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Chile

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BASIC STATISTICS OF CHILE (2006 UNLESS NOTED)

THE LAND

Area (thousands sq. km)	756.6

POPULATION

Total (millions)	16.4
Inhabitants per sq. km	21.7
Net average annual increase over previous 10 years, per cent	1.2

EMPLOYMENT

Total employment (thousands)	6 272
In %: Agriculture	12.6
Mining	1.4
Manufacturing	13.3
Services	72.7
Unemployment rate (in per cent)	7.8

GROSS DOMESTIC PRODUCT (GDP)

GDP at current prices and current exchange rate (USD billion)	145.8
Per capita GDP at current prices and market exchange rate (USD)	8 875
Average annual real growth over previous 5 years (in %)	4.3
In % of GDP : Agriculture	3.9
Mining	23.0
Manufacturing	12.8
Services	54.8

INVESTMENT

Gross fixed capital formation (GFCF) in % of GDP	24.1
Average annual real growth over previous 5 years (in %)	8.4

PUBLIC FINANCES (% OF GDP)

Revenue	27.9
Primary balance	8.6
Nominal balance	7.9
Consolidated net debt (central government and central bank)	–6.1

INDICATORS OF LIVING STANDARDS

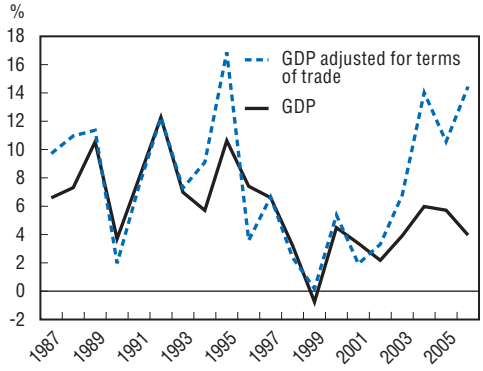
Internet users per 100 inhabitants	25
Doctors per 1 000 inhabitants (2003)	1.1
Infant mortality per 1 000 live births (2005)	8
Income inequality (Gini coefficient)	0.54
Poverty incidence (national poverty line)	13.7

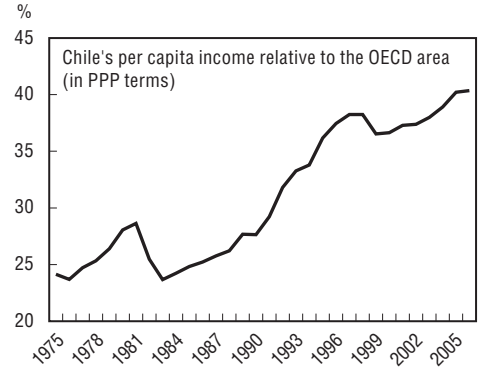
FOREIGN TRADE

Exports of goods (USD billion)	58.1
In % of GDP	39.8
Average annual growth over previous 5 years (%)	26.0
Copper exports in % of total exports	55.6
Imports of goods (USD billion)	35.9
In % of GDP	24.6
Average annual growth over previous 5 years (%)	16.9

Executive summary

Chile remains a strong performer. Exemplary macroeconomic management continues to deliver robust public finances and low, albeit recently rising, inflation. Structural reform is ongoing, ranging from improvements in regulation to a strengthening of social protection, including through much-needed further pension reform. Growth is on the rise, contributing to further reducing Chile's still sizeable income gap relative to the OECD area, reducing poverty and improving income distribution. Sustaining productivity-driven growth over the long term through continued structural reform initiatives is Chile's overarching policy challenge.





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Macroeconomic management has been laudable and is building on past achievements. *The policy setting combining rules-based fiscal management, inflation targeting and a flexible exchange rate is serving the economy well in a period of unprecedented strength in the price of copper. A Fiscal Responsibility Law was approved in 2006 and tightened the fiscal framework further. The structural budget surplus target will be reduced from 2008 without endangering macroeconomic equilibrium in the short run. The pension reform that is under discussion is well thought out, but its effect on retirement saving will depend to a large extent on the strength of the incentives to be introduced by the reform.*

The planned hike in government-funded social services needs to be cost-effective to yield commensurate improvements in social outcomes. *Comfortable public finances have laid the groundwork for further policy action to enhance social development, especially in the areas of education, health care and housing. There remains much room for raising efficiency in service delivery to the level of the best performers in the OECD area, especially in education. To this end, steps need to be taken to narrow the disparities in performance that currently exist among students with varying socio-economic backgrounds, to improve risk-sharing among health insurers and to continue to close the housing deficit facing the poorest segments of society.*

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There is much scope for tackling informality in the labour market and in the business sector. *Enforcement has been stepped up, encouraging compliance with the tax code and business regulations. But product market regulations can be made less burdensome on enterprises, especially SMEs, and employment protection legislation (at least for indefinite contracts) more flexible. Low human capital remains an important obstacle to reducing labour informality. Therefore, policy initiatives to improve the skills of the labour force through the education system, and labour training and skill certification would also contribute to reducing informality in the future. It will be important to assess the beneficial effects of more comprehensive social protection (and the costs it entails) on the incentives for formality facing those who might otherwise work informally.*

Efforts should be made to raise labour force participation further, especially among females and youths. *This is important for lifting the economy's long-term growth potential, reducing poverty and improving income distribution. Participation is low for females and is trending down for youths, due essentially to rising school enrolment. Policy action to encourage more flexible arrangements in working-time allocation and to facilitate access to affordable child care would provide an alternative for mothers with young children to reconcile household and work responsibilities. By making the hiring of youths more attractive, the subsidy programme proposed in the context of pension reform would also help to increase formal labour force participation.*

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Assessment and recommendations

Chile's overarching policy challenge continues to be to reduce its income gap relative to the OECD area at a more sustained pace

Chile remains a strong performer, even in relation to the most successful comparator countries in the OECD area. Activity lost some vigour in 2006, predominantly because of one-off factors, rather than structural weaknesses, but rebounded in earnest in the first half of 2007. Macroeconomic management continues to be exemplary, delivering falling public indebtedness, growth around potential and low, albeit recently rising, inflation. The rules-based policy framework – combining instruments for saving revenue windfalls related to business and copper-price cycles with inflation targeting and exchange-rate flexibility – is serving the economy well in a period of unprecedented strength in the price of copper. As a result, economic activity is now much more resilient to the vagaries of commodity prices than in previous cycles. The authorities intend to build on these achievements with an ambitious structural reform programme, ranging from regulatory matters to a strengthening of social protection, including through much-needed further enhancements to social security. The OECD concurs with the authorities' view that a combination of sound macroeconomic policies and additional progress in structural reform is essential for raising and maintaining the economy's growth potential over the longer term so as to achieve a faster reduction in the income gap that still exists between Chile and the OECD area. Sustaining high growth in the future is also important for a further reduction in poverty and can do much to improve Chile's still very skewed income distribution.

Macroeconomic management has been laudable and is building on previous achievements

The copper-price boom of the last three years has put the fiscal policy framework to the test. The structural budget surplus rule inaugurated in 2001 has called for maintenance of a surplus of 1% of GDP net of the effects on public finances of business and copper-price cycles. Continued adherence to the fiscal rule – despite the change in government in 2006 – has allowed the authorities to avoid a pro-cyclical stance in an environment of historically high copper prices, while delivering a reduction in public indebtedness (central bank and central government) and recently moving to a net creditor position. Buttressed by fiscal prudence, monetary policy continues to be conducted within a framework combining inflation targeting and a floating exchange-rate regime. This policy setting has anchored inflation expectations within the target range of 2 to 4%. At end-2006, the Central Bank of

Chile (BCCh) revised its 2001 guidelines on the operation of the inflation-targeting regime, re-emphasising the mid-point of the 2 to 4% target range as its central target and lengthening its policy horizon to 2 years from 1 to 2 years. This is a sensible policy move for a central bank that had achieved inflation stability around its desired level. The Capital Market Law II was finally approved in March 2007, having been discussed in Congress for nearly four years. The law paves the way for further financial deepening, including through the development of risk capital. *This macroeconomic policy setting is serving Chile extremely well and should therefore be maintained. An important challenge is to strengthen the provision of social services in ways that maintain a lean public sector in a low-tax, low-debt environment.*

The reduction of the structural budget surplus target is consistent with macroeconomic stability and the improved public finances

The level of the structural budget surplus to be targeted by the government from 2008 was reduced from 1 to 0.5% of GDP in May 2007. The additional funds available as a result of the reduction in the target are set to finance additional spending on education. As discussed in the *2005 Survey*, this policy move is understandable against a background of an improving net asset position and the need to satisfy multiple social demands in a country of Chile's income level. On the basis of official estimates, the associated fiscal impulse is compatible with macroeconomic stability. *As in the case of any spending increase, careful attention should be paid to the effectiveness of the outlays financed by the funds released as a result of the reduction in the budget surplus target.*

The Fiscal Responsibility Law enacted in 2006 is further improving the policy framework

The Fiscal Responsibility Law, enacted in 2006, embeds the fiscal rule in law and introduces explicit formal mechanisms for using fiscal savings for funding future liabilities, capitalising the central bank and dealing with pension-related contingencies. At the same time, the methodology for calculating the structural budget target has been adjusted to include revenue from molybdenum – a metal which Chile exports in large amounts and whose price has been volatile in international markets, thereby affecting public finances – and those accruing from the taxation of privately-owned mining companies. These moves are consistent with the analysis presented in the *2005 Survey*. While the Law is a sensible instrument for pre-funding pension-related and other contingencies within the confines of the fiscal rule, there are options for strengthening it further. *The fiscal savings accumulated in the Pensions Reserve Fund should continue to be invested abroad during the 10-year period in which withdrawals cannot be made as a means of further insulating the domestic economy from commodity-price volatility*. With regard to the recapitalisation of the central bank, whose net worth is estimated at –1.4% of GDP in 2008, *benefiting from the favourable fiscal situation, the limit set by law (0.5% of GDP per year for 5 years) on transfers from the Treasury could be increased to allow for full recapitalisation at a swifter pace.*

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Much-needed complementary pension reform is under way

A pension reform package, submitted to Congress in 2006, aims at addressing the main shortcomings of the current pension system: low coverage (given that only about 55% of the labour force currently contributes to a pension fund) and low density of contributions (because one-half of those workers who do contribute do so for less than 60% of their working lives). Once approved by Congress, the new system will combine solidarity pensions for individuals whose retirement income falls below a certain threshold, possibly because of a patchy contribution history, with capped, top-up payments to encourage workers who have accumulated enough capital to finance a pension above the minimum threshold to save more for retirement. Instead, the current system guarantees a minimum pension only for those workers who have contributed to a pension fund for a long enough period of time and does not provide any particular incentive for retirement saving. The proposed scheme therefore improves upon the current one, because it encourages savings through capped, top-up payments while maintaining social protection for the poor. Once it is fully implemented, the cost of the reform is estimated at about 1% of GDP per year.

Individuals' responses to the proposed incentives for retirement saving will be an important determinant of the success of the reform

The strength of the incentives for saving introduced in the proposed pension scheme depends not only on the level of the solidarity pension, but also on the cap and marginal tax-equivalent rate on the top-up payments. An increase in the value of the solidarity pension above that envisaged in the reform proposal (about one-half of the minimum wage) would bolster social protection for the elderly, but it would also weaken the incentive embedded in the reform for low-income workers to save for retirement, especially those who have never done so. Moreover, in the proposed system, the implicit withdrawal rate associated with the top-up payment is equivalent to 37.5% tax on contributory pensions. A flat, uncapped, top-up scheme would instead provide sharper incentives for saving but would also probably be prohibitively costly. At the same time, it should be recognised that it is not easy to offer generous incentives for saving for retirement at a time when other elements of social protection are being enhanced. This includes the introduction of unemployment insurance in 2002 – which is funded mostly by employers and employees and therefore entails a low fiscal cost – and the ongoing broadening of the array of publicly funded health-care entitlements through the implementation of AUGE, a plan introduced in 2002 to ensure treatment for a number of pre-selected pathologies for all individuals, regardless of whether they are insured privately or publicly. To compensate, the pension reform introduces fiscal incentives for formal labour force participation among youths and a government subsidy of 15% of the amount saved voluntarily for retirement for workers with formal jobs. Of course, gauging the appropriateness of the proposed incentives for saving for retirement is essentially an empirical question. But pitfalls could be avoided. *The level of the solidarity pension should not be raised further in relation to the minimum wage, and effort should be made to raise awareness among the targeted population of the benefits of preparing for old age and, if needed, for enhancing the incentives for saving by recalibrating the value of the cap and the marginal tax rate on the top-up payments, public finances permitting.*

Contributions to a pension fund and health insurance are to become compulsory for own-account workers

Making social security contributions compulsory for own-account workers, who represent over one-quarter of employment, is important, because currently only 5% of these workers contribute to a pension fund. The problem is that these workers may either not be able to afford to save for retirement or perceive it as too costly in relation to the benefit of old-age protection, which creates incentives for non-compliance. While efforts to bring "hard-to-tax" groups, such as independent workers, into the tax net are commendable, they are not free of enforcement costs, which will need to be carefully assessed. Therefore, *enforcement should be stepped up further, and the perceived cost of social protection for independent workers should be assessed through regular surveys, which would allow the authorities to gauge the target population's willingness and capacity to pay*. Likewise, the reform proposal makes health insurance compulsory for independent workers 10 years after approval of the reform package. Because health insurance coverage is now already high for the population as a whole, including own-account workers, *health insurance could be made compulsory at the same time and following the same timeframe for implementation as in the case of pension contributions*.

Options are being proposed for encouraging retirement saving by women and for enhancing competition among pension-fund managers

The proposed pension reform package also bolsters incentives for workers whose attachment to the labour market is weakest, such as women and youths, to save for retirement. If approved, a year's contribution based on earnings at the minimum wage level will be paid into a mother's pension fund for every live birth, and life insurance premia will be reduced for women on account of their longer life expectancy. *Measures to ensure gender equality are welcome but should not aim at overcorrecting an imbalance that currently exists by giving women a higher retirement income than those accruing to men with the same contribution history, accounting for life expectancy differentials. It would also be desirable to eliminate in a phased manner the gap that currently exists in the case of contributory pensions between the retirement age for men (65 years) and women (60 years), given that the solidarity pension is paid at age 65 for both males and females*. This would also be consistent with pension reform trends in the OECD area. With regards to pension-fund management, the reform proposal includes measures for fostering competition among fund managers, such as through a bidding process for new affiliates, with the aim of further reducing administrative costs. Also, the cap on the share of assets under management that can be invested abroad is to be raised from 45 to 80%. There appears to be considerable agreement between fund managers and the authorities on the merits of reform in this area. *Greater flexibility in pension-fund investment decisions could be permitted, including through the complete removal of the ceiling on asset holdings abroad*. This would be consistent with greater reliance on prudential regulations for portfolio management issued by the industry regulator, rather than on mandated quantitative restrictions, as is currently the case.

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The tax system is being improved to remove obstacles to financial deepening and to business-sector development

The Chilean tax system is modern, and its administration is efficient. But payment of a stamp duty on credit and loan transactions, as well as on the issuance of fixed-income securities, is inefficient. It is particularly onerous for small, family-run businesses, whose access to credit is typically costlier than for their larger counterparts. In the past, the stamp duty discouraged competition in the banking sector, because loan renegotiations were liable for taxation, as in the case of new contracts. The authorities recognise these drawbacks. A gradual reduction in the statutory rate, which varies according to the maturity of contracts, is therefore planned through 2009. This initiative is welcome, and the time is ripe for making headway in this policy area. *The authorities are right to implement it in a gradual manner, because revenue accruing from stamp duties accounted for about 0.6% of GDP in 2006 and because the revenue foregone and the benefits of reform in terms of efficiency gains are difficult to quantify*. Additional recent measures to improve the efficiency of the tax system have focused on simplifying procedures and on creating incentives for innovative activities.

Social spending must be sustainable over time

Government outlays on social programmes are set to rise over the medium term in a manner consistent with the structural budget surplus rule. There is scope for raising budgetary appropriations, because publicly financed spending on education and health care currently accounts for a considerably lower share of GDP than in the OECD area. This is essentially because total spending – public and private – is heavily tilted towards private components in Chile, especially in health care and tertiary education. Emphasis on housing policies is also justified, given the need to gradually close Chile's still sizeable, albeit declining, housing deficit. The fact that conventional health output indicators, such as mortality and immunisation rates, are already good in comparison with OECD benchmarks suggests that health services are provided reasonably efficiently. But this is by no means the case for education. To illustrate, the efficiency analysis reported in this *Survey* suggests that Chile could improve education outcomes, measured by PISA scores, by some 16% while holding the current level of spending and non-policy factors unchanged, if it were as efficient in the provision of these services as the best performers in the OECD area. It is also important to bear in mind that, for an increment in public spending levels to deliver the expected improvements in social indicators, it needs to be sustained over time. *It is therefore essential for Chile to maintain its commitment to the structural budget surplus rule, so as to ensure the sustainability of the planned increases in social spending over the longer term.*

The hike in government-funded social services needs to be cost-effective to yield commensurate improvements in social outcomes

The planned increase in social spending will need to be carried out in a cost-efficient manner to make sure that it yields commensurate improvements in social outcomes. In *education*, the voucher scheme introduced in the early 1980s to finance municipal provision

has yet to enhance performance through increased competition among schools and to narrow the quality differentials that currently exist among public, subsidised private and fully private schools. The fact that performance varies predominantly across, rather than within, the three types of schools is in contrast with the experience of OECD countries, where differences in performance occur mainly within, rather than across, schools. A differentiated voucher scheme is being designed to increase funding for the schools catering for students from disadvantaged social backgrounds and to enhance managerial autonomy for the best performing schools. In *health care*, despite recent reform, private insurers still have considerable room for cream-skimming; as a result, risk is concentrated within the public insurance and service-delivery systems, which places a financial burden on the public budget. The range of pathologies covered by AUGE is being broadened. In the case of *housing*, the quantitative deficit is being reduced, but the quality of subsidised housing needs to be enhanced. Policy effort is re-focusing the subsidy programme towards the lowest income quintile of the population. To tackle remaining deficiencies in the provision of social services, *efforts will need to be stepped up to: i) narrow the disparities in performance that currently exist among schools with students from varying backgrounds through the differentiated voucher scheme and additional initiatives to improve the quality of teaching and management; ii) improve risk sharing among private and public health insurers, while increasing the coverage of health insurance to a broader variety of pathologies through AUGE; and iii) continue to close the housing deficit, while enhancing the quality of subsidised housing units and their surrounding neighbourhoods for the poorest segments of society*.

There is much scope for tackling informality in the labour market

International comparisons are difficult, but labour informality is thought to be less pervasive in Chile than in most of Latin America and to have fallen gradually over time. Nevertheless, slightly more than 20% of the Chilean population aged 15 years and above and working at least 20 hours per week did not have a formal labour contract in 2006. International experience suggests that informality typically arises from disincentives associated with restrictive employment protection legislation (EPL), which is burdensome on businesses, especially small and medium-sized enterprises. Therefore, making the labour code more flexible would help to reduce informality. In this regard, as recommended in the *2005 Survey*, *some modification of regulations on full-time work might be useful to clarify that working time can be cut by any number of hours, and not necessarily by as much as one-third, a limit that currently triggers some special provisions*. Recent changes in the legislation on labour dispatching and sub-contracting have strengthened the regulatory framework by eliminating legal uncertainties that had discouraged the use of these more flexible labour contracts. While it is too soon to evaluate the impact of these recent measures, they may contribute to labour formalisation.

Low human capital deters formalisation, leaving ample room for policy action

Empirical evidence based on Chilean household survey data suggests that low human capital is one of the main obstacles to lowering labour informality in Chile. Employers may find it prohibitively expensive to hire unskilled workers formally, because their

productivity is low in relation to the burden of compliance with regulations and the tax code, which adds to direct costs. Policy effort to improve the skills of the labour force, recommended elsewhere in this *Survey* and in previous ones, is therefore likely to also contribute to reducing informality over the longer term. This can be done through the education system, given that Chile still lags considerably behind the OECD area in terms of student performance, at least on the basis of standardised tests. The authorities are well aware that policy action in this area is of paramount importance to break the vicious circle of low human capital, informality and low income that perpetuates Chile's extant income disparities, despite years of sustained economic growth. For those already in the workforce, training should be more readily available. The main shortcoming of the current tax break-financed schemes is that they fail to reach informal workers. *The grants available for small enterprises could be extended to those that currently operate informally, provided that support is conditional on the recipient enterprise taking the necessary steps to formalise itself. This option could be complemented with an expansion of the skill-certification system*, which currently exists for particular skills, such as installation work and tourism, for example, but not as yet for the most common occupations in industry and construction, or in the most dynamic sectors.

Chile's product-market regulations could be more investment-friendly

While stricter enforcement of the tax code and regulations can do much to reduce business informality, it is also important to recognize economic factors that create incentives for many activities to go unregistered. Around 40-50% of Chilean enterprises are deemed to operate informally, even though its product market regulations (PMR) are reasonably pro-competition. But, on the basis of the OECD PMR indicator (reported in the *2003 Survey*), administrative regulation is more restrictive in Chile than in the OECD area, and the country's indicators of barriers to entrepreneurship and regulatory burdens on start-ups are sub-par by OECD standards. This is consistent with the 2005 *Doing Business* indicators calculated by the World Bank, according to which the cost of obtaining licenses as a share of per capita income is high in Chile in relation to OECD comparators. So is the cost of closing businesses. Progress has been made at the central government level in streamlining the necessary procedures for business registration and closures. Recent measures are making it easier for small enterprises to register electronically as taxpayers, to file and pay taxes and to obtain general information on how to close a business, among others. But the municipal governments, which have regulatory purview over several aspects of business activity, are lagging. *Procedures for opening and closing businesses should be streamlined and their costs reduced further. In particular, coordination needs to be enhanced between the central government and the municipalities, and between them and health, safety and other agencies.*

Tax evasion is coming down due to improved tax administration and higher enforcement

Cognizant that the tax authorities have a role to play in tackling business informality, policy effort has been focused on making tax administration more taxpayer-friendly, while upgrading its enforcement capabilities. This strategy is bearing fruit, and tax compliance

appears to be increasing over time: nearly 11% of the potential tax base of the value added tax is estimated to have been undeclared in 2005, relative to nearly 24% in 1998. Chile's tax code does not appear to be particularly burdensome on businesses. The tax-to-GDP ratio is about 17% of GDP, and reliance on the VAT – which accounts for nearly 44% of revenue – discourages non-compliance as a result of the invoice-credit mechanism used for collection: a registered taxpayer has a clear incentive to purchase intermediate goods and inputs from another registered taxpayer to obtain a credit for these purchases. The VAT is also uniformly rated at 19%, with few exemptions. But compliance costs may be particularly onerous for small enterprises. Currently, there is no estimate of such costs in Chile, but international experience suggests that they should not be underestimated. Undoubtedly, progress has been made in recent years to reduce the time and cost of paying taxes through e-government, including electronic invoicing and tax pre-filing services, as well as simplified accounting requirements for SMEs. But *some additional effort should be made by the tax authority to estimate VAT compliance costs, especially for SMEs. The authorities should continue to work towards making the tax system more taxpayer-friendly to small businesses.*

Raising female labour force participation should be a priority

By fostering labour force participation among the groups that are lagging behind, such as females, policy can contribute to raising the economy's long-term growth potential, and reducing poverty and income inequality. Although female labour force participation has risen steadily since 1990, there remains a sizeable gender gap in labour supply. The effective gender gap is higher still when part-time work is taken into account, as it tends to be more prevalent among women. There are cultural reasons why women may prefer to focus on household responsibilities, which appear to be particularly strong in Chile, rather than to engage in gainful activities outside the home. But there is scope for policy action in this area. Recent initiatives, such as the implementation of full-day schooling in municipal and subsidised private schools, which started in 1997, and the extension of compulsory schooling to lower-secondary education in 2003 should encourage female participation. This is because the empirical evidence provided in this *Survey* on the basis of household survey data suggests that the presence of young children in the household is a powerful impediment to labour supply among prime-age females. Policy options for encouraging more flexible arrangements in the allocation of working time would provide an alternative for mothers with young children to reconcile household and work responsibilities. This is important, because the prevalence of part-time work among females is below the OECD area average. *In this regard, the recommendation made to clarify regulations so that working time can be reduced by any number of hours, and not necessarily by as much as one-third, would go in the direction of fostering female participation, in addition to encouraging labour formalisation, as noted above.*

An increase in the availability of affordable child care may also encourage participation among other household members

Mothers with younger children, especially those in low-pay jobs, are discouraged from working outside the home when they have to pay for child care out of pocket. The supply

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of publicly funded care for young children has increased significantly over the years, but there is considerable pent-up demand for these services. Of course, the net economic benefit of reducing the costs of child care borne by parents depends ultimately on the labour-supply response. Indeed, the payoff from policy action in this area could go far beyond the increase in participation among prime-age females, because it would unlock opportunities for other household members to engage in gainful occupations outside the home. This is the case of the elderly, for example, whose labour supply is discouraged by the presence of young children in the household. Older household members can be relied upon for child care through informal intra-household arrangements. This is also the case of female youths, whose participation is discouraged by the presence of young children in the household, which suggests that they too contribute to informal child care. The fact that such informal arrangements are likely to change when the younger cohorts, who have higher participation rates, grow older also needs to be taken into account. Therefore, *public finances permitting and taking into account the varying labour-supply responses, measures could be considered for further facilitating access to child care so as to encourage female labour supply*.

There are options for reconciling youth labour force participation with rising educational attainment

The proposed social-security reform also aims at encouraging participation among youths. There is considerable scope for policy action in this area, because youth participation is not only low in Chile in comparison with the OECD average, but it is also trending down, especially for males, while remaining fairly low and stable over the years for young females. The authorities envisage the introduction of a sizeable pension contribution subsidy for individuals aged 18-35 earning less than 1.5 times the minimum wage on their first jobs – that is, probably those with low educational attainment – as a means of making paid employment attractive to these individuals. By making the hiring of youths more attractive, the subsidy programme would also contribute to removing financial constraints on human capital accumulation and encourage those youngsters who are not studying nor working to engage in some sort of paid occupation that may enhance their earnings capacity in the future. The share of youths who are neither studying nor working is coming down, but it remains comparatively high for females. Empirical evidence shows that educational attainment is one of the most powerful determinants of participation, for both men and women. Therefore, *policies that foster human capital accumulation for the population as a whole should be given priority, because they would contribute to reducing the remaining gender gap in labour supply and employment*.

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Chapter 1

Fostering long-term growth: The challenges ahead

Chile's economic performance remains strong. Growth has picked up since 2003, and the economy is well equipped to weather the effects of copper-price cycles. This is due to a strong policy setting combining a freely floating exchange rate, inflation targeting and a fiscal rule that has delivered a gradual decline in public indebtedness to a net creditor position. Sustained growth over the longer term will be essential for reducing Chile's still sizeable income gap with respect to the OECD area, reducing poverty and improving income distribution. But more will need to be done to make sure that this convergence process is maintained in the future, especially through sustained policy reform initiatives that can lift the economy's long-term growth potential. This overarching policy challenge can be addressed through action dealing with three main structural areas: efficiency of government spending on selected social programmes, informality in the labour market and the business sector, and labour force participation among underrepresented groups, females and youths in particular. Initiatives in these policy domains reinforce each other and complement those highlighted in the 2005 Survey, which focused on options for boosting the economy's business innovation potential and for strengthening the regulatory framework in network industries.

Chile's growth performance remains strong, underpinned by sound macroeconomic management and an extraordinarily favourable external environment. Fiscal policy has been guided by continued adherence to the fiscal rule, leading to a gradual reduction in public indebtedness and allowing monetary policy to be conducted in a counter-cyclical manner within a framework that combines inflation targeting with exchange-rate flexibility. At the same time, the institutional framework for macroeconomic policy-making is being enhanced, and much-needed improvements in the pension system are being pursued. The comfortable fiscal situation is allowing the authorities to hike public spending on selected social programmes in support of their social development priorities.

As argued in the *2005 Survey* (OECD, 2005), years of continued high growth – except for a cyclical slowdown during 1998-2003 – have allowed Chile to gradually reduce its still-sizeable income gap relative to the OECD area. But more will need to be done to make sure that this convergence process is sustained over the longer term, especially through policy initiatives that can lift the economy's long-term growth potential. This remains Chile's overarching policy challenge. To this end, this *Survey* focuses on three main structural areas: efficiency of government spending on selected social programmes, informality in the labour market and the business sector, and labour force participation among females and youths. Policies aimed at removing the main obstacles to growth in these selected areas will complement and reinforce those recommended in the *2005 Survey*, which focused on innovation and regulation as important structural areas for reform, areas that remain in need of continuing attention from policy-makers.

Recent developments: The copper-price upswing and economic growth

The economy is weathering the effects of the current copper price upswing exceedingly well, as discussed in Chapter 2. The cumulative terms-of-trade gains since 2003 have been unprecedented over the last half-century. The price of copper – Chile's main export item – rose by almost 350% during 2003-06. These very supportive external conditions have undoubtedly contributed to Chile's recovery from the 1998-2003 slowdown, as noted in the *2005 Survey*. As is generally the case in periods of sustained terms-of-trade booms, the rate of growth of GDP has been outpaced by that of command GDP (corrected for terms-of-trade fluctuations) (Figure 1.1). But the impact on GDP growth of the current copper-price upsurge appears to be less pronounced than during previous cycles. In particular, business-cycle volatility, defined as a moving average of the standard deviation of the output gap, has trended gradually down, especially since late 2000. This suggests that the economy is now better placed to withstand terms-of-trade shocks, an achievement that owes much to the institutional reforms, including the introduction of the structural budget surplus rule in 2001 and the conduct of monetary policy in a floating exchange-rate regime since September 1999. As noted in previous *Surveys*, this policy framework is appropriate for a small, open, resource-based economy, where the effect on public finances of terms-of-trade shocks is most often stronger than that of the business cycle.

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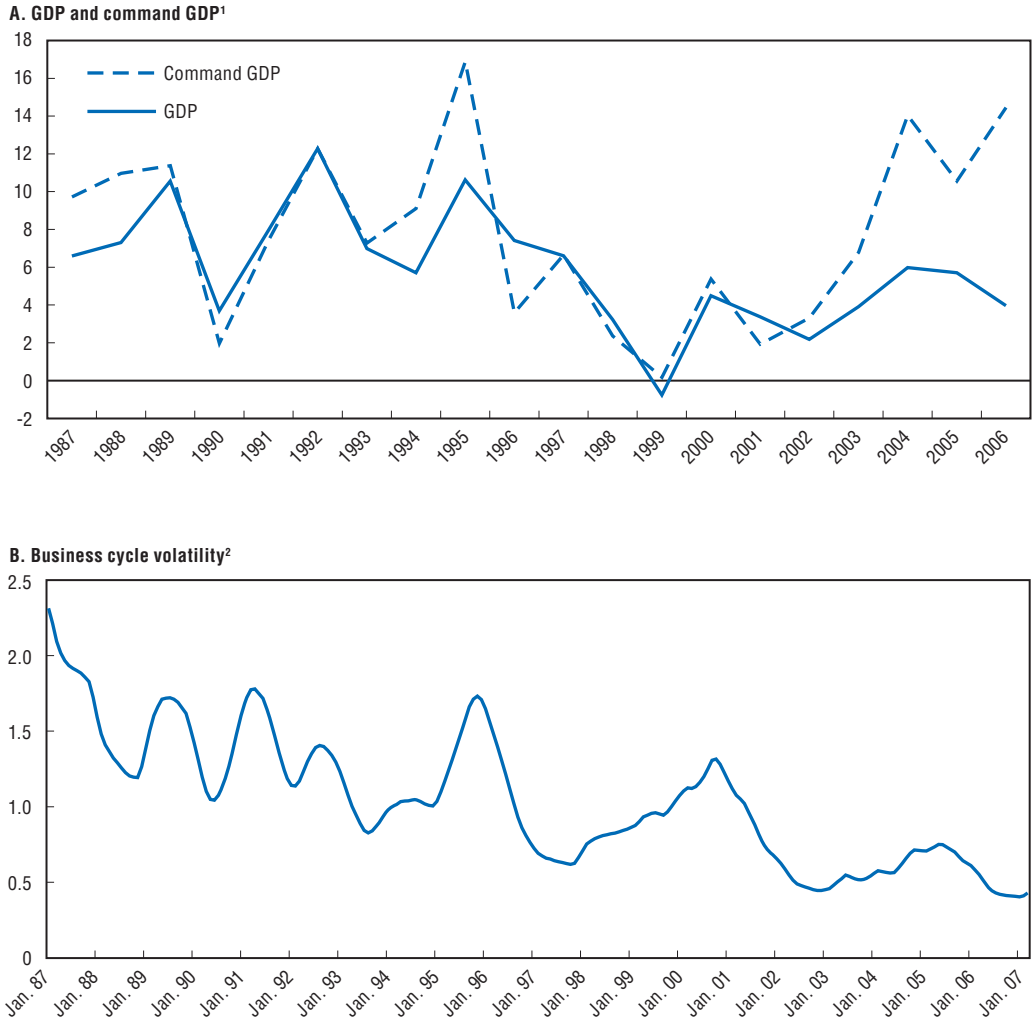
Figure 1.1. **GDP and national income: The effect of terms-of-trade volatility, 1987-2007**



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1. Command GDP adjusts GDP by deflating exports by the import price deflator.
2. Business cycle volatility is defined as the 12-month moving average of the standard deviation (calculated over 12-months) of the output gap, defined as the per cent difference between the seasonally adjusted IMACEC index and its trend.

Source: Ministry of Finance, Central Bank of Chile and OECD calculations.

The event analysis carried out in Box 1.1 is illustrative of the Chilean economy's response to copper-price volatility. The latest copper-price boom, which started in 2003, has been much stronger and longer than the previous ones covered by the event analysis (1979-80 and 1987-89). Yet, private consumption and investment have remained stable, unlike in the previous cycles. Credit also remained impervious to the boom, a trend that also characterised the previous cycle (1987-89). Moreover, the effect of the copper-price appreciation on the real effective exchange rate has been less pronounced in the latest cycle than in the previous one, despite the much larger magnitude of the current price hikes. Finally, of particular interest is the stability of government consumption in comparison with the previous upswings.

Table 1.1. **Basic macroeconomic indicators, 2001-06: A summary**[1]

	2001	2002	2003	2004	2005	2006
GDP growth rate (real, in per cent)	3.4	2.2	4.0	6.0	5.7	4.0
Nominal budget balance (in per cent of GDP)[2]	–0.5	–1.2	–0.4	2.1	4.7	7.9
Current account balance (in per cent of GDP)	–1.6	–0.9	–1.1	2.2	1.1	3.6
Exchange rate (CLP per USD, period average)	634.9	688.9	691.4	609.5	559.8	530.3
CPI inflation (IPC, in per cent, end-of-period)	2.6	2.8	1.1	2.4	3.7	2.6
Unemployment rate (in per cent)	9.9	9.8	9.5	10.0	9.2	7.8

1. Based on Table 2.1.
2. Refers to the general government.
Source: Central Bank of Chile, INE and Ministry of Finance.

Box 1.1. **The macroeconomic response to copper price booms**

The response of the Chilean economy to the copper-price cycle can be illustrated by an event analysis. Accordingly, a chronology of such cycles is established, and the behaviour of selected macroeconomic aggregates can be described over the cycle. The dating of a cycle was carried out as follows: it begins in the year when the nominal price of copper rises relative to the previous year by at least 10%, provided that a cumulative increment of at least 60% was maintained over the subsequent two-year period, and ends when the cumulative change over two years falls by at least 60%. A window of at least one year separates cycles. Based on this definition, three copper-price upswings could be identified over the period spanning 1975-2006: 1979-80, 1987-89 and 2003-06. No downswing was detected using a symmetrical definition of copper-price declines.

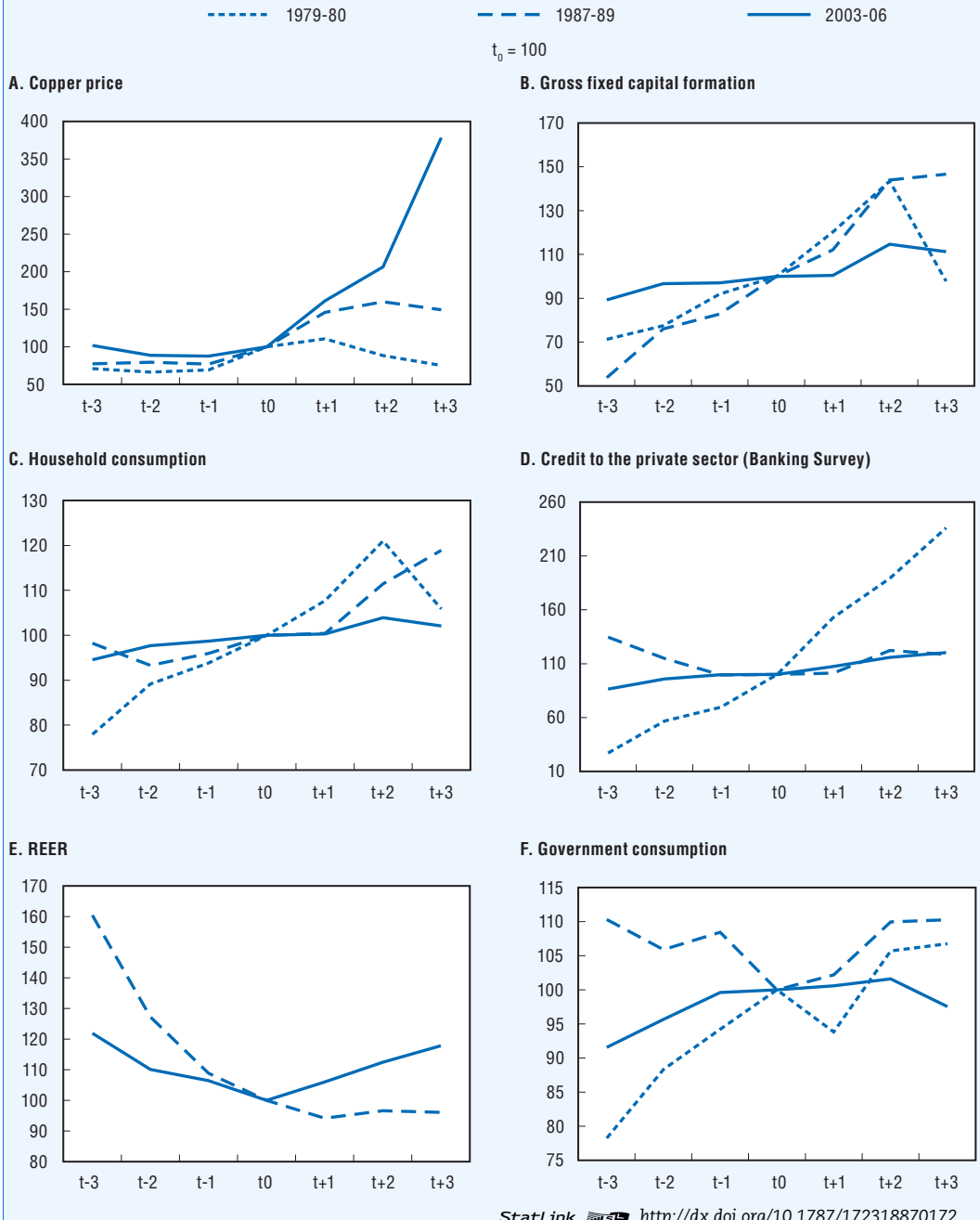
The event analysis is depicted in Figure 1.2. The latest copper-price upswing stands out in comparison with the previous two due to its strength and duration. In both previous cycles, an inflexion point had been reached one or two years into the cycle, whereas prices continued to rise during 2006, hence three years into the latest upswing. The pro-cyclicality of investment and household consumption is noticeable in the two previous upswings, and, unlike the current cycle, the investment upsurges lost momentum two years into the cycle. Credit to the private sector displayed comparable trends in the current upswing and during that of 1987-89. The expansion in private credit during the 1979-80 upswing contributed to the banking crisis of 1981-82, when expansionary policies were unsustainable in a fixed exchange-rate setting. The real effective exchange rate rose in the most recent upswing by less than in the previous ones. Finally, the rise in government consumption was more modest than in the previous upswings, reflecting the measures that have been put in place since 2001 to insulate the public finances from copper-price volatility through a structural budget surplus rule.

Recent trends in domestic demand growth (discussed in more detail in Chapter 2 and summarised in Table 1.1), especially the recovery in investment, bode well for lifting the economy's growth potential. Private consumption has grown briskly, but by less than in previous episodes of large terms-of-trade gains. Exports have soared on the back of significant price hikes, but not at the same clip as import demand in response to the vibrancy of private consumption and investment growth (Figure 1.3). The contribution of government consumption to growth has been modest, in line with continued adherence to the structural budget surplus rule. Following a period of deceleration, notably through 2002, private investment has risen to the levels observed during the high-growth period of 1985-97. As noted below, maintenance of a comparatively high investment rate

Box 1.1. **The macroeconomic response to copper price booms** *(cont.)*

Figure 1.2. **Event analysis: Selected indicators over copper-price cycles**[1]

t_0 = 1979 in upswing 1, 1987 in upswing 2 and 2003 in upswing 3

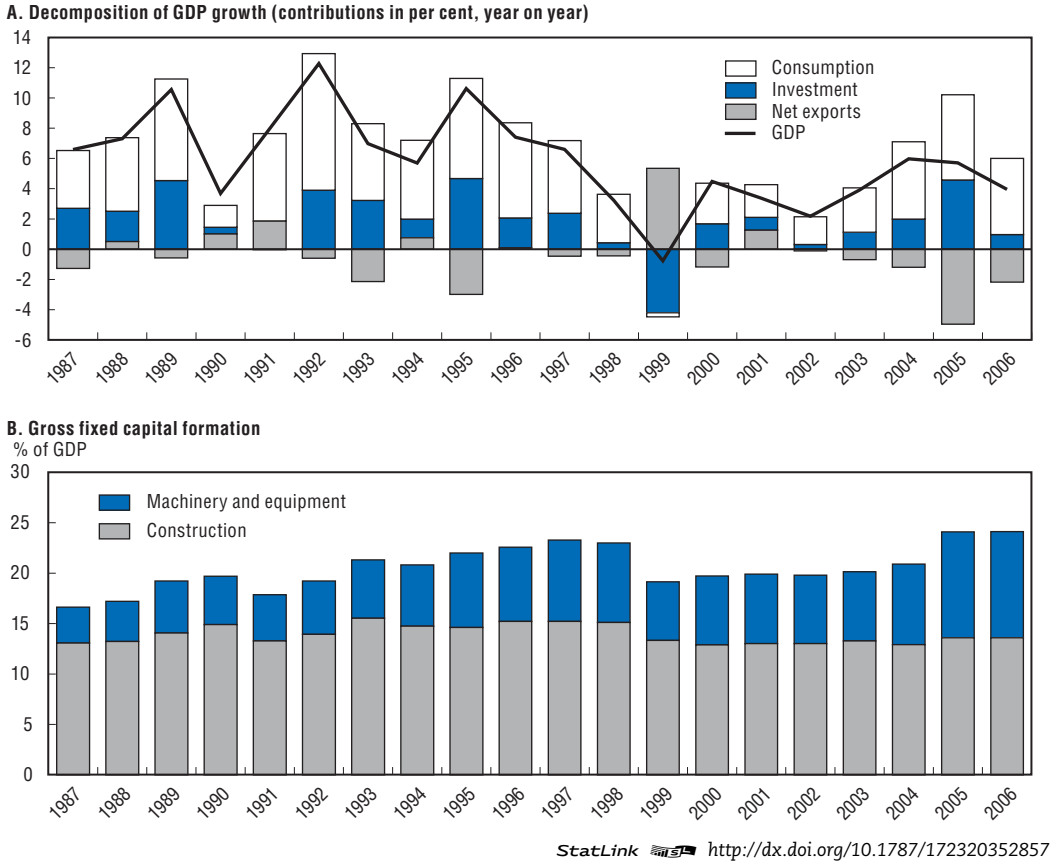


StatLink http://dx.doi.org/10.1787/172318870172

1. The nominal variables were deflated by the GDP deflator. An increase in the REER denotes an appreciation of the *peso*.

Source: IMF (*International Financial Statistics*) and OECD calculations.

Figure 1.3. **Trends in growth and investment, 1987-2006**



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Source: Central Bank of Chile and OECD calculations.

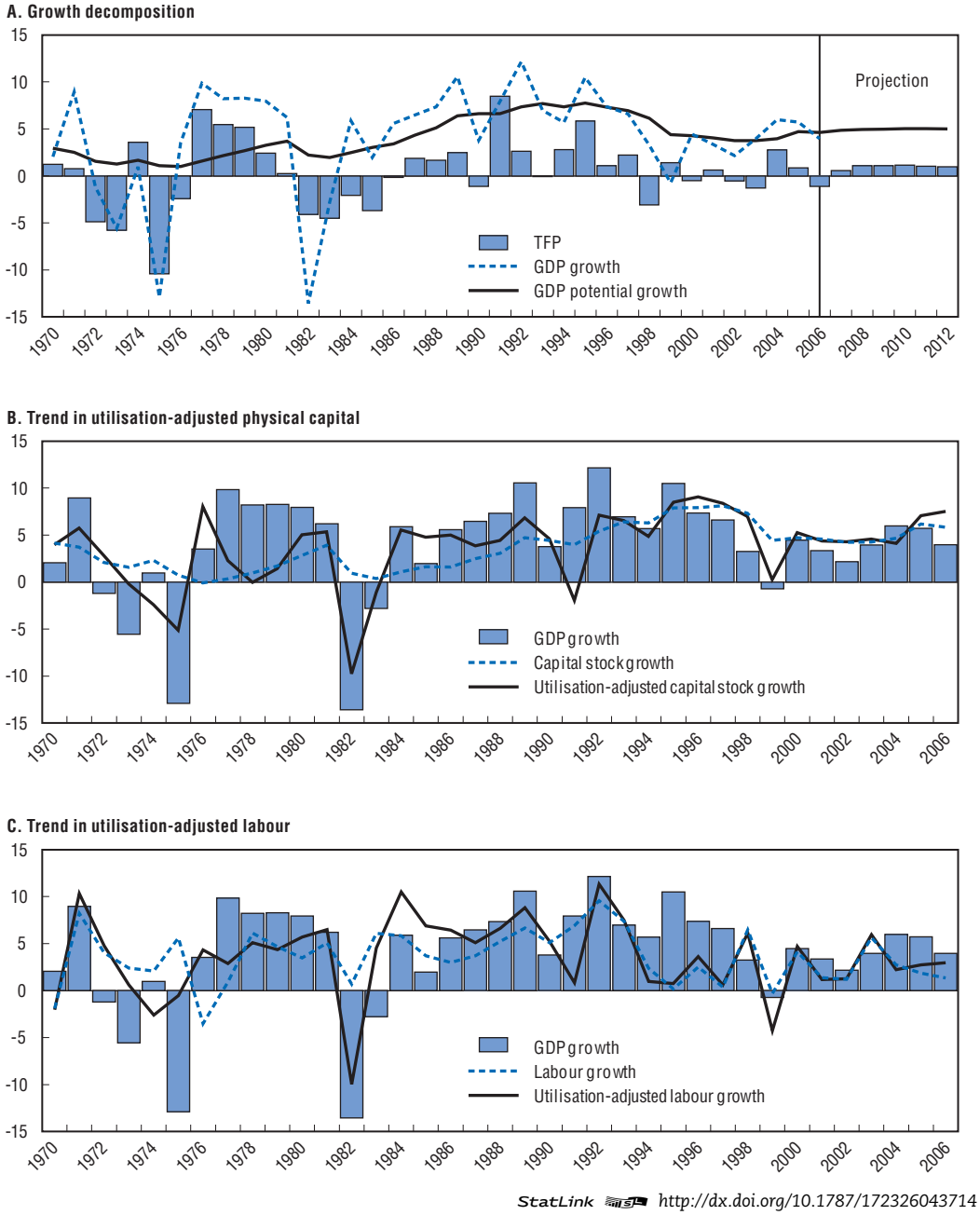
will be essential for sustaining the economy's growth potential over the medium term in view of less favourable trends in labour utilisation and in the absence of faster productivity growth.

Long-term prospects: The main drivers of growth

Potential GDP growth is estimated to have recovered following the 1998-2003 slowdown but remains below the average of the golden-age period of 1985-97 (Figure 1.4). An update of the estimations (reported in the *2005 Survey*) provided by the expert committee in charge of estimating potential GDP every year, based on a production function approach akin to that used by the OECD for its member countries, suggests that trend output rose to close to 5% in 2005-06 from less than 4% during 2002-04. On the basis of conservative assumptions on the growth rate of the labour force, hours worked and physical capital investment, trend GDP is projected to rise by about 5% per year over the near term (2007-12), or just under 4% on a per-capita basis, a rate that, although on the rise, still falls short of the golden-age period average by about one percentage point. Nevertheless, this is to be expected to a certain extent, given that income per capita is higher today than in the golden-age. Sustaining high growth in the future is important for a further reduction in poverty and can do much to improve Chile's still very skewed income distribution (Box 1.2).

Figure 1.4. **Decomposition of trend GDP growth, 1970-2012**[1]

In per cent (year on year)



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1. Trend GDP growth is adjusted for labour quality and capital utilisation.

Source: Ministry of Finance, Central Bank of Chile and OECD calculations.

Trends in the relative contributions of capital, labour and total factor productivity (TFP) growth suggest that physical capital accumulation has become the main driver of potential GDP growth in Chile (Figure 1.5). Having peaked in the late 1990s, the contribution of TFP growth is slackening, and that of quality-adjusted labour is decreasing at a faster pace, having peaked in the early 1990s. To some extent, this is due to the country's demographic transition: all else equal, the accumulation of labour inputs is likely to

Box 1.2. **Trends in poverty and income distribution, 1990-2006**

Years of sustained growth have resulted in a gradual decline in the poverty headcount ratio; that is, the share of the population living below the national poverty and indigence lines (Table 1.2). This drop in the incidence of poverty was particularly sharp during 2003-06, a period when economic activity gathered momentum following the 1998-2003 slowdown. Equally important is the improvement in income distribution during 2003-06, following years of relative stability in the relevant indicators, such as the Gini coefficient and the income ratio of the top to the lowest income deciles. The income gap (*i.e.,* the average income shortfall of the poor with respect to the poverty line) has also fallen over time (not shown), suggesting a durable increase in earnings among the poorer segments in society.[1] Nevertheless, about 2.2 million Chileans are still poor, especially those in households that are larger, less educated, headed by a woman and with fewer people working.

Table 1.2. **Trends in poverty and income distribution, 1990-2006**

	1990	1992	1994	1996	1998	2000	2003	2006
	Incidence of poverty (in per cent)							
Poverty rate	38.6	32.8	27.7	23.2	21.6	20.2	18.7	13.7
Of which: indigents	13.0	9.0	7.6	5.7	5.6	5.6	4.7	3.2
	Income distribution							
Gini coefficient	0.57	0.56	0.57	0.57	0.58	0.58	0.57	0.54
10/90 income ratio	30.1	27.9	29.9	32.2	34.5	32.8	34.6	31.3

Source: MIDEPLAN (National Household Survey, CASEN).

The improvement in the distribution of income during 2003-06 cannot be attributed to targeted income transfers to poor households. Average autonomous income (*i.e.,* labour and capital income, as well as privately-financed pensions) of households in the top income decile was still 31.3 times higher than that of individuals in the lowest income decile in 2006, little changed from the outcomes prior to the 1998-2003 slowdown. However, this income ratio would fall to 23.1 if monetary income transfers, such as means-tested benefits paid to low-income individuals, were taken into account. The ratio would be even lower, at 11.6, if the value of other transfers related to the provision of health care and education services were imputed in household income.

An important implication of the improvement in Chile's income distribution is that it should contribute to making the incidence of poverty more sensitive to growth in the years to come. In other words, for a given level of GDP growth, there should be a faster reduction in the poverty rate than in the past. This is because international evidence suggests that the impact of economic growth on the incidence of poverty is stronger in more egalitarian societies than in those with a more skewed distribution of income.[2]

1. See Ministry of Finance (2007) for more information.
2. See Bourguignon (2003) for more information.

contribute only modestly to trend GDP growth over the longer term on account of falling population growth rates. Also, young people are spending more time in education, thus reducing their labour supply. Nevertheless, there is much scope for concomitantly improving the utilisation of labour and its quality, as will be argued below and in Chapter 5,

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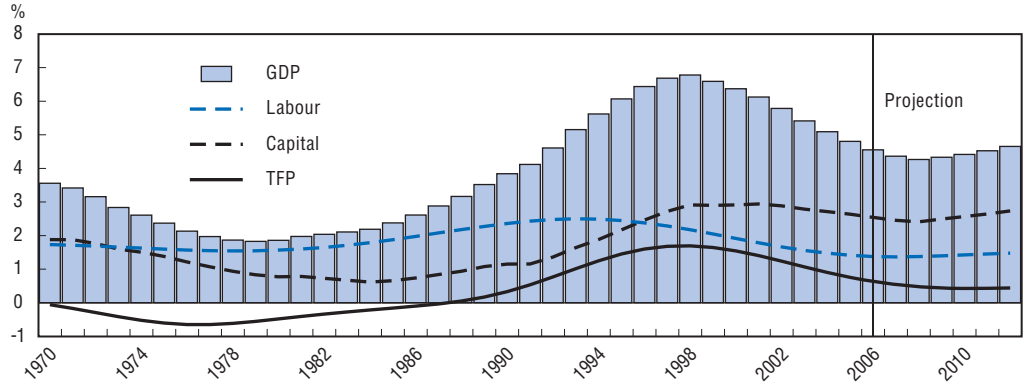
Figure 1.5. **Contributions to trend GDP growth, 1970-2012**[1]

In per cent, 10-year moving averages



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1. The calculations are based on a production function with constant returns to scale and a share of capital (labour) in GDP of 45% (55%).

Source: Ministry of Finance and OECD calculations.

given that labour force participation is relatively low in Chile by international comparison. So is the quality of human capital, as evidenced by scores in standardised tests, as discussed below and in Chapter 3. The extent of informality in the labour market also suggests that there are considerable untapped resources that can be mobilised in support of longer-term growth. Physical capital accumulation, on the other hand, is accounting for a rising share of trend GDP growth, underpinned by a robust private investment growth since 2003, as noted above. Chile's share of real investment in GDP rose during 2004-06.

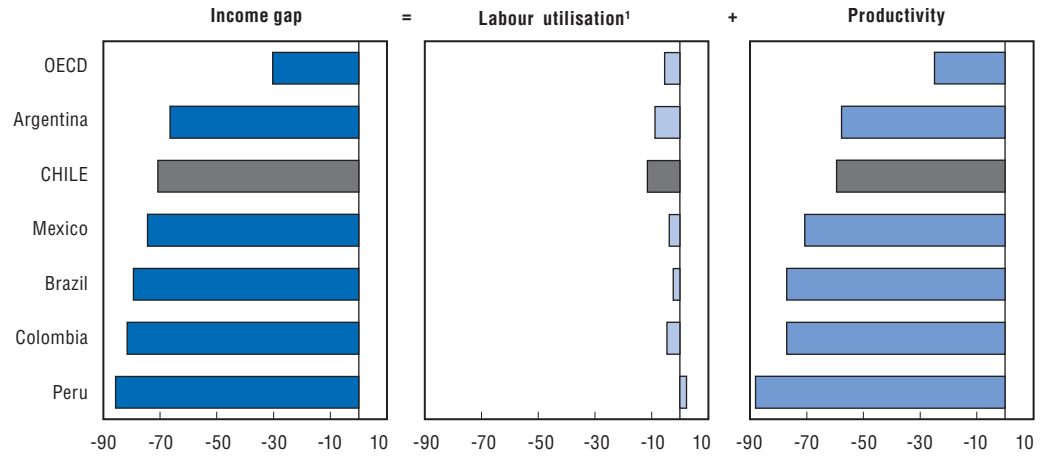
Projections for the medium term are broadly in line with recent trends.[1] Physical capital accumulation is set to continue to be the main engine of trend GDP growth. The contributions of labour and TFP are projected to remain at approximately their current levels. TFP growth is expected to rise to about 1.1% per year during 2006-12. This is about one-fifth of estimated trend GDP growth over the period, a ratio that is comparable to that observed during 2000-06. It should be recognised that these estimates are subject to measurement errors and tend to fluctuate considerably over short periods of time. Increasing reliance on capital accumulation, instead of TFP growth, suggests that there is scope for policy action to lift trend GDP growth through efficiency gains. International experience shows that TFP growth accounts for about one-half of trend GDP growth on average in the OECD area. A sizeable differential in TFP trends also explains the underperformance of Latin American growth relative to that observed in more advanced countries (Cole *et al.*, 2004).

As noted in previous *Surveys*, TFP growth is shaped not only by cyclical variables, such as improvements in the terms of trade, but especially through structural reform. In addition, recent empirical evidence underscores the complementarity that exists between macroeconomic stability, which Chile has achieved, and structural reform (Fuentes *et al.*, 2006). It will be argued below that Chile can boost its long-term growth by some combination of faster increases in the quantity and quality of labour inputs, physical capital accumulation and more efficient ways of combining inputs (TFP).

Productivity growth: A shift to domestic sources?

Labour productivity has risen in Chilean manufacturing over time but remains substantially below the OECD average. Closing this gap should be a policy priority, because, to the extent that Chile fails to close the existing productivity gap over time, cross-country income differentials would persist. Chileans appear to work more than the OECD average,[2] but this is not enough to compensate for lower labour productivity and, to a lesser extent, lower labour force participation, particularly among females and youths. The decomposition of Chile's income gap relative to the United States between labour utilisation and productivity suggests that there is some scope for closing the income gap by improving labour utilisation, a factor of production that is underutilised even in relation to Latin American comparators (Figure 1.6). But the largest gains are bound to come from raising labour productivity, an objective that will require concerted action on many policy fronts.

Figure 1.6. **Sources of real income differentials, 2004**
Percentage point differences in PPP-based GDP per capita with respect to the United States



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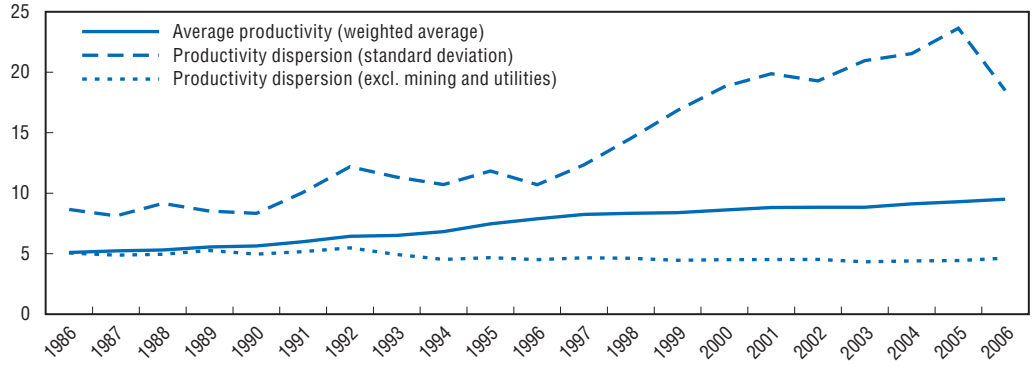
1. Based on total hours worked per capita.

Source: Central Bank of Chile, IMF WEO database and OECD Productivity database (January 2006).

Average productivity is trending up, but not uniformly across sectors, resulting in a growing dispersion in productivity levels. As discussed in the *2005 Survey*, there are important differences in productivity trends within manufacturing. There have been considerable productivity gains in the more dynamic sectors of the economy, such as mining, selected agribusiness activities and public utilities, which have far outpaced those in industry and financial services. These trends have exacerbated the dispersion of productivity levels across sectors, at least until 2005 (Figure 1.7). If high-productivity sectors are not taken into account, dispersion has actually fallen over time. These trends in labour productivity dispersion are consistent with the more disaggregated estimates for TFP performance reported by Bergoeing *et al.* (2006). Whereas some dispersion in productivity levels may actually foster technological diffusion, a persistent gap across sectors suggests the presence of impediments to technology diffusion throughout the economy, which prevent productivity gains from spreading from the high-productivity sectors to the laggards.

Figure 1.7. **Labour productivity level and dispersion, 1986-2006**
In millions of 1996 CLP



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Source: INE and OECD calculations.

The experience of Chile clearly demonstrates that trade openness and pro-competition reform are major sources of productivity enhancement. Empirical evidence based on firm-level data shows that the entry of new, more productive firms was the main source of aggregate productivity gains during the 1990s, a period of comprehensive pro-competition reform (Bergoeing *et al.*, 2006). Also, firms producing tradable goods are significantly more productive than their counterparts producing non-tradeables, a discrepancy that has increased over time (Balassa-Samuelson effect). The positive association between openness to trade and foreign direct investment and labour productivity growth is confirmed by empirical analysis based on aggregate data (Ramirez, 2000 and 2006). Trade liberalisation over the 1990s was conducive to productivity gains within firms, which is associated with increased exposure to foreign competition and easier access to imported capital goods and intermediate inputs embodying technological gains. Empirical evidence suggests that import penetration is an important determinant of firm-level productivity, including through the exit of poorly-performing plants (Crespi, 2006). Of course, for exposure to foreign competition to yield productivity gains, it is important to remove burdensome regulations that may impede competition in product markets.[3] While reasonably pro-competition by international comparison, at least as gauged by the OECD methodology for quantifying product market regulations (PMR) restrictiveness, there are several features of the Chilean regulatory framework that call for further reform, particularly those related to the ease of opening and closing businesses. It will be argued in Chapter 4 that such restrictions also discourage businesses from operating formally, with ensuing adverse effects on economic performance.

Recognition that trade-orientation can do much to boost economic efficiency underpins the Chilean authorities' efforts to secure access for Chilean exports through free trade agreements, as well as the maintenance of a flexible exchange-rate regime. Chile has recently signed free-trade agreements (FTAs) with China and Japan, and a preferential tariff agreement (PTA) with India, following arrangements with the European Union and the United States (Table 1.3). As a result of these agreements, which cover about two-thirds of exports, Chile is now a very open economy: its average effective tariff is currently less than 2%, against an average most-favoured nation (MFN) tariff that has been set at a uniform rate of 6% since 2003 (Saez, 2007). Bilateral agreements also aim at ensuring access to markets by removing non-tariff barriers and have incorporated features such as

Table 1.3. **Preferential Trade Agreements, 1990-2006**

Country	Type	Status	Model	Main areas
Mexico	Complementarity agreement	Replaced by FTA in 1999	ALADI	Trade in goods
Venezuela	Complementarity agreement	Since July 1993	ALADI	Trade in goods
Bolivia	Complementarity agreement	Since July 1993	ALADI	Trade in goods
Colombia	Complementarity agreement	Since January 1994	ALADI	Trade in goods
Ecuador	Complementarity agreement	Since January 1995	ALADI	Trade in goods
MERCOSUR	Complementarity agreement	Since October 1996	ALADI	Trade in goods
Canada	FTA	Since July 1997	NAFTA	Trade in goods, services, investment, telecommunications
Peru	Complementarity agreement	Since July 1998	ALADI	Trade in goods
Cuba	PTA	Negotiations concluded in August 1998	ALADI	Trade in goods
Mexico	FTA	Since August 1999	NAFTA	Trade in goods, services (financial services under negotiation), investment, air transport, intellectual property
Central American Common Market (Costa Rica, El Salvador, Guatemala, Honduras and Nicaragua)	FTA	Signed in October 1999 (partially in force)	NAFTA	Trade in goods, services (except financial services), air transport, telecommunications, public procurement
European Union	FTA	Since February 2003	–	Trade in goods, services, financial services, establishment of investment, public procurement, intellectual property
United States	FTA	Since January 2004	NAFTA	Trade in goods, services, financial services, investment, telecommunications, public procurement, e-commerce, intellectual property
Korea	FTA	Since April 2004	NAFTA	Trade in goods, services (financial services yet to be negotiated), investment, public procurement, intellectual property
EFTA (Iceland, Liechtenstein, Norway, Switzerland)	FTA	Since December 2004	–	Trade in goods, services (financial services yet to be negotiated), establishment of investment, public procurement, intellectual property
Trans-Pacific Economic association (Brunei, Chile, New Zealand and Singapore)	Economic association	Signed in July 2005	–	Trade in goods, services (financial services yet to be negotiated), public procurement, intellectual property
China	FTA	Since October 2006	–	Trade in goods. Services and investment under negotiation
Panama	FTA	Negotiations concluded in February 2006	NAFTA	–
India	PTA	Signed in March 2006		Trade in goods
Japan	FTA	Since September 2007		Trade in goods, services, financial services, investment, public procurement, intellectual property

Source: Saez (2007).

investment protection. Against this background, the impact of future free-trade agreements on the economy will likely be small, as noted in the *2005 Survey*.

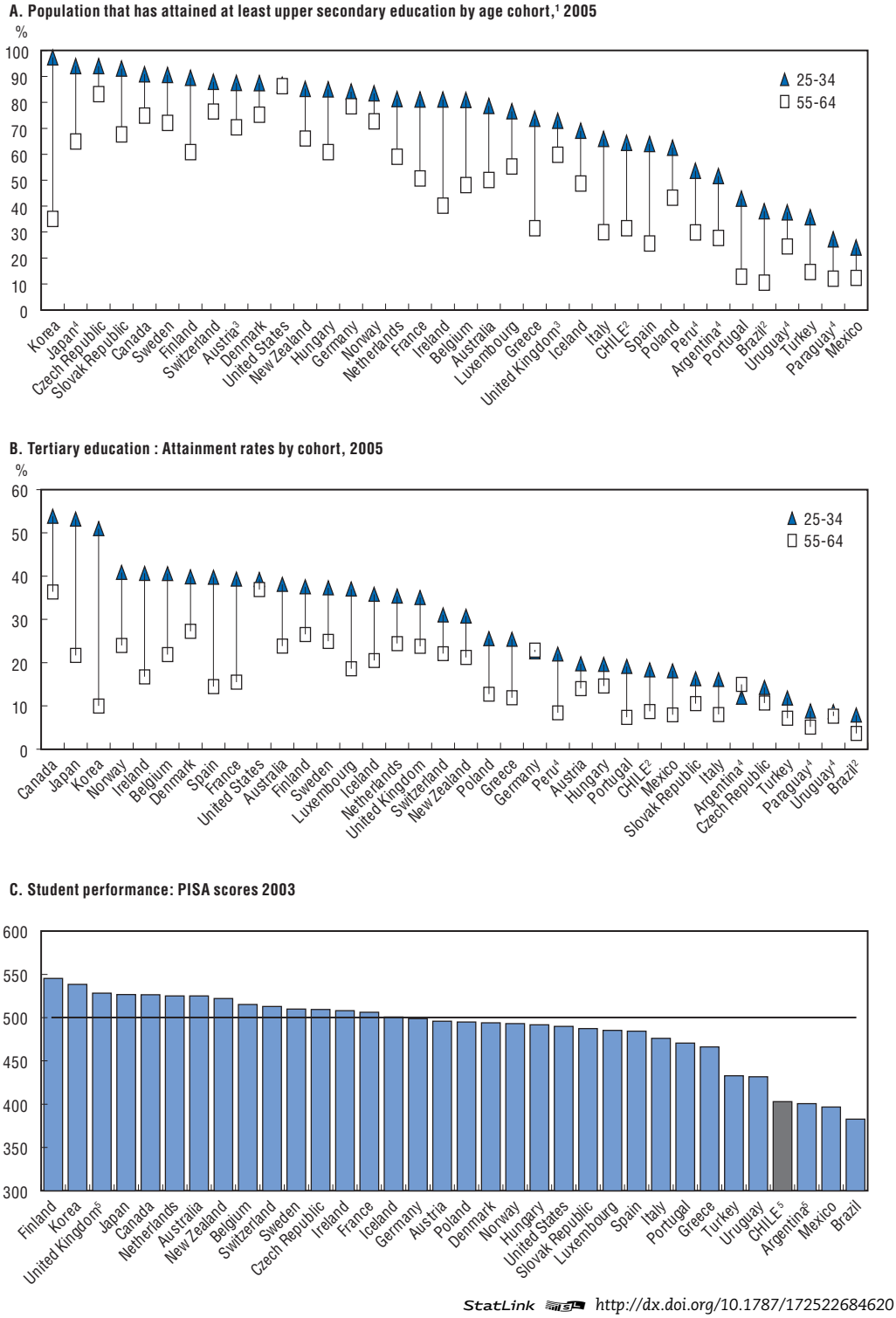
Likewise, financial deepening can underpin productivity gains. Empirical evidence based on firm-level data suggests that productivity grew faster in firms that had been credit-constrained, which is indicative that access to credit enhances productivity (Bergoeing *et al.*, 2006). The evidence of a direct causal link between access to credit and productivity enhancement justifies a policy focus on initiatives to develop the financial

system further. There is widespread recognition that the capital market (MK II) reform (discussed in Chapter 2), once enacted following Congressional approval in March 2007, could go a long way in reducing remaining impediments to further financial deepening, especially by facilitating access to risk capital for enterprises, including those such as SMEs whose access to capital markets is limited. The increase in the assets of FOGAPE, a government fund that guarantees a certain percentage of loans from public and private financial institutions to small businesses, is another initiative to facilitate access to credit to small entrepreneurs lacking sufficient guarantees.

To a large extent, labour productivity growth is held back by a lack of innovation in the business sector.[4] Even in one of the most dynamic sectors of the economy, such as the copper industry, comparative advantages, including through the exploitation of better-quality deposits, may be a more powerful determinant of labour productivity than innovation or technological progress.[5] The *2005 Survey* identified a combination of low R&D intensity, a bias towards basic, rather than applied, research and heavy reliance on government financing as the main factors behind Chile's poor innovation performance by international comparison.[6] This is despite the fact that Chile already meets several framework conditions for innovation, such as a stable macroeconomy, considerable openness to foreign trade and a reasonably developed financial sector. Chile's openness to trade facilitates the diffusion of technology embodied in imported capital goods and intermediate inputs, as discussed above, whose effect on productivity is underestimated by the conventional measures of innovation activity.[7] It should be recognised that, to some extent, R&D intensity tends to be lower in resource-based economies, even among OECD countries (Maloney and Rodriguez-Clare, 2005). But the composition of R&D intensity is more tilted towards government financing in Chile than in resource-rich economies in the OECD area, such as Australia and Norway. There is, therefore, considerable scope for policy action to encourage enterprises to innovate more.

To remedy this situation, the authorities plan to boost government support for R&D. However, the extent to which the increase in government financing, which is planned over the medium term due to the allocation of revenue accruing from the taxation of mining companies introduced in 2005, will encourage enterprises to innovate is as yet unknown. So is the use by enterprises of newly introduced tax breaks for innovation. The *2005 Survey* recommended the use of tax incentives for innovation so as to exploit policy instruments that have thus far been used only sparingly. These policy initiatives can go some way in fostering innovation, and ultimately productivity growth. Direct support may also be helpful, in so far as support is granted in a transparent, contestable manner and consistent with Chile's comparative advantages. But clearly there are a huge number of harder-to-quantify elements to innovation summed up in the phrase "innovation culture", which need to be better understood, so that effective policies for developing such a culture may be put in place. The payoff of policy actions that can stimulate innovation is potentially large, given that the social returns to innovation are likely to be higher in Chile than in the OECD area on account of the fact that Chile is on average farther away from the technology frontier and has a considerably lower R&D intensity. Based on recent estimates (Lederman and Maloney, 2003), social rates of return to innovation are in the neighbourhood of 20-30% per year in the OECD on average, but could be as high as about 60% per year in medium-income countries such as Chile. The recent initiative to reduce the tax burden on imports of formulas, patents, engineering work and technical consulting is a useful step to improve

Figure 1.8. **Human capital indicators, Chile and OECD countries**



StatLink http://dx.doi.org/10.1787/172522684620

1. Excluding ISCED 3C short programmes.
2. The reference year is 2004.
3. Including some ISCED 3C short programmes.
4. The reference year is 2002, 2003 for Japan.
5. Refers to PISA 2000.

Source: OECD (*Education at a Glance*).

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access to standardized and made-to-order technology and software, which is likely to be productivity enhancing.

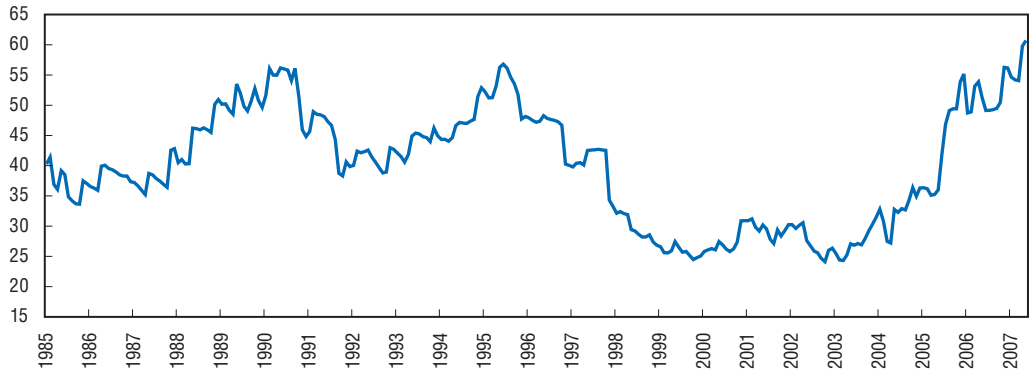
The main obstacle to productivity enhancement continues to be low human capital. The *2005 Survey* argued that Chile's secondary education attainment is sub-par in relation to the OECD average, despite non-negligible improvements over the years (Figure 1.8). More importantly, student performance is comparatively poor on the basis of standardised test scores, such as the OECD Programme for International Student Assessment (PISA). Student performance differs considerably among schools, suggesting that the education system has failed to reduce quality differentials in the school network. In the OECD area, by contrast, most of the performance differential occurs within, rather than between, schools, as noted in Chapter 3. Tertiary and post-tertiary enrolment rates are also low by OECD standards, and the higher-education system suffers from a bias towards humanities and social sciences, whereas there is a dearth of scientists working in the business sector, which impedes innovation. The quality of higher-education institutions is heterogeneous, and vocational training schools often operate with outdated curricula and out of tune with market demands. For those already in the labour market, the current arrangements for financing on-the-job training (essentially through tax relief for enterprises) suffer from a number of deficiencies, including in the area of accreditation of training providers and a lack of comprehensive skill certification, which would make skills more readily marketable. At the same time, labour informality discourages employers from investing in workforce training and the accumulation of job-specific skills, while denying informal workers access to most types of labour training.

Dealing with energy shortages

As discussed in the *2005 Survey*, Chile's electricity supply is subject to considerable risk associated with adverse weather conditions, given its reliance on hydro-power generation and the recurrence of cuts in gas shipments from Argentina. Until 2003, generation capacity expanded primarily through investment in gas-fired combined-cycle plants using imported gas from Argentina. The price of imported gas was low (around USD 2.50 per mbtu), and the resulting long-run contract prices for energy fluctuated within a narrow band of USD 25-30/MWh, which is far below that of its closest alternatives: coal, diesel and liquefied natural gas (LNG). In May 2004, however, the Argentine government began to cut gas supplies to Chile. As discussed in the *2005 Survey*, the regulatory framework discouraged investment in energy generation using alternative fuels for two main reasons. *First*, about 60% of sales were contracted at the node price (*i.e.* a regulated price calculated every six months in April and October, reflecting estimated marginal generation costs over the following 48 months). *Second*, node prices were allowed to fluctuate within a narrow band, so that they could not increase in tandem with rising generation costs.

To address these shortcomings, a new regulatory framework (*Ley Corta 2*) was approved in May 2005. The new law substituted competitive bidding for the regulated node price and allowed the duration of contracts between generators and distributors to be lengthened to up to 15 years. According to the new framework, the auction price is kept unchanged in real terms over the duration of the contract and is adjusted periodically to reflect changes in fuel and other costs. The law also broadened the bands within which regulated prices can fluctuate, thus allowing them to respond more promptly to supply conditions (Figure 1.9). Moreover, the new regulatory framework allows generators to offer financial incentives for regulated customers to reduce consumption during shortages.

Figure 1.9. **Energy node price, 1985-2007**
Quillota node, in 2006 USD/MWh[1]



StatLink http://dx.doi.org/10.1787/172573817335

1. The nominal node price, available from CNE, was deflated using the US PPI price index.

Source: OECD calculations.

An important policy question is whether the new regulatory framework will be able to reduce deficit probabilities over the next five years. The simulations reported in Annex 1.A1 for Chile's Central Interconnected System (SIC) show that the first round of bidding for distribution contracts completed in December 2006 and the price increase brought about by the broadening of the fluctuation band around the node price have gone a long way to solving the problems caused by the gas supply crisis. The analysis shows that the main determinants of the probability of a deficit over the five-year simulation horizon are the timing of new investment in generation capacity, hydrological risk and demand growth. The intensity of gas supply cuts appears to be a less powerful determinant of simulated deficit probabilities. This is because existing gas-fired plants have been reconverted to burn gas or diesel; as a result, the availability of gas affects generation costs (because gas is cheaper than its alternatives, such as coal, diesel and liquefied natural gas, LNG) and emission levels, but not deficit probabilities.

Despite these achievements, a few regulatory difficulties remain. Delays in the drafting of operating rules for the energy price auctions to be used in distribution contracts have delayed much-needed investment in energy generation. The rules that govern the financial incentives to be offered by generators for consumers to reduce consumption have recently been published. But their implementation requires the development of information-technology systems by the firms involved, so that the incentives are expected to be fully operational and in force by early 2008. These considerations are important because of the sensitivity of the simulated deficit probabilities to changes in demand and supply conditions over the next three years.

The policy challenges

To make headway into further growth-enhancing structural reform, Chile will need to maintain a solid macroeconomic framework, building on the achievements to date, which include abiding by a rules-based framework for the conduct of fiscal and monetary policy. This policy setting has allowed for debt reduction and avoiding fiscal pro-cyclicality, which has insulated the economy from terms-of-trade volatility. Against this background, three

main structural policy challenges are identified in this *Survey* to sustain growth in a resource-dependent economy such as Chile's. These are to:

- make the government more efficient in support of growth and social development,
- tackle informality to improve the business environment and labour utilisation, and
- encourage labour force participation of females and youths.

These structural policy objectives are intertwined. They reinforce each other and complement those highlighted in the *2005 Survey*, which focused on policy options for boosting the economy's business innovation potential and for strengthening the regulatory framework in network industries. A summary of progress in structural reform in these areas is presented in Annex 1.A2.

Managing the macroeconomy during and after the copper price boom

The economy's behaviour over the copper-price boom suggests that the current policy setting, combining a structural budget surplus rule with inflation targeting and a floating exchange-rate regime, has been appropriate for macroeconomic management in a resource-dependent economy that is vulnerable to sharp swings in the terms of trade. Fiscal management has delivered gradually falling indebtedness and prevented the copper-price boom from fuelling an expansion in government spending that cannot be sustained once the revenue windfalls dwindle or reverse. Due to a careful conduct of monetary and fiscal policies, an excessive exchange-rate appreciation has been avoided on the heels of sizeable terms-of-trade gains and a credit boom during the copper-price upswing. In this policy setting, economic performance should be resilient to the ensuing expected fall in the price of copper. Options are being considered for strengthening the policy regime further, as evidenced by the enactment of a Fiscal Responsibility Law (FRL) in September 2006, discussed in Chapter 2, which deals with a number of policy considerations raised in the *2005 Survey*. The FRL embeds the structural budget surplus rule in law and introduces formal explicit mechanisms for capitalising the central bank and for dealing with pension-related contingencies.

The main challenge in the macroeconomic area is to maintain the policy orientation that has served Chile so well over the last copper-price upswing. The authorities will need to guard against pressures for hiking social spending further, while maintaining a lean public sector in a low-tax, low-debt environment. Spending pressures are likely to arise from a combination of low public indebtedness and large public savings that have been accumulated over the terms-of-trade boom, coupled with multiple social demands in a middle-income society that still exhibits considerable income disparities. A substantial fiscal expansion occurred in 2007 due to the upward revision of estimated trend GDP growth and of the long-term price of copper relative to 2006, which allowed for higher spending on selected social programmes, including education, health care and housing. A further expansion is projected for 2008 as a result of the reduction in the structural budget surplus target from 1 to 0.5% of GDP (discussed in Chapter 2), which will release budgetary resources that will be used to finance additional spending on education.. Over the long run, the sustainability of such planned increases in social spending will therefore need to be assessed carefully against the need to prepare for remaining contingencies associated with the pension system and the revenue foregone associated with the planned gradual reduction in the stamp duties needed to improve the efficiency of the tax system.

The remaining weaknesses of the pension system, which will need to be addressed in the current reform proposal, are related to the system's relatively low coverage and low density of contributions, as discussed in the *2005 Survey* and in Chapter 2. The system's coverage is relatively low, because a large portion of the workforce cannot afford to save for retirement and/or works informally. The density of contributions is low, not only because of labour informality, but also as a result of precarious attachment to the labour force, especially for women, who often fail to contribute to a pension fund for the minimum statutory length of time needed during their working life for eligibility under the current regime for a minimum pension guarantee. The reform package submitted to Congress at end-2006 aims at tackling these shortcomings and, given the current comfortable fiscal position, at strengthening the social assistance pillar of the pension system in an incentive-compatible manner. The main policy challenge in this case is two-fold: *first*, to design an effective system of social protection for the elderly that does not create disincentives for saving for retirement, especially among those on low incomes, and *second*, to address informality in the labour market, which is the root cause of low coverage/density in the social security system.

The comfortable fiscal position is creating room in the budget for addressing remaining inefficiencies in Chile's tax system, which is otherwise modern. Policy challenges remain in this area. In particular, the payment of a stamp duty on credit and loan transactions, as well as on the issuance of fixed-income securities, increases the cost of loans, especially for firms with limited access to the financial market, such as small-scale, often family-run businesses and enterprises for which bank lending may be the only source of external financing. Renegotiations of loan contracts are now exempted from the stamp duties, thereby removing an impediment to competition in the banking sector. Elimination of these taxes is nevertheless constrained by the amount of revenue they yield. A gradual reduction in the statutory rates is planned during 2007-09, given that collection of stamp duties accounted for about 0.6% of GDP in 2006. Additional recent measures to improve the efficiency of the tax system have focused on simplifying tax procedures for SMEs. Making the tax system more efficient in a business-friendly environment can do much to improve economic efficiency.

Related to macroeconomic management is the need to minimize the risk of energy shortages over the medium to longer terms. There is a role for further policy action in this area on the basis of the simulations reported in Annex 1.A2. The analysis indicates that deficit probabilities are low in general – but not insignificant – over the next five years and could be substantially higher if the assumptions used in the baseline scenario turn out to be unrealistic. For example, the sensitivity analysis around the baseline simulations suggests that the combination of an extreme drought with an unexpected supply cut substantially increases the probability of a deficit. To reduce this risk, rules need to be set for generators to put in place incentives for consumers to reduce energy consumption in the event of a shortage. These rules, which are complementary to *Ley Corta 2*, are yet to be set. Similarly, additional measures to be considered by the authorities to reduce the risk of deficits include mechanisms for pre-approving sites for the installation of emergency turbines, and continued effort to reduce regulatory red tape that slows down the implementation of investment projects.

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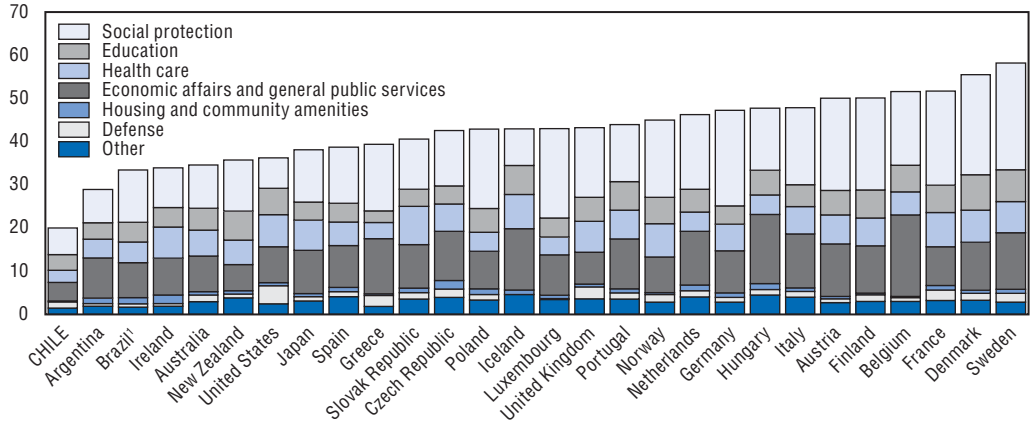
Making the government more efficient in support of growth and social development

Chile's strong public finances have allowed the authorities to improve the composition of government spending over the years in pursuit of their social development objectives. In contrast with the OECD area, the bulk of government spending in Chile is on broad social programmes, such as education and health care (Figure 1.10). But, as discussed in Chapter 3, the level of public spending on these programmes is much lower than the OECD average in relation to GDP, because private financing is substantial, especially for tertiary education and health care. Reliance on private financing puts the overall spending-to-GDP ratio – public and private – on a par with the OECD average in the areas of primary and secondary education, but not in health care, although total spending is comparable with the average of the emerging-market economies in the OECD area.[8] Social security and support for the elderly account for a much lower share of expenditure in Chile than in the OECD area on average, because Chile has a much younger population and its pension system is privately-run and fully-funded, unlike most countries in the OECD area.

Figure 1.10. **Government expenditure by functional classification: Argentina, Brazil, Chile and OECD countries**

In per cent of GDP, latest information since 2000



StatLink http://dx.doi.org/10.1787/172635800222

1. Excludes debt service.

Source: IMF (GFS database), OECD (National Accounts database) and STN (for Brazil).

Chile's social indicators are in general not out of step with the country's overall spending levels. This suggests that, on balance, services are delivered in a fairly cost-efficient manner. But the empirical analysis reported in Chapter 3 – which computes an efficiency frontier for the provision of education and health care services in OECD countries, Chile and other comparators beyond the OECD area – shows that there is scope for making service delivery more efficient in the case of education. Given Chile's spending level, the country's health indicators already fare relatively well in relation to comparator countries in the OECD area and in Latin America, despite remaining barriers to efficient risk sharing among private and public health insurers. But outcomes are sub-par in education: school attainment is comparatively low, despite an increase over the years, and performance is poor on the basis of standardised test scores, such as PISA. Income-related discrepancies in education outcomes remain sizeable, as well as disparities in performance among public, subsidised private and fully private schools. In the area of housing

programmes, comparison with countries in the OECD area is difficult, but a sizeable housing deficit is yet to be closed in Chile. Policy action, which has traditionally aimed at ensuring that the population has access to services, is now beginning to focus on measures to improve quality in service delivery and removing extant access barriers for the most disadvantaged groups in society.

Benefiting from a comfortable fiscal position, the government plans to raise budgetary allocations for a variety of social programmes, including education, health care and housing over the medium term. The main challenge in this area is therefore to ensure that this incremental spending is carried out in a cost-efficient manner, so that it yields commensurate improvements in social outcomes. It also needs to be recognised that, for an increment in public spending levels to deliver the expected improvements in social outcomes, it needs to be sustained over time. Longer-term sustainability needs to be assessed against the emerging spending pressures associated with the pension-related contingencies and the additional counter-cyclical elements recently embedded in the structural budget surplus rule, as well as the revenue foregone associated with tax measures, such as the gradual elimination of the stamp duties, that are needed to improve the efficiency of the tax system.

Tackling informality to improve the business environment and labour utilisation

It is not easy to define, measure and compare informality across countries. In principle, the "shadow", "undeclared", "underground" or "black" economy refers to activities undertaken outside the scope of taxation and regulation. On the basis of household-survey data, about 20% of the Chilean population aged 15 years and above and working at least 20 hours per week did not have a formal labour contract in 2006, which is a conventional metric for labour informality. The ratio is higher, at about 33% of the working population, if individuals working in enterprises employing 1-49 workers are considered informal, as discussed in Chapter 4. It is particularly challenging to put these percentages in a cross-country perspective, because there is no universally accepted definition of informality, even within the OECD area. But, based on comparable information for other countries, labour informality appears to be lower in Chile than in the rest of Latin America and has decreased over time.[9] Labour informality is not dissociated from business informality, to the extent that informal-sector workers often work in enterprises that are also informal, and hence do not pay taxes. Informality in the business sector is conventionally gauged on the basis of non-compliance with tax obligations and business regulations: about 40-50% of enterprises are estimated to operate informally, and nearly 11% of the potential tax base of the value added tax is estimated to have been undeclared in 2006.

The economic problems associated with informality-related segmentation in the labour market and in the business sector are well known. It creates allocative inefficiencies, which pose an obstacle for growth by preventing effective input utilisation. Labour informality reduces the incentives facing employers to invest in human capital through job-specific training, which slows the diffusion of productivity gains and technological progress across sectors, in addition to trapping low-productivity workers in low-pay jobs. Labour informality also poses a fiscal problem, because informal-sector workers do not contribute to social security while creating a claim on the government through social protection for the elderly. In this regard, informality poses challenges for the design of tax policy, because it narrows tax bases, resulting in the shifting of the tax burden

onto formal enterprises and individuals. Likewise, informality complicates the design of social-protection programmes, because it makes it difficult to reach informal workers through social assistance, labour training and active labour market policies (ALMPs). When enterprises operate informally, a lack of access to the financial sector increases their costs of finance, which often results in a low level of physical capital used in production and reduced productivity.

Policy action to encourage human capital accumulation is likely to generate dividends in terms of reducing informality. This is because low human capital appears to be a key determinant of labour informality in Chile, on the basis of the empirical evidence presented in Chapter 4. The level of education of the labour force, which is still comparatively low, often makes it prohibitively costly for employers to hire low-productivity workers formally. The workers who are most likely to work informally belong to vulnerable groups whose attachment to the labour market is weak, such as youths and females. For example, according to household survey data (CASEN), about 53% of women in the lowest income quintile did not have a labour contract in 2003, against around 36% of men in the same income group and about 20% of the working population as a whole.[10] But international experience suggests that informality also often arises from disincentives associated with high taxes and social security contributions, which may be perceived as too onerous in relation to the benefits accruing from the services they finance. A restrictive regulatory framework in both labour and product markets can also generate strong incentives for informality, which points to areas of structural reform where policy action is likely to pay off.

Chile's revenue-to-GDP ratio is low by OECD standards, and its reliance on the VAT as a source of revenue makes for relatively few tax code-related incentives for informality. At the same time, tax administration is efficient and is becoming increasingly taxpayer-friendly, which facilitates enforcement and encourages compliance. Effort has been made over time to improve taxpayer services to SMEs, especially through e-government. Targets for revenue collection were introduced in 2001 as part of legislation aimed at reducing evasion and improving tax administration. Increasing emphasis on enforcement is paying off. Further policy action in this area is important, because on the basis of the 2005 *Doing Business* indicators computed by the World Bank it takes almost twice as much time to deal with (*i.e.* prepare tax returns, file and pay) corporate income, value added and labour taxes in Chile as in the OECD area. But carrots as well as sticks are important: the perceived benefits to workers in terms of access to social protection need to outweigh the costs of formal employment.

Remaining restrictions in product market regulations (PMR) contribute to business informality. If the PMR framework is burdensome, explicit and implicit costs of compliance tend to be high, encouraging firms and individuals to operate informally. The empirical evidence reported in Chapter 4 for a sample of OECD and non-OECD countries suggests that, in addition to the quality of tax administration, a pro-competition business environment and a flexible labour code are associated with greater compliance with the tax code. While product market regulations are not overly restrictive in Chile on the basis of the OECD methodology presented in the *2003 Survey*, the barriers to entrepreneurship associated with the license and permit system, including the complexity of rules and procedures, remain well above those in place on average in the emerging-market economies in the OECD area and in Brazil, the only other non-member country in Latin America for which the methodology was applied. Administrative requirements for opening

sole-proprietor firms are also considerably more burdensome than in comparator countries in the OECD area and Brazil. Effort has been made to tackle these shortcomings since the PMR scores were computed in 2003, but there is considerable room for Chile to catch up with the best performers in the OECD area.

Restrictions embodied in the labour code often encourage informality, but they do not seem to be the main culprit in case in Chile, at least as far as gauged by the OECD methodology for assessing the restrictiveness of employment protection legislation. Chile's labour code is actually slightly more restrictive than in the average of OECD comparator countries with regard to protection of workers with indefinite contracts, although there are no additional restrictions on collective dismissals, as provided for in some OECD countries. There is broad agreement that recent legislation on labour sub-contracting and dispatching has gone a long way in addressing the regulatory uncertainty that had discouraged the use of these flexible employment arrangements.

Encouraging labour force participation for women and youths

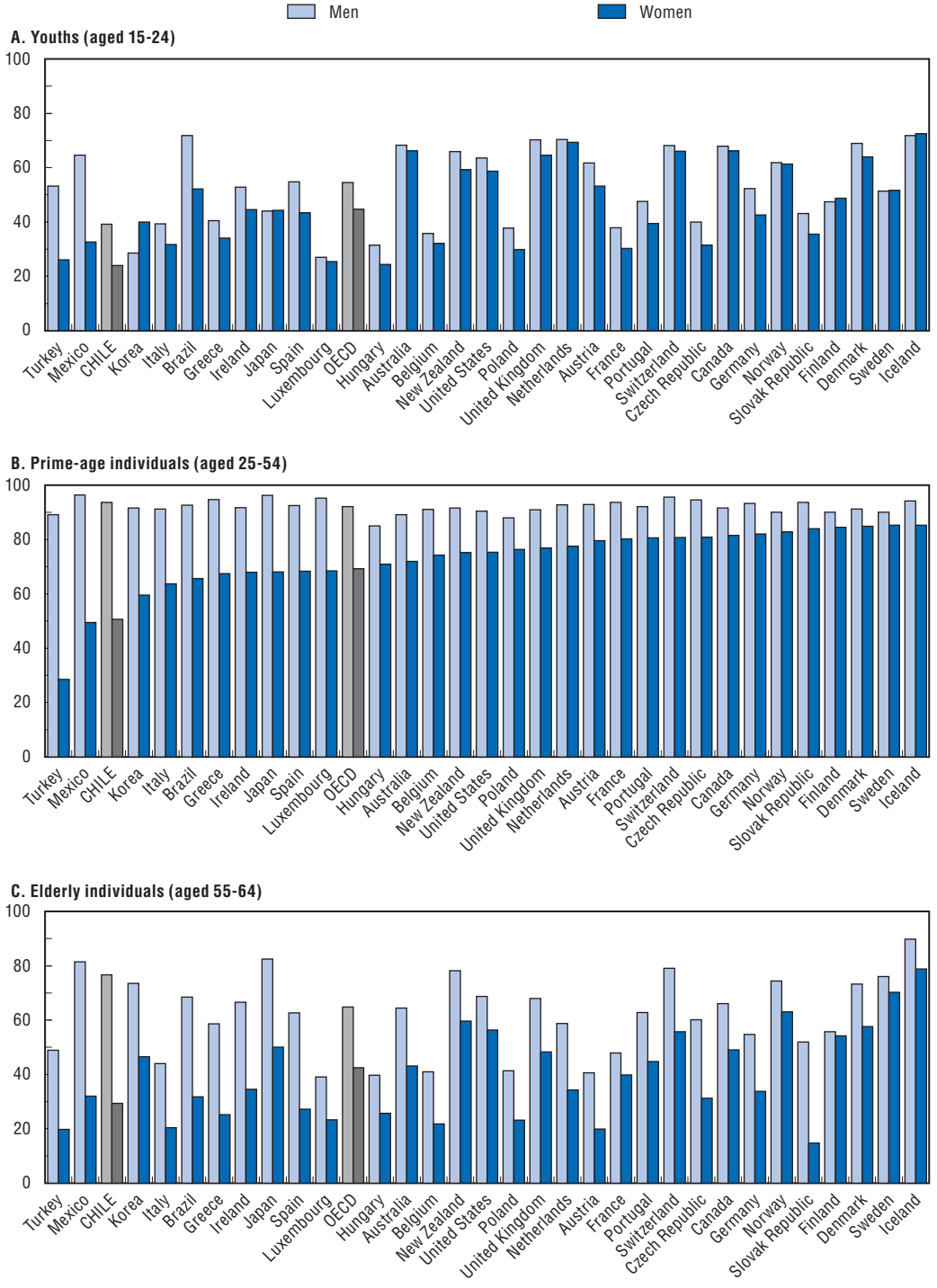
As noted in previous *Surveys*, labour force participation is low in Chile by OECD standards for females and youths. Female labour supply is at less than 50% of the working-age population (Figure 1.11), a ratio that is low not only by comparison with the OECD average, but also in relation to Latin American comparator countries (Contreras and Puentes, 2004). Consistent with international trends, female labour supply has nevertheless risen over time. But, in the case of males, a downward trend in participation, despite falling unemployment, is worrisome (Figure 1.12). With regard to youths, participation rates are trending down, predominantly as a result of rising school enrolment, especially for males, while remaining fairly low and stable over the years for young females. Low participation is not a problem to the extent that youngsters opt to delay entry into the labour market to spend more time in education and if returns to formal education are higher than those to seniority.

The main policy challenge in this area is to raise female labour supply further, for both prime-age individuals and youths, as a means of making better use of labour inputs. An increase in participation is important not only to sustain growth over the longer term, given the expected fall in fertility in the years to come, but also as a means of reducing poverty and improving the distribution of income, which remains severely skewed in Chile (Bravo and Contreras, 1999). The results of the empirical analysis reported in Chapter 5 – which is based on household-survey data for the whole country, rather than Metropolitan Santiago, as in the body of literature currently available – point to areas where policy action would have much to do to boost labour supply among women. Participation appears to be sensitive to education attainment in Chile, as is the experience of Brazil, a regional comparator country for which a similar empirical analysis was carried out (OECD, 2006). There are also cultural barriers to female participation, which appear to be strong. This suggests that policies aimed at encouraging human capital accumulation for the population at large would contribute to raising participation.

But female participation is deterred by a lack of affordable child care services. This is consistent with the empirical evidence reported in Chapter 5 showing that the number of young children in the household, especially for those aged 6-10 years, is a powerful deterrent to female participation. This finding lends credence to the policy objective of the last few years to gradually adopt full-time schooling, rather than the part-time option that has until now prevailed in Chile and in the rest of Latin America. Efforts to facilitate access

Figure 1.11. **Labour force participation by gender and age: Brazil, Chile and OECD countries, 2004**

Countries ranked by participation rate for prime-age females

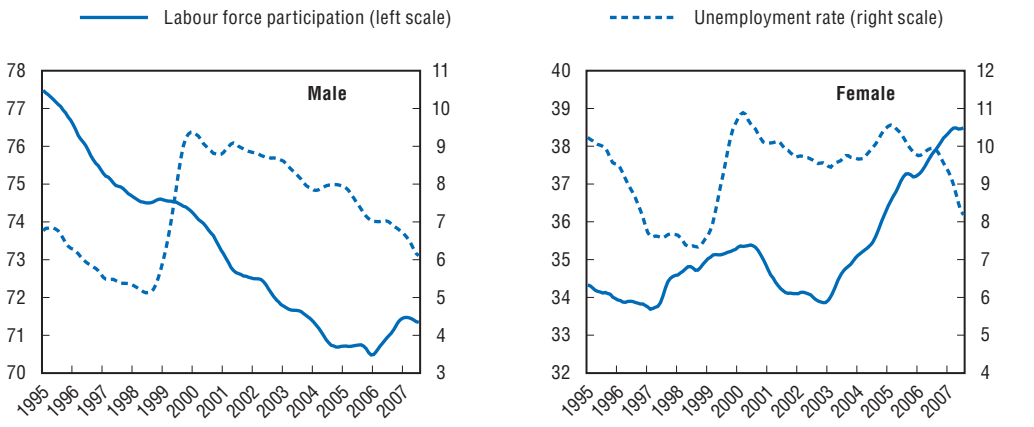


StatLink http://dx.doi.org/10.1787/172728845233

Source: INE, IBGE (National Household Survey, PNAD), OECD (Labour Force Statistics) and OECD calculations.

Figure 1.12. **Labour force participation and unemployment by gender, 1995-2007**

In per cent



StatLink http://dx.doi.org/10.1787/172737627738

Source: INE and OECD calculations.

to day care and pre-school education are welcome, especially because its potential benefits go beyond the labour policy area: international experience suggests that access to early childhood education can improve school outcomes later in life. Policy action in this area is also likely to encourage participation among other household members. The empirical evidence reported in Chapter 5 shows that the presence of young children in the household deters participation among young females and the elderly, suggesting that they participate in informal intra-household arrangements for child care.

Policy effort to encourage female participation would go some way in addressing the issue of gender disparities in earnings as well. The gender earnings gap is large in Chile and highly correlated with occupational experience. Once age, marital status, educational attainment and experience are taken into account, recent research based on household survey data suggests the presence of a sizeable earnings gap, which is larger still among better paid individuals. By making it easier for women to reconcile work and household responsibilities, policy action will contribute to narrowing the experience differential that accounts for some of the gender earnings gap.

Notes

1. These projections are based on conservative assumptions for growth of hours worked (a reduction by 0.5% per year), average years of education of the labour force (an increase by about 1.1% per year) and the natural rate of unemployment (7.8%), during 2006-12. The labour force is taken from the Ministry of Finance, based on the report of the expert committee in charge of estimating potential GDP growth. The stock of capital is calculated using the investment series reported by the expert committee, applying a depreciation rate of 5.5% per year…
2. Information on hours worked is not readily available for Chile on an annual basis. As an estimate, the number of annual hours worked was calculated using data provided by INE on normal hours worked per week, multiplied by 52, minus Sundays and one-half of Saturdays. Based on this calculation, the average annual hours worked in 2004 was 1 877 in Chile, against the OECD average of 1 731.
3. A recent initiative in this area is related to the Competition Tribunal. The authorities intend to increase the fines that the Tribunal is entitled to apply, introduce clear criteria for which judges may excuse themselves due to conflict of interest, increase the number of sessions judges must attend and confer broader investigative powers to the National Economic Attorney's Office.

4. Bergoing and Repetto (2004) show that the income gap between Chile and the United States is due predominantly to an efficiency gap in the use of technology, rather than a difference in the capital-labour ratio. If both countries had the same capital-labour ratio, Chile's per capita income would still be only about one-fifth of that of the United States.
5. See Garcia *et al*. (2001) for a comparison of the sources of productivity growth in the copper industry in Chile and the United States.
6. See OECD (2007) for more information.
7. Keller (2001) shows that about 70% of the R&D spillovers across borders is due to trade flows, with foreign direct investment playing a less important role.
8. The fact that Chile's population is younger than in most OECD countries explains at least in part the lower ratio of spending on health care to GDP.
9. A broader definition used by the International Labour Office (ILO) in an attempt to make measurement comparable across countries treats as informal the employees of small private non-agricultural unregistered unincorporated enterprises with less than five paid workers producing at least part of their output for sale or barter. Based on this definition, Chile's informality rate stood at about 32% in 2000, comparable to that of Mexico (2000) and somewhat lower than in Brazil (1999) and a large number of countries in Latin America. See International Labour Office (2005) for estimates of labour informality in selected Latin American countries.
10. See Politeia (2007) for more information on the incidence of informality among males and females.

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ANNEX 1.A1

The electricity sector's adjustment to gas supply cuts: A simulation of deficit probabilities

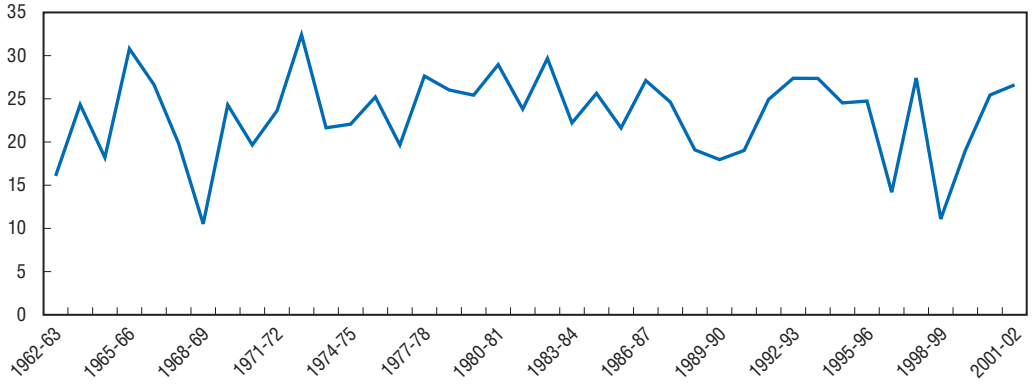
This Annex simulates energy deficit probabilities for Chile's Central Interconnected System (SIC) using a conventional stochastic programming model (Omsic). The simulations take into account the planned expansion in generation capacity on the basis of first round of bidding for distribution contracts completed in December 2006, as well as the price increase brought about by the broadening of the fluctuation band around the node price.

The sources of energy shortages in central Chile

Chile's Central Interconnected System is subject to substantial hydrological risk, because about 60% of energy is generated by hydroelectric plants, which have limited storage capacity, with the exception of the Laja reservoir. Annual energy consumption is around 38 000 GWh. In an average year, about 55% of annual consumption can be met with hydroelectric generation. In a rainy year, such as 1972-73 or 1992-93, almost 80% of energy demand can be met by hydro generation. By contrast, during an extreme drought, such as those of 1968-69 or 1998-99, hydroelectric generation cannot supply more than 10 000 GWh, or about one-fourth of annual consumption (Figure 1.A1.1).

Figure 1.A1.1. **Hydroelectric energy production, 1962-63 to 2001-02**

SIC system, in GWh



StatLink http://dx.doi.org/10.1787/172752515178

Source: CDEC-SIC (*Matrices de Energía Generable*, 2006).

Evaluating the likelihood of an energy deficit

The order in which generators operate is determined by the Economic Dispatch Centre (CDEC). Given current demand, dispatch is made according to strict merit order after accounting for transmission constraints, as discussed in the *2005 Survey*. Generators do bid; dispatch is made according to their marginal operating costs, which are fixed according to technical parameters and fuel costs. By law, dispatch is mandatory whenever the plant is available and CDEC commands it to operate. Therefore, dispatch is independent of generation contracts. Generators that sell more energy than they produce are required to buy the difference in the spot market at the spot price. Each month, CDEC settles accounts among generators. The spot price always equals the opportunity cost of water stored in the Laja reservoir. When full, the Laja reservoir holds enough water to generate about 7 000 GWh, or less than one-fifth of annual consumption. Since installed capacity from Lake Laja generators is limited to 2 500 GWh, energy can be stored effectively for several years.

The rate at which water in Lake Laja is used is governed by a stochastic dynamic programming model (Omsic).[1] CDEC used this model for many years to operate the system and has recently replaced it by the PLP model.[2] Omsic trades off the benefit of using water today to generate power, as opposed to relying on thermal generation, against the cost of not having water available in the future for hydroelectric generation, in which case energy needs to be rationed or thermal generation used. The model uses as input data the current level of Lake Laja and estimates the probability of future hydrologies over the next five years using a sample of 40 years of past hydrologies. Each yearly hydrology is assumed be have the same statistically independent probability. The output of the model indicates the amount of water that should be drawn from the reservoir and the shadow price of the remaining water. This shadow price is the system's marginal cost or spot price, which is adjusted hourly.

A difficulty in estimating deficit probabilities is the need to take account of this optimal use of water stored in the reservoir. Another difficulty is that hydrologies are random. Each time the system operator decides how much reservoir water to use, the following year's hydrology is not known, and the model is optimised accordingly. Optimisation with random hydrologies has the implication that even with overall low deficit probabilities, a severe deficit might nonetheless occur if the hydrology is very dry, and this outcome would be optimal. For this reason, there are two useful indicators to assess the state of the system: the monthly and annual deficit probabilities and the size of the deficit, should the hydrology be very dry.

Simulations of deficit probabilities for 2007-12

Method and assumptions

The procedure for estimating deficit probabilities is as follows. After calculating the optimal use of the Laja reservoir for each possible water level and for each of the hydrologies in the statistical series, 10 000 hydrology sequences are chosen at random. In each selection, one of the 40 hydrologies is selected month by month. Then, for each of the 10 000 sequences, the optimal operation of the system is simulated every month. From each of these 10 000 simulations, energy deficits are calculated and the following statistics are reported for each month of the hydrological year: *i*) total energy not supplied on average in the 10 000 simulations (in GWh), *ii*) the standard deviation, *iii*) the proportion of

simulations in which there is a deficit of at least 1% of demand (*i.e.* the probability of a deficit occurring in that given month), *iv*) the average water level in the Laja reservoir, and *v*) the average marginal cost in USD/kWh. Yearly deficit probabilities (*i.e.*, the probability that a deficit occurs during at least one month of the year) are also reported.

A few assumptions are required. Lake Laja's level is assumed to be 1 338 meters above sea level on 1 June 2007.[3] The demand and plant entry (*plan de obras*) projected by CNE in April 2007 when fixing the node price defines the baseline scenario. It excludes two diesel turbines, Los Vilos 1 and Cardones 1 (with 125 MW capacity each), and the additional 120 MW that would be added by expanding the combined-cycle Taltal II plant.[4] The demand projection assumes average growth of about 6.8% per year (Table 1.A1.1). Moreover, Argentine natural gas is assumed to be available for one week each month, as is currently the case.

Table 1.A1.1. **Electricity consumption projections, 2006-07**

	Projected demand			
	2006		2007	
	Consumption (GWh)	Rate of growth (per cent)	Consumption (GWh)	Rate of growth (per cent)
2006	38 412	. .	38 231	. .
2007	41 443	7.9	40 724	6.5
2008	44 800	8.1	43 477	6.8
2009	48 250	7.7	46 521	7.0
2010	51 482	6.7	49 684	6.8
2011	54 932	6.7	53 063	6.8

Note: Transmission losses are assumed at 4.1%, or the 1996-2005 average.
Source: 2007 forecast: CNE (2007); 2006 forecast: Galetovic, Inostroza and Munoz (2006), based on CNE (2006).

CNE's projection of new generation capacity to be added over the simulation horizon is based on the choice of an investment plan that minimises the expected cost of supply and outage. This projection is needed to calculate the node price but does not involve announced investment programmes. New contracts with distributors will be partly based on two new coal plants: Guacolda III (135 MW) and Nueva Ventanas (242 MW). Higher prices, in turn, have encouraged investment in a number of small and medium-sized hydroelectric plants, which will add 350 MW of capacity during 2007-09. Higher prices have also encouraged the re-conversion of all combined-cycle gas plants, which are now able to burn diesel in addition to natural gas, and the installation of some 490 MW of additional diesel capacity (Los Vientos, 120 MW in January 2007; Campanario, 120 MW in March 2007; and the open-cycle San Isidro II, 250 MW in April 2007). Finally, the new LNG plant, which is currently under construction at the port city of Quinteros, will supply a new plant, San Isidro II, which is owned by Endesa.

The baseline results

The results of the baseline simulations, reported in Table 1.A1.2, show that the monthly deficit probability is extremely low on average (3.7 GWh, against about 3 200 GWh of monthly consumption) in the current hydrological year and concentrated at year-end. The probabilities are still low, but somewhat higher, in 2009-10. Deficit probabilities are negligible from July 2010, because 1 163 MW of generation capacity will come on stream between October 2008 and April 2010: the hydroelectric plant La Higuera (155 MW), the

Table 1.A1.2. **Deficit probabilities, 2007-08 to 2011-12 hydrologies**

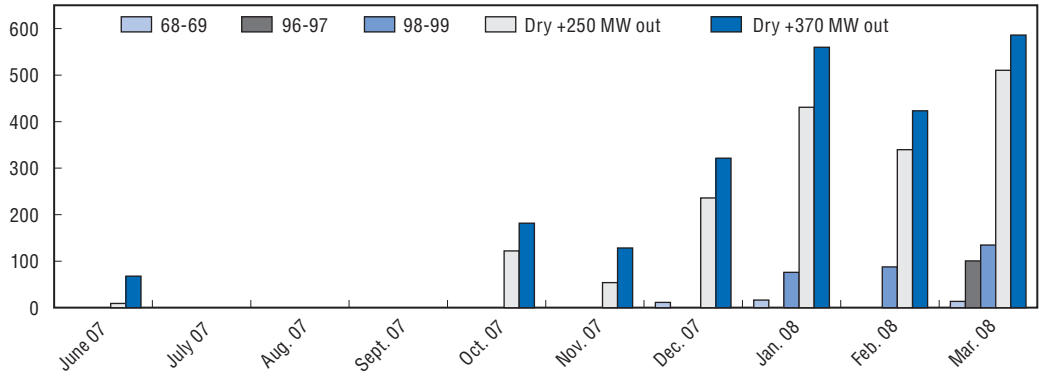
Baseline simulations

	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
2007-08												
Deficit (GWh)	n.a.	n.a.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9	0.0	3.7
St. dev.	n.a.	n.a.	0.0	0.0	0.0	0.0	0.0	0.0	0.4	10.3	16.1	0.6
Deficit probability	n.a.	n.a.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.8	0.0	4.8
Water level (meters)	n.a.	n.a.	37.9	37.9	37.5	37.5	38.5	39.8	39.5	37.5	35.2	32.7
Spot price	n.a.	n.a.	107	102	102	96	96	97	106	129	127	140
2008-09												
Deficit (GWh)	0.1	0.1	0.0	0.0	0.0	0.0	1.9	0.1	0.3	1.2	0.2	0.7
St. dev.	1.8	4.0	1.8	1.0	0.2	0.0	10.0	4.0	6.9	13.8	2.0	5.8
Deficit probability	0.0	0.1	0.0	0.0	0.0	0.0	2.8	0.1	0.2	0.7	0.0	0.7
Water level (meters)	30.3	29.4	30.1	30.3	30.1	30.3	31.4	33.0	32.8	30.8	28.7	26.4
Spot price	129	129	114	115	113	110	109	108	108	127	132	140
2009-10												
Deficit (GWh)	2.9	2.4	0.8	0.4	0.1	0.1	0.5	0.2	1.3	3.8	1.0	7.6
St. dev.	18.2	19.1	11.5	6.6	1.2	1.5	7.0	4.4	14.0	23.3	7.3	36.1
Deficit probability	3.2	1.7	0.6	0.4	0.0	0.0	0.4	0.3	0.7	2.7	1.8	4.1
Water level (meters)	24.1	23.3	24.0	24.2	23.9	24.1	25.2	26.7	26.5	24.5	22.5	20.5
Spot price	151	143	131	128	119	115	107	112	113	127	131	143
2010-11												
Deficit (GWh)	1.9	2.8	0.6	0.0	0.0	0.0	0.3	0.0	0.4	1.5	0.0	0.0
St. dev.	14.9	17.4	5.2	0.7	0.0	0.0	6.0	0.0	5.3	11.6	0.0	0.0
Deficit probability	1.9	2.4	1.2	0.0	0.0	0.0	0.2	0.0	0.6	1.5	0.0	0.0
Water level (meters)	18.6	18.2	19.9	21.0	21.6	22.3	23.7	25.9	25.9	24.1	22.7	21.2
Spot price	136	134	76	70	66	64	65	62	65	69	65	68
2011-12												
Deficit (GWh)	0.7	0.0	0.4	0.0	0.0	0.0	2.4	0.0	0.1	0.0	0.0	0.0
St. dev.	8.4	1.1	5.1	0.0	0.0	0.0	15.0	0.0	1.3	0.5	0.5	0.0
Deficit probability	0.4	0.0	0.7	0.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0
Water level (meters)	19.4	19.3	20.9	22.0	22.8	23.7	25.1	27.3	27.3	25.4	24.1	22.7
Spot price	67	66	63	55	55	54	68	56	59	63	61	61

Source: Authors' simulations.

Figure 1.A1.2. **Monthly deficit probabilities in 2007-08: Extreme drought and supply outages**

In GWh



StatLink http://dx.doi.org/10.1787/172780355385

Source: Authors' simulations.

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coal-fired plants Guacolda and Nueva Ventanas, and the combined-cycle plant Quinteros I. The commitment of coal plants is largely the result of the allocation of distribution contracts in the auctions that took place at the end of 2006.

Although low, annual deficit probabilities (*i.e.* the probability that at least one month with an energy deficit occurs during a given hydrological year) are not insignificant. Despite abundant reserves in the Laja reservoir, an extreme drought, such as those of 1968-69, 1996-97 or 1998-99, would cause a deficit towards the end of the year (Figure 1.A1.2). More importantly, the combination of a dry year and a thermal capacity outage would raise deficits considerably.

Sensitivity analysis

Planned investment is delayed by six months

The baseline simulations were modified by assuming that the investments projected by CNE to come on stream in October 2008 and afterwards are delayed by six months. The results, reported in Figure 1.A1.3 (Panel A), show that a six-month delay is of almost no consequence until December 2009, but the deficit probability rises to about 10% after January 2010. In other words, if the expansion of generation capacity is delayed by six months, an energy deficit is estimated in one in four simulations in the 2010-11 hydrological year (Table 1.A1.3).

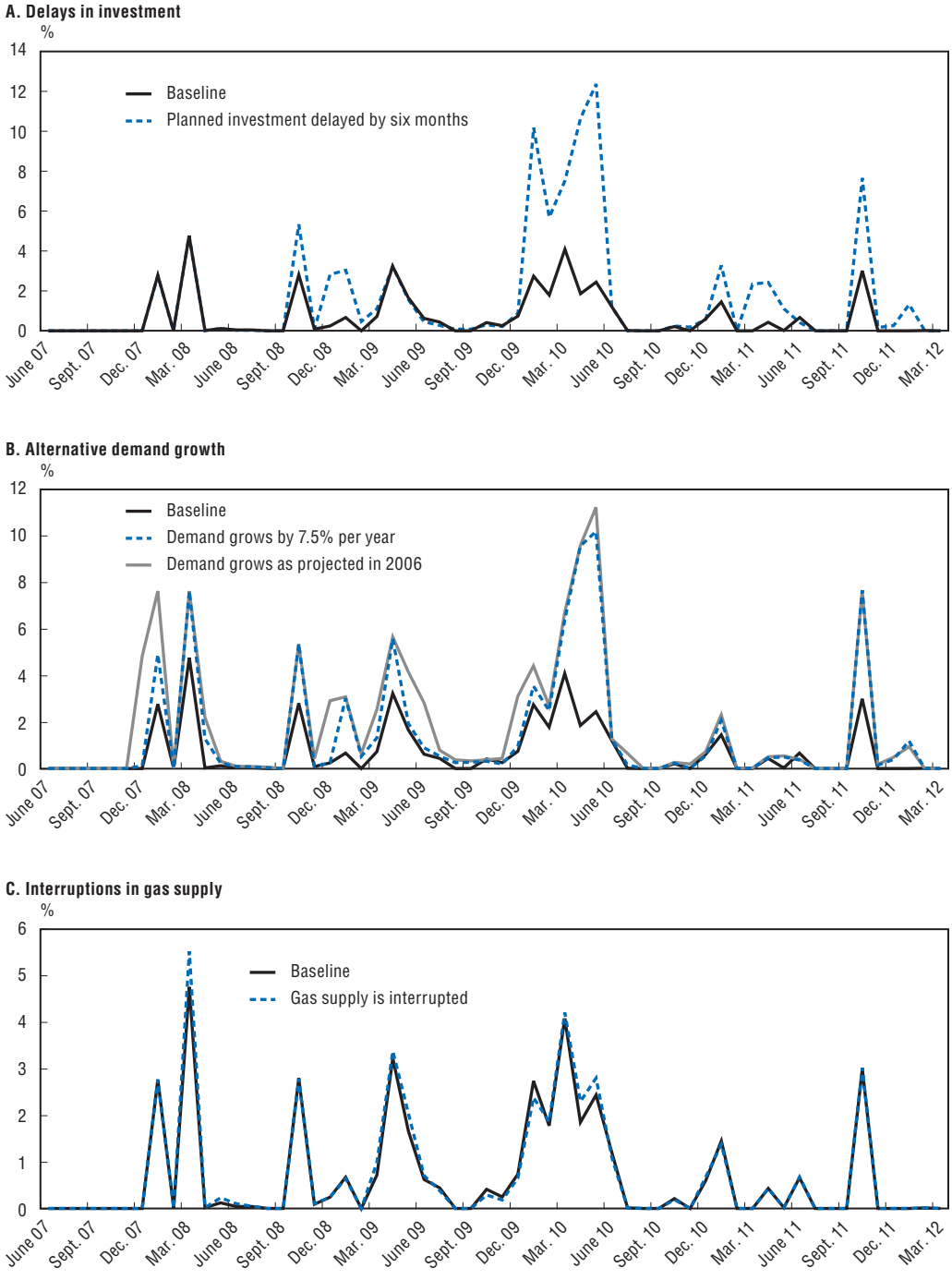
Demand grows as projected in 2006 and by 7.5% per year

The baseline simulations were modified to allow consumption to grow as projected in 2006 and by 7.5% per year (instead of 6.8%, as projected by CNE in the last node price-setting round). The estimations reported in Figure 1.A1.3 (Panel B) show that the simulated deficit probabilities are very sensitive to the demand growth assumption, as expected. Monthly deficit probabilities are considerably higher than in the baseline simulations during March-May 2010, exceeding 10%, when demand grows as projected in 2006 and by 7.5% per year. Annual deficit probabilities are also substantially higher in 2010-11 (Table 1.A1.3).

Gas supply is interrupted

The monthly deficit probabilities do not depend strongly on gas supply cuts, as indicated in Figure 1.A1.3 (Panel C). This is also the case for annual deficit probabilities in Table 1.A1.3. The low sensitivity of deficit probabilities to gas supply cuts is due to the fact that combined gas-cycle plants that have been reconverted to burn diesel can generate energy despite cuts in gas supply at a loss of only about 5-8% of generation capacity. By now, almost all combined cycle plants have been reconverted. Of course, the environmental impact of using diesel to generate electricity is not taken into account in the analysis.

Figure 1.A1.3. **Monthly deficit probabilities: Sensitivity analysis, 2007-2012**
In per cent



StatLink http://dx.doi.org/10.1787/172782721555

Source: Authors' simulations.

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Table 1.A1.3. **Annual deficit probabilities: Sensitivity analysis**

In per cent

Hydrology	Baseline scenario	Planned investment is delayed by six months	Demand grows as projected in 2006	Demand grows by 7.5% per year	Gas supply is interrupted
2007-08	5.5	5.5	7.6	7.6	5.5
2008-09	3.7	5.8	8.5	7.2	4.2
2009-10	11.1	15.1	18.5	14.3	11.7
2010-11	6.7	24.7	22.4	21.1	6.3
2011-12	4.1	11.1	9.0	8.8	4.1

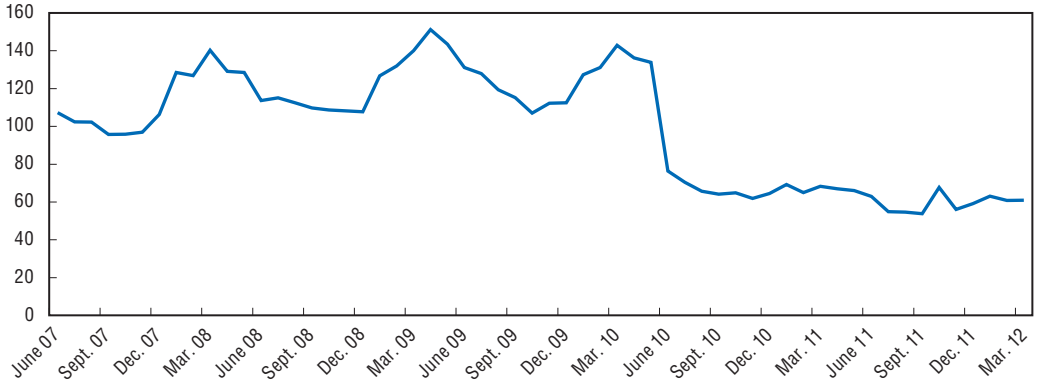
Source: Authors' simulations.

Trends in simulated prices

Figure 1.A1.4 shows the projected evolution of the expected spot price of energy in the baseline simulations. The fall in the spot price after June 2010 is due to the entry of hydroelectric plant Higueras and coal plants Guacolda III and Nueva Ventanas, as well as further normal entry thereafter. This expansion of generation capacity is due to the new regulatory framework (Ley Corta 2), which allows generators to pass at least part of the increase in generation costs caused by the delay in investments and higher oil and coal prices on to consumers. This encouraged the reconversion of gas-fired plants and investment in small hydro plants. The substitution of auctions for the regulated node price also removed an obstacle to investment in generation capacity.

Figure 1.A1.4. **Average energy marginal cost at the Quillota node, 2007-2012**

Baseline, US$/MWh



StatLink http://dx.doi.org/10.1787/172832017703

Source: Authors' simulations.

Notes

1. See Galetovic and Muñoz (2007) and Galetovic *et al.* (2007) for more information.
2. See Power System Research Institute (2001) and Torres (2006) for information on the PLP model and Galetovic, Olmedo and Soto (2002) for information on Omsic. The advantage of the PLP model is that it allows for a better representation of the weekly or monthly operation of the system, because it incorporates transmission losses and constraints, and optimises water use from all SIC reservoirs and not just Laja. The shortcoming of the PLP model, however, is that it does not allow hydrologies to be modelled randomly and, by construction, excludes the possibility of an extreme drought. Omsic is more suitable for the simulation of deficit probabilities, because it allows Monte Carlo simulations to be used to model hydrological uncertainty, which is important when estimating deficit probabilities over the medium term.

3. The amount of water in lake Laja is measured by its height above sea level. When full, the level of Lake Laja is 1 368 m. By contrast, the lake is almost empty at 1 310 m.

4. The diesel turbines are excluded, because no generator has so far announced that it would undertake the projects. Also, diesel turbines can be deployed very fast; they are used typically during deficits. Expansion of the Taltal II plant is also excluded, because its owner, Endesa, has not provided any information suggesting that it will carry out the project.

ANNEX 1.A2

Progress in structural reform

This Annex reviews the actions taken in the area of structural reform based on the policy recommendations made in the *2005 Survey*.

***2005 Survey* recommendations**	**Actions taken**
Measures to encourage innovation	
Government support	
Target direct government support to firms that have limited access to external financing.	The MKII Law, promulgated in June 2007, introduces tax incentives for seed and risk capital investment, allows banks to invest in risk capital ventures, facilitates the creation of risk capital funds and allows CORFO to invest (up to a ceiling) in these funds, among other provisions.
Reduce fragmentation and duplication in the delivery of government support.	The Innovation Council has recommended that innovation policy focus on CORFO for business innovation and support for applied research and on CONICYT for support for basic research. Effort is ongoing to standardise the existing research grant mechanisms within CONICYT and to eliminate duplication in the production of innovation indicators and technical analysis.
Improve the governance and cost-effectiveness of innovation funds by strengthening project evaluation and allocating funds on a contestable basis.	A management unit was created in CONICYT to streamline internal procedures and elaborate innovation indicators and scoreboards. Efforts are under way to increase the share of grants allocated by CORFO in a contestable manner from the current level of about 50% of grants.
Better disseminate information on the public resources available to promote innovation.	Effort is ongoing in CONICYT to disseminate information on the requirements for the concession of grants and *ex post* performance indicators.
Higher education and vocational training	
Continue to facilitate access to higher education, especially for students from low- and middle-income households.	The number of higher-education grants rose by about 20% in 2007 relative to 2006. Additional support (subsistence grants) was introduced in 2006 for selected grant categories for students from the lowest two income quintiles, as well as new modalities of student loans.
Step up efforts to improve quality through the accreditation of higher-education institutions. Consider the option of making accreditation compulsory.	A National Accreditation Commission (CNAP) was created through the Promulgation of the Higher-Education Standards Law (*Ley de Aseguramiento de la Calidad de la Educación Superior*) in November 2006.
Make vocational training more attuned to market demand.	The second phase of the MECESUP2 Programme (2005-11) is being implemented to reform academic curricula, increase financial support for grants and the acquisition of university equipment for doctoral studies and improve managerial practices, among other objectives.

***2005 Survey* recommendations**	**Actions taken**
IPR protection and risk/venture capital	
Improve the enforcement of copyright protection and speed up the processing of patent applications.	The Intellectual Property Law was amended in January 2007 to compensate patent applicants for delays in approval and registration procedures. New patent examiners were hired in 2006, which reduced the time for processing patent applications from an average of six months in December 2005 to three weeks in June 2007. The time span for opposing a patent registration was shortened.
Develop risk and venture capital through further capital market reform. Work towards congressional approval of the Capital Market Reform (*MK II*) package.	The MKII Law was promulgated in June 2007; its main provisions are listed above.
Measures to strengthen regulation in network industries	
Cross-sectoral issues	
Settle methodological issues prior to tariff reviews, making regulation a continuous process between tariff reviews.	The "continuous learning" principle that has been in place for tariff setting in the water sector is being extended to the telecom and electricity sectors.
Strengthen the regulatory agencies by building a professional career stream for them within the civil service.	Hiring under the new civil service regime is already in place in the regulatory agency for water (*Superintendencia de Servicios Sanitarios*) and is expected to be extended to the electricity regulator (*Superintendencia de Electricidad y Combustibles*) and the National Energy Commission (*Comisión Nacional de Energía*). A regulator is expected to be created for the telecom sector, and staff will be hired in line with the new regime.
Set up expert panels for conflict resolution in the areas of telecoms and water, following the example of the electricity sector.	Draft regulation is available for the creation of an expert panel for the telecom sector similar to that for the electricity sector. No plan is yet in place for the water sector.
Network industries: energy (electricity and gas) and telecoms	
In electricity, consider the option of unbundling retailing from distribution and continue to improve the functioning of CDEC by introducing explicit operating rules and procedures, and possibly granting it greater operational autonomy.	No action taken apart from the provisions introduced in *Ley Corta I*. Explicit operating rules and procedures for CDEC are expected to be issued soon, following discussions with the industry throughout 2006.
In natural gas, avoid the introduction of import ceilings and origin restrictions to ensure security of supply.	There is no longer the intention to introduce import ceilings and origin restrictions.
In telecoms, continue to boost price competition in areas with multiple providers. Conduct further analysis on the current price structure to determine the extent and incidence of existing cross-subsidies.	Increased flexibility in tariff setting since 2004 is likely to result in the demand by the industry to fully liberalise prices, which will be dealt with by the competition authorities.
Infrastructure	
Strengthen the cost-benefit analysis for selecting infrastructure projects eligible for government guarantees.	The Fiscal Responsibility Law has strengthened the requirements for technical assessment of bids for public concessions (Art. 23).
Separate the planning, execution and regulatory stages of infrastructure concessions and assign these functions to different agencies.	Effort is ongoing to strengthen the institutional structure of the Ministry of Public Works (*Asesoría para una Propuesta de Institucionalidad para la Administración y Regulación del Sistema de Concesiones*).
Set up an oversight body, preferably independent from government, in charge of evaluating projects and monitoring compliance with contractual covenants.	Draft legislation was submitted to Congress in May 2007 creating a public works regulator (*Superintendencia de Obras Públicas*).
Make information about the terms of contracts public, preferably in a regular report to be submitted to the legislature.	A website was created at end-2006 to make information on contracts and legislation available to the population. Dissemination is set to improve with the creation of the public works regulator, pending congressional approval of draft legislation.
Measures to make better use of labour resources	
Employment protection legislation	
Remove restrictions on the duration of temporary contracts.	No action taken.
Allow working time of full-time workers to be reduced by any number of hours, and not necessarily up to one-third, a limit that currently triggers some special provisions.	No action taken.

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2005 Survey recommendations	Actions taken
Enhance the regulation of labour dispatching, by formally clarifying the legal responsibilities of client enterprises and dispatching firms, and subcontracting.	Legislation was approved in 2007 clarifying the legal responsibilities of subcontracting firms in the areas of employment protection, social security, health and safety. With respect to labour dispatching, regulations were issued on the maximum duration of contracts and on the legal responsibilities of dispatching firms.
Labour training	
Continue to tighten the requirements for accreditation of training centres (OTECs) to improve the quality of enterprise-level training.	Certification requirements were tightened in September 2006. The number of training centres was reduced by almost one-third to nearly 1900.
Enhance SENCE's advisory role, given that the market for training services is largely supply-driven and employers are often ill-informed about training possibilities.	The tightening of certification requirements for training centres (OTECs) was put in place by SENCE and the National Standards Institute (*Instituto Nacional de Normalización*) on the basis of service delivery quality.
Extend the skill certification system to the most common occupations in industry and construction.	Draft legislation on national skill certification is under discussion in Congress (already approved by the Lower House).
Make labour training more responsive to market demand.	The draft legislation on skill certification proposes the creation of a commission including government, labour and the private sector members to set sector-specific skill requirements.

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Chapter 2

Managing the macroeconomy during and after the copper price boom

Compliance with the structural budget surplus rule, which has been in place since 2001, has allowed the government to maintain a counter-cyclical fiscal stance in an environment of rising copper prices, while delivering a gradual reduction in public indebtedness. Monetary policy is conducted within a framework that combines inflation targeting with exchange-rate flexibility. A Fiscal Responsibility Law was promulgated in September 2006, strengthening the macroeconomic framework further by embedding the fiscal rule in law and setting out regulations for the use of fiscal savings. Complementary pension reform is being discussed in Congress with the objective of strengthening the pension system's solidarity pillar and encouraging retirement saving. The tax system is also being improved with a view to removing obstacles to financial deepening and to business-sector development. Government spending on social programmes is budgeted to rise considerably, in line with the authorities' emphasis on social development. The main challenge in the macroeconomic area is to maintain the policy setting that has served Chile so well over the recent copper-price upswing, while tempering demands for hiking public social spending and maintaining a lean public sector in a low-tax, low-debt environment.

Chile's macroeconomic performance remains strong. Compliance with the structural budget surplus rule, which has been in place since 2001, has allowed the government to achieve a net creditor position. Monetary policy continues to be conducted within a policy framework combining inflation targeting and a floating exchange-rate regime. This has anchored expectations within the target range of 2 to 4%. To consolidate the gains achieved so far and to address remaining policy challenges, the institutional framework for macroeconomic policy-making continues to be strengthened. The tax system is also being improved with a view to removing obstacles to financial deepening and to business-sector development. The main challenge in the macroeconomic area is to maintain the policy setting that has served Chile so well over the current copper-price upswing. The sustainability of planned increases in social spending over the longer term will need to be assessed carefully against the need to prepare for: *i*) contingencies associated with the pension system; *ii*) the additional counter-cyclical elements recently embedded in the structural budget surplus rule; and *iii*) the foregone revenue associated with measures that could improve the efficiency of the tax system.

Short-term developments

After experiencing robust growth in 2005, GDP growth slowed to 4% in 2006 (Table 2.1). This was due to the combination of a stronger-than-expected impact of higher energy prices on household consumption, recurrent cuts in shipments of gas from Argentina and slower investment growth in the mining sector, following a strong expansion in 2005. Mining output also suffered from a strike that closed the largest copper mine in the world (*La Escondida*) for some time, as well as a temporary shutdown of the second largest copper mine (*Chuquicamata*) for technical reasons. The negative effect on activity of high energy prices mitigated somewhat the positive impact of high copper prices, given that Chile is a net energy importer. The contribution of government consumption to growth was modest as a result of continued adherence to the structural budget balance rule. The trade surplus remains sizeable because of considerable terms-of-trade gains. Job creation slowed down during the year, but remains vigorous, leading to a sustained reduction in unemployment since mid-2004.

Growth is expected to pick up in the remainder of 2007 and 2008 to nearly 6% per year and to remain above trend. GDP grew by 6.1% on a year-on-year basis in the first semester of 2007, reflecting the economy's renewed dynamism. Due to a fiscal expansion in 2007 and beyond, discussed below, government consumption is set to contribute positively to growth. Household consumption is poised to remain vigorous on the heels of robust credit creation and improving labour market conditions. Private investment growth is set to pick up in earnest, following a slowdown in 2006. Inflation is poised to exceed the 4% ceiling of the inflation target in 2007 predominantly on account of a temporary shock to food prices in mid-year in line with global trends and tightening supply conditions, but medium-term (two-year-ahead) expectations remain well anchored around the 3% target. The main risk to this otherwise positive outlook is higher-than-expected energy prices and, to a lesser

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Table 2.1. **Basic macroeconomic indicators, 2001-06**

	2001	2002	2003	2004	2005	2006
Supply and demand						
GDP (in current billion pesos)	43 657.6	46 484.9	51 156.4	58 404.6	66 599.0	77 337.7
GDP (in current USD billion)	68.8	67.5	74.0	95.8	119.0	145.8
GDP growth rate (real, in per cent)	3.4	2.2	4.0	6.0	5.7	4.0
Supply						
Agriculture	7.6	7.0	2.4	10.5	5.7	3.5
Mining	5.7	–4.2	5.5	5.0	–1.5	0.1
Manufacturing	0.6	1.9	3.3	7.2	6.4	2.5
Services[1]	3.6	2.8	3.7	5.2	6.3	4.6
Demand						
Private consumption	2.9	2.4	4.2	7.0	7.9	7.1
Public consumption	2.9	3.1	2.4	6.1	5.3	3.6
Gross fixed investment	4.3	1.5	5.7	9.9	21.9	4.0
Exports	7.2	1.6	6.5	11.7	3.5	4.2
Imports	4.1	2.3	9.7	16.9	17.7	9.4
Supply (in per cent of nominal GDP)						
Agriculture	4.5	4.7	4.8	4.3	4.1	3.9
Mining	8.1	6.7	8.4	12.8	15.8	23.0
Manufacturing	16.5	16.7	16.4	15.9	14.8	12.8
Services[1]	66.4	66.3	65.3	61.7	59.7	54.8
Public finances (in per cent of GDP)[2]						
Revenue	23.8	23.2	22.8	23.9	25.8	27.9
Expenditure	24.3	24.4	23.2	21.8	21.1	20.0
Primary balance	0.7	–0.1	0.7	3.1	5.5	8.6
Nominal balance	–0.5	–1.2	–0.4	2.1	4.7	7.9
Balance of payments (in USD billion)						
Current account balance	–1.1	–0.6	–0.8	2.1	1.3	5.3
In per cent of GDP	–1.6	–0.9	–1.1	2.2	1.1	3.6
Trade balance	1.8	2.4	3.7	9.6	10.8	22.2
Exports	18.3	18.2	21.7	32.5	41.3	58.1
Imports	16.4	15.8	17.9	22.9	30.5	35.9
International reserves (gross)	14.4	15.4	15.9	16.0	17.0	19.4
FDI (net inflows)	4.2	2.5	4.3	7.2	7.0	8.1
Outstanding external debt	38.5	40.5	43.1	43.5	44.9	47.6
In per cent of GDP	56.0	60.0	58.2	45.4	37.8	32.6
Exchange rate and prices						
Exchange rate (CLP per USD, period average)	634.9	688.9	691.4	609.5	559.8	530.3
CPI inflation (IPC, in per cent, end-of-period)	2.6	2.8	1.1	2.4	3.7	2.6
GDP deflator (in per cent)	3.8	4.2	5.8	7.7	7.9	11.7
Unemployment rate (in per cent)	9.9	9.8	9.5	10.0	9.2	7.8

1. Includes electricity, gas, water and construction.
2. Refers to the general government.

Source: Central Bank of Chile, INE and Ministry of Finance.

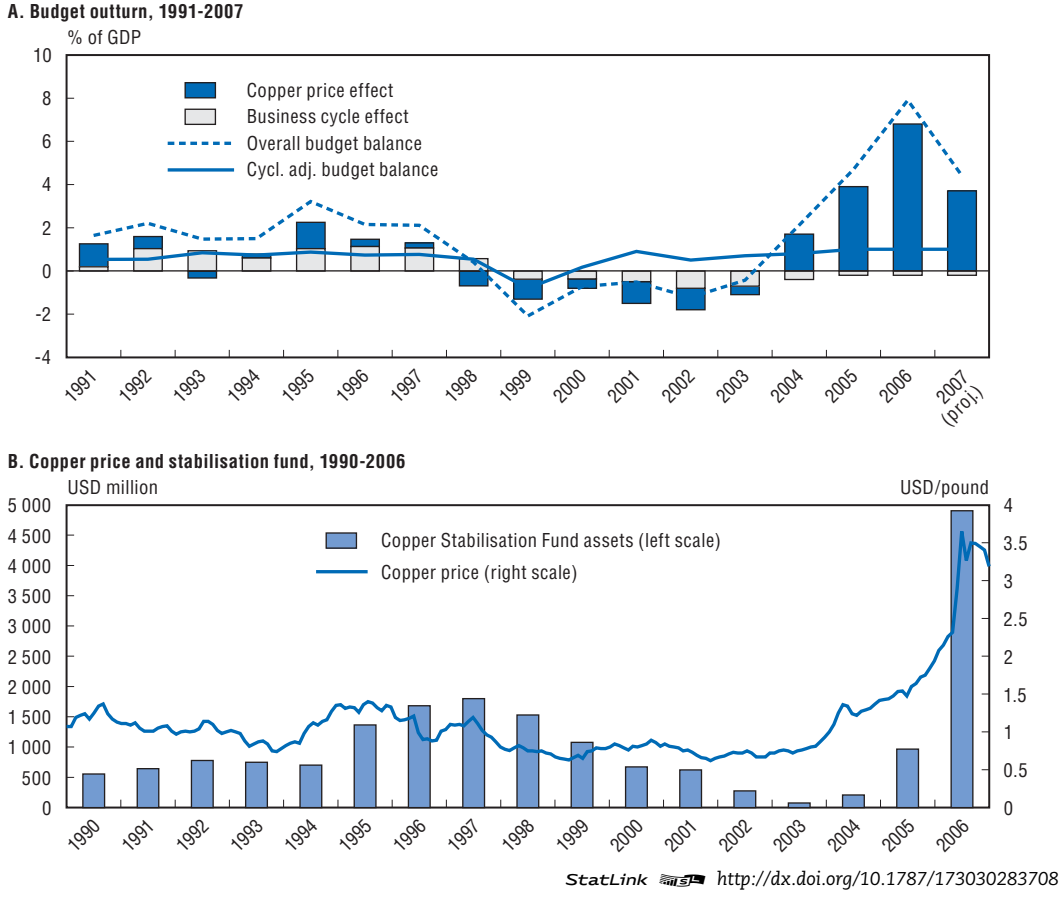
extent, energy supply shortages in the industrial sector. The economy is nevertheless better equipped than in previous cycles to withstand either a copper-price downswing, essentially on account of its robust macroeconomic policy framework, or adverse energy supply shocks because of the strengthening of the regulatory framework, as discussed in Chapter 1.

Fiscal policy

Recent trends and outlook

The robust copper price boom of the last three years has put the fiscal framework to the test. Due to continued adherence to the structural budget surplus rule, which was maintained by the current administration upon taking office in March 2006, the consolidated (central government and central bank) budget surplus rose to nearly 8% of GDP in 2006 (Ministry of Finance, 2006a) (Figure 2.1). Consistently, the gross consolidated public debt-to-GDP ratio came down to less than 25% of GDP at end-2006 as a result of several years of robust fiscal performance. Owing to this reduction in gross indebtedness, coupled with a further accumulation of assets during 2006, the consolidated net debt is now negative. The level of indebtedness of the public-enterprise sector is also declining gradually to around 5.5% of GDP on a net basis at end-2006, as is the stock of publicly guaranteed debt (about 1.5% of GDP at end-2006) and recognition bonds (about 12% of GDP at end-2006) associated with the pension reform of the early 1980s (discussed in the *2005 Survey*; OECD, 2005).

Figure 2.1. **Public finance indicators**



Source: Ministry of Finance and OECD calculations.

Low indebtedness and the introduction of the structural budget balance rule in 2001 have reduced the scope for fiscal activism. The correlation between the deviation of the price of copper from its long-term trend and the fiscal stance, measured by the cyclically-adjusted

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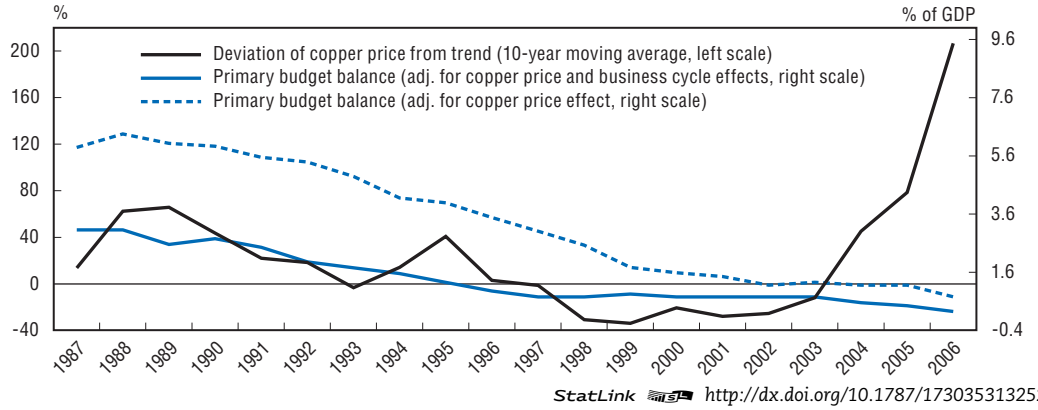
primary budget balance, appears to be weakening over time (Figure 2.2). This is confirmed by the empirical analysis reported in Annex 2.A1, which suggests that Chile's fiscal reaction function is well defined: the fiscal stance responds strongly to the level of net public indebtedness, and fiscal activism contributed to debt reduction, at least until 2001, when the positive impact on public finances of cyclical improvements in the business and copper price cycles had been complemented by discretionary action. This behaviour has allowed for a gradual reduction in the net debt-to-GDP ratio over the years. Since 2001, however, there appears to have been less fiscal activism, a development that is likely attributable to continued compliance with the fiscal rule in an environment of low indebtedness. However, it may be too early to ascertain the extent to which a reduction in business-cycle fluctuations in recent years can be ascribed essentially to the reformed policy framework, which has undoubtedly been a major contributor, or to changes in the nature of shocks hitting the economy.[1]

Figure 2.2. **Fiscal policy over the business and copper price cycles, 1987-2006**

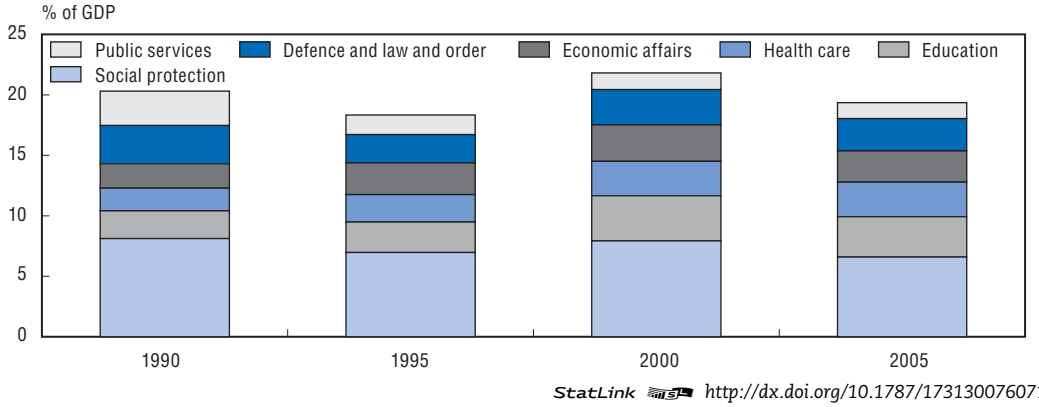


StatLink http://dx.doi.org/10.1787/173035313252

Source: IMF (International Financial Statistics), Central Bank of Chile, Ministry of Finance and OECD calculations.

The composition of government spending has improved simultaneously with fiscal consolidation. A reduction in outlays on interest payments, on the back of a sustained reduction in public indebtedness, has allowed the government to raise budgetary allocations for social programmes (social protection, education and health care) (Figure 2.3). This trend reflects the authorities' heightened policy emphasis on social

Figure 2.3. **Composition of central government spending, 1990-2005**



StatLink http://dx.doi.org/10.1787/173130076071

Source: Ministry of Finance.

development over the years. Nevertheless, as discussed in Chapter 3, the shares in GDP of government spending on education and health care are still well below the OECD average, which reflects to some extent a reliance on private financing, especially in the areas of tertiary education and health care.

Recent policy actions

The Fiscal Responsibility Law

The enactment of the Fiscal Responsibility Law (FRL) in September 2006 was an important step in strengthening the fiscal framework. The FRL embeds the structural budget surplus rule in law and introduces explicit formal mechanisms for capitalising the central bank and for dealing with pension-related contingencies, as recommended in the *2005 Survey* (Box 2.1). At the same time, the methodology for calculating the structural budget surplus target was adjusted to include revenue from molybdenum – a copper derivative that Chile exports in large amounts and whose price has been volatile in international markets, thereby affecting public finances – and those accruing from the taxation of privately-owned mining companies.

Box 2.1. **Chile's Fiscal Responsibility Law**

Enacted in September 2006, the Fiscal Responsibility Law (FRL):

- Creates the Fund for Economic and Social Stabilisation (*Fondo de Estabilisación Económica y Social*), the Pensions Reserve Fund (Fondo de Reserva de Pensiones) and the Contingency Unemployment Programme (Programa de Contingencia contra el Desempleo). Initial allocations for the Stabilisation and Pensions Reserve funds were set at a total of about USD 6.6 billion, financed by accumulated budgetary savings.
- Sets rules for a gradual recapitalisation of the central bank through phased capital transfers from the Treasury.
- Strengthens the institutional status of the structural budget surplus rule by requiring the government to state in its budget documentation the impact of policy changes on the structural budget balance.

The initiatives: A brief description

The Unemployment Programme

The Unemployment Programme enhances fiscal counter-cyclicality by allowing government spending on job-creation programmes if the unemployment rate exceeds either 10% in a given quarter or the quarterly average of the rate in the previous five years. Policy action is also allowed in communes where the unemployment rate is above 10%, regardless of the level of unemployment in the province where they are located. Information on the programmes financed by the government will be reported by the Ministries of Finance and Labour.

The Pensions Reserve Fund

The Pensions Reserve Fund provides contingent funding for the payment of assistance pensions and minimum pension guarantees. The Fund will be capitalised through annual transfers from the Treasury of at least 0.2% of previous year's GDP (capped at 0.5% of previous year's GDP). Capital injections will persist until the Fund has accumulated assets (including the return on investments) equivalent to 900 million UFs (about USD 30 billion in April 2007). Fund assets can be used to finance the payment of pension contingencies

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Box 2.1. **Chile's Fiscal Responsibility Law** *(cont.)*

only 10 years after enactment of the FRL. The outlays financed by the Fund each year cannot exceed one-third of the total of planned spending on assistance pensions and minimum pension guarantees in the reference year and the projected spending on these programmes in 2015. Fund assets will be managed by the Treasury and can be invested in Chile and abroad.

As discussed in the 2005 Survey, individuals who have contributed for at least 20 years to a personal fund but have not been able to save enough to ensure a retirement income at least as high as the minimum pension are entitled to a means-tested minimum pension paid by the government. The fiscal cost associated with this entitlement is a main source of contingent liabilities for the central government, because this cost is affected by uncertainty about the financial performance of pension funds, developments in labour markets and the trajectory of individual contribution density (*i.e.* actual number of months of contribution over total potential months of contribution) over time.

The other pension-related contingency is associated with the payment of means-tested, general revenue-financed assistance pensions to those individuals whose contribution history falls short of the minimum required duration and who do not have alternative sources of income. The assistance pension is not an entitlement, unlike the minimum pension guarantee, because the aggregate budgetary allocation for these pensions is set by the government in the budget-making process, and, therefore, the value of these benefits depends on the number of beneficiaries. But the value of these benefits, which is currently about one-half of that of the minimum pension, may rise over the years, particularly as society becomes wealthier and presumably puts a higher premium on equity considerations.

The Fund for Economic and Social Stabilisation

All remaining budget surplus is allocated to this Fund. Operations are disclosed regularly, and prudential regulations allow for investment in high-grade corporate and government securities abroad.

Recapitalisation of the central bank

The FRL allows the Treasury to recapitalise the BCCh on a yearly basis for a period of five years by an amount that is equivalent to the budget surplus minus the capital injection into the Pensions Reserve Fund up to a ceiling of 0.5% of the previous year's GDP. The BCCh's net worth is estimated at –1.4% of GDP in 2008, considering a capital injection of 0.5% of GDP in July 2007, but excluding future losses associated with non-performing loans in the central bank's portfolio.

Chile is in the fortunate position of implementing the FRL at a time when fiscal consolidation has been secured. Typically, fiscal responsibility legislation has been introduced in the OECD area and in other Latin American countries, such as Argentina, Brazil and Peru, prior to, and in support of, fiscal consolidation and as an integral part of institutional reform in the fiscal area. Such fiscal rules therefore focus on the introduction of numerical ceilings/targets for the budget balance and/or level of indebtedness. In the Chilean context, however, the FRL institutionalises an existing fiscal rule – the structural budget surplus rule, which is well entrenched but hitherto not embedded in law – while explicitly introducing formal mechanisms for investing the savings accruing from continued adherence to the fiscal rule in an environment of low indebtedness and very supportive copper prices.

Further pension reform

Policy action has also aimed at addressing the remaining weaknesses of the pension system. As discussed in the *2005 Survey*, the Chilean pension system suffers from low coverage of social security and low density of contributions (Box 2.2). It was argued then that the time was ripe for addressing these challenges because of the comfortable fiscal position and the projected reduction in government spending on other pension-related commitments, including the redemption of recognition bonds issued to cover the transition costs of the early 1980s reform. Consistent with this policy advice, a Commission was set up in 2006 (*Consejo Asesor Presidencial para la Reforma Previsional*) to assist the authorities by proposing reform options. Legislation was subsequently submitted to Congress in December 2006 laying out the main elements of reform.

Box 2.2. **The pension system: An overview of the current system and background to the reform proposal**

An overview of the system[1]

The Chilean pay-as-you-go (PAYG) pension system was reformed in the early 1980s with the creation of a "three-pillar" system:

- The first pillar corresponds to: *i)* the minimum income guarantee (PMG) provided by the government for those individuals aged 65 years (60 years for women) who have contributed to a pension fund for at least 20 years but whose accumulated savings are insufficient to finance a minimum pension upon retirement; *ii)* the means-tested, general revenue-financed assistance pension (PASIS) paid to those workers (aged 65 years and above) who do not have another source of income; and *iii)* the military and national police schemes. While the minimum pension guarantee is an entitlement, payment of an assistance pension is not.
- The second pillar is mandatory, fully funded and privately managed; pensions are earnings-related and based on defined contributions. Contribution rates are capped at 10% plus the fee paid to the pension fund (AFP) for management and disability/survivor insurance (2.4% on average in 2004), in addition to the compulsory 7% contribution to health insurance (discussed in Chapter 3).
- The third pillar refers to complementary retirement plans (optional, fully funded, earnings-related, privately managed), where contributions are deductible from income taxation up to a ceiling.

There are three alternatives for the payment of retirement income: *i*) pensions administered by the AFPs (*retiro programado*), *ii*) annuities paid by a life-insurance company (*renta vitalicia*), and *iii*) a combination of both options, where the AFP pays a pension for a limited period and the life-insurance company pays an annuity, or the AFP pays part of the pension and the life-insurance company pays an annuity for the whole retirement period. Replacement rates are estimated to be in the neighbourhood of 50% (as of May 2004) on average for the second-pillar regime.

The challenges to be addressed in the reform proposal

The coverage of social security is low. Based on administrative records held by the pension fund industry's regulator, only about 55% of the labour force contributes to social security. This ratio is low in part because of labour informality (discussed in Chapter 4), and also because contribution to an AFP is optional for the self-employed, who account for about 25% of total employment.

Box 2.2. **The pension system: An overview of the current system and background to the reform proposal** *(cont.)*

Early retirement is widespread, although there are penalties, which have been raised.

The density of contributions is low. Density is defined as the actual number of months of contribution over total potential months of contribution (i.e. 240 months, corresponding to the minimum of 20 years). Based on the regulator's administrative records, about one-half of those individuals who contribute to social security, do so for less than 60% of their potential contribution period. Many individuals, particularly females and the self-employed, have gaps in their contribution history, affecting their ability to accumulate funds to finance their retirement income.

Simulations

Simulations reported in the *2005 Survey* based on Berstein, Larrain and Pino (2005) suggest that, at the current level of the minimum pension, those pensioners who will not have saved enough for a retirement income above the minimum pension but will have met the requirement for a minimum pension guarantee (20 years of contribution) will account for about 10% of pensioners towards the end of the forecast period (2005-25). Also, the share of pensioners who will receive a pension below the guaranteed level and are not entitled to a guarantee is set to stabilise over time, but at a high level of about one-half of pensioners over the forecast period. These individuals would receive a pension income based on their contributions plus the returns on their investment and, in addition, can apply for an assistance pension if they have no other sources of income, once their savings have been depleted.

Fiscal costs associated with the pension system

The pension system imposes costs on the budget associated with: *i*) the payment of pensions to the workers who chose to remain affiliated with the old PAYG regime, *ii*) the redemption upon retirement, invalidity or death of recognition bonds held by those individuals who chose to migrate to the new pension system in 1980, [2] *iii*) the payment of minimum pension guarantees to retirees who have contributed to the current regime for the minimum length of time set in law, but who have been unable to save at a level that ensures a minimum pension upon retirement, and *iv*) the payment of assistance pensions to workers who do not meet the requirements for a minimum pension guarantee.

The total cost of the civil pension system to the budget is approximately 2.7% of GDP in 2007 (considering the accrued interest on the recognition bonds). Current simulations show that the deficit of the old PAYG regime is set to fall from the current level of about 2.2% of GDP to about 0.4% of GDP by 2025, while payment of minimum pension guarantees and assistance pensions will rise from about 0.5% of GDP to 1.2% of GDP in 2025. The stock of remaining recognition bonds will have been redeemed by then.

1. See the 2003 and 2005 *Surveys*, Corbo and Schmidt-Hebbel (2004) and Arenas and Mesa-Lago (2006) for more information.
2. The recognition bonds were issued to finance the transition from the old PAYG regime to the current three-pillar system. These bonds can be redeemed upon retirement (65 years for males and 60 years for females), invalidity or death. The face value of the bonds is calculated at the moment of transition to the current system to yield a pension income equivalent to 80% of average earnings during 1978-79 pro-rated for the duration of enrolment in the old system. The bonds earn a mandated rate of return of 4% per year in real terms. For more information see Arenas and Gana (2005).

The pension reform proposal currently under discussion in Congress aims at tackling the main shortcomings of the current system (low coverage and low density of contributions) and at bolstering social protection by strengthening the solidarity pillar of the pension system in an incentive-compatible manner. Once it is fully implemented, the cost of the reform is estimated at about 1% of GDP per year. Its main elements, which are by and large consistent with the 2005 *Survey*'s policy recommendations, are:

- Creation of the Solidarity Pension System (*Sistema de Pensiones Solidarias*) targeted at low-income individuals (males and females) of 65 years of age. The system is set to be fully operational in five years following approval of the reform package. Invalidity and old-age pensions would be means-tested but not conditional on labour-market attachment and contribution history, as in the current system. When fully operational, the system would replace the current assistance pensions (PASIS) and the minimum pension guarantee (PMG) and would benefit the low- and middle-income population (those in the bottom three income quintiles). The system would cover workers who have not contributed to social security and hence have no pension income by granting them a pension benefit (*Pensión Básica Solidaria*) that would be capped at CLP 75 000 per month in 2009 (up from CLP 60 000 per month in 2008). Those workers who have contributed to a pension fund but whose savings are not high enough to allow them to earn a retirement income higher than CLP 200 000 per month in 2012 (CLP 60 000 in 2008) would receive top-up payments (*Aporte Previsonal Solidario*). The implicit withdrawal rate associated with this top-up payment implies a 37.5% effective marginal tax on contributory pensions.
- Replacement of the AFP Superintendency by a new regulator (*Superintendencia de Pensiones*) and creation of an Investment Council (*Consejo Técnico de Inversiones*) under the new regulator to strengthen its prudential regulation capability. The institution in charge of administering the solidarity pension system (*Instituto de Previsión Social*, which would replace INP, *Instituto de Normalización Previsional*) would be under the supervisory purview of the new regulator. Agencies to improve services to pensioners and to raise awareness of pension entitlements and obligations would also be created.
- Introduction of a bonus per child to be awarded to women as means of fostering gender equality. The bonus would be equivalent to a year's contribution (on a minimum wage) to a pension fund and would earn a real rate of return equal to the average real rate earned by all C-type pension funds.[2] Life and invalidity insurance premia would be calculated separately for males and females, resulting in lower premia for women on account of their longer life expectancy. The gender difference between these premia would be paid into the recipient's pension fund.
- Introduction of compulsory contributions to a pension fund for own-account workers, who would have access to solidarity pensions. The level of contributions would be raised over a seven-year period following approval of the reform package, and contributions for health insurance would be introduced in 10 years for these workers, as is currently the case for dependent workers.
- Introduction of a pension contribution subsidy for younger adults (18-35 years of age) during the first two years of employment for those workers earning up to 1.5 times the minimum wages. The subsidy would include a payment to the employer equivalent to one-half of a pension contribution on a minimum wage and a payment of another one-half of a pension contribution to be made directly into the worker's pension fund.

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- Introduction of a subsidy for voluntary retirement saving equivalent to 15% of the amount currently saved through voluntary pension schemes. The new subsidy is targeted to medium-income families that currently do not benefit from the existing tax incentives for saving for retirement. About 200 000 contributors are expected to benefit from the new subsidy.
- Introduction of a tender among AFPs for the affiliation of workers entering the labour market as a means of fostering competition in the industry and reducing administrative costs. The tender process would select the fund manager offering the lowest fee; the contract would last for 12 months, during which period the new entrants would not be allowed to switch to another pension fund. Life and invalidity insurance (SIS) would be unbundled from fund management: insurance would be tendered for all fund-holders in the AFP system, differentiated only by gender. Finally, the ceiling on pension fund investment abroad would be raised to 80% from the current level of 45%. Banks would be allowed to enter the AFP market, subject to prudential regulations to ensure the unbundling of pension fund management from banking operations. Employers would have the option of contributing to a worker's pension fund through the creation of complementary collective saving mechanisms (*Ahorro Previsional Voluntario Colectivo*). Of course, the scope for boosting competition among pension fund managers is constrained by the price and return elasticities of demand, which are low (Berstein and Micco, 2002). Lack of awareness by affiliates of administrative-cost differentials among fund managers also discourages competition: a survey conducted in 2002 (*Encuesta de Protección Social*) showed that 93% of respondents did not know the value of these costs.

Contingencies also exist with regard to the redemption of recognition bonds. Recent simulations show that, if the probability of redemption on the basis of invalidity or death is adequately taken into account, the cost to be borne by the budget associated with the unwinding of the stock of recognition bonds may be more front-loaded than previously expected (Arenas and Gana, 2005).[3] This is important, because about 80% of the recognition bonds issued during 1981-2004 are yet to be redeemed, and about 30% of redemptions during 1981-2004 were on the basis of invalidity or death. But, while the claim on the budget is likely to materialise earlier than previously projected, the fiscal cost is estimated to be somewhat lower than previously estimated due to the fact that the interest accrued on these bonds is also lower as a result of more front-loaded redemptions.

Tax measures

Chile's tax system is modern, but some inefficiencies remain (Box 2.3). In particular, payment of a stamp duty is due on credit and loan transactions, as well as on the issuance of fixed-income securities. The statutory rate also varies according to the maturity of the contract, currently within a range of 0.134-1.608% per month in the case of loans, although it is being reduced gradually starting in 2007 to 0.1-1.2% in 2009. As in other countries in Latin America where financial transactions taxes are in place, there are likely to be considerable efficiency losses, including through the impact that these levies may have on financial intermediation.[4] The taxation of financial transactions increases the cost of loans, imposing a proportionally heavier burden on firms with limited access to the financial market, such as SMEs, for which bank lending may be the only source of financing. They have also discouraged the renegotiation of contracts, because renegotiated credits have until recently been taxed as new loans, therefore impeding competition in the banking sector. Elimination of these taxes is nevertheless constrained by the amount of

Box 2.3. **Chile's tax system: An overview and main issues**

An overview

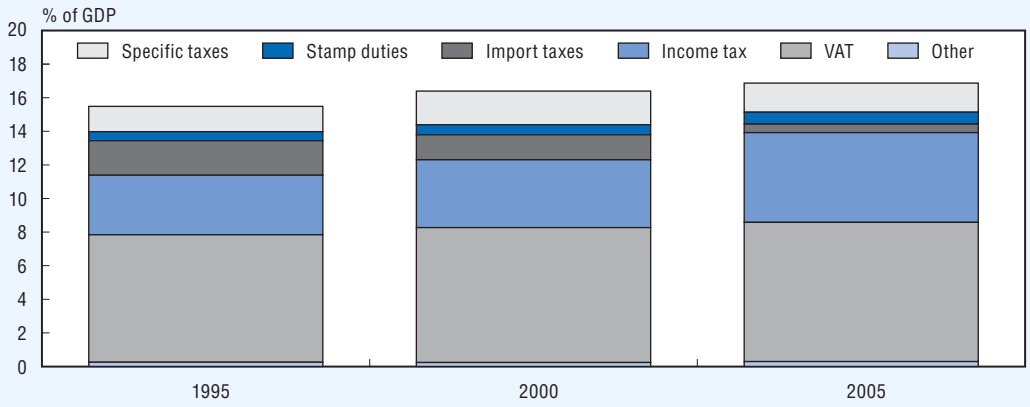
Chile's tax system has the following main characteristics:

The personal and corporate tax systems are fully integrated and account for about one-third of tax collection (Figure 2.4).[1] There is a 17% corporate tax (*Impuesto de primera categoría*, IPC), an earnings tax (*Impuesto de segunda categoría*, ISC) and a progressive general income tax (*Impuesto global complementario*, IGC) with the highest marginal rate at 40%. In particular:

- Selected investments, donations to higher-education institutions and expenditure on labour training are deductible up to a ceiling against the IPC. Non-residents pay a flat rate of 35% on profit remittances and public enterprises pay a flat rate of 40%. Professional services and enterprises located in Special Economic Zones (mainly the far North and South, and Easter Island) are exempt.
- There is a presumptive taxation regime for unincorporated businesses in selected sectors (agriculture, small mining and transport) subject to a turnover threshold. Special tax regimes are also in place for small enterprises (annual turnover less than 3 000 UTMs) based on simplified accounting, and for small taxpayers (street vendors, miners, craftsmen, etc.) based on turnover. [2]
- The ISC and the IGC are progressive and apply to the same base at the same marginal rates. Taxes are filed on an individual, rather than household, basis. The ISC is paid monthly, while the IGC is due annually. The exemption threshold is nevertheless relatively high, at 13.5 UTM per month for the IPC and 13.5 UTA per year for the IGC (121% of monthly and annual income per capita, respectively, in 2005).

The VAT is the main indirect tax, accounting for about 44% of total tax collection. Transactions are taxed at a uniform rate of 19%. Exports, transport and life insurance are exempt (professional, educational and health care services are exempt). There is no registration threshold, as discussed in Chapter 4. Other indirect taxes include excises on tobacco, alcohol and fuels, import duties (at a flat rate of 6%, although the effective rate is less than 2% on account of several free trade agreements) and stamp duties, which affect primarily credit operations (discussed in the main text).

Figure 2.4. **Composition of central government tax revenue, 1995-2005**



StatLink http://dx.doi.org/10.1787/173147608266

Source: SII.

Municipal taxes account for about 1.5% of GDP and comprise a property tax, municipal licenses and a vehicles registration tax. The property tax is creditable against the corporate income tax.

1. This ratio excludes municipal tax collections and mandatory contributions to health and unemployment insurance, as well as to a pension fund (4.7% of GDP in 2005).
2. The monthly and annual tributary units (UTM and UTA, respectively) are inflation linked measurement units expressed in CLP and used for tax purposes. The UTA is just the UTM multiplied by 12.

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revenue they yield: collection of stamp duties accounted for about 0.6% of GDP in 2006. But recent reform has aimed at mitigating these inefficiencies through a planned gradual reduction in statutory rates during 2007-09, as well as the exemption of renegotiations of loan contracts from the stamp duties.

Recent measures to modify the tax system have focused on fostering innovation and simplifying tax procedures for SMEs. To encourage investment in R&D, the withholding tax due on transfers of intellectual property (consulting fees, software acquisition, etc.) was reduced to 15% of expenditure from the current level of 20-30%. Also, during a 10-year period, 35% of R&D spending will be creditable against the income tax and the remaining 65% of expenditures will be tax deductible, provided that the enterprise signs a contract with a research centre accredited by the government's development agency (CORFO) and that these contracts are registered at CORFO. Efforts to simplify tax procedures for SMEs have focused on electronic filing of taxes, as discussed in Chapter 4. The new procedure is considerably simpler: it makes use of the information available in the firm's VAT returns and accounting statements, and is both faster and cheaper for SMEs.[5] Exports of services are now exempted from stamp duties and zero-rated for VAT, as is currently the case of exports of goods. Finally, the credit that currently exists for foreign investors for investment in fixed capital in the context of bilateral tax treaties (currently at 30% of tax liabilities) has been extended to Chileans investing abroad, regardless of whether a tax treaty is in place or not. Congress has recently turned down a proposal to allow for accelerated depreciation of fixed capital investments carried out during 2007-08 as a means of encouraging private-sector investment.

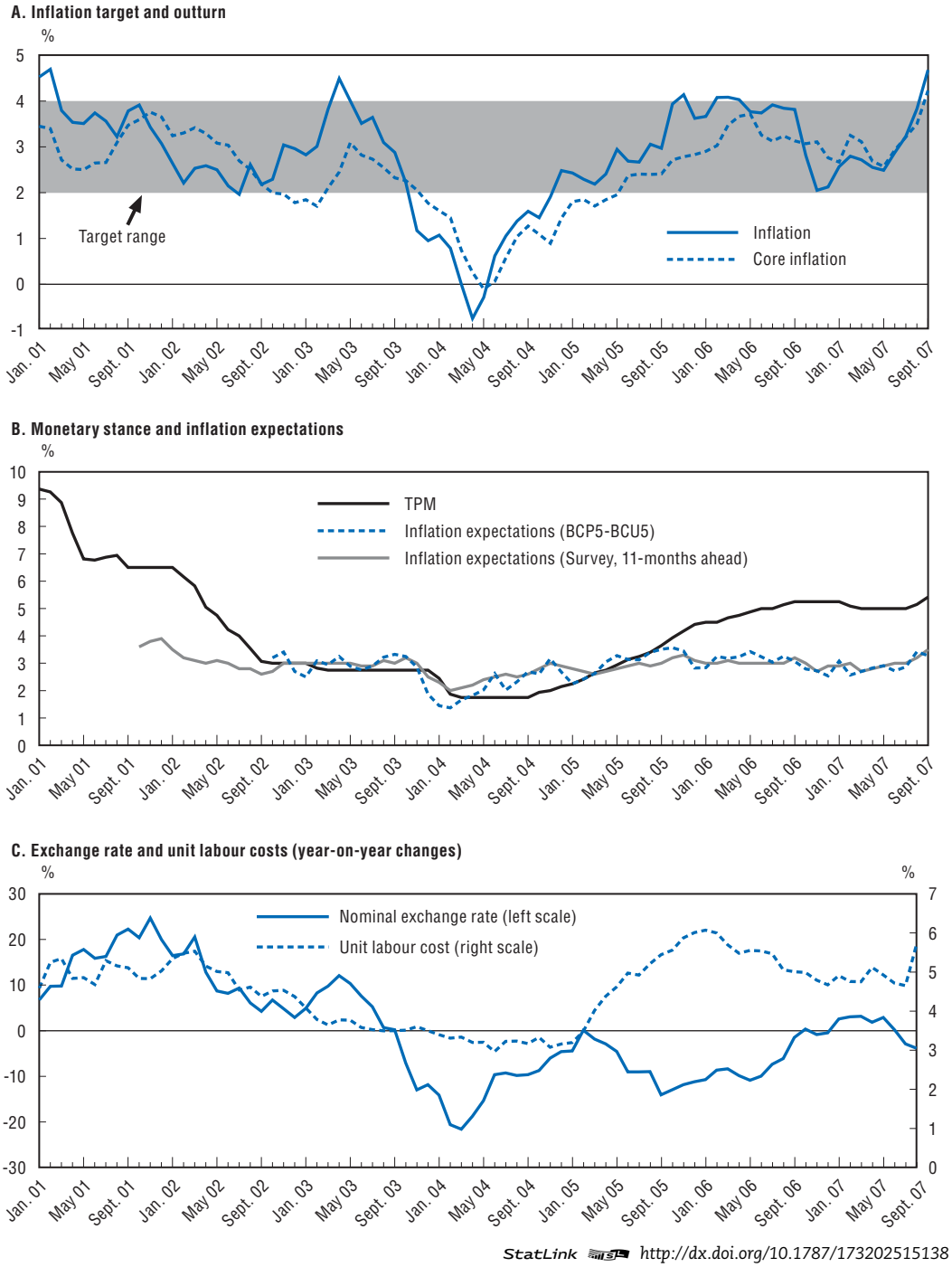
There are pending issues in tax policy. The income tax encourages individuals to incorporate themselves. This is because of the discrepancy between the corporate income tax (IPC) of 17% and the top bracket of the personal income tax (ISC) of 40%, and of several exemptions to the corporate income tax, including retained earnings (discussed in more detail in Chapter 4). Several savings instruments, including social security contributions up to a ceiling, are deductible from income taxation (Serra, 1998). In addition, the tax system is in effect mildly regressive. Although the high marginal rates and exemption threshold of the personal income tax would make for high progressivity, average rates are much lower as a result of the exemptions and incentive for individuals to incorporate themselves. The personal income tax system is therefore much less progressive than in most countries in the OECD area.[6] In any case, it should be noted that most of the redistributive effort in Chilean public finances that is contributing to the improvement in income distribution noted in Chapter 1 is carried out through the expenditure side of the budget, which may be optimum (Engel, Galetovic and Raddatz, 1999).

Monetary policy

Recent trends and outlook

Monetary policy has successfully anchored inflation expectations. The policy framework has combined inflation-targeting and a floating exchange rate regime since September 1999. Headline inflation has remained within the 2-4% range targeted by the BCCh since 2001, except for the period from end-2003 to end-2004, when it undershot the target floor by a significant amount (Figure 2.5). Headline inflation remained close to the ceiling of the target range during most of 2006, and just exceeded it for very short periods, essentially on account of high energy prices, but began to converge to the mid-point of the

Figure 2.5. **Monetary stance, exchange rate and unit labour costs: Recent trends, 2001-07**



StatLink http://dx.doi.org/10.1787/173202515138

Source: Central Bank of Chile and OECD.

target range towards the end of the year. More recently, due to rising energy and food prices, as well as a closing output gap, core and headline inflation have trended up and are set to exceed the ceiling of the target range towards year-end.

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The policy interest rate (*Tasa de Política Monetaria*, TPM) was raised successively from September 2004 to end-2006 towards a more neutral stance in line with a pick-up in activity and rising unit labour costs. However, the concomitant appreciation of the *peso*, coupled with broadly stable inflation expectations within the target range, resulted in a sharp tightening of monetary conditions. The monetary stance was subsequently eased in January 2007 because of weak GDP readings towards end-2006 and a faster-than-expected convergence of inflation to the 3% target. The monetary stance is likely to be tightened further towards end-2007 at a pace that will depend on changes in the international environment, the possible propagation of inflationary shocks to other prices in the economy, and the strength of economic activity. Domestic credit continues to grow at a vigorous pace, despite a deceleration since early 2007 in the consumer credit segment – a development that may be attributed to the impact of high energy prices on consumer sentiment and the concomitant monetary tightening since mid-2007.

The monetary policy framework has been instrumental in anchoring expectations around the target. The policy interest rate and the expected inflation series depicted in Figure 2.5 (Panel B) have tended to move together since the adoption of inflation targeting and the liberalisation of the exchange-rate regime in September 1999, a finding that is confirmed by the empirical evidence reported in Annex 2.A1. In particular, the combination of exchange-rate flexibility and inflation targeting since late 1999 has allowed monetary policy to be conducted in a forward-looking manner, so that the monetary authority can react to changes in inflation expectations, rather than being encumbered by the need to defend an exchange-rate peg.

Recent policy actions

The BCCh has re-emphasised the mid-point of the inflation target and lengthened the time horizon for achieving the target. At end-2006, the BCCh issued a revision to its 2001 document on the operations of the inflation-targeting regime (Central Bank of Chile, 2006), re-defining the inflation target to 3%, with a tolerance band of plus or minus 1 percentage point. Until then, the BCCh had stated that it would target inflation within a 2-4% range, rather than emphasising the mid-point of the target range. At the same time, the BCCh also redefined its inflation target horizon to 2 years. Until then, it had targeted inflation within a horizon of 1-2 years.

Financial deepening

Chile's financial market is reasonably well developed. As discussed in the *2005 Survey*, the ratios to GDP of credit to the private sector and equity-market capitalisation are high by emerging-market standards. However, turnover is low in equity markets, partly as a result of a preponderance of pension funds, which typically follow a buy-and-hold strategy on account of the long maturities of their liability portfolios. At the same time, the size of the fixed-income market (corporate and government) is comparable to that of several OECD countries in relation to GDP, and the public debt market appears to be liquid on the basis of turnover and bid-ask spread indicators. The corporate bond market is also sizeable in comparison with other emerging markets and close to the OECD average. Further financial deepening would therefore call for policy action to encourage the development of other market segments.

The Capital Market Law II (MKII) was approved in March 2007, following nearly four years of debate in Congress. The legislative process was longer than expected, which

the authorities attribute to the complexity of the draft law. There is widespread recognition that the reform package could go a long way to reducing remaining impediments to further financial deepening, especially by facilitating access to risk capital for enterprises and strengthening the stock market. Banks will be allowed to invest (through their subsidiaries) up to 1% of their equity in risk-capital initiatives, and capital gains from investment in risk-capital funds will be exempted from taxation. The reform package also introduces stricter regulations for the custody of bank, insurance company and AFP certificates, which will make for greater capital-market security. A pledge registry was also created to facilitate credit operations by allowing intermediaries to know whether or not assets pledged as collateral are being used in other transactions. Also, the bankruptcy compensation framework for derivative-based transactions was brought up to international standards. At the same time, a Capital Markets Commission was created in 2006 to advise the government on areas for future reform. Moreover, recent policy initiatives have focused on facilitating Chile's financial integration in international markets. The securities and insurance regulator, SVS, aims to upgrade the offshore stock exchange to make existing information requirements more flexible for non-residents wishing to trade in Chilean markets.

Public debt management has contributed to fostering the development of the domestic fixed-income market. The Central Bank of Chile (BCCh) is the main issuer of government securities, accounting for the bulk of traded domestic debt (Ministry of Finance, 2006b) (Table 2.2). The Treasury issues abroad and in the domestic market, essentially through long-dated, UF-indexed securities. CODELCO, the mining company, essentially issues abroad and, therefore, provides a benchmark for other Chilean private-sector issuers, given the dearth of Treasury-issued securities in foreign markets. As

Table 2.2. **Public debt indicators, 1995-2005**

In per cent of GDP

	1995	2000	2005
Traded public debt			
Central government[1]	6.0	3.8	5.2
In CLP	0.3	0.2	1.8
In USD	5.7	3.6	3.4
Central bank	28.8	31.2	16.0
Fixed rate	0.0	4.0	5.6
UF-indexed	27.8	26.2	7.4
USD-indexed/denominated	1.1	2.1	2.6
Other	–0.1	–1.1	0.1
Public enterprises[2]	2.1	4.4	5.4
Memorandum items:			
Total gross debt	43.2	41.2	30.9
Consolidated[3]	40.3	36.2	24.3
Public enterprises	2.9	5.0	5.6
Guaranteed debt	4.1	0.9	1.4
Recognition bonds	22.5	19.8	12.0
Subordinated debt	3.6	2.1	1.4
Consolidated net debt[3]	8.3	6.8	2.5

1. Includes CORFO liabilities and excludes securities held by the central bank.
2. Excludes liabilities with the Treasury.
3. Central government and central bank.

Source: Ministry of Finance.

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recommended in the 2005 *Survey*, policy action has focused on replacing inflation- and exchange rate-indexed securities by instruments paying a nominal rate of return, which facilitates the de-indexation of the Chilean economy. The replacement of USD-denominated debt by instruments denominated in *pesos* has been carried out while reducing foreign reserve holdings, so as to maintain the government's net foreign asset position. Effort has been made to achieving greater coordination between the BCCh and the Treasury on debt issuance, with the Treasury focusing on the long end of the yield curve and the BCCh gearing its portfolio to short- and medium-term instruments needed for the conduct of monetary policy.

Challenges and policy recommendations

The challenges

The main challenge facing Chile in the macroeconomic area is to accommodate demands for hiking government spending, including through the reduction of the structural budget surplus target from 2008, while maintaining a lean public sector in a low-tax, low-debt environment. Although the planned increase in social spending from 2007 is consistent with continued adherence to the structural budget surplus rule and macroeconomic stability, it is important to carefully assess the impact of the resulting fiscal expansion on the effectiveness of government spending. The multiple social demands that typically arise in a country of Chile's income level and considerable income inequality will need to be satisfied while ensuring that public indebtedness remains low, which is the outcome of years of careful fiscal management, and the tax burden on businesses and individuals continues to be comparatively light, which has underpinned Chile's competitiveness and sustained its strong growth performance.

Fiscal policy

Strengthening fiscal responsibility legislation further

The FRL makes headway in several policy areas. It includes formal mechanisms for dealing with pension-related contingencies through the creation of the Pensions Reserve Fund. This is a sensible strategy for pre-funding these contingencies within the confines of the fiscal rule, while embedding it in law. The FRL also enhances the scope for fiscal counter-cyclicality through the Unemployment and the Stabilisation funds, and deals with the long-standing need to recapitalise the central bank. These measures are consonant with the OECD's policy advice, as discussed in previous *Surveys*, but there is some room for improvement in two main areas:

- The option of requiring the assets of the Pensions Reserve Fund to be invested abroad during the 10-year period in which withdrawals cannot be made would be consistent with effort to further insulate the domestic economy from commodity price volatility.
- On the capitalisation of the central bank, benefiting from the favourable fiscal situation, it would be prudent to increase the limit set by law (0.5% of GDP per year for five years) to allow for full recapitalisation at a swifter pace, given that the net worth of the central bank is projected at –1.4% of GDP in 2008.

The level of the structural budget surplus to be targeted by the government was reduced in May 2007 to 0.5% of GDP from 1% of GDP.[7] The 2008 budget will be drafted according to the new surplus target. The reduction of the fiscal rule's structural budget surplus target is consistent with falling net public indebtedness, diminishing central bank

recapitalisation needs, sizeable fiscal savings that can be used to finance the projected cost to the budget associated with pension-related contingencies, and is understandable given the need to satisfy multiple social demands in a country of Chile's income level. The budgetary resources released through the reduction of the structural budget surplus will be used to finance additional spending on education. Although the corresponding fiscal stimulus is not expected to be destabilising, the authorities are advised to be vigilant about the cost-effectiveness of this additional spending.

Making the most of pension reform

The authorities' pension reform proposal aims to address the root causes of the contingencies that will burden the current system in the future – low coverage and low density of contributions – while strengthening social protection for the elderly. The proposed scheme improves upon the current one, because it aims at encouraging saving for retirement through capped, top-up payments for those workers who have accumulated enough assets to finance retirement income above a certain minimum level, while enhancing social protection for the poor through solidarity pensions. Instead, the current system guarantees a minimum pension only for workers who have contributed to a pension fund for a long enough period of time and does not provide any particular incentive for retirement saving. But, the strength of the incentives for saving introduced in the proposed scheme depends not only on the level of the solidarity pension, but also on the cap on, and withdrawal rate associated with, the top-up payments. While the basic thrust of the pension reform proposal is in line with the OECD's policy advice in previous *Surveys*, there is some scope for improvement.

It is not clear whether, at the proposed levels, the cap and the marginal tax rate on the top-up payments will create strong enough incentives for saving for retirement. Of course, this is an empirical question. A flat uncapped, top-up scheme would provide stronger incentives for saving but would also probably be prohibitively costly. But, if needed and public finances permitting, it might be advisable to strengthen these incentives through some recalibration of the relevant parameters. In addition, the strength of the incentives for retirement saving introduced in the proposed scheme also depends on the relative value of the solidarity pension. While an increase in the value of these pensions in relation to the minimum wage undoubtedly strengthens social protection for the elderly, it also reduces the incentive for low-income workers to save through a contributory pension scheme, especially those who have never done so. Therefore, the level of the solidarity pension should be set sufficiently low in relation to the minimum wage; currently, the assistance pension is about one-half of the minimum wage, or about one-third of the median wage. This is a fair amount by OECD standards, where the average minimum retirement benefit, which includes all types of safety-nets, such as minimum and basic pensions and means-tested benefits, is just under 29% of average earnings. Because the strength of the incentives for retirement saving needs to be tested in the course of reform, gradualism is recommended during implementation, as planned by the authorities, while at the same time taking the necessary steps to raise awareness among the targeted population of the benefits of preparing for old age.

Making social security contributions compulsory for own-account workers is consistent with the policy advice made in the *2005 Survey*. This is important because currently only 5% of these workers contribute to a pension fund according to administrative records, while accounting for about one-quarter of employment. The

problem is that these individuals may either not be able to afford coverage or perceive it as too costly in relation to the benefit of social protection, which creates incentives for non-compliance. Therefore, in addition to the recommendations above to strengthen the incentives for saving for retirement for the population as a whole, special attention should be focused on independent workers. Not only will enforcement efforts need to be stepped up considerably, but also the cost of social protection perceived by these workers will need to be gauged through regular surveys, which would allow the authorities to assess the intended population's willingness and ability to pay.

The reform proposal also makes health insurance compulsory for independent workers 10 years after approval of the reform package. But, because health insurance coverage is already high for the population as a whole, including own-account workers, it would be recommendable to make contributions for health insurance compulsory at the same time and following the same timeframe for implementation as in the case of pension contributions, rather than delaying it until 10 years after approval of the reform proposal. It is important to note that an expansion of health care services provided publicly under AUGE, discussed in Chapter 3, would go a long way to strengthening social safety nets but would also reduce the attractiveness of health insurance for individuals on low incomes.[8]

Efforts to foster gender equality are welcome. Women will likely benefit from the proposed reform, because, as noted in the *2005 Survey*, they are less likely than men to meet the length-of-contribution requirement for a minimum pension guarantee on account of their patchier labour histories, especially during their child-bearing years. Options for ensuring gender equality are welcome but should not aim at overcorrecting this imbalance by giving women a higher retirement income than those accruing to men with the same contribution history, accounting for life-expectancy differentials. Simulations suggest that the proposal for reducing the life/invalidity insurance premia paid by women relative to those paid by men on account of their longer life expectancy will overcorrect the gender imbalance that currently exists to the detriment of women for those females with pension fund assets less than CLP 60 million. It would also be desirable to eliminate in a phased manner the gap that currently exists between the retirement age for males (65 years) and females (60 years) for the contributory pillar, given that the retirement age is proposed to be the same (65 years) for males and females in the solidarity pillar. A reduction in the age gap between males and females is a trend in the OECD area.

In the case of youths, the subsidy programme is likely to contribute to higher labour force participation, as discussed in Chapter 5, and to encourage affiliation to a pension fund. However, the subsidy could be paid in full directly into the worker's pension fund, rather than one-half to be paid to the employer and the remainder into the worker's pension fund, as currently proposed.

The options envisaged for boosting competition among the pension fund managers (AFPs) are steps in the direction of reducing administrative costs. These costs have decreased over time, to 2.4% of invested funds on average (including survival and disability insurance) in 2004 but can be lowered further. The tendering of life and invalidity insurance for all fund-holders in the same AFP makes discrimination on the basis of personal medical history more difficult, which potentially improves risk pooling, and increases transparency by allowing workers to shop for the lowest premia. Also, the elimination of fixed fees for transfers of funds among AFPs will help to facilitate portability and hence to boost competition. Finally, the increase in the ceiling on assets under

management that AFPs can invest abroad (from 45 to 80%) is welcome to allow them to diversify their portfolios, and possibly seek higher rates of return, which should make portfolio management more efficient. However, as noted below, the regulatory framework for pension funds should be liberalised further in support of financial deepening.

The regulatory framework for pension fund management could be liberalized further. Chile's financial markets are dominated by the pension fund industry; therefore, reform in this area should be guided by caution and gradualism. However, the option of introducing greater flexibility in the quantitative ceilings currently in place for portfolio allocation could be considered as a means of encouraging activity in the fixed-income market. Emphasis could gradually be shifted towards prudential regulations for portfolio composition to be issued by the industry regulator, rather than mandated quantitative restrictions. Greater flexibility would likely lead to increased portfolio diversification, including through the removal of the ceiling on asset holdings abroad, and activity in the secondary-market segment for fixed-income securities. Effort to boost competition in the pension fund management market, which is worthwhile, given the extent of market concentration, would go in the direction of fostering activity in secondary fixed-income markets. Splitting asset management from administration could also be considered.

Finally, the institutional design of the pensions system may overburden the regulator. At the normative level, the current system focuses on the Superintendency for Pension Funds under the Sub-Secretary for Social Insurance. The reform proposal envisages the replacement of the current regulator by another one (Superintendency of Pensions, also under the Sub-Secretary for Social Insurance), and the creation of a Users' Commission (*Comisión de Usuarios*) for each AFP.[9] The inclusion of the institution in charge of administering the solidarity pension system (*Instituto de Previsión Social*) under the supervisory purview of the new regulator may overburden it, given that the nature of regulation in the private pension system differs significantly from the administration of a first-pillar system of social protection. The new institutional set-up is more complex at the normative level; therefore, it will be important to clearly define the roles of the new institutions to avoid duplication and overlapping of mandates. It is equally important to maintain the independence of the regulator in the new institutional set-up.

Making the tax system more efficient

Measures are being taken to gradually reduce the stamp duties, which are welcome, and to strengthen incentives for innovation, as recommended in the *2005 Survey*. Gradualism is nevertheless recommended in the case of stamp duties, because revenues accruing from these levies account for about 0.7% of GDP, and because the revenue foregone and the benefits of reform in terms of efficiency gains are difficult to quantify. Also, consideration should be given to closing the gap in the income tax rates paid by individuals in the top income bracket and by corporations as a means of deterring abuse through self-incorporation. As noted in Chapter 4, personal expenses other than those related to the enterprise's income-generating activities cannot be included in the calculation of taxable income, which is a desirable feature of the tax code. Overall, it is important to bear in mind that, as noted above, a low tax ratio and a lean public sector are assets that should not be squandered against emerging pressures for increasing public spending on several programmes.

Financing the provision of social services in a cost-effective manner

The planned increase in social spending, while consistent with the authorities' emphasis on enhancing social protection, should be implemented in a cost-effective manner and geared towards achieving a commensurate improvement in social indicators. In some areas of social services, Chile does not differ significantly from the OECD average in the level of total spending in relation to GDP. This is the case of primary and secondary education, essentially because private spending is substantial, which compensates for comparatively low public spending levels. This discrepancy in the level of government-financed spending, which is especially large in tertiary education and health care, as discussed in Chapter 3, would suggest that there is some scope for hiking public financing. Emphasis on housing policies is also justified, given the need to gradually close Chile's still sizeable, albeit declining, housing deficit. But it is important to bear in mind that, for an increment in public spending to deliver the expected improvements in social outcomes, it needs to be sustained over time.

Monetary policy and financial deepening

Chile's monetary framework – combining inflation targeting with exchange-rate flexibility – is working well. The maintenance of low, stable inflation for several years has allowed for further financial deepening through the development of a mortgage market, for example, a lengthening of fixed-income asset maturities and improving credit conditions. The non-bank credit market is booming, especially the business-to-customer segment, calling for enhanced efforts on the part of the BCCh to monitor developments in this area by strengthening its data collection and analysis capabilities. This is important to improve the monetary authorities' understanding of changes in the credit channel of the monetary transmission mechanism, which is likely to become increasingly potent over time.

Public debt management has an important role to play in financial-market development. An important constraint to the development of the fixed-income market is the limited supply of government debt. The Treasury does not (and will not, based on current projection) need to resort to the market for budget financing purposes, given the central government's (including the central bank) net credit position, but it is playing a role in building risk-free benchmarks for the private sector. For example, issuance of CLP-denominated long-term bonds would facilitate the pricing of same-maturity corporate bonds, for which there is robust demand by life-insurance companies. Demand for these long-dated instruments is likely to rise as pension-fund contributors retire and need to acquire life insurance annuities. Liquidity, on the other hand, is constrained by the predominance of pension fund and life insurance companies in the market, which tend to follow buy-and-hold investment strategies, as noted above, and the limited supply of government securities.

Against this background, it is important to formulate a debt-management strategy and clearly communicate its objectives to the market, so that debt issuance and redemptions can be carried out on a regular basis and follow a pre-announced calendar. To enhance transparency and communicability, a report on the government's Debt Management Strategy could be published on a yearly basis to complement the Ministry of Finance's Report on Public Debt Statistics (*Informe de Estadísticas de la Deuda Pública*), which is issued every year. In Latin America, the experiences of Brazil and Mexico in this respect are illustrative.

The authorities are rightly devising options for facilitating access to credit by small and medium-sized enterprises (SMEs). On account of their credit quality, these enterprises typically rely on bank credit for funding, rather than capital markets. In this respect, Chile is not different from most OECD countries. But there are options for mitigating natural cost and access disadvantages faced by SMEs in comparison with larger borrowers. SMEs are likely to benefit from the rapid growth of the mutual fund industry, which creates options for financing higher-yield, riskier issuers.

Summary of recommendations

This chapter's main recommendations are summarised in Box 2.4.

Box 2.4. **Summary of recommendations**

Strengthening fiscal responsibility legislation further

- Consider increasing the annual limit on transfers to recapitalize the BCCh from the current level of 0.5% of GDP per year to allow for a speedier completion of the recapitalisation of the central bank.

Making the most of pension reform

- Set the value of the solidarity pension sufficiently low in relation to the minimum wage to strengthen incentives for saving through a contributory scheme.
- Gauge the willingness of own-account workers to pay for social protection through regular surveys, while strengthening enforcement capabilities when contribution becomes mandatory.
- Make health insurance mandatory for own-account workers at the same time and following the same timeframe as in the case of pension contributions, rather than delaying implementation until 10 years after approval of reform.
- Ensure that options for correcting gender imbalances do not give women a higher retirement income than those accruing to men with the same contribution history, accounting for life-expectancy differentials.
- Eliminate in a phased manner the gap that currently exists between the retirement age for males (65 years) and females (60 years) for contributory pensions.
- Maintain the independence of the AFP regulator in the new proposed institutional set-up.

Making the tax system more efficient

- Reduce the stamp duties gradually.
- Assess the net benefits of reducing the discrepancy between the top marginal rate for the personal income tax (currently at 40%) and the uniform corporate tax rate (currently at 17%).

Financing the provision of social services in a cost-effective manner

- See recommendations in Chapter 3.

Fostering further financial sector development

- Gradually replace mandated quantitative restrictions by prudential regulations for pension fund portfolio composition to be issued by the industry regulator.
- Boost coordination between the BCCh and the Treasury on debt issuance management.

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Notes

1. De Mello and Moccero (2007) estimate a structural model for four Latin American inflation targeters (Brazil, Chile, Colombia and Mexico) and conduct counterfactual exercises to test whether volatility in interest rates, inflation and the output gap changed significantly after adoption of inflation targeting coupled with exchange rate flexibility in these countries. The results for Chile suggest that the interest rate became less volatile after September 1999, when the peso was allowed to float, due to milder shocks in an environment where monetary policy has been unencumbered by the need to defend an exchange-rate peg.
2. There are five types of pension funds, ranging from A to E, where A-type funds have the riskiest investment portfolios.
3. Previous simulations had been based on the expected retirement dates for the workers that chose to migrate to the new regime after 1981 and therefore hold recognition bonds. In doing so, these simulations excluded early withdrawals on the basis on death or invalidity, which are additional conditions for redeeming these bonds.
4. For example, empirical evidence on bank debit taxes in Latin America suggests that such instruments can have considerable disintermediation effects (Baca-Campodonico *et al*., 2006).
5. In addition, firms may opt to have the SII provide them with a pre-filled, on-line tax return at no additional cost. The tax simplification reform also reduces the monthly provisional tax payments (therefore reducing the working capital requirement for SMEs that are not net taxpayers) and provides a strong incentive to invest, since it allows fixed assets to be depreciated instantaneously.
6. Because of its uniformity, the VAT tends to be regressive, when the effect of life-time earnings on consumption decisions is not taken into account (Engel, Galetovic and Raddatz, 1999). More recent evidence that takes into account the role of retained earnings and the incentive for self-incorporation, as well as exemptions in the VAT, confirms the slight regressivity of the Chilean tax system (Cantallopts *et al*., 2007).
7. See Velasco *et al.* (2007) for more information.
8. The experience of Brazil is instructive in this regard, where a comprehensive social assistance programme for the elderly pays a pension that is equivalent to the minimum pension, regardless of contribution history and labour-market attachment, thereby reducing the incentives for social security coverage. This disincentive is exacerbated by universal access to health care. The conflict that emerges in the design of social assistance and insurance programmes is at the heart of labour informality in the country. See OECD (2006) for more information.
9. The Users' Commission will be composed of representatives of workers, employers, pensioners and an academic, who would chair it. The election process for each representative will be set by the Ministers of Labour and Finance.

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ANNEX 2.A1

Fiscal policy over the business and copper-price cycles

This Annex assesses empirically the behaviour of the fiscal stance over the business and copper-price cycles since 1989. Of particular importance in the analysis is the effect on the conduct of fiscal policy of a gradual decline in indebtedness – which is a key determinant of how fiscal policy is conducted over the business cycle in the OECD area – and the introduction of the structural budget surplus rule in 2001. While falling indebtedness weakens the "sustainability" motive for fiscal consolidation, the fiscal rule makes fiscal activism over the copper price cycle less likely. These hypotheses are tested below.

The methodology

The extent to which the fiscal stance has been pro- or counter-cyclical can be assessed by regressing changes in the cyclically-adjusted primary budget balance – as a measure of discretionary action – against changes in the cyclical component of the primary budget balance (*i.e.* the component that reacts to the business and the copper-price cycle). The intuition is that, if the estimated correlation is negative (positive), built-in stabilisers are offset (magnified) by discretionary action, which is pro-cyclical (counter-cyclical). To test the extent to which discretionary fiscal policy responds to sustainability factors, the debt-to-GDP ratio is also incorporated in the equation. In particular:

$$\Delta B_t^s = a_0 + \gamma \Delta B_t^c + a_1 \Delta b_{t-1} + u_t, \qquad (2.A2.1)$$

where B_t^s is the cyclically-adjusted primary budget balance (in relation to trend GDP)at time t, B_t^c is the cyclical component of the primary budget balance (*i.e.* including both copper-price and business-cycle effects) (in relation to GDP), b_{t-1} is the lagged public debt stock (in relation to GDP), u_t is an error term and Δ is the difference operator.[1]

The interpretation of Equation (2.A2.1) is that if the estimated coefficient γ is negative (positive), part of the cyclical fluctuations in the primary budget balance is offset (magnified) by discretionary action, characterising pro-cyclical (counter-cyclical) activism.

Data

Equation (2.A2.1) is estimated using annual data available from the Ministry of Finance on the headline budget balance, the cyclically adjusted budget balance and the cyclical component of the budget balance, which can be decomposed between the cyclical effects on public finances associated with the business cycle and with the copper price cycle. The primary budget balance was constructed by adding interest payments to the headline balance. The data set covers the period 1989-2006.

The results of the estimation of Equation (2.A1.1) by OLS are reported in Table 2.A1.1. On the basis of these results, fiscal activism appears to have been guided essentially by debt sustainability considerations during the period of analysis: an increase in the net debt-to-GDP ratio by 1 percentage point is associated with an increase in the cyclically adjusted budget balance by about 0.5-0.6%.[2]

Discretionary fiscal policy appears to have been insulated from cyclical developments in both economic activity and the price of copper. Nevertheless, this was not the case before 2001. Until then, fiscal activism was counter-cyclical, as evidenced by a positive estimated coefficient on the cyclical component of the budget balance. This means that an improvement in the budget balance on account of a rising output gap or a copper price hike was accompanied by discretionary action to raise the budget balance further. This is, however, not the case after 2001, a development that may be associated with the introduction of the structural budget surplus rule. Although the results should be interpreted with caution, given the dearth of data used in the empirical analysis, they remain valid if the budget balance is corrected for the effects on public finances only of fluctuations in the price of copper.

Table 2.A1.1. **Fiscal policy over the business and copper price cycles, 1989-2006**

Dep. Var.: Cyclically-adjusted primary budget balance[1]

	1	2	3	4
Cyclical component of budget balance	0.05		0.01	
	(0.045)		(0.085)	
Cyclical component of budget balance (before 2001)		0.16**		0.59**
		(0.056)		(0.240)
Cyclical component of budget balance (after 2001)		0.03		–0.01
		(0.038)		(0.075)
Lagged net debt-to-GDP ratio	0.05***	0.03**	0.06**	–0.02
	(0.012)	(0.012)	(0.021)	(0.035)
Intercept	1.56***	1.54***	1.71***	1.64***
	(0.215)	(0.223)	(0.449)	(0.428)
Cyclical effect	Business cycle and copper price		Copper price only	
F test (*p* value)	0.01	0.00	0.04	0.02
R-squared	0.65	0.69	0.32	0.49
Cyclical component is endogenous? (*p* value)	0.10	…	0.32	…

1. Heteroscedasticity-corrected standard errors are reported in parentheses. Statistical significance at the 1, 5 and 10% levels is denoted by respectively (***), (**) and (*). All models are estimated by OLS. The number of observations is 18. The cyclical component of the budget balance is instrumented by its lagged value in the endogeneity test.

Source: OECD estimations.

Notes

1. See OECD (2003), Chapter 4, for more information and evidence for the member countries.
2. The cyclical component of the budget balance may be endogenous, because fiscal activism tends to be expansionary, which affects the output gap. This is nevertheless not the case on the basis of the endogeneity test reported with the regression results.

ANNEX 2.A2

Monetary policy and inflation expectations: Long-run effects

This Annex uses co-integration analysis to empirically test whether Chile's monetary policy framework has contributed to anchoring inflation expectations around the pre-announced targets.[1] Visual inspection of the interest rate and the expected inflation series in Figure 2.5 (Panel B) suggests that these variables have tended to move together since the adoption of inflation targeting and the liberalisation of the exchange-rate regime. These co-movements provide *prima facie* evidence that monetary policy has been successful in anchoring inflation expectations. But, to be sure, a more formal test is required, consisting of estimating long-run relationships among these variables using co-integration analysis.

Data

The empirical analysis was conducted using monthly data available from the central bank (BCCh). The interest rate is defined in nominal terms as the annualised TPM rate, and expected inflation is defined as the 12-month-ahead consumer price inflation (measured by the IPC) based on the market surveys conducted by the BCCh since September 2001. The sample period selected for the empirical analysis was therefore guided by the availability of information on inflation expectations.[2] On the basis of conventional tests, both the interest rate and expected inflation were found to exhibit unit roots (results not reported but available in de Mello and Moccero, 2006) and were therefore first-differenced in the co-integration analysis below.

Cointegration analysis

The co-integration test was performed for the interest rate and expected inflation, because the inflation target was constant during the period after inflation expectations data started to be collected. The test was performed using the Johansen-Juselius methodology, including a constant as the only deterministic element in the vector error-correction model (VECM). The maximum number of lags included in the VECM was originally set at twelve and then selected on the basis of two different multivariate lag selection criteria: the Akaike Information Criterion (AIC) and the Schwarz Bayesian Criterion (SBC). On the basis of these tests, an optimal lag length of two was chosen on the basis of SBC and seven on the basis of AIC. The optimal structure was finally set according to SBC, since no co-integrating vector was found with seven lags.

The results of the co-integration tests are reported in Table 2.A2.1 and indicate the presence of a unique long-term relationship between the policy interest rate and expected

Table 2.A2.1. **Co-integration tests**

	MAX test		Trace test	
H_0	r = 0	r = 1	R = 0	r ≤ 1
H_1	r = 1	r = 2	R ≥ 1	r ≥ 2
Statistics	16.05	5.72	21.77	5.72
Critical value (at 10% confidence level)	13.75	7.52	17.79	7.50

Source: Data available from the Central Bank of Chile and OECD calculations.

inflation. This suggests that the conduct of monetary policy in a regime characterised by inflation targeting and floating exchange rates has been forward-looking and effectively anchored inflation expectations.

The estimated co-integrating vector is: $r_t = 12.7 + 5.5E_t\pi_{t+12} + e_t$, where r_t is the interest rate, $E_t\pi_{t+12}$ is 12-month-ahead expected inflation, and e_t is an error term. The sample spans the period 2001:9 to 2006:1. The estimated parameters suggest that the interest rate reacts to changes in expected inflation, so that monetary policy is conducted in a forward-looking manner. The magnitude of the estimated coefficient on expected inflation suggests that the conduct of monetary policy has managed to de-link private-sector inflation forecasts from realised inflation outcomes. This finding is consistent with the evidence for industrial countries reported by Levin *et al.* (2004) that inflation is much less persistent in countries that have explicit targets for inflation, where there is no correlation between private-sector inflation forecasts and lagged inflation.

Notes

1. This Annex is based on de Mello and Moccero (2006).
2. The option of extracting information about inflation expectations from the returns differential between same-maturity inflation-indexed and nominal bonds (BCU and BCP) is possible, but the relevant time series are too short.

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Chapter 3

Delivering cost-efficient public services in health care, education and housing

The authorities plan to raise budgetary allocations over the medium term for a variety of social programmes, including education, health care and housing. This incremental spending will need to be carried out in a cost-efficient manner to make sure that it yields commensurate improvements in social outcomes. Chile's population health indicators show that it fares relatively well in relation to comparator countries in the OECD area and in Latin America. But this is less so in the case of education, where secondary and tertiary educational attainment remain low, despite a significant increase over the years, and performance is poor on the basis of standardised test scores, such as PISA. Even though comparison with countries in the OECD area is difficult, a sizeable housing deficit has yet to be closed in Chile. To meet these various challenges, efforts will need to be stepped up to: i) narrow the disparities in performance that currently exist among schools with students from varying backgrounds through use of the "differentiated" voucher scheme and additional measures to improve the quality of teaching and management; ii) improve risk sharing among private and public health insurers, while increasing the coverage of health insurance to a broader variety of pathologies under AUGE; and iii) continue to tackle the shortage of housing, while enhancing the quality of subsidised housing units and their surrounding neighbourhoods for the poorest segments of society.

Consistent with their social development objectives, the authorities plan to raise budgetary allocations over the medium term for a variety of social programmes, including education, health care and housing. A gap in government spending levels and in performance indicators between Chile and the OECD area would justify an increase in government financing for selected programmes. While Chile's health indicators point to already good outcomes by international comparison, this is not the case for education, where secondary school attainment remains lower than the OECD average, despite an increase over the years, and performance is poor on the basis of standardised test scores, such as PISA. Indeed, the analysis reported below suggests that there is much scope for boosting efficiency in the delivery of education services. A sizeable housing deficit has yet to be overcome, calling for policy action in this area too.

Policy action, which has successfully facilitated access by the population to public services, is now beginning to focus on measures to improve quality in service delivery and removing extant access barriers for the most disadvantaged groups in society. For the planned increase in spending to be carried out in a cost-efficient manner, so as to make sure that it yields commensurate improvements in social outcomes, efforts will need to be stepped up to: *i*) narrow the disparities in performance that currently exist among schools through the "differentiated" voucher scheme in primary and lower-secondary education; *ii*) improve risk sharing among private and public health insurers, while increasing the coverage of health insurance to a broader variety of pathologies as planned under AUGE; and *iii*) continue to shrink the housing deficit, while enhancing the quality of subsidised housing for the poorest segments of society. Current initiatives in these areas need to be evaluated against a background in which social protection is being strengthened through concomitant reforms in pension and social assistance programmes, discussed in Chapters 1, 2 and 5.

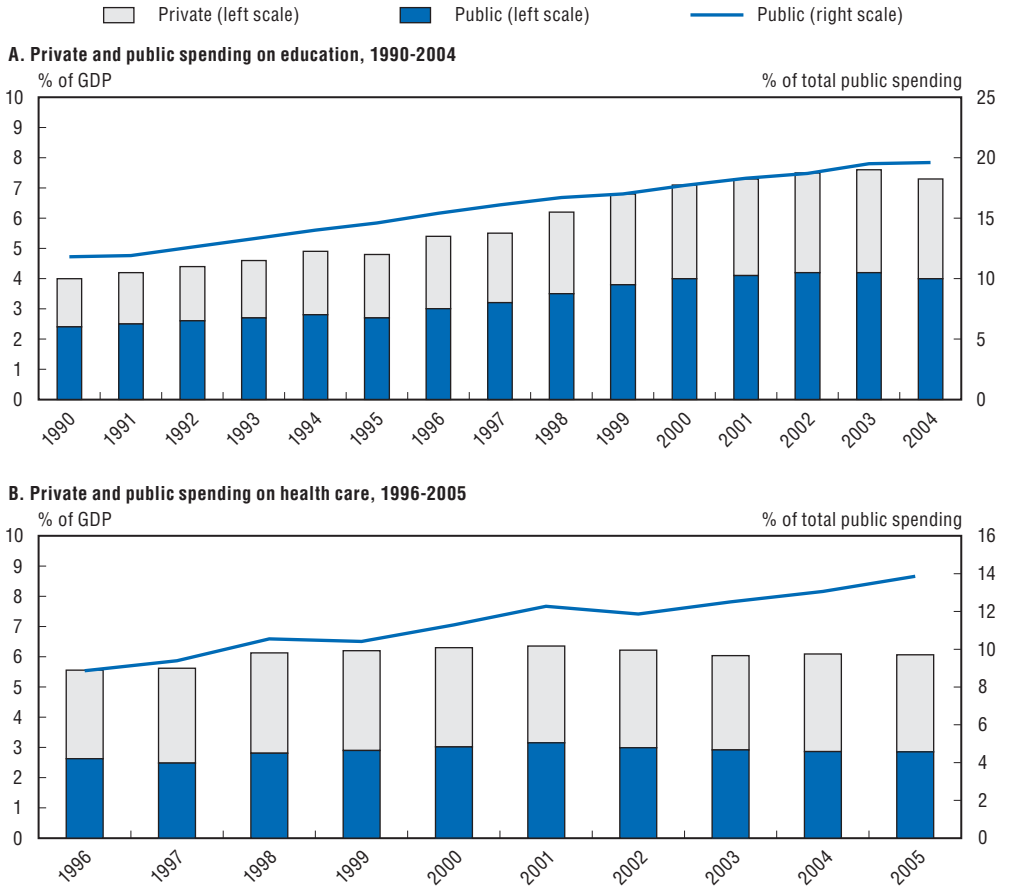
Spending and reforms in education, health care and housing

Review of social spending

Trends in spending on education and health care have diverged over the years. A sizeable increase in total spending (public and private) on education in relation to GDP contrasts with a relative stability of outlays on heath care (Figure 3.1). Government spending on these programmes is accounting for a rising share of total outlays, reflecting the authorities' increased policy emphasis on social development. In particular:

- In the case of education, most of the increase in spending is associated with rising payroll costs (due to higher teacher salaries and the hiring of new teachers as a result of the introduction of full-day schooling in 1997) and the expansion and upgrading of school infrastructure, including ICT equipment and libraries (OECD, 2003). The increase in public spending has been directed essentially at the primary and secondary school levels, which almost doubled in real terms from 1990 to 2004 on a per-student basis. As a result, the share in GDP of total spending on primary and secondary education is now

Figure 3.1. **Private and public spending on education and health care**



StatLink http://dx.doi.org/10.1787/173238302021

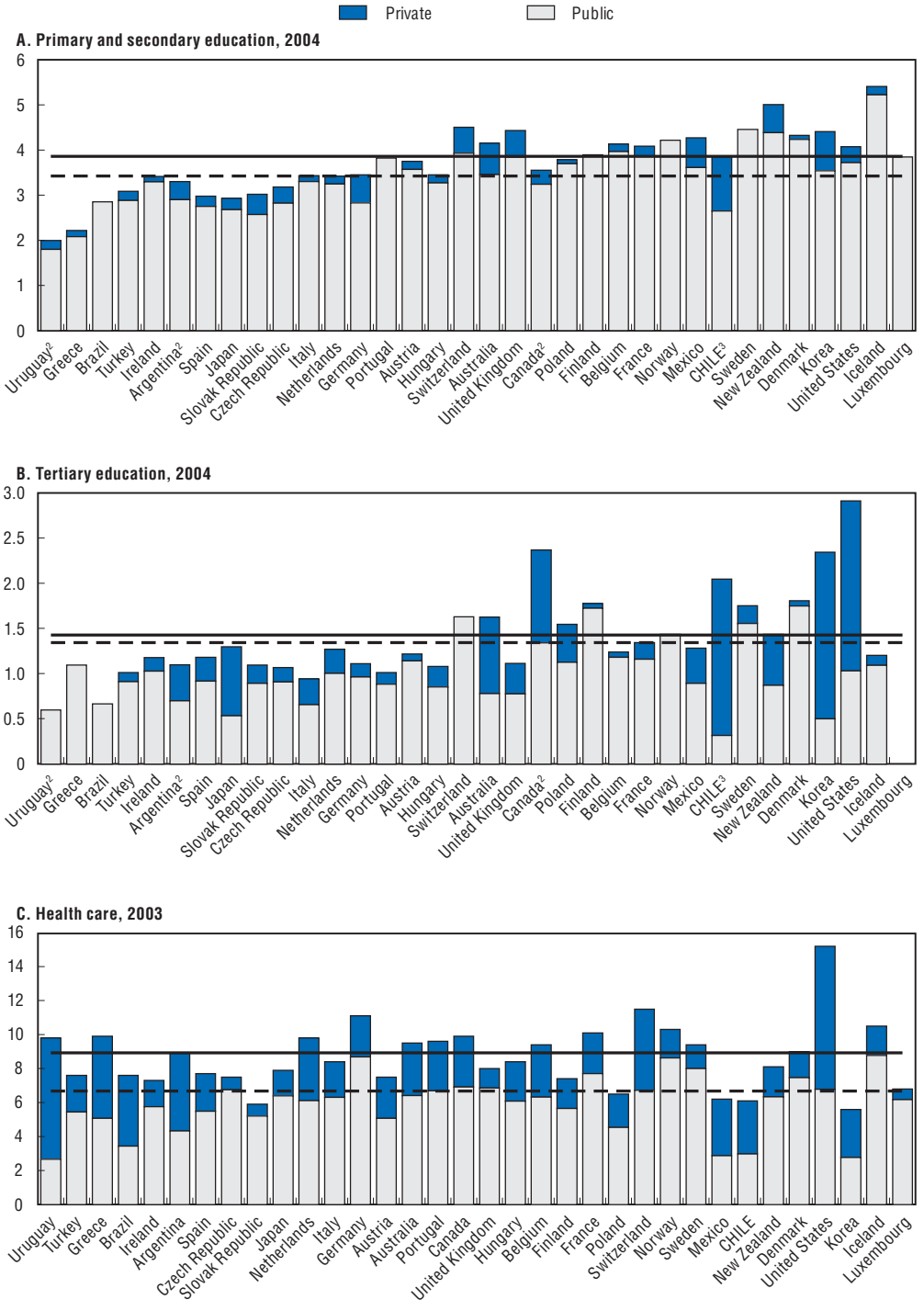
Source: Ministry of Education (2005), World Health Organisation and OECD calculations.

comparable in Chile to the OECD average (Figure 3.2). Spending per student in tertiary education has been stable in real terms.

- Total spending on health care has been stable since the mid-1990s in relation to GDP and is now on a par with the average of the emerging-market economies in the OECD area (Figure 3.1, Panel B, and 3.2, Panel C). Nevertheless, government spending on health care has risen more slowly than predicted on the basis of the increase in per capita income since the mid-1990s (Figure 3.3).[1]
- Expenditure is tilted towards private financing. This is particularly the case for tertiary education and, to a lesser extent, health care. There is an economic rationale for relying increasingly more on private financing as the level of education rises and private returns exceed social returns. But, even in this case, there is room for government financing, because in a world of imperfect financial markets students from disadvantaged backgrounds may face budget constraints to attending tertiary education, which trap them in a vicious cycle of low income and low human capital.
- Spending on housing accounted for nearly 5% of total government outlays, against the Latin American average of about 4% during 1990-2001.[2] Outlays are budgeted to rise further in 2007. An important consideration is that housing subsidies were fairly

Figure 3.2. **Expenditure on education and health care**[1]

In per cent of GDP



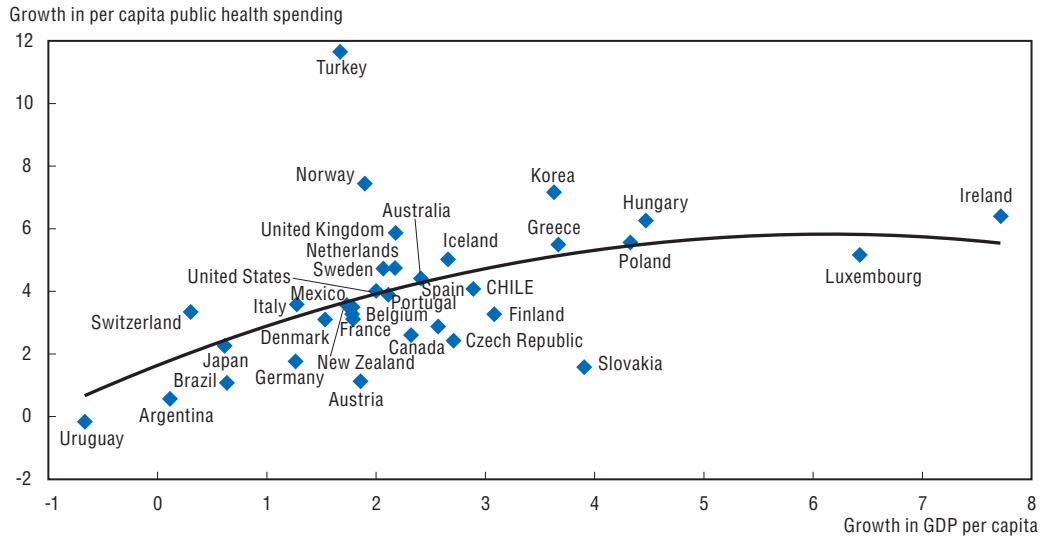
StatLink http://dx.doi.org/10.1787/173276077385

1. The solid horizontal lines refer to the OECD average, excluding the emerging-market economies within the OECD area (Czech Republic, Hungary, Korea, Mexico, Poland, Slovak Republic and Turkey). The dashed lines refer to the average of the emerging-market economies within the OECD area and the non-OECD countries included in the sample.
2. Refers to 2002 (2003 for Canada).
3. Refers to 2005.

Source: OECD (2005, 2006) and World Health Organisation and OECD calculations.

Figure 3.3. **Growth in government spending on health care and GDP**[1]

In per cent



StatLink http://dx.doi.org/10.1787/173322133152

1. Refers to the annual compounded growth rates between 1995 and 2003 (in 2000 USD PPP terms).

Source: World Health Organisation, World Development Indicators and OECD calculations.

pro-cyclical in Chile during 1996-2005, with a tendency to rise in periods of cyclical upswings and to fall when economic activity slackens.[3]

Recent policies: An overview

Education

Chile's education system has improved considerably over time. Services are delivered by the municipalities and private accredited institutions, which may be subsidised or not.[4] Public financing is granted through a voucher scheme (Box 3.1): parents are free to choose the schools in which to enrol their children, and voucher payments are made directly by the central government to the municipalities where the schools are located. Through the voucher scheme, public and private subsidised schools compete for students (and voucher receipts), which has the potential for enhancing efficiency in service delivery.

Empirical evidence suggests that the impact of competition on school performance in Chile is limited (McEwan and Carnoy, 2000; Sapelli and Vial, 2002; Hsieh and Urquiola, 2003). It is often argued that the transfer of voucher payments to the municipalities in a lump sum for all schools located in their jurisdictions allows for cross-subsidisation among the schools, which weakens the incentive for bolstering performance through competition within municipalities. Schools therefore seek to improve performance by attracting better students, rather than by providing services more efficiently (Larrañaga, 2004). Problems also arise from the demand side, because parents are not always able (or willing) to switch schools on the basis of performance. Rather, practical considerations, such as school location, tend to play a determinant role in choice, which reduces the scope for competition (Elacqua and Fabrega, 2004).

Policy effort is beginning to focus on the most disadvantaged students and the weakest public schools through the introduction of a differentiated voucher scheme in pre-school, primary and lower-secondary education. As discussed in previous *Surveys*, the new system is expected to be fully operational in 2008, reaching students until the 4th grade of

Box 3.1. **Chile's primary and secondary education system: An overview**

Increased reliance on the municipalities in service delivery

The municipalities are the main agents in the delivery of publicly-funded services. Since the mid-1970s, local governments have been granted increased autonomy in service delivery. The education system was decentralised in the 1980s, and private-sector involvement was encouraged.[1] Local governments took on responsibility for hiring and firing teachers (under the conditions set out below) and for maintaining school infrastructure. The Ministry of Education retained a regulatory role, setting general guidelines (*i.e.* school hours, academic calendar), designing curricula and running special programmes, such as the provision of school meals, textbooks and school equipment.

Voucher-based financing

The voucher system is the main financing instrument for primary and secondary education. There are three types of schools: municipal (fully public), subsidised private and fully private, fee-based institutions. Only the first two classes of schools are entitled to receive voucher payments.[2] Parents receive vouchers from the government for each school-aged child, which they can "cash in" at the school of their preference. The government transfers the per-student subsidy directly to the private school or the municipality where the public school is located. The subsidy paid to the schools is a multiple of a "school subsidy unit", which depends on whether the school provides half- or full-day education, the level of education (primary or secondary) and the amount of co-payments, which are allowed in the case of subsidised private schools. While municipal schools also receive additional transfers from the municipalities and through ancillary national programmes, private schools are financed solely through fees and user charges. To ensure access by poor students, these schools are required to set up scholarship funds financed by 15% of all revenue from co-payments.

Enhanced protection of teachers' rights

The Teachers' Statute was introduced in 1991. It centralised wage negotiations and enhanced municipal teachers' protection against dismissal. Subsidised private schools can still freely negotiate teachers' contracts, while abiding by norms on wages, holidays, payment of performance bonuses, etc. Fully private schools have complete autonomy to negotiate compensation and the terms of contracts.

Increased focus on performance assessment

Performance assessment relies on school tests (SIMCE). Testing started in 1987 and consists of a national exam for all students enrolled in the 4th, 8th and 10th grades. The test allows for a continuous monitoring of school performance over time. Average school test scores have been published annually since 1995.

Compulsory upper-secondary education and full-day schooling

Upper-secondary education became compulsory in 2003, resulting in 12 years of compulsory education. Full-day schooling was introduced in 1997 for municipal and subsidised private schools. Considerable budgetary resources were needed to implement full-day schooling through expanded capacity and the hiring of teachers. Implementation was gradual during 2003-06 for the municipal schools and is expected to be completed in 2010 for the subsidised private schools.

1. See Delannoy (2000) and OECD (2004) for analyses of the Chilean decentralisation policy in education.
2. See the *2003 Survey* (OECD, 2003a, Chapter 5) for more information.

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primary school. A year of schooling will be added per calendar year thereafter to reach all grades of lower-secondary education (up to 8th grade). Municipal public schools will benefit the most from the new voucher scheme, since students from disadvantaged backgrounds are overrepresented in these institutions. The main rationale for such a scheme is as follows:

- It is costly to cater for students with special needs, particularly in primary education. The value of the supplementary differentiated voucher is therefore expected to be around 60% of that of the regular voucher and to decrease with the school grade.[5] Eligible students will be identified on the basis of household participation in *Chile Solidario* – a well-functioning conditional, means-tested income transfer programme to fight extreme poverty – and additional means-testing based on information available from the *Ficha de Protección Social* (the new instrument used by the authorities to measure the socioeconomic characteristics of the population), and the income classification system used by FONASA (the public health insurance provider).[6]
- Schools that perform poorly need additional support, which goes beyond incremental financing. Municipal and private subsidised schools will be classified into three categories based on their students' SIMCE test scores (controlling for their socio-economic backgrounds) to be eligible for additional government assistance. The best performing schools will manage their voucher receipts in accordance with four-year plans, which they will submit to the Ministry of Education. Those schools in an intermediate range will manage their voucher receipts in accordance with four-year "recovery" plans to be elaborated by the school and pre-approved by the Ministry of Education. For the worst performing institutions, all funds received will be managed in line with recovery plans prepared jointly by the school, the Ministry of Education and an external agency. It is expected that performance will have improved after four years, so that the school will be able to "graduate" from the programme after reaching the level of performance of those schools in the performance category immediately above.

The authorities also intend to create an independent Superintendency of Education to boost the quality of education services. Its main roles would be regulatory and supervisory. It would monitor school quality and managerial standards and practices, therefore contributing to improving educational outcomes. The Superintendency would also gather and disseminate information deemed relevant in the selection of schools (*e.g.,* test results at the school and student levels, indicators of teacher quality, information on the institutions advising schools on pedagogical and technical matters). To perform its duties adequately, the Superintendency would be staffed by highly-qualified individuals.

Health care

Chile's health care system is characterised by the co-existence of private and public service providers and insurers (Box 3.2). Insured individuals can seek treatment in public or private facilities, depending on their insurance coverage and affordability of co-payments (which are required in private outlets). As in the case of education, it is believed that competition among insurers and service providers enhances performance. But, in fact, there is considerable segmentation in the market: around three-quarters of all publicly insured individuals receive attention in public medical facilities, and a comparable share of privately insured individuals receives attention in private facilities.[7] Performance and service quality also differ considerably between public and private medical facilities. Moreover, risk pooling is imperfect, as private insurers still have considerable room for

Box 3.2. **Chile's health care system: An overview**

The private and public insurers

The health care reform of the 1980s unbundled service delivery from insurance. Insurers can be private (*Instituciones de Salud Previsional*, ISAPRE) or public (*Fondo Nacional de Salud*, FONASA). Both the government and the private sector act as health care providers. Hospital management was decentralised to the regional level and primary health care to the municipalities. The Ministry of Health retained a regulatory role.

FONASA is financed by a payroll tax (7% for all wage earners) and direct financing from the government. Beneficiaries can choose to receive attention exclusively in public facilities under the Institutional Modality (*Modalidad Institucional*) of care, or in public or private facilities under the Free Choice Modality (*Modalidad de Libre Elección*) of care, where co-payments are required for service delivery in addition to the mandatory contribution. FONASA incorporates a solidarity mechanism by providing free insurance coverage to low-income individuals. To increase spending on vulnerable social groups, budgetary transfers to FONASA have been rising faster than mandatory contributions, reaching 54% of total FONASA revenue in 2005, up from 41% in 1990.

The private insurers (ISAPREs) are funded by the same 7% payroll tax plus surcharges for broader coverage and type of plan. ISAPREs can reject applications through a selection mechanism based on the insurance-holder's socio-economic characteristics and family background (with the associated health risks). They are also free to change the cost and coverage of the plans yearly and have the right to restrict coverage during certain periods, although since 2005 price increases have been capped at 30% of the ISAPREs' average tariff increase.[1] Pre-existent illnesses usually have less complete coverage, and certain illnesses are not covered at all. As a result, coverage by ISAPREs is strongly associated with contribution capacity and the health risk of the individual or family group.

FONASA beneficiaries accounted for 68% of the population in 2005 and ISAPRE affiliates for 16.3%. The remainder refers to the individuals who are not insured and to the army and police forces, which have their own health systems. Jointly with the ISAPREs, FONASA works under the supervision of the Health Insurance Regulatory Agency (*Intendencia de Fondos y Seguros Previsionales de Salud*), created in 1990.

The AUGE Plan

The AUGE plan (*Acceso Universal con Garantías Explícitas en Salud*) aims at increasing the health care coverage of the population (including diagnosis and treatment), improving the quality of services and limiting the financial burden of health care on households. AUGE was implemented in 2002 with three pathologies covered and was extended gradually to cover 56 of the most common pathologies in 2007, especially those more prevalent in poorer communities and with the highest impact on household budgets. The plan is set to be expanded further to cover 80 pathologies by 2010. AUGE does not discriminate on the basis of personal characteristics and is mandatory for certified providers in both the public and private sectors.

For each pathology covered by the plan, AUGE creates an entitlement for the insured in FONASA and ISAPREs: if treatment for a covered pathology is not received within a pre-determined time frame, the government is obliged to finance treatment in another hospital or clinic, private or public. AUGE also aims at guaranteeing quality through a certification mechanism by which only hospitals, clinics and medical facilities that comply with certain quality standards set by the Ministry of Health will be able to provide treatment for the pathologies covered.

AUGE sets ceilings on co-payments for both FONASA and ISAPREs at 20% of treatment costs. Diagnostics and treatments are provided free of charge to low-income individuals. When costs exceed two months' salary, the beneficiary may request the insurer (FONASA or ISAPREs) to cover the full cost of co-payments.

To be granted access to AUGE, FONASA beneficiaries must seek attention in public primary health care units or hospitals. For those belonging to an ISAPRE, access is granted through a network of authorized health care providers. Outside this network, access is not guaranteed, and the individual is not covered. With the objective of increasing disease prevention, since 2005 FONASA and ISAPREs must cover a voluntary health check free of charge. The check includes laboratory tests, general health questions and a physical examination.

1. For example, if the average tariff increase among the ISAPREs is 5%, then prices cannot rise by more than 6.5%.

cream-skimming; as a result, risk is concentrated within the public insurance and service delivery systems, which places a financial burden on the public budget.

The share of population with no health insurance almost halved during 1990-2003 to 7% (Ministry of Planning, 2003a). Despite these achievements and in recognition of remaining shortcomings, recent policy action has focused on two main areas:

- The coverage of health care services has been broadened for low-income individuals through AUGE, a plan introduced in 2002 to ensure treatment for a number of pre-selected pathologies for all individuals, regardless of whether they are insured privately or publicly. AUGE creates an entitlement for individuals to receive treatment for one of the pre-assigned pathologies within a set time frame. The number of pathologies covered by AUGE is currently being extended, which is expected to account for most of the increase in budgetary allocations for health care over the medium term.
- The private health insurance industry's regulatory framework has been strengthened. Through the 2005 Law of ISAPREs (*Ley Larga de Isapres*) the scope for cream-skimming by private health insurers has been reduced, and risk pooling has improved. The Ministry of Health now issues a common list of pathologies and treatments that may be excluded from standard coverage, instead of allowing the ISAPREs to set these exclusions freely. Also, pre-existing illnesses can now be excluded from coverage only for an initial five-year period. Likewise, the ISAPREs are no longer free to unilaterally terminate a contract with a policy-holder, except for a number of special cases, including failure to declare a pre-existing illness. Moreover, the risk factors used by ISAPREs to price insurance policies are now regulated, and a ceiling was introduced on the difference between minimum and maximum factors.[8] Finally, an inter-ISAPRE solidarity fund was created to facilitate risk-pooling among insurers holding low- and high-risk portfolios.

Housing policies: Design and effectiveness

Chile is a pioneer in Latin America in the design and implementation of housing subsidy programmes. Publicly financed housing subsidies are demand-oriented, means-tested and granted through a scoring mechanism based on the amount of pre-existing individual savings and household socio-economic characteristics. Subsidies may also be complemented by mortgage loans from private financial institutions (Box 3.3). The authorities are committed to bringing down the housing deficit (*i.e.* the difference between the number of households and the housing stock), which almost halved between the end of the 1970s and the beginning of the 2000s (Held, 2000; Ministry of Housing and Urban Planning, 2004), but remains sizeable, at about 10-15% of the housing stock, or about 500 000 units. On the basis of current policies, Chile's housing deficit is projected to be eliminated in about 10 years.

The housing subsidy programme has encouraged private saving. Stable, clear rules have been essential, but also the protection of contracts from inflation through comprehensive, backward-looking indexation for the value of property, mortgage payments and accumulated savings. Nevertheless, the market for small private mortgage loans remains small. High transactions costs in processing relatively small mortgage contracts and high default rates make this market segment relatively unattractive to private financial institutions. Access to mortgage loans for the poorest segments of society is now being facilitated by government subsidies for administrative costs and guarantees for loans in the event of default.

Box 3.3. **Housing policies in Chile: An overview**

Housing policies are designed and carried out under the purview of the Ministry of Housing and Urban Planning (MINVU) and the Urban and Housing Service (SERVIU) agencies. MINVU manages the housing subsidy programmes at the national and regional levels, sets quality standards for social housing developments and provides collateral for subsidised mortgage operations. The SERVIUs operate at the local level and often act as an intermediary between MINVU and the subsidy applicants.

The old and new housing polices

Before the end of the 1970s, housing policy was conducted mainly through direct subsidised credit at a fixed nominal interest rate. Given the level of inflation prevailing at the time, real interest rates were often negative, which discouraged the development of a mortgage market (Pérez-Iñigo Gonzáles, 1999). Since then, housing policy has become demand-oriented and centred around the subsidy programmes discussed in the main text. Heads of households and single individuals who are not home-owners can apply for a housing subsidy on the basis of a scoring mechanism, whereby applicants are rated according to pre-existing savings and socio-economic characteristics (*e.g.* household size and composition, number of disabled people, etc.). Pre-existing savings are used to finance mortgage down-payments and can be made through a dedicated account at a private bank. In some cases, land can be used as down-payment in the absence of savings.[1]

Income was not included among the set of socio-economic characteristics used in the scoring mechanism to allow individuals to select themselves into different programmes according to their preferences and willingness to pay. Increasing emphasis is being placed on means testing of applicants from the poorest segments of society; the Rural Housing Subsidy (*Vivienda Rural*) is being stepped up, and a new Solidarity Fund has been created.[2] Collective applications are also possible, so long as applicants are legally organised as a group, such as a cooperative, and submit a housing project for consideration, including recreation areas, public infrastructure, etc. Since 2004, housing programmes targeted to middle-income individuals (*Vivienda Básica*, *Programa Especial de Trabajadores*, *Sistema Unificado*) are being merged under a programme called DS40. The Social Protection Survey (*Ficha de Protección Social*), which replaced the CAS Survey, is used to identify the target population.[3] Another element considered in the evaluation process is the presence of elderly individuals in the household.

Individuals are eligible for the housing subsidy only once. The subsidy is granted directly to the beneficiary and can be cashed in by the property seller. The government itself commissions the construction of the housing development, and, in this case, the subsidy is implicit in the price of housing. Banks have been active in raising funds for mortgage purposes, by issuing debt and other financial instruments. In the second half of the 1990s, some 40 000 operations were conducted on a yearly basis for an average value of about USD 22 000 per unit.

1. In spite of the switching to more market-oriented housing policies, MINVU continued to grant credits until 2001, when they were discontinued because of a comparatively high rate of non-performing loans.
2. The number of subsidies under the Solidarity Fund increased from about 2 200 in 2001 to more than 33 000 in 2005.
3. The CAS survey was the main instrument for targeting social programmes in Chile until mid-2007, including monetary transfers, social housing and others. The score was valid for two years. See Larrañaga (2005) for more information on the CAS survey.

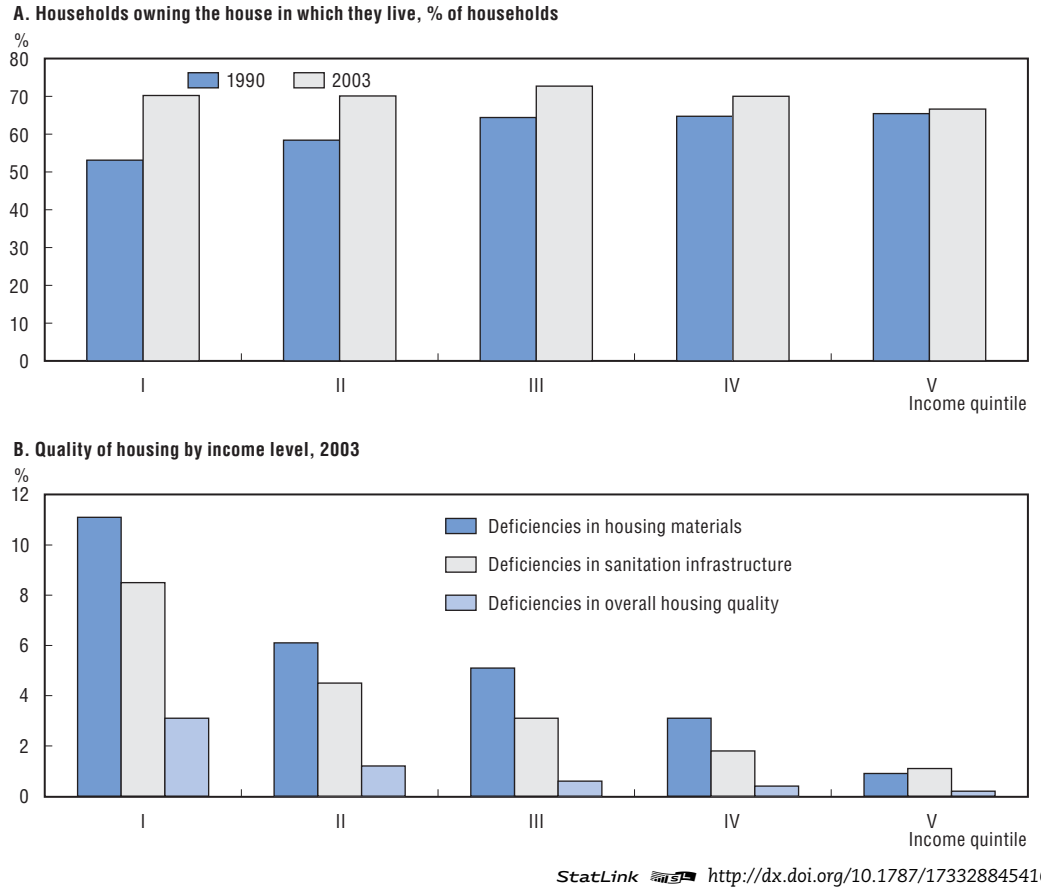
The secondary housing market lacks liquidity. This is primarily because in most programmes, subsidised housing cannot be sold during the initial five years after acquisition, thus reducing the scope for home-owners to use their property as collateral for

other mortgage operations, including for the purchase of better-quality units. This "lock-in" effect is important, because subsidised housing built during 1990-2005 accounts for almost 30% of Chile's housing stock. As noted in the *2005 Survey* (OECD, 2005), this restriction also discourages labour mobility, with undesirable consequences for the labour market. The authorities are nevertheless relaxing these restrictions by now allowing homeowners to sell their subsidised property in order to buy or build a new one (*Programa para la Movilidad Habitacional*), which will help to develop a secondary housing market.

The targeting mechanism is being re-designed. Because the scoring mechanism attributes a high weight to pre-existing savings, wealthier individuals end up receiving higher subsidies than poorer individuals with limited saving capacity (Pérez-Iñigo Gonzáles, 1999). Recent measures are therefore putting more weight on means-testing than accumulated savings, so that only households in the lower income quintiles of the population are eligible for housing subsidies. As a result, the housing deficit of the lowest income quintile is expected to be reduced from 150 000 to 50 000 units during 2006-10.

While access to housing has increased, especially for the poorest segments of the population, quality deficiencies remain (Figure 3.4). New housing developments are located increasingly far from city centres because of rising land prices, which have outpaced the increase in the real value of subsidies per housing unit. As such, land costs almost doubled to about 60% of total housing costs, leading to a gradual reduction in

Figure 3.4. **Access to housing and quality deficiency indicators**



StatLink http://dx.doi.org/10.1787/173328845416

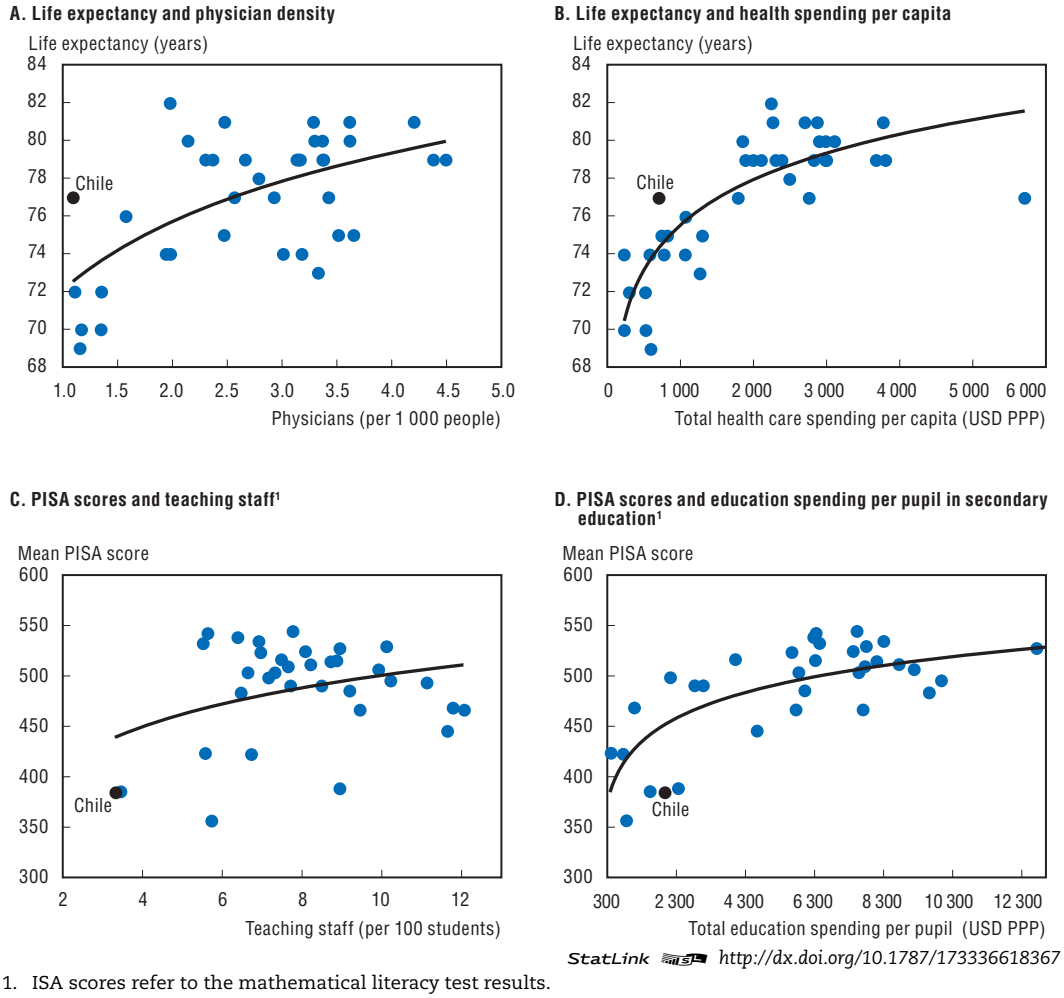
Source: Ministry of Planning (2003b).

property size and the quality of construction. Overall, the Ministry of Housing and Urban Planning (2004) estimates that some 670 000 units need upgrading (*e.g.* materials, sanitation, etc.) and that some 500 000 units are overcrowded. Recent measures to close the qualitative housing deficit and to reduce urban segregation include an increase in the value of the housing subsidy (by 20% per unit in real terms in 2006) and improvements in public transportation and utility services, especially water and sanitation. Programmes are also being implemented to improve the quality of the housing stock (*Protección del Patrimonio Familiar* and *Programa de Aseguramiento de la Calidad*), to tighten the accreditation of building societies and to launch a certification process for construction materials.

How well do the education and health systems perform?

While spending has a bearing on social outcomes, this link is rather tenuous (Figure 3.5). The government often plays a dominant role in financing service delivery, which suggests that there is considerable scope for improving social outcomes through efficiency gains in public programmes.

Figure 3.5. **Outcomes and inputs in health and education in OECD and non-OECD countries, 2003**



StatLink http://dx.doi.org/10.1787/173336618367

1. ISA scores refer to the mathematical literacy test results.

Source: OECD (2000, 2003b, 2003c, 2005, 2006), World Health Organisation and OECD calculations.

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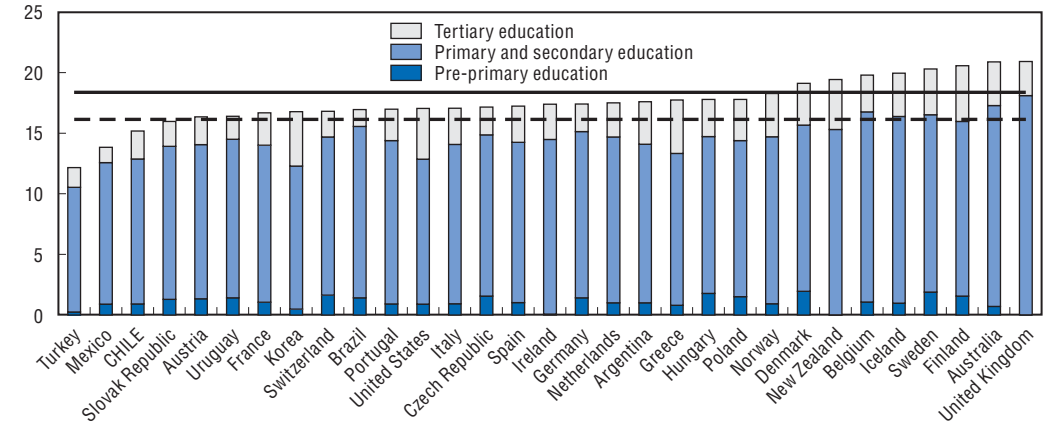
Education outcomes

Chile's education indicators have improved markedly since 1990 but are often sub-par in relation to most countries in the OECD area. The net enrolment rate was about 90% in 2004 for primary and lower-secondary education – a rate that has not changed much since 1990 – but was considerably lower for upper-secondary education, despite a 15 percentage-point increase since 1990 to almost 70% in 2004. At the same time, graduation rates increased (from 43.4% in 1995 to 67.4% in 2003), and drop-out rates fell (from 7.4 to 4.5%) in upper-secondary education. As a result of improved educational attainment, the illiteracy rate decreased from 4.7% in 1996 to 3.5% in 2004, and the average years of schooling of the labour force increased from about 8.5 to 10.5 over the same period.

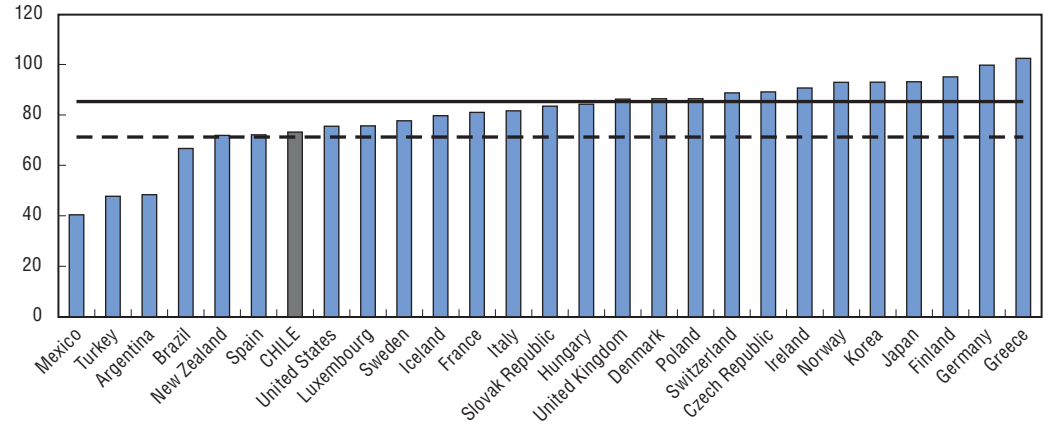
Other indicators put Chile at disadvantage with respect to the best performers in the OECD area. While in line with emerging-market comparators, the expected time a child spends in education is almost four years less than in the more mature countries in the OECD area (Figure 3.6). A similar case emerges for upper-secondary graduation rates, which

Figure 3.6. **Education outcomes: International comparisons**[1]

A. Expected years of schooling for a 5-year-old child, 2005 or latest information



B. Upper-secondary gross graduation rates, 2005 or latest information



StatLink http://dx.doi.org/10.1787/173352051100

1. The solid horizontal lines refer to the OECD average, excluding the emerging-market economies within the OECD area (Czech Republic, Hungary, Korea, Mexico, Poland, Slovak Republic and Turkey). The dashed lines refer to the average of the emerging-market economies within the OECD area and the non-OECD countries included in the sample.

Source: OECD (2005 and 2006).

are almost 20 percentage points lower than in the more mature OECD countries, while on a par with emerging-market comparators. In addition, while Chile performs well in international standardised tests when compared with Latin American peers, it has much room for improvement with respect to the OECD area, as noted in Chapter 1.

Income-related discrepancies in education outcomes have narrowed over time but remain sizeable. While enrolment rates are already high for primary and lower-secondary education across income groups, and to a lesser extent for upper-secondary education, a gap remains for pre-school and tertiary education between the top and the lowest income quintiles (Table 3.1). In the case of pre-primary education, only one in three children among the poorest segment of society is enrolled, against one-half in the top income quintile. The scarcity of affordable child-care options is associated with low female labour force participation, as discussed in Chapter 5. The income-related enrolment gap is higher for tertiary education, where a student from an affluent family is five times as likely to go to university as one from a poor background.

Performance varies predominantly across, rather than within, the three types of schools. On the basis of conventional raw output indicators, such as completion and drop-out rates, performance is best for the fully private schools and worst for the municipal (fully public) schools. This is also the case when performance is gauged by standardised test scores, according to which fully private schools outperform subsidised private schools, which in turn outperform municipal schools. The performance differential is higher at the upper-secondary level (Table 3.2). This outcome is in contrast with the experience of OECD countries, where differences in performance take place mainly within, rather than across, schools. It suggests

Table 3.1. **School enrolment by income level, 1990 and 2003**[1]

Income quintile	Pre-primary education		Primary and lower-secondary education		Upper-secondary education		Higher education	
	1990	2003	1990	2003	1990	2003	1990	2003
I	16.9	30.3	95.5	98.5	73.3	87.5	4.4	14.5
II	17.5	34.0	96.9	99.1	76.3	91.7	7.8	21.2
III	20.4	35.0	97.6	99.5	80.5	94.0	12.4	32.8
IV	27.2	36.1	97.5	99.5	87.2	96.9	21.3	46.4
V	32.4	49.1	98.9	99.5	94.3	98.7	40.2	73.7

1. Defined in per cent of the total population that should attend school at that level.
Source: Marcel and Tokman (2005).

Table 3.2. **Education performance by school type: SIMCE scores, 2003 and 2004**[1]

	School type		
	Municipal	Private subsidised	Fully private
	Primary and lower-secondary education, 2004		
Language	240	259	296
Mathematics	241	260	305
	Upper-secondary education, 2003		
Language	241	257	301
Mathematics	230	250	317

1. The SIMCE test has no maximum score. Scores are rescaled each time so as to yield a mean of 250 and a STD of 50.
Source: Ministry of Education (SIMCE database).

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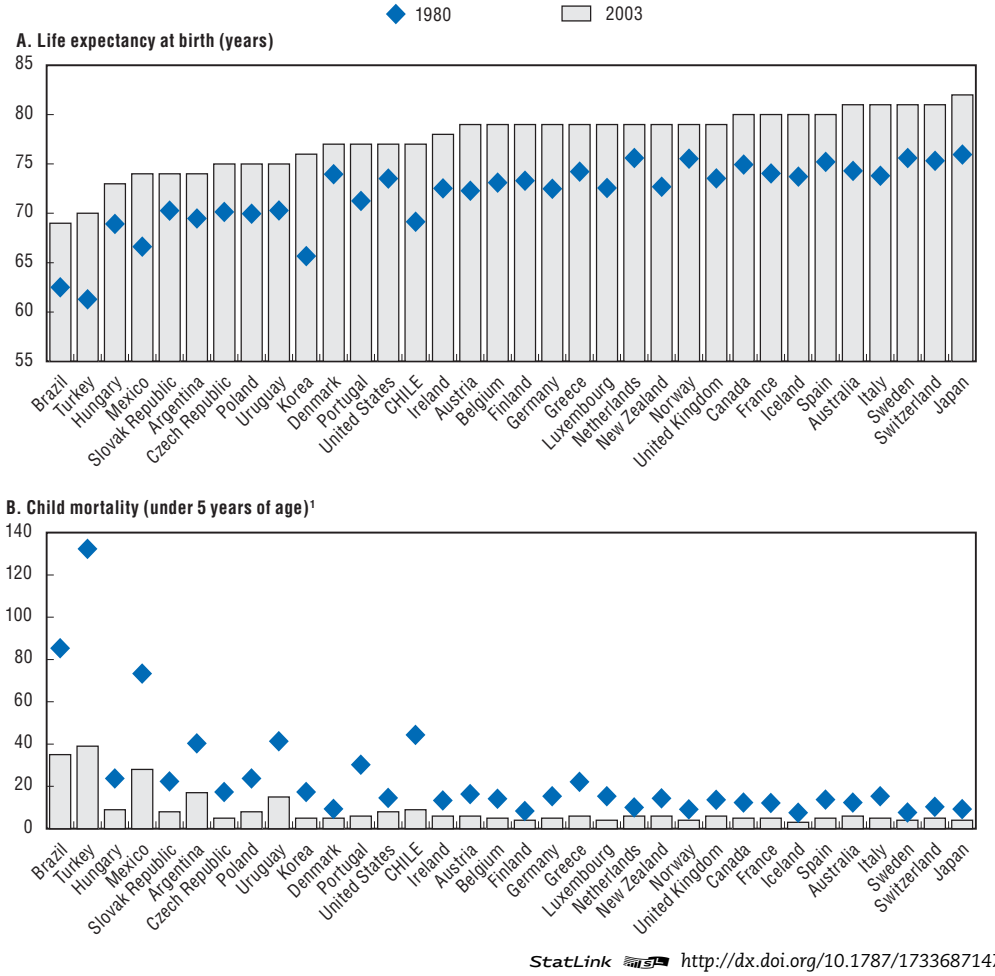
that the education system has not managed to avoid a clustering of students with comparable socio-economic backgrounds in a particular school category, as noted in previous *Surveys*.[9]

Performance differentials reflect differences in student backgrounds, as well as spending levels. Empirical analysis shows that, controlling for student and school characteristics (*e.g.* family background, class size, etc.), performance is still worse in municipal and subsidised private schools than in fully private schools (Mizala *et al.*, 2002). As for spending levels, in the case of primary and lower-secondary education, spending per student was about 200% higher in fully private schools and 20% higher in subsidised private schools than in municipal schools in 2003 (Marcel and Tokman, 2005). This suggests that an increase in funding for the schools that tend to cater for disadvantaged students should go some way to reducing the performance gap among school categories.

Health care: Broad coverage but persistent segmentation

Health indicators have improved over time. Access to health care is now nearly universal. Together with Brazil, Korea and Turkey, Chile is one of the countries in the sample that have made the greatest progress in increasing life expectancy, a standard indicator of the health status of the population, to a level that is now close to the OECD average (Figure 3.7). Chile has

Figure 3.7. **Health outcomes: International comparisons, 1980 and 2003**



StatLink http://dx.doi.org/10.1787/173368714736

1. The child mortality rate is defined as per 1 000 live births.

Source: World Health Organisation (2006) and World Bank.

also managed to reduce child mortality, although it remains above the average of the best performers in the OECD area.

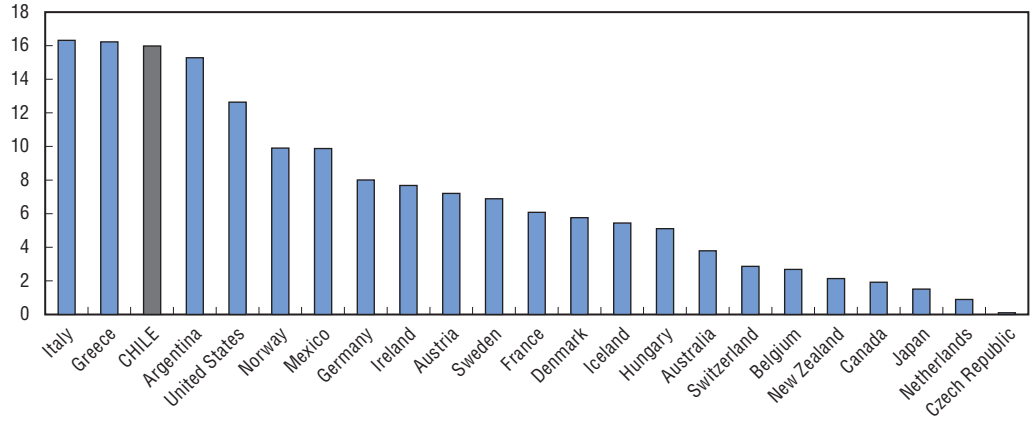
The health insurance market is segmented on the basis of socio-economic and risk characteristics. The ISAPREs select comparatively healthier individuals through price discrimination, restricted coverage and exclusion, whereas the riskier groups of the population, including low- to middle-income individuals, the elderly and females, are overrepresented among FONASA beneficiaries. In 2003, 91% of individuals in the lowest income quintile were insured by FONASA, whereas 51% of the top income quintile was insured by an ISAPRE. In the same year, women accounted for 53% of FONASA beneficiaries and 49% of ISAPREs' beneficiaries. As regards age, individuals of at least 60 years of age accounted for only 1% of ISAPREs' beneficiaries and for about 13% of FONASA beneficiaries. As a result, both contributions and spending per beneficiary substantially differ between FONASA and the ISAPREs, although this gap has narrowed over time: spending per beneficiary was 1.7 times higher in the ISAPREs than in FONASA in 2005, against 3.5 times in 1984.

Measuring the efficiency of government spending in education and health care

Spending on education is less efficient in Chile than in most OECD countries. The efficiency analysis reported in Annex 3.A1 suggests that Chile could improve education outcomes, measured by PISA scores, by some 16% for the same level of spending and holding non-policy factors unchanged, if it were as efficient in the provision of these services as the best performers in the OECD area (Figure 3.8). The methodology used to calculate relative efficiency, described in Box 3.4, consists of computing a "technological frontier" using financial and technical inputs, on the one hand, and outputs, such as PISA scores, on the other. Students' socio-economic backgrounds are considered as an environmental variable, which is expected to affect educational outcomes in a manner that is outside the control of policy-makers. Using the same technique, it was found that efficiency is lower in municipal and subsidised private schools than in their fully private counterparts (Mizala *et al.*, 2002), indicating that there is an efficiency gap within the school system.

Figure 3.8. **Efficiency gaps in education: OECD and selected non-OECD countries**[1]

Required increase in PISA scores to reach the technological frontier computed in Table 3.A1.2 (in per cent)



StatLink http://dx.doi.org/10.1787/173421455165

1. The countries that were found to be on the technological frontier (Finland, Korea, Poland, Portugal, Slovak Republic, Spain, Turkey and Brazil) are not reported.

Source: Table 3.A1.2.

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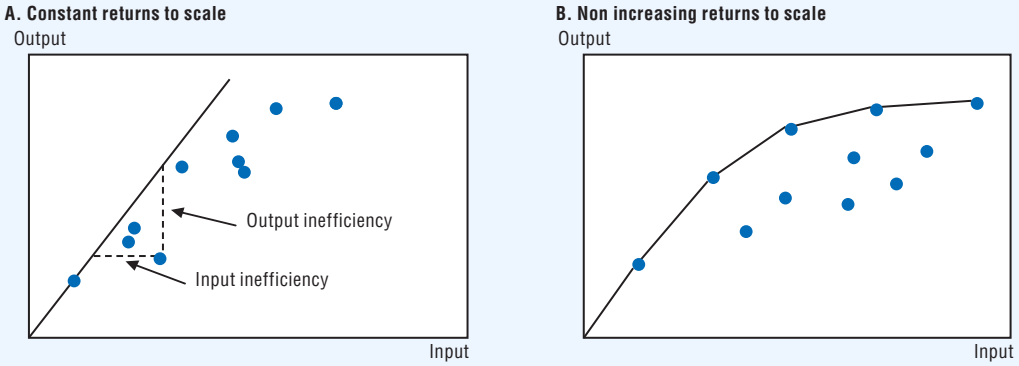
Box 3.4. **Measuring efficiency in social spending**

The efficiency analysis presented in Annex 3.A1 consists of estimating an efficiency frontier for the delivery of education and health care services using financial and technical inputs. The analysis assesses the efficiency of government spending in different countries by comparing social outcomes with respect to the resources mobilised in service delivery.

Efficiency can be gauged in allocative and technical terms. Allocative efficiency is gauged in relation to a technological frontier, whereas technical efficiency defines the optimal combination of inputs to produce output on the basis of their relative prices. In either case, it is possible to measure efficiency from an input (cost) or an output vantage point. Input efficiency explores the proportional reduction in inputs (production costs) that is possible to reach a given level of output. Output efficiency defines by how much output can be expanded, given a certain level of input (Figure 3.9).

Figure 3.9. **Efficiency frontiers**



Source: Sutherland *et al.* (2007).

Different techniques are available to compute technological frontiers at the micro (*e.g.* hospitals, schools) and aggregate levels (*e.g.* regions, countries). These can be parametric or non-parametric. A conventional non-parametric technique is Data Envelopment Analysis (DEA), which uses linear programming tools to construct a frontier that includes the most efficient observations, which "envelop" the others. When applying DEA, several practical points should be borne in mind.

First, the method is very sensitive to measurement errors in the variables of interest and outliers that could potentially bias efficiency estimates. For example, when a country in the sample has erroneously been assigned an extremely high output value, it will be on the frontier, distorting the efficiency level of the remaining countries.

Second, results are sensitive to small samples. This is because a large sample is needed for accurately distinguishing among the efficiency levels of the different countries in the sample. The higher the number of observations, the higher the possibility of classifying some countries as inefficient.

Third, special care should be taken when choosing the number of outputs and inputs. When these are fast growing, overall efficiency will be overestimated, since the model becomes less discriminating. In essence, increasing the number of inputs and outputs may eventually lead each unit to be associated with a unique combination of inputs and outputs. Then, by definition, they will uniquely be classified as fully efficient.

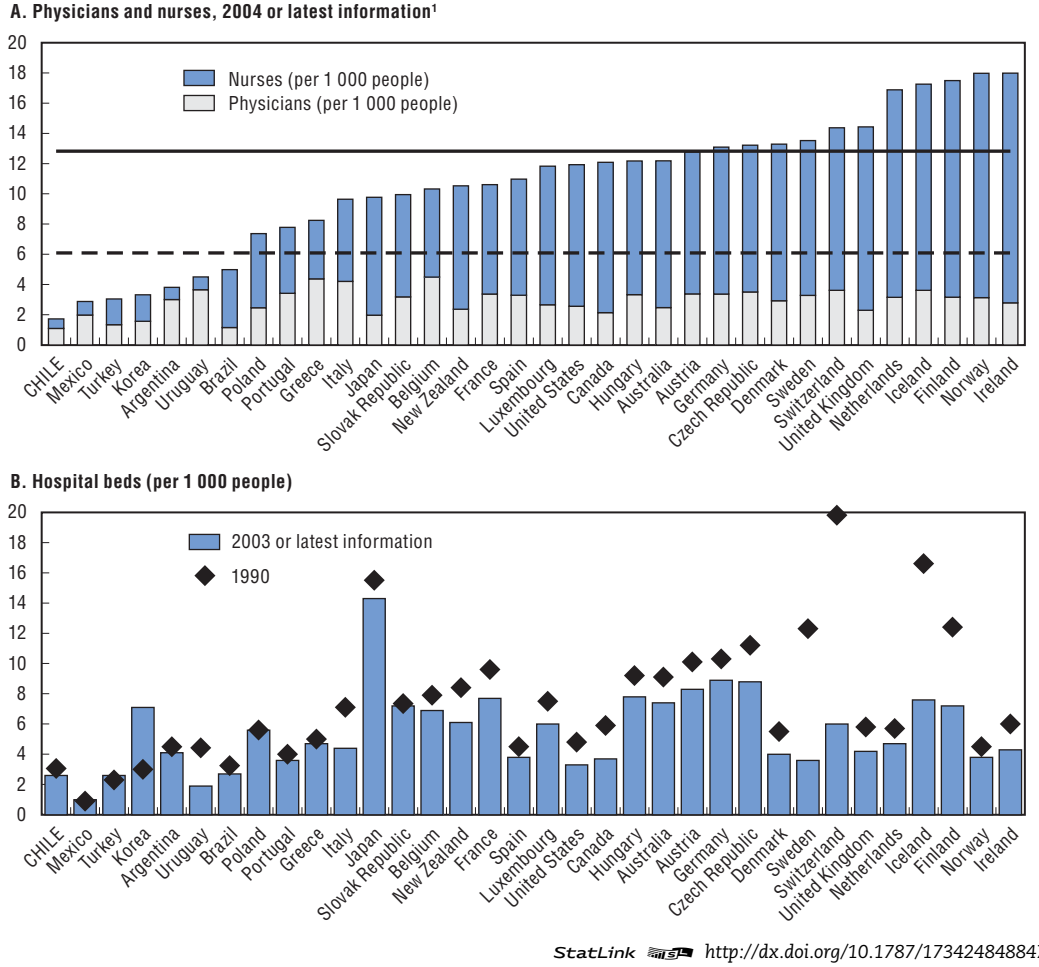
Fourth, the chosen form for the frontier is an arbitrary assumption that leads to different measures of efficiency losses. As such, the results will be sensitive to whether constant or variable returns to scale are assumed in production.

Box 3.4. **Measuring efficiency in social spending** *(cont.)*

Finally, as the results may depend on the model specification and the variables considered relevant for the analysis, it is necessary to perform sensitivity analyses. This calls for experimenting with different functional forms for the production function and different input and output variables.

On the other hand, the Chilean health care system is efficient by international comparison. The efficiency analysis presented in Annex 3.A1 places Chile on the efficiency frontier for a sample of OECD and non-OECD countries. This is possibly due to the fact that service delivery is not as input-intensive as in most OECD countries: Chile's ratios of health-care workers (physicians and nurses) and hospital beds to population are much lower than the OECD average (Figure 3.10), while health outcomes (*i.e.*, life expectancy, child mortality

Figure 3.10. **Health input indicators: Chile, OECD and selected non-OECD countries**



StatLink http://dx.doi.org/10.1787/173424848847

1. The solid horizontal line refers to the OECD average, excluding the emerging-market economies within the OECD area (Czech Republic, Hungary, Korea, Mexico, Poland, Slovak Republic and Turkey). The dashed line refers to the average of the emerging-market economies within the OECD area and the non-OECD countries included in the sample.

Source: World Health Organisation, World Development Indicators and OECD calculations.

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and immunisation rates) are comparable to the OECD average.[10] As a result, Chile's health care system manages to deliver relatively good outcomes using comparatively fewer inputs.

Challenges and policy recommendations

Much has been done to strengthen social policies in Chile over the years. Public spending levels have increased and outcomes have improved. The focus of social policies is now shifting away from ensuring access by the population to basic services – a policy objective that has by and large been achieved – towards improving quality and removing extant access barriers for the most disadvantaged groups in society.[11] This, coupled with a strengthening of social protection, discussed elsewhere in this *Survey*, is paving the way for further improvements in Chile's social indicators in the years to come. The main policy challenge Chile will need to face in this area is to ensure that the planned increases in government spending on social programmes are implemented in a cost-efficient, fiscally sustainable manner so as to yield commensurate improvements in social outcomes. This is particularly the case of education, where there is much room for raising efficiency in service delivery to the level of the best performers in the OECD area.

Closing the student performance gap

Options for reducing performance differentials among the students with varying socio-economic backgrounds should feature prominently on the government's education policy agenda. Catering for students from disadvantaged socio-economic backgrounds, who are over-represented in the municipal school network, is costly, which places a financial burden on these schools. The differentiated voucher scheme can do much to bridge this financial and performance gap. But, at present, there is no empirical study on service delivery costs in the Chilean education system, which makes it difficult to assess whether or not the value of the differentiated voucher will be adequate to compensate for higher provision costs. The authorities are advised to closely monitor the functioning of the new system and to make the necessary adjustments to guarantee that incremental resources deliver better educational outcomes. Once the new system has been fully implemented and the initial results have been assessed, the possibility of extending the differentiated voucher to upper-secondary education could be considered as a further step.

Spending per pupil differs substantially among different types of school. An important feature of the Chilean education system is that it allows subsidised private schools to charge co-payments in addition to the financial support they receive from the government through the voucher scheme. As an effort to equalise spending needs across schools, the mechanism to withdraw public support from the subsidised private schools in tandem with the collection of co-payments could be improved by raising the withdrawal coefficient in a progressive manner, so that the coefficient would be higher the higher the share of co-payments.

An increase in teachers' compensation alone may not yield the expected improvement in outcomes unless accompanied by measures to improve the quality of teaching, as noted in previous *Surveys* and in OECD (2004). This can be achieved through training programmes for both teaching and managerial personnel. An early retirement programme, which is being considered, would also contribute to creating room in the system for younger, better trained teachers. It is nevertheless important to make sure that the resources allocated to funding teacher training programmes are well spent. An accreditation system for training institutions should therefore be put in place and administered under the purview of the Ministry of Education. Options for strengthening the link between teachers' compensation

and performance could also be considered as a means of encouraging human capital accumulation, especially in municipal and subsidised private schools, where teachers are relatively less favourable to performance evaluations.[12]

The recovery plans that underperforming schools will have to devise need to be considered useful by school managers. In this area, follow-up and political resolve are essential. For a plan to be credible, its implementation should be assessed on a timely and frequent basis, which may overstretch the Ministry of Education's capacity. An appropriate assessment, including the costing, of the demands on the central government associated with this requirement should therefore be carried out before the system is fully operational in 2008. Also, some schools may perceive the need for approval by the Ministry of Education of their recovery plans as micromanagement on the part of the central government or as a device to exert control by the centre over municipal policies. Ministry of Education officials are therefore advised to work closely with their municipal counterparts to allay such concerns, should they arise.

The additional resources allocated to the municipalities through the differentiated voucher scheme should not substitute for locally raised funds. The municipalities can use voucher receipts freely and top up grants with their own budgetary revenue. In 2005, municipal funds accounted for just over 12% of total spending on education. But, because transfers are fungible, increases in voucher receipts may well substitute for locally raised funds, leaving overall spending unaltered. To prevent this from happening, a matching-grant mechanism could be considered in parallel with the introduction of differentiated vouchers. Moreover, switching the direct transfer of voucher receipts from municipalities to schools would eliminate the potential for cross-subsidisation among the schools within a municipality, therefore increasing contestability and boosting performance.

Of course, for a shift in the allocation of voucher receipts to stimulate efficiency-enhancing competition, it is important to grant the municipal schools greater managerial autonomy. Because the Teachers' Statute calls for centralised, nation-wide wage negotiations, and because there are restrictions on personnel management, it is difficult for schools to compete on the basis of enhanced efficiency in the use of inputs, which is at odds with the spirit of the voucher system. This is particularly important, because the wage bill accounts for the lion's share of municipal school budgets. The possibility of decentralising wage setting to the municipal or regional levels and making personnel management more flexible would go in the direction of enhancing managerial autonomy at the school level.

Competition depends crucially on the availability of information on student and school performance. The Ministry of Education should therefore disseminate such information. The publication of SIMCE scores at the school level is a useful step in this respect. But more is needed to raise parents' awareness of the scope for boosting school performance through competition, since many parents do not consider it a key variable when selecting a school for their children. The announced creation of a Superintendency for Education is therefore welcome, because it would contribute to improving the quality and quantity of information available in the education system, while setting and enforcing quality standards in service delivery.

The differentiated voucher scheme's emphasis on non-performing schools is commendable, but options for rewarding top performers should be strengthened at the same time. SNED (*Sistema Nacional de Evaluación de Desempeño de los Establecimientos Educacionales Subvencionados*) – a national system that has been in place since 1996 to

monitor performance by municipal and private subsidised schools – is being used to this end and preliminary evidence shows that it has a positive impact on performance. SNED focuses not only on measuring student performance (through SIMCE scores), but also on teaching innovation, work conditions, parents' involvement in school management, student accessibility and retention, etc.[13] Information is subsequently used to construct a performance index per school and for comparator groups of schools at the regional level using as clustering features the geographical location of the school (urban or rural), its level of education (primary, lower secondary, etc.) and the income and the level of education of students' parents, among others. The index is calculated by an external institution, the Centre for Applied Economics of the University of Chile. Currently, the best performing institutions receive as a reward additional resources for two years, which are distributed as bonuses among teachers. Public finances permitting, it would be advisable to strengthen this system by introducing rewards for the schools that manage to "graduate" following successful implementation of their recovery plans using SNED.

There is room for removing access barriers to selected education services, notably pre-primary and tertiary education, for vulnerable social groups. In the case of pre-primary education, an extension of public provision is often constrained by the financial burden it would place on the budget. This is the case even among the wealthiest countries in the OECD area. But the evidence reported in Chapter 5 suggests that the presence of children aged less than six years in a household is an important deterrent to women's participation in the labour market. The cost of public provision will therefore need to be assessed against the benefit of increasing labour supply among prime-age women. As mentioned above and discussed in Chapter 5, the supply of pre-school education services has increased considerably over the years. With regards to higher education, there is room for raising government spending from a level that is currently well below the OECD average and in comparator countries in Latin America. For example, the number of recently created Excellence Scholarships (*Beca de Excelencia*), which are currently granted to the top 5% performers in upper-secondary education belonging to the first four income quintiles and having attended municipal or subsidised private schools, could be increased. As noted in the *2005 Survey*, another way of favouring access is through means-tested student loans with government collateral (*Sistema Crédito Estudios Superiores*), which are available from 2006. Budget restrictions permitting, government support to the Solidarity Funds (*Fondos de Crédito Solidario*) administered by the universities could also be bolstered if actions are taken in order to improve the system's efficiency.

Boosting the efficiency of health care programmes

There is scope for improving risk pooling in health insurance. The main provisions of the 2005 Law of ISAPREs go in this direction, especially through the creation of the Solidarity Compensation Fund among private insurers, which mitigates incentives for cream-skimming within this industry segment. But there is little risk pooling between the ISAPREs and FONASA. As a result, to the extent that risk is concentrated in FONASA, the current system puts an undue burden on the budget. Previous reforms considered the need to remedy this situation, but progress has so far been timid. The option of extending the Solidarity Compensation Fund to FONASA should therefore be considered.

Competition should be enhanced between the public and private health care providers as a means of fostering efficiency. Despite efforts towards unbundling, there remains a close link between insurance and service delivery, since most FONASA beneficiaries receive treatment in public hospitals and most ISAPRE policy-holders rely on private

medical facilities. The main deterrent to competition among ISAPREs is the higher level of co-payments policy-holders need to make to receive treatment in non-authorised or non-insured facilities. In FONASA, competition is limited by a combination of restrictions for beneficiaries to remain in the public sector (under the "Institutional Modality" of care), and through higher co-payments in selected private health care providers with which FONASA has an agreement (under the "Free Choice Modality" of care). This makes treatment in private hospitals and clinics substantially more expensive for low- and middle-income individuals. The option of equalising the level of co-payments for both ISAPRE and FONASA beneficiaries for homogeneous services provided by public and private providers would go in the direction of removing obstacles to competition. It would be advisable, however, that the level of co-payments reflect marginal service-delivery costs, so as to avoid the introduction of informal cost recovery if co-payments are set at unrealistic levels. Also, FONASA could consider relaxing mobility restrictions for beneficiaries under the Institutional Modality of care. In this case, the impact that this measure might have on the cost of insurance coverage would need to be carefully evaluated. The fact that the proportion of ISAPRE beneficiaries receiving treatment in public hospitals has risen over time, although it remains small, may indicate that public institutions are ready to compete.

Improvements in budgeting may boost efficiency in public hospitals. Financing has been traditionally provided through historic budgeting, especially for recurrent outlays, such as payroll, and, to a lesser extent, per-act billing (*Facturación por Atención Prestada*, FAP), mainly for materials and medical inputs. Because it is well known that this budgeting mechanism discourages efficiency, efforts have been made to strengthen the link between budgetary allocations and performance. The intention is to gradually replace historical budgeting and FAP by diagnosis-related (*Pagos Asociados a Diagnósticos*, PAD) and prospective payments (*Pagos Prospectivos por Prestaciones*, PPP). PAD links financing and outcomes by providing fixed payments in advance per diagnosis for pre-specified interventions, and PPP is a payment mechanism for treatments not included in PAD, which have no pre-specified reimbursement, and when differences arise between diagnostic-based costing and the effective treatment received. Application of the PAD-PPP system is still limited; it would therefore be advisable to broaden the range of treatments that can be financed through the system, while continuing to evaluate its functioning to make sure that more budget flexibility results in higher efficiency.

Competition among medical outlets could be enhanced through regular service satisfaction surveys. Information is limited, but a survey conducted in 2003 shows that satisfaction is considerably lower in public facilities (hospital and municipal units) than in their private counterparts (Ministry of Planning, 2003a). Once remaining institutional constraints have been removed, the scope for boosting competition among medical facilities on the basis of perceived quality should not be underestimated. In this case, the results of satisfaction surveys should be disseminated broadly, including through the health care insurers, so as to enhance societal control over service delivery.

Facilitating access to better housing for vulnerable social groups

Chile is a pioneer in designing and implementing housing subsidy programmes in Latin America. The current focus on the most vulnerable segments of the population is welcome, because the housing deficit, estimated at 10-15% of the housing stock, is concentrated among the poor: the lowest income quintile of the population accounts for almost 40% of the quantitative deficit (almost 70% for the lowest and second income

quintiles). This policy focus has the merit of benefiting informal-sector workers, who have limited access to non-subsidised mortgage loans. At the same time, the policy objective of reducing the qualitative housing deficit and urban segregation are both sensible. The authorities are addressing this challenge by raising the value of the housing subsidy and quality standards. The recent announcement of a housing debt cancellation under certain conditions and for some programmes also goes in the direction of benefiting mainly the most vulnerable groups.[14] While there is some rationale for debt forgiveness in some cases, including in the case of properties with construction deficiencies, the authorities should be careful not to introduce an element of arbitrariness in a system that has traditionally operated with clear and predicable rules.

The expansion of the housing subsidy programmes may affect land prices. To a certain extent, this is beyond the authorities' control, because an increase in the demand for housing associated with an expansion of subsidy programmes will inevitably put upward pressure on land prices, especially in new housing development areas. The authorities should therefore consider the possibility of using public land, where available and zoning and environmental restrictions permitting, for new housing developments. But, because the stock of public land that could be used for social housing may soon be exhausted, the option of buying land in advance to be subsequently used for social housing developments should also be considered. In any case, when assessing the economic viability of new housing developments, it is important to balance the cost of land, which is higher near city centres, with that of extending urban and transport infrastructure to new areas.

A reduction in the qualitative housing deficit requires better coordination among different policy-makers in charge of urban planning, transport, public works and environment, at the central government level, as well as in the municipalities. It is especially important to make sure that the housing developments financed through the Solidarity Fund do not perpetuate urban segregation and social exclusion. Improving access to services, such as medical facilities, schools and public transport, together with urban amenities and better recreational areas outside the housing estates, is important for raising living standards outside the city centres.

Summary of recommendations

This chapter's main recommendations are summarised in Box 3.5.

Box 3.5. **Summary of recommendations**

Closing the student performance gap

- Improve the quality of teaching through training programmes for teaching and managerial personnel and by setting up an accreditation system for training institutions.
- Appropriately assess the demands on the central government arising from the recovery plans to be introduced for underperforming schools.
- Consider the introduction of a matching mechanism in the differentiated voucher programme to prevent higher voucher receipts from substituting for municipality-financed spending.
- Consider the introduction of rewards for "graduating" schools, possibly on the basis of the currently available SNED-related per-school performance index.

Box 3.5. **Summary of recommendations** *(cont.)*

Boosting the efficiency of health care programmes

- Extend the Solidarity Compensation Fund to FONASA as a means of further improving risk pooling.
- Consider a relaxation of mobility restrictions for FONASA beneficiaries under the Institutional Modality of care (while carefully evaluating the impact that this measure might have on insurance costs), and make the level of co-payments for homogeneous services equal for FONASA and ISAPRE policy holders.
- Broaden the range of treatments that can be financed through diagnosis-related and prospective payments (PAD-PPP).
- Conduct service satisfaction surveys more frequently and disseminate the results broadly, including through health care insurers.

Facilitating access to better housing and neighbourhood conditions for vulnerable social groups

- Use public land for new subsidised housing developments, where available and zoning and environmental regulations permitting.
- Consider the option of buying land in advance for new subsidised housing developments.
- Boost coordination among the different policy-makers in charge of urban planning, transport, public works and environment at the central- and local-government levels.

Notes

1. Nevertheless, increases in public spending due to the recent implementation of the AUGE Plan (described below) may have partially reversed this trend.
2. See Gonzales Arrieta (1999) and Szalachman (2006) for a comparison of housing policies in Latin America.
3. The correlation between the real rate of growth of housing subsidies and of (one-year lagged) real GDP is 0.85 during those years.
4. For the institutions (public or private) to be accredited they have to meet a series of requirements, including appropriate facilities, adequate teaching and support staff, etc.
5. The logic for the decreasing differentiated subsidy is that household and socioeconomic factors play a more prominent role in shaping lifetime educational outcomes at lower than higher grades.
6. . In the last two cases, the requirements are to be indigent on the basis of the CAS Survey and to belong to the first FONASA income-classification bracket (*Tramo* A). When none of these criteria are met, additional factors are considered (*i.e.*, household income, mother or father's educational attainment, residency (urban or rural) and the poverty level of the student's community).
7. The share of FONASA beneficiaries receiving attention in private facilities (17.5% in 2003) is higher than that of ISAPRE (private) policy-holders receiving attention in public outlets (7.4% in 2003). This is because FONASA beneficiaries can choose to receive treatment in private facilities under the Free Choice Modality of care (*Modalidad de Libre Elección*).
8. Risk factors determine the cost of coverage and account for differences in gender and age. As such, premia are higher during woman's fertile period and for older people.
9. See Manzi (2007) for more information and discussion on the potential effects of clustering.
10. Of course, as acknowledged in Annex 3.A1, health outcomes do not depend exclusively on the physical and monetary resources devoted to health care but are also affected by external factors.
11. Estimations available from the Ministry of Planning for 2003 show that, if social spending (*i.e.* education, health care and income transfers, such as the household subsidy, the water subsidy

and unemployment insurance) is imputed into the beneficiary population's income, the income of households in the lowest quintile almost doubles and that of households in the second quintile rises by 20% (Ministry of Planning, 2004).

12. See Mizala and Romaguera (2004) for more information based on opinion surveys. Also, in 2005 some 5 000 municipal teachers did not accept to be evaluated by a compulsory performance evaluation programme put in place in 2003.

13. See Mizala and Romaguera (2004) for more information.

14. Debt cancellation is automatic for owners of properties with construction deficiencies, those who obtained housing loans before 1977 and those for whom outstanding debt is lower than 15 UFs. For home-owners who have reimbursed more than 50% of the loan, debt cancellation requires payment of 12 UFs, while for those who have reimbursed less than 50% of their loans but never incurred payment arrears cancellation requires payment of 18 UFs. Finally, those who have reimbursed less than 50% but have outstanding payment arrears are required to pay 24 UFs to benefit from debt forgiveness.

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ANNEX 3.A1

Measuring efficiency in education and health care

This Annex uses Data Envelopment Analysis (DEA) to measure the efficiency of spending on education and health care in Chile from an international perspective.[1] The technique consists of computing a technological frontier where the most efficient countries in the sample (*i.e.* those producing the maximum amount of output for a given input level) operate. The countries that operate on the frontier "envelop" the remaining ones, thus providing a benchmark for comparison. The frontier represents "best practices", and the degree of inefficiency is measured as the gap between the countries on the frontier and those within it.

Education and health inputs and outputs are measured as follows. With regard to output, in the case of education, conventional indicators are school enrolment, average years of schooling and standardised test scores; in the case of health, conventional output indicators are life expectancy, immunization rates (DTP and measles) and child mortality rates. Inputs can be defined in physical or monetary units. When defined in physical (monetary) units, inputs can be used to compute technical (allocative) efficiency measures.[2]

The data and sample

Health care

Output is measured by life expectancy at birth, under-five mortality rates (per 1 000 live births), and the percentage of one-year-olds immunised with three doses of DPT (diphtheria-poliomyelitis-tetanus) vaccine and two-year-olds immunised with one dose of measles vaccine. As the methodology requires a higher output score to mean a better outcome, mortality rates were converted into survival rates. With regards to inputs, the densities of physicians and hospital beds per 1 000 population are used as measures of physical inputs (Puig-Junoy, 1998) and the total (public and private) per capita expenditure on health care (in USD at PPP exchange rates) is used as the input cost measure.

To control for external factors affecting health outcomes, the urbanization rate (percentage of people living in urban areas) and educational attainment (percentage of population aged 25-64 having attained at least lower secondary education) are also considered in the computation of the technological frontier. Urbanisation may affect efficiency, because urban areas may attract higher-quality medical personnel and enjoy economies of scale in service delivery, among other factors (Jayasuriya and Wodon, 2002). Educational attainment is included in the analysis of efficiency in the provision of health

care, because the population's education and health status are interconnected (Cutler and Lleras-Muney, 2006).

Education

Output is measured by PISA scores in mathematical literacy. Technical efficiency uses the number of teaching staff per 100 students in secondary education as a measure of physical input, while annual expenditure per student in secondary education (based on full-time equivalents) in USD (at PPP exchange rates) is used for allocative efficiency.[3] The socio-economic background of students is proxied by the Index of Social and Cultural Status (ESCS) obtained from PISA.[4] The ESCS was rescaled, because the original index contains negative values, which undermine the functioning of DEA analysis.

The sample

The original sample includes all OECD countries, as well as Argentina, Brazil, Chile, Paraguay, Peru and Uruguay in the case of health care, and Argentina, Brazil, Chile, Russia and Uruguay for education.[5] Data are available from a variety of sources including OECD (2000, 2003c, 2005, 2006), the World Bank's *World Development Indicators* and the World Health Organisation (2005 and 2006). The data set refers to 2003, although 2000 PISA scores are used for Argentina and Chile, because these countries did not participate in the 2003 PISA wave, and spending per student refers to 1999.[6] Also, the ESCS was not computed in the same manner in 2000 and 2003; therefore, this indicator had to be recomputed using the 2003 methodology for Argentina and Chile (OECD, 2003b).

Measured efficiency in education and health

The sample as a whole

In education, the benefits accruing from improving efficiency are considerable. The results reported in Tables 3.A1.1 and 3.A1.2 show that the use of physical inputs could be reduced by 26-39% on average to yield the same level of output, if all countries had the same level of efficiency as those on the best-practices frontier.[7] Instead, output could be raised by 6-8% for the same input intensity, if the inefficient countries in the sample had the same level of efficiency as those on the frontier. Using spending per student as the input measure suggests that delivery costs could be cut by 30-64% on average (41-68% for the inefficient countries), without affecting PISA scores, if all units operated on the best-practice frontier. For their current level of spending, the inefficient countries could raise their PISA scores by 5-7% if they operated on the frontier.[8] A variety of sensitivity exercises show that the results are robust to the inclusion of only one output and to the exclusion of the control variables.

With regards to health care, the results reported in Tables 3.A1.3 and 3.A1.4 show that, for the same level of output, input intensity could be reduced on average by about 5-14% (or by about 12-18%, if attention is focused on the inefficient countries alone), depending on model specification. Instead, for the same level of technical inputs, output could be raised by 0.2-18% (or 0.4-24% for the inefficient countries alone). When focusing on spending, rather than physical inputs, potential input intensity cuts are in the neighbourhood of 10-17% (18-20% for the inefficient countries), and output could be raised by 0.3-23% (0.4-28%, for the inefficient countries) by bringing all the countries in the sample to the best-practices frontier.

Table 3.A1.1. **Technical efficiency in education**[1]

In per cent

	Potential cuts in inputs		Potential gains in outputs	
	Non-increasing returns to scale	Constant returns to scale	Non-increasing returns to scale	Constant returns to scale
Australia	–33.54	–43.96	3.79	78.48
Austria	–48.55	–55.94	7.20	127.01
Belgium	–46.24	–54.85	2.68	121.53
Canada	–0.47	–16.62	0.34	19.95
Czech Republic	–29.76	–40.38	5.29	67.73
Denmark	–40.11	–49.07	5.76	96.39
Finland	0.00	–39.49	0.00	65.29
France	–33.95	–46.28	6.08	86.19
Germany	–23.72	–34.50	7.94	52.70
Greece	–53.17	–66.48	15.75	198.33
Hungary	–42.62	–50.13	10.63	100.56
Iceland	–40.95	–49.84	5.64	99.36
Ireland	–30.82	–40.60	7.76	68.38
Italy	–44.35	–57.40	14.61	134.80
Japan	–20.24	–33.29	1.51	49.93
Korea	0.00	–16.87	0.00	20.29
Mexico	0.00	0.00	0.00	0.00
Netherlands	–12.69	–27.20	0.88	37.36
New Zealand	–23.02	–35.04	3.87	53.96
Norway	–51.64	–58.17	9.90	139.06
Poland	–5.29	–45.05	1.50	82.02
Portugal	0.00	–24.35	0.00	32.21
Slovak Republic	–30.29	–39.88	8.85	66.33
Spain	0.00	–52.77	0.00	111.77
Sweden	–32.66	–42.50	6.86	73.91
Switzerland	–39.52	–49.13	2.86	96.62
Turkey	0.00	–0.11	0.00	0.12
United States	–26.24	–35.45	12.38	54.94
Argentina	–40.71	–40.72	17.32	68.69
Brazil	–22.94	–22.94	19.76	29.79
Chile	**0.00**	**0.00**	**0.00**	**0.00**
Russia	–53.86	–65.70	15.82	191.55
Uruguay	–29.77	–44.51	9.19	80.25

1. Output is measured by PISA scores. Inputs are the ratio of teaching staff to pupils. The control variables are urbanisation rate and lower-secondary educational attainment.

Source: OECD calculations.

How does Chile rank?

With regards to education, Chile lies on the frontier in terms of technical efficiency, but there is room for boosting allocative efficiency. As such, spending per student may be reduced by 36-38% without affecting PISA scores by raising allocative efficiency to the level of the countries that are currently on the best-practice frontier. Alternatively, PISA scores could be increased through allocative-efficiency gains by some 16%, while holding spending and other non-policy factors unaltered.[9] The fact that Chile is technically but not allocatively efficient indicates the presence of inefficiencies in the use of other inputs needed to deliver education services.

In the case of health care, the results suggest that Chile is among the most efficient countries in the sample. There seems to be scope for improvement only when the frontier

Table 3.A1.2. **Allocative efficiency in education**[1]

In per cent

	Potential cuts in inputs		Potential gains in outputs	
	Non-increasing returns to scale	Constant returns to scale	Non-increasing returns to scale	Constant returns to scale
Australia	–38.75	–78.81	3.79	372.14
Austria	–65.00	–82.18	7.20	461.48
Belgium	–32.20	–78.39	2.68	362.75
Canada	–15.16	–74.16	1.92	287.00
Czech Republic	–1.15	–60.25	0.10	151.64
Denmark	–52.84	–80.22	5.76	405.82
Finland	0.00	–76.86	0.00	332.15
France	–41.84	–81.40	6.08	437.92
Germany	–60.18	–77.92	8.00	352.90
Greece	–60.45	–71.71	16.23	253.61
Hungary	–34.77	–60.92	5.11	155.89
Iceland	–42.74	–76.49	5.44	325.53
Ireland	–41.11	–75.15	7.68	302.58
Italy	–55.84	–80.59	16.32	415.20
Japan	–21.62	–76.91	1.51	333.28
Korea	0.00	–73.37	0.00	275.66
Mexico	–8.98	–8.98	9.88	9.88
Netherlands	–13.58	–75.78	0.89	313.05
New Zealand	–17.81	–71.07	2.13	245.78
Norway	–78.37	–85.72	9.90	600.77
Poland	0.00	–47.71	0.00	91.28
Portugal	0.00	–44.92	0.00	81.55
Slovak Republic	0.00	–34.69	0.00	53.12
Spain	0.00	–61.78	0.00	161.71
Sweden	–55.58	–79.08	6.88	378.24
Switzerland	–47.89	–86.05	2.86	617.36
Turkey	0.00	0.00	0.00	0.00
United States	–76.99	–84.14	12.64	530.91
Argentina	–45.52	–46.89	15.29	88.29
Brazil	0.00	0.00	0.00	0.00
Chile	**–35.63**	**–37.70**	**15.98**	**60.54**

1. Output is measured by PISA scores. The input is total (public and private) per capita spending. The control variables are urbanisation rate and lower-secondary educational attainment.

Source: OECD calculations.

is computed assuming constant returns to scale. But, as discussed in Box 3.3, this hypothesis tends to overestimate inefficiency. In any case, the results for the allocative efficiency analysis show that spending per capita could be cut by some 31% while keeping life expectancy and the child survival rate unaltered, if Chile were to reach the efficiency frontier. Also, health outcomes could be boosted by a sizeable 44% by keeping technical input intensity constant.

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Table 3.A1.3. **Technical efficiency in health**[1]

In per cent

	Potential cuts in inputs		Potential gains in outputs	
	Non-increasing returns to scale	Constant returns to scale	Non-increasing returns to scale	Constant returns to scale
Australia	–1.26	–28.01	0.06	38.93
Austria	–9.19	–10.70	0.22	11.99
Belgium	–31.67	–38.82	0.16	63.45
Canada	0.00	–11.00	0.00	12.37
Czech Republic	–12.46	–13.60	0.11	15.75
Denmark	–9.50	–30.51	0.09	43.91
Finland	0.00	0.00	0.00	0.00
France	–12.95	–20.81	0.14	26.29
Germany	–16.25	–19.72	0.12	24.56
Greece	0.00	0.00	0.00	0.00
Hungary	–12.61	–13.87	0.52	16.12
Iceland	0.00	–34.05	0.00	51.65
Ireland	0.00	–2.12	0.00	2.18
Italy	0.00	–12.15	0.00	13.84
Japan	0.00	–2.79	0.00	2.87
Korea	0.00	–22.01	0.00	28.24
Luxembourg	0.00	–9.98	0.00	11.10
Mexico	0.00	0.00	0.00	0.00
Netherlands	–13.85	–23.65	0.22	30.99
New Zealand	–13.84	–28.22	0.17	39.33
Norway	0.00	–16.46	0.00	19.70
Poland	–0.59	–7.48	0.05	8.10
Portugal	0.00	0.00	0.00	0.00
Slovakia	0.00	0.00	0.00	0.00
Spain	–1.82	–20.85	0.06	26.36
Sweden	0.00	–8.48	0.00	9.27
Switzerland	0.00	–4.92	0.00	5.20
Turkey	–6.22	–6.22	1.68	6.63
United Kingdom	–12.29	–30.81	0.13	44.55
United States	0.00	0.00	0.00	0.00
Argentina	–29.90	–32.13	1.32	47.36
Brazil	–5.38	–5.38	1.42	5.70
Chile	**0.00**	**0.00**	**0.00**	**0.00**
Paraguay	0.00	0.00	0.00	0.00
Uruguay	0.00	–34.53	0.00	52.77
Peru	–5.91	–5.91	0.85	6.29

1. The outputs are life expectancy and child survival rate. The inputs are densities of physicians and hospital beds. The control variables are urbanisation rate and lower-secondary educational attainment.

Source: OECD calculations.

Table 3.A1.4. **Allocative efficiency in health**[1]

In per cent

	Potential cuts in inputs		Potential gains in outputs	
	Non-increasing returns to scale	Constant returns to scale	Non-increasing returns to scale	Constant returns to scale
Australia	–27.07	–32.52	0.25	48.21
Austria	–10.62	–12.34	0.22	14.09
Belgium	–35.81	–39.84	0.16	66.25
Canada	–9.80	–11.23	0.11	12.66
Czech Republic	0.00	–11.50	0.00	13.01
Denmark	–30.92	–32.52	0.14	48.19
Finland	0.00	–0.57	0.00	0.58
France	–19.44	–23.35	0.15	30.48
Germany	–20.15	–22.02	0.12	28.25
Greece	0.00	0.00	0.00	0.00
Hungary	–14.39	–14.39	0.32	16.82
Iceland	0.00	–36.81	0.00	58.25
Ireland	–3.86	–4.82	0.16	5.06
Italy	–5.69	–12.15	0.11	13.84
Japan	0.00	–8.51	0.00	9.31
Korea	0.00	–22.94	0.00	29.79
Luxembourg	0.00	–7.16	0.00	7.72
Mexico	–12.44	–23.09	1.32	30.04
Netherlands	–25.26	–26.71	0.26	36.44
New Zealand	–19.33	–31.40	0.18	45.79
Norway	–16.67	–18.88	0.01	23.27
Poland	0.00	–7.12	0.00	7.68
Portugal	0.00	0.00	0.00	0.00
Slovak Republic	0.00	0.00	0.00	0.00
Spain	–4.80	–22.32	0.06	28.73
Sweden	0.00	–1.15	0.00	1.17
Switzerland	0.00	–4.75	0.00	5.00
Turkey	–4.72	–4.72	1.62	4.96
United Kingdom	–23.55	–33.43	0.23	50.22
United States	0.00	0.00	0.00	0.00
Argentina	–24.21	–30.64	1.21	44.20
Brazil	–31.50	–31.50	2.06	46.01
Chile	**0.00**	**–30.66**	**0.00**	**44.24**
Paraguay	0.00	0.00	0.00	0.00
Peru	0.00	0.00	0.00	0.00
Uruguay	–24.00	–36.28	0.78	56.96

1. The outputs are life expectancy and child survival rate. The input is total (public and private) per capita spending. The control variables are urbanisation rate and lower-secondary educational attainment.

Source: OECD calculations.

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Notes

1. See Herrera and Pang (2005) and ADB (2006) for efficiency measurements in both health and education in samples of 140 developing countries and Asian countries, respectively. See Afonso and Aubyn (2006) and Sutherland *et al.* (2007) for efficiency measurements in primary and secondary education in the OECD area, and World Health Organisation (2000) for health care in a sample of developed and developing countries. Di Gresia (2000) and Mizala *et al.* (2002) carry out efficiency analyses at the school level in Argentina and Chile, respectively. See also de Mello (2000) for measurements of efficiency in health care and education in Latin America using Free Disposal Hull as an alternative technique.
2. It should be recognised that, when making international comparisons, the use of costs as an input measure has the potential drawback of picking up national price inefficiencies. As such, countries that use the same physical quantity of inputs to produce the same quantity of output, but differ in the price structure of inputs, will exhibit different measured efficiency. See Jacobs *et al.* (2006) for more discussion on the definition of inputs and outputs.
3. This measure, as well as per capita spending in health care, has the potential drawback that education and health status of the population should in principle depend on accumulated spending, since it takes time for policies to bear fruit. Other physical inputs affecting efficiency in education include teacher quality and school equipment (*i.e.* computers, furniture, etc.).
4. The index is derived from three variables related to family background: *i*) highest level of parental education; *ii*) highest parental occupation; and *iii*) number of home possessions. See OECD (2003b) for methodological discussion.
5. In education, Luxembourg and the United Kingdom were dropped due to lack of ESCS data. Also, Russia and Uruguay were eliminated when performing the allocative efficiency analysis since they were considered outliers.
6. Also, annual spending per student in 2002 was used for Uruguay, since data for 2003 were not available.
7. The scope for reducing input intensity is slightly greater, at 33-41%, if the countries that are already on the frontier are excluded from the sample when calculating the averages.
8. As was mentioned in Box 3.3, inefficiency estimates are magnified when the constant returns to scale assumption is used. This can easily be seen under output-orientation in the allocative efficiency analysis for education.
9. The gains with constant returns to scale (under the output orientation) reach a sizeable 61%.

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Chapter 4

Tackling informality to improve the business environment and labour utilisation

Informality often arises from disincentives associated with high taxes and a restrictive regulatory framework in both labour and product markets. About 20% of the Chilean population aged 15 years and above and working at least 20 hours per week did not have a formal labour contract in 2006. At the same time, nearly 11% of the potential value added tax base is estimated to have been undeclared in 2005. While Chile's tax system is not particularly burdensome to business formality, there is scope for making product-market regulations less onerous to firms and the labour code more flexible, especially with regards to indefinite contracts and the allocation of working time. Low human capital remains an important obstacle to reducing labour informality. To the extent that informal businesses also hire informally, there is some room for designing policies to tackle business informality in conjunction with those aimed at boosting formal labour contracting. Chile is strengthening its social safety net through the introduction of unemployment insurance and by reforming existing health insurance and pension systems. An important policy question is whether the incentives for formality arising from more comprehensive social protection will be strong enough to compensate for the additional costs these contributory programmes entail.

It is not easy to measure accurately the extent of informality in the labour market and in the business sector. On the basis of household survey (CASEN) data, slightly more than 20% of the Chilean population aged 15 years and above engaged in full-time work (at least 20 hours per week) did not have a formal labour contract in 2006, which is a conventional metric for labour informality. The ratio is higher, at about 33% of the working population, if individuals working in enterprises with 1-49 employees are considered informal. With regards to business informality, about 40-50% of enterprises are deemed to operate informally, and nearly 11% of the potential tax base of the value added tax, which accounts for nearly one-half of central government revenue, is estimated to have been undeclared in 2005.

International experience suggests that informality often arises from disincentives associated with high taxes and a restrictive regulatory framework in both labour and product markets, which is burdensome on businesses, especially small and medium-sized enterprises (SMEs). On the basis of the OECD indicators of restrictiveness in product market regulations (PMR) and stringency in employment protection legislation (EPL), informality appears to be more closely associated with cumbersome regulations than with the burden of taxation. At the same time, the level of education of the labour force, which is still low by OECD benchmarks, makes it difficult for employers to hire low-productivity workers formally. The empirical evidence reported in this chapter suggests that low human capital is a powerful impediment to reducing labour informality in Chile. There is therefore room for policy action to tackle the remaining obstacles to better labour utilisation and to enhancing the business environment.

The main determinants of business informality

Informality in the business sector is conventionally gauged on the basis of non-compliance with tax obligations and business regulations.[1] As such, a burdensome tax system – with high statutory rates, complex provisions and an inefficient, unfriendly tax administration – and a regulatory framework in product and labour markets that impedes competition are the main reasons why enterprises choose to operate informally. Informality not only has fiscal repercussions, given the revenue foregone, but it also affects economic efficiency, because firms are denied access to credit, government support for innovation and labour training, as well as legal protection. While Chile's low tax burden, discussed in Chapter 2, does not particularly discourage business formality, there is scope for making product-market regulations less burdensome to firms and the labour code more flexible.

Incentives for informality arising from the tax system

On the basis of estimates currently available, tax evasion appears to be declining over time. It is difficult to estimate its prevalence, because it is not observed directly and therefore needs to be inferred from observable data (Box 4.1). Estimates for the corporate income tax (*Impuesto de primera categoría*, IPC) suggest that evasion accounted for about 40%

Box 4.1. **Estimating tax evasion**

Tax evasion is not observed directly and therefore needs to be estimated. Conventional methods consist of comparing effective and potential collection, where potential revenue is computed on the basis of the national accounts and/or audits carried out by the tax authority.

Both methods are fraught with problems; therefore, estimates should be interpreted with caution. Computation of potential revenue depends on the quality of national accounts statistics, which are measured with error and use tax returns to estimate several types of income. Also, assumptions need to be made to exclude from the national accounts aggregates those transactions that are exempt from taxation. Moreover, the methodology does not allow for distinguishing tax avoidance, which is not unlawful, from outright evasion, which is. In turn, estimating evasion on the basis of audit reports depends on the quality of tax administration, which determines the tax authority's ability to correctly identify instances of avoidance and to enforce compliance with the tax code. On a more technical level, this method also suffers from a sample selection bias, because the enterprises that are audited are those that are estimated to have a higher probability of non-compliance, instead of being selected randomly.

In the particular case of sales taxes or VAT, for example, evasion can be estimated by comparing average daily sales over a given period with sales made on a day when the taxpayer was visited by a tax inspector. This is based on the premise that non-compliance is likely to be low, if at all possible, on such a day. The difficulty of this method is that daily sales fluctuate over time and across establishments, and inference depends on the analyst's ability to distinguish fluctuations that are due to the audit effect from those that are associated with the underlying distribution of sales across businesses and over time.

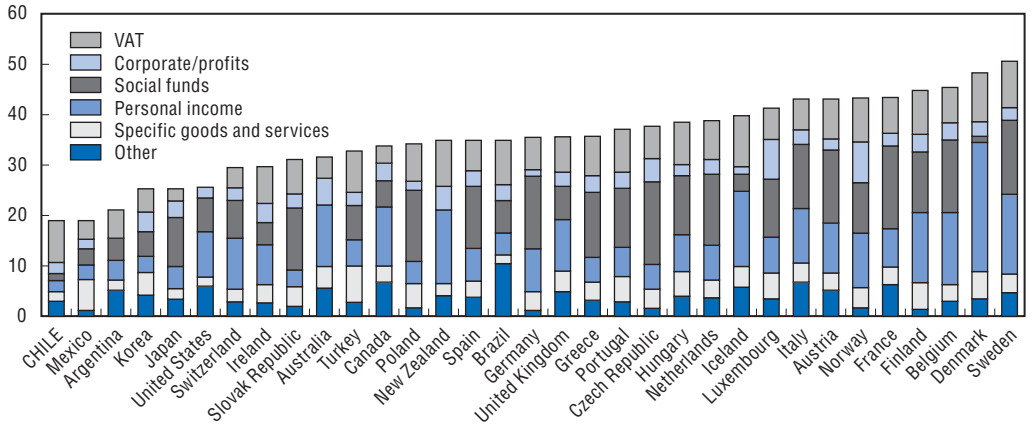
As a result of these methodological difficulties, estimates of VAT evasion vary considerably across countries. In the European Union, for example, evasion rates are estimated to have ranged from about 2.5% of the computed potential tax base in the Netherlands to over 34% in Italy on average during 1994-96 (Nam *et al.*, 2003). Chile is in an intermediate range of estimates on the basis of the 11% evasion rate estimated by SII for 2005 (SII, 1996 and 2005). In the case of Colombia, a regional comparator for which information is readily available, VAT evasion was estimated at about 28% in 1994, with a higher rate for domestically produced goods and services than for imports (Steiner and Soto, 1998).

of potential collection in 1997, which is considerably less than the 58% rate estimated for 1989 (Jorratt and Serra, 1999). Three-quarters of this estimated evasion is due to non-compliance with the value added tax (VAT) code: businesses that are not VAT-registered taxpayers most probably also evade other taxes. The remainder is due to under-invoicing of taxable income, abuse of presumptive taxation provisions and over-invoicing of expenditure, among other usual practices. In the case of the VAT, the evasion rate was estimated at about 11% in 2005, down from nearly 24% in 1998 (SII, 1996 and 2005). It is also estimated to exhibit considerable disparity across sectors, ranging from 13% in hotels and restaurants to 73% of sales in the case of retailing (Engel *et al.*, 1998). Empirical evidence suggests that compliance tends to rise in tandem with economic growth and trade openness, given that it is more difficult to evade taxes paid on imports than on domestic consumption (Serra, 2003).

As discussed in Chapter 2, Chile's revenue-to-GDP ratio is low by OECD standards (Figure 4.1). This is true even if social security contributions are excluded in the case of the OECD countries to facilitate comparison in light of the privatisation of the social security system in Chile in the early 1980s. International experience suggests that tax evasion tends to rise with the tax rate, because the gains associated with avoidance are potentially large, even when the probability of detection is taken into account (Annex 4.A1). Also, reliance on the VAT – which accounts for nearly 44% of revenue in Chile in 2006 – discourages informality as a result of the invoice-credit mechanism used for collection. This is because a registered taxpayer has a strong incentive to purchase intermediate goods and inputs from another registered taxpayer to obtain a credit for these purchases. When purchases are made from an informal enterprise, they cannot be credited against the registered taxpayer's tax liabilities.

Figure 4.1. **Composition of tax revenue: Argentina, Brazil, Chile and OECD countries, 2003**

In % of GDP



StatLink http://dx.doi.org/10.1787/173426415660

Source: OECD (Revenue Statistics), SII for Chile and SRF for Brazil, and OECD calculations.

Although there is no comparable estimate for Chile, complexities in tax filing requirements often put a compliance burden on individuals and enterprises, especially SMEs, which encourages informality.[2] International evidence suggests that compliance costs are in the neighbourhood of 3-5% of collections for the VAT and retail sales taxes.[3] Compliance costs are higher for the preparation of tax returns and documentation of tax exemptions. In particular:

- With regards to the VAT, the fact that the tax is uniformly rated at 19% across goods and services in Chile and has relatively few exemptions reduces the cost of compliance with the tax code. But the absence of a threshold for VAT registration probably overburdens small enterprises. Several OECD countries also do not have a registration threshold (Belgium, Italy, Korea, Mexico, among others), while the level of these thresholds varies considerably in other countries: in the range of less than EUR 10 000 in annual turnover in Finland, Greece and Poland, among others, and between EUR 50 000-80 000 in Ireland and France, for example.[4] International experience suggests that setting the level of this threshold depends on a trade-off between revenue yield and enforcement/collection costs: a high enough threshold reduces such costs but leaves a large number of

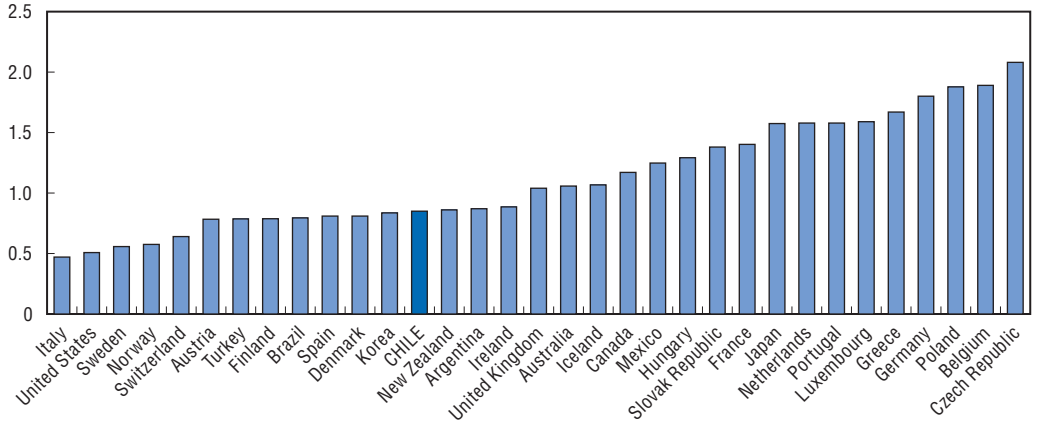
businesses out of the tax net.[5] At the same time, the invoice-credit system imposes financial costs on businesses in Chile, although the time for processing credits is set to come down from 30 days to 8-15 days on average.

- In the case of the income tax, compliance costs are likely to be high due to greater complexity in the tax code than in the case of the VAT. In particular, as discussed in Chapter 2, the discrepancy between the top marginal rate for the personal income tax (currently at 40%) and the uniform corporate tax rate (currently at 17%) creates incentives for individuals to incorporate themselves, although the tax code bans the inclusion of personal expenses in the calculation of tax liabilities other than those related to the enterprise's income-generating activities. In doing so, they can reduce their tax liabilities through a variety of mechanisms, including by claiming personal expenses as business costs. It is important to recognise that this type of tax arbitrage is not cost-free, since it creates a compliance cost for the taxpayer, which may ultimately lead to evasion, in addition to burdening the tax administration. On the other hand, despite the opportunity it creates for tax arbitrage, this gap in rates has allowed firms to finance expansion through retained earnings. It can be argued that the availability of internal sources of finance is important in periods of financial distress and for firms with limited access to external funds.
- Compliance costs also include the time it takes to pay taxes. A new tax system for SMEs introduced in 2007 is aimed at reducing the time and cost of filing taxes, as noted below, But, on the basis of indicators computed by PricewaterhouseCoopers and the World Bank (2006), Chile fares rather poorly in comparison with OECD countries: it takes almost twice as long to comply with the tax code in Chile as in the OECD area on average. Chile fares even worse against the small open economies in the OECD area, such as Ireland and New Zealand, where the time it takes to pay taxes is on average one-third of Chile's. In the case of SMEs, the number of taxes and local charges and fees they have to pay is high in comparison with other Latin American countries, which exacerbates the compliance-cost asymmetry between large and small businesses (Tokman, 2001).

Enforcement also creates costs for tax administration, which tend to rise with the complexity of the tax code. The extent to which an increase in spending on tax enforcement results in a more than commensurate increase in compliance is an empirical question. Evidence for Chile suggests that the payoff of increased emphasis on enforcement can be large. It was estimated in 2001 that a 10% hike in spending on enforcement could reduce VAT evasion from 23% of the computed potential base to 20% (Engel *et al.*, 2001). Much has been done over the last few years to improve Chile's tax administration (see below), and, therefore, it is likely that this payoff is now lower than estimated in 2001. Also, Chile's lean tax administration compares favourably with countries in the OECD area on the basis of the ratio of administrative expenditures on tax administration to net collections (Figure 4.2). Albeit crude, this ratio is a conventional metric for overall tax administration efficiency.

Efforts to combat business informality have focused on strengthening tax administration and reducing compliance costs. Legislation was approved in 2001 (*Ley Contra la Evasión*) introducing several measures that were implemented during 2001-05, including targets for net increments in revenue collection associated with enforcement of the tax code. Emphasis was placed on boosting coordination between the internal revenue and customs administrations, as well as with the Treasury. A large taxpayers unit was set

Figure 4.2. **Tax administration efficiency: OECD and non-OECD countries, 2003**
Ratio of administrative costs to net revenue collections (in per cent, 2000-04 average)



StatLink http://dx.doi.org/10.1787/173458752451

Source: OECD (Tax Administration Database).

up, and the VAT and income tax codes have been amended to improve clarity and eliminate legal loopholes. Sanctions for non-compliance have been strengthened.

Successful implementation of the law is associated with a reduction in the estimated VAT evasion rate from about 20% in 2000, the reference year against which the performance targets were set, to about 11% in 2005-06. The improvement in compliance is due to greater emphasis on the part of the tax authority on improving audit standards and capabilities, including through a better screening of taxpayers to be audited. The tax authority has also become more responsive to taxpayers' needs, as evidenced by the taxpayers' satisfaction surveys conducted since 2000. Moreover, conflict resolution is being enhanced though the creation of 16 independent Tax Courts. This measure is expected to speed up legal procedures and strengthen the protection of taxpayers' rights, because first-instance rulings on disputes between taxpayers and the tax authority are currently made by the tax administration, which is believed to create an anti-taxpayer bias in dispute settlements.

Effort has been made to improve taxpayer services to SMEs, especially through e-government. Measures include: greater ease for small enterprises to register electronically as taxpayers; to file and pay taxes; to obtain general information on how to close a business (*Portal PyMEs*); and to liaise with SME associations to raise awareness about taxpayer's rights and obligations, and to facilitate access by these enterprises to the necessary ICT tools and internet access points.[6] A simplified system was introduced in 2007 for SMEs to reduce the time and cost of filing taxes. In this system, SII uses electronic invoicing to process the taxpayers' information on purchases and sales and uses it for the purpose of tax pre-filing via the Internet. This strategy aims not only at reducing compliance costs, but also at encouraging the use of ICT tools in commercial operations at large, making enterprises more competitive. Electronic invoicing has also been available since late 2003, including for professional services.[7] In the case of SMEs, legislation was adopted in late 2005 making the assignment of invoices more flexible, swifter and cheaper, particularly if electronic invoicing is used. The law grants the right of execution to electronic invoices and provides for the assignment of electronic invoices to be notified by

electronic registration. Experience to date has been successful. As of October 2007, 5 800 firms had already adopted electronic invoicing, about 67% of which are SMEs.

Incentives for informality arising from product-market regulations

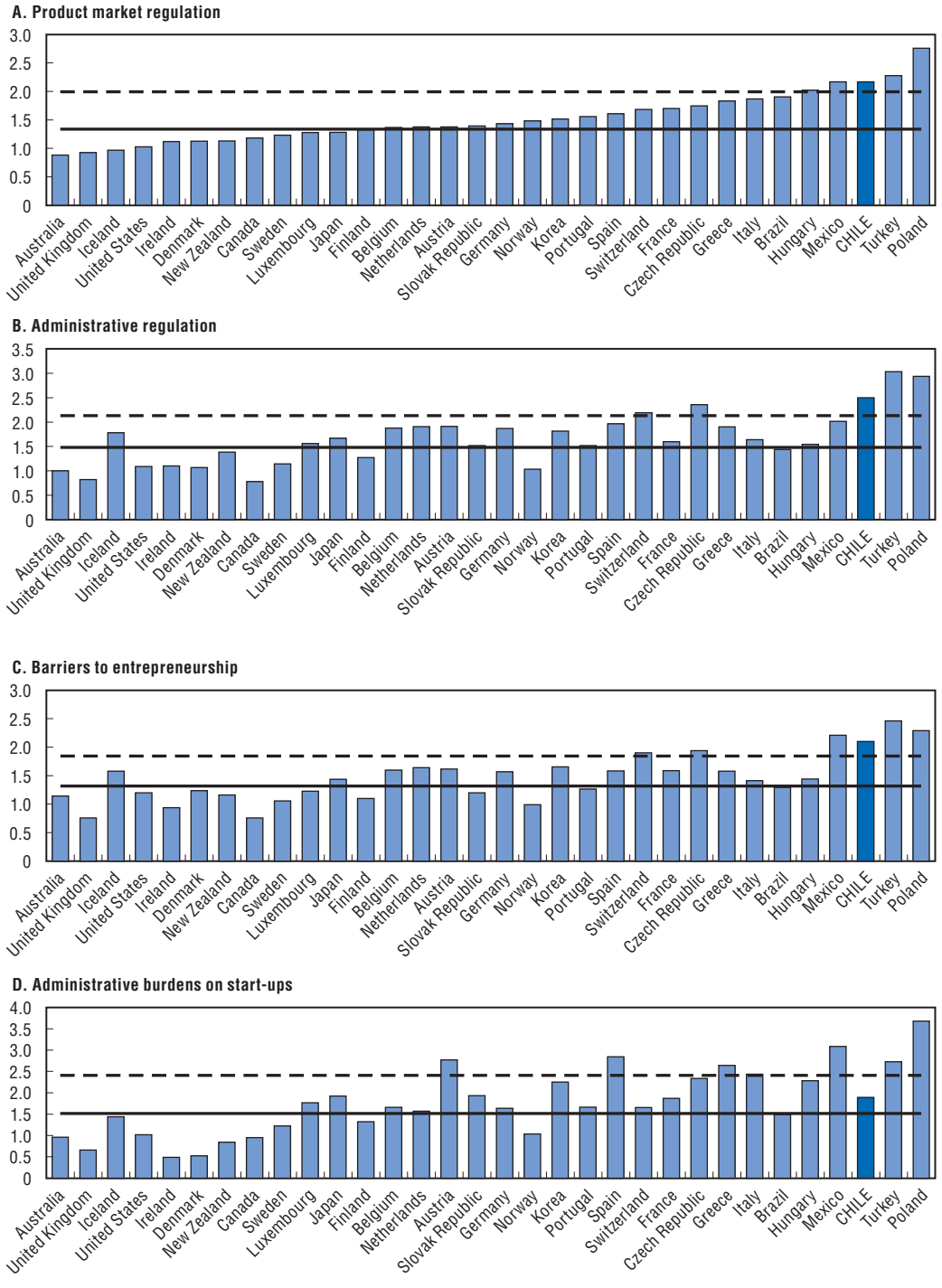
The argument about compliance and enforcement costs applies not only to taxes, but also to regulations in product markets. The empirical evidence for a sample of OECD and non-OECD countries reported in Annex 4.A1 suggests that, in addition to the quality of tax administration, a pro-competition business environment and a flexible labour code are associated with greater compliance with the tax code, at least as gauged by VAT productivity. Of particular relevance in the empirical analysis are regulations on business start-ups, which is an area where Chile still has some way to go to make its PMR framework less onerous to business and therefore more conducive to formality.

Chile's regulatory framework in product markets is reasonably pro-competition, but there is considerable scope for improvement. On the basis of the OECD indicator of PMR restrictiveness (reported in the *2003 Survey*), administrative regulation is more onerous in Chile than in the OECD area, and the country's indicators of barriers to entrepreneurship and regulatory burdens on start-ups is sub-par by OECD standards (Figure 4.3). This is consistent with the 2005 *Doing Business* indicators calculated by the World Bank, according to which the cost of obtaining licenses as a share of per capita income is high in Chile in relation to OECD comparators. By the same token, opinion surveys conducted with informal enterprises suggest that the number and cost of procedures, as well as a lack of information, are the most important factors discouraging them from applying for municipal licenses (González Garay and Kühn Barrientos, 2004). Regulation on closing a business is burdensome in terms of the time needed for closures (nearly 5.5 years in Chile, as opposed to less than 2.5 on average in the OECD area) and costly (14.5% of the estate in Chile, against 9% on average in the OECD area). Chile also ranks well behind OECD countries (with the exception of Italy, Mexico, Poland and Turkey) in the area of contract enforcement.

Attempts have been made in recent years to address these weaknesses. For example, since early 2006, it has been possible to start and close a business electronically, at least from the point of view of tax administration. New businesses can now register and obtain a taxpayer number (*Rol Unico Tributario*, *RUT*) on-line. They can also file and pay taxes through the SII website. A lack of internet access and skills in using ICT technologies nevertheless remains an obstacle in the case of SMEs. Effort is therefore being stepped up to set up regional centres providing internet access and disseminating information on taxpayer rights among SMEs. The authorities are also working with the municipalities to simplify procedures for business registration and those regulations that are typically under the purview of local governments. A comprehensive policy strategy (*Chile Emprende Contigo*) was launched in 2007 to address the main difficulties of the SME sector by seeking to simplify the regulatory framework for these enterprises, facilitate their access to credit and foster entrepreneurship and competitiveness.

Figure 4.3. **Product market regulations: Chile, Brazil and OECD countries, 2003**

0-6 increasing scale from least to most restrictive



StatLink http://dx.doi.org/10.1787/173458876275

Note: The solid horizontal line refers to the OECD average, excluding the emerging-market economies within the OECD area. The dashed line refers to the average of the emerging-market economies within the OECD area (Czech Republic, Hungary, Korea, Mexico, Poland, Slovak Republic and Turkey) and Brazil.

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The main determinants of labour informality

It is difficult to measure labour informality accurately and to compare these estimates across countries (Box 4.2). Notwithstanding this caveat, the informal labour market, defined as comprising workers without a formal labour contract, accounted for about 20% of Chile's population aged 15 years or above engaged in full-time jobs (at least 20 hours per week) in 2006 on the basis of household survey (CASEN) data. The ratio is virtually unchanged from 2003. Considering people working in small-scale, low-productivity, often family-based activities as an alternative measure raises the informality rate to 36% of the employed population aged 15 years and above in 2003 (Gasparini and Tornarolli, 2007). Another conventional metric for labour informality is self-employment, which accounted for about 37% of the Chilean labour force in 2003 on the basis of the CASEN Survey. Comparable information for other countries suggests that labour informality is nevertheless lower in Chile than in the rest of Latin America and has decreased over time (Table 4.1).

Box 4.2. **Measuring labour informality**

It is not easy to define and measure informality in a comparable manner across countries. Conventional metrics focus on enterprise size, individuals' labour-market status and social security coverage of the labour force.* There is no universally accepted definition of labour informality, even in the OECD area.

Definitions based on firm size and labour-market status treat as informal those workers employed in low-productivity, precarious jobs. Because labour productivity and job precariousness are not directly observable, conventional proxies are used instead. A worker employed in a small-scale, often family-based enterprise, as well as the self-employed, are therefore typically considered informal. This definition would nevertheless treat own-account white-collar professionals as informal, while these individuals are likely to be well educated and to work in higher-productivity occupations. For example, the International Labour Office (2005) treats as informal the employees of small, private, non-agricultural, unregistered, unincorporated enterprises with less than five paid workers producing at least part of their output for sale or barter. The alternative definition based on social-security coverage also has shortcomings, especially in the light of considerable variation across countries in social-protection entitlements, such as severance payment obligations, unionisation rights, workplace safety regulations, and health and unemployment insurance.

There are important reasons why policy-makers should be concerned about the informal sector. *First,* these activities are often well entrenched and affect both informal- and formal-sector workers. The informal sector therefore often becomes a trap for unskilled workers, perpetuating a vicious circle of limited human capital and low pay in a segmented labour market. *Second,* informality complicates the design of social-protection programmes, because it makes it difficult for the authorities to reach informal-sector workers through social assistance and active labour-market policies (ALMPs). *Third,* informality poses challenges for the design of tax policy, because it narrows tax bases, resulting in the shifting of the tax burden onto formal enterprises and individuals. *Fourth*, labour informality is associated with income inequality, so long as it is related to low educational attainment. *Finally,* a lack of access to the financial sector increases the financing costs facing informal enterprises, which often results in a low level of physical capital used in production and hence low productivity.

* See OECD (2004 and 2006), Maloney (2004) and Gasparini and Tornarolli (2007) for more information.

Table 4.1. **Incidence of labour informality in Latin America**

	Productive definition[1]		Social protection definition[2]	
	Year	Incidence rate (%)	Year	Incidence rate (%)
Argentina	2005	44	2005	43
Bolivia	2002	77	2002	74
Brazil	2003	55	2003	35
Chile	**2003**	**37**	**2003**	**22**
Colombia	2004	61	1999	59
Costa Rica	2003	41	…	…
Dominican Republic	2004	51	…	…
Ecuador	2003	66	1998	61
El Salvador	2003	57	2003	48
Guatemala	2002	70	2002	60
Haiti	2001	89	2001	…
Honduras	2003	64	2003	…
Jamaica	2002	58	2002	…
Mexico	2002	54	2002	59
Nicaragua	2001	65	2001	68
Panama	2003	50	2003	…
Paraguay	2003	72	2003	74
Peru	2003	70	2003	70
Uruguay	2004	42	2004	28
Venezuela	2003	54	2003	42

1. An individual is treated as an informal-sector worker if he/she is unskilled self-employed, salaried in a small private firm or has zero declared income.
2. A salaried worker is informal if he/she does not have the right to a retirement pension conditional on employment status.

Source: Gasparini and Tornarolli (2007).

International experience suggests that low human capital is a key determinant of labour informality. This is the case in Chile, too. Workers who belong to vulnerable groups, whose attachment to the labour market is weak, such as youths, are most likely to work informally. Restrictions embodied in the labour code do not seem to be the main culprits for informality in Chile, at least as gauged by the OECD methodology for assessing EPL restrictiveness (below), although they tend to be a contributory factor. Unlike other countries in the region, such as Argentina, Brazil and Uruguay, and in the OECD area, the design of social-assistance programmes does not appear, as yet, to create strong disincentives for formality. To the extent that informal businesses also hire informally, there is some room for designing policies to tackle business informality in conjunction with those aimed at boosting formal labour utilisation.

Incentives for informality arising from low human capital

Information available from the CASEN household survey for 1990-2003 suggests that the incidence of informal labour has been falling gradually since the late-1990s but remains pervasive among youths and the elderly. Informality, defined as the share in employment of full-time workers without a labour contract, rose slightly during 1990-2003, reaching a peak in 1998, when GDP growth decelerated sharply in the midst of the Asian crisis, and decreased gradually thereafter.[8] Informality is more prevalent among youths, especially those aged 15-19 years, and the elderly (aged 65 years and above) than for prime-age individuals (Table 4.2). Informality rates are also higher for males than females, for all age groups. Among prime-age individuals, informality is highest among the least educated

Table 4.2. **Labour informality: Incidence rates by age and gender, 1990-2003**

Age	Females				Males			
	1990	1996	1998	2003	1990	1996	1998	2003
15-24	18.2	23.3	23.1	25.3	26.6	29.5	33.4	27.2
15-19	32.4	36.8	41.7	34.4	39.1	51.6	51.4	45.3
25-54	10.3	12.6	14.7	12.0	13.5	16.8	17.6	16.1
55-64	12.0	14.8	14.4	12.1	14.3	21.1	17.6	15.8
65+	34.9	25.2	29.1	29.9	23.9	31.1	37.3	26.3
15+	12.3	14.8	16.3	14.2	16.3	19.6	20.5	17.8

Source: MIDEPLAN (National Household Survey, CASEN).

Table 4.3. **Labour informality and formal-informal earnings differentials by years of education, 1990-2003**

Years of education	Informality rate (%)					
	Females			Males		
	1990	1996	2003	1990	1996	2003
0 to 7	20.4	24.0	28.0	22.5	30.4	29.2
8 to 11	17.6	16.8	21.1	15.3	19.2	20.5
12	10.4	13.9	11.3	8.0	11.0	13.2
12+	5.0	7.6	7.7	5.8	8.6	8.4
	Formal-informal hourly wage ratio					
0 to 7	1.35	1.53	1.33	1.22	1.37	1.29
8 to 11	1.54	1.40	1.42	1.27	1.43	1.32
12	1.48	1.24	1.49	1.45	1.43	1.42
12+	1.84	1.63	1.77	1.49	1.66	1.50

Source: MIDEPLAN (National Household Survey, CASEN).

and falls sharply with years of schooling (Table 4.3). These trends are similar to those obtained when informality is defined in terms of social-security coverage.

The empirical evidence reported in Annex 4.A2, based on household survey data for 2003, confirms the presence of a strong link between labour informality and human capital: an individual's probability of working in the formal sector increases sharply with educational attainment. In addition, labour informality appears essentially to be a self-selection phenomenon in Chile, rather than the outcome of rigidities in the labour market. On the basis of the empirical findings, it seems that low-productivity, less educated individuals self-select into informal-sector jobs. In particular:

- Better educated workers are not only more likely to "queue" for a formal-sector job, but also to obtain one. This suggests that employers use educational attainment as a screening device to assess a job-seeker's productivity level, which is not observable directly. For example, among the least educated individuals (with at most seven years of schooling), it is estimated that for each worker employed in the formal sector, there are about 1.4 workers queuing for a formal-sector job.
- In addition to education, the probability of working in the formal sector increases with job tenure and experience, as well as with the number of elderly people and formal-sector workers in the household. Men are less likely than women to work in the formal sector, and larger firms are more likely to hire formally. Workers living in the

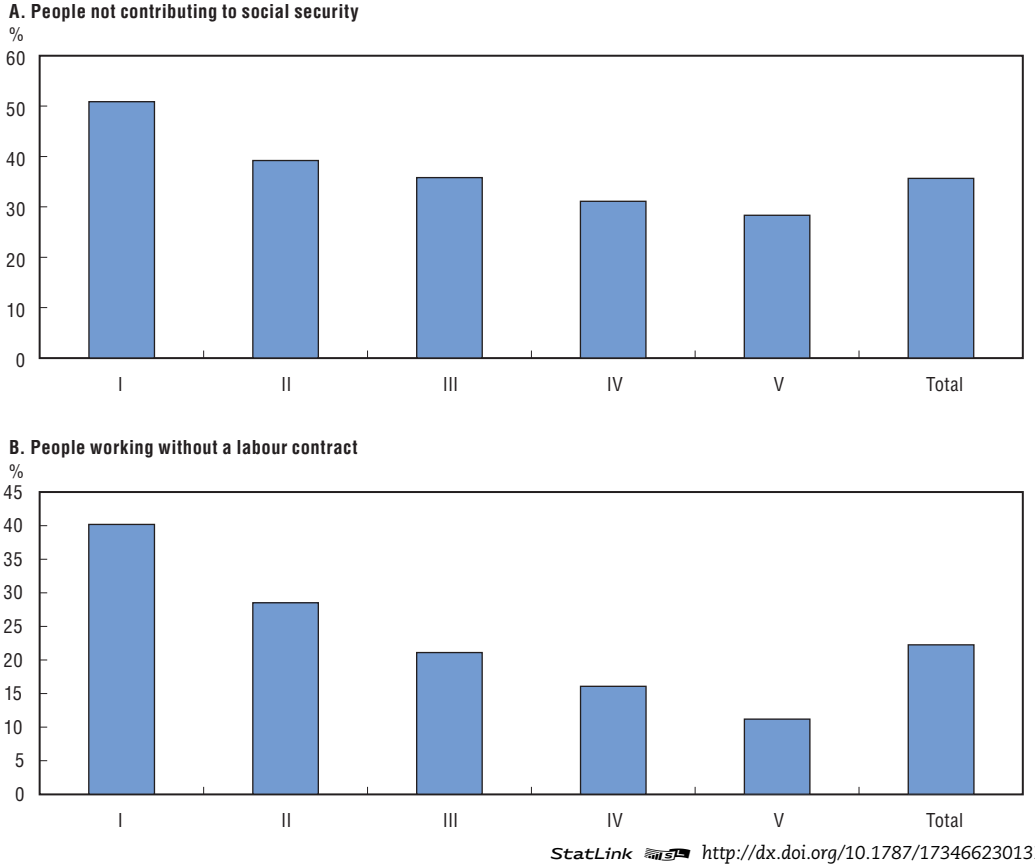
metropolitan region of Santiago and in households with children aged less than three years and with informal-sector workers are less likely to work formally.

- Informality appears to arise predominantly from self-selection in Chile. This is because workers are estimated to have a high probability of obtaining a formal-sector job if they seek one. Females, better educated individuals and those aged 45-54 years are most likely to queue for and to obtain formal-sector jobs. However, there may be discrimination in the hiring process: males are more likely to obtain a formal-sector job, but are less likely to queue for these jobs, and being married increases a worker's odds of being selected, while decreasing his/her likelihood of queuing for a formal job.

Informal-sector workers are often trapped in low-pay occupations. The empirical evidence reported in Annex 4.A2 suggests that there is an earnings premium in the formal sector. Formal-sector workers earn more than their counterparts in the informal sector for all levels of education, and this earnings premium rises with educational attainment (Table 4.3). As a result, informal-sector workers are concentrated among low-income groups (Figure 4.4).

Figure 4.4. **Informality by income level, 2003**

Incidence by income quintile, in per cent



StatLink http://dx.doi.org/10.1787/173466230137

Source: MIDEPLAN (National Household Survey, CASEN).

Incentives for informality arising from employment protection legislation and social protection

The stringency of Chile's labour code is not out of line with OECD comparators, as gauged by the EPL indicator computed by the OECD and reported in the 2003 *Survey* (Figure 4.5). This

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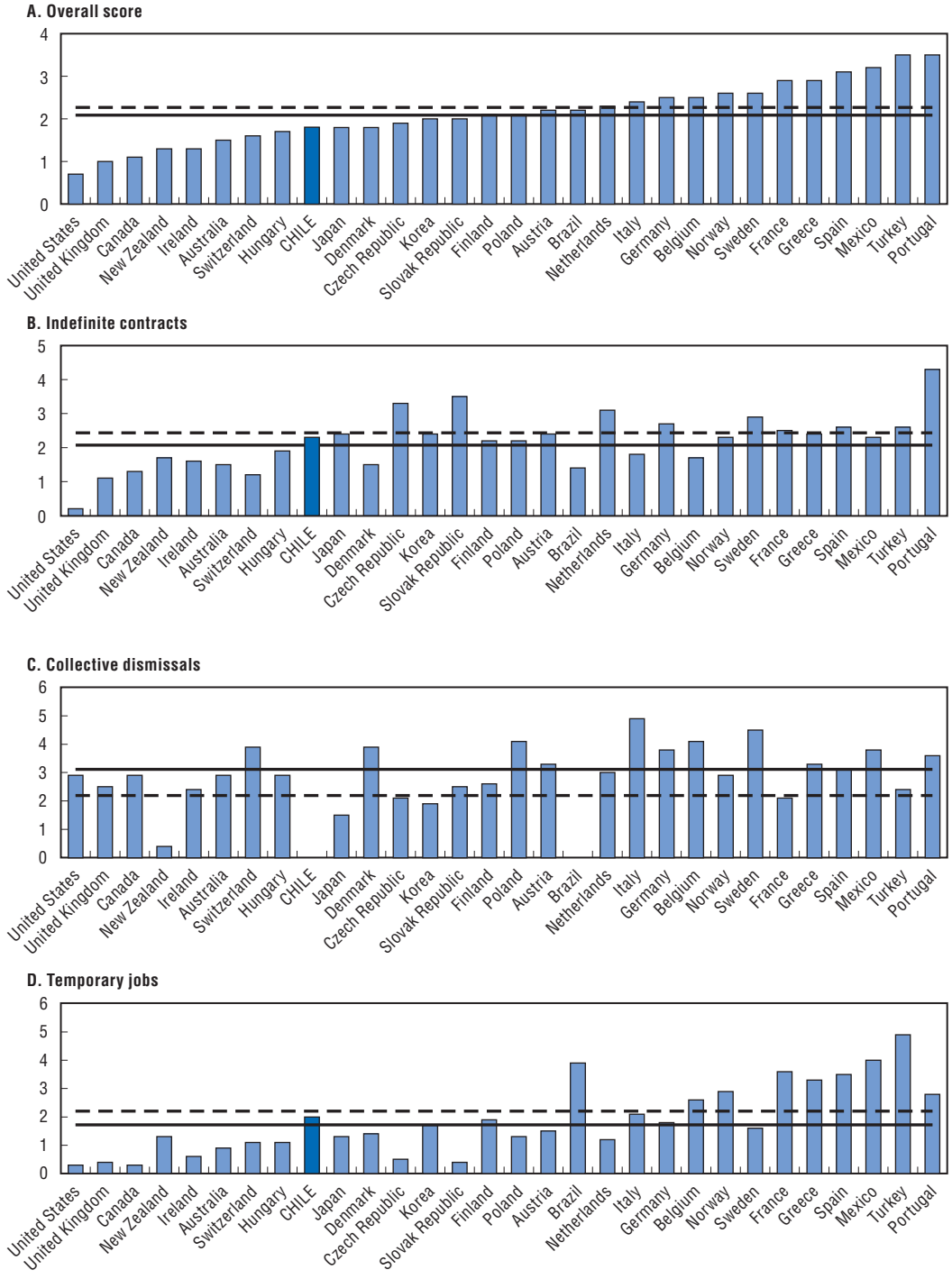
Figure 4.5. **Employment protection legislation: Chile, Brazil and OECD countries, 2003**

0-6 increasing scale from least to most restrictive



StatLink http://dx.doi.org/10.1787/173480823536

Note: The solid horizontal line refers to the OECD average, excluding the emerging-market economies within the OECD area. The dashed line refers to the average of the emerging-market economies within the OECD area (Czech Republic, Hungary, Korea, Mexico, Poland, Slovak Republic and Turkey) and Brazil.

is essentially due to a lack of additional restrictions on collective dismissals, which are present in some OECD countries' labour codes. With regard to protection of workers with indefinite and temporary contracts, Chile's EPL is actually somewhat more restrictive than in the OECD area on average. Nevertheless, the absence of additional restrictions on collective dismissals makes the Chilean tax code more flexible than in OECD comparators.

Chile is beginning to strengthen its social-protection programmes. Unemployment insurance was introduced in 2002, the array of publicly funded health care entitlements through AUGE is being broadened (Chapter 3), and the solidarity pension system is being strengthened (Chapter 2). Formal social safety nets are nevertheless still weak in comparison with OECD countries and regional comparators, such as Argentina, Brazil and Uruguay. Typically, formal-sector jobs become less appealing where access to social-protection programmes is poorly targeted and not conditional on labour-market status. The level of social transfers to the elderly in relation to the minimum wage also affects the incentives facing individuals to work in the formal sector. The attractiveness of enhanced social protection therefore needs to be gauged against the additional costs these contributory programmes entail and that need to be borne entirely (in part in the case of unemployment insurance) by individuals who might otherwise work informally.

Challenges and policy recommendations

Tackling business informality

The cross-country evidence reported in Annex 4.A1 shows that the burden of taxes and regulation in product and labour markets are important determinants of business informality, at least as far as measured on the basis of VAT productivity. In the case of Chile, the ratio of tax revenue to GDP is low in relation to OECD comparator countries, making the disincentives for formality arising from the tax code comparatively less potent than in the OECD area. At the same time, the VAT is uniformly rated and has few exemptions, tax administration is efficient and an emphasis on bolstering the tax authority's enforcement capabilities over the last few years has delivered the expected increment in collections and compliance rates. Effort has now been made to bring micro enterprises and SMEs into the tax net, which are most likely to operate informally. But more can be done to make the regulatory framework in product and labour markets less burdensome on businesses.

Making the tax code and tax administration more friendly to formality

Tax compliance should be fostered in a cost-effective manner. An option for lowering compliance and administration costs is to exclude "hard-to-tax" segments of economic activity, including SMEs, from the tax net by introducing registration thresholds for the VAT and the income tax and by concentrating tax administration efforts on large taxpayers. This is especially appealing for countries with weak tax administrations. In other countries, particularly those, such as Chile, where tax administration is comparatively strong, there is no registration threshold for the VAT and the corporate income tax. Among the shortcomings of a registration threshold, which are well documented, is the incentive for enterprises not to expand beyond the level of activity at which they would become liable for paying taxes, or to operate informally when they do cross the threshold. But the existence of a large number of small registered taxpayers makes tax administration onerous to the tax authorities and raises compliance costs to be borne by these taxpayers. Currently, there is no estimate of such costs for Chile, but international experience suggests that they should not be underestimated. Some effort should therefore be

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expended by the tax authorities to estimate these costs, especially for SMEs, through regular surveys. If costs are deemed high, the option of introducing a registration threshold for VAT could be considered. In any case, the authorities are advised to continue to work towards making the tax system more taxpayer-friendly to small enterprises.

Chile's option for developing the taxpaying capacity of micro businesses and SMEs, which account for the bulk of enterprises in the country, through emphasis on e-government to support tax compliance, is welcome. As noted above, a simplified system was introduced in 2007 for SMEs to reduce their time and cost of filing taxes. In this system, SII uses electronic invoicing to process the taxpayers' information on purchases and sales and uses it for the purpose of tax pre-filing via the Internet. But the introduction of a VAT registration threshold, if deemed appropriate, should not preclude further policy action in this area. An important challenge is therefore to enhance taxpayer services in a manner that is conducive to business development, aiming in particular at reducing the time it takes to pay taxes, which is high in Chile by OECD standards, as noted above. It should be recognised that most micro and small entrepreneurs belong to the poorest segments of society and are therefore likely to lack the skills needed to master ICT tools. In this respect, initiatives such as the MIPYME 10 000-2006 programme – aiming at introducing 10 000 SMEs to the use of ICT and the tools available at the SII website – are welcome. This programme is believed to be working well and should therefore be expanded. In addition, the options of approaching informal businesses – possibly through SME associations – and putting in place campaigns to inform SMEs about registration procedures and the advantages formalisation entails (less costly access to credit and government support, among others) should also be considered. This is important because many informal SMEs consider a lack of information as one of the main obstacles to formalisation.

Making the regulatory framework less burdensome

Procedures for opening and closing businesses should be streamlined and their costs reduced further. Although it is now possible to do so electronically from the point of view of tax administration, there has been much less progress in streamlining other necessary procedures, especially those required by municipal governments. The authorities are well aware of the need for further policy action in this area and are advised to work closely with municipal governments towards this end. In particular, more coordination is needed among the local authorities, health and safety and other agencies to expedite registration.

At the same time, incentives for business formalisation should be strengthened. A survey conducted among small informal enterprises in the metropolitan region of Santiago shows that they are more likely to opt for operating in the formal sector as the costs associated with informality rise. Formality is therefore not perceived as a means to facilitate business operations, but as a stage in the process of business development (Tokman, 2001, Chapter VI). Opinion surveys suggest that it is only after businesses reach a certain level of turnover that informality becomes costly, especially by hindering access to markets and to sources of finance for expansion. Policy action to facilitate access to longer-term credit would also go in the direction of making formalisation more attractive to small enterprises. It would allow firms to expand, benefiting from new business opportunities, and therefore to cross the threshold beyond which informality becomes less attractive. In this respect, the experience of the Social and Solidarity Investment Fund (FOSIS), which provides credit to SMEs and poor own-account workers, could be extended to unregistered

businesses, provided that support is conditional on the recipient enterprise taking the necessary steps to move out of informality. These businesses have access only to costlier credit through personal loans granted in the name of the enterprise owner, who typically uses his/her home as collateral. To make formalisation more attractive it is also important that the authorities work closely with business associations, as is the case of SII in its effort to raise awareness about taxpayers' rights and obligations.

Tackling labour informality

Improving human capital accumulation

A powerful instrument for reducing labour informality is to improve the skills of the labour force. This can be done through the education system, given that, as discussed in Chapters 1 and 3, Chile still lags considerably behind the OECD area in terms of student performance, at least as assessed on the basis of standardised international tests. Secondary-school attainment has risen over the years, and the gap with the OECD area has been narrowed, although attainment remains lower than in the most dynamic economies with which Chile competes in world markets. Higher educational attainment is also low by international comparison, although enrolment is on the rise. As discussed in the *2005 Survey* (OECD, 2005a), the success of policies that have been put in place since 2003 in the area of support for innovation will depend on whether the higher education system will be able to increase the supply of skilled scientists to meet the demand by innovative businesses. Policy action in this area will take time to mature, as discussed in previous *Surveys*, and Chile is taking the necessary steps to improve access by the population to education and to improve the quality of services, as discussed in Chapter 3. The authorities are well aware that policy action in this area is of paramount importance to break the vicious circle of low human capital, informality and low income that perpetuates Chile's extant income disparities, despite years of sustained economic growth.

For those already in the labour force, labour training should be strengthened. Given Chile's heterogeneous labour markets, efforts to promote human capital accumulation should be designed to target a broader cross-section of the labour market, not only formal-sector employees. As discussed in the *2005 Survey*, labour training is financed through tax rebates, and, more recently, grants have been introduced for small enterprises in lieu of tax relief.[9] The main shortcoming of the current set-up, which is otherwise perceived as successful, is that it fails to reach informal-sector workers. The option of extending the grants available for small enterprises to those that currently operate informally could be considered, provided that support is conditional on the recipient enterprise taking the necessary steps to formalise itself. In addition, the labour training programmes currently financed by FOSIS, the solidarity fund, could target a broader client base, other than youths, including informal-sector workers.[10] Moreover, it was argued in the *2005 Survey* that further regulation was needed, because the market for training services is largely supply-driven. New legislation is being prepared, but has not yet been approved. SENCE's advisory role should also be enhanced, because studies have suggested that employers are often ill-informed about training possibilities. In this regard, OECD experience suggests that a greater involvement of workers and their associations could be a useful means of increasing awareness of the potential benefits of better training.

The strengthening of labour training should be complemented by an expansion of the skill certification system. Well-functioning, comprehensive certification has the potential of making skills marketable for those workers who lack formal education and therefore

cannot compete for a formal-sector job with their better educated counterparts. As noted in the *2005 Survey*, certification currently exists for particular skills, such as installation work and tourism, for example, but not as yet for the most common occupations in industry and construction, or in the most dynamic sectors in the economy. Policy action in this area should therefore focus on expanding the current system.

Making EPL more conducive to labour formalisation

The labour code can become more flexible. To the extent that workers opt for informal self-employment to overcome EPL restrictions, effort to make the labour code more flexible, especially with respect to indefinite contracts and the allocation of working time, would go some way to reducing informality, while at the same time boosting labour supply (also discussed in Chapter 5). The *2005 Survey* called for greater flexibility in the allocation of working time as a means of boosting labour supply. It was argued that selective changes in EPL might create room for enterprises and workers to negotiate more flexible arrangements, given that, in practice, there is very little negotiation between employers and employees on matters other than remuneration. To this end, some modification of regulations on full-time work might be useful to clarify that working time can be reduced by any number of hours, and not necessarily by as much as one-third, a limit that currently triggers some special provisions.

Legislation on labour dispatching and subcontracting was amended in early 2007. The new law clarifies the responsibilities of client enterprises and dispatching firms, removing significant legal uncertainties that had discouraged the use of this flexible modality of employment. At the same time, the legal framework for subcontracting was strengthened. While it is too soon to ascertain whether the new legal framework will encourage a more widespread use of flexible labour contracts, preliminary assessments are positive. Policy action in this area is important, because many dispatched and subcontracted workers who used to be hired informally as a means of reducing regulatory uncertainty can now be declared.

The cost of compliance with the labour code and social-security obligations could be reduced further for SMEs, which are most likely to hire informally. For example, SII's efforts to make a host of taxpayer services available on-line could be extended to labour matters. At a minimum, SII could share information of common interest, such as wage bills and individual workers' employment history, with the employment and labour agencies. The option of allowing social-security contributions to be paid on-line, as in the case of taxes, would go in the direction of reducing compliance time and costs, which overburden individual workers and SMEs.

Boosting social protection without making labour formalisation less attractive

Chile needs to find ways of strengthening its social safety net, while not weakening the incentives for labour formality arising from the design of social-protection programmes. Of course, the breadth and depth of social protection depends on societal preferences and ability to pay. But it is important to make sure that these programmes do not encourage informality. In this regard, the authorities' pension-reform proposal currently before Congress, which strengthens the assistance pillar of the social-security system, discussed in Chapter 2, should not reduce the opportunity cost of informality. If the level of the solidarity pension is set too high in relation to the minimum wage, it would discourage saving for retirement and formality, which in turn affects the density of

contributions and hence the cost of first-pillar pensions borne by the budget. Therefore, a wedge should be kept between the value of the solidarity pension and that of the minimum wage to prevent these perverse incentives from becoming stronger as the relative value of the solidarity pension is raised. Currently, the means-tested social-assistance pension is about one-half of the minimum wage.

Likewise, a broadening of the range of health-care services provided through AUGE, discussed in Chapter 3, would also go in the direction of strengthening social safety nets, but, to the extent possible, should not affect the incentives for workers to obtain health insurance. Health insurance and social-security contributions will become compulsory for own-account workers 10 years after approval of the social-security reform package submitted by the government to Congress in late 2006, although social-security contributions will be voluntary for a three-year period before it becomes compulsory. As argued in Chapter 2, because health insurance coverage is now already high for the population as a whole, including own-account workers, health insurance should be made compulsory at the same time and following the same timeframe for implementation as in the case of pension contributions, rather than delaying it until 10 years after approval of the reform proposal. In any case, this time frame should be flexible enough to allow for a careful assessment of workers' revealed opportunity cost of social protection. This can be achieved by carefully monitoring take-up rates during the period in which social-security contributions will be voluntary and identifying the groups that will be most unlikely to comply, once contributions and health insurance become compulsory. This is an important step towards designing complementary policies that might be put in place during implementation to encourage compliance and step up enforcement mechanisms.

Chile introduced unemployment insurance (*seguro de cesantía*) in 2002. The experience of several OECD countries is that, when appropriately designed, it increases the attractiveness of formal jobs (OECD, 2004, Chapter 5). However, in the case of Chile, the cost of unemployment insurance will add to those related to pension contributions and health insurance, which will become compulsory for own-account workers over the next 10 years, as discussed in Chapter 2. An important policy question is therefore whether or not the attractiveness of unemployment insurance – as well as that of health insurance and social-security coverage – will be strong enough to compensate for the additional costs these contributory and other programmes, such as health insurance and social security coverage, entail and that need to be borne by individuals who might otherwise work informally.

Policy action to encourage formal labour-force participation among vulnerable workers, such as females and youths, should be pursued vigorously in support of long-term growth, and further sustained reductions in poverty and income inequality. As discussed in Chapters 2 and 5, the authorities are working towards encouraging females and youths to work formally by boosting the supply of day care and pre-school education and proposing mechanisms in the pension-reform package submitted to Congress in December 2006 to reduce gender-related discrepancies in insurance premia and to subsidise pension contributions by youths. These are steps in the right direction, given that the empirical analysis reported in Annex 4.A2 shows that having children aged three years or less is an important obstacle to labour formality.

The fact that the incidence of informal labour rises after prime age suggests that policy action should not neglect older self-employed individuals. There is considerable

evidence that older individuals may voluntarily opt for informal self-employment later in their working life, once they have accumulated the skills and capital needed to set up their own businesses. Whether they do so informally or not depends on the attractiveness of formality, which in turn depends on the balance between the perceived benefits of social protection, which may be uncertain and of a long-term nature, against the costs of compliance, which may be high, especially for budget-constrained individuals. Effort to facilitate compliance with taxes and regulations should therefore underpin policy action in this area. Informal self-employment may also be attractive to prime-age females because more flexible working-time arrangements make it easier for them to reconcile work and household responsibilities, especially given the dearth of affordable child care and pre-school education, as noted above. Ongoing efforts to remedy this problem would therefore also encourage self-employed females to work formally.

Summary of recommendations

This chapter's main recommendations are summarised in Box 4.3.

Box 4.3. **Summary of recommendations**

Making the tax code and tax administration more friendly to formality

- Assess compliance costs for micro and small enterprises and continue to work to make the tax system more SME-friendly.
- Expand the ICT training programme for SMEs (MIPYME 10 000-2006).
- Further simplifying procedures to reduce the time it takes to pay taxes, especially by SMEs.

Making the regulatory framework less burdensome

- Strengthen coordination among the municipalities, health, safety and other agencies to expedite business registration.
- Extend credit support under FOSIS to unregistered businesses, conditional on the recipient enterprise taking the necessary steps to formalise.

Improving human capital accumulation

- Extend the grants available for small enterprises for labour training to those that currently operate informally, conditional on the recipient enterprise taking the necessary steps to formalise.
- Expand the skill-certification system to cover the most common occupations in industry and construction.

Making EPL more conducive to labour formalisation

- Modify regulations on full-time work to clarify that working time can be reduced by any number of hours, not necessarily one-third.

Boosting social protection without making labour formalisation less attractive

- See recommendations in Chapter 2.

Notes

1. See Schneider (2004) and Alm *et al.* (2006) for recent surveys on how to measure business informality.

2. The firm-level evidence reported by de Paula and Scheinkman (2006) for Brazil suggests that business formality is correlated with firm size, investment per worker and the capital-labour ratio, controlling for the quality of entrepreneurship.
3. For the United States, for example, compliance with state and local sales tax legislation is estimated to have cost 3% of total sales in 2003 on average, including 13.5% for smaller retailers and 2.2% for the large ones (PricewaterhouseCoopers, 2006). Estimates for the VAT are in the neighbourhood of 3-5% (Slemrod, 1996).
4. See OECD (2006) for more information.
5. While exemption thresholds vary considerably across countries, exemptions typically affect agricultural goods and selected inputs, fuels, passenger transport, and selected financial transactions and services. See Ebrill *et al.* (2001) for more information.
6. There is no unique definition of SMEs. SII defines micro enterprises as those with annual sales below 2 400 UFs, small enterprises as those with annual sales between 2 400-25 000 UFs, and medium-sized enterprises as those with annual sales between 25 000-100 000 UFs. Based on this definition, SMEs account for about 99% of businesses in Chile.
7. The ensuing reduction in transaction costs is sizeable, especially for SMEs. Other costs, such as those related to the storage of tax documentation, are also reduced. The Santiago Chamber of Commerce estimates that savings may reach up to 0.5% of GDP.
8. See the *2005 Survey* for more information.
9. Labour training provided by enterprises has benefited almost 20% of all dependent employees in recent years (15% of the employed population). The main public institution to support enterprise-level training is SENCE (*Servicio Nacional de Capacitación y Empleo*). Enterprises are typically free to choose training content and to select trainees, notwithstanding the possibility – foreseen in the law, but rarely used – to obtain a somewhat higher tax rebate if the training is agreed upon by a bipartite training committee at the enterprise level.
10. Training programmes such as *Programa de Nivelación de Competencias Laborales* and *Escuela Taller* already target poor unemployed or under-employed individuals who are most likely to work informally.

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ANNEX 4.A1

The efficiency of the value added tax: The experience of OECD and non-OECD countries

This Annex provides empirical evidence on the main determinants of non-compliance with the VAT code in a sample of OECD and non-OECD countries. Since tax avoidance is not observed directly, and country-specific information is overly sensitive to differences in the methodology used to quantify unpaid taxes and not readily available in a comparable manner for a large enough set of countries, the option of gauging the extent of non-compliance by VAT efficiency becomes appealing.

The efficiency of a tax is calculated by dividing its revenue-to-GDP ratio by its statutory rate. To the extent that avoidance reduces tax revenue for a given rate, it lowers efficiency. Of course, efficiency also depends on specific features of the VAT code, including exemptions and the level of the exemption threshold, where in place, which narrow the tax base, and the extent of zero-rating, which creates a credit and therefore reduces revenue, among others. Against this background, it should be recognised that the use of efficiency as a proxy for tax avoidance is not without problems, but unavoidable against the backdrop of severe data constraints

The estimating equation

Economic theory posits that non-compliance depends on the efficiency of tax administration and the incentives facing the taxpayer arising from the level of the tax rate. The equation to be estimated below can be defined as follows:

$$P(r_n) = a_1 + a_2 r_n + a_3 T_n + a_4 F_n + a_5 X_n + e_n \,, \qquad (4.A1.1)$$

where $P_n = \frac{\tau_n}{r_n}$ denotes the efficiency of the VAT in country n, τ_n is the VAT revenue-to-GDP ratio, r_n is the statutory VAT rate, T_n is a measure of tax administration quality, F_n is a vector of indicators of regulatory restrictiveness, X_n is a vector of controls and e_n is an error term.

The data

The data set includes a cross-section of OECD and a few non-OECD countries.[1] It uses OECD data on VAT collections and indicators of quality of tax administration, restrictiveness in product market regulations (PMR) and rigidity in employment protection legislation (EPL). Additional variables are also used to control for non-tax determinants of tax efficiency, for which data are available from the World Bank.

Information on statutory VAT rates is available from PricewaterhouseCoopers. There is considerable variation across countries on VAT rates and revenue yields, but much less on the level of VAT efficiency. Regional patterns appear to be of little use to highlight common features in VAT taxation: while some countries levy a relatively uniform rate, such as Chile, for example, others in the same region have a complicated rate structure, such as Brazil, even though the efficiency of the VAT is comparable in these countries. Within the OECD area, Italy and Austria have the same statutory rate of 20%, but Italy has much lower efficiency. As noted above, such variations are related not only to evasion/avoidance, but also to the fact that many tax codes apply different rates to different goods and services.

The OECD indicators of PMR restrictiveness and EPL stringency are available for all OECD member countries in 2003 (Conway *et al.*, 2005), as well as for Brazil and Chile (OECD, 2003 and 2005b). As noted in the main text, the indicators of product market regulation measure the degree to which policies promote or inhibit competition through administrative and economic regulations. The EPL stringency indicator is also available for the OECD member countries in 2003 (OECD, 2004) and for Brazil and Chile (OECD, 2003 and 2005). A restrictive labour code creates incentives for businesses to hire and operate informally. Because the OECD indicators of PMR restrictiveness and EPL stringency are only available for Brazil and Chile outside the OECD area, the World Bank's 2003 *Doing Business* indicators were also considered in the empirical analysis as alternative measures of the difficulty of opening/closing businesses and EPL rigidity for a broader range of countries. The tax administration efficiency indicator is defined as the ratio of administrative costs to net revenue; hence, a lower indicator implies higher efficiency.

Other variables are used as controls, including trade openness (*i.e.* share of exports and imports in GDP) and the urbanisation rate. Trade openness proxies for the relative ease of collection of import duties in relation to the taxation of domestic consumption, and the urbanisation rate proxies for the size of agriculture in GDP, a sector where tax avoidance (due to informality) tends to be pervasive in many countries. To avoid biases related to the potential endogeneity of some of these variables, a time lag is considered: the data refer to the average of the right hand-side variables over the period spanning 1995 through 2000, whereas the left hand-side variable refers to 2003. A measure of the size of the informal sector in GDP, available from Schneider (2004) for 2000, is also included in the set of controls, to account for the informality linkages across different markets.

The results

The empirical results are reported in Table 4.A1.1. VAT efficiency is affected negatively by the level of the statutory rate and the ratio of tax administration costs to net revenue. The tax rate coefficient is small in magnitude, although it is highly significant, so that the loss in efficiency due to an increase in the VAT rate is relatively modest, controlling for trade openness, the urbanisation rate and the size of the informal economy.[2] The hypothesis that VAT efficiency differs between the OECD and non-OECD countries in the sample was tested by including a dummy variable identifying the non-OECD countries. The results suggest that VAT efficiency does not differ in a statistically significant manner across country groupings.[3]

The VAT rate was not found to be endogenous on the basis of a standard endogeneity test. Endogeneity is possible, because the authorities may set the tax rate to maximise

efficiency based on expected Laffer-curve effects. To implement the test, the determinants of the tax rate that are uncorrelated with efficiency were selected on the basis of the raw correlations between the VAT rate and the potential correlates available in the data set. The ratio of total tax revenue to GDP, the average rate of change in the urbanisation rate over the period 1995-2000 and the salary cost of tax administration were found to be correlated with the VAT rate at the 1% level of significance. The rate of growth of urbanisation was nevertheless not retained, because it was not found to be significant at classical levels in a regression of the VAT rate on its correlates, as well as the regressors included in the efficiency equation. The test statistics reported for each model are the *p*-values associated with an *F* test for the exclusion of the residuals of the VAT rate regression from the efficiency regressions. The test statistics suggest that the VAT rate is not endogenous, which validates the estimation of the regressions by OLS.

Table 4.A1.1. **VAT efficiency: OECD and non-OECD countries, 2003**

Dept. Var.: VAT efficiency[1]

	1	2	3	4	5	6
VAT rate	–0.01 ***	–0.01 ***	–0.01 ***	–0.01 ***	–0.01 ***	–0.01 ***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)
Tax administration efficiency	–0.4 **	–0.04 **	–0.04 *	–0.04 *	–0.04 *	–0.04 *
	(0.020)	(0.019)	(0.020)	(0.022)	(0.019)	(0.023)
Non-OECD member		0.04				
		(0.037)				
PMR restrictiveness indicator			–0.04 **		0.005 *	
			(0.016)		(0.002)	
EPI, stringency indicator				–0.03 **		0.001 *
				(0.015)		(0.001)
Intercept	0.65 ***	0.67 ***	0.74 ***	0.68 ***	0.70 ***	0.74 ***
	(0.068)	(0.065)	(0.097)	(0.083)	(0.082)	(0.099)
PMR/EPL, indicator source	. .	. .	OECD		Doing business	
PMR restrictiveness indicators	. .	. .	Admin. burned on start-ups	. .	Cost to close a business	. .
EPL stringency indicator	. .	. .	. .	Procedures on collective dismissals	. .	Employing workers
No. of observations	31	31	26	27	30	30
F test (*p* value)	0.00	0.00	0.00	0.00	0.00	0.00
R-squared	0.34	0.36	0.48	0.56	0.43	0.40
VAT rate endogenous? (*p* value)	0.18	0.08	0.98	0.07	0.27	0.11

1. The tax administration efficiency indicator is the ratio of administrative costs to net revenue. Heteroscedasticity-corrected standard errors are reported in parentheses. Statistical significance at the 1, 5 and 10% levels is denoted by respectively (***), (**) and (*). All models are estimated by OLS. The full set of controls (not reported) includes trade openness, the urbanisation rate and the size of the informal economy. The VAT rate correlates used in the endogeneity test are the ratio of total tax revenue to GDP and the total salary cost of tax administration.

Source: OECD estimations.

The models that include PMR and EPL indicators suggest that a more restrictive regulatory environment is associated with lower VAT efficiency for a given tax rate. Among the PMR indicators constructed by the OECD, that on administrative burdens on business start-ups was found to affect efficiency negatively. Other indicators were experimented with, including those of overall administrative regulation and burden on entrepreneurship, which were signed as expected, but not significant at classical levels. Among the EPL indicators used, that on restrictions on collective dismissals was found to affect VAT efficiency negatively at the 5% level of significance. The EPL indicators focusing on

protection for regular workers and on the regulation of temporary employment were signed as hypothesised, but not significant at a classical level of statistical significance.

The *Doing Business* indicators that were used to maximise the number of non-OECD countries in the sample performed in a comparable manner to those constructed by the OECD. The cost of closing a business, which makes for a restrictive PMR environment, is signed negatively, as expected. So is the indicator of employment rigidity, confirming the hypothesis that EPL stringency discourages tax compliance.

Notes

1. The largest possible sample covers 31 countries, including all OECD countries that have a VAT (except Iceland, Luxembourg, Netherlands and United Kingdom, in addition to Argentina, Brazil, Chile, Lithuania, Slovenia and South Africa.
2. This is consistent with the evidence reported by Silvani and Wakefield (2002) for a sample of 22 countries in the 1990s. They show that, if the rate is raised by one percentage point, productivity falls by 3.6%. Their estimation nevertheless does not take into account other determinants of productivity, such as the quality of tax administration, among others.
3. The results are robust to the inclusion of a dummy variable identifying the emerging-market economies within the OECD area (Czech Republic, Hungary, Korea, Mexico, Poland, Slovak Republic and Turkey), in addition to the non-OECD countries in the sample.

ANNEX 4.A2

The determinants of labour informality in Chile: Evidence from household survey data

This Annex uses data from the CASEN Survey, available from the Ministry of Planning, to empirically assess the main determinants of labour informality. The estimation procedure is comparable to that of Soares (2004) for Brazil and Mengistae (1998) for Ethiopia.

The estimation strategy

The model describes the formal and informal sectors separately. Wages can be written in each sector as:

$$W_f = Z\gamma_f + e_f, \tag{4.A2.1}$$

$$W_i = Z\gamma_i + e_i \ , \tag{4.A2.2}$$

where f and i indicate, respectively, the formal and the informal sectors, Z is a vector of wage determinants, and e_f and e_i are error terms.

Individuals choose the sector in which they wish to work according to the following decision rule:

$d_1 = 1$ if $I_1 = \alpha_1(W_f - W_i) + X_1\beta_1 + u_1 > 0$, (4.A2.3)

$d_1 = 0$ if $I_1 = \alpha_1(W_f - W_i) + X_1\beta_1 + u_1 \leq 0$. (4.A2.4)

Equations (4.A2.3) and (4.A2.4) define the so-called "in the queue" conditions. Accordingly, individuals choose the sector in which to work on the basis of inter-sectoral wage differentials and other determinants (X_1) that could include variables not considered in the wage equation, such as the number of children in the household and household income, among others. This set-up assumes that individuals who wish to work in the formal sector will eventually find a job there. However, it is possible that they will need to queue to work in the formal sector and that entrepreneurs select them on the basis of productivity levels and employment costs. Individuals who are not picked from the queue must therefore work in the informal sector. In this case, the selection process carried out by formal-sector entrepreneurs can be defined as:

$d_2 = 1$ if $I_2 = \alpha_2 E(W_f \mid I_1 > 0) + X_2\beta_2 + u_2 > 0$, (4.A2.5)

$d_2 = 0$ if $I_2 = \alpha_2 E(W_f \mid I_1 > 0) + X_2\beta_2 + u_2 \leq 0$, (4.A2.6)

where E is the expectations operator.

Equations (4.A2.5) and (4.A2.6) define the "chosen from the queue" conditions. The term $E(W_f \mid I_1 > 0)$ captures the expected cost to be incurred by the employer when hiring a worker, and vector X_2 includes other costs and personal characteristics that proxy for a worker's productivity.

Two different models will be estimated to take into account the selection mechanisms described above. The first one – the Abowd-Farber model – assumes that the decisions taken by the worker and the entrepreneur are sequential. The second one – the Poirier model – assumes that decisions are simultaneous. In any case, for identification, an exclusion restriction is introduced, so that one or more variables included in X_1 must be excluded from X_2, and one or more variables included in Z must be excluded from X_1 and X_2 . The variable included in the wage equations and excluded from the "in the queue" and "chosen from the queue" equations is firm size. The variables included in the "in the queue" equation but excluded from the "chosen from the queue" and wage equations are family characteristics. Finally, the variable included in the "chosen from the queue" equation and excluded from the wage equations is a dummy variable that indicates the worker's marital status.

The wage equations for the formal and informal sectors will be estimated correcting for double selection in the labour market. However, a wage equation for the informal sector cannot be estimated for the Poirier model. The estimation of the wage equations takes into account the presence of heteroscedasticiy due to the inclusion of estimates of the inverse Mills ratios and not the actual ratios.[1]

The data

Household survey (CASEN) data are used for 2003. The sample, which includes prime-age individuals (aged 25-64 years) who work in full-time jobs (at least 20 hours per week), contains 25 909 formal-sector workers and 6 957 informal-sector workers. Based on CASEN's weighting factors, this sample is representative of a population of 1 965 532 formal-sector workers and 384 400 informal-sector workers.

Estimation results

Models without queuing

A simple model without queuing was estimated as a benchmark against which the results of the double-selection models can be compared. A reduce-form probit model was used to estimate a worker's probability of being employed in the formal sector. The results, reported in Table 4.A2.1 suggest that the probability of working in the formal sector increases with education, at least up to 12 years of schooling, job tenure and experience (in a non-linear manner), and the number of elderly people and formal-sector workers in the household. Men are less likely than women to work in the formal sector, and larger firms are more likely to hire formally. Workers living in the metropolitan region of Santiago and in households with children aged less than three years and with other informal-sector workers are less likely to work formally.

Double-selection models

The results of the double-selection models, reported in Table 4.A2.2, suggest that education is an important determinant of a worker's probability of being "chosen from the queue". Experience has a similar effect on being in the queue and on being selected from

Table 4.A2.1. **Formality equation: Reduced-form probit model**[1]

	Marginal effect	Coefficient	Standard error
Years of schooling			
8-11	0.000	–0.004	0.005
12	0.005	0.102**	0.006
12+	0.004	0.085**	0.007
Job tenure	0.000	0.003**	0.000
Potential experience	0.001	0.011**	0.001
Potential experience squared	0.000	0.000**	0.000
Gender ("1" = Male)	–0.004	–0.089**	0.004
Firm size			
2-5 workers	–0.145	–1.210**	0.005
6-9 workers	–0.069	–0.734**	0.006
10-49 workers	–0.033	–0.497**	0.005
50-199 workers	–0.012	–0.202**	0.006
Residency			
North	0.003	0.063**	0.006
Central	0.003	0.066**	0.004
South	0.005	0.095**	0.006
Number of children in household			
Less than 3 years of age	–0.001	–0.017**	0.004
3-5 years of age	0.008	0.150**	0.005
6-10 years of age	0.004	0.069**	0.003
11-17 years of age	0.003	0.051**	0.002
Number of elderly individuals in household	0.001	0.028**	0.005
Number of formal-sector workers in household	0.055	1.071**	0.003
Number of self-employed workers in household	0.002	0.030**	0.005
Number of informal-sector workers in household	–0.081	–1.563**	0.003
Number of unemployed workers in household	0.005	0.100**	0.023
Marital status ("1" = Married)	–0.001	–0.027**	0.004
Head of household	0.014	0.256**	0.004
Per capita non-labour income	–0.001	–0.025**	0.001
Constant		0.854**	0.012
Number of observations		2 349 932	
Log L		–331 331.72	

1. Standard errors are reported in parentheses. (**) and (*) denote statistical significance at the 1% and 5% levels, respectively.

Source: MIDEPLAN (CASEN database) and OECD estimations.

the queue. Individuals living in the metropolitan region of Santiago are less likely to be in the queue and to be selected from the queue. The observations that males are more likely to be selected from the queue, but less likely to be in the queue, and that being married increases the odds of being selected, but decreases a worker's likelihood of being in the queue, points to possible discrimination in the hiring process. The results of the Poirier model are similar to those of the Abowd-Farber model. Moreover, the correlation coefficient estimated in the simultaneous model is not statistically significant from zero, which is an indication that the Poirier model is similar to the sequential model.

Is there queuing in the labour market?

The queuing hypothesis is tested by assuming that all parameters in the "chosen from the queue" equations are zero, except the constant, which must be high enough so that all workers have the same probability of being selected. The hypothesis of no universal queue – implying that all workers want to work in the formal sector and all the selection is carried

out by the employer – is tested by assuming that the parameters of the "in the queue" equation are all zero, with the exception of the constant, which must be high enough so that all workers prefer to work formally. The results of a conventional likelihood ratio test (not reported) suggest that both null hypotheses cannot be rejected at the 1% level of significance, thus lending support to the double-selection models as an adequate description of the formal and informal labour markets in Chile.

The parameter estimates reported in Table 4.A2.2 can be used to calculate the probability that individuals will queue for formal jobs, be selected from the queue and work in the formal sector. The results, reported in Table 4.A2.3, show that the probability of

Table 4.A2.2. **Formality equations: Double-selection models**[1]

	Abowd-Farber model		Poirier model	
	In the queue	Chosen from the queue	In the queue	Chosen from the queue
Years of schooling				
8-11	0.004	–0.034*	0.004	–0.034*
	(0.007)	(0.017)	(0.007)	(0.017)
12	0.082**	0.150**	0.082**	0.151**
	(0.007)	(0.018)	(0.007)	(0.019)
12+	–0.013	0.660**	–0.013	0.660**
	(0.008)	(0.023)	(0.008)	(0.023)
Tenure	0.004**	–	0.004**	–
	(0.000)	–	(0.000)	–
Potential experience	0.013**	0.021**	0.013**	0.021**
	(0.001)	(0.002)	(0.001)	(0.002)
Potential experience squared	0.000**	–0.001**	0.000**	–0.001**
	(0.000)	(0.000)	(0.000)	(0.000)
Gender ("1" = Male)	–0.143**	0.244**	–0.143**	0.245**
	(0.005)	(0.011)	(0.005)	(0.011)
Firm size				
2-5 workers	–1.245**	–	–1.245**	–
	(0.006)	–	(0.006)	–
6-9 workers	–0.777**	–	–0.777**	–
	(0.007)	–	(0.007)	–
10-49 workers	–0.525**	–	–0.525**	–
	(0.006)	–	(0.006)	–
50-199 workers	–0.244**	–	–0.244**	–
	(0.007)	–	(0.007)	–
Residency				
North	0.035**	0.022	0.035**	0.022
	(0.007)	(0.021)	(0.007)	(0.021)
Central	0.100**	0.023*	0.100**	0.023*
	(0.005)	(0.011)	(0.005)	(0.011)
South	0.109**	0.256**	0.109**	0.256**
	(0.007)	(0.020)	(0.007)	(0.020)
Number of children in household				
Less than 3 years of age	–0.013**	–	–0.013**	–
	(0.005)	–	(0.005)	–
3-5 years of age	0.180**	–	0.180**	–
	(0.005)	–	(0.005)	–
6-10 years of age	0.042**	–	0.042**	–
	(0.003)	–	(0.003)	–
11-17 years of age	0.067**	–	0.067**	–
	(0.003)	–	(0.003)	–

Table 4.A2.2. **Formality equations: Double-selection models**[1] *(cont.)*

	Abowd-Farber model		Poirier model	
	In the queue	Chosen from the queue	In the queue	Chosen from the queue
Number of elderly individuals in household	0.054**	–	0.054**	–
	(0.006)	–	(0.006)	–
Number of formal-sector workers in household	1.576**	–	1.576**	–
	(0.006)	–	(0.006)	–
Number of self-employed workers in household	0.036**	–	0.036**	–
	(0.005)	–	(0.005)	–
Number of informal-sector workers in household	–1.539**	–	–1.539**	–
	(0.003)	–	(0.003)	–
Number of unemployed workers in household	0.158**	–	0.158**	–
	(0.026)	–	(0.026)	–
Marital status ("1" = Married)	–0.080**	0.278**	–0.080**	0.278**
	(0.005)	(0.011)	(0.005)	(0.011)
Head of household	0.368**	–	0.368**	–
	(0.005)	–	(0.005)	–
Per capita non-labour income	–0.022**	–	–0.022**	–
	(0.001)	–	(0.001)	–
Constant	0.417**	1.995**	0.418**	1.994**
	(0.014)	(0.030)	(0.014)	(0.030)
ρ	–	–	–	–0.010
	–	–	–	(0.014)
Number of observations	2 349 932	–	2 349 932	–
Log L	–321 536.92	–	–321 536.68	–

1. Standard errors are reported in parentheses. (**) and (*) denote statistical significance at the 1% and 5% levels, respectively.

Source: MIDEPLAN (CASEN database) and OECD estimations.

Table 4.A2.3. **Implied probabilities: Based on double-selection models**

	In the queue		Chosen from the queue		Working in the formal sector		Length of queue	Probit
	Probit	Standard error	Probit	Standard error	Probit	Standard error		
Whole population	0.84	0.31	1.00	0.01	0.84	0.31	1.19	1.19
Males	0.83	0.32	1.00	0.00	0.83	0.32	1.20	1.21
Females	0.87	0.29	0.99	0.01	0.86	0.29	1.15	1.16
Age								
Less than 35 years	0.84	0.31	1.00	0.00	0.84	0.31	1.19	1.19
35-44 years	0.84	0.31	1.00	0.00	0.84	0.31	1.18	1.19
45-54 years	0.85	0.31	0.99	0.01	0.84	0.30	1.18	1.19
55-64 years	0.82	0.33	0.99	0.01	0.81	0.33	1.22	1.23
Years of schooling								
Less than 8	0.72	0.39	0.99	0.01	0.71	0.39	1.39	1.40
8-11	0.80	0.35	0.99	0.00	0.79	0.34	1.26	1.27
12	0.87	0.28	1.00	0.00	0.87	0.28	1.15	1.15
12+	0.92	0.23	1.00	0.00	0.92	0.23	1.09	1.09

Source: MIDEPLAN (CASEN database) and OECD estimations.

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being selected from the queue is almost one for most workers, suggesting that, even though a double-selection model is an appropriate description of the allocations of formal- and informal-sector workers in the labour market, there is not much selection in the formal sector. Most of the selection occurs in the "in the queue" equations, where females, more educated workers and individuals aged 45-54 years are most likely to queue for formal jobs. The parameter estimates also allow for estimating the length of the queue, which ranges between about 1.1 and 1.4, depending on model specification. This suggests that, for each formal-sector worker, there are 1.1-1.4 workers in the queue. The most important differences are by educational attainment: the length of the queue for workers with less than eight years of education is 1.4, which implies that for each worker in the formal sector, there are 1.4 informal-sector workers in the queue.

Wage equations

Wage equations can be estimated for formal- and informal-sector workers. The results reported in Table 4.A2.4 suggest that education is a powerful determinant of earnings in both the formal and the informal sectors: uneducated workers earn a higher wage premium in the informal sector, and their more educated counterparts (with at least 12 years of schooling) earn a higher wage premium in the formal sector. Tenure and experience (in a non-linear manner) also affect wages positively. Males are better paid than females in both sectors, and the wage gap is wider in the formal sector. Wages are higher in larger firms and in the metropolitan region of Santiago. The inverse Mills ratio is negative in both equations, which means that there is a negative correlation between the errors of the decision and the wage equations. This implies that a positive shock to formal-sector wages is associated with a negative shock in the decision equation (making a worker less likely to find a job in the formal sector). The same result is found for the informal sector.

Using the wage equation for the informal sector, the hypotheses of a single queue and the absence a job queue can be tested. The equation for the informal sector can be written as:

$$W_i = Z\gamma_i + \sigma_{1i}\lambda_{3i} + \delta_1\lambda^*_{1i} + \delta_2\lambda_{4i} + e_i\,, \qquad \text{(4.A2.7)}$$

where $\delta_1 = \pi\sigma_{1i}$, $\delta_2 = \pi\sigma_{2i}$, $\lambda^*_{1i} = \lambda_{1i} - \lambda_{3i}$ and σ_{1i} (σ_{2i}) is the covariance between the error term of the "in the queue" ("chosen from the queue") equation and the error term in the informal sector (λ_{ji}) are the respective inverse Mills ratios. Finally, π is the proportion of informal-sector workers queuing for a formal-sector job.

A test of the absence of a job queue ($\pi = 0$) is $H_0 : \delta_1 = \delta_2 = 0$, which is rejected at the 1% level (results not reported). The test for the presence of a single queue ($\pi = 1$) is $H_0 : \sigma_{1i} = \delta_1$, which is also rejected at the 1% level. These tests again favour the use of a double-selection model to describe wage setting in the formal and informal sectors in Chile.

Structural probits

The informality equations were also estimated using structural probit models, in which the "in the queue" and "chosen from the queue" equations are estimated simultaneously. To benchmark these findings, regression results are reported in Table 4.A2.6 for the univariate model. The coefficient on the wage differential is positive and significant, suggesting that the wage premium is an important element in the decision to work in the formal sector. As for the other regressors, there are a few important

Table 4.A2.4. **Wage equations: Reduced-form model**[1]

	Formal sector	Informal sector
Years of schooling		
8-11	0.150**	0.176**
	(0.000)	(0.000)
12	0.406**	0.340**
	(0.000)	(0.001)
12+	1.112**	0.949**
	(0.000)	(0.000)
Tenure	0.001**	0.000**
	(0.000)	(0.000)
Potential experience	0.014**	0.010**
	(0.000)	(0.000)
Potential experience squared	0.000**	0.000**
	(0.000)	(0.000)
Gender ("1" = Male)	0.154**	0.123**
	(0.000)	(0.000)
Firm size		
2-5 workers	–0.291**	–0.211**
	(0.000)	(0.001)
6-9 workers	–0.221**	–0.020**
	(0.001)	(0.001)
10-49 workers	–0.125**	–0.079**
	(0.000)	(0.001)
50-199 workers	–0.070**	–0.003
	(0.000)	(0.002)
Residency		
North	–0.098**	–0.179**
	(0.000)	(0.001)
Central	–0.235**	–0.238**
	(0.000)	(0.000)
South	–0.210**	–0.236**
	(0.000)	(0.001)
Inverse Mills ratio	–0.076**	–0.043**
	(0.001)	(0.000)
Constant	6.259**	6.148**
	(0.000)	(0.001)
Number of observations	25 908	6 946

1. Standard errors are reported in parentheses. (**) and (*) denote statistical significance at the 1% and 5% levels, respectively.

Source: MIDEPLAN (CASEN database) and OECD estimations.

differences from the reduced-form probits reported above: education is negatively correlated with formality and potential experience is negatively associated with the probability of working in the formal sector.

As for the bivariate models, the structural probit for the Poirier model could not be estimated, because the informal-sector wage equation cannot be computed. The results of the estimations of the Abowd-Farber model are reported in Table 4.A2.7. As in the univariate case, the wage differential is an important determinant of the queueing decision. Education is also negatively correlated with the decision to join the queue. Unlike the bivariate reduced-form probit, the number of children in the household is positively correlated with the probability of working in the formal sector. In the structural bivariate probit, the number of elderly individuals and formal-sector, self-employed and

Table 4.A2.5. **Wage equations: Double-selection models**[1]

	Abowd-Farber model	Poirier model	
	Formal sector	Informal sector	Formal sector
Years of schooling			
8-11	0.154**	0.128**	0.152**
	(0.001)	(0.005)	(0.001)
12	0.390**	0.344**	0.389**
	(0.001)	(0.007)	(0.001)
12+	1.077**	0.986**	1.068**
	(0.002)	(0.014)	(0.001)
Tenure	0.001**	0.001**	0.001**
	(0.000)	(0.000)	(0.000)
Potential experience	0.011**	0.014**	0.011**
	(0.000)	(0.001)	(0.000)
Potential experience squared	0.000**	0.000**	0.000**
	(0.000)	(0.000)	(0.000)
Gender ("1" = Male)	0.129**	0.161**	0.127**
	(0.001)	(0.006)	(0.001)
Firm size			
2-5 workers	–0.293**	–0.271**	–0.292**
	(0.001)	(0.010)	(0.001)
6-9 workers	–0.221**	–0.181**	–0.220**
	(0.001)	(0.011)	(0.001)
10-49 workers	–0.125**	–0.108**	–0.127**
	(0.001)	(0.010)	(0.000)
50-199 workers	–0.068**	–0.050**	–0.072**
	(0.001)	(0.011)	(0.001)
Residency			
North	–0.093**	–0.111**	–0.099**
	(0.001)	(0.008)	(0.001)
Central	–0.233**	–0.226**	–0.237**
	(0.001)	(0.004)	(0.000)
South	–0.212**	–0.208**	–0.210**
	(0.001)	(0.006)	(0.001)
Mills ratio 1	–0.069**	–	–0.075**
	(0.001)	–	(0.002)
Mills ratio 2	–2.550**	–	–2.733**
	(0.061)	–	(0.046)
Mills ratio 3	–	–0.078**	–
	–	(0.004)	–
Mills ratio 3*	–	–0.065**	–
	–	(0.002)	–
Mills ratio 4	–	–0.088**	–
	–	(0.017)	–
Constant	6.339**	5.993**	–
	(0.003)	(0.042)	–
Number of observations	25 301	6 069	–

1. Standard errors are reported in parentheses. (**) and (*) denote statistical significance at the 1% and 5% levels, respectively.

Source: MIDEPLAN (CASEN database) and OECD estimations.

Table 4.A2.6. **Formality equation: Univariate structural probit model**[1]

	Marginal effects	Coefficient	Standard error
Wage differential	0.206	3.397**	0.019
Years of schooling			
8-11	0.004	0.077**	0.005
12	–0.007	–0.109**	0.006
12+	–0.028	–0.388**	0.008
Potential experience	0.000	–0.007**	0.001
Potential experience squared	0.000	0.000	0.000
Gender ("1" = Male)	–0.011	–0.187**	0.004
Number of children in household			
Less than 3 years of age	–0.001	–0.011**	0.004
3-5 years of age	0.008	0.129**	0.005
6-10 years of age	0.004	0.072**	0.003
11-17 years of age	0.004	0.058**	0.002
Number of elderly individuals in household	0.002	0.032**	0.005
Number of formal-sector workers in household	0.067	1.096**	0.003
Number of self-employed workers in household	0.001	0.015**	0.005
Number of informal-sector workers in household	–0.095	–1.557**	0.003
Number of unemployed workers in household	0.002	0.037	0.021
Marital status ("1" = Married)	0.000	–0.006	0.004
Head of household	0.018	0.283**	0.004
Per capita non-labour income	–0.001	–0.024**	0.001
Residency			
North	–0.019	–0.256**	0.006
Central	–0.001	–0.008*	0.004
South	–0.007	–0.102**	0.006
Constant		0.158**	0.011
Number of observations		2 349 932	
Log L		–355 680.27	

1. Standard errors are reported in parentheses. (**) and (*) denote statistical significance at the 1% and 5% levels, respectively.

Source: MIDEPLAN (CASEN database) and OECD estimations.

unemployed workers in the household increases an individual's probability of working in the formal sector.

In the "chosen from the queue" equation, the wage rate is positively correlated with being selected from the queue, suggesting that it might be measuring productivity. Also, rather surprisingly, education is negatively associated with the probability of being chosen from the queue. A similar result was found by Soares (2004) using Brazilian data. A negative coefficient on years of schooling implies that, for a given wage level, education has a negative correlation with formality, even though it is positively correlated with wages. The overall effect of educational attainment on informality is therefore unknown and could be better approximated by the reduced-form probit. Another interpretation is that more educated individuals would select themselves into the informal sector.[2]

Table 4.A2.7. **Formality equation: Bivariate structural probit model**[1]

	In the queue	Chosen from the queue
Wage differential	19.484**	–
	(0.222)	–
E (w1/in the queue)	–	3.594**
	–	(0.020)
Years of schooling		
8-11	–0.537**	–0.561**
	(0.011)	(0.009)
12	–0.846**	–1.275**
	(0.014)	(0.012)
12+	–1.716**	–3.594**
	(0.024)	(0.024)
Potential experience	0.062**	–0.021**
	(0.001)	(0.001)
Potential experience squared	–0.002**	0.000**
	(0.000)	(0.000)
Gender ("1" = Male)	0.550**	–0.435**
	(0.009)	(0.006)
Residency		
North	–0.227**	0.281**
	(0.011)	(0.008)
Central	0.121**	0.985**
	(0.006)	(0.008)
South	0.026**	1.048**
	(0.008)	(0.010)
Number of children in household		
Less than 3 years of age	0.058**	–
	(0.006)	–
3-5 years of age	0.100**	–
	(0.007)	–
6-10 years of age	0.073**	–
	(0.004)	–
11-17 years of age	0.041**	–
	(0.004)	–
Number of elderly individuals in household	0.057**	–
	(0.007)	–
Number of formal-sector workers in household	4.378**	–
	(0.067)	–
Number of self-employed workers in household	0.109**	–
	(0.008)	–
Number of informal-sector workers in household	–1.343**	–
	(0.004)	–
Number of unemployed workers in household	0.103**	–
	(0.037)	–
Marital status ("1" = Married)	–0.345**	0.332**
	(0.007)	(0.005)
Head of household	0.514**	–
	(0.007)	–
Per capita non-labour income	–0.013**	–
	(0.001)	–
Constant	–8.939**	–20.970**
	(0.098)	(0.124)
Number of observations	2 349 932	–
Log L	–333 105.36	–

1. Standard errors are reported in parentheses. (**) and (*) denote statistical significance at the 1% and 5% levels, respectively.

Source: MIDEPLAN (CASEN database) and OECD estimations.

Notes

1. The inverse Mills ratio is the ratio of the probability density function over the cumulative density function of a distribution. It is used in regression analysis to take account of a possible selection bias.
2. As a sensitivity test (not reported), the "chosen from the queue" equations were re-estimated by excluding the expected wage in the formal sector for workers who join the queue. The results suggest that workers with 12 years of schooling are less likely to join the queue, although they are more likely to be selected from the queue. The converse holds for workers with more than 12 years of schooling, and males are more likely to be selected from the queue.

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Chapter 5

Encouraging labour force participation for women and youths

Chile's labour force participation is low by comparison with most countries in the OECD area, especially among females and youths. In the case of women, labour supply has risen steadily over time for prime-age and older individuals, against a background of relative stability for men. With regards to youths, participation rates are trending down, primarily as a result of rising school enrolment, especially for males, while remaining fairly low and stable over the years for young females. The main policy challenge in this area is to raise female labour supply further, for both prime-age individuals and youths, as a means of making a better use of labour inputs in support of long-term growth. This can be achieved essentially by removing provisions in the labour code that constrain the allocation of working time and by improving access to affordable child care for mothers with young children. Policies aimed at fostering human capital accumulation for the population as a whole would also contribute, because educational attainment is one of the most powerful determinants of labour force participation.

Chile's labour force participation is low by comparison with most countries in the OECD area, especially among females and youths, as noted in Chapter 1. In the case of women, labour supply has risen steadily since 1990 for prime-age and older individuals, against a background of relative stability for men. With regards to youths, participation rates are trending down, predominantly as a result of rising school enrolment, especially for males, while remaining fairly low and stable over the years for young females. The share of youths who are neither studying nor working is also coming down, although it remains comparatively high for females. This group is not accumulating any kind of human capital and face a labour market that is putting an increasingly high premium on human capital. The empirical evidence reported in this chapter, based on household survey data, shows that educational attainment is one of the most powerful determinants of participation, for both men and women. The main policy challenge in this area is to raise female labour supply further, for both prime-age individuals and youths, as a means of making better use of available labour inputs in support of living standards and long-term growth, reducing poverty and improving income distribution.

Labour market trends

Labour force participation, employment and unemployment

On the basis of household survey data, Chile's labour supply has exhibited distinctly different trends along gender and age lines over the years. On the one hand, female participation has been on the rise, increasing by almost 10 percentage points during 1990-2003 to about 42%, especially for individuals aged between 55-64 years (Table 5.1). Notwithstanding this increase, female participation remains low by OECD and even Latin American standards, as noted in previous *Surveys* and in Chapter 1. This is in contrast with a relative stability in male participation since 1990 at about 73% in 2003, which is close to the OECD average. On the other hand, in the case of youths, participation has been low and stable over the years for females, but relatively high, although falling, for males. The gender gap in participation rates remains sizeable, but is falling over time as a result of the relative stability of labour supply among males and an increase for females, which is welcome. In any case, it should be recognised that these trends are likely to have been affected by the pick-up in economic activity following the 1998-2003 slowdown.

As in the case of trends in participation, there are important age- and gender-related differences in employment rates. Employment increased steadily during 1990-2003 for females, but began to fall after 1996 for males, having risen gradually during 1990-96. These trends nevertheless mask important discrepancies among different age groups. In the case of youths, employment remained stable for females during 1990-2003, whereas there was a pronounced decline for males, especially for the 15-19 age group, a pattern that tracks closely the trends in participation described above. The increase in employment among older workers (55 years and above) is also noticeable for both men and women.

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Table 5.1. **Labour force participation, employment and unemployment by age and gender, 1990-2003**

In per cent

Age group	Participation			Employment			Unemployment		
	1990	1996	2003	1990	1996	2003	1990	1996	2003
Females									
15-24	27.3	27.9	30.1	22.1	23.2	22.3	18.9	16.8	26.0
15-19	12.9	12.6	13.4	9.7	9.3	8.9	24.9	25.9	33.3
25-54	41.7	47.6	55.8	38.7	45.0	50.3	7.3	5.5	9.9
55-64	20.7	26.2	34.3	19.9	25.5	31.7	3.8	2.7	7.5
65+	6.1	7.3	7.7	5.9	7.0	7.4	3.2	3.6	2.9
15+	32.4	36.3	42.2	29.3	33.6	37.1	9.6	7.3	12.1
Males									
15-24	51.4	46.8	41.7	43.8	42.2	34.2	14.7	9.9	17.9
15-19	26.7	21.9	17.1	21.5	18.5	13.1	19.6	15.5	23.7
25-54	93.7	94.5	93.9	88.2	90.9	87.7	5.9	3.8	6.5
55-64	69.6	75.6	78.0	66.0	72.5	72.3	5.2	4.2	7.3
65+	25.2	30.9	29.2	23.1	29.4	27.8	8.2	4.9	4.9
15+	73.6	74.7	73.1	68.0	71.0	67.1	7.6	4.9	8.2

Source: MIDEPLAN (CASEN database) and OECD calculations.

Unemployment trends reflect a mismatch between participation and employment. Unemployment fell in the high-growth period that preceded the Asian crisis and rose thereafter for both males and females. A slowdown in economic activity during 1998-2003, coupled with a concomitant sharp increase in the minimum wage in real terms, are the main culprits for rising unemployment, as discussed in previous *Surveys*. Also, unemployment is typically higher for females than males, despite their much lower labour force participation. The gradual increase in female unemployment suggests that labour demand has not expanded *pari passu* with the increase in participation, especially for youths and older women (aged 55-64 years). This is nevertheless not the case for elderly females (aged 65 years and above), for whom the unemployment rate is low and falling. A combination of high and rising unemployment among youths and low and falling unemployment among the elderly also characterizes unemployment trends for males, despite their much higher participation rates.

As usual, participation rates are strongly correlated with educational attainment. Labour supply rises monotonically with years of schooling among females, but only for individuals with up to 12 years of education in the case of males (Table 5.2). Participation is lower among the best educated men than for those with 12 years of education. The sharpest increase in participation during 1990-2003 was for individuals – both males and females – with 12 years of education, for whom the increase in unemployment was most severe. These trends also suggest that demand for better educated individuals – those who have completed at least upper-secondary education – has not kept pace with supply.

Cohort effects explain to a large extent a comparatively low unemployment rate among the least educated individuals. Unemployment is lower for both men and women with less than 8 years of education than for individuals with 8-12 years of education. This is because of comparatively low unemployment among older individuals, who tend to be less educated than younger generations, given the considerable increase in educational attainment in Chile over the years. These trends underscore the presence of strong inter-generational effects on both participation and unemployment.

Table 5.2. **Labour force participation and unemployment by educational attainment, 1990-2003**

In per cent

Years of schooling	Participation			Unemployment		
	1990	1996	2003	1990	1996	2003
Females						
Less than 8	21.7	22.6	24.6	8.3	6.3	9.9
8-11	25.7	29.9	32.9	12.2	8.9	13.1
12	40.0	46.0	52.3	10.3	8.6	15.0
12+	56.0	58.4	62.0	8.1	5.6	9.6
Males						
Less than 8	73.8	72.7	66.0	7.9	5.1	8.3
8-11	69.6	69.9	67.4	9.5	5.6	9.2
12	79.2	82.8	83.5	6.9	4.8	8.7
12+	74.7	75.9	75.9	5.1	3.6	6.4

Source: MIDEPLAN (CASEN database) and OECD calculations.

The effective gender gap in labour force participation is higher still when part-time work is taken into account; it tends to be more prevalent among women (Table 5.3). The incidence of part-time work rose for both females and males during 1990-2003, regardless of their educational attainment, and is now close to the OECD average, although it is lower than in regional comparator countries, such as Brazil (OECD, 2006). Part-time work is also strongly affected by educational attainment: the percentage of working-age women with at least 12 years of schooling who work less than 20 hours per week is less than one-half of that of their counterparts with less than 12 years of schooling. These trends underscore the fact that part-time work is an option for women to reconcile household and professional activities, as in many countries in the OECD area. But the strong correlation between the incidence of part-time work and educational attainment also suggests that part-time work may be the only viable arrangement for less educated women, for whom child care and pre-compulsory education services may be prohibitively expensive.

Table 5.3. **Incidence of part-time work by gender and educational attainment, 1990-2003**

Individuals aged 15-64 years working less than 20 hours per week, in per cent

Years of schooling	Males			Females		
	1990	1996	2003	1990	1996	2003
Total	**3.1**	**3.6**	**4.9**	**6.5**	**7.8**	**10.5**
Less than 8	3.5	4.6	6.6	9.9	9.7	15.7
8-11	3.4	4.3	5.1	7.4	10.9	15.2
12	2.2	2.3	3.8	4.2	6.0	8.9
12+	3.1	2.9	4.8	5.2	6.0	7.0

Source: MIDEPLAN (CASEN database) and OECD calculations.

The design of social insurance schemes affects labour supply among older workers. Recent empirical evidence based on household survey data (the University of Chile's *Encuesta de Ocupación*, which focuses on the metropolitan region of Santiago) suggests that the pension reform of the early 1980s, which replaced a pay-as-you-go system by a privately-run, fully-funded, defined-contribution scheme, encouraged labour force

participation among the elderly (James and Edwards, 2005). This is because of a combination of restricted access to savings in the event of early retirement, on the one hand, and a strengthening of the actuarial linkage between contributions and retirement income, on the other. The reform also exempted pensioners who continue to work after retirement from social security contributions. This reduction in the tax burden on post-retirement income also encouraged labour force participation among the elderly.

Gender-related earnings differentials

In spite of being on average better educated than men, women earn less. Although the gender-earnings gap has narrowed over time, especially for the least educated individuals (with less than 8 years of schooling), it remains sizeable among the best educated individuals (with at least 12 years of schooling) (Table 5.4). Empirical evidence suggests that, once other individual characteristics are controlled for, males with a university degree earn about 50% more than females with the same qualifications, against an average gender-earnings gap of 22-35% (Nopo, 2006). Controlling for age, marital status, educational attainment, occupation and whether or not the individual works full-time, the gender-earnings gap rises with earnings from about 20-30% on average during 1992-2003 in favour of males up to the 70th percentile of the wage distribution to over 70% at the top end. Nevertheless, to a large extent, this reflects an occupational-experience gap, due to women's spells of inactivity during their working lives as a result of child bearing. Once the average number of years at the same job is taken into account, as well as age, marital status and educational attainment, empirical evidence suggests that the gender-earnings gap fluctuates between 10-20% for most of the wage distribution, although it rises sharply for the top five percentiles.

Table 5.4. **Earnings-gender gap by educational attainment, 1990-2003**
Ratio of male to female average hourly wages[1]

Years of schooling	1990	1996	2003
Less than 8	1.60	1.28	1.22
8-11	1.44	1.26	1.39
12	1.37	1.30	1.30
12+	1.75	1.61	1.57

1. Individuals aged 15-64 years working on a full-time basis.
Source: MIDEPLAN (CASEN database) and OECD calculations.

Discrepancies in earnings are related not only to gender but also to years of schooling, suggesting that returns to education may be high. Measured in terms of average hourly wage ratios across educational attainment categories, returns are highest for the best educated individuals, both males and females (Table 5.5). Returns fell gradually for females with up to 11 years of schooling during 1990-2003 and rose considerably for the best educated females and for the least educated males. The increase in the wage premium associated with having more than 12 years of schooling during 1990-2003 is striking for both males and females. These trends reflect to some extent supply effects, which may have prevented a faster increase in earnings, at least in the case of females, given that the increase in participation was particularly sharp for individuals with up to 12 years of schooling.

Table 5.5. **Average hourly wage ratios by gender and educational attainment, 1990-2003**

Individuals aged 15-64 years working on a full-time basis

	Males			Females		
	1990	1996	2003	1990	1996	2003
8-11 years to less than 8 years	1.12	1.35	1.30	1.25	1.38	1.14
12 years to 7-11 years	1.46	1.44	1.42	1.53	1.40	1.52
12+ years to 12 years	2.14	2.39	2.59	1.68	1.93	2.14

Source: MIDEPLAN (CASEN database) and OECD calculations.

Youth participation and schooling

The decline in labour supply among youths is closely associated with an increase in school enrolment and improving educational attainment. Low participation is not a problem to the extent that youngsters opt to delay entry into the labour market in order to spend more time in education, and if returns to formal education are higher than those to seniority. There is plenty of anecdotal evidence, supported by the empirical analysis reported in Annex 5.A1, that this is the case in Chile. But there are countries in the OECD area, such as the Netherlands and the United Kingdom, that have managed to combine high education attainment with high participation among youths. It is likely that more youths will need to work to finance, at least in part, the cost of their studies as post-secondary enrolment rises further and against a dearth of government support. Therefore, there may be scope for policy action to make it easier for youths to join the labour force, if they so wish, while remaining in education.

Most youths aged 15-19 years study and do not work, a share which increased considerably during 1990-2003 for both males and females (Table 5.6). By contrast, the percentage of young men who work, instead of studying, remains higher than that for females, but is much lower in 2003 than it was in 1990. Coupled with an increase in the share of youngsters who study while working, these trends are consistent with rising returns to higher education, as well as the increasing premium the labour market is putting on skills. But the proportion of youths who are neither studying nor working remains high. This is particularly worrying in the case of women aged 20-24 years, despite a steady decline during 1990-2003.

Table 5.6. **Distribution of youths by education and employment status, 1990-2003**

In per cent

	15-19 years			20-24 years		
	1990	1996	2003	1990	1996	2003
Males						
Not studying nor working	13.2	12.0	11.7	18.0	11.1	16.5
Not studying but working	19.4	16.0	9.7	64.0	61.4	49.8
Studying and not working	65.3	69.4	75.2	15.7	22.9	26.4
Studying and working	2.0	2.5	3.4	2.4	4.6	7.3
Females						
Not studying nor working	26.8	19.3	16.5	53.4	41.4	38.2
Not studying but working	8.6	7.5	6.2	32.6	33.9	30.3
Studying and not working	63.5	71.3	74.6	12.6	21.6	26.0
Studying and working	1.1	1.9	2.8	1.4	3.2	5.5

Source: MIDEPLAN (CASEN database) and OECD calculations.

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The determinants of labour force participation and employment

The empirical evidence reported in Annex 5.A1, based on household survey data for 1990-2003, allows for the identification of the main determinants of participation for both prime-age individuals and youths.[1] In particular:

- Educational attainment is among the key determinants of labour supply, for both males and females. The effect of educational attainment is particularly strong for prime-age females with at least 12 years of schooling. For prime-age males, the effect is strongest for those individuals with up to 12 years of schooling. In the case of youths, educational attainment is a powerful deterrent to male participation, given the trend towards rising school enrolment and falling participation over the years, but it is not the case for females, whose participation rates are on the rise together with an increase in educational attainment.
- The number of young children in the household is a powerful deterrent to female participation, both for prime-age and young women. This effect is particularly strong for those with children aged less than three years. The converse is true in the case of males, as expected, for whom participation rises with the number of children in the household. The presence of an adverse effect for young females suggests that they may be expected to contribute to intra-household arrangements for child care. This is consistent with the finding that female participation rises with the number of elderly individuals in the household, which suggests that intra-household arrangements are important for child care so that mothers with young children can return to the labour force.
- Household income is another important determinant of participation and employability, especially for females (prime-age and youths). Participation tends to be lower for women living in more affluent households, although that has not always been the case, and to a certain extent the same is true for men. The probability of participation also rises for prime-age women who are heads of household.
- Regional and demographic effects also matter. As expected, labour supply rises with age, albeit in a non-linear fashion for both prime-age males and females, and is lower in rural areas than in urban areas for prime-age and young females. It is also higher in the metropolitan region of Santiago than in the rest of the country.

Educational attainment is a powerful determinant of employability too. The empirical findings about the main determinants of participation are similar to those of employability. The presence of young children in the household is also detrimental to female employment, as in the case of participation. This finding is consistent with the experience of OECD countries and Brazil, a regional comparator, which suggests that the gender gap in employment widens as the number of children in the household unit increases.

Participation and employability are likely to benefit from two policy measures put in place over the last few years. The first is the implementation of full-day schooling in municipal and subsidised private schools, which started in 1997 (Chapter 3). This measure is likely to have encouraged female participation, especially among mothers with young children, who might want to work on a full-time basis and are prevented from doing so due to a scarcity of affordable child-care facilities. The empirical evidence reported above underscores the disincentive effect on participation associated with the presence of older children (aged 6-10 years) in the household. The second is the extension of compulsory schooling to lower-secondary education in 2003, resulting in 12 years of compulsory education, which is likely to have a positive impact on female participation and

employability. This is because, on the basis of the empirical findings reported above, there is a disincentive effect for participation associated with the presence of older children (aged 11-17 years) in the household. Of course, this disincentive effect is much weaker than in the case of younger children.

Structural shifts in the economy, as well as individual and market characteristics, have affected participation and employability. The empirical results reported in Annex 5.A1 can be used to decompose changes in participation during 1990-2003 between changes in its main determinants and in the estimated coefficients (Box 5.1). The same exercise can be carried out for employability. In doing so, it is possible to assess the impact on participation/employability of structural changes in the economy (captured by changes in estimated coefficients) relative to that of changes in individual and market characteristics (captured by changes in variables).

Box 5.1. **Determinants of labour force participation and employment: A decomposition exercise**

Regression analysis, such as that reported in Annex 5.A1, is conventionally used to estimate the main determinants of labour force participation and employment. Probit models are particularly useful because the main variables of interest – participation and employability – are binary (*i.e.* they are value "0", if the individual participates or is employed, or "1", otherwise) and may therefore be expressed in terms of probabilities. Once the regressions have been estimated, the overall effect on participation/employment can be decomposed between changes in variables and in the estimated coefficients. To this end, several methodologies are now available, including that of Yun (2004).

The basic idea of the decomposition exercise is that participation/employability, denoted by Y, is a function of several market-related and individual characteristics, such that it can be written as:

$$Y = F(X'\beta),$$

where F is a normally distributed cumulative density function, as in a probit model, X is a set of regressors, which includes the main determinants of participation/employability, and β is a vector of estimated coefficients.

The decomposition exercise consists of re-writing Y as follows:

$$\overline{Y}_t - \overline{Y}_{t+1} = \overline{F(X_t'\beta_t)} - \overline{F(X_{t+1}'\beta_{t+1})} = \overline{F(X_t'\beta_t)} - \overline{F(X_{t+1}'\beta_t)} + \overline{F(X_{t+1}'\beta_t)} - \overline{F(X_{t+1}'\beta_{t+1})}$$

Changes in Y – denoted by $\overline{Y}_t - \overline{Y}_{t+1}$ – can therefore be written as a sum of two components. The first term – $\overline{F(X_t'\beta_t)} - \overline{F(X_{t+1}\beta_t)}$ – accounts for changes over time in variables (the determinants of participation/employment included in X), whereas the second term – $\overline{F(X_{t+1}'\beta_t)} - \overline{F(X_{t+1}'\beta_{t+1})}$ – accounts for changes in the estimated coefficients (β).

Intuitively, changes in coefficients measure to some extent structural changes in the economy, such as structural reform in product markets, trade liberalization, amendments to the labour code, etc. Changes in variables, on the other hand, are related predominantly to the individual and market-related characteristics, such as those related to demography, household status, residency location and human capital accumulation.

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Although statistical testing does not always yield clear-cut results, the decomposition exercise carried out on the basis of the analysis reported in Annex 5.A1 suggests that:

- In the case of labour supply, structural changes in the economy (captured in the estimated coefficients for the participation equations for 1990 and 2003) have been the main determinants of rising participation for prime-age individuals (Table 5.7). The converse is nevertheless true for youths, for whom long-term trends in the underlying individual and market-related determinants, especially those associated with rising human capital, explain most of the change in participation during 1990-2003.
- With regard to labour demand, on the other hand, long-term trends in the underlying determinants of employability, rather than structural changes in the economy, tend to explain most of the changes in employment rates for both prime-age individuals and youths.

Table 5.7. **Participation and employability: Decomposition analysis, 1990-2003**
Based on the regression results reported in Annex 5.A1[1]

	Males		Females	
	Youths	Prime-age individuals	Youths	Prime-age individuals
Change in participation	9.7	–0.2	–2.8	–14.1
Change in variables	6.8	0.9	–1.7	–5.9
Change in coefficients	2.4	–1.0	–0.5	–7.6
Change in employment	9.6	0.5	–0.2	–11.6
Change in variables	6.2	0.5	–1.6	–5.8
Change in coefficients	3.1	–0.1	2.0	–5.1

1. Changes are defined as the difference between the participation/employment rates in 1990 and in 2003. A negative (positive) number denotes an increase (decline) in participation/employment.

Source: MIDEPLAN (CASEN database) and OECD estimations.

Challenges and policy recommendations

Chile's gender gap in labour supply remains sizeable. Notwithstanding a gradual increase over the years, female labour force participation is well below the OECD average. There are cultural reasons why women may prefer to focus on household responsibilities, rather than to engage in gainful activities outside the home.[2] But there is also scope for policy action in this area. By fostering labour force participation among the groups that are lagging behind, such as females and youths, policies can contribute to raising the economy's long-term growth potential, and reducing poverty and income inequality. Empirical evidence suggests that an increase in participation among individuals in the poorer one-half of the income distribution may have a significant impact on poverty and income distribution.[3]

On the basis of the empirical analysis reported above, human capital appears to be an important determinant of both labour force supply and employability. Therefore, policies that foster human capital accumulation for the population as a whole would contribute to reducing the remaining gender gap in labour supply and employment. Rising school enrolment explains to a large extent the decline in participation among young men. But a still large share of youngsters, especially women, who neither study nor work is worrying, possibly because they care for younger siblings. At the same time, the presence of young children in the household creates a strong disincentive for participation among young and prime-age females, which suggests that informal intra-household arrangements may not be effective enough to compensate for a scarcity of affordable child care and pre-school education, which would make it easier for mothers with young children to work.

Strengthening the framework conditions for labour utilisation

Policy options for encouraging more flexible arrangements in the allocation of working time are likely to have a bearing on labour force participation. Mothers with young children may opt to work less than full time as a means of reconciling household and work responsibilities but may be prevented from doing so. The prevalence of part-time work among Chilean women is below the OECD area average; it is also low in relation to regional comparators, such as Brazil. The constraints imposed by the labour code on the allocation of working time, discussed in the *2005 Survey* (OECD, 2005b), may play a part. In this regard, the recommendation made in Chapter 4 to clarify regulations so that working time can be reduced by any number of hours, and not necessarily by as much as one-third, a limit that currently triggers some special provisions, would go in the direction of fostering female participation, given that part-time work tends to be more prevalent among women.

It is too soon to evaluate the impact of recent reforms of regulations on labour dispatching and subcontracting, but anecdotal evidence available to date is encouraging. The reform of legislation on labour dispatching in early 2007 removed legal uncertainty as to responsibilities of client enterprises and dispatching firms that had discouraged the use of this flexible form of employment. The concomitant strengthening of the legal framework for subcontracting also goes in the direction of encouraging participation among females and youths, who are most likely to benefit from more flexible working practices. These reform initiatives are important, because the experience of OECD countries suggests that the easing of constraints imposed by employment protection legislation can do much to improve employment outcomes, especially when accompanied by regulatory measures in product markets that ease restrictions on the entry and expansion of new firms. The authorities are therefore advised to remain vigilant and to respond promptly to any remaining obstacles that might not have been addressed in these recent reforms.

Making social protection conducive to participation

The strengthening of Chile's social protection – discussed in Chapters 2 and 4 – may affect labour supply. In principle, reform options that go in the direction of increasing the perceived benefit of formal employment relative to its costs would encourage labour force participation. However, the costs of increased social protection, including those arising from mandatory social security contributions and health insurance for own-account workers, may be too high for the individuals whose attachment to the labour force is weakest, which include females and youths. These individuals might opt for not participating at all or for doing so informally. Again, as discussed in Chapter 4, the authorities are advised to monitor trends in labour supply during the period in which social security contributions by own-account workers will be voluntary (during 7-10 years after approval of the pension reform proposal) and identifying the groups whose labour supply may be discouraged, once social security contributions and health insurance become compulsory (10 years after approval of the pension reform proposal).

By the same token, the effect on participation of some additional measures that are being proposed in the area of pension reform is uncertain. In particular, the introduction of a bonus per child to be awarded to women as a means of fostering gender equality, the lowering of life and invalidity insurance premia for women and options for boosting competition among AFPs to reduce administrative costs are measures that make saving for retirement more attractive for women and youths, hence possibly contributing to participation. But the question of whether or not the proposed reforms, including in the area of health insurance, will make

participation attractive enough to compensate for the additional costs these contributory programmes will entail is essentially empirical. The reforms are planned to be implemented in a phased manner, which is welcome, to allow the authorities to monitor closely the ensuing changes in incentives for participation and informality.

Social security reform is also likely to affect the incentives for participation among youths. The introduction of a pension contribution subsidy for individuals aged 18-35 earning less than 1.5 times the minimum wage on their first jobs is likely to encourage youth participation. However, the age group envisaged by the programme is rather broad. If the initiative's focus is on youths, the 18-24 age group could be targeted instead, because this is the demographic group for which informality is most widespread and labour force participation is lowest. By making the hiring of youths more attractive, the subsidy programme would also contribute to removing financial constraints on human capital accumulation and to encourage those youngsters who are neither studying nor working to engage in a paid occupation that may enhance their earnings capacity in the future.

Facilitating access to child care

Public finances permitting, options could be considered for facilitating access to child care so as to encourage female labour supply. The payoff from continued policy action in this area is potentially very large. Mothers with younger children, especially those in low-pay jobs, often find it prohibitive to work while having to pay for these services out of pocket. In fact, according to the 2003 CASEN survey, 16% of women aged 25-39 stated that they did not look for a job in the previous two months because they did not have an option for child care (Politeia, 2007). This problem is worse for low-income mothers, affecting about 22% of mothers aged 20-29 years in the bottom income quintile, against less than 5% for those in the top quintile.

The supply of child care centres for young children has increased significantly over the years, but there is much room for improvement. Chilean legislation mandates enterprises with at least 20 female employees to provide child care facilities (in the workplace or outside it) for children aged less than 2 years. But this provision affects only a small proportion of enterprises (about 17% in 2004). Most mothers, especially those with a comparatively weak attachment to the labour force and on precarious jobs, therefore need to rely on publicly provided facilities (including JUNJI and *Fundación Integra*), especially among the low-income groups (Table 5.8). For older children, access to pre-school

Table 5.8. **Distribution of child care facilities by income group, 2003**

In per cent

	Income quintile					Total
	I	II	III	IV	V	
Municipal	16.8	14.0	17.7	3.7	0.3	10.3
Private subsidised	5.2	5.5	5.1	6.8	14.8	7.8
Fully private	0.0	5.6	23.5	52.9	61.0	29.0
JUNJI[1]	48.7	42.1	35.2	20.1	4.4	29.6
Fundación Integra	24.9	22.6	8.1	6.9	2.5	12.7
Enterprise-based	2.4	5.4	6.1	9.6	17.0	8.4
Unknown	2.0	5.0	4.4	0.0	0.2	2.3

1. *Junta Nacional de Jardines Infantiles*.

Source: Politeia (2007).

education is on the rise. About 57% of children aged 3-5 were engaged in pre-school education in 2003 (against 36% in 1990), whereas only just over 6% of those aged 0-3 were in child care (2.5% in 1990). Facilitating access to publicly-funded child care is important not only from the viewpoint of encouraging female labour supply, but also because international experience suggests that access to early childhood education can improve school outcomes later in life, strengthening educational attainment.

Of course, the net economic benefit of reducing the costs of child care borne by parents depends ultimately on the labour-supply response. This is an empirical question. But an increase in the availability of affordable child care may affect participation not only for prime-age women, but also among other household members. This is the case of the elderly, for example, whose presence in a household is strongly correlated with prime-age female participation on the basis of the empirical analysis reported in Annex 5.A1 and discussed above. Older household members can be relied upon for child care through informal intra-household arrangements. This is also the case of female youths, whose participation is discouraged by the presence of young children in the household, which suggests that they too contribute to child care. This may explain to some extent the high percentage of young women who neither study nor work. If this is the case, the payoff of policies aimed at facilitating access to child care services would go far beyond the increase in participation among prime-age females, because they would unlock opportunities for both young women and older household members to engage in gainful occupations. The fact that informal arrangements for child care within the household are likely to change when the younger cohorts, who have higher participation rates, grow older also needs to be taken into account. Moreover, because female employability depends strongly on educational attainment, the constraint imposed by a lack of affordable child care services may affect less-educated individuals disproportionately.

Summary of recommendations

This chapter's main recommendations are summarised in Box 5.2.

Box 5.2. **Summary of recommendations**

Strengthening the framework conditions for labour utilisation

- Clarify regulations so that working time can be reduced by any number of hours, and not necessarily by as much as one-third, a limit that currently triggers some special provisions.

Making social protection conducive to participation

- Monitor trends in labour supply during the period in which social security contributions by own-account workers will be voluntary (during 7-10 years after approval of the pension reform proposal) and identify the groups whose labour supply may be discouraged once social security contributions and health insurance become compulsory (10 years after approval of the pension reform proposal).

Facilitating access to child care

- Public finances permitting, increase the supply of publicly-funded child care services, especially for low-income households.

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Notes

1. These findings are broadly in line with those reported by Contreras and Puentes (2004) using a labour market survey conducted by the University of Chile for the metropolitan region of Santiago since 1957.
2. Evidence based on survey data shows that conservative social attitudes towards working women are an important deterrent to female labour force participation, an effect that is estimated to far outweigh the positive impact of education attainment on a woman's propensity to work outside the home (Contreras and Plaza, 2006).
3. See Bravo and Contreras (2004) for more information.

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ANNEX 5.A1

The determinants of labour force participation and employment

This Annex uses data from the CASEN household survey to estimate the determinants of labour force participation and employability for prime-age (25-54 years) males and females and youths (15-24 years) on the basis of probit models for 1990, 1996 and 2003.

The determinants of labour force participation

Prime-age females

The results of the probit estimations for prime-age females, reported in Table 5.A1.1, indicate that educational attainment, measured by years of schooling, increases the

Table 5.A1.1. **Labour force participation equations: Prime-age individuals, probit models**[1]

	Males			Females		
	1990	1996	2003	1990	1996	2003
Years of schooling						
8-11	0.019**	0.020**	0.034**	0.005**	0.069**	0.066**
	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)
12	0.031**	0.029**	0.041**	0.112**	0.151**	0.165**
	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)
12+	0.018**	0.019**	0.026**	0.319**	0.328**	0.315**
	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)
Age	0.016**	0.013**	0.019**	0.023**	0.013**	0.017**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Age squared	0.000**	0.000**	0.000**	0.000**	0.000**	0.000**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Number of children in the household						
Less than 3 years	0.008**	0.011**	0.014**	–0.084**	–0.095**	–0.090**
	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)
3-5 years	0.011**	0.014**	0.014**	–0.064**	–0.060**	–0.062**
	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)
6-10 years	0.006**	0.009**	0.007**	–0.053**	–0.052**	–0.057**
	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)
11-17 years	0.002**	0.000	0.005**	–0.002**	–0.009**	–0.012**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Number of elderly individuals in the household	0.001	–0.004**	–0.006**	0.089**	0.108**	0.050**
	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)

Table 5.A1.1. **Labour force participation equations: Prime-age individuals, probit models**[1] *(cont.)*

	Males			Females		
	1990	1996	2003	1990	1996	2003
Household per capita non-labour income	–0.001**	–0.001**	–0.002**	0.010**	0.014**	–0.008**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Head of household	0.091**	0.083**	0.076**	0.304**	0.301**	0.284**
	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)
Rural areas	0.024**	0.009**	0.006**	–0.164**	–0.155**	–0.141**
	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)
Region II	0.006**	0.021**	0.010**	–0.121**	–0.104**	–0.031**
	(0.001)	(0.000)	(0.001)	(0.002)	(0.003)	(0.002)
Region III	0.006**	0.019**	0.019**	–0.090**	–0.041**	0.001
	(0.001)	(0.001)	(0.001)	(0.003)	(0.003)	(0.003)
Region IV	–0.004**	0.010**	0.006**	–0.024**	0.081**	0.014**
	(0.001)	(0.001)	(0.001)	(0.003)	(0.003)	(0.002)
Region V	–0.003**	0.005**	0.000	–0.025**	0.047**	0.021**
	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)
Region VI	–0.009**	–0.002**	0.017**	0.018**	0.033**	0.015**
	(0.001)	(0.001)	(0.001)	(0.003)	(0.002)	(0.002)
Region VII	–0.010**	0.015**	0.013**	–0.032**	0.062**	0.052**
	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)
Region VIII	–0.022**	–0.006**	–0.013**	–0.062**	–0.046**	–0.050**
	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)
Region IX	–0.049**	0.008**	–0.014**	–0.055**	0.034**	–0.044**
	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)
Region X	–0.002	0.002*	–0.003**	–0.038**	0.025**	0.015**
	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)
Region XI	0.016**	0.014**	0.003*	–0.034**	0.098**	0.105**
	(0.002)	(0.001)	(0.001)	(0.005)	(0.004)	(0.004)
Region XII	0.007**	0.028**	–0.014**	–0.009*	0.138**	0.045**
	(0.001)	(0.000)	(0.001)	(0.004)	(0.003)	(0.003)
Region XIII	0.006**	0.026**	0.015**	0.042**	0.107**	0.080**
	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)
Number of observations	2 367 356	2 756 380	3 122 811	2 625 127	2 958 500	3 311 258
Adj. R^2	0.10	0.14	0.14	0.13	0.12	0.11

1. Standard errors are reported in parentheses. (**) and (*) denote statistical significance at the 1% and 5% levels, respectively.

Source: MIDEPLAN (CASEN database) and OECD estimations.

probability of participation. The participation effect is particularly strong for individuals with at least 12 years of schooling. Age contributes positively to participation in a non-linear manner, underscoring the presence of strong life-cycle effects in labour supply. The number of children in the household affects negatively the probability of participation, especially for those aged less than three years. The number of elderly individuals in the household affects positively the probability of participation. The effect of household income on labour supply changed over time: it was positively correlated with participation in 1990 and 1996, but the estimated coefficient turned negative in 2003. The probability of participation is also higher for women who are heads of household, lower in rural areas than in urban areas, and higher in the metropolitan region of Santiago than in the rest of the country. The results are similar for the employability regressions (reported in Table 5.A1.2).

Table 5.A1.2. **Employment equations: Prime-age individuals, probit models**[1]

	Males			Females		
	1990	1996	2003	1990	1996	2003
Years of schooling						
8-11	0.028**	0.034**	0.048**	0.007**	0.067**	0.067**
	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)
12	0.057**	0.052**	0.072**	0.118**	0.152**	0.161**
	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)
12+	0.050**	0.045**	0.060**	0.312**	0.330**	0.314**
	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)
Age	0.026**	0.016**	0.030**	0.029**	0.017**	0.020**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Age squared	0.000**	0.000**	0.000**	0.000**	0.000**	0.000**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Number of children in the household						
Less than 3 years	0.009**	0.013**	0.016**	–0.069**	–0.096**	–0.074**
	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)
3-5 years	0.010**	0.017**	0.012**	–0.054**	–0.061**	–0.056**
	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)
6-10 years	0.002**	0.014**	–0.002**	–0.045**	–0.049**	–0.057**
	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)
11-17 years	0.003**	0.003**	0.004**	–0.004**	–0.006**	–0.010**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Number of elderly individuals in the household	–0.001*	–0.011**	–0.008**	0.082**	0.093**	0.042**
	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)
Household per capita non-labour income	0.001**	–0.001**	–0.002**	0.013**	0.017**	–0.004**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Head of household	0.135**	0.113**	0.144**	0.277**	0.292**	0.262**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Rural areas	0.043**	0.030**	0.029**	–0.140**	–0.135**	–0.103**
	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)
Region II	0.011**	0.035**	0.020**	–0.107**	–0.098**	–0.023**
	(0.002)	(0.001)	(0.001)	(0.002)	(0.003)	(0.002)
Region III	0.007**	0.023**	0.026**	–0.071**	–0.029**	–0.026**
	(0.002)	(0.001)	(0.001)	(0.003)	(0.003)	(0.003)
Region IV	–0.005**	0.011**	–0.013**	–0.011**	0.084**	0.015**
	(0.002)	(0.001)	(0.001)	(0.003)	(0.003)	(0.002)
Region V	–0.011**	0.004**	–0.020**	–0.023**	0.039**	–0.004*
	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)
Region VI	–0.008**	–0.007**	0.023**	0.005*	0.023**	0.019**
	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)
Region VII	–0.007**	0.025**	0.018**	–0.012**	0.070**	0.043**
	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)
Region VIII	–0.041**	–0.017**	–0.036**	–0.056**	–0.049**	–0.050**
	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)
Region IX	–0.044**	0.002	–0.045**	–0.042**	0.032**	–0.045**
	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
Region X	–0.003	0.002*	–0.006**	–0.025**	0.027**	0.015**
	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)
Region XI	0.013**	0.028**	0.014**	–0.013**	0.102**	0.104**
	(0.003)	(0.002)	(0.002)	(0.005)	(0.005)	(0.004)
Region XII	0.000	0.054**	0.014**	0.009*	0.138**	0.023**
	(0.002)	(0.001)	(0.002)	(0.004)	(0.004)	(0.004)
Region XIII	0.009**	0.036**	0.006**	0.044**	0.113**	0.070**
	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)
Number of observations	2 367 356	2 756 380	3 122 811	2 625 127	2 958 500	3 311 258
Adj. R^2	0.07	0.10	0.10	0.11	0.12	0.09

1. Standard errors are reported in parentheses. (**) and (*) denote statistical significance at the 1% and 5% levels, respectively.

Source: MIDEPLAN (CASEN database) and OECD estimations.

Prime-age males

The results of the probit estimations for prime-age males, also reported in Table 5.A1.1, show a strong participation effect associated with educational attainment, although it is less so for the most educated men than it is for women. Participation increases with age, albeit in a non-linear fashion, the number of children in the household, especially for children aged 6-10 years, and residency in rural areas. Conversely, participation falls with the number of elderly people in the household and household income. As in the case of females, the results are similar for the employability equations (Table 5.A1.2).

Female youths

The results of the probit estimations for female youths, reported in Table 5.A1.3, show that the probability of participation rose with educational attainment in 2003, although the

Table 5.A1.3. **Labour force participation equations: Youths, probit models**[1]

	Males			Females		
	1990	1996	2003	1990	1996	2003
Years of schooling						
8-11	–0.163**	–0.249**	–0.044**	–0.014**	–0.044**	0.100**
	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.002)
12	–0.254**	–0.291**	–0.038**	0.061**	0.079**	0.236**
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
12+	–0.495**	–0.569**	–0.409**	0.018**	–0.061**	0.032**
	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)
Age	0.513**	0.509**	0.578**	0.404**	0.304**	0.435**
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Age squared	–0.010**	–0.009**	–0.011**	–0.009**	–0.006**	–0.009**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Number of children in the household						
Less than 3 years	0.117**	0.070**	0.102**	–0.068**	–0.062**	–0.038**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
3-5 years	0.042**	0.092**	0.024**	–0.025**	0.004**	–0.013**
	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)
6-10 years	–0.008**	0.050**	–0.005**	0.042**	0.038**	–0.004**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
11-17 years	0.024**	–0.014**	–0.016**	0.036**	0.018**	–0.001*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Number of elderly individuals in the household	–0.073**	–0.026**	–0.035**	0.037**	–0.006**	–0.002
	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)
Household per capita non-labour income	–0.025**	–0.014**	–0.028**	0.005**	–0.003**	–0.031**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Head of household	0.273**	0.354**	0.262**	0.067**	0.160**	0.152**
	(0.002)	(0.003)	(0.003)	(0.004)	(0.004)	(0.003)
Rural areas	0.227**	0.084**	0.106**	–0.070**	–0.061**	–0.056**
	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)
Region II	0.058**	–0.010*	–0.033**	–0.093**	–0.004	0.020**
	(0.004)	(0.005)	(0.004)	(0.003)	(0.003)	(0.003)
Region III	0.038**	–0.030**	–0.085**	–0.065**	0.001	–0.007
	(0.005)	(0.006)	(0.004)	(0.004)	(0.004)	(0.004)
Region IV	0.021**	0.090**	–0.014**	–0.043**	0.088**	–0.032**
	(0.004)	(0.004)	(0.004)	(0.003)	(0.004)	(0.003)
Region V	–0.065**	0.077**	–0.009**	0.011**	0.079**	0.034**
	(0.004)	(0.004)	(0.003)	(0.003)	(0.003)	(0.003)

Table 5.A1.3. **Labour force participation equations: Youths, probit models**[1] *(cont.)*

	Males			Females		
	1990	1996	2003	1990	1996	2003
Region VI	0.008	0.121**	–0.033**	0.060**	0.153**	0.027**
	(0.004)	(0.004)	(0.004)	(0.003)	(0.004)	(0.003)
Region VII	0.008	0.165**	–0.039**	0.021**	0.105**	0.047**
	(0.004)	(0.004)	(0.004)	(0.003)	(0.004)	(0.003)
Region VIII	–0.012**	–0.018**	–0.074**	–0.033**	0.056**	–0.018**
	(0.004)	(0.004)	(0.003)	(0.003)	(0.003)	(0.002)
Region IX	–0.092**	0.093**	–0.151**	0.024**	0.117**	0.010**
	(0.004)	(0.004)	(0.003)	(0.003)	(0.004)	(0.003)
Region X	0.068**	0.007	–0.077**	0.006*	0.068**	0.036**
	(0.004)	(0.004)	(0.003)	(0.003)	(0.003)	(0.003)
Region XI	0.117**	0.152**	0.030**	0.081**	0.092**	0.118**
	(0.009)	(0.008)	(0.008)	(0.007)	(0.007)	(0.007)
Region XII	0.108**	0.130**	0.004	0.043**	0.178**	0.044**
	(0.006)	(0.006)	(0.006)	(0.005)	(0.006)	(0.006)
Region XIII	0.012**	0.113**	0.029**	0.044**	0.104**	0.096**
	(0.003)	(0.004)	(0.003)	(0.003)	(0.003)	(0.002)
Number of observations	1 238 528	1 271 887	1 404 420	1 279 224	1 258 138	1 344 917
Adj. R^2	0.37	0.38	0.38	0.15	0.16	0.21

1. Standard errors are reported in parentheses. (**) and (*) denote statistical significance at the 1% and 5% levels, respectively.

Source: MIDEPLAN (CASEN database) and OECD estimations.

effect was the converse for some educational levels in 1990 and 1996. Participation tends to fall with the number of children in the household, especially for those aged less than 3 years. The association between youth participation and the number of elderly individuals in the household was not robust across time periods. Household income was found to be negatively correlated with the probability of participation in 1996 and 2003. Being head of household raises the probability of participation, while living in a rural area decreases it. Again, as in the case of prime-age individuals, the results are similar for employability (Table 5.A1.4).

Table 5.A1.4. **Employment equations: Youths, probit models**[1]

	Males			Females		
	1990	1996	2003	1990	1996	2003
Years of schooling						
8-11	–0.123**	–0.197**	–0.048**	–0.021**	–0.046**	0.064**
	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.002)
12	–0.147**	–0.221**	–0.040**	0.034**	0.047**	0.164**
	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)
12+	–0.338**	–0.460**	–0.286**	0.006**	–0.058**	0.032**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
Age	0.455**	0.477**	0.463**	0.288**	0.236**	0.257**
	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)
Age squared	–0.009**	–0.009**	–0.009**	–0.006**	–0.005**	–0.005**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Number of children in the household						
Less than 3 years	0.090**	0.056**	0.071**	–0.065**	–0.050**	–0.034**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
3-5 years old	0.046**	0.079**	0.018**	–0.013**	0.008**	–0.002
	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)

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Table 5.A1.4. **Employment equations: Youths, probit models**[1] *(cont.)*

	Males			Females		
	1990	1996	2003	1990	1996	2003
6-10 years old	–0.018**	0.038**	–0.006**	0.032**	0.029**	–0.009**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
11-17 years old	0.018**	–0.017**	–0.015**	0.024**	0.023**	0.001
	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)
Number of elderly individuals in the household	–0.056**	–0.019**	–0.037**	0.025**	–0.002	–0.006**
	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)
Household per capita non-labour income	–0.016**	–0.010**	–0.021**	0.011**	0.003**	–0.017**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Head of household	0.244**	0.344**	0.233**	0.069**	0.148**	0.122**
	(0.002)	(0.003)	(0.003)	(0.004)	(0.003)	(0.003)
Rural areas	0.267**	0.121**	0.135**	–0.047**	–0.035**	–0.013**
	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)
Region II	0.069**	0.054**	–0.055**	–0.070**	–0.012**	0.105**
	(0.004)	(0.005)	(0.003)	(0.002)	(0.003)	(0.004)
Region III	0.073**	–0.045**	–0.079**	–0.042**	0.001	0.087**
	(0.005)	(0.005)	(0.004)	(0.003)	(0.004)	(0.004)
Region IV	0.001	0.069**	–0.045**	–0.051**	0.049**	0.061**
	(0.004)	(0.004)	(0.003)	(0.002)	(0.003)	(0.003)
Region V	–0.061**	0.090**	–0.059**	–0.016**	0.064**	0.084**
	(0.004)	(0.004)	(0.003)	(0.002)	(0.003)	(0.003)
Region VI	0.042**	0.125**	–0.064**	0.028**	0.111**	0.109**
	(0.004)	(0.004)	(0.003)	(0.003)	(0.004)	(0.004)
Region VII	0.040**	0.158**	–0.051**	0.017**	0.075**	0.085**
	(0.004)	(0.004)	(0.003)	(0.003)	(0.003)	(0.003)
Region VIII	0.001	–0.021**	–0.100**	–0.038**	0.036**	0.058**
	(0.004)	(0.004)	(0.002)	(0.002)	(0.003)	(0.003)
Region IX	–0.055**	0.084**	–0.160**	0.005	0.061**	0.081**
	(0.004)	(0.004)	(0.002)	(0.003)	(0.003)	(0.003)
Region X	0.055**	0.008*	–0.100**	–0.002	0.031**	0.116**
	(0.004)	(0.004)	(0.003)	(0.003)	(0.003)	(0.003)
Region XI	0.078**	0.185**	–0.041**	0.057**	0.075**	0.190**
	(0.009)	(0.008)	(0.006)	(0.006)	(0.006)	(0.008)
Region XII	0.081**	0.092**	0.014**	0.023**	0.165**	0.128**
	(0.007)	(0.006)	(0.005)	(0.005)	(0.006)	(0.006)
Region XIII	0.044**	0.123**	–0.012**	0.023**	0.068**	0.156**
	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)
Number of observations	1 238 528	1 271 887	1 404 420	1 279 224	1 258 138	1 344 917
Adj. R^2	0.30	0.34	0.31	0.14	0.16	0.18

1. Standard errors are reported in parentheses. (**) and (*) denote statistical significance at the 1% and 5% levels, respectively.

Source: MIDEPLAN (CASEN database) and OECD estimations.

Male youths

In the case of male youths, for whom both participation and employment rates fell during 1990-2003, the estimation results reported in Table 5.A1.3 suggest that there is a negative relationship between participation and educational attainment. The number of young children in the household, especially those aged less than 6 years, increases the probability of participation, while the converse is true for children aged 6-17 years. Household income decreases the probability of participation, while being head of household increases it. Living in rural areas increases the probability of participating in the labour market. The results of the employability regressions are similar to those for participation (Table 5.A1.4).

Decomposition analysis

Based on the methodology proposed by Yun (2004), described in Box 5.1, the results of the probit regressions can be used to decompose changes in participation rates over time between differences in variables and differences in coefficients. The decomposition analysis focuses on changes in labour force participation and employment over the period 1990-2003.

Labour force participation

The results of the decomposition analysis are reported in Table 5.A1.5 for both prime-age females and youths. During 1990-2003, prime-age female participation rose by 14 percentage points. Changes in both variables and coefficients contributed to the increase. Most of the change in variables was due to changes in educational attainment, which contributed to raising participation, age effects, the number of young children in the household and head-of-household status. As for changes in coefficients, the findings are less clear-cut, but changes in educational attainment suggest that returns to education

Table 5.A1.5. **Decomposition of female labour force participation, 1990 and 2003**[1]

Based on the estimations reported in Tables 5.A1.1 and 5.A1.3
($\Delta F = -2.8$ for youths and –14.1 for prime-age females)

	Youths				Prime-age females			
	Variables	ΔF (in %)	Coefficients	ΔF (in %)	Variables	ΔF (in %)	Coefficients	ΔF (in %)
Years of schooling								
8-11	–0.06	2.20	0.00	0.02	0.00	–0.01	–38.95	276.99
12	–0.85	30.09	–0.07	2.30	–0.96	6.84	–40.00	284.48
12+	–0.05	1.94	0.00	0.14	–1.70	12.08	–10.45	74.29
Age	7.10	–2 51.51	–0.80	28.29	–3.09	21.95	605.59	–4 306.38
Age Squared	–5.98	211.98	0.33	–11.65	3.83	–27.23	–502.65	3 574.39
Number of children								
Less than 3 years	–1.04	36.88	–0.01	0.36	–0.57	4.03	2.42	–17.22
3-5 years	–0.35	12.45	0.00	0.08	–0.78	5.52	–1.13	8.05
6-10 years	0.06	–1.99	0.02	–0.64	–0.20	1.45	3.68	–26.15
11-17 years	0.26	–9.11	0.04	–1.45	0.00	0.01	15.28	–108.63
Number of elderly	–0.06	1.97	0.01	–0.19	–0.06	0.42	12.19	–86.66
Head of household	–0.09	3.02	0.00	0.07	–1.39	9.92	–2.16	15.36
Urban	–0.56	19.81	0.00	0.08	–0.65	4.64	–10.07	71.60
Household income	–0.23	7.98	0.05	–1.93	–0.23	1.64	52.24	–371.50
Region II	0.11	–3.72	–0.01	0.22	0.01	–0.07	–7.20	51.18
Region III	0.01	–0.33	0.00	0.04	0.00	–0.02	–3.80	27.03
Region IV	0.03	–1.18	0.00	0.02	0.01	–0.04	–3.58	25.46
Region V	0.01	–0.39	0.00	0.10	0.00	0.02	–11.30	80.37
Region VI	0.04	–1.46	0.00	–0.06	0.00	0.02	0.40	–2.86
Region VII	–0.01	0.42	0.00	0.07	–0.01	0.04	–11.74	83.47
Region VIII	–0.06	2.01	0.00	0.09	–0.03	0.20	–4.25	30.24
Region IX	–0.03	1.14	0.00	–0.04	–0.01	0.05	–1.70	12.11
Region X	0.00	–0.18	0.00	0.09	0.00	0.02	–8.85	62.93
Region XI	0.00	–0.12	0.00	0.01	0.00	–0.01	–2.03	14.41
Region XII	0.00	–0.07	0.00	0.00	0.00	0.01	–1.15	8.16
Metropolitan Region	0.00	–0.16	–0.03	0.92	–0.02	0.12	–38.42	273.22
Total	**–1.7**	**61.7**	**–0.5**	**16.9**	**–5.9**	**41.6**	**–7.6**	**54.4**

1. Standard errors are reported in parentheses. (**) and (*) denote statistical significance at the 1% and 5% levels, respectively.

Source: MIDEPLAN (CASEN database) and OECD estimations.

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increased considerably during the period of analysis. Changes in the number of children aged less than 3 years and between 6 and 17 years reduced participation, possibly suggesting that obstacles related to access to child care became more stringent in 2003 relative to 1990. Changes in regional coefficients were also important.

In the case of female youths, the participation rate rose by almost 3 percentage points during 1990-2003. Changes in variables accounted for the bulk of this increase, especially educational attainment, the number of young children in the household (less than 6 years of age) and residency in urban areas. In the case of coefficients, most of the overall change is explained by age effects.

With regards to males, the results of the decomposition analysis are reported in Table 5.A1.6. In the case of prime-age individuals, participation rose by 0.2 percentage points during 1990-2003 due essentially to changes in variables. The variable whose change contributed the most is educational attainment, while age effects and changes in head-of-household status decreased participation. With regards to youths, there was a sizeable drop in the participation rate, although it remains higher than that of females.

Table 5.A1.6. **Decomposition of male labour force participation, 1990 and 2003**[1]

Based on the estimations reported in Tables 5.A1.1 and 5.A1.3
($\Delta F = 9.7$ for youths and $\Delta F = -0.2$ for prime-age males)

	Youths				Prime-age males			
	Variables	ΔF (in %)	Coefficients	ΔF (in %)	Variables	ΔF (in %)	Coefficients	ΔF (in %)
Years of schooling								
8-11	–0.28	–2.84	0.11	1.13	–0.01	5.12	–0.04	27.23
12	1.49	15.31	0.14	1.40	–0.38	250.62	–0.03	21.79
12+	1.33	13.68	0.01	0.11	–0.14	93.19	–0.02	14.68
Age	4.13	42.35	3.90	40.01	–2.99	1 969.07	–1.30	858.87
Age squared	–3.27	–33.61	–1.54	–15.84	3.24	–2 137.47	0.44	–292.62
Number of children								
Less than 3 years	0.61	6.27	0.00	–0.04	0.12	–77.22	–0.01	5.89
3-5 years	0.21	2.16	0.00	–0.03	0.21	–135.56	0.00	3.13
6-10 years	–0.01	–0.09	0.00	0.02	0.05	–31.07	–0.01	3.84
11-17 years	0.16	1.59	–0.08	–0.82	0.01	–3.87	–0.01	6.87
Number of elderly	0.04	0.43	0.01	0.09	0.00	0.92	0.01	–3.66
Head of household	0.73	7.52	0.00	–0.04	0.53	–352.60	0.00	–0.11
Urban	0.98	10.01	–0.04	–0.37	0.22	–141.79	0.02	–10.09
Household income	0.79	8.15	–0.01	–0.11	0.05	–30.29	0.01	–3.81
Region II	–0.01	–0.06	–0.01	–0.07	0.00	1.34	0.00	0.82
Region III	0.00	–0.01	0.00	–0.05	0.00	–0.14	0.00	1.33
Region IV	–0.01	–0.09	0.00	–0.04	0.00	–1.38	0.00	1.70
Region V	–0.04	–0.37	0.01	0.12	0.00	0.09	0.00	1.08
Region VI	0.00	0.00	0.00	–0.05	0.00	–0.37	–0.01	6.66
Region VII	0.00	0.03	–0.01	–0.06	0.00	0.29	–0.01	5.83
Region VIII	–0.02	–0.17	–0.02	–0.18	–0.02	11.40	0.00	2.68
Region IX	0.02	0.19	–0.01	–0.11	–0.01	5.41	–0.01	4.52
Region X	0.00	0.04	–0.02	–0.23	0.00	0.29	0.00	–0.51
Region XI	–0.01	–0.07	0.00	–0.01	0.00	–0.25	0.00	–0.33
Region XII	–0.01	–0.05	0.00	–0.02	0.00	–0.25	0.00	–0.83
Metropolitan Region	–0.02	–0.16	0.02	0.16	0.00	1.05	–0.03	17.79
Total	**6.8**	**70.2**	**2.4**	**25.0**	**0.9**	**–573.5**	**–1.0**	**672.8**

1. Standard errors are reported in parentheses. (**) and (*) denote statistical significance at the 1% and 5% levels, respectively.

Source: MIDEPLAN (CASEN database) and OECD estimations.

Changes in variables accounted for most of this trend, especially in the case of educational attainment (above 11 years of schooling), age effects, residency in an urban area and household income. Changes in coefficients also reduced participation, predominantly through age effects.

Employability

The results of the decomposition analysis are reported in Table 5.A1.7 for both prime-age females and youths. The sharp increase in prime-age female employment during 1990-2003, as in the case of participation, was due to a combination of changes in variables and coefficients. As for changes in variables, differences in educational attainment and in the number of young children in the household (less than 10 years old), head-of-household status and the number of elderly individuals in the household explain most of the increase in employment. In the case of coefficients, most of the increment in employment is explained by age effects.

Table 5.A1.7. **Decomposition of female employment, 1990 and 2003**[1]

Based on the estimations reported in Tables 5.A1.2 and 5.A1.4
($\Delta F = -0.2$ for youths and $\Delta F = -11.6$ for prime-age females)

	Youths				Prime-age females			
	Variables	ΔF (in %)	Coefficients	ΔF (in %)	Variables	ΔF (in %)	Coefficients	ΔF (in %)
Years of schooling								
8-11	–0.10	58.01	1.52	–913.00	0.00	–0.02	1.00	–8.63
12	–0.50	298.78	1.68	–1 008.44	–1.03	8.91	0.76	–6.55
12+	–0.02	10.47	0.26	–159.14	–1.68	14.50	0.10	–0.89
Age	5.25	–3 154.09	–9.41	5 652.01	–3.96	34.28	–24.24	209.59
Age Squared	–4.29	2 576.01	5.68	–3 413.36	4.41	–38.11	17.52	–151.52
Number of children								
Less than 3 years	–1.03	618.89	0.31	–184.28	–0.48	4.15	–0.02	0.18
3-5 years	–0.18	109.40	0.06	–38.90	–0.68	5.89	0.01	–0.07
6-10 years	0.04	–26.02	–0.52	313.53	–0.18	1.54	–0.28	2.43
11-17 years	0.18	–106.81	–0.84	505.89	0.00	0.02	–0.23	1.97
Number of elderly	–0.04	23.42	–0.14	84.67	–0.06	0.49	–0.35	3.02
Head of household	–0.09	52.97	0.04	–25.46	–1.27	10.99	–0.08	0.73
Urban	–0.39	233.30	0.18	–107.71	–0.57	4.97	0.38	–3.29
Household income	–0.53	318.67	–1.40	840.13	–0.30	2.59	–1.28	11.09
Region II	0.08	–49.42	0.28	–169.70	0.01	–0.07	0.18	–1.59
Region III	0.01	–3.71	0.08	–48.22	0.00	–0.02	0.05	–0.47
Region IV	0.04	–25.73	0.21	–124.85	0.00	–0.02	0.06	–0.54
Region V	–0.02	10.56	0.39	–236.55	0.00	0.02	0.13	–1.12
Region VI	0.02	–12.00	0.14	–85.24	0.00	0.01	0.05	–0.39
Region VII	–0.01	5.94	0.17	–104.24	0.00	0.02	0.20	–1.75
Region VIII	–0.07	42.51	0.52	–313.88	–0.03	0.22	0.08	–0.67
Region IX	–0.01	4.34	0.20	–118.49	–0.01	0.05	0.00	0.00
Region X	0.00	0.94	0.31	–184.10	0.00	0.02	0.17	–1.51
Region XI	0.00	–1.47	0.02	–13.81	0.00	0.00	0.04	–0.38
Region XII	0.00	–0.64	0.03	–18.15	0.00	–0.01	0.01	–0.07
Metropolitan Region	0.00	–1.48	2.26	–1 357.09	–0.02	0.16	0.64	–5.57
Total	**–1.6**	**982.8**	**2.0**	**–1 228.4**	**–5.8**	**50.6**	**–5.1**	**44.0**

1. Standard errors are reported in parentheses. (**) and (*) denote statistical significance at the 1% and 5% levels, respectively.

Source: MIDEPLAN (CASEN database) and OECD estimations.

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In the case of female youths, employment remained relatively stable during the period of analysis. While changes in variables (especially the number of young children in the household and household income) contributed to raising employment, those in coefficients (especially educational attainment) acted to decrease it.

With regards to males, the results of the decomposition analysis are reported in Table 5.A1.8. The fall in prime-age male employment by about 0.5 percentage points during 1990-2003 is explained essentially by changes in variables. Changes in educational attainment increased employment: the sum of all educational changes is equivalent to more than one percentage point increment in employment. This was nevertheless offset by other effects, especially changes in head-of-household status. Employment also fell for male youths, especially through changes in variables. Changes in educational attainment, age and residency in an urban area are the most important changes in variables. In the case of changes in coefficients, age effects were most important.

Table 5.A1.8. **Decomposition of male employment, 1990 and 2003**[1]

Based on the estimations reported in Tables 5.A1.2 and 5.A1.4
(ΔF = 9.3 for youths and 0.5 for prime-age males)

	Youths				Prime-age males			
	Variables	ΔF (in %)	Coefficients	ΔF (in %)	Variables	ΔF (in %)	Coefficients	ΔF (in %)
Years of schooling								
8-11	–0.25	–2.62	0.10	1.00	–0.01	–2.29	0.00	–0.60
12	1.06	10.96	0.10	1.02	–0.65	–140.09	0.00	–0.43
12+	1.12	11.58	–0.02	–0.24	–0.40	–85.45	0.00	–0.29
Age	4.40	45.60	5.52	57.31	–4.67	–1 006.28	–0.08	–16.67
Age Squared	–3.61	–37.41	–2.17	–22.54	4.80	1 034.26	0.02	3.92
Number of children								
Less than 3 years	0.57	5.87	0.00	–0.04	0.12	26.86	0.00	–0.12
3-5 years	0.28	2.90	–0.01	–0.08	0.19	41.15	0.00	–0.03
6-10 years	–0.02	–0.25	0.01	0.11	0.02	3.63	0.00	0.16
11-17 years	0.14	1.49	–0.11	–1.10	0.01	1.58	0.00	–0.09
Number of elderly	0.04	0.40	0.00	0.05	0.00	0.64	0.00	0.08
Head of household	0.71	7.37	0.00	0.00	0.85	183.15	0.00	–0.77
Urban	1.31	13.57	–0.05	–0.51	0.35	76.40	0.00	0.19
Household income	0.60	6.20	–0.04	–0.37	–0.03	–6.43	0.00	0.23
Region II	–0.01	–0.09	–0.01	–0.15	0.00	–0.76	0.00	–0.03
Region III	0.00	–0.03	–0.01	–0.10	0.00	0.05	0.00	–0.03
Region IV	0.00	0.00	–0.01	–0.08	0.00	0.47	0.00	0.03
Region V	–0.04	–0.43	0.00	–0.04	0.00	–0.10	0.00	0.08
Region VI	0.00	0.01	–0.02	–0.22	0.00	0.11	0.00	–0.17
Region VII	0.02	0.19	–0.02	–0.20	0.00	–0.06	0.00	–0.15
Region VIII	0.00	0.01	–0.05	–0.51	–0.03	–7.04	0.00	–0.04
Region IX	0.01	0.14	–0.03	–0.35	–0.01	–1.82	0.00	0.00
Region X	0.00	0.04	–0.04	–0.43	0.00	–0.14	0.00	0.02
Region XI	–0.01	–0.05	0.00	–0.02	0.00	0.06	0.00	0.00
Region XII	0.00	–0.05	0.00	–0.02	0.00	0.00	0.00	–0.01
Metropolitan Region	–0.07	–0.71	–0.08	–0.82	0.00	–0.49	0.00	0.09
Total	**6.2**	**64.7**	**3.1**	**31.7**	**0.5**	**117.4**	**–0.1**	**–14.6**

1. Standard errors are reported in parentheses. (**) and (*) denote statistical significance at the 1% and 5% levels, respectively.

Source: MIDEPLAN (CASEN database) and OECD estimations.

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List of acronyms

AFP	Pension Fund Administrator *Administradoras de Fondos de Pensiones*
ALADI	Latin American Integration Association *Asociación Latinoamericana de Integración*
BCCh	Central Bank of Chile *Banco Central de Chile*
CDEC	Economic Dispatch Center *Centro de Despacho Económico de Carga*
CNAP	National Education Institutions Accreditation Commission *Comisión Nacional de Acreditación*
CNE	National Energy Commission *Comisión Nacional de Energía*
CONYCIT	National Commission for Scientific and Technological Research *Comisión Nacional de Investigación Científica y Tecnológica*
CODELCO	National Cooper Corporation *Corporación Nacional del Cobre*
CORFO	Chilean Economic Development Agency *Corporacón de Fomento de la Producción*
EFTA	*European Free Trade Association* *Asociación Europea de Libre Comercio*
FOGAPE	Small Enterprise Support Fund *Fondo de Garantía para Pequeños Empresarios*
FONASA	National Health Fund *Fondo Nacional de Salud*
FOSIS	Social and Solidarity Investment Fund *Fondo de Solidaridad e Inversión Social*
INE	National Statistics Institute *Instituto Nacional de Estadísticas de Chile*
ISAPREs	Private Health Insurers *Instituciones de Salud Previsional*
JUNJI	National Organization of Child Care Centres *Junta Nacional de Jardines Infantiles*
MIDEPLAN	Ministry of Planning and Cooperation *Ministerio de Planificación y Cooperación*
MINVU	Ministry of Housing and Urban Planning *Ministerio de Vivienda y Urbanismo*
NAFTA	North American Free Trade Agreement *Tratado de Libre Comercio de América del Norte*

OTECs	Technical Training Organizations *Organismos Técnicos de Capacitación*
SENCE	National Service of Training and Employment *Servicio Nacional de Capacitación y Empleo*
SERVIU	Urban and Housing Service *Servicio de Vivienda y Urbanización Regional*
SIC	Central Interconnected System *Sistema Interconectado Central*
SII	Internal Revenue Service *Servicio de Impuestos Internos*
SVS	Superintendency of Securities and Insurance *Superintendencia de Valores y Seguros de Chile*

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