

Chile: Selected Issues

This Selected Issues paper for Chile was prepared by a staff team of the International Monetary Fund as background documentation for the periodic consultation with the member country. It is based on the information available at the time it was completed on July 11, 2006. The views expressed in this document are those of the staff team and do not necessarily reflect the views of the government of Chile or the Executive Board of the IMF.

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Price: \$15.00 a copy

**International Monetary Fund
Washington, D.C.**

INTERNATIONAL MONETARY FUND

CHILE

Selected Issues

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Approved by the Western Hemisphere Department

July 11, 2006

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I. TOWARD IMPROVING THE DATA AND PROCEDURES USED IN CURRENT ANALYSIS AND FORECASTING AT THE CENTRAL BANK OF CHILE¹

Executive Summary

- *Under the inflation targeting framework, collecting and analyzing data is key to economic management. Because of substantial lags, policymakers are forced to act in a forward-looking manner and forecast the likely evolution of the economy, conditional on the current and projected stance of monetary policy.*
- *Data used by the Central Bank are generally of high quality, but there is some room for improvement, particularly with respect to labor cost components, the CPI, and time series for non-mining sectors. In particular, data shortcomings may prevent obtaining an accurate picture of compensation and hours worked. The recently updated Establishment Survey promises much needed improvements to labor cost statistics, but it would be desirable to review it to help further improve the data.*
- *Aggregate expenditure data are both timely and comprehensive, but data on inventories could be improved. Such an improvement would help distinguish better between persistent consumption shifts and transitory stockpiling increases.*
- *A reorganization under way at the Central Bank is designed to separate data construction and forecasting. This reorganization promises to lead to better estimates of GDP and better forecasting. Experience at the Federal Reserve Board has shown that merging the operational and research staffs has helped strengthen analytical and operational work, while improving morale.*

A. Introduction

1. ***The framework for economic analysis employed by the Central Bank of Chile for the implementation of its inflation targeting framework is similar to that used by most other central banks.*** The key assumptions of this framework are as follows:
 - ***Inflation is a persistent process.*** It depends on past inflation, expectations of future inflation, and aggregate resource utilization. A variety of other factors also influence inflation in the short run, including ad valorem taxes, energy prices, and the exchange rate; these same factors can also exert a longer-run influence on inflation, to the extent that they alter expectations.

¹ Prepared by David Reifschneider (U.S. Federal Reserve Board), based on information collected in the context of an MFD mission in January 2006.

- ***Resource utilization depends on many factors.*** Resource utilization—the level of real GDP relative to the economy’s productive potential—depends inter alia on fiscal policy, the external environment, the terms of trade, and financial conditions. Although most of these factors are outside the control of the Central Bank, monetary policymakers can influence financial conditions through changes in the policy rate.
- ***Monetary policy also influences real activity and inflation through expectational effects.*** For example, by pledging to take whatever steps are necessary in the future to keep inflation down the road in line with the announced target, the Central Bank helps keep expected inflation, and hence actual inflation, anchored today.

2. ***Forecasting plays a central role in the monetary policy process in Chile and elsewhere.*** Within the inflation-targeting framework, the Central Bank seeks to stabilize inflation by altering its policy rate; this, in turn, influences the path of prices over time both directly, through expectational and exchange-rate effects, and indirectly through changes in aggregate resource utilization. Because of substantial lags, policymakers are forced to act in a forward-looking manner and forecast the likely evolution of the economy, conditional on the current and projected stance of monetary policy. For this reason, central banks devote considerable resources to monitoring current economic developments and projecting trends in the macro economy. In carrying out these tasks, much effort is expended on both the collection of a wide range of economic indicators and on the analysis of this information.

3. ***Chilean practices in data collection area are in line with those of other countries.*** The Central Bank of Chile itself is a primary producer of statistics on the national economy: it not only provides information on the banking system and financial markets but also compiles the national accounts. Information on the economy is also provided by the National Institute of Statistics (INE), which regularly surveys households and firms about labor market conditions and publishes indices for consumer prices and industrial production. Finally, important indicators of economic conditions are provided by trade associations and other groups; among these is the University of Chile, which conducts surveys of public attitudes as well as the labor market under contract with the Central Bank.

4. ***The Central Bank of Chile devotes considerable resources to the analysis of current conditions and to forecasting.*** Among the chief products of the Central Bank is the monetary policy report published three times a year; this report provides a detailed review of recent economic developments, presents the Central Bank’s short-to-medium-run inflation forecast, and discusses key topics relevant to monetary policy and the outlook. In addition, each month the staff presents the members of its Board with updated estimates of the current state of the economy and expected conditions over the next six months. On a weekly basis, the staff also provides to the Board summary information on incoming economic data. Finally, members of the Central Bank’s research group support its current analysis and forecasting work by carrying out longer-term investigations of such topics as the measurement of potential output and the design of general equilibrium models of the economy.

5. ***Improving the current analysis and forecasting activities of the Central Bank of Chile would be of considerable value to the nation.*** Section B identifies possible ways in which the range and quality of the data available for policy analysis might be enhanced. Implementing these suggestions would require an important investment on the part of the Central Bank and other government agencies, but would likely reap considerable dividends over time. Section C addresses areas in which the current analysis and forecasting work of the Central Bank could be further improved through changes in internal procedures. A few general proposals are presented for ways in which the Central Bank's current research efforts could be better integrated with its operational work. The cost of implementing some of these improvements is sufficiently important that any progress in these areas ultimately probably depends on significant increases in funding—a spending decision that would need to be balanced against other national priorities.

B. Macroeconomic Data

6. ***In implementing its inflation-targeting strategy, the Central Bank of Chile draws upon a reasonably broad set of statistical indicators on the state of the economy.*** Aside from standard high-frequency financial market data, Chilean policymakers have access with only a short delay to reasonably reliable readings on monthly unemployment, industrial production, international trade, consumer prices, and survey data on public attitudes and expectations. In comparison with the typical situation in other countries, perhaps most impressive is the availability of timely information on aggregate output on a quarterly basis. These GDP estimates—generated by the Central Bank itself and released with a lag of only 53 days (83 days for annual data)—are made possible by direct readings on production in the various sectors of the Chilean economy, as provided by individual firms responsible for a major portion of national output (e.g., copper mining), by trade associations (e.g., construction), and by comprehensive sales tax data measuring activity in the retail/wholesale trade sector as well as in other service sectors.

7. ***There are also areas in which the Central Bank could benefit from improvements in the quality of existing data and access to additional information.*** Most useful would be more accurate and comprehensive information on labor costs and the major components of aggregate demand and income. Policymaking would also likely benefit from several specific enhancements to the consumer price index, as well as an effort to construct time-series indices of production plans for sectors other than mining. Although some of these improvements would be relatively inexpensive to implement and could be undertaken by the Central Bank on its own, other data initiatives would be more costly and would require action by other parties, such as INE.

Consumer prices

8. ***The accurate measurement of aggregate price movements is critical to the conduct of monetary policy.*** As in most inflation-targeting countries, the focus of attention is on the

consumer price index—the measure of aggregate inflation with probably the least measurement error and the closest connection to the welfare of households. However, there are areas in which this index—which is produced by the INE—could be improved:

- The consumer price index is based on data collected from establishments in the Greater Santiago region alone, and does not include information from merchants in other areas of the country.
- The fixed expenditure weights used to construct the aggregate index are largely based on a 1996–97 survey, which may no longer accurately reflect the current basket of goods consumed by Chilean households.
- Only limited adjustments are being done at present (using simple main components method) to adjust for changes over time in the quality of individual goods and services (an important consideration for items such as motor vehicles, personal computers, and telephone services).
- Changes in methodology with significant effects on the overall index should be published with advanced public notice and systematically accompanied with revisions to historical estimates, to ensure the comparability of published inflation measures across time.

9. *Plans to address these deficiencies are under way.* By 2008, INE plans to expand its sampling of prices beyond the Santiago area to the nation; at the same time, the agency hopes to reduce possible reporting errors by providing its field agents with hand-held electronic recording devices. The new 2006–07 household expenditure survey will update the weighting of the consumer basket and be nationally representative. Going forward, INE plans to update the weighting more frequently. Finally, INE plans to use hedonic price analysis to purge individual market prices for the component related to quality improvements. Going ahead with these various projects would likely involve a significant increase in costs, including the hiring of additional statisticians and/or economists with expertise in statistical surveying and the design of aggregate price indexes. However, the investment would be worthwhile given the critical importance of accurate price data to the conduct of monetary policy. Moreover, some expenses could be held down by exploiting studies already carried in other countries on, for example, quality adjustments for the prices of specific goods.

Labor costs and productivity

10. *Unit labor costs and profit margins are important factors in the empirical representation of the inflation process.* Labor costs make up the bulk of most firms' expenses. Adjusted for productivity gains and expressed on a unit cost basis, these data provide information on both trends in underlying cost pressures and the level of profit margins—factors that influence future price inflation. Growth in hourly compensation also provides useful information on the consistency of current labor market conditions with long-

term price stability. Finally, timely data on labor compensation can be used to help predict near-term trends in labor income and, hence, consumer spending. These factors are built into the Central Bank's macro-econometric forecasting model. Such data play a similar central role in macro models developed and maintained at the U.S. Federal Reserve and several other central banks.

11. ***There is room to improve the Chilean data on labor cost and productivity measures.***

The labor market survey of business establishments carried out by INE suffered from shortcomings that may have distorted estimates of total employee compensation and hours worked in the private sector. These distortions, in turn, implied errors in the measurement of output per hour and unit labor costs in the business sector, even if statistics on aggregate production in this sector are accurate. In January 2006 INE introduced a new index based on a recent survey which is expected to address some of these shortcomings as follows:

- ***The new survey increased coverage and introduced replacement of firms.*** In the previous survey coverage was shrinking as businesses had failed or otherwise disappeared. The new survey expanded the universe to cover 76 percent of total employment and the new sample represents 5 percent of this universe. However, firms that employ less than 10 employees are not included in the survey; such firms represent only 16 percent of total employment, but 90 percent of firms. To ensure that the sample remains representative, the survey periodically replaces firms, based on the concept of a "generic firm."
- ***The survey's design was revised to improve data quality.*** However, the survey remains long and its complicated nature may lead to reporting errors.

12. ***These improvements are welcome and could be usefully followed up by a review to ensure their effectiveness.*** INE, in consultation with experts from the U.S. Bureau of Labor Statistics, had redesigned the household survey to bring it in line with standards set by the International Labor Organization. The new survey (which expands the range of information collected on individuals) promises to be a major advance on the old. The Chilean authorities could likely achieve similar improvements in the quality of the establishment survey by consulting with experts in other countries to review the new survey with a view to improving its design and data-collection procedures. Such an undertaking would likely require significant additional resources. However, an improved establishment survey—in conjunction with the new household survey—would pay high dividends over time in terms of improved understanding of the Chilean labor market.

Aggregate expenditure data

13. ***Although the data on aggregate production are both timely and comprehensive, the source data for some expenditure components of GDP are not always fully reliable, especially inventory investment.*** Since March 2005, the Central Bank has been publishing quarterly data on inventory variation obtained from the balancing of supply and demand

tables at constant and current prices at the level of 33 products, including agriculture and fishing. Considering that the measurement of inventories is one of the most complex challenges faced in national account data compilation, this was an important first step. Still, there is a need for information at a more disaggregated level. The Central Bank has also introduced a new inventory survey, which is used only as an independent source of information to check the results obtained from the balancing exercise. The survey could usefully be expanded to a more disaggregated level to improve data quality.

14. ***Chile would benefit from more detailed and reliable data on inventories.*** In most economies, movements in production that are driven by changes in stockpiling tend to be less persistent than ones associated with swings in private consumption and investment. From the standpoint of policymakers, this distinction is important because transitory changes in real activity and aggregate resource utilization have only minor implications for inflation, and thus require no appreciable monetary response. Better inventory data, then, might allow the Central Bank to better tune its policy actions while seeking to stabilize the economy. Also, more detailed information on inventories by stage of processing might enable Central Bank's analysts to distinguish between, say, a rise in stocks driven by unexpected decline in sales, and one deliberately undertaken by firms in anticipation of an expansion in aggregate sales.

15. ***Better inventory data should also lead to improved estimates of fixed investment.*** In the current construction of the Chilean national accounts, imports of capital goods are assumed to translate immediately into final investment. This assumption is reasonable for equipment imported directly by firms, but less so for other types of capital—such as trucks and computer equipment—that are imported by dealers, who hold the goods in inventories until sold to end-users. Moreover, the dynamics of these two types of transactions may be quite different: End-user investment demands directly determine imports by end-users while merchants' expectations for such demands drive other types of capital imports, giving the latter a speculative aspect that may matter in forecasting.

16. ***Available information on final sales is broadly satisfactory, but could be improved in some respects.*** By collecting more detailed data on the nominal value of goods and services purchased by households, firms, and the government, the Central Bank may be able to produce more accurate estimates of aggregate real consumption and final sales. The need for such detailed data may also increase over time as the Chilean economy evolves. At present, the reliability of the Central Bank's output-oriented GDP measurement system relies on obtaining comprehensive data on aggregate production from contacts with a relatively small number of firms and trade associations. As manufacturing and services continue to expand and diversify, obtaining this information will likely become increasingly complex.

At some point, then, the continued production of high-quality estimates of GDP may thus require placing more emphasis on collecting detailed expenditure data.²

Aggregate income data

17. *The Central Bank's analysis would benefit from more timely information on household income and corporate profits.* In the United States and Canada, for example, monthly data on disposable personal income provides leading information on expected movements in consumer spending in subsequent months. Quarterly data on income and profits may also help to identify near-term trends in consumption, residential investment, and business capital spending. At present, however, such correlations cannot be exploited in the case of Chile because the income side of the national accounts is relatively undeveloped.

18. *A project is now in progress at the Central Bank to create annual sectoral income accounts.* This project—which may make use of an expanded annual income supplement to the new household labor market survey—should provide useful information on one of the fundamental determinants of aggregate spending. However, the development of reasonably reliable quarterly or monthly income measures probably hinges on a major overhaul of the establishment survey, as discussed above. Such an overhaul would provide accurate monthly estimates of labor compensation, the major component of household income.

Production plans and related survey information

19. *The Central Bank could enhance the use of information collected on the near-term production plans of large firms.* So far, the Central Bank has not made a practice of systematically collecting and storing these data for industries other than copper mining and for large energy and oil companies. Doing so would be inexpensive and could prove to be quite useful. For example, a time series database of such information would enable analysts at the Central Bank to evaluate the informational content of these plans. Such analyses might reveal systematic biases that could be controlled for in sector-specific forecasting, and might demonstrate correlations with activity elsewhere in the economy that could be used to improve the accuracy of the overall GDP projections.

20. *As part of the regular information-gathering process, the Central Bank staff could also poll their large firm contacts on current economic conditions.* Such informal polls have proven helpful to monetary policymakers in the United States and elsewhere because of

² Further economic development may eventually make it worthwhile for Chile to adopt chain-aggregation methods in the construction of real GDP. The statistical agencies of a number of industrialized economies have adopted this somewhat complicated methodology in order to mitigate aggregation problems arising from steep secular declines in the relative prices of computers and related equipment. However, the production and purchase of such equipment are relatively minor items in the Chilean economy at present, and such a methodological change does not seem merited at this time.

their extremely timely nature. To minimize the burden on both Central Bank employees and firm contacts, the list of questions asked in such a poll should be extremely brief. Standardizing the wording of one or two regular questions would be helpful in this regard, and would improve the comparability of responses over time. Such a poll should initially be undertaken as an experiment only and, given that the Central Bank already has access to survey data on business expectations, it would need to weigh the incremental value of the information obtained from an informal poll against its cost in employee time.

C. Current Analysis and Forecasting

21. ***The Central Bank of Chile devotes considerable resources to the analysis of current conditions.*** Several staff members are engaged full-time in evaluating current conditions, forecasting the likely evolution of the economy, and presenting this material in briefings and reports to the Central Bank's policymakers. Several economists from the research group also provide part-time support through their contributions to special operational projects. In addition, the computationally-intensive nature of this type of work requires a substantial amount of technical support from the IT staff, as well as related expenses for computer hardware and software. Finally, managing all these activities involves considerable time on the part of the Central Bank's senior management.

22. ***Overall, these resources appear to be used in an effective manner, and the quality of the Central Bank's current analysis and forecasts is quite good.*** However, the structure of operational work at the Central Bank seems to have some drawbacks:

- ***Dual responsibilities.*** Some staff members have been responsible for both constructing historical estimates of GDP and forecasting its near-term movements—a mingling of tasks with potentially adverse effects on the quality of both products.
- ***Research and development.*** Economists engaged in current analysis and forecasting may need more time to investigate potential improvements to their procedures and operations and further enrich the quality of their tasks.

23. ***The Central Bank management is addressing these issues, in part through internal reorganization.*** Over time, this reorganization promises to lead to improved estimates of GDP as well as more efficient forecasting operations. The reorganization should also facilitate an increased investment in better procedures for current analysis and forecasting. The transition will require paying close attention to internal communication.

Separating data construction from forecasting

24. ***In the national accounts area, the current mixing of data construction with current analysis and forecasting has some potential drawbacks.*** In many ways, this joint assignment is a natural arrangement because the national accounts group obtains information about near-term plans as well as actual production levels when surveying its industry contacts; the group

also understands exactly how incoming source data translates into the estimates of GDP and its components. However, under such a joint assignment, dual-task analysts may tend to apply the detailed approach used in data construction to forecasting. While finer source detail on the production and use of goods and services is critical in producing accurate estimates of real GDP, a similarly detailed approach to forecasting may be counter-productive.³ Dual-task analysts, who work with extremely disaggregated data on a day-to-day basis, are naturally inclined to produce detailed projections as well. Conversely, analysts who are not familiar with such detailed data often seem to be biased in the opposite direction. Fortunately, either extreme can be avoided by investing sufficient time and effort into the exploration of different forecasting procedures in order to establish the best-return level of detail.

25. ***The Central Bank is implementing a formal separation between the group responsible for constructing the national accounts and the group responsible for current analysis and forecasting.*** This reorganization should help ensure that the national accounts statisticians concentrate on their measurement tasks, thereby yielding better estimates of GDP. It should also help to improve forecasting operations, provided that care is taken to ensure that all the potential benefits of the reorganization are realized. In particular, it will be key to ensure that the forecasting group remains well informed about the procedures used to translate source data into estimates of GDP. A thorough review of current analysis and forecasting procedures will help ensure that attention is set at the appropriate level of detail.

Shifting resources

26. ***More time could be devoted to operational research and development projects.*** At present, the current analysis and forecasting group is for the most part occupied with monitoring incoming data, preparing forecasts of near-term activity, and producing regular briefing material (including the Monetary Policy Report). Investing more effort in operational R&D should provide benefits to the Central Bank through improvements in both the accuracy of the staff's projections and policymakers' understanding of the forces driving the economy. These expected returns are likely to increase over time, as historical data accumulates for a variety of series that have started to be collected over the past few years, including indicators of consumer confidence, inflation expectations, and business sentiment.

27. ***At constant budget, investing more time in R&D work would likely require freeing up resources currently allocated to other activities.*** One obvious way of doing this would be to trim the time now spent on lower-return activities and, in some areas, reduce the degree of

³ A distinction should be made between detailed economic forecasts and using large datasets to project aggregate output and inflation. While the former is resource intensive, the latter can be easily done using, for example, dynamic factor models. In addition, the decision to monitor the economy at a particular level of detail also depends on available resources: the U.S. Federal Reserve and the European Central Bank have large staffs, and naturally devote more resources to a detailed analysis of their economies than smaller central banks do.

detail. Another way that operations could be simplified would be to use only seasonally-adjusted price data in the analysis of inflation trends. As a means of freeing up resources for operational R&D work, the Central Bank may also wish to consider reducing the frequency of policy board briefings from its current frequency of once a month. The U.S. Federal Open Market Committee's practice of meeting only eight times a year demonstrates that it may be possible to reduce the frequency of these briefings without diminishing the effectiveness of monetary policy. In-between these major briefings, staff could keep Board members informed of recent developments through the circulation of standard summary tables and charts, perhaps accompanied by brief summary notes.

28. ***The Central Bank could also free up staff time by improving the efficiency of its current database management procedures.*** Many central banks facilitate the exchange of data among staff members and across statistical and graphing packages by maintaining central databases constructed using standardized software packages, such as FAME. These centralized database systems promote productivity by making it easier to automate many operational tasks. However, available commercial database packages are fairly expensive and implementing a centralized database system typically would require new hardware and making significant changes to computer system operations.

Further enhancing the quality of the operational staff

29. ***Many central banks find it difficult to attract and retain high-quality staff to work in operational areas.*** Economists engaged in current analysis and forecasting often view their jobs as less attractive than those of their counterparts in the research divisions. This is a concern, because good monetary policy depends importantly on the quality of the analysis policymakers obtain from their staffs. Investing more effort in operational R&D projects would help address these concerns, while improving the efficiency of the Central Bank's computer operations and automating more operational tasks would make the work environment more pleasant.

30. ***The Central Bank of Chile could consider improving the integration between its operational and research staffs—two groups with distinct responsibilities at most central banks.*** Economists working in the research group do not provide day-to-day support to policymakers but instead work on long-term projects, including ones that support the operational work of the Central Bank. These economists enjoy relatively more freedom than their operational counterparts to pursue a research agenda, subject to advanced approval by their managers. Although this structure has its advantages, it does mean that the most intellectually stimulating work of the Central Bank is reserved for people working outside of operational areas—a result that not only lessens the attractiveness of current analysis and forecasting work, but also can reduce its quality by hindering useful exchanges of ideas.

31. ***To mitigate similar problems, the U.S. Federal Reserve Board largely eliminated the distinction between its research and operations groups back in the late 1980s.*** All

economists are now expected to contribute to operational work, and all are expected to engage in some form of long-term research. In the view of senior management, this organizational change has strengthened the quality of the Board's operational work and increased the relevance of its research. The change has also improved the morale of those economists most heavily involved in current analysis and forecasting, thereby making it easier to attract and retain employees in those areas. Finally, and perhaps somewhat surprisingly, breaking down the separation between operations and research was over time welcomed by most economists with active research agendas because the exposure to operational work confronted them with interesting new problems for further study. This experience suggests that the Central Bank of Chile might wish to contemplate instituting a similar change. Other venues to improve coordination between research and operations would be to increase internal job mobility or increase the number of joint projects.

II. DEEPENING LIQUIDITY IN THE CHILEAN FIXED-INCOME MARKETS¹

Executive Summary

- *This paper reviews the current state of liquidity in the Chilean fixed-income markets. It assumes that the authorities maintain a minimum supply of public debt necessary to support the development of a risk-free yield curve in both peso and UF.*
- *It also reviews developments and considers a number of potential impediments to the supply of corporate bonds to the market, recommending that the authorities seek to reduce the time required to register a bond and remove the distortions caused by the current operation of the stamp tax.*
- *The paper goes on to consider the characteristics of demand in the market, recommending that liquidity could be improved by relaxing some of the investment restrictions on private pension funds and reviewing the procedures surrounding the taxation of foreign investors.*
- *Finally, the paper considers a number of microstructure issues, recommending enhanced transparency in the OTC market and a strengthening of the regulatory framework in some specific areas, including the provisions covering market intermediaries, clearing, and settlement. It also makes a case for the introduction of a system of specialists in public debt, tailored to the current needs of the market.*

A. Introduction

1. ***The Chilean securities market has deepened significantly in recent years, but it remains characterized by a low degree of liquidity.*** This aspect was highlighted in the 2003–04 Financial Stability Assessment Program (FSAP) report, which identified some specific weaknesses in market infrastructure. Building on this report, the present paper focuses on liquidity in the fixed-income markets. It reviews the current situation and proposes a number of potential changes.

2. ***Ensuring an adequate level of liquidity in the domestic capital market is an important objective for policy makers.*** Liquidity enhances the resilience of the economy to shocks, enabling it to absorb the impact of budgetary or external shocks. It also enhances the risk management capacity of the financial system, facilitating financial intermediation and

¹ Prepared by Allison Holland, based on the findings of an MFD Technical Assistance mission comprising Julian Alworth, Brian Bell, Ana Carvajal, Hervé Ferhani, and Allison Holland.

corporate sector access to capital; reduces the cost of capital, by lowering liquidity premia; increases the efficiency of pricing, improving the allocation of capital across the economy; and facilitates more effective monetary policy implementation. The paper is organized as follows: Section B provides an overview of liquidity in the fixed-income markets; sections C and D discuss some issues in the supply of bonds to the market; section E reviews the characteristics of demand and section F addresses issues in the market microstructure. Section G concludes.

B. Overview of the Fixed-Income Market

3. *The size of the Chilean fixed-income market is comparable to that in several OECD countries.*² As a ratio to per capita GDP, the government bond market in Chile is larger than in Norway and New Zealand but, relative to Mexico, it is small.³ The corporate bond market, at twice the level of GDP per capita and 12 percent of GDP, is of a size similar to that of Norway and New Zealand.

Table 1. Selected Countries: Domestic Bond Market
(In US\$ billions)

		2003	2004	2005 Q3	Per Capita GDP (\$'000s)*	GDP*
Chile	Corporate	9.7	11.5	13.2	7.0	114.0
	Government	20.7	20	20.7		
Australia	Corporate	87.4	100.7	111.7	34.7	708.0
	Government	89	89.9	87.2		
Canada	Corporate	87.4	97.6	102.7	35.1	1130.2
	Government	516.8	557.2	579.8		
Ireland	Corporate	33.1	48.2	51.7	48.4	199.7
	Government	35.7	42.7	38.2		
New Zealand	Corporate	-	-	-	26.4	108.6
	Government	23.6	24.7	23.1		
Norway	Corporate	7.1	7.3	8.8	64.3	296.0
	Government	42.5	45.4	41.9		
Brazil	Corporate	2.7	4	4.7	4.3	792.7
	Government	246.6	295.9	408.1		
Mexico	Corporate	12.9	17.4	21.3	7.3	768.4
	Government	128.1	151.4	182.5		

Source: BIS, WEO.

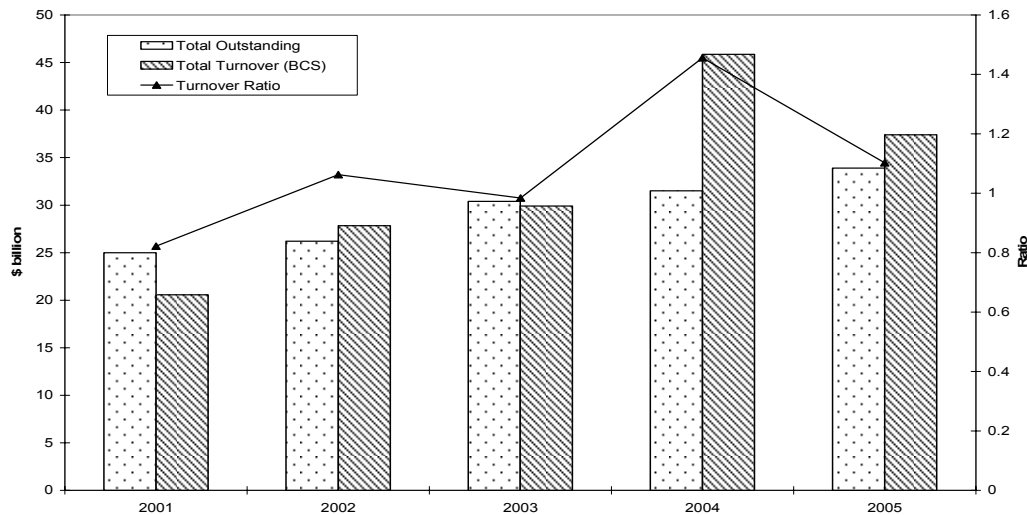
* 2005 data.

² Note bonds issued by financial institutions are excluded from the data on corporate bonds.

³ Relative to GDP, it is of a similar size.

4. **International comparisons suggests that there is scope for improving liquidity in the fixed-income market.** A liquid market is generally defined as one in which trading can be accommodated with little effect on price. Measuring the liquidity of a market is not straightforward, but it can be proxied by measures such as the turnover ratio. Although, at an aggregate level, Chile's average turnover ratio has trended upwards in recent years, it remains well below that in other countries (Figure 1). In 2005, total turnover in fixed income on the *Bolsa de Comercio de Santiago* (BCS) was US\$37.4 billion, consistent with an overall turnover ratio of 1.1; this ratio was significantly lower than in Norway (2.5) or Australia (3.9).⁴

Figure 1. Turnover, 2001–05



5. **Liquidity is concentrated in the public debt market.** Close to 70 percent of all fixed-income transactions on the BCS involve public debt instruments, with most activity concentrated in the 5– and 10–year inflation-indexed benchmarks, which are also actively traded in the OTC Tasas market. Bid-ask spreads for these benchmark bonds are indicative of relatively good liquidity. However, activity in Chilean public debt instruments significantly lags that in other comparable markets: the turnover ratio for such instruments is 1.6 in Chile compared with 2.1 in Norway, 4.2 in New Zealand, 6.1 in Australia, and 17 in Canada.⁵

⁴ The turnover ratio is 1.6 if activity on the OTC Tasas market is included. Based on data from the Oslo Stock Exchange and Battellino and Chambers (2006).

⁵ Combining activity on the BCS and on the OTC Tasas market. Based on data from the Oslo Stock Exchange, the Reserve Bank of New Zealand, Battellino and Chambers (2006) and Canada (2005).

C. Supply of Public Sector Fixed-Income Securities

6. ***Initiatives taken by the Chilean central bank in recent years have helped enhance the role the public debt markets play.*** In 2002, shifting away from the older-style *Pagarés Reajustables con Pago en Cupones* (PRCs), the central bank introduced standard bullet bonds denominated in both pesos (BCPs) and in inflation-indexed *Unidades de Fomento* (UF) (BCUs). It also began establishing benchmark bonds at key maturities on both the peso and inflation-indexed yield curves. At end-2005, 39 percent of all public debt outstanding in the domestic market was comprised of these new standardized bullet bonds (24 percent in BCUs and BTUs and 15 percent in BCPs).⁶ This has allowed the development of a yield curve, out to 10-years in pesos and 20-years in inflation-indexed bonds (such a development would have been significantly more cumbersome with the older bonds, given their amortizing structure). Auctions, held at regular intervals, were introduced in 2003 as the main mechanism for issuance in the primary market, modernizing the approach to public debt management. This, together with the introduction of an annual issuance calendar in 2006, have also helped increase transparency in the market.⁷

7. ***In the government bond market, a clear and explicit market development strategy would help resolve uncertainties regarding future debt issuance.*** This strategy could include several elements, including a decision to meet the government's financing requirements primarily in the domestic market and a clear commitment to the development of a liquid yield curve. This strategy should also include a clear calendar of issues, coordinated with the central bank's issues, and other structural measures to strengthen the market, such as the introduction of designated market specialists or market makers.

D. Supply of Corporate Debt

8. ***The market for primary issuance of corporate debt is active, with rising volumes.*** Net issuance in the domestic market has increased significantly in recent years; since 2000, it has averaged more than double the volume of net issues abroad—US\$1.5 billion compared with US\$0.6 billion (Table 2). There has also been an increase in the number of corporates issuing: Between 1995 and 2004, the total number of corporates with domestic bonds outstanding rose from 48 to 72. Outstanding domestic corporate debt securities account for 11 percent of GDP in Chile compared with 4.6 percent of GDP on average for emerging markets and 2.6 percent for Latin America. In that respect, Chile is closer to the OECD countries (16½ percent of GDP on average) than to neighboring economies.

⁶ This excludes two outstanding bonds issued by the state-owned copper company CODELCO in the domestic market.

⁷ Previously, the central bank only published its issuance calendar on a monthly basis.

Table 2. Corporate Debt Issuance and Stock, 1995–2005
(In US\$ billions)

	Domestic			External		
	Gross Issuance	Net Issuance	Stock	Gross Issuance	Net Issuance	Stock
1995	0.1	0.0	2.4	0.3	0.0	0.4
1996	0.2	0.0	2.3	1.4	1.6	2.0
1997	0.1	-0.3	1.8	1.4	0.7	2.6
1998	0.9	0.5	2.2	0.7	0.3	2.9
1999	0.7	0.5	2.5	1.0	0.7	3.6
2000	1.0	1.3	3.5	0.3	0.3	3.9
2001	2.6	2.9	5.7	0.9	0.9	4.9
2002	1.4	1.8	6.5	0.7	1.1	6.0
2003	2.5	0.7	9.7	2.1	0.7	6.7
2004	2.4	1.0	11.5	1.3	0.0	6.8
2005 Q3	-	1.2	13.2	-	0.5	7.2

Source: SVS, BIS.

9. ***To some extent, the increase in domestic corporate debt issuance reflects a shift in issuance from external to domestic markets.*** The preference of some issuers for the domestic market suggests that they fully appreciate the benefits of accessing the local pool of liquidity. Market participants report that there is now a significant cost advantage to issuing in the domestic market and generally consider that it is easier to issue longer tenors in the domestic market than abroad. They also stress that the increasing liquidity of the US\$/UF and US\$/CLP forward market allows issuers to issue domestically and swap the proceeds into U.S. dollars, if needed.

10. ***Corporate issuance is concentrated in UF-denominated instruments.*** Corporates have two main incentives for issuing inflation-indexed paper: (i) there is a strong demand from life insurance companies for such paper; and (ii) the absence of a nominal government yield curve at longer tenors hinders the pricing of peso-denominated debt. As a result, corporates have to bear some unwanted inflation risk given that the market for long-term CLP/UF swaps remains limited, despite some recent improvements in liquidity.

Issuance process

11. ***The regulatory framework for the issuance of fixed-income products does not appear to present major impediments to the development of the market.*** The framework provides sufficient flexibility to issuers in terms of issuance size, structure, and characteristics. Public offering requirements are reasonable and in line with international standards.

12. ***Corporate debt issuance is relatively easy for large corporates, but small corporates face significant hurdles.*** The problems for smaller issuers seem to arise primarily from their credit quality and size. In practice, they are often unlikely to obtain the credit rating required for private pension fund investments. Also, the generally smaller size of issuance tends to deter private pension funds and other major institutional investors. Altogether, this has led to a compartmentalized capital market, with reduced opportunities for smaller issuers.

13. ***The length of the registration process for new bond issuance does act as an impediment to the development of the market, particularly for smaller issuers.*** Issuers and banking sources report that it takes a minimum of 90 days to issue a corporate bond, even for large corporates. This includes 30–40 days to register with the *Superintendencia de Valores y Seguros* (SVS) and an additional period of at least 30 days to complete the registration process with the *Comision Clasificadora de Riesgo* (CCR). These delays tend to be longer for smaller and lower credit grade corporates. Although the SVS has taken several positive steps to reduce the burden for issuance of new tranches of pre-registered bonds, the regulatory authorities should explore ways to reduce the approval process further. In particular, given that local credit rating agencies are now well established, the authorities could consider streamlining the role of the CCR, refocusing its activities on the areas where it can add most value.

14. ***The stamp tax adds to the cost of issuance, particularly for shorter tenors.*** The stamp tax is applied as a flat rate tax (of 1.6 percent) on all financing activities. Consequently, its cost impact on long-term financing is significantly lower than on short-term financing. For example, assuming a general level of interest rates of 5 percent, the stamp tax adds 172 basis points to the cost of a one-year instrument, 38 basis points a year to a 5–year instrument, and 21 basis points a year to a 10–year instrument.⁸ This structure tends to impact small and medium-sized enterprises (SMEs) more significantly, given their relatively volatile and uncertain financing needs. This may also encourage them to favor bank lending over capital market financing, as banks may be able to offer more flexibility in the type of instruments provided. The stamp tax also hinders competition in the provision of financing, as the relief available on rolled-over debt is restricted to roll-over with the same lender.

15. ***The authorities could consider equating the incidence of the stamp tax across maturities, reducing current distortions.*** Ideally, a comprehensive review of the taxation of financial instruments would be undertaken to allow an assessment of the overall cost-benefit impact of the stamp tax. Reducing or eliminating the tax could be considered within an overall framework that would take account the impact on fiscal revenue as well as agents' behavior in the market.

⁸ The computations assume that the stamp tax is financed out of the proceeds of the borrowing.

Foreign issuers

16. ***Recent regulatory changes have opened up the possibility for foreign corporate debt issuers to tap the domestic Chilean market.*** Recently-issued SVS regulations facilitate the issuance of debt by non-resident corporates. Although these regulations have only been in place for a few months, there are some encouraging signs of interest from Latin American corporates. Likely barriers include the stamp tax and the requirement that the issuer be approved by the CCR to ensure that it can access the pool of liquidity held by pension funds. Whilst it would be surprising if non-resident issuance grew to a significant share of the market quickly, the SVS and other market participants could advertise this facility internationally to help enhance its development.

Securitization market

17. ***Although the market for mortgage-related bonds functions well, securitization is still modest.*** The market combines both mortgage-backed securities (*letras hipotecarias*) and endorsable mortgage loans (*mutuos hipotecarios*). While the securitization of *mutuos hipotecarios* has virtually disappeared, following the decline in interest rates in recent years, securitization of *letras hipotecarias* continues at a steady pace. More recently, other assets have been securitized, mainly related to department store credit cards and leasing associated with housing and car loans. Complex forms of securitization are almost non-existent.

18. ***Securitization could be enhanced as a useful mechanism to provide SME access to capital.*** Given the importance of small and medium sized enterprises (SMEs) for the growth of the economy, many countries have developed programs to help improve their access to credit through securitization. The Chilean authorities could explore ways to link guarantees issued by the *Fondo de Garantía para Pequeñas Empresas* (FOGAPE) to securitization schemes (Box 1 outlines a potential framework, based on the experience of Spain).⁹

E. Characteristics of Demand

19. ***The Chilean domestic market is dominated by a small group of large buy-and-hold investors.*** In general, market activity is enhanced when investors have different risk-return characteristics and investment motives. In Chile, the majority of domestically issued public sector bonds is held by buy-and-hold investors—private pension funds hold 56 percent of the outstanding stock and the insurance sector another 15 percent. Combined with low levels of public sector debt issuance, this is a strong impediment to the development of a liquid secondary market in debt. At the same time, the Chilean private pension funds hold close to 20 percent of their assets in cash and bank deposits, compared to an OECD average in the low single digits (Table 3). Such high holdings reflect unsatisfied demand for domestic fixed-

⁹ FOGAPE is a government fund that provides guarantees on bank loans to SMEs.

income assets and, in such a situation, new issues by investment grade corporates are often over-subscribed.

Box 1. SMEs Securitization: The Spanish Case

Foreign experience. Since the late 1990s, several European countries have incorporated securitization into their SME programs; Germany and Spain have been the most active. These programs are also developing in other regions of the world; in 2005, Singapore launched its SME Loan Access program. A key feature of these programs is the provision of some sort of public guarantee.

Main features. The Spanish program is likely to be the most relevant for Latin American countries, since it is based on cash securitization rather than synthetic securitization, as in Germany. Its mechanics are as follows: The SME loans are passed by the originator to a special purpose vehicle, the *Fondo de Titulización para PYMEs* (FTPYME). The Treasury commits to guaranteeing specific tranches issued by the FTPYME, provided that the fund holds a minimum percentage of bank loans to SMEs in its portfolio. In return for the liquidity gained through the sale of the SME loans, the originator commits to reinvest part of this liquidity in SME financing.

Developments. Initially, FTPYMEs had to hold at least 40 percent of SME loans in their portfolios; the Government was committed to guarantee tranches with credit ratings of at least BBB; and the originator was committed to reinvest 40 percent into new SME financing. These features were subsequently modified and, at present, the minimum percentage of SME loans is 80 percent; the Government is committed to guaranteeing tranches with AA credit ratings and above; and originators need to reinvest at least 80 percent of their liquidity into new SME financing. The scheme is supported by a master agreement signed with the Ministry of Economy.

Bank participation. Approximately 60 Spanish banks have participated in the scheme. In a few cases, SME portfolios from several banks have been packaged into one single securitization transaction. In 2004, SMEs securitization in Spain amounted to 18 percent of the total volume of securitization issuance (€9.3 billion out of total issuance volume of €51.6 billion).

20. **Greater liquidity in the secondary market would improve the efficiency of portfolio valuation.** The regulatory authorities in Chile take two approaches to valuation of institutional investors' portfolios. In the case of mutual funds, the Mutual Fund Association has taken the lead in developing the *Sistema Unificado de Precios* (SUP), the pricing source for the industry. In the case of private pension funds, the *Superintendencia de Administradoras de Fondos de Pensiones* (SAFP) has developed a pricing vector, providing daily prices to pension funds and insurance companies for the valuation of their portfolios. Market participants have expressed concern about the quality of prices generated by this pricing vector. A more coordinated approach would leverage industry expertise, improve the quality of valuation overall, and allow greater differentiation of performance across different institutional investors.

Table 3. Portfolio Composition of Pension Funds: Chile and Selected Countries
(In percent)

Country	Cash and Deposits	Bills and Bonds	Loans	Shares	Other	Total	Foreign	Assets/GDP
Chile (2005)	20.8	31.0	0.0	46.9	1.3	100.0	30.4	59.4
Australia (2002)	7.7	19.8	3.9	59.8	8.9	100.0	19.1	67.4
Canada (2001)	0.4	40.7	2.9	49.6	6.4	100.0	21.4	48.2
Denmark (2001)	1.3	49.2	1.6	45.6	2.3	100.0	25.0	23.8
Ireland (2001)	2.8	21.4	0.0	65.6	10.2	100.0	67.8	44.7
Netherlands (2001)	1.5	34.7	8.8	49.5	5.4	100.0	65.0	105.1
Spain (2001)	16.0	50.9	0.6	21.0	11.5	100.0	34.3	6.8
Switzerland (2000)	7.3	31.2	12.0	33.9	15.6	100.0	25.0	121.1
United Kingdom (2001)	3.2	13.9	0.0	60.9	22.1	100.0	22.9	69.2
United States (1998)	3.6	20.9	1.6	61.6	12.2	100.0	11.0	72.0

Sources: SAFP, OECD, APRA, Irish Pension Fund Association, Danish Supervisor, Davis (1995 and 2001).

Domestic Investors

21. ***The Chilean pension system is highly concentrated, with no significant cross-fund variation in portfolio asset allocations.*** There are 6 private pension funds in Chile, with the largest 3 managing more than 70 percent of total assets. The high elasticity of substitution between pension funds due to minor differences in performance, coupled with asymmetric penalties for under-performance relative to the industry average, has led to funds achieving almost identical returns. As a result, they hold similar asset allocations, a lack of diversity which generates inertia and low liquidity in the secondary market.

22. ***Greater competition in the provision of private pension funds management services might lead to an increase in diversity of views, generating greater activity.*** Achieving this increase in competition will not be straightforward. One approach that could be considered would be to split the administration business from asset management, allowing firms to specialize in the provision of those services where they have the greatest comparative advantage. As economies of scale considerations are likely to be relatively less important on the asset management side, such a split might encourage new entrants.

23. ***The tight regulatory framework imposes strict limits on private pension fund investment opportunities.*** An important quantitative restriction is that funds cannot invest more than 30 percent of their assets in foreign issues, and this allowance is fully utilized (Table 3). As noted, investment restrictions on pension funds result in holdings of cash that

are significantly higher than in other developed systems, thus reducing the returns to contributors.

24. ***Relaxing the restrictions on holdings of foreign assets appears desirable.*** This would allow private pension funds to transfer much of their cash holdings into foreign equity and fixed income, which would help increase the expected return to contributors. In many small developed countries, large private pension funds not subject to binding foreign investment limits do invest a significantly larger share of their assets abroad. For example, pension funds in Ireland and the Netherlands invest over 60 percent of their assets abroad, in part because of the lack of suitable liquid instruments domestically. The increasing availability and liquidity of foreign exchange forwards means that the resultant foreign exchange exposure could be effectively hedged.

25. ***The development of the derivatives market is also hampered by existing restrictions on private pension fund activities.*** At present, private pension funds are only permitted to use derivatives to hedge an exposure, which in effect means hedging a currency exposure. While new regulations might allow private pension funds to participate in the interest rate derivatives markets, current restrictions limit their ability to actively manage their duration and/or take strategic views on interest rate developments. It also limits activity in the derivatives markets, reducing liquidity and the effectiveness of that market.

26. ***Life insurance companies tend to hold long-dated inflation-indexed securities, which are scarce.*** Insurance companies represent the second largest buy-and-hold investor class in the fixed-income market, with life insurance accounting for 70 percent of total insurance business. In 2005, total investments of insurance companies amounted to US\$22.1 billion, with 15 percent of total held in public sector debt, 21 percent in mortgage-related debt, and 34 percent in corporate debt. As the pension fund system matures and more annuities are required when contributors retire, there will be added pressure for the life insurance sector to acquire inflation-indexed long-dated debt. In the absence of significant new public sector issuance, the majority of such debt will need to come from the corporate sector. To the extent that such supply will not be forthcoming, there could be an increasing mismatch between the assets and liabilities of the life insurance sector, with unwanted consequences for the provision of annuities.

27. ***The mutual fund industry has grown steadily over the last 10 years, resulting in a new source of demand for fixed-income assets.*** At end-2005, the mutual fund industry managed US\$13.7 billion in assets, up from US\$2.5 billion in 1995. During 2005, the net value of funds under investment grew by 5 percent, with a 17 percent increase in the number of participants (Table 4). Since only 3 percent of the population presently holds such a fund, there seems to be significant scope for this industry to experience continued growth. Mutual funds are increasingly active in the public sector and corporate debt markets, providing much needed competition and alternative investment perspectives to the pension and insurance

sectors. They also tend to hold longer-dated paper than in the past and now participate directly in the primary debt issuance of both government and corporate paper.

Table 4: Developments in Mutual Fund Industry, by Type

	Net Value of Fund (CLP '000s)			Number of participants		
	Dec-04	Dec-05	Mar-06	Dec-04	Dec-05	Mar-06
Type 1	2,709	3,295	3,945	124,191	187,551	203,006
Type 2	406	314	389	72,038	64,041	66,589
Type 3	2,397	1,582	1,693	233,347	193,328	189,934
Type 4	195	213	270	32,690	36,599	41,581
Type 5	444	847	962	58,059	106,649	112,647
Type 6	293	408	470	22,799	36,471	39,172
Type 7	164	266	281	16,302	30,004	31,887
Type 8	13	53	53	150	1,232	1,394
Total	6,622	6,978	8,063	559,576	655,875	686,210

Source: SVS.

28. ***The growth of a high-yield market in Chile may be determined by developments in the mutual fund industry.*** Investment restrictions prevent private pension funds from playing a significant role in the development of a high-yield sector in Chile.¹⁰ Even if some additional flexibility were granted to invest in sub-investment grade bonds, it should only be marginal, given that the private pension funds are the main pillar of the social security system, requiring a high degree of conservatism in determining investment parameters. As Table 4 suggests, there appears to be an increase in the risk appetite of mutual fund investors, with a significant increase in the numbers of participants in the more flexible and exotic funds—types 5 (capital instruments), 6 (free investment), 7 (structured) and 8 (qualified investors). This could provide a basis for development of the high-yield market, with mutual funds providing a source of funding for corporates unable to access other investor segments.

29. ***Broad financial literacy programs would foster the development of a healthy market.*** As markets develop, the need for more informed investors increases. However, financial literacy often lags the development of financial products. A broad financial literacy program could help relax the strong conservative culture that prevails in the Chilean financial market, further facilitating the development of a high-yield market and enhancing SME access to credit. Programs such as those developed by Singapore and Australia could serve as a reference for the Chilean authorities.

¹⁰ They may not invest in any corporate issue that is not rated at least BBB.

Foreign investors

30. ***Foreign investor activity in the Chilean fixed-income markets is very limited.*** In the equity market, the removal of tax impediments in 2001 led to a significant increase in foreign investor participation. In the fixed-income market, although provisions exist to exempt foreign institutional investors from the capital gains tax, the registration process is still cumbersome and some uncertainties continue to exist about the application of these provisions. Improving the operational effectiveness of these provisions, through clear regulations, and simplifying the registration process, by relying to a greater extent on the exchange of information provisions in existing double tax agreements, could increase foreign investor participation. Their presence would add liquidity to the fixed-income market, given likely differences in the risk appetite of foreign investors relative to domestic investors.

31. ***The lack of information on trading conditions in the Chilean fixed-income market also acts as a deterrent to prospective foreign investors.*** Some market participants commented that more efforts should be devoted to promoting Chile among foreign investors. They noted the contrast with the situation in Brazil, where the authorities work closely with the Brazilian Mercantile and Futures Exchange and the Brazilian Clearing and Depository Corporation to promote the market to foreign investors through the BEST—Brazil Excellence in Securities Transactions—initiative.

F. Developing Market Infrastructure

32. ***Turnover in the Chilean fixed-income markets is concentrated on the Bolsa de Comercio de Santiago.*** The BCS provides full price transparency through an electronic trading platform. Corporate debt securities are traded through periodic call auctions which, given the lower level of liquidity in these instruments, appear to be an appropriate choice of trading mechanism. This concentrates supply and demand at particular points of time, maximizing available liquidity. Meanwhile, public debt securities are traded on a continuous basis on the order book, reflecting their higher liquidity. Liquidity on the exchange is further maximized through a requirement that private pension funds execute their secondary market transactions there.

33. ***The lack of a block trading facility on the BCS may impede the ability of pension funds to undertake significant portfolio reallocations.*** While the trading platform provides an adequate mechanism to execute a normal trade size, pension funds are exposed to significant execution risk when undertaking a large portfolio reallocation trade. They are required to either expose the full extent of the trade to the market, risking an adverse price impact, or split the trade, extending the time required to complete the transaction and, thus, increasing their benchmark tracking risk. Many exchanges provide a block-trading facility for larger trades, with delayed publication of transaction prices. Such a facility might bring benefits to the Chilean markets, as it would provide some protection to market participants undertaking large trades, without reducing the quality of regulatory oversight.

34. ***Transparency in the OTC markets could also be improved.*** Currently, the wider market only has access to price information from trades executed on the BCS; information on trades conducted in OTC markets is much more limited. Only banks have access to information on OTC Tasas, the electronic interbank market used to trade inflation-indexed instruments, and the telephone market (*mercado puntas*) is almost completely opaque. The opacity of the market has prevented both market participants and the regulatory authorities from developing a comprehensive picture of its size and structure. While there is little evidence of price distortions, this lack of transparency is thought to discourage new entrants.¹¹ Also, the fragmentation of responsibilities between the SVS and the Superintendency of Banks may reduce the overall effectiveness of regulatory oversight of the markets.

35. **The authorities should consider implementing comprehensive reporting and dissemination requirements of trades.**¹² Reporting could be centralized in the SVS, the Depósito Central de Valores (DCV), or the BCS. A dissemination tool should also be developed. The experience of the U.S. with the implementation of TRACE in the corporate debt market could serve as a reference for the Chilean authorities (Box 2).

Market makers and intermediaries

36. ***A tailored system of specialists in public debt could add value.*** It is not clear that a traditional market making system could be supported, given the limited supply of public debt. Neither Australia nor New Zealand, two countries which only have a limited supply of government debt, possesses such a system. Given the dominant position of the pension funds and life insurance companies in the market, a traditional market making arrangement requiring market makers to make firm two-way prices to clients would expose them to an unacceptable level of risk. However, establishing less traditional arrangements would be feasible:

- ***Requirements.*** In Chile, the main purpose of specialists could be to actively promote the development of fixed-income securities to new market participants by providing price information and market analysis. Success could then be determined by increased turnover. This would be similar to the approach in Brazil, where market makers are required to achieve certain turnover requirements in a small selection of designated bonds.

¹¹ For public sector debt, the two markets, BCS and OTC Tasas, appear to be well linked with prices and activity in the BCU 5- and 10-year benchmarks broadly equal on both.

¹² A specific project is underway in conjunction with FIRST to address this issue.

**Box 2. Price Transparency in the U.S. Corporate Bond Market:
The Implementation of TRACE**

Transparency. In 1998, the U.S. Securities and Exchange Commission requested the National Association of Securities Dealers (NASD) to enhance the transparency and integrity of corporate debt markets through: (i) the adoption of reporting obligations in all transactions in U.S. corporate bonds and the development of a system to receive and distribute transaction prices; (ii) the creation of a database that would enable NASD and other regulators to supervise the market; and (iii) the development of surveillance mechanisms.

TRACE. In response, NASD developed the Trade Reporting and Compliance Engine (TRACE). It was introduced in July 2002, and implemented in phases. Originally, dealers had 75 minutes to report trades to the system. Currently, dealers must report all trades within 15 minutes. Transactions and price details are published immediately on receipt of the report.

Impact. Studies on the impact of TRACE suggest that transaction costs decreased for both retail and institutional investors. While these studies suggest that the effects may not be uniform for bonds with different levels of liquidity and while the observed changes may not be wholly attributable to TRACE, NASD has concluded that increasing price transparency has not had any detrimental effect on liquidity and, indeed, has improved liquidity at the margin.

Regulators. Regulators have also benefited from TRACE. In a testimony before the U.S. Senate Committee, NASD officials stated that “*NASD now has a better view into the U.S. corporate debt market ..we have learned that [it] is far more active than originally anticipated and ... contrary to popular belief ... the bond market has a substantial retail participation.*”

- **Privileges.** In return for providing enhanced services to prospective participants, specialists could be given certain privileges in the auctions of public debt—for instance, access to a non-competitive bidding facility—but they would not be given exclusive access to the primary market (Box 3).
- **Meetings.** Other benefits might include participation at regular meetings with the authorities to discuss market development issues and issuance plans. Such a regular dialog between key market participants is common in the European and U.S. markets.

37. **Market intermediaries should be subject to a robust risk-based supervisory framework, with adequate enforcement mechanisms.** Current capital requirements are insufficient, and there are no “fit and proper” requirements in place for securities intermediaries. Although the draft Capital Market II law contains provisions for the development of such requirements, the authorities should consider a more comprehensive

review of the licensing requirements applicable to securities intermediaries. With respect to market conduct rules, it would be important to impose symmetric requirements across all intermediaries, including dealers. The BCS has recently constituted a regulatory committee, composed of independent members, to enhance its enforcement capabilities. Close coordination of BCS and SVS efforts should be ensured.

Box 3. A Potential Framework for Specialists in Public Debt

Introducing a designated group of specialists in public debt. The principal obligation of these specialists would be to actively promote the Chilean fixed-income markets to new market participants by providing price information and market analysis. The principal benefit would be some degree of privileged access to the primary issuance process, such as through a non-competitive bidding facility. This could be achieved through either: (i) allowing them to bid for a quantity of the auction on a non-competitive basis as part of their auction bid; or (ii) providing them with a ‘green shoe’ option, where they could bid for an additional quantity of the bond at a non-competitive price following the auction.

Access to a non-competitive bidding facility could be a function of performance. Performance could be determined on the basis of increased turnover with target groups of investors. This would require specialists to report details of their trading activity on a regular basis to the authorities, a common practice abroad. For example, in Europe, debt managers have harmonized their primary dealer reporting obligations to reduce the burden on primary dealers active in several markets. The authorities may want to consider discounting activity with private pension funds, life insurance companies, and group affiliates, as well as activity in the interbank market. This would increase the relative weight of activity with the more diverse participants the authorities want to attract, such as foreign investors and mutual funds.

General Regulatory Framework

38. ***The authorities will need to evaluate how best to address deficiencies in the legal framework for clearing, settlement, and custody.*** Beyond approval of the draft Capital Market II law, which contains key provisions in the areas of netting and movable collateral, reforms are needed to incorporate the concepts of finality and novation. The draft law would also strengthen custody arrangements. However, the authorities will need to evaluate whether additional provisions should be included to clearly address the status of assets held in custody in the event of insolvency.

39. ***Risk management arrangements for the clearance and settlement of BCS trades should continue to be overseen by the SVS.*** Operational improvements have taken place in this area: the central bank has recently implemented RTGS, while the BCS has introduced multilateral netting, accompanied by a set of mechanisms to manage settlement risk. It is

important, however, that the SVS continue to keep the adequacy of these mechanisms under review and assess whether additional mechanisms, such as a settlement fund or a central counterparty, are needed.

40. ***Additional changes at an operational level could improve the services provided by the DCV.*** In particular, if the number of foreign investors increases, the DCV should actively seek arrangements with other central securities depositories abroad, which could generate additional activity by foreign investors at the margin. However, given the presence of foreign banks in Chile, the current arrangements are unlikely to represent a significant impediment to foreign investor activity.

G. Conclusion

41. ***The authorities should continue to work closely with market participants to develop the fixed-income markets more broadly.*** Establishing a forum where representatives of the market, market operators, and regulators could exchange views on specific factors impeding the development of the fixed-income markets would be beneficial.¹³ For example, market development could be enhanced by encouraging the use of standardized repo contracts or developing an active interest rate futures contract.

42. ***Reducing concentration in demand and increasing the diversity of the investor base would help enhance liquidity.*** This could be achieved by relaxing the constraints on private pension fund investments abroad; this would also reduce the crowding out effect on other investors, allowing them to develop further. Foreign investors could be encouraged through greater provision of information and effective operationalization of the existing capital gains tax exemption. More generally, the authorities could consider, within a comprehensive review of the taxation of financial instruments, exempting all investors from capital gains and income tax on fixed-income instruments, as they have done for equities. They could also consider specific measures to encourage greater issuance of fixed-income securities, including reviewing the mechanics of the stamp tax.

43. ***Liquidity could be further enhanced by growth in the mutual fund industry.*** This objective could be supported by a broad financial literacy program, creating a more sophisticated investor base with more diverse appetites for risk. This source of demand represents a hope for the development of a high-yield market, which would facilitate greater access to the capital markets by SMEs.

¹³ An example of such a committee would be the Securities Lending and Repo Market committee in the U.K. The committee meets on a quarterly basis and consists of representatives of international securities lending and repo practitioners and bodies such as the Financial Services Authority, the Debt Management Office, the Inland Revenue, CREST, the London Stock Exchange, and the London Clearing House. The Bank of England chairs the meetings and provides the secretariat.

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III. PUBLIC SECTOR DEBT AND MARKET DEVELOPMENT¹

Executive Summary

- *This paper addresses the role of public debt in facilitating the broader development of the financial markets and discusses a potential debt management framework that would support the development of a liquid public debt market.*
- *The government's decision to invest the bulk of its projected fiscal surpluses in financial assets will broadly preserve the stock of public debt at current levels. This will create a need for the government to refinance existing debt as it falls due. A risk management approach would suggest that the central government should refinance this debt in the domestic market by issuing long-dated debt.*
- *In order to maximize liquidity in the domestic public debt market, coordination of issuance plans across the central bank and the government will be crucial. Regular dialog with market participants to discuss issuance plans, review market developments, and discuss technical factors will enhance the liquidity of the market.*

A. Public Debt in Chile

1. ***Public debt plays an important role in supporting the development of a well functioning financial system.*** In general, Treasury securities play three key roles as a benchmark, providing: (i) an indicator of the risk-free rate, which is required for the valuation of other securities; (ii) the benchmark rate for portfolio allocation decisions; and (iii) the tools for risk management, trade facilitation, and relative value comparison, facilitating the provision of intermediation services to the private sector by allowing dealers' hedge positions.^{2, 3}

2. ***Total public sector debt in Chile is relatively low by international standards.*** At end-2005, it was equivalent to 31.7 percent of GDP, with marketable debt amounting to 24 percent of GDP. The public sector had issued US\$22.4 billion of marketable securities in

¹ Prepared by Allison Holland, based on the findings of an MFD Technical Assistance mission.

² Zamsky (2000). This assumes that valuation is made on the basis of discounted cash flows. Maintaining liquidity at key points of the curves will enhance the quality of these prices and implied discount factors, and, thus, the effectiveness of investors' valuations and resource allocation decisions.

³ The inclusion of the risk-free instrument shifts the location of investors' efficient frontier, allowing them to achieve a better risk-return outcome.

the domestic market and US\$5.7 billion in the international market. Public debt securities are issued by three main institutions:

- **Central bank.** It is the main issuer of public debt. Its instruments account for 90 percent of total domestic marketable public debt outstanding; it has not issued debt in the external markets. Its marketable debt outstanding at end-2005 amounted to US\$19.8 billion, equivalent to 17 percent of GDP.
- **Central government.** It has issued bonds in the international capital market and long-dated inflation-indexed bonds (BTUs) in the domestic market. As of end-2005, it had US\$5.5 billion of marketable debt outstanding (US\$3.5 billion abroad and US\$2.1 billion in the domestic market). Total marketable central government debt was equivalent to 4.7 percent of GDP. The central government also had US\$3.2 billion of non-marketable promissory notes outstanding, held on the central bank's balance sheet.
- **CODELCO.** The state-owned copper company CODELCO, a high quality credit, helps provide benchmarks in the external market.⁴ It is a natural issuer abroad, given the source of its revenues, and provides a credible benchmark for other Chilean corporate issuers. At end-2005, it had 5 bullet bonds outstanding in the external markets, with residual maturities ranging from 3 years (2009) to 30 years (2035) and total value outstanding of US\$2.2 billion. In the domestic market, it had 2 inflation-indexed bullet bonds outstanding, equivalent to US\$0.5 billion. The presence of CODELCO in the international market reduces the need for the government to provide a benchmark in these markets, giving it flexibility to focus its issuance in the domestic market.

B. The Current Conjuncture

3. ***The central government is projected to continue enjoying fiscal surpluses in the years ahead, raising the question of how best they should be used.*** A number of options are available, some with consequences for the stock of public debt. In recent years, the government has used part of its surpluses to prepay debt, however its room to prepay more debt is now limited. Other options include recapitalizing the central bank or investing the funds to meet future government liabilities. Prepaying debt or recapitalizing the central bank could lead to a significant reduction in the stock of marketable public debt.

4. ***In effect, the government has chosen a mix of alternatives.*** The government plans to gradually recapitalize the central bank, at a rate of ½ percent of GDP a year, will invest 0.2–0.5 percent of GDP to meet future public pension liabilities, and invest any residual

⁴ It is currently rated A+ by Standard and Poor's compared to A for the Government of Chile.

surpluses in the Fund for Economic and Social Stabilization (FESS). This choice will tend to preserve the stock of public debt at current levels, giving rise to an ongoing need for the government to refinance existing debt.

5. ***This approach is similar to that adopted in other countries facing fiscal surpluses.***

These countries have chosen to maintain a stock of public debt, on the basis that there is a need for the government to provide a risk-free benchmark to support the broader financial markets. Consequently, any fiscal surpluses have generally been invested, with the existing stock of debt rolled over:

- ***In Australia, the government has determined that the general level of interest rates in the economy would be higher in the absence of government debt.*** This position is consistent with findings on the U.S. Treasuries market in Shinasi, et al (2001) that a reduced stock would increase transactions costs and lead to a higher cost of funding for the private sector. Wolfnilower (2000) also found that a reduction in the availability of U.S. Treasuries would lead to a reduction in the supply of private capital to the fixed-income markets and an increase in the cost of financing. Consequently, Australia is committed to maintaining sufficient benchmark bonds to support the market, concentrating its issuance in bonds eligible for delivery into interest rate futures contracts.
- ***Norway has continued to issue debt, despite the existence of a fund where the surpluses invested by the government exceed 100 percent of GDP.*** Fiscal surpluses in Norway are transferred to the Government Pension Fund (GPF) and fiscal deficits are financed by transfers from the GPF. The Norwegian authorities believe that there is a need to preserve issuance of government securities to: (i) help maintain a liquidity reserve; (ii) support the Norges Bank's liquidity management operations; and (iii) maintain and develop smoothly functioning and efficient financial markets.

6. ***More generally, maintaining a presence in the domestic markets will facilitate a country's access to the market in case of a need for re-entry.*** If a country needs to re-enter the market because its fiscal situation suddenly deteriorates, it could face significant re-entry costs. The decision to maintain such a presence was, for example, significant in the U.K. government's decision to maintain a new supply of government bonds during the period 1998–2001 and to explicitly commit to a minimum amount of gross issuance in 2000, in the face of a windfall from the sale of third generation mobile phone licenses (Box 1).

Box 1. Bond Exchanges and Buybacks: The U.K. Experience, 1998–2001

In response to a decline in financing requirements in 1998–2001, the U.K. Debt Management Office (DMO) introduced innovative operations to build liquidity in new benchmarks in the absence of outright net issuance. These operations helped establish new liquid benchmarks at the 5-, 10-, and 30-year tenors of the nominal curve. Over the period, the DMO issued a total of £46.3 billion of new bonds, relative to an overall decline in the size of the portfolio of £28.9 billion. Three types of operation were used: conversions (four in total); switch auctions (five); and reverse auctions (six).

- **Conversions** were fixed price offers where the DMO would set a fixed price ratio, based on its fitted yield curve, at which it was prepared to exchange the source bond for the new benchmark. The intention was to buy back as much of possible of the source bonds, which were generally older, higher coupon, bonds. Smaller-sized bonds were targeted and, to facilitate retail participation, the offer was held open for a period of three weeks.
- **Switch auctions** were targeted at larger-sized source bonds. The intention was to switch a small amount of the old bond for the new bond, leaving the old bond with sufficient liquidity. Similar to the exchange offer held by the central bank of Chile in 2002, these operations were structured as an auction. The DMO determined the reference price of the source bond and market participants then submitted bids for the destination bond against that price. Source bonds were determined on the basis of minimizing the duration mismatch with the new benchmark. The auctions were structured as competitive bid price auctions
- **Reverse auctions** were held for a basket of bonds, with short residual maturity (below 5 years), that the DMO was prepared to purchase. Offers of eligible bonds were ranked on the basis of whether they were “cheap” to the DMO’s fitted yield curve. The auctions were conducted on a competitive offer price basis and financed through the regular bond issuance program, splitting the connection between the purchase and sale of new bonds.

The DMO also continues to buy back bonds directly in the secondary market at a price of its own determination when they near maturity.

C. A Potential Framework

7. ***A continuing challenge for the Chilean authorities is how to maximize liquidity in the fixed-income markets, given a broadly stable stock of public debt.*** In general, several factors contribute to enhancing liquidity in the market, including issuer transparency, regularity of issuance, use of standardized instruments and building of benchmarks. Jeanneau

and Verdia (2005) discuss how the successful increase in liquidity in the Mexican government bond market can be attributed to the decision by the *Secretaria de Hacienda y Crédito Público* to develop and follow a clear and comprehensive public debt management strategy (Box 2).

**Box 2. Improving Liquidity in the Government Bond Market:
The Mexican Experience**

Liquidity in the Mexican government bond market has improved significantly since the late 1990s, reflecting in large part actions undertaken by the *Secretaria de Hacienda y Crédito Público* to develop a comprehensive public debt management strategy. The Mexican government debt is now one of the most actively traded local debt markets, bid-offer spreads on benchmarks have narrowed, and bid dispersion in auctions has declined. This strategy included five key elements:

- A shift to the *financing of fiscal deficits in the domestic market*;
- *Lengthening the maturity structure* of government debt;
- A commitment to the *development of a liquid domestic yield curve*;
- Greater *predictability and transparency* in operations; and
- *Structural initiatives* to strengthen the market, including reducing the time taken to announce the results of auctions; introducing market makers; creating a securities lending facility for market makers at the Bank of Mexico; and promoting authorized price vendors to disseminate prices and strengthen valuation.

8. ***While the Chilean central bank has set out an explicit objective for its debt management, there is still a need for the central government to do so.*** The stated objective of the central bank is to manage its debt in order to minimize financing costs, with limited financial risks, and to the extent possible, contribute to the development of the financial market. By contrast, the finance ministry has not announced a specific objective with respect to its debt management, which hinders its ability to communicate effectively with the market. In 2003, for example, the ministry began issuing 20-year inflation-indexed bonds (BTUs) but there is uncertainty in the market about the prospects for supply in 2006 and beyond. Similarly, in 2005 the finance ministry issued a 10-year BTU but without any clear commitment to future issuance, thus forcing the central bank to resume issuance to ensure a continued supply of bonds at this key maturity point.

9. ***To reduce fragmentation, the finance ministry and the central bank should design and publish a coordinated calendar of issuance.*** The current calendar of the central bank suggests that it would take 6–24 months to fully establish new benchmarks (6–12 months for

the 2- and 5-year segments and 12–24 months for the 10-year segment). Committing to a minimal issuance plan, which would involve introducing new 2- and 5-year benchmarks every year and longer-term benchmarks at least every other year, appears feasible going forward (in Australia, new benchmarks are introduced every other year).

10. ***Issuance should be concentrated at the current benchmark points of both the peso and inflation-indexed yield curves.*** To maximize the positive impact on the fixed-income market, issuance should be focused on the standard bullet bonds recently introduced by the central bank. These provide the basis for the swaps market and facilitate the measurement of the yield curve. Benchmarks exist at the 2-, 5-, and 10-year tenors of the peso curve. When market conditions permit, a 20-year peso bond could be considered. Over time, this will increase the stock of peso-denominated bullet bonds in the market, enhancing liquidity in the peso swap market and facilitating greater peso issuance by the corporate sector. With respect to indexed bonds, the authorities should concentrate on the 5-, 10- and 20-year tenors, which are key maturities for the life insurance industry and the pension funds.

11. ***The authorities should aim at building a smooth redemption profile, to ensure that there is sufficient debt amortizing in any one year to support their issuance pattern.*** This will require the authorities to continue with active management of the debt portfolio, including exchanging off-the-runs for new on-the-runs when opportunities present themselves. Similar exchange operations have been effective in many countries, particularly in Europe, in helping build new benchmarks rapidly.⁵ In addition, this mechanism could support the redistribution of amortizations, helping smooth the overall redemption profile. At the central bank, refinancing longer-dated PRCs through exchanges may provide additional scope to issue more of the newer benchmarks.⁶ A buyback program could also be considered.

12. ***Any program of exchanges or buybacks should aim for cost neutrality, preferably under an auction format.*** In late 2002, the central bank effectively piloted such a program of debt exchange. Banks active in the swaps market expressed a strong interest in such operations. At present, these banks need to use a portfolio of assets of similar duration to hedge their exposures. Increasing the supply of standard bullet bonds at key maturities would enhance their hedging effectiveness in the swaps market. To ensure cost-effectiveness, the authorities could consider using a competitive price auction format, rather than the standard uniform price format used for outright issuance. This would provide a price incentive for market participants, while allowing the authorities to control the overall cost. Initially, the authorities may also want to keep the size of such operations relatively small or allow for some upward flexibility in the size, depending on the quality of bids received. The quality of

⁵ See Economic and Finance Committee Working Group on EU Government Bills and Bonds Markets (2001).

⁶ As at 31 December 2005, PRCs represented approximately 25 percent of the debt portfolio of the Central bank.

the bids received in an exchange (or offers in a buyback) should be assessed against the authorities' internal yield curve.

13. ***To mitigate costs, the authorities could consider providing a fixed bid in a “shop window” for ad hoc buybacks.*** Under these arrangements, the Finance Ministry or the central bank could indicate the price at which they would be prepared to buy a specific bond. The price would be determined on the basis of the authorities' yield curve and could take account of say, the implied price ratio of the bond being purchased relative to the new bond that would be issued, forward to the next planned auction of that new bond. The price would vary from day to day. This could be effected very simply by submitting a limit order to the *Bolsa de Comercio de Santiago*. Details of stock bought back through this process should be regularly communicated to the market (monthly basis), and the authorities should be transparent about their plans for canceling (and refinancing) such debt.

14. ***Establishing a framework for structured dialog with market participants would help the authorities explain their plans and decisions.*** Such a dialog would help provide an appropriate forum to discuss the modalities of any debt exchange operations. Involving the market in the design of the program should enhance the success of the operations. The authorities could also seek market feedback on the desired size and frequency of auctions of the various instruments.

D. Split of Issuance Across Institutions

15. ***Delivering the minimal issuance plan described above would require a minimum gross issuance of around US\$1.5 billion a year.*** The current amortization profile of existing public debt, both domestic and external, suggests that this could be readily achieved over the next five years (Figure 1). However, given that amortizations are not evenly spread over the years, the authorities might want to use money market instruments or debt exchanges to help distribute issuance more evenly.⁷

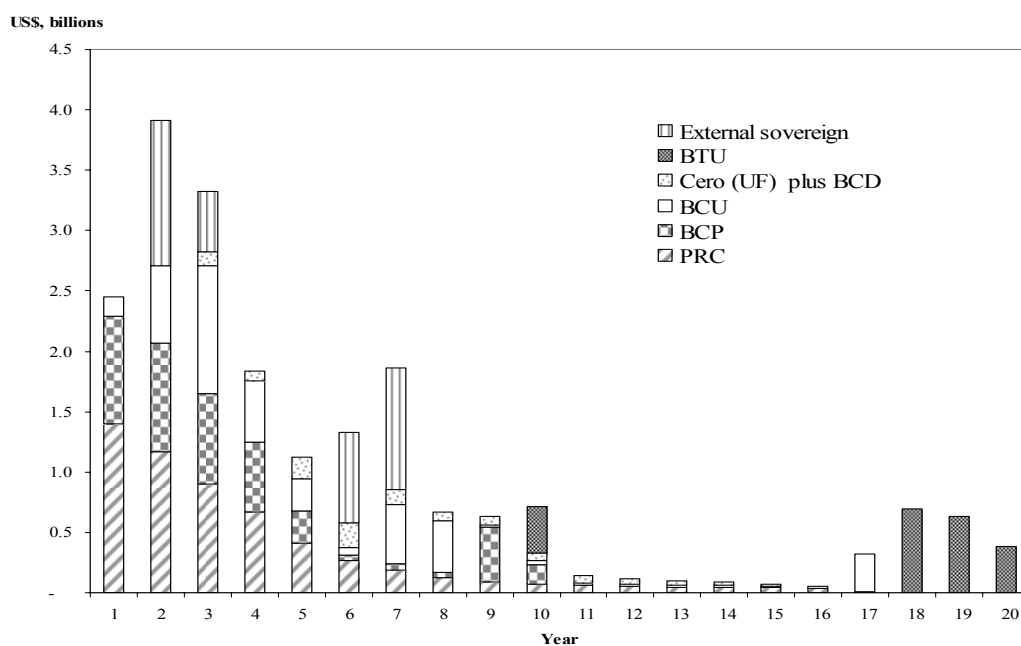
16. ***The current stock of central government debt in the market will need to be refinanced.*** An asset-liability management (ALM) approach to the balance sheet of the government suggests that it should focus its issuance in the domestic market at the long-end of the curves. Given the nature of tax revenues, the main income flow of the government, longer-dated inflation-indexed debt is an attractive instrument from a risk-management perspective, providing beneficial “fiscal smoothing” properties.⁸ Nominal fixed-rate bonds

⁷ For example, New Zealand considers the projected budget balance over the following 3-years and then determines the average financing need, taking account of any redemptions. This average financing need provides the basis for their program of issuance. The NZDMO then uses money market instruments to balance the requirements across the years.

⁸ See OECD (2005) or Wheeler (2004) for a fuller discussion of risk management approaches for public debt managers or Giavazzi and Missale (2005) for an application to the case of Brazil.

also perform well from a risk management perspective, providing useful insurance against negative supply-side shocks. Therefore, issuing some longer-dated peso bonds would also be appropriate. Biasing future government issuance at these tenors would complement the continued issuance of central bank liabilities along current lines, providing a long-dated benchmark for the market.

Figure 1. Amortization Profile of Total Marketable Public Debt
(As at 31 December 2005, US\$ billions)



17. ***The central bank currently issues bullet bonds with a maximum maturity of 10-years.*** The central bank's liabilities finance its asset position, principally international reserves, which accounted for 64 percent of its total assets as at end-2005 (74 percent of which were held in short-term or floating rate instruments).⁹ Within these investment parameters, the central bank aims at minimizing the duration gap with its liabilities. This is facilitated by the current structure of its debt portfolio, with new liabilities biased towards short- and medium-term maturities and with a maximum maturity of 10-years.

E. Conclusion

18. ***The decision by the government to invest the bulk of its projected fiscal surpluses in financial assets will broadly preserve the stock of public debt at current levels.*** Within this context, enhancing the liquidity of the market will require an active and creative approach to debt management by the authorities. There will be a need to actively manage the overall

⁹ See BCCh (2005) for a discussion of the central bank's policies with respect to its international reserves.

redemption profile to ensure that there are sufficient amortizations in any one year to allow a minimal issuance plan. Exchanges and buybacks could also help the authorities establish new benchmarks quickly, with positive externalities for market intermediaries' risk management capabilities.

19. ***In an environment of limited issuance, coordination of issuance plans between the central bank and the government will be crucial.*** This will reduce any uncertainty in the market about the source of future supply and reduce the scope for potential fragmentation of the market. Given the structure of the balance sheet of the respective institutions, such coordination should be possible. Clear communication of these intentions to the market will be imperative in maximizing the impact on liquidity. Ideally, the authorities would establish a regular dialog with market participants to review developments in the public debt markets and to discuss technical factors relating to specific operations.

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**APPENDIX I. MANAGEMENT OF GOVERNMENT FINANCIAL ASSETS AND LIABILITIES:
SELECTED CROSS COUNTRY EXPERIENCE**

	Australia¹	Norway²
<i>Objective</i>	Manage the Commonwealth net debt portfolio at least cost over the medium-term and contribute to supporting financial market efficiency, subject to the government's general policies and risk preferences.	Cover central government borrowing requirement at the lowest possible cost, risks taken into account. Furthermore, government borrowing shall contribute to maintain and develop well-functioning and efficient financial markets in Norway.
<i>Purpose</i>	The main conclusion of the Australian Office of Financial Management (AOFM) 2004 review was that, in the absence of a futures market, which is the key market used by participants to manage their interest rate risk, the general level of interest rates in the economy would be higher. As a consequence, the objective of debt management is to issue bonds to support the bond and bond futures market (3- and 10-year contracts), while minimizing cost subject to risk.	The stated purpose of issuing government debt is (i) to manage intra-year liquidity needs; (ii) to facilitate Norges Bank's liquidity management operations; and (iii) to maintain and develop smoothly functioning and efficient financial markets in Norway.
<i>Number of Benchmarks</i>	Maintains 2 benchmark bonds. It aims to issue a new 5-year bond every two years with a new 13-year bond every other year.	Five benchmark securities are maintained with residual maturity of between 11 and 2 years; new 11 year bonds are launched every 2 to 2.5 years.
<i>Target size of benchmarks</i>	The aim is to build each to a target size of A\$5bn over two years. Up to ¾ of the target is expected to be issued in the first year of the bond's life.	Approximately NOK 30 billion.
<i>Primary dealer / market maker arrangements</i>	No formal system of primary dealers of market makers.	Primary dealers commit to maintaining firm limit orders on the Oslo Stock Exchange in the 5 designated benchmark bonds. Primary dealers have exclusive access to auctions of benchmark bonds.

¹ See www.aofm.au for full details.

² See www.norgesbank.no and www.odin.dep.no/fin for more details.

	Australia¹	Norway²
<i>Market support mechanism</i>	The market is further supported by a securities lending / repo facility, introduced in 2004, which provides specific bonds from the Government's portfolios (at a penal rate) to market participants against the pledge of similar securities.	Primary dealers have access to a securities lending / repo facility of bonds held in the Government's portfolio.
<i>Risk management</i>	Risk is managed through the determination of a benchmark; derivatives (IRS) are used to achieve the benchmark.	The Norges Bank uses interest rate swaps, on behalf of the MOF, to manage the interest rate risk associated with the debt portfolio.
<i>Issuance calendar</i>	To enhance the transparency of the AOFM's operations, an issuance calendar was introduced in 2004, enhanced in 2005.	
<i>Management of assets</i>	The Australian Future Fund was to be established in 2005-06 with a transfer of (short-term) assets from the Government's portfolio. Assets will be managed so as to minimize the impact on financial markets.	Assets are principally managed in the new Government Pension Fund, established January 1, 2006. This Fund is comprised of the Government Pension Fund—Global (formerly the Norwegian Petroleum Fund) and the Government Pension Fund—Norway (formerly the National Insurance Fund).
<i>Size of assets under investment</i>	The seed capital transferred was expected to be of the order of A\$16 bn.	Government Pension Fund—Global (formerly the Norwegian Petroleum Fund) was approx. 1400bn at end of 2005. Government Pension Fund—Norway (formerly the National Insurance Fund) was NOK 158 billion at the end of 2003.
<i>Objective of Fund</i>	The objective of the fund is to offset the unfunded public sector pension liability; it will not be available to meet current expenditures.	"The Government Pension Fund shall support central government saving to finance expenditure on pensions under the National Insurance Scheme and safeguard long-term interests through use of Government petroleum revenues"

	Australia¹	Norway²
<i>New transfers of assets</i>	New investments will be determined on the basis of accrued surpluses at the end of each budget year.	Transfers into the Government Pension Fund—Global will be determined on the basis of the difference between petroleum related revenues and the non-oil budget balance. No funds have been transferred to or from the National Insurance Fund since 1979; however, the return is reinvested.
<i>Use of the Fund</i>	Funds will be locked away until the liabilities are fully funded, which is estimated to take up to 2020.	The Fund will be used to finance the non-oil related budget deficit. Consequently, savings in the Pension Fund will not be directly linked to these liabilities and transfers from the Fund will not be earmarked for pension purposes.
<i>Investment strategy</i>	The Fund will be invested in a diversified portfolio invested through external managers.	The Government Pension Fund—Global only invests abroad in a diversified assets. The capital is invested in non-Norwegian financial instruments (bonds, equities, money market instruments and derivatives), and in 42 developed and emerging equity markets and 31 currencies for fixed-income investments. Norges Bank Investment Management manages the Fund partly internally and partly by engaging external managers. The Government Pension Fund—Norway invests largely in Norwegian and Scandinavian assets. Most of the capital is invested in government securities. Capital from the Fund can also be invested in private Norwegian bonds and certificates or as bank deposits. Up to 20 percent of the total assets can be invested in equity instruments listed on the Norwegian, Swedish, Danish or Finnish stock exchanges.

IV. THE EXPERIENCE OF POVERTY REDUCTION IN CHILE¹

A. Introduction

1. *Since 1990, Chile has combined a very rapid rate of economic growth with an impressive reduction in poverty.* In real terms, per capita GDP grew by 4.5 percent a year between 1987 and 2000 (Table 1), a relatively high rate by world standards. The poverty index computed by the Chilean Ministry of Planning shows that, over the same period, the population living under the poverty level was reduced by more than half, from 40 percent to 18 percent. Alternative poverty indices show similar results (Box 1). In particular, World Bank measures of the share of the population living below certain income lines in Chile show improvements similar those registered in several East and Southeast Asian countries over the same period.

Table 1. Percentage of Population Below World Bank Poverty Lines, Selected Countries

	Year	Poverty Line			Year	Poverty Line			Average Growth in Real Per Capita GDP
		\$1	\$2	\$3		\$1	\$2	\$3	
Chile	1987	6.2	24.1	39.3	2000	1.0	9.6	20.1	4.5
Argentina	1986	0.3	1.4	4.5	1998	7.7	15.9	23.9	1.9
Brazil	1987	11.9	29.4	42.7	2001	8.2	22.4	34.3	0.4
Costa Rica	1986	7.3	18.1	31.7	2000	2.0	9.5	18.8	2.6
Lithuania	1993	6.8	42.6	73.1	2000	0.5	6.9	22.9	2.9
Malaysia	1987	1.2	14.7	29.7	1997	0.2	9.3	20.3	6.1
Mexico	1989	8.3	25.0	39.7	2000	9.9	26.3	41.0	1.8
Paraguay	1990	4.9	26.3	46.4	1999	14.9	30.3	43.6	0.0
Peru	1990	1.4	10.4	25.7	2000	18.1	37.7	55.6	2.0
Philippines	1988	18.2	55.5	75.6	2000	15.5	47.5	66.9	0.5
Poland	1992	0.0	1.7	12.6	1999	0.6	1.2	7.2	4.9
Romania	1994	2.8	27.5	59.0	2000	2.1	20.5	46.4	0.1
South Africa	1993	10.0	34.2	48.5	2000	10.7	34.1	48.5	0.5
Thailand	1988	17.9	54.0	73.7	2000	1.9	32.5	54.0	4.4
Tunisia	1990	1.3	11.6	26.5	2000	0.3	6.6	19.3	3.2
Venezuela	1987	6.6	24.7	38.8	1998	14.3	30.6	46.0	0.4
China (Urban)	1987	0.2	11.7	57.2	1997	0.5	9.1	29.7	8.1
India (Urban)	1988	32.9	76.0	90.0	1999	19.3	60.5	81.3	3.7
Indonesia	1987	28.2	75.8	90.7	2002	7.5	52.4	77.7	3.1

Source: World Bank POVCAL Database

2. *Empirical evidence shows that economic growth often, but not always, leads to poverty reduction.* Among the countries that have successfully reduced poverty, growth effects appear significantly larger than the effects of changes in income distribution. Within a sample of middle-income countries for the period 1990–2000, about half of the countries were able to reduce poverty. In those cases, the growth effect accounts for most of the reduction in poverty. However, there are also cases in which relatively strong growth did not

¹ Prepared by James P. Walsh.

result in a decline in poverty: in Peru, for instance, per capita GDP grew by 2 percent a year during 1990–2000, but poverty rose during that period. There are also cases, such as Jamaica, in which poverty rates declined significantly (from 28 percent to 16 percent), despite a drop in per capita GDP during the 1990s (World Bank, 2003).

3. ***In Chile, rapid economic growth led to an impressive reduction in poverty, but not to a change in the overall income distribution.*** As shown in Table 2, the percentage of the population living below the poverty line, as measured by both the Chilean authorities and the World Bank, has declined, while health indicators (already quite good) and measures of quality of life have risen. However, the distribution of income, as measured by the GINI coefficient, has not substantially changed: in Chile, the poor have become less poor at about the same rate at which the rich have become richer, a fact discussed further in Cowan and De Gregorio (1996).

4. ***The paper is organized as follows.*** Section B looks at how much of the change in poverty rates in Chile and other middle-income countries in our sample can be attributed to economic growth, and how much to changes in income distribution. Section C attempts to quantify the impact of economic growth and exports on poverty rates in the sample, with a focus on how Chile's experience compares to that of other countries. Section D looks at social and microeconomic links to poverty reduction. Section E concludes.

Table 2. Chile: Evolution of Poverty Indicators: 1990–2005
(In percentage of population unless otherwise indicated)

	1990	1994	1996	2000	2003
Income					
Poor households	38.6	27.5	23.2	20.6	18.8
Indigent households	12.9	7.6	5.7	5.7	4.7
Below \$1 poverty line	6.2	4.7	5.2	0.9	n.a.
Below \$2 poverty line	19.6	22.4	9.7	9.6	n.a.
GINI Coefficient	56.5	54.8	57.5	57.6	n.a.
Education					
Girls enrolled in grade 1	103.3	n.a.	n.a.	95.9	n.a.
Children enrolled in primary school	99.9	n.a.	n.a.	102.7	n.a.
Health					
One-year olds immunized against DPT	99.0	92.0	91.0	97.0	99.0
Life expectancy at birth (in years)	73.7	n.a.	n.a.	n.a.	76.4
Infant Mortality (deaths per 1000 births)	17.0	n.a.	n.a.	11.0	8.0
Other					
Telephone mainlines (per 1000 people)	66.0	113.4	149.2	217.1	221.0
Television sets (per 1000 people)	206.1	243.0	263.5	483.6	n.a.

Source: ECLAC, World Bank.

Box 1. Measuring Poverty

- **Poverty statistics.** Poverty statistics can be divided into monetary and nonmonetary indicators. Monetary measures may measure poverty from the income or the consumption side.
- **One-dollar-a-day line.** This measure, used as a Millennium Development Goals indicator, represents the most commonly used indicator of poverty. It is a transparent indicator, easy to calculate across countries, and does not have to be adjusted for relative price changes. However, as it is set at a fixed level across countries, this ease of comparison can mask real differences in costs of living across countries.
- **Basic consumption basket.** The United States, Chile's Ministry of Development Planning (MIDEPLAN), and the UN's Economic Commission for Latin America and the Caribbean (ECLAC) all define poverty as the inability to purchase a basic consumption basket. ECLAC's extreme poverty line is defined as the cost of a subsistence basket for one year, with the poverty line twice this level. When coordinated internationally (as ECLAC does for Latin American countries) such a line has the advantage of taking country prices and consumption preferences differences into account. However, no consistent world estimates are available.
- **Percentage of median income.** The poor can also be defined as those earning less than a certain percentage of the median income of the population (EUROSTAT). However, calculating the percentage of the population beneath the moving target of median income is more difficult than calculating the percentage of households below a line fixed in real terms. It can also result in perverse conclusions, such as a decline in poverty should the incomes of the middle class and rich fall while the incomes of the poor remain unchanged.
- **Consumption-based indicators.** Such poverty indicators may constitute a better indicator of the well-being of the poor than measuring it from what they earn. However, such data are not always reliable and ensuring international comparability of consumption across countries and time is difficult.
- **Nonmonetary measurements.** Measures such as access to improved water sources, enrollment in primary education, rates of vaccination, or literacy rates fall into this category. Monitoring such measures is aimed at ensuring that tangible progress is being made in conditions among the poor. However, the relationship between nonmonetary measures and macroeconomic developments is not clear, as some countries have been able to make progress in specific areas by refocusing expenditure or improving the quality of spending.

B. Growth and Distribution

5. **Among the countries that successfully reduced poverty, growth effects are large.** Although poverty indicators measured from the consumption side are generally considered to be better indicators of the well-being of the poor than those from the income side, such measures are not always available or reliable. In this section and the next, we look at the

evolution of these income indicators, which include cash transfers from the government, while the following section looks at a broader set of issues, including the impact of nonmonetary transfers. Applying the method of Bourguignon (2003), we decompose changes in poverty between changes in the mean of income, associated with economic growth, and changes in the distribution of income (Box 2).² In the countries in our sample in which poverty was reduced, the growth effect accounts for 86 percent on average of the total reduction in poverty, with relatively small effects from the changes in income distribution (Table 3).

Box 2. Modeling Income Distributions

Modeling income distributions with statistical distributions. Bourguignon (2003) decomposes reductions in the poverty rate into changes in the location of poverty, that is, the mean of the income distribution, and thus, economic growth, and changes in its distribution (an increase among incomes of the poor that is faster than that of the rich). These changes can be decomposed by fitting a statistical distribution to the data at the beginning and end of the sample period and separating how much of the change is due to a change in the mean of the distribution and how much is due to a change in shape. If the distribution of income at time t can be thought of as a cumulative probability distribution $F(y | \mu_t, L_t)$ where L_t summarizes the other parameters of the distribution and μ_t represents the mean, then we can decompose the change from $F(y | \mu_t, L_t)$ to $F(y | \mu_{t+1}, L_{t+1})$ as:

$$F(y | \mu_{t+1}, L_{t+1}) - F(y | \mu_t, L_t) = G(y | \mu_{t+1}, \mu_t, L_t) + D(y | \mu_t, L_{t+1}, L_t) + R(y | \mu, L)$$

Where G is the effect of growth, D is the effect of distributional changes, and R are residual changes not covered by G or D .

Decomposing growth and distributional effects. The lognormal distribution is most often used to model income distributions, both for its computational simplicity and the positive skewness that it shares with most empirical income distributions. For each country, we estimate the mean, μ , and variance, σ , for two lognormal distributions, F_{t+1} and F_t fit to data at the beginning of the sample period and the end. We can thus estimate the growth and distributional effects above as:

$$G(y | \mu_{t+1}, \mu_t, L_t) = F(y | \mu_{t+1}, \sigma_t) - F(y | \mu_t, \sigma_t)$$

$$D(y | \mu_t, L_{t+1}, L_t) = F(y | \mu_{t+1}, \sigma_{t+1}) - F(y | \mu_{t+1}, \sigma_t)$$

That is, the growth effect is the changes due only to change in the means, the distributional effect due to changes in the variance, and the residual effect is the remainder.

² The data used in this section and below are described in the Data Appendix.

Table 3. Decomposition of Poverty Headcount Changes into Growth and Distributional Effects

	\$1 Poverty Headcount				\$2 Poverty Headcount				\$3 Poverty Headcount			
	Initial Level	Change	Growth Effect	Distrib. Effect	Initial Level	Change	Growth Effect	Distrib. Effect	Initial Level	Change	Growth Effect	Distrib. Effect
Chile	6.2	-5.2	-4.7	-0.5	24.1	-14.5	-15.0	0.5	39.3	-19.2	-20.9	1.7
Argentina	0.3	7.4	-0.1	7.5	1.4	14.5	-0.4	14.9	4.5	19.4	-1.2	20.6
Brazil	11.9	-3.7	-1.3	-2.5	29.4	-7.0	-2.2	-4.7	42.7	-8.4	-2.6	-5.8
Botswana	33.3	-2.6	5.6	-8.2	61.3	-5.6	5.6	-11.2	75.9	-5.7	4.4	-10.1
Costa Rica	7.3	-5.3	-3.3	-2.0	18.1	-8.7	-6.8	-1.9	31.7	-12.9	-9.8	-3.1
Dominican Republic	8.6	-8.6	-4.3	-4.3	24.8	-24.1	-9.6	-14.4	40.1	-32.0	-12.6	-19.4
Estonia	1.0	-0.9	-0.8	-0.1	7.5	-2.8	-5.4	2.6	21.4	-3.1	-13.1	10.1
Lithuania	6.8	-6.3	-4.3	-2.0	42.6	-35.7	-16.9	-18.8	73.1	-50.2	-17.2	-33.0
Malaysia	1.2	-1.0	-1.1	0.1	14.7	-5.4	-11.6	6.2	29.7	-9.4	-20.9	11.5
Panama	11.8	-4.6	-6.6	2.0	23.8	-6.1	-11.4	5.3	34.3	-7.5	-14.5	7.0
Peru	1.4	16.7	0.2	16.5	10.4	27.4	0.9	26.4	25.7	29.9	1.7	28.2
Philippines	18.2	-2.7	1.9	-4.6	55.5	-8.0	2.7	-10.7	75.6	-8.7	2.1	-10.8
Thailand	17.9	-15.9	-14.3	-1.6	54.0	-21.6	-32.3	10.7	73.7	-19.7	-33.5	13.8
Venezuela	6.6	7.7	-1.1	8.9	24.7	5.9	-2.9	8.9	38.8	7.2	-3.6	10.8
South Africa	10.0	0.7	-1.5	2.2	34.2	-0.1	-3.2	3.1	48.5	0.0	-3.5	3.5

6. *The effects of changes in income distribution on poverty are smaller, though their magnitude increases in cases in which poverty rises.* Among countries in which poverty fell, changes in income distribution can account for only a small share of the reduction in poverty. However, in the group of countries in which poverty rose during the sample period (slightly less than half the countries in the sample), changes in income distribution were larger than in the other group and, in general, led to an increase in poverty. In the countries in which economic growth was positive (e.g. Peru and Venezuela) but poverty rose, the income distribution effect often outweighed the effect of growth by a substantial margin.

7. *In Chile, growth had a stronger effect on poverty than changes in income distribution.* During the 1987-2000 period, the average income per capita rose sharply while, according to our estimates, the variance of log income, which captures distributional effects, increased by a very small amount. Indeed, more commonly used measures of income distribution, such as the GINI coefficient, do not show a decline in inequality in Chile during the 1990s, despite a sizable reduction in poverty.

C. Sources of Economic Growth

8. *There are some salient differences between macroeconomic policies in middle-income countries that successfully reduced poverty in the 1990s and those that were not able to do so.* Table 4 shows that, in the countries (including Chile) that were most successful at reducing poverty, GDP growth and export growth were generally faster than in the other countries. This section focuses on the relative impact of these factors on poverty and their interaction.

9. *Macroeconomic conditions were critical in reducing poverty in Chile during the 1990s.* Prudent macroeconomic policies have helped raise the savings ratio, boost investment, including foreign direct investment, and have led to strong rates of economic growth. At the same time, inflation fell from 22 percent in 1990-91 to an average of just over

2 percent in recent years. Strong economic growth helps explain a significant portion of the reduction in poverty levels in Chile, as does the country's focus on export growth.

Table 4. Comparison of Macroeconomic Conditions, Selected Countries

	Avg. Growth GDP Per Capita	Change in Export Share of GDP	Initial \$1 Headcount
Entire Sample (34 Countries)			
Average	2.4	35.0	7.0
Standard Dev.	2.4	21.4	9.2
Countries Showing Largest Reduction in Poverty			
Average Among Ten Best	4.0	38.5	5.2
Chile	4.5	30.3	6.2
Dominican Rep.	2.8	24.4	8.6
Malaysia	6.1	62.9	1.2
Panama	3.4	78.9	11.8
Poland	4.9	23.7	0.0
Thailand	4.4	33.0	17.9
Tunisia	3.2	43.6	1.3
Countries Showing Smallest Reduction in Poverty			
Average Among Ten Worst	1.1	27.7	3.7
Algeria	-1.2	15.5	1.8
Mexico	1.8	19.0	8.3
Peru	2.0	15.8	1.4
Russia	1.3	27.8	6.1
Ukraine	-2.9	47.1	2.1
Venezuela	0.4	21.4	6.6

Growth and Initial Conditions

10. ***To ascertain general patterns and see how Chile deviates from them, we look at the effect of growth in a cross-country regression framework.*** We estimate the impact of macroeconomic conditions on poverty reduction using a pooled regression of the change in the three poverty rates described above in 32 countries during the 1990s. The results from these regressions are discussed below, and the Data Appendix discusses the methodology as well as the countries and sample used.

11. ***Poverty reduction is strongly associated with per capita income growth.*** The coefficient on average growth is largest at the one-dollar headcount, based on our parameter estimates, and falls progressively at the two- and three-dollar levels (Table 5). At the average growth rate for the sample (2.4 percent annually), the growth effect would reduce poverty at the one-dollar level by about 28 percent, but at the three-dollar level by only around 12 percent.

12. ***Initial conditions appear important in poverty reduction, and there is evidence of some convergence effects.*** The results suggest that countries with initially high income levels tend to experience more rapid poverty reduction than others, although the effect only becomes significant at the three-dollar line. The initial level of poverty is quite significant across all formulations, providing some evidence for convergence effects. This effect is of similar magnitude across all three poverty lines.

Table 5. Regressions Estimates Incorporating Growth Effects and Initial Conditions

	\$1 Poverty Line		\$2 Poverty Line		\$3 Poverty Line	
Average per capita GDP growth	-0.382 ** (-2.11)	-0.244 (-0.74)	-0.208 *** (-3.11)	-0.262 ** (-2.10)	-0.147 *** (-3.83)	-0.194 ** (-2.72)
Initial (log) per capita GDP	-0.662 (-0.68)	-0.815 (-0.79)	-0.514 (-1.35)	-0.452 (-1.12)	-0.452 ** (-2.05)	-0.403 * (-1.75)
Initial Poverty Level	-0.817 *** (-6.00)	-0.833 *** (-5.90)	-0.570 *** (-6.78)	-0.562 *** (-6.50)	-0.654 *** (-10.95)	-0.649 *** (-10.74)
Squared avg. per capita GDP growth		-0.028 (-0.50)		0.011 (0.52)		0.009 (0.78)
Constant	6.936 (0.82)	8.238 (0.92)	6.357 * (1.87)	5.821 (1.62)	6.429 *** (3.23)	6.011 *** (2.90)
Adj. R-squared	0.52	0.51	0.64	0.63	0.83	0.82
Root MSE	2.29	2.32	0.86	0.87	0.50	0.50
Number of observations	34	34	34	34	34	34

Notes: Cross-country regressions. T-statistics in parentheses; *** denotes significance at 1 percent level, ** at 5 percent, and * at ten percent.

Export Growth

13. ***Many countries, including Chile, that have experienced rapid declines in poverty have also shown rapid increases in exports.*** The strategy of many Asian countries of reducing poverty by concentrating on labor-intensive manufacturing growth is well established. In Chile, those regions that have performed well in export growth appear to have experienced more rapid poverty reduction than other regions (Contreras, 2001). To assess how the growth in exports affects poverty differently from overall economic growth, we split the average growth rate in the model above into: (i) the change in the export share of GDP; and (ii) the growth in non-exported GDP.

14. ***Broad-based economic growth led by exports appears to be the combination that most benefits the poor.*** The effect is strongly positive across all poverty lines: rising export share and rising growth positively affect poverty, and this effect is particularly strong for the poorest. At the one-dollar level, the change in export share has a stronger effect on poverty lines than at the higher poverty lines. At this level, increasing the share of exports in GDP by 10 percentage points would reduce the poverty headcount by 22 percent, whereas at the three-dollar line, poverty would fall by only 5 percent. The average growth of non-exported GDP affects poverty relatively more at lower poverty lines.

15. ***When we control for export growth, we also find evidence of some growth nonlinearities.*** The square of GDP growth becomes significant in the regressions when we control for export shares and the growth of non-exported GDP (Table 6). This would point to increasing returns: more rapid GDP growth would lead to even faster poverty reduction. The coefficient declines with the level of poverty, as observed with the other variables.

16. ***In Chile, non-copper exports rose from about 14 percent of GDP in 1989 to 19½ percent in 2005.*** Chile was already strongly export-oriented at the beginning of the 1990s and became more so in subsequent years, although the share of exports to GDP did not rise as rapidly as in some other countries in the sample. The growth in nonmining exports has been reflected in strong growth in labor-intensive sectors, such as agriculture and food processing. Export growth in Chile is thus likely to account for part of its success at reducing poverty: by our estimates above, the rise in exports between 1989 and 2005 would be associated with a decline in the one-dollar poverty headcount of about 14 percent, in addition to the reduction in poverty stemming from economic growth. These changes are similar to those registered in the export-oriented economies of Asia, which focused on labor-intensive manufacturing growth to a greater degree than Chile.³

Table 6. Regression Estimates Incorporating Export Effects

	\$1 Poverty Line	\$2 Poverty Line	\$3 Poverty Line
Initial Poverty Level	-0.564 * -(1.78)	-0.506 *** -(3.71)	-0.652 *** -(7.08)
Initial (log) per capita GDP	-0.304 -(0.22)	-0.658 -(1.23)	-0.692 ** -(2.29)
Avg. Growth Non-Exported GDP	-0.125 -(1.04)	-0.106 ** -(2.31)	-0.070 ** -(2.65)
Change in Export Share of GDP	-0.104 ** -(2.11)	-0.040 ** -(2.11)	-0.022 * -(2.01)
Squared Avg. Per Capita GDP Growth	-0.080 * -(1.73)	-0.047 ** -(2.67)	-0.033 *** -(3.26)
Constant	4.537 (0.38)	7.861 (1.62)	8.741 *** (3.13)
<i>Adj. R-squared</i>	0.30	0.57	0.79
Root MSE	2.30	0.90	0.52
Number of observations	28	28	28

Notes: Cross-country regressions. T-statistics in parentheses; *** denotes significance at 1 percent level, ** at 5 percent, and * at ten percent.

³ The absence of disaggregated data between mining and nonmining exports in most other countries of the sample prevents a comprehensive econometric assessment of the relationship.

D. Social Policy and Structural Aspects of Poverty Reduction in Chile

17. ***Together with economic growth, social policies and microeconomic factors play a critical role in poverty reduction.*** A recent World Bank report identifies three critical areas to help enhance the fight against poverty: (i) stepping up government programs to provide support to the poorest, including through well-targeted transfers and subsidized access to public services; (ii) broadening assets ownership, particularly with respect to education, health, land, and access to public infrastructure; and (iii) increasing market efficiency, including through the development of flexible labor markets and equitable institutions.⁴

18. ***In Chile, innovative and well-targeted social programs have been critical in successfully reducing poverty, particularly among the poorest.*** Chile's programs of cash transfers have helped make a sizable difference in income distribution by raising the living standards of the poor.⁵ By tying some programs to job retraining and educational goals, they may also have improved prospects for income mobility. Eligibility for social programs targeted to the poor is assessed on the basis of a simple two-page survey (the *Ficha CAS*) in which information is collected about the family structure, employment, housing conditions, and ownership of consumer durables. This survey provides a useful database of all persons poor enough to request government assistance. It also constitutes a straightforward and transparent mechanism to assess the needs of the poor, which can be used easily across ministries and social programs.

19. ***Chile also has a strong track record in the provision of public services, including education and health.*** Its social indicators, already quite high in the late 1980s, have significantly improved in recent decades, attaining good levels by international standards (see Table 2). At present, Chile's share of GDP devoted to education, including in the private sector, is one of the highest in Latin America. The impact on poverty rates of improved access to health care is more difficult to assess as it is thought to be largely endogenous to poverty reduction. In our sample, we observe that some social indicators, such as infant mortality, are strongly correlated with poverty reduction, but this relationship is not significant when added to the regressions discussed in Section C.

20. ***Chile's housing, health, and educational programs have also helped improve the distribution of income.*** Bravo, Contreras, and Millán (1999) show that, by estimating the cash value of these extensive programs and including it in the computations of the distribution of income, the 1998 GINI coefficient would be significantly reduced, from 0.56 to 0.50. When these social programs are taken into account, the share of imputed income earned by the first quintile rises from 3.1 percent of total income to 5.2 percent—an

⁴ Virtuous Circles of Poverty Reduction and Growth, Latin American and Caribbean Studies, World Bank.

⁵ The survey data underlying the income distribution and poverty statistics in this paper include these transfers.

increase of almost 70 percent. Using per capita GDP figures in our sample, this would indicate that, after transfers, the income of the lowest decile would rise from US\$0.8 a day to US\$1.3 a day, while the income of the lowest quintile would rise from US\$1.2 a day to US\$1.7 a day.⁶ Thus, when we add to the household incomes in Chile the estimated value of these programs, the average imputed income of the lowest quintile is slightly above that of the lowest *two* quintiles before taking these programs into account.

Table 7. Effect of In-Kind Transfers on Poverty Lines in Chile

Quintile	Before Transfers			After Transfers		
	Share	Income	(per day)	Share	Income	(per day)
Q1	3.1	277	\$0.76	5.16	467	1.28
Q2	6.7	604	\$1.66	8.2	742	\$2.03
Q1+Q2	9.7	441	\$1.21	13.36	604	\$1.66
Q3	10.8	978	\$2.68	11.6	1,050	\$2.88
Q4	18.3	1,657	\$4.54	18.02	1,631	\$4.47
Q5	61.1	5,533	\$15.16	57.02	5,160	\$14.14

Source: World Bank.

Note: Per capita GDP in constant 2000 U.S. dollars: \$9,049.2.

21. *The steady and rapid increase in financial sector intermediation in Chile also appears to have contributed to the reduction in poverty rates.* Bank credit to the private sector rose from 47½ percent of GDP in 1987 to 61½ percent in 2000, and has now broadly stabilized at that level. Beck, Demirguc-Kunt, and Levine (2004) find a strong relationship between reduction in poverty headcounts at the one- and two-dollar poverty lines and the growth in private credit. Although Chile's current credit-to-GDP ratio is quite high by middle-income country or Latin American standards, it is significantly lower than in Korea, Malaysia, and Thailand, pointing to some scope for further progress in that area.

22. *Chile's record in the labor market area has been more mixed, and does not appear to have contributed to poverty reduction.* Much of the research on poverty in Latin America shows that households led by middle-aged or older people have low poverty rates, while households headed by women and with lower levels of education are more likely to be poor.⁷ In reviewing labor regulations in Chile, Pagés and Montenegro (1999), conclude that tenure-based job security regulations bias employment in favor of older workers and reduce long-term employment rates. These regulations also tend to reduce female labor force participation and keep less experienced or poorly trained workers, such as the young, out of the labor

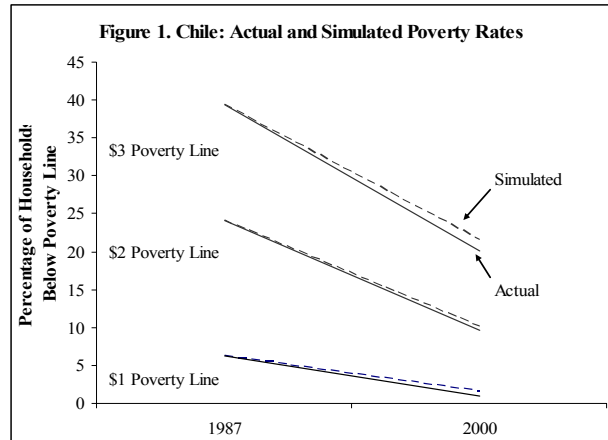
⁶ These rough estimates are not directly comparable to the World Bank's estimated poverty lines: quintile income figures are averages while poverty lines are maxima, and the exchange rates used in conversions differ.

⁷ See the 2001 World Bank report on poverty in Chile.

force. Given that labor market regulations in Chile have not been significantly changed in recent decades, these findings suggest that the decline in poverty cannot be explained by changes in labor market regulations.

E. Conclusion

23. *The factors laid out above explain much of the reduction in poverty in Chile during the 1990s.* Using the parameter estimates of the model including exports (see Table 6), we simulate each of the poverty lines for Chile in 1990. These estimates match closely the actual values observed (Figure 1). In each case, the model can explain about 90 percent of the reduction in poverty observed during the 1990s, a much better record than for most of the countries in the sample.



24. *Chile's experience in reducing poverty owes less to changes in income distribution than in other countries.* Despite Chile's impressive record in non-monetary redistributive programs, the results suggest that, when compared with other countries, changes in the Chilean income distribution contributed relatively less to poverty reduction than growth. That is, the upward shift in mean incomes in Chile was more important in reducing poverty than changes in income distribution. In other countries, such as the Dominican Republic and the Philippines, a shift in the shape of the income distribution contributed more strongly to poverty reduction.

25. *Export-oriented growth is a critical engine of poverty reduction.* In the late 1980s, Chile's economy was already more export oriented than most other Latin American countries. During the 1990s and the early 2000s, nonmining exports grew rapidly, likely contributing to poverty reduction in Chile, as exports did in other middle-income countries.

26. *Chile's macroeconomic and social policies are supportive of poverty reduction, but there is room for improvement in the area of structural reforms.* Chile's prudent economic management has helped ensure strong economic growth and low inflation for the benefit of its entire population, especially the poor. Chile has also been able to use fiscal policy to mitigate some of the problems associated with its highly unequal income distribution. It has also developed a deep financial system, which tends to provide better access to credit and financial services than in most other countries. However, bank credit as a share of GDP remains below that in comparable Asian countries, and more flexibility in the labor markets would likely benefit the poor.

APPENDIX I. DATA ISSUES

Definition of poverty. For the purposes of this paper, we look at incomes poverty, based on three common international poverty lines: the World Bank (and Millennium Development Goals); one-dollar a day poverty line; and implied two- and three-dollar a day poverty lines.

For each country, we estimate the effect of policies on three poverty lines. By analyzing three poverty lines across countries, we can better assess Chile's performance. The MDGs use the dollar-a-day headcount to estimate poverty. However, this income level covers almost no one in Chile. To obtain a sample closer to what Chilean poverty statistics present, we also use country headcounts for US\$2 and US\$3 poverty lines, which are available from the same database. Throughout the paper, we refer to those living below the one-dollar line as the extreme poor, or the indigent. The one-dollar line tracks the Chilean authorities' indigence line quite closely, which is likely to be the case in most countries.

How do World Bank poverty lines compare to Chile's own poverty statistics? MIDEPLAN produces a household survey (the CASEN survey) from which it calculates the number of Chileans living in poverty and in extreme poverty. The World Bank uses these data as the basis for its international poverty database entries for Chile, adjusting the poverty thresholds to reflect international purchasing power. Both surveys show poverty on a declining trend in Chile, but the World Bank's data show more volatility around the trend, particularly during the early 1990s. Incomes among the poor did decline in the early 1990s as inflation rose and, as monetary policy was tightened, unemployment rose in response. But overall, Chile's poverty line seems close to the World Bank's three-dollar-a-day line, while Chile's indigence or extreme-poverty measure is somewhere between the one- and two-dollar a day lines.

The sample of countries retained for the study includes countries economically similar to Chile. Specifically, the countries included in the sample includes all countries for which real GDP per capita in the 1990s was comprised on average between 30 percent and 170 percent of Chile's, with the exception of Saudi Arabia and small island economies¹. The sample does not include countries not included in the World Bank's POVCAL international poverty-rate database. In South America, it includes all countries except Guyana, Suriname, Bolivia, and Ecuador.

Source of data. The data come from the World Bank's POVCAL database, which takes household-census data from a wide variety of countries and provides periodic estimates of the percentage of the country's population living below a given poverty line. As these data are only available on the basis of intermittent household surveys, we do not have matched

¹ Countries included are Argentina, Belarus, Botswana, Brazil, Bulgaria, Chile, Colombia, Costa Rica, Croatia, Dominican Republic, Estonia, Hungary, Kazakhstan, Latvia, Lithuania, Malaysia, Mexico, Panama, Paraguay, Peru, Philippines, Poland, Romania, Russia, South Africa, Thailand, Tunisia, Turkey, Ukraine, and Venezuela.

time periods across countries; for Chile, our sample runs from the 1987 to the 2000 surveys, but for Argentina, from 1986 to 1998.

We use the longest observation possible covering the decade of the 1990s for each country. POVCAL entries stem from country-survey data. In Chile, the CASEN survey was published for 1987 and every even-numbered year between 1990 and 2000. We thus use the period 1987–2000 in our estimations. Other countries publish their surveys in different years: for Argentina we have 1986–98, and for Brazil, 1989–2001. The average period of a country observation is 9.5 years.

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