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Hungary: Selected Issues and Statistical Appendix

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INTERNATIONAL MONETARY FUND

HUNGARY

Selected Issues

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I. INFLATION TARGETING IN HUNGARY: IMPLEMENTATION AND POLICY CHALLENGES [1]

A. Introduction

1.   **The National Bank of Hungary (NBH) adopted an inflation (IT) targeting framework in June 2001**, consistent with its primary objective of achieving and maintaining price stability. This followed the widening of the exchange rate band in early May 2001 from ±2¼ percent around the central rate against the euro to ±15 percent.[2] These decisions marked a significant change in Hungary's monetary and exchange rate regime: an inflation target replaced the exchange rate as a new anchor for monetary policy.[3] In a policy statement, the NBH indicated its aim of bringing inflation down to EMU-compatible levels by 2004/2005 so as to qualify for early adoption of the euro.[4]

2.   **It had become increasingly clear that a change in the monetary framework would be desirable to resume disinflation.** The introduction of inflation targeting followed a period during which disinflation had stalled. Under the previous narrow exchange rate band regime, in which the central rate was adjusted according to a preannounced rate of crawl, the monetary authorities had limited leeway to tighten monetary policy, a difficulty frequently accentuated by strong capital inflows that kept the forint at the strong edge of the band. The NBH had to conduct sterilized intervention at times, and the risk of fueling additional inflows prevented the active use of interest rate hikes to tackle inflation. By 2000, it was evident disinflation had stalled: average inflation in that year—at 9.8 percent—barely budged from the 10 percent recorded for 1999. The new framework helped avoid the risk that inflation would settle in at 10 percent or more, which could have raised the costs of achieving lower inflation and complicated the approach to EU membership and adoption of the euro.

3.   **Inflation targeting has met with much initial success.** It created a well-defined policy framework (see Box 1), which helped guide inflation expectations (Figure 1) and provided an initial impetus towards resuming disinflation. Coupled with the band widening, the authorities increased the room for maneuver for monetary policy to fight inflation. Monetary conditions were, in fact, tightened: the forint appreciated by some 10 percentage points against the euro since the band widening and, with inflation expectations coming down, real short-term interest

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[1] Prepared by Paulo Drummond.

[2] Thus the new band resembles ERM2, the transition regime toward adopting the euro. For details of ERM2, see "Monetary and Exchange Rate Regimes in the Central European Economies", on the Road to EU Accession and Monetary Union," SM/01/209 (September 5, 2001)

[3] All foreign exchange restrictions were lifted on June 5, 2001, making the forint fully convertible, and a new Central Bank Act was approved by Parliament on June 19, 2001, defining the primary objective of the NBH as the achievement and maintenance of price stability. A new president of the NBH took office in February 2002.

[4] NBH's *Statement on The New System of Monetary Policy*" (June 12, 2001).

rates increased. So far, tradable goods price inflation has moderated some 2 percentage points on the heels of the appreciation of the exchange rate. Year-on-year consumer price inflation declined steadily from 10.8 percent in May 2001 to 5.9 percent in March 2002, also reflecting declining food and fuel prices, and lower inflation in services.

Box 1. The Inflation Targeting Framework of the National Bank of Hungary (NBH)

Inflation targeting helped create a transparent and well-defined policy framework, with the following key characteristics:[1]

- An objective of satisfying the Maastricht criteria on inflation by 2004/2005, with intermediate inflation targets of 4.5 percent for end-2002 and 3.5 percent for end-2003.

- Inflation targets formulated as the 12-month rise in the CPI at end-December. The decision to use headline instead of core inflation reflected the goal of keeping the framework transparent and simple. A tolerance band of ±1 percent around the central targets allows for unexpected shocks to inflation.

- Using the NBH's benchmark interest rate as the primary instrument to attain the inflation goal. Among the various channels of monetary policy transmission, the exchange rate is viewed as the most powerful and fastest one. Reflecting lags in the transmission mechanism, the NBH works with a target horizon (i.e., the period over which the NBH commits to trying to achieve the targeted inflation rate) of 1 to 1½ years.

- Preparing and publishing detailed quarterly inflation forecasts six quarters ahead, as part of the NBH's *Quarterly Inflation Report*. This report also provides an analysis of inflation developments, discusses inflation projections and risks, and describes considerations underlying monetary policy decisions.

- A Monetary Council that decides on changes in monetary policy. Its policy actions are aimed at addressing divergences between the forecast of inflation and the inflation target.

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[1] Based on the NBH's, *"Quarterly Report on Inflation,"* August 2001; and the NBH's *"Statement on the New System of Monetary Policy,"* June 12, 2001. For a review of institutional conditions at the time of adoption of the IT framework in Hungary, see Abel (forthcoming).

Figure 1. Hungary: Reuter's Poll of Year-on-Year CPI Inflation
Forecasts for end-December 2002
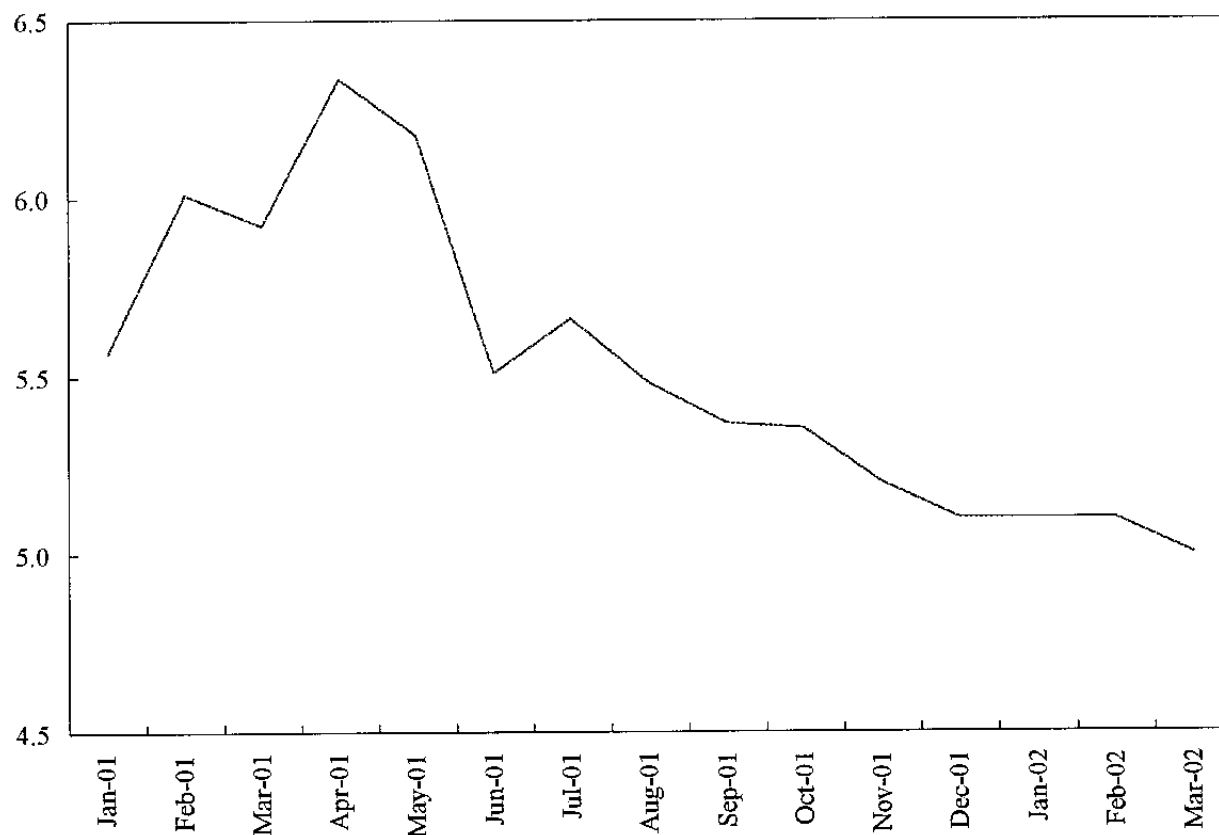
Sources: NBH and Reuters.

4.   **Notwithstanding these successes, the new framework is confronted with challenges.**
First, a great deal of uncertainty remains about the monetary policy transmission mechanism—
particularly through the interest rate channel, but also via the pass-through from the exchange rate
to inflation (the subject of Section B below). Second, tensions may arise from operating an
inflation targeting framework in the context of an exchange rate band (discussed in Section C).
Finally, minimizing the real costs of achieving lower inflation is a key objective and challenge
(discussed in Section D). In each of these sections, the aim of this paper is to draw out some
ortant considerations. These were relevant parts of the discussions for the 2002 Article IV
consultation.[5]

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[5] For an extensive review of issues in the design and implementation of inflation targeting, see
Carare et al. (forthcoming), Mishkin (2001), Schaechter et al. (2000), Bernanke et al. (1999).

B. Monetary Policy Transmission Mechanism

5.   **In an open economy, monetary policy actions are transmitted in various ways.**
Briefly, through the interest rate channel, an increase in interest rates can reduce inflation by
reducing aggregate demand, and by influencing inflation expectations, which in turn affect the
wage and price-setting mechanism. Through the credit channel, two effects are generally
distinguished: the impact of a tighter monetary policy on the supply of loans by banks (the lending
channel) and, the impact on the liquidity of borrowers (the balance sheet channel). The direct
exchange rate channel entails the pass-through of exchange rate changes (an appreciation in the
case of a tighter monetary policy) on to tradable goods prices, as well as indirect effects on the
prices of domestically produced goods via the price of imported intermediate inputs.[6]

6.   **The impact of changes in monetary policy through the interest rate and credit
channels is constrained by the structure of the economy.** While determining the efficiency of
monetary transmission is not an easy task, there is some evidence for Euro area countries that
interest rate effects are sizable (Guiso et al. (1999)) (Table 1). And for a number of these
countries, the interest rate channel is a dominant channel in the transmission mechanism (Angeloni
(2002); Mojon and Peersman (2001); and, van Els et al. (2001)). While the interest rate and credit
channels may become more influential over time in Hungary, these effects are likely to be
moderate now for three main reasons. First, the direct impact of interest rate changes on domestic
demand can be expected to be relatively weak because of limited financial deepening (for
example, the ratio of broad money to GDP is low at about 50 percent of GDP). Second, bank
intermediation is low in Hungary. The ratio of bank loans to GDP is 25 percent compared with
the EU average of 91 percent, reflecting fairly low leverage of the household sector.[7] An
additional factor is that a large share of Hungarian enterprises relies on external borrowing,
including intercompany loans (corporate external debt is close to 20 percent of GDP). Third,
taking into account the balance sheet channel, the impact of rising interest rates on firms' and
households' balance sheet positions should be modest, in light of the relatively low debt ratios in
Hungary.[8]

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[6] For a detailed discussion of these channels, useful references are: Bernanke and Gertler (1995);
Bondt (1998); Meltzer (1995); Mishkin (1995); Svensson (1998), and Taylor (1995).

[7] The speed at which credit responds to changes in the interest rate also depends on the maturity
structure of banks' loan portfolios. A relatively high share of medium- and long-term loan
contracts and fixed interest rates are likely to cushion the impact of any policy interest rate hike
(Bondt (1998, 1999))—but these characteristics do not apply strongly to Hungary.

[8] The impact of a tightening of monetary policy that causes firms' balance sheets to deteriorate
(by reducing their cash flow) also depends on the size of short-term or floating-rate debt exposure
in their balance sheets. While the availability of data on debt exposure of firms is limited, banks'
balance sheets indicate that the percentage share of forint assets with repricing periods of up to 90
days was about 80 percent in 2001 (NBH's *Financial Stability Report,* November 2001, p. 34).

Table 1. Hungary: Effects of Interest Rate Changes on CPI
(In Percent)

	Euro Area		Country with Lowest Response		Country with Highest Response	
	After 1 Year	After 3 Years	After 1 Year	After 3 Years	After 1 Year	After 3 Years
VAR simulation [1]	0.00	-0.07	0.00	0.00	-0.24	-0.36
Structural model [2]	-0.13	-0.13	0.00	-0.11	-0.79	-0.78

Source: Angeloni et al. (2002).

[1] Domestic short-term interest rates increase by one standard deviation (Mojon and Peersman (2001)).

[2] Permanent 100 basis point interest rate increase.

7.   **The exchange rate is the dominant channel for monetary policy transmission, but the NBH's ability to influence the exchange rate is limited.** Benczur et al. (2002) highlight the importance of the direct exchange rate channel in the disinflation process in Hungary. An appreciating nominal exchange rate is not only the central, but also the fastest channel of monetary policy transmission in this regard.[9] However, the main instrument of the NBH to influence the exchange rate is limited to its policy interest rate,[10] and many other factors, which cannot be foreseen and involve expectations in financial markets over a range of domestic and external variables, also play a critical role. Moreover, the exchange rate can be volatile (Figure 2).

8.   **There is also a good deal of uncertainty about the size and timing of exchange rate pass-through.** At this early stage of the new monetary policy regime, too short a time series prevents new econometric estimates of the pass-through. Research by the NBH on the

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[9] NBH's *"Quarterly Report on Inflation,"* August 2001, p. 35.

[10] While foreign exchange interventions cannot be ruled out, the NBH has refrained from intervening since the band widening, and it has signaled that it would resort to intervention only in emergency situations.

Figure 2. Hungary: Policy Interest Rate and the Forint 2001-2002

NBH's policy interest rate (2-week deposit rate)

forint/euro (right-hand scale)

forint/euro variance (in percent); 30-day moving average
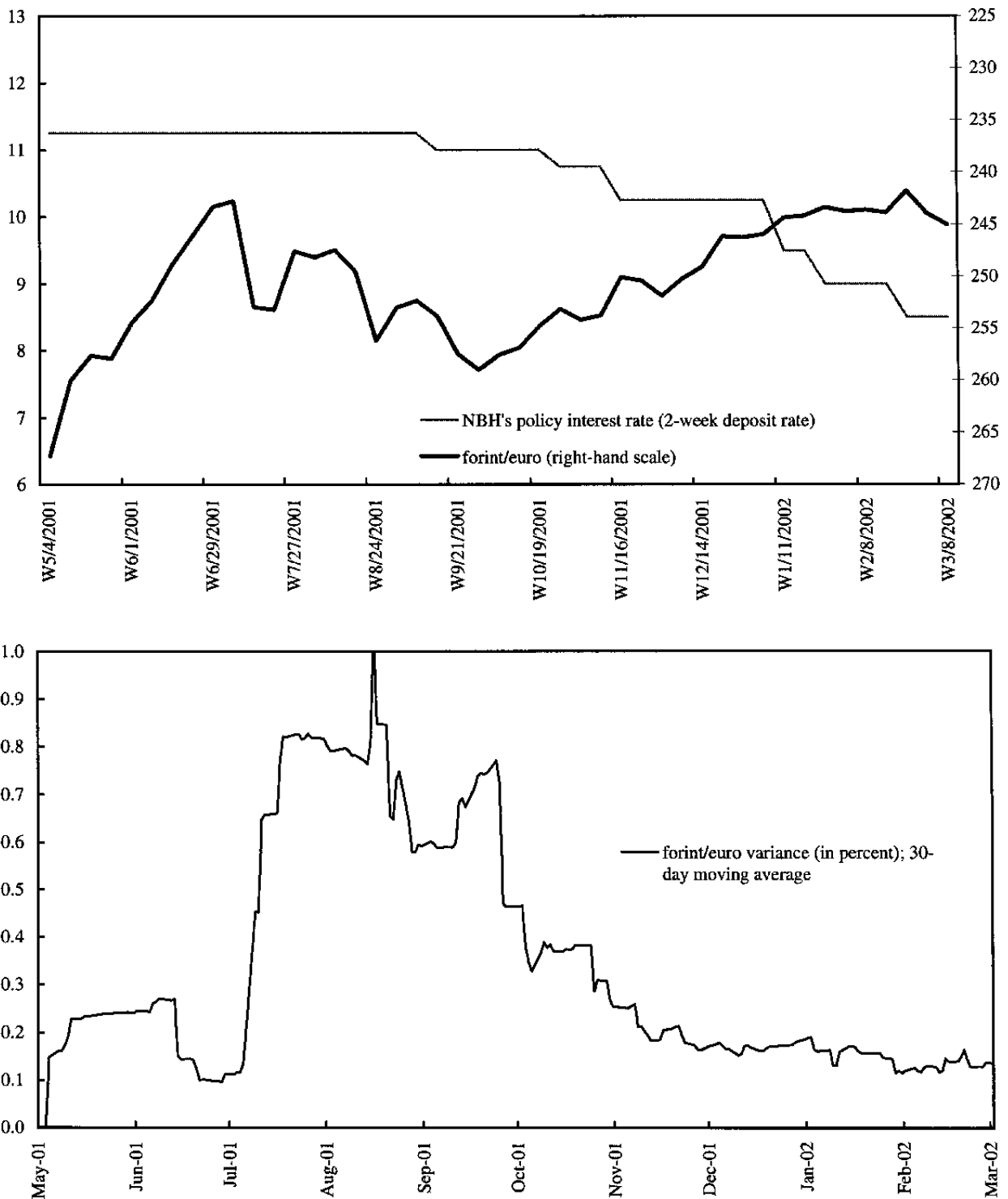
Sources: NBH and staff estimates.

pass-through coefficient using historical data prior to the band widening (Darvas (2001)) estimates a long-run pass-through of 40 percent for Hungary, but shows the relationship was unstable.[11] Evidence from relevant cross-country studies would seem to suggest that estimates of the pass-through to the overall CPI could fall in the range of 20 to 50 percent after 4 quarters (Box 2).

Box 2. Selected Recent Empirical Estimates of the Exchange Rate Pass-Through

There is extensive research on the exchange rate pass-through in the literature, with a significant number of studies analyzing the pass-through to import and export prices, and mostly for industrial countries. The following recent studies estimate the exchange rate pass-through directly to consumer prices, and focus on emerging markets and/or inflation targeters:

● Gagnon and Ihrig (2002) estimate a long-run rate of pass-through of 0.22 for a selected group of inflation targeters, using cross-country data for industrial countries between 1971 and 2000. Their results suggest that, on average, a one percent change in the nominal effective exchange rate causes consumer prices (CPI) to rise by approximately a quarter of a percent in the long-run.

● Mihaljek and Klau (2001) estimate pass-through coefficients for a group of emerging market economies, using various sample periods between 1981 and 2001. Their estimates, based on nominal bilateral exchange rates, vary greatly from 0.08 in the Phillipines to 0.54 in Hungary (estimated for the period 1993 through 2000), and 0.56 in Turkey. These estimates are for the impact of contemporaneous exchange rate changes and up to two-quarter lags, with strong evidence of structural breaks for most countries.

● Choudhri and Hakura (2001) work with cross-section data for a group of 71 developing and developed countries from 1971 to 2001. They report pass-through estimates for Hungary of 0.18, 0.31 and 0.48 with 1, 2, and 4 lags (quarters) respectively, using nominal trade-weighted effective exchange rates.

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9. **A number of factors would tend to lessen the exchange pass-through in Hungary.**[12] First is the exchange rate regime itself. Under the new regime, with greater exchange rate flexibility, a change in the exchange rate is less likely to be regarded as permanent as then under the previous regime. And transitory changes in the exchange rate would be expected to have less effect on prices. Second, and related to the first, is the degree of exchange rate variability. There is some evidence in the literature that higher exchange rate volatility leads to a lower pass-through (Gagnon and Ihrig (2001)), including by clouding agents'

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[11] The study, which used time-varying coefficients, is based on inflation in non-food, non-energy, and non-administered prices and is therefore not strictly comparable with the assumed pass-through in the NBH's inflation report.

[12] These factors abstract from measurement problems that arise when estimating the exchange rate pass-through. One such measurement problem could occur if Balassa-Samuelson (B-S) effects were not adequately controlled for, so that the impact of an exchange rate appreciation, for example, would be masked to a degree by higher B-S induced inflation.

assessments of how temporary (or permanent) changes in the exchange rate are.[13] Third, lower inflation has been associated with a lower pass-through (Taylor (2000)). This is because a low inflation environment itself may change price-setting behavior (Bank of Canada's Monetary Policy Report): "when inflation is low, and the central bank's commitment to keeping it low is highly credible, firms are less inclined to quickly pass higher costs on to consumers in the form of higher prices." Choudhri and Hakura (2001) find evidence of strong association between the pass-through and the average inflation rate across a large group of countries and periods.[14]

10.   **In practice, the NBH has taken a pragmatic and flexible approach in dealing with the exchange rate pass-through in its central projection for inflation.** In the absence of a firm historical relationship, and based on international experience, the NBH initially assumed that a permanent change in the forint's exchange rate would lead to a 50 percent pass-through to the price level of tradable goods over the course of one year, and 75 percent over two years, translating roughly into a 20 percent pass-through to the CPI over two years.[15] Since the band widening, however, the actual pass-through of the exchange rate appreciation on to tradable goods prices seems to have been slower than expected earlier[16]—possibly reflecting the first two factors discussed in the preceding paragraph. In its February 2002 inflation report, the NBH revised downward its working assumption for the pass-through to 37.5 percent and 60 percent over the course of one and two years, respectively—or about 15 percent for headline inflation over two years. This falls below the range of estimates in Box 2, possibly reflecting the desire by the NBH to use conservative assumptions, in addition to the recognition that the extent of the pass-through may have diminished.

C. Inflation Targeting and the Exchange Rate Band

11.   **The NBH's move toward greater exchange rate flexibility, in the form of a wider exchange rate band, has several advantages.** Besides allowing the NBH to move closer to EMU requirements and signalling the importance it still attaches to the exchange rate, it gave more leeway to respond to demand pressures, and provided a buffer to cope with potentially

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[13] Engel (2001) explores the hypothesis that low pass-through of exchange rates might imply high exchange-rate volatility in equilibrium, explaining the exchange rate "disconnect" from the rest of the economy.

[14] Other factors affecting the pass-through deal with the business cycle and the structure of the economy, including import shares and competitive structure (Fisher (1989)).

[15] Based on the NBH's review of the experiences of the Czech Republic and Greece. Tradable goods account for about 25 percent of the CPI basket.

[16] The ratio of the cumulative fall in the price of tradables to the cumulative exchange rate appreciation, using the month prior to the exchange rate band widening as the base was about 25 percent. Of course, this calculation abstracts from changes in tradables prices due to factors other than changes in the exchange rate, and it is only based on the first ten months since the band widening.

volatile capital flows—following the full liberalization of the capital account. In addition, greater exchange rate flexibility raised the exchange rate risk premium and eliminated the perceived exchange rate "guarantee" to domestic borrowers, discouraging unhedged borrowing by residents.

12.   **Under the new exchange rate regime, a nominal anchor was called for.** While the exchange rate remains the main channel of disinflation in the new monetary policy framework, the exchange rate band, by design, is too wide to have the exchange rate effectively guide expectations. In focusing directly on the primary goal of disinflation, the explicit inflation target provides a transparent nominal anchor to guide monetary policy and expectations.[17]

13.   **The IT framework subordinates the exchange rate path to inflation targets.** The viability of the wide band will depend, therefore, on adopting inflation targets and supporting policies that are consistent with the band itself. It is not unusual for central banks to adopt a flexible approach to IT in which there is a positive weight on variables other than inflation (such as output, the current account, or exchange rate variability) in the central bank's objective function (Svensson (1998)). However, as pointed out in Mishkin (2001), if the central bank is also determined to respond to certain exchange rate movements or keep the exchange rate within certain bounds (consistent with the "fear of floating" identified by Calvo and Reinhart (2000)), meeting the inflation targets could be put at risk.[18] So far, the width of the exchange rate band in Hungary seems to have been sufficient to mitigate such problems, as the forint has moved freely within the band. And the NBH has made clear its orientation of monetary policy towards achieving the inflation targets.

14.   **In practice, conflicts may arise between inflation targeting and the exchange rate band.** Balassa-Samuelson effects need to be considered. Perhaps reflecting the scope for higher productivity in services in the transition context, these effects may be fairly small. However, there is also evidence that these effects may be large, so this is another area of uncertainty.[19] Another example is the situation in which higher interest rates are needed to contain inflation, but may attract capital inflows, putting upward pressure on the exchange rate, and threatening the exchange rate band. If the prospective current account deficit were within safe limits, and fiscal

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[17] As pointed out by Abel (2001), and consistent with section B above, while the IT framework provides a nominal anchor, there is a need for "considerable caution concerning the smooth functioning of the transmission mechanism."

[18] Mishkin (2000) suggested that emerging market economies should "adopt a transparent policy of smoothing short-run exchange rate fluctuations that helps mitigate potentially destabilizing effects of abrupt exchange rate changes, while making it clear to the public that they will allow exchange rates to reach their market-determined level over longer horizons."

[19] For more discussion, see Doyle et al. (2001), which supports that the B-S effects may lie in the range of 1–3 percent per year.

consolidation adequate, a revaluation of the central parity would be an option. While not yet in ERM2 officially—which cannot take place until after joining the EU—the authorities are mimicking this regime. Thus, it is worth noting that revaluation of the central parity does not restart the clock on the two years needed in ERM2 before adopting the euro. However, resulting pressures from higher interest rates would be particularly problematic if external competitiveness were a concern. In this case, fiscal tightening would help keep monetary tightening as modest as possible, and avoid too strong an appreciation of the forint. Box 3 describes the experience of two present euro area members that had inflation targets coexist with ERM style bands, and highlights the important role of fiscal policy.

D. Reducing the Costs of Disinflation—The Role of Inflation Targeting

15.   **There is ample literature to highlight the potential output costs of disinflation.**[20] Buiter (2001) discusses a number of policy frameworks in open economies and their impact on the costs of disinflation and concludes that "the benefits from eliminating moderate inflation cannot be enjoyed without incurring the pain of increased unemployment and lost production." Structural features of the economy—e.g., the share of the tradables sector and the degree of wage flexibility—have traditionally played a prominent role in determining the magnitude of the sacrifice ratio (ratio of the loss of output to disinflation) (Mankiw (2001), and Taylor (1998)). Not surprisingly, attempts to obtain meaningful estimates of the sacrifice ratio across a number of countries, going back to Ball (1994), yield a wide range of estimates, but support the view that "disinflations are almost always costly."[21]

16.   **The NBH has undertaken some work on assessing the potential costs of disinflation in Hungary.** A recent NBH working paper by Benczur et al. (2002) calculates sacrifice ratios for Hungary in the range of 0.8 to 1.8, simulating an open economy model of the type found in Svensson (1998) and Batini and Haldane (1999).[22] They note that a sacrifice ratio of this size is

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[20] While this section focuses on the output costs of disinflation, which are temporary, bear in mind that the welfare gains from reducing inflation are permanent.

[21] Ball (1994) estimated output costs, based on the difference between the actual level of output and what output would have been without disinflation, for 19 countries. He identified 65 episodes where "trend inflation fell substantially, with an overall average sacrifice ratio of 0.8. However, the ratios vary widely across countries from -0.8 percent (and therefore sometimes negative, implying no cost) to 4 percent.

[22] The calculation is based on a number of parametric assumptions, including a growth rate of potential output of about 4.5 to 5 percent, and inflation persistence coefficients of 0.6 and 0.7.

Box 3. Selected Country Experiences with Inflation Targeting and ERM2-style Exchange Rate Bands

Of the countries that adopted formal inflation targeting prior to joining the EMU, Finland and Spain pursued inflation targets along with exchange rate bands. In both countries, decisive fiscal action helped underpin disinflation and contributed to avoiding conflicts between the inflation and exchange rate targets.

● Spain announced in December 1994 its intention to adopt an inflation targeting framework from January 1995, and it operated under this framework until joining EMU in January 1999. Spain had been a member of the ERM since 1989, and the introduction of the IT took place shortly after the widening of the ERM band to ±15 percent in August 1993. At the time of the regime change, monetary policy faced new challenges, with the Spanish currency (peseta) coming under speculative pressure in March 1995, and it was devalued. But against the background of a continued tightening of monetary policy, the peseta strengthened, and inflation expectations fell. The Bank of Spain managed to reduce inflation from 4.7 percent to under 2 percent in the three years following adoption of the IT. The considerable width of ERM bands gave the authorities leeway in pursuing inflation targets subject to the exchange rate band. Disinflation was underpinned by supporting monetary policies and decisive and strong fiscal consolidation.

● Finland adopted an explicit inflation targeting framework from February 1993 until the introduction of the single European currency (euro) in January 1999. It adopted inflation targeting after abandoning the peg of the Finnish currency (markka) to the European currency unit (ECU) in September 1992. Between January 1995 and October 1996, it adopted a ±3 percent fluctuation band against the ECU, and subsequently joined the exchange rate mechanism of the European Monetary System (ERM), allowing the markka to fluctuate within a ±15 percent band. The move to the wide band of the ERM did not affect the BoF's monetary policy stance: although the pass-through from exchange rate movements to inflation had weakened with the markka's floatation (Tyvainen, 1997), the Bank of Finland held the markka in a rather narrow corridor of about ±2.5 percent to the deutsche mark. A key factor that contributed to avoiding conflicts between the inflation and exchange rate targets was the significant, gradual and steady fiscal consolidation throughout the period.

Source: Schaechter et al. (2000).

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similar to the one implied by macroeconometric model estimates in another NBH working paper by Jakab and Kovács (2002). Not surprising, the simulations in Benczur et al. are very sensitive to assumptions on inflation persistence: higher persistence, and therefore less forward looking behavior in forming inflation expectations, could increase the cost of disinflation and imply sacrifice ratios well outside the range reported here.

17.   **Policy frameworks can play a role in reducing the costs of disinflation, invariably a goal of policy makers.** In introducing the new inflation targeting framework, the NBH noted that "for the purpose of reducing the cost of disinflation, the Central Bank had devised a gradual but ambitious program of disinflation of several year's duration." As noted in Buiter (2002) policy

frameworks that reduce inflation persistence can help reduce costs of disinflation. This can be achieved by inducing a more forward-looking behavior in the economy or by improving the response of prices and wages to changes in relative prices. The latter can be achieved either through changes in the price- and wage-setting mechanism, or by improving the credibility of disinflationary policies.[23]

18.   **The IT framework may help reduce the costs of disinflation in Hungary in a number of ways.**

●   **By making inflation expectations more forward-looking—hence weakening the weight of past inflation.** Based on a sample of inflation targeters and non-inflation targeters, Corbo et al. (2001) found that inflation persistence declined strongly among targeters during the 1990s, suggesting that inflation targets strengthened forward-looking expectations of inflation. Corbo also found that inflation forecast errors, based on country VAR models for emerging market economies, fell consistently with adoption of inflation targeting, toward the low levels prevalent in non-inflation targeting industrial countries.

●   **By focusing monetary policy more clearly on inflation.** The framework may improve the NBH focus on price stability, as well as the NBH's response to inflation shocks. By being particularly visible and easily monitored, the targets provide a readily understood and transparent nominal anchor for monetary policy—and help to establish the necessary credibility to make the formation of expectations forward looking.

●   **By acting as a commitment device.** To the extent that the formal framework is binding on the monetary authorities, inflation targeting can increase the accountability of the central bank, helping avoid time-inconsistency problems. In this context, the new framework and the choice of the ERM2 style exchange rate band provides a strong signal of the authorities' intention to seek early EU membership and adoption of the euro. The existence of a clearly established end-point serves to reinforce the role of inflation targets in anchoring the policy framework, helping lend credibility to the NBH's ambitious program of disinflation.

19.   **The effectiveness of the framework (in reducing the cost of disinflation) hinges on the NBH's ability to shift market expectations in the direction of its inflation targets.** As argued in Yetman (2001), with the objective of monetary policy clearly stated, the distance between expected inflation and the actual target is closely linked to the credibility of policies. In this regard, the NBH should be able to build upon its initial success, but the following considerations will be at play:

●   Strengthening the credibility of the inflation targeting framework will take time and depend on the NBH's success in meeting disinflation objectives. At the same time, the NBH's ability to achieve lower inflation will, ultimately, depend on how quickly expectations about future inflation become more firmly anchored on the target. The less-than-perfect monetary policy

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[23] Following Blinder (1999), "a central bank is credible if people believe it will do what it says."

transmission mechanisms—as highlighted in section B of this paper—would seem to add to the NBH's challenges.

• Ensuring that supportive policies are in place will be key, so that the NBH can give priority to inflation. As discussed in section C of this paper, a prudent and supportive fiscal policy is essential, including by keeping the external current account deficit within safe limits.

• Keeping the monetary policy framework transparent, and building on it, could help improve the response of prices to NBH adjustments in policies. By doing so, agents may be increasingly able to infer the objective of monetary policy from observing changes in the NBH's instrument, rather than from economic outcomes. The quality of the NBH's *Quarterly Report on Inflation* should facilitate the task at hand by helping communicate to the public the forward looking nature of monetary policy.[24]

E. Concluding Remarks

20. **The adoption of the inflation-targeting regime is a welcome development.** It has met with much initial success, and provides an appropriate framework for monetary policy anchored firmly on disinflation. Various aspects of the monetary policy transmission mechanism pose challenges for the NBH, calling for prudent assumptions in the conduct of monetary policy in light of the benefits of strengthening policy credibility. Successfully implementing the IT framework can play a significant role in helping to reduce the costs of disinflation in Hungary, especially when supported by a high level of transparency and adequate support from fiscal policy.

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[24] Clearly, a number of other detailed but important technical and institutional issues play a role in how effective the IT framework can be. While analyses of all these issues is beyond the scope of this paper, it is important to stress that the NBH has chosen a simple and transparent system that seems to have most, if not all, the desirable institutional features of a successful inflation targeting framework.

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II. THE DEMOGRAPHIC SHOCK AND HUNGARY'S PENSION SYSTEM[1]

A. Introduction

1.   **Aging populations pose a serious fiscal risk over the longer term for many OECD countries—and Hungary is no exception.** Hungary has a fertility rate well below replacement level, leading to a simultaneous shrinking and aging of the population, with the proportion of persons age 65 or older projected to more than double by mid-century. The aging problem is, however, somewhat less severe than that of some of the other OECD countries, but only because of the relatively shorter life expectancy of the Hungarian population.

2.   **Rising costs in the social security system—exacerbated by an increasing dependency ratio—pose the greatest threat to long-term fiscal stability.** But the demographic time-bomb will not fully hit for another two decades, allowing the government time to enact forward-looking reforms to limit the long-run fiscal impact. Indeed, the 1997 pension reform (a move to a two-pillar system, an increase in the retirement age, and a change in indexation) aimed at addressing this future contingent liability. Completion of this reform has stalled, however; the short-term impact on the fiscal accounts may have been a consideration.

3.   **The reform measures to date are not enough to avoid future fiscal pressures from social security shortfalls.** Even assuming completion of the 1997 reform, the OECD estimates that the pension-related revenue shortfall could reach 1½ to 2½ percent of GDP by mid-century. A number of additional measures could be taken to forestall the coming demographic crunch, including changes in contributions rates and/or benefits, further raising of the retirement age, and more broadly, addressing the low labor force participation rates, particularly with respect to older workers and the minority Roma population. More fundamental reform proposals—such as shifting to a notional defined contribution system (described below)—have also been put on the table.

4.   **This paper will focus on the impact of aging on the public pension system.[2]** The next section describes the background underlying Hungary's current pension system. Section III provides a review of some of the recent work assessing Hungary's pension system viability. The subsequent sections then explore some of the implications of further reform options, both from a theoretical point of view and with scenario analyses.

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[1] Prepared by Nancy Wagner.

[2] While this paper restricts itself to an analysis of the pension system, another serious fiscal strain, in the context of the demographic shock, will likely be that imposed by the health care system. Absent major structural reforms, the OECD (2000) projects that the deficit of the health care system could reach 5.7 percent of GDP by 2050, up from the current 0.8 percent of GDP.

B. The Current Pension System

Background

5.   **Hungary's pension system evolved over time in response not only to macroeconomic and political developments, but also far-reaching shocks to the system.** Thus, in the first decades of the 20th century, Hungary—as part of the Austro-Hungarian Empire—introduced a Bismarckian-type pension system, namely, contribution-financed pensions with benefits roughly proportional to contributions. Initially, the pension system was capitalized, as the first disbursements were to be paid long after the first contributions. But World War II, following on the heels of the Great Depression, left the pension funds depleted of their assets: inflation eroded the value of bonds and bank deposits; shares in destroyed real estate and enterprises were worthless; and any remaining assets were confiscated by the occupation or the succeeding government (Kun (2001)).

6.   **In the aftermath of World War II, a pay-as-you-go (PAYG) system was introduced, with the benefits of the pensioners paid with the contemporaneous contributions of the active generation.** Thus, the first generation of pensioners under the PAYG received an outright grant from the current workers. The link between contributions and benefits was loosened even for succeeding generations, and pensions were financed from the central budget. Moreover, during this period, the retirement age was lowered by five years to 60 for men and 55 for women.

7.   **But the system was yet to experience another radical shock—the collapse of the socialist system at the end of the 1980s and a resultant structural transformation that would shake the roots of the entire economy.** In the first years of the transition to a market economy, economic activity contracted dramatically, and unemployment more than quadrupled. This led to a policy decision to provide incentives for early retirement as a buffer against unemployment, with the participation rate dropping by as much as 10 percentage points by 1996.

8.   **All this had adverse implications for the pension system.** While the old-age dependency ratio[3] only edged up from 35 percent in 1989 to 35.6 percent in 1996, the system dependency ratio[4] shot up from 51.4 percent in 1989 to 83.9 percent (Kun (2001)). This sharp rise in the system dependency ratio led to some ad hoc changes to indexation parameters, allowing a substantial drop in the average replacement ratio. Combined with the compression of real wages (to which pensions were indexed) associated with the economic crisis and macrostabilization package in 1995, these changes actually lowered pension expenditure in percent of GDP. Nevertheless, the need for systemic reform was recognized, underscored by the adverse demographic trends and the fiscal costs of transition to a market economy.

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[3] Ratio of retirement-age population to working-age population.

[4] Ratio of pensioners to contributors.

C. Pension Reform in the 1990s

9.   **In the early years of transition to a market economy, the pension system was a traditional PAYG system, but with a broad array of other benefits provided for the older population,** including disability pensions (an important mechanism for premature withdrawal from the labor market), survivor benefits, early pensions (paid by the former employer for early retirees), transportation subsidies, and in-kind services.[5] This system was supplemented after 1993 with voluntary private pension funds (which later became effectively the third-pillar of a reformed multi-pillar system).

10.   **The PAYG system, in the absence of reform, was projected to generate rising deficits by the middle of this century.** A simulation by Rocha and Vittas (2001) showed that the public pension system would move from approximately balance in 1997 to a deficit of about 6 percent of GDP by 2050, with the old age dependency ratio almost doubling and the system dependency ratio rising by about 35 percentage points to 120 percent.

11.   **The government therefore undertook comprehensive pension reform in 1997—** modifying both the existing public PAYG system and introducing a compulsory second pillar based on private pension funds—with the new multi-pillar system coming into effect in January 1998. In addition to improving the viability of the public pension system, the introduction of the mandatory 2nd pillar was expected to more thoroughly develop an institutional investor base (much more so than the voluntary 3rd pillar) and thereby contribute to increasing the depth and stability of domestic capital markets.

12.   **The main features of the reform to the PAYG included:**

- raising the retirement age gradually to 62 for both men and women, to be fully phased in by 2009;

- increasing the number of years of service to 40 for early retirement eligibility, also in full effect by 2009;

- increasing the reward for later retirement, while raising the penalty for early retirement;

- switching to a "Swiss" indexation formula—50 percent net wages and 50 percent CPI inflation—from backward indexation based on net wages;

- reducing the redistributive element through changing the benefit formula (including removing the penalty on higher income workers); and

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[5] The OECD notes that these in-kind services, typically provided by local governments, appear to have a strong work disincentive for lower-income individuals, as such services are cut as soon as additional income is available.

- broadening the payroll tax base.

13. **Some of these changes were designed to tighten the link between benefits and contributions, with the intent of enhancing compliance and shifting from a redistributive role toward one with more of an insurance nature.** Intra-generational redistribution would still be accomplished, but outside of the pension system through a top-up to a minimum level. Employers' contributions to the public pension fund would gradually decrease from 24 percent of wages in 1997 to 18 percent in 2002, while employees' contributions would rise from 6 percent in 1997 to 8 percent by 1999 (Table 1).

Table 1. Hungary: Proposed Contributions to Pension Schemes
(Percent of Wages)

	Employer	*Employee*		
	Both Systems	**Pure PAYG System**	**Two-Pillar System**	
			1st Pillar (PAYG)	**2nd Pillar (private funds)**
1997	24	6	n.a.	n.a.
1998	24	7	2	6
1999	22	8	1	7
2000	22	8	0	8
2001	20	8	0	8
2002	18	8	0	8

Source: Ministry of Finance.
Note: The proposed reduction of employers' contributions was endorsed after the 1997 reform package.

14. **The government's decision to introduce a private 2nd pillar, rather than limiting reform to the PAYG system, was based on four perceived shortcomings of the PAYG-only reform scenario:**[6] (i) surpluses in the PAYG system could translate into political pressures to increase benefits; (ii) surpluses would also imply a new role as asset manager for the public pension fund; (iii) surpluses in a public pension fund would not contribute to capital market development to the extent that private pension funds could; and (iv) private funds could generate higher returns and diversify risks.

15. **The key elements of the two-pillar system (with the 1st pillar PAYG and the 2nd pillar privately-funded) included:**

- new labor market entrants were required to join the two-pillar system as of mid-1998.

- current workers could choose to remain in the modified PAYG system, but could also opt out and join the new system. Those who chose to join the new system were also given the option, for a limited period, to return to the modified full PAYG system.

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[6] See Rocha and Vittas (2001) for a more extensive discussion.

- a reduction in the annual accrual rate (for each year of service) earned under the 1st pillar PAYG from 1.65 percent per year (as in the pure PAYG system) to 1.22 percent per year, implying that pensioners under the new system would receive only about 74 percent of the payout from the PAYG compared to those who opted to remain fully under the PAYG;

- employers would continue contributing the same percentage of wages to the public pension scheme, but employees' contributions to the 1st pillar would be only 2 percent of wages the first year, lowered to 1 percent in 1999, and eliminated by 2000;

- employees would contribute 6 percent of gross wages to the 2nd pillar in the first year, rising to 8 percent in 2000 and beyond (Table 1);

- employees who had contributed to the two-pillar system for at least 15 years would be guaranteed a minimum pension benefit from the 2nd pillar of 25 percent of their 1st pillar benefit, implying a minimum pension of about 93 percent of the full PAYG.[7]

16.   **Current workers were given until September 1999 to decide whether to join the two-pillar system or remain with the PAYG.** Based on the assumption of private pension fund returns of 2 percent over real wage growth, the two-pillar system was intended to be attractive to workers age 36 and under. Indeed, initial reform plans called for requiring all workers over 40 years of age to remain in the pure PAYG system.[8] However, concerns that a mandatory cut-off age would trigger constitutional challenges led to the decision to allow anyone to join the two-pillar system.

17.   **A much higher-than-anticipated percentage of older workers opted for the new two-tier system,** perhaps the result of overly optimistic expectations on private investment fund returns or a lack of confidence in the PAYG system. As of end-2001, almost 60 percent of employees, or about 2.2 million workers, were members of the 2nd pillar, with more than 22 percent over age 40.[9]

18.   **As of 2001, the accumulated assets in the 2nd pillar private pension funds were estimated at Ft 260 billion (about US$917 million), with more than 80 percent invested in domestic government paper, less than 10 percent in domestic equities, and only 4percent in foreign securities.** The relatively low diversification of the funds' portfolios

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[7] That is, if B represents the benefit paid to a participant in the full PAYG plan, then the minimum pension for a two-pillar member is .74B+.25(.74B) = 92.5B.

[8] Rocha and Vittas calculate that, while the guarantee on the 2nd pillar is not likely to be binding for younger workers, the guarantee translates into a minimum real return of 4 percent per year for workers in their mid-forties.

[9] Meanwhile, membership in the voluntary 3rd pillar reached 1.2 million.

reflects—not so much the limits imposed on asset composition (investment in equities and abroad is well below the ceilings)[10]—as the fact that funds' performance is benchmarked against a long-term government bond index.[11] Table 2 provides the real yields on the private pension funds to date, compared with the real growth in the wage bill as a proxy of the implicit rate of return on the PAYG.

Table 2. Hungary: Real Yields/Growth
(In Percent)

	2nd Pillar Pension Funds	Wage Bill
1998	3.0	5.8
1999	8.9	9.2
2000	-1.8	4.7
2001*	-1.0	9.3
Average (1998-2001)	2.3	7.2

* Preliminary estimate (with range of (-1.2) to (-0.8)).
Sources: Hungarian Financial Supervisory Agency; staff estimates.

19.   **The real growth of the wage bill exceeded the real yield on the pension funds over the past four years.** This appears in contrast to the usual arguments of dynamic efficiency,[12] which suggest that the expected marginal product of capital (even when risk-adjusted) should be greater than the expected growth of aggregate wages over the long run. Of course, the comparison here is for a very short time period, and hence no long-run conclusions should be drawn. It, nevertheless, does highlight that, in a rapidly converging economy like Hungary's, high productivity growth coupled with increasing employment can produce seemingly anomalous results which—perhaps over the near- to medium-term—could temporarily favor a public unfunded system to a funded one.

D. Additional Steps in 2001

20.   **The new government which came into office in 1998 evidenced less enthusiasm for the reformed pension system.** Completion of the reform stalled: the option to switch back to the full PAYG was extended to December 2002, and the contribution rate to the 2nd pillar remained at 6 percent, 2 percentage points less than originally envisaged. The capped

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[10] The limit on equity holdings is 50 percent of total assets, while the limit on foreign assets is 30 percent.

[11] This relative performance evaluation of Hungary's pension funds can lead to herding behavior among fund managers and result in over-investment in the bond market, at a cost to diversification.

[12] See, for example, Feldstein (1996) and Abel *et al* (1989).

contribution rate, in combination with the higher-than-expected number of older workers in the 2nd pillar, increased the probability that the government's Pension Guarantee Fund would have to be tapped in the future, with the longer the delay in raising the contribution rate, the greater the risks of triggering the guarantee.[13]

21.   **The reasons for deviating from the original plan are not entirely clear, but may point to concerns about the transitional costs—and the associated impact in the short-term on the fiscal deficit—being greater than expected owing to the reformed system's popularity.**[14] But this would be a case of putting the cart before the horse. Although the initial fiscal costs would be higher (and meeting the Maastricht fiscal criterion somewhat more difficult), the higher fiscal deficit would be neutral from the standpoint of macroeconomic stability, as the additional savings in the pension funds would offset the reduction in public savings.

22.   **In addition to capping the contribution at a lower rate than originally planned, the government reversed some of the other features of the initial reform, with the adoption of a reform package in November 2001.** The major changes were:

- the mandatory nature of the 2nd pillar was eliminated for new labor market entrants. As of January 1, 2002, new labor market entrants would have to choose, within a given time period, which system they wished to join.

- the guarantee on the minimum pension payout of the 2nd pillar was abolished, including retroactively. The Pension Guarantee Fund would continue to exist, but would now only provide guarantees against mismanagement, fraud, etc., more along the lines of a deposit insurance scheme.

23.   **What are the likely implications of these changes?** It will be difficult to fully assess until after the December 2002 switch-back deadline, because most participants in the two-pillar scheme will likely wait to make their decisions until close to the deadline (in fact, very few have returned to the full PAYG so far). Nevertheless, a preliminary assessment indicates that some aspects of the latest package may improve the pension system's viability, while other features are likely to cause a deterioration over the longer run.

24.   **First, the decision to allow voluntary participation for new labor market entrants could lead to an increase in the unfunded liabilities of the overall pension system, defeating a purpose of the original reform, to the extent that workers choose to participate in the traditional PAYG plan.** The fiscal deficit, all else equal, would be

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[13] The Pension Guarantee Fund has been financed through membership fees (equal to 0.3 to 0.5 percent of contributions), but would ultimately be backed by the central budget.

[14] In 2001, transfer payments from the central government to the Pension Insurance Fund to cover the losses in contributions owing to the 2nd pillar were about 0.6 percent of GDP.

smaller in the near-term, but only as long as the temptations to spend the extra revenues from contributions were resisted.

25.   **Second, the elimination of the state-guarantee for privately funded pensions reduced the contingent liabilities stemming from the reformed pension system, particularly in view of the surprisingly high number of older participants.** Thus, to the extent that the guarantee's withdrawal does not lead to a significant backflow into the traditional PAYG plan, the intertemporal fiscal balance would be improved. But the generosity of the initial guarantee may well have been a reason that so many older workers chose to participate in the two-pillar scheme—there was almost no downside risk while there was potentially unlimited upside gains, depending on investment returns—and the guarantee's abolition might persuade a large number of these older participants to return to the full PAYG system.

26.   **Third, the maintenance of the lower contribution rate to the private second pillar, in combination with the above two changes, could well induce a fairly large backflow into the PAYG.** Rocha and Vittas estimated that, if the 6 percent contribution rate were maintained, this would lower the equilibrium cut-off age (i.e., the age at which the two-pillar system's benefits are likely to exceed those of the pure PAYG scheme) to perhaps 28–33 years. If participants were to take this into account, the unfunded liabilities of the pension system could rise significantly. If, however, most participants remain, the net result is a decline in the unfunded liabilities, even relative to the initial reform, through an effective reduction in the benefits-to-contributions ratio in the 1st pillar of the two-pillar scheme.[15]

E. Assessment of the Demographic Shock on the Pension System

27.   **But what is the expected impact of the demographic shock on the viability of the reformed public pension system?** The following reviews some of the major findings of studies which have assessed the impact (OECD (2000), Rocha and Vittas (2001)), then examines the outcome of a generational accounting exercise done by Gál *et al* (2001).

OECD Assessment

28.   **Hungary's employment rates are among the lowest in the OECD.** This is particularly true for older workers and the Roma population. In this regard, employment rates in 1999 for those between 55 and 64 were 29.7 percent and 11.3 percent for men and women, respectively, compared with OECD averages of 60.8 percent and 37.6 percent. At the same time, employment rates for the Roma population were less than 50 percent of the average, and this segment of the population, in contrast to the decline in the rest of the population, is projected to double by 2050. The figure below illustrates the employment rates in 2000 by

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[15] There has apparently been no discussion about increasing the PAYG benefit for members in the two-pillar scheme, despite the fact that they will now be contributing more to the PAYG pillar than originally planned.

age-sex cohorts. If these low rates of employment persist, the number of employed could shrink by more than 25 percent in the next five decades, exacerbated by the rising share of older workers.

Employment/Unemployment Rates by Age-Sex Cohorts, 2000
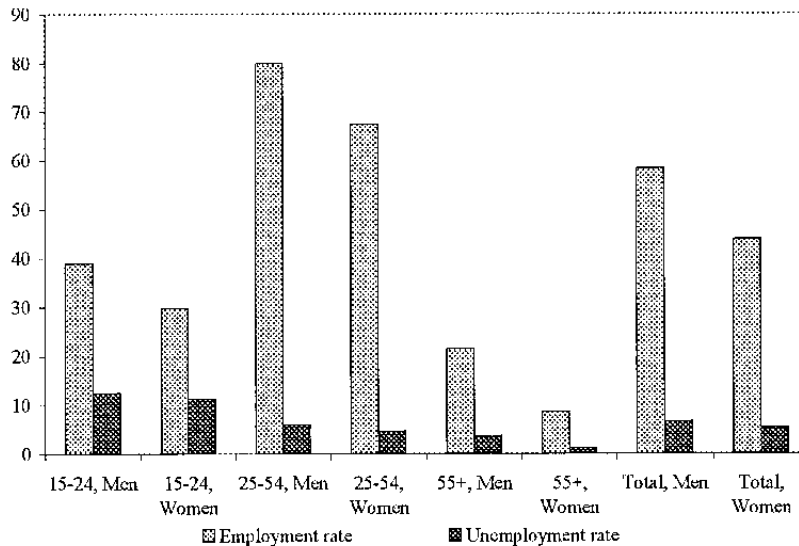
Source: Ministry of Finance.

29. **Two of the most important reform measures—which have greatly improved the long-term viability of the pension system—have been the increase in the retirement age and the shift in indexation.** With these changes, the outlook is less gloomy, as employment rates should rise for older workers, albeit offset to some degree by falling rates for younger cohorts, as average length of schooling rises. The OECD uses as its baseline a rise in the employment rate for the 15–64 cohort of 10 percentage points to 66 percent by 2050 (compared with the current OECD-Europe average of 60 percent). The PAYG system is then close to balance until 2030, after which it moves into deficit, with the shortfall reaching about 1¼ percent of GDP by 2050. The shift to Swiss indexation could, however, turn out to be contentious, as this implies that the average replacement rate would decline over the pension payment period from 60 percent of net wages to 45 percent. If, under political pressures, this part of the reform were reversed, the PAYG deficit would rise by 2050 to 2¾ percent of GDP.

30. **The OECD also considers the impact of the government's proposals to lower the employer's pension contribution rate by up to 6 percentage points** (in fact, as shown in Table 1 above, with more recent information, the MoF has already built in a 2 percentage point cut by 2002). The OECD projects that, with a 2 percentage point cut, the PAYG system would remain in deficit throughout the next five decades, with the shortfall somewhat greater

than 1½ percent of GDP by 2050. If the contribution rate were reduced by the full 6 percentage points, the deficit would be an additional percentage point greater by 2050.[16]

Rocha and Vittas assessment[17]

31.   **As noted earlier, absent reform, the public pension system would have generated deficits of as much as 6 percent of GDP by 2050.** Restoring balance would have led to a rise in the contribution rate to more than 50 percent or, alternatively, a cut in the replacement rate from about 60 percent to under 35 percent. The increase in the retirement age alone under the reformed pension system is estimated to have reduced future annual deficits on average by about 1½–2 percent of GDP. When the shift to Swiss indexation is added, the overall improvement in the PAYG balance is more than 4 percentage points of GDP by 2050.

32.   **The revenue losses to the PAYG system from the diversion of contributions (assuming they are maintained at the 6 percent rate) to the 2nd pillar rises to about 0.8 percent of GDP after the first 5 years, then increases to about 1.4 percent by the third decade.** These developments reflect the rising share of the active population enrolled in the two-pillar system. Had the contribution rate to the 2nd pillar been raised to 8 percent as planned, the PAYG deficits would have been 0.3–0.4 percent of GDP larger. By 2040, the PAYG deficit is smaller than it would have been had the 2nd pillar not been introduced, as most retirees would then be under the two-pillar system, with a public pension system replacement ratio of only about three-fourths that of the pure PAYG system.

33.   **With the 6 percent contribution rate, Rocha and Vittas' scenario shows the public pension balance moving into deficit around 2014 and reaching about 1 percent of GDP by 2050.** Thus, this scenario is more pessimistic than the OECD's as to the timing of moving into deficit, but somewhat more optimistic as to the size of the deficits over the longer-term. However, from a macroeconomic point of view, the more relevant measure of the impact of the reform is to consider its impact on national savings. Rocha and Vittas examine the first-order impact by combining the savings from the public and private pillars (gross contributions plus interest minus redemptions). They show that total pension savings rise from a deficit of about ½ percent of GDP, when the multi-pillar system was introduced, to a peak of more than 2 percent of GDP by the third decade, then fall to about 1 percent by 2050. If the 2nd pillar contribution rate had been raised to 8 percent, the overall pension savings would have followed roughly the same pattern as described above, but with the greater contribution from the private pillar offset by slightly larger deficits in the public pillar. However, this assumes, perhaps unrealistically, that the number of participants in the

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[16] These calculations have not built in an employment response to the cuts in contribution rates. Such an endogenous response could mitigate over the longer term, at least to some degree, the impact of the lower contribution rates.

[17] This assessment does not take into account the changes in November 2001, but the authors do employ the assumption that the 2nd pillar contribution rate will remain at only 6 percent.

multi-pillar system is the same under either the 6 or 8 percent contribution rates. If, instead, the maintenance of the 6 percent rate induces a large number of employees to switch back to the full PAYG system, then the outcome in terms of overall pension savings, implicit pension debt, and PAYG deficits would likely be worse.[18]

Generational accounting

34.   **Gál, Simonovits, and Tarcali (2001) examined the impact of reforms on the intergenerational balances of the pension system.** Using the framework of generational accounting, they determined that the 1997 reform package substantially reduced the potential intergenerational tensions. In a broader study by Gál, Simonovits, Szabó and Tarcali (2000), it was determined that almost 40 percent of the generational imbalance in 1996 was due to the pension system alone. Thus, Gál *et al* (2001) narrowed their more recent analysis to examining changes in Hungary's pension system, rather than the full range of government taxes and benefits, and the results that follow refer only to the generational imbalance associated with the pension system. The base year used for the 2001 study was 2000.

35.   **A fundamental assumption of the generational accounting approach is that any changes in taxes and benefits necessary to satisfy the inter-temporal government budget constraint will be borne by future generations.** Current generations pay taxes and receive benefits in line with the present distribution of the net tax burden. Thus, to examine the intergenerational balance, comparisons are made between the newly born cohort (which faces a lifetime of taxes and benefits, according to policy as of 2000) and the as-yet-unborn cohorts (whose taxes and benefits will balance the budget constraint). Among the baseline assumptions in Gál *et al* are a 1½ percent annual average increase in productivity and a 5 percent discount rate.[19]

36.   **The study demonstrates that Hungary's public pension system would have been unsustainable, from an intergenerational point of view, prior to the 1997 reform package.** Without any reforms beyond a rise in the retirement ages of men and women by 1 and 2 years, respectively, the per capita account (in net present value terms) of the newborn would be US$1,130 compared to US$18,950 for future generations (a positive number implies the cohort is a net contributor to the pension system, so that the internal rate of return

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[18] Their estimates also abstract from potential second-order effects of efficiency losses owing to adverse incentives for labor supply and the possibility of more limited development of capital markets.

[19] Note that these assumptions are in line with international practice in generational accounting, but—particularly with respect to the assumption on productivity growth—may not adequately capture Hungary's rapidly converging economy in the earlier years of the projection period.

is negative).[20] The reform package, however, significantly reduced the degree of intergenerational redistribution (although the system is still not in full balance), with the newborns' accounts now at US$3,270 compared to future generations' accounts of US$5,510. Table 3 shows the impact on the generational pension accounts of selected cohorts for each of the major elements of the reform package.

37.   **The full reform package eliminated almost three-quarters of the net losses facing future generations in the pension system.** The shift to Swiss indexation had the greatest impact (indicated by a drop of about US$10,000 in the absolute generational imbalance from that reform alone), followed by the raising of the retirement age (which, by itself, would reduce the absolute generational imbalance by more than US$5,000). The current active generations (ages 0–50) have borne most of the costs of the reform, although the indexation change has allowed current pensioners to also share in the costs. One of the reform measures—phasing out progressiveness from the pension formula, implying a tighter link between contributions and benefits—actually increased the degree of generational imbalance. However, if employment were made endogenous to the system (with greater incentives for a longer working life), this may no longer be the case.

38.   **But how robust are these results to the underlying assumptions?** Gál *et al* perform some sensitivity analyses and find that the absolute generational imbalance is most sensitive to the assumption on productivity growth. Higher productivity growth implies a faster increase in contributions than in benefits under the reform scenario, since benefits are indexed 50–50 to prices and wages.[21] In fact, an assumption of permanently higher productivity growth could reverse the generational imbalance in the pension system in favor of future cohorts (Table 4).[22]

39.   **Changes in the assumptions on the discount rate, the rate of return on private pension funds, and the contribution rate to the 2nd pillar have much more muted effects**

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[20] For the other age cohorts, since only the remaining lifetime is considered, the older the cohort, the smaller the remaining period of contributions relative to benefits, and the account eventually turns negative (implying that the older cohorts are net benefactors from the system). Prior to the 1997 reform package, the age at which the account balance turned negative was only 37 years, reflecting the early effective retirement age. After reform, this rose to 41 years.

[21] Without reform, higher productivity growth would have actually worsened the generational imbalance, as benefits—fully indexed to wages—would have increased more rapidly than contributions.

[22] The absolute generational imbalance may turn negative, implying that future cohorts are less burdened than the newborns, but the generational accounts of newborn and future cohorts are still positive. Thus, both cohorts remain net contributors to the pension system, even under higher productivity assumptions.

Table 3. Hungary: Generational Pension Accounts for Selected Cohorts Under Different Reform Measures
(In Thousands of U.S. Dollars)

Age of Cohort	No Reform	Swiss Indexation	Retirement Age Increase	Phasing out Progressiveness	New Accrual Rates	Partial Pre-funding	Complete Reform
Future	19.0	11.1	14.3	20.2	17.1	15.6	5.5
Newborn	1.1	3.3	1.8	0.9	1.5	1.1	3.3
10	2.9	5.0	3.7	2.7	3.3	2.7	4.8
20	5.4	7.5	6.4	5.2	5.9	5.1	7.5
30	3.9	6.2	5.3	3.6	4.5	3.6	6.7
40	-2.0	0.3	0.0	-2.5	-1.1	-2.0	1.7
50	-11.0	-8.9	-8.6	-11.7	-11.0	-11.1	-7.2
60	-21.3	-19.7	-20.9	-21.6	-21.3	-21.3	-19.6
Absolute Generational Imbalance*	17.9	7.8	12.5	19.3	15.6	14.5	2.2

* The difference in net contributions between newborns and future cohorts, in net present value terms.

Sources: Gal, Simonovits, and Tarcali (2001).

Table 4. Hungary: Generational Pension Accounts: Robustness of Results*

(In Thousands of U.S. Dollars)

Age of Cohort	No Reform r=5, g=1.5	Reform r=5, g=1.5	Reform r=5, g=1.5 8% contribution to 2nd pillar	Reform r=5, g=2	Reform r=5, g=3	Reform r=4, g=1.5	Reform r=5, g=1.5 interest rate = 1.5
Future	19.0	5.5	5.2	4.0	1.1	6.2	5.8
Newborn	1.1	3.3	3.0	4.2	6.6	3.7	3.7
10	2.9	4.8	4.4	5.7	7.8	5.0	3.8
20	5.4	7.5	7.0	8.1	9.7	7.3	4.0
30	3.9	6.7	6.4	7.0	7.6	5.7	4.2
40	-2.0	1.7	1.5	1.6	1.2	-0.2	4.4
50	-11.0	-7.2	-7.2	-7.7	-8.8	-9.6	4.5
60	-21.3	-19.6	-19.6	-20.1	-21.1	-21.6	4.6
Absolute Generational Imbalance**	17.9	2.2	2.2	-0.2	-5.5	2.5	2.1

* r is the discount rate, g is the productivity growth rate, contribution to 2nd pillar is 6 % (unless otherwise noted), real interest rate = 4 percent.

**The difference in net contributions between newborns and future cohorts, in net present value terms.

Sources: Gal, Simonovits, and Tarcali (2001).

on the absolute generational imbalance (Table 4). Thus, the primary impact of introducing the 2nd pillar has been a reduction in the long-term public pension indebtedness rather than redressing intergenerational redistribution.

F. Prospective Further Pension Reform Options

40.   **At the time of the initial reform effort in the mid-1990s, one criticism that was raised about the move to a partially funded system (as with the multi-pillar scheme) was the transitional cost.** It was argued that this cost could be mitigated, while still improving incentives, by shifting instead to another form of public PAYG system—one based on the concept of notional defined contributions (NDC).[23] Over the past year, the government has again floated the idea of such a reform of the overall pension system. The advantages, as claimed, are that NDCs are more actuarially fair by tying contributions more closely to benefits. This should enhance the incentives for a longer working life and, at the same time, reduce the incidence of tax evasion. Such an approach would also consider changes in life expectancy (for population cohorts as a whole) at the time of annuitization of benefits, and would therefore allow for a more flexible retirement age, dependent on the prospective pensioner's choice on the trade-off between higher benefits versus longer retirement period.

41.   **But other reforms could prove just as effective.** Of course, shoring up (as opposed to backtracking on) the funded private pension pillar would be one approach. Indeed, while, in principle, both the private and the PAYG pillar of the pension system could be used to raise the actuarial fairness and, thus, the incentives to participate (officially) in the labor market, strengthening the private pillar might be a more effective way to achieve this goal if contributions to the PAYG pillar are still perceived to have more of a tax nature than the contributions to the private pillar. But if the government prefers to bolster the public system, then further parametric reform of the current PAYG would be another reform possibility. In this connection, consideration could be given to increasing the statutory retirement age to 65 and to limiting the use of disability payments to support early retirement. The issue of indexation could also be revisited. While the move to Swiss indexation was a large part of improving the viability of the system (see below), shifting fully to indexation only to consumer prices would reduce even further the public system's unfunded liabilities.[24]

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[23] A notional defined contribution system is one in which a public unfunded system is redesigned to essentially mimic a privately funded defined contribution system. This is done through the creation of individual retirement accounts (or notional accounts) which, though unfunded, represent claims on future resources, with benefits tightly linked to contributions and the rate of return explicitly based on demographic and productivity changes.

[24] This issue poses the difficult normative question of whether pensioners should share in the productivity gains (as embodied in wage growth) of the younger working generation. One argument in favor of some sharing of productivity gains is that the older generation contributed to the technological know-how, the build-up of human capital, etc., which underpin productivity growth.

42.   **Thus, reform options could be broadly characterized as choosing from among:**
(i) bolstering the partially funded multi-pillar scheme; (ii) parametric reform of the current
unfunded PAYG system; or (iii) introducing an NDC variant of an unfunded PAYG system.
Some of the theoretical and practical considerations regarding the choice of reform approach
are reviewed below.

Theoretical considerations[25]

43.   **In recent years, the superiority of funded pension systems over PAYG schemes
has been forcefully argued.** Among the reasons for this viewpoint are that: (i) funding will
increase saving and hence economic growth; (ii) funded systems are not subject to
demographic shocks; (iii) private funding diversifies risks and, in particular, is immune to
political risk; and (iv) the performance of capital market returns is superior to the rate of
return on PAYG contributions.

44.   **But a closer look reveals that these arguments may not be well-founded:**

- On the **first argument**, the jury is still out on the effect of funding on savings and,
ultimately, on growth. The higher expected returns from private pension funds, for
example, could have either a negative or positive impact on total voluntary savings,
depending on the relative magnitudes of the substitution and income effects.
Moreover, greater confidence in a privately funded pension could reduce the
perceived need for precautionary saving to ensure an adequate income in retirement.

- On the **second argument**, at the most basic level, PAYG and funded pension systems
simply represent different approaches of organizing claims on future output. Claims
in the PAYG system are on the wages of the future working cohort, while funded
systems rely on cashing in assets in the future. In either case, the claims are a type of
zero-sum game on the consumption of pensioners versus the rest of the population.
All pension schemes are, therefore, impacted by the demographic shock, as output
growth, all else equal, would decline in the face of a shrinking labor force, thereby
eroding the contribution base for a public unfunded system or resulting in deflation of
financial assets in private funds. Thus, the fundamental issue is not whether the
pension system is funded or unfunded, but rather how large the economic pie to be
shared between the pensioners and others. That is, one of the central questions
regarding pension reform is its prospective impact on an economy's growth potential.

- On the **third argument**, many shocks would be common to both public and privately
funded pension systems. Diversification only holds if the risks to which each type of
pension system are exposed are negatively correlated or independent of each other.
Shocks to output, for example, affect all pension schemes (as described above). And
political risk can affect both public as well as privately funded pension schemes. This

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[25] This section draws heavily on Barr (2000).

risk is more overt in the case of public schemes, with the government able to alter the benefit formula, the contribution rate, etc., or make fiscally irresponsible promises, on which it will eventually have to default. But private funding can also be adversely affected by political risk, with, for example, changes in the taxation of contributions or benefits or fiscal imprudence which could lead to inflationary pressures, ultimately decapitalizing private funds. On the other hand, privately funded pensions are subject to some risks that have less impact on PAYG systems. Purely inflationary shocks, for example, would have a greater adverse affect on funded schemes than on PAYG systems. Similarly, privately funded systems also face, to a greater degree, management risk, investment risk, and annuities market risk [26]

- On the **fourth argument**, Geanakoplos, Mitchell, and Zeldes (1998) demonstrate the flawed analysis of a simple rate of return comparison. Such comparisons fail to account for the cost of continuing to pay for current pension beneficiaries (as well as benefits accrued to the current active generation). Moreover, if the private funds are primarily invested in domestic government bonds, then this represents a claim on future taxpayers in the same manner as unfunded pension liabilities. Conversely, if any surpluses accumulated in the public pension system were invested in the same manner as those in private funds, the rates of return should be essentially the same. Sinn (2000) also shows that, under a reasonable set of assumptions and if the transition costs are fully accounted for, it would be impossible to construct a Pareto-improving transition to a funded system. In sum, the purported gaps in rates of returns between the two systems largely disappear when analytically correct comparisons are made.

45.   **The difference between the two broad types of unfunded schemes is also often overplayed.** The potential equivalence of unfunded traditional PAYG and NDC pension systems can be demonstrated with simplified accrual formulas for these two pension schemes:

Let b_{PAYG} and b_{NDC} represent the pension benefit under the traditional PAYG and NDC, respectively, and let R denote the date of retirement, where 0 is assumed to be the first year of the worklife. Then, for the traditional PAYG,

$$b_{PAYG} = \sum_{t=M}^{R} a_t \cdot v_t \cdot (1+i)^{R-t}$$

where a_t is the accrual rate, v_t is a measure of earnings, i is an implicit rate of return, and M is the time when earnings begin to count for the computation of benefits.

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[26] Annuities market risk could stem from insurance company failures or from the widely varying computations of annuities, dependent on interest rate assumptions, life expectancy calculations, etc.

For the NDC system,

$$b_{NDC} = f_R \cdot \sum_{t=0}^{R} c \cdot w_t \cdot g^{R-t}$$

where f_R is a factor which converts the notional capital into a pension stream after taking into account life expectancy at time of retirement, c is the contribution rate, w_t is the individual worker's wage at time t, and g is a revaluation factor based on an accumulated productivity measure (such as average earnings growth (as in Sweden) or average GDP growth (as in Italy)). [27]

46.   **The traditional PAYG can be modified to mimic the NDC by making appropriate actuarial adjustments to the parameters and variables.** Thus, for example, many PAYG pensions are based on only a subset of earnings (e.g., the last ten years, so that M = R–10), rather than lifetime earnings as in an NDC scheme. The accrual rate, a_t, also often varies over the lifetime, and the earnings measure may not be the individual worker's wages, but rather an average wage or minimum wage concept, depending on the degree of redistribution inherent in the system.

Similarly, for a funded private pension system,

$$b_{PV} = A_R \cdot \sum_{t=0}^{R} c \cdot w_t \cdot (1+r)^{R-t}$$

where A_R is an insurance company's annuitization factor applied to the accumulated funds in the account, c and w_t are as defined above, and r is the average market rate of return minus administrative costs and management fees. This formula is analogous to that of the NDC formula. But A_R is unlikely to be the same as f_R, since the insurance company would need to build in a profit margin and would probably have higher administrative costs. And g is not likely to equal (1 + r). Typically, the rate of return on funds invested in the capital market will exceed the imputed rate of return on a notional account. But, as noted above, the returns on the privately funded pillar cannot be treated in isolation from the transition costs, and once these have been properly taken into account, there is broadly an equivalence between the two types of schemes.

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[27] See Disney (1999) for a description of the recently-introduced NDC pension systems in Sweden, Italy, Latvia, and Poland.

47.   **Thus, at least on a first-order theoretical basis, the issue of the type of pension financing and whether the system is public or private may well be irrelevant.**[28] Instead, the key issue is how to encourage economic growth so that output in the future can better handle the consumption demands of both the working generations and the pensioners. This can be done either through increasing labor productivity (e.g., improving on human capital through education or increasing the amount and/or quality of the capital stock) or increasing the labor supply (e.g., raising the retirement age, inducing higher participation rates, increasing immigration, or importing labor indirectly through investment abroad in countries with growing labor forces).

Practical considerations

48.   **In comparing pension reform proposals, pragmatic aspects of implementing a new system must also be considered.** Among the most important considerations is the administrative costs of setting up and running a particular pension scheme. Additional decisions must also be taken which could affect the presumed actuarial fairness or the attractiveness of a reformed system as well. In this regard, meeting the informational requirements for converting the existing PAYG pillar into one with a transparent NDC system (including "virtual" accounts for all workers) would likely involve a substantial effort in terms of resources and staff. This could ultimately undermine the cost-effectiveness of such a move. Moreover, those countries which have implemented a type of NDC plan have not adhered rigidly to the actuarial fairness—supposedly one of the NDC system's most appealing features—and have allowed for exceptions, such as permitting accrual rights during periods of childrearing, military service, schooling, etc.

49.   **Under either an NDC scheme or a privately funded system (both of which attempt to use actuarial fairness to induce longer working lives), difficult decisions must be taken as to when to allow retirement.** For example, should the retirement age be flexible, but only provided there has been sufficient "accumulation" in the notional or funded account? This would help to avoid the implicit government guarantee of not allowing pensioners to fall below some minimum income, but would, at the same time, penalize lower paid workers and perhaps undermine political support. In a similar vein, should a pensioner be permitted to receive a lump sum payment at retirement (to invest as he or she wishes) or be required to take an annuity? If not required to annuitize, then, again, the issue of an implicit government guarantee arises if the pensioner were to use up his financial resources prior to his death. In addition, an adverse selection problem could arise, in which only those with longer life expectancies would opt for an annuity. In turn, this would imply that insurance companies (or the government under a public NDC scheme) would have to reduce pension benefits for those who choose the annuity option or run the risk of excessive expenditures.

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[28] It is possible that a move to funding could be perceived as improving the actuarial fairness of the system and reducing the incidence of taxation (whether or not it actually does) and could, therefore, induce greater labor input.

50.   **Evidence to date suggests that administrative costs of individual accounts are likely to be considerably higher than for traditional PAYG schemes.** The constrained choice inherent in PAYG schemes allows for administrative economies of scale. But these economies of scale are lost in a decentralized system, with the costs proportionately higher on smaller pension accounts of low earners. Indeed, in the U.K, where capital markets and fund management could be expected to be much more efficient and mature than in an economy like Hungary's, Orszag (1999) estimates that, on average, more than 40 percent of the value of individual accounts is dissipated by administrative costs and fees over a typical career. In a similar vein, but perhaps more applicable for Hungary, James and Palacios (1994) compare the per member administrative costs in U.S. dollars for two emerging markets' pension systems—one funded and the other unfunded. They find costs of US$50.2 per member for Chile's private funded system compared with the Czech Republic's US$2.2 for its public unfunded system.[29]

51.   **In addition, political economy considerations suggest that mitigating the demographic shock through importing labor—either directly or indirectly—may not be as feasible as theory might indicate.** On importing labor directly, policies supporting immigration frequently encounter resistance, often on unfounded fears of taking away jobs from the local population, a surge in crime, or changes in ethnic and cultural composition.[30] As for importing labor indirectly through investment abroad in countries with young and growing labor forces, most of the advanced economies (and even many of the richer emerging markets) are also characterized by aging populations, so that such investment would likely have to target developing economies. But many of these countries suffer from underdeveloped capital markets, inadequate institutional frameworks, or even corruption, all of which may inhibit and undermine returns to private investment.

G. Reform Scenario Simulations

52.   **With the above considerations in mind, there is no clear cut answer as to a superior pension system.** What is clear, however, is that increasing economic output is a win-win situation for all schemes. This section, therefore, looks at some reform scenarios, some of which could increase output, while others adjust benefits or contributions to examine the impact on the overall pension system. The baseline case is based on data and projections

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[29] Another cost that is frequently overlooked with respect to privately funded pension systems is the cost of educating the population so that they are sufficiently well-informed to take advantage of the greater choices associated with private funding.

[30] The government (in office from 1998-2002) attempted to gain support for some immigration by focusing on tapping the ethnic Hungarian populations in the neighboring countries.

provided by Hungary's Ministry of Finance (MoF).[31] The reform scenario simulations will then modify these data and projections, as described below.

Scenario 1: Baseline case

53.   **Tables 5 and 6 present the major macroeconomic and demographic assumptions, respectively, which underpin the baseline case.** Real GDP growth is assumed to slow over time from more than 5 percent per year in the first decade to less than 2½ percent in the final two decades of the projection period. Employment growth turns negative by 2013, reflecting the shrinkage of the population at the same time that it is aging. While the employment rate rises by 14 percentage points,[32] it is insufficient to overcome these demographic factors. Importantly, it is assumed that the contribution rate to the private pillar, while currently at 6 percent, rises to 8 percent in 2003, but at the same time, the employee's total contribution is raised to 9 percent, with 1 percentage point going to the PAYG pillar.

54.   **Figure 1 shows the outcome of these assumptions,** with Panel A illustrating the old-age and system dependency ratios from 2000 through 2050, Panel B the evolution of the pension system deficit over time, and Panel C the public pension debt (accumulating from 2000) and the cumulative pension system surplus (including the 2nd pillar funds). Panel A indicates a persistent, and relatively constant, large discrepancy between the old-age and system dependency ratios. This is in large part explained by the assumption of a roughly unchanged proportion of disabled pensioners (below retirement age) relative to total pensioners. As shown in Panel B, the annual balance of the overall pension system peaks in the 2030's, then falls steadily as the redemptions from the 2nd pillar pick up pace. The cumulative debt of the public pension system, as seen in Panel C, rises to 48 percent of GDP by 2050, but the net asset position of the pension system as a whole—including the contributed funds, interest earned, and redemptions from the 2nd pillar—reaches 108 percent of GDP by 2050.[33]

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[31] The government is required to make an annual submission to Parliament of a 50-year forecast for the Pension Insurance Fund.

[32] This large rise in the employment rate may reflect, in part, assumptions by the MoF about work incentive effects stemming from the growing role of the 2nd pillar.

[33] By comparison, Laursen (2000) shows that, without reforms, the Czech Republic's public pension system debt could reach 135 percent by 2050.

Figure 1. Hungary: Baseline Scenario

Panel A. Dependency Ratios
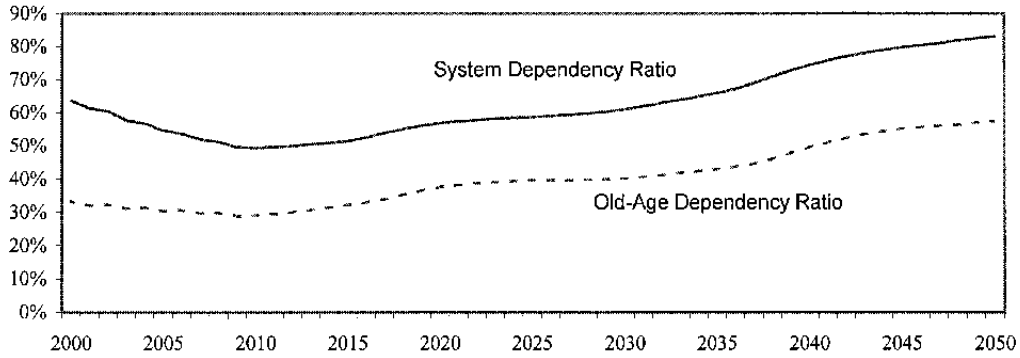
Panel B. Pension System Balances
(In Percent of GDP)
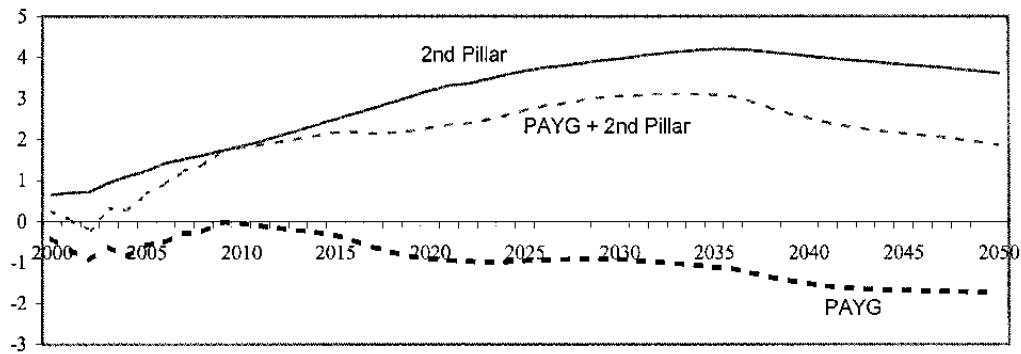
Panel C. Pension System Debt/Net Asset Position
(In Percent of GDP)
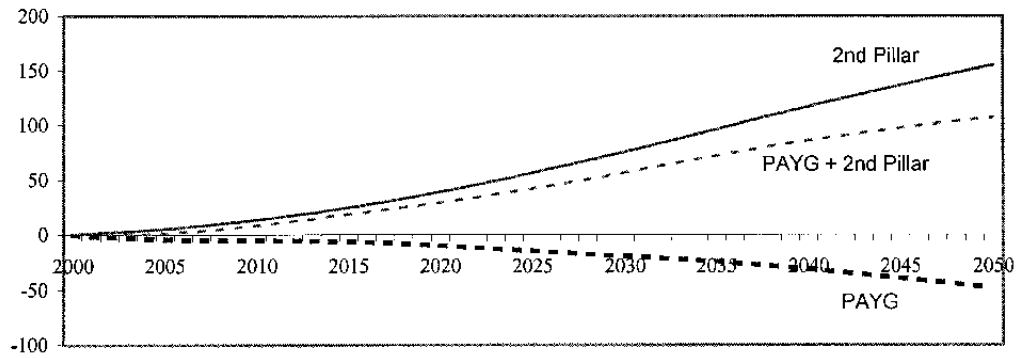
Source: Ministry of Finance.

Table 5. Hungary: Macroeconomic Assumptions for Baseline
(Percentage Change)

	Consumer price index	Gross average earnings	Pension benefits	Nominal GDP	Real GDP	Net average earnings	Number of employed
2000-05	5.1	8.5	6.5	10.9	5.6	7.9	1.9
2006-10	2.8	6.1	4.5	7.6	4.7	6.1	1.4
2011-15	2.5	6.0	4.3	5.9	3.3	6.0	-0.1
2016-20	2.5	5.9	4.2	5.6	3.0	5.9	-0.7
2021-25	2.5	5.6	4.1	5.6	3.0	5.6	-0.5
2026-30	2.5	5.5	4.0	5.3	2.7	5.5	-0.8
2031-50	2.5	5.5	4.0	5.0	2.4	5.5	-1.1

Source: Ministry of Finance.

Table 6. Hungary: Demographic Assumptions for Baseline
(In Thousands of Persons)

	Population						Pension beneficiaries		
	Total	Working age	Retirement age	2nd pillar members	Employed	Un-employed	Total	Old-age benefits	Disabled and other pension benefits
2000	10,064	5,991	1,985	2,093	3,783	239	2,406	1,663	743
2005	9,866	6,100	1,845	2,855	4,173	263	2,279	1,568	711
2010	9,678	6,127	1,774	3,590	4,462	280	2,202	1,542	660
2015	9,498	5,917	1,897	4,113	4,444	279	2,286	1,675	610
2020	9,321	5,560	2,085	4,408	4,293	270	2,440	1,871	568
2025	9,126	5,358	2,118	4,519	4,179	263	2,452	1,913	539
2030	8,897	5,226	2,093	4,451	4,022	253	2,452	1,929	523
2035	8,637	5,006	2,147	4,293	3,809	239	2,513	2,001	513
2040	8,362	4,663	2,306	4,076	3,601	226	2,675	2,178	497
2045	8,087	4,357	2,399	3,859	3,402	214	2,711	2,233	478
2050	7,817	4,144	2,380	3,658	3,222	203	2,678	2,217	461

Source: Ministry of Finance.

Scenario 2: Cap on contribution rate to the 2ⁿᵈ pillar

55.   **The second scenario considers the impact on the pension system if the
contribution rate to the 2ⁿᵈ pillar is capped at 6 percent.**[34] At the same time, the
employees' contribution rate to the PAYG pillar is maintained at 2 percent in the two-pillar
system and at 8 percent in the full PAYG system, as is currently the case. The accumulated
public pension debt, at 38 percent of GDP, is smaller than in the baseline (Figure 2), as the
PAYG system received higher contributions without a fully proportionate rise in benefits to
the multi-pillar members, but the overall net asset position of the pension system is almost 30
percentage points of GDP lower than in the baseline, owing to the substantial (in relative
terms) reduction in contributions to the 2ⁿᵈ pillar.

Scenario 3: Cap on contribution rate to the 2ⁿᵈ pillar, with 10 percent switchback to PAYG

56.   **This scenario replicates the previous one, but with the additional assumption
that about 10 percent of those in the multi-pillar system—discouraged by the low
contribution rate to the 2ⁿᵈ pillar—decide to switch back to the full PAYG scheme.** The
impact on the PAYG system is fairly muted, reflecting in large part the fact that the reformed
PAYG has a tighter link of benefits to contributions in the future. Thus, while the amount of
benefits paid out (at the full accrual rate for those who returned to the PAYG) will rise to the
extent of the switch-back, the contributions also rise by a similar magnitude. (Figure 3),
which illustrates this scenario, thus appears only marginally different from that of (Figure 2),
with the PAYG debt only slightly larger by 2050, but the overall net asset position of the
pension system is some 10 percentage points of GDP smaller, reflecting the reduction in
participants in the private pillar.

Scenario 4: Indexation to consumer prices

57.   **This scenario illustrates the impact of shifting from Swiss indexation to pure
price indexation as of 2003.** The impact on the pension system is dramatic, with the PAYG
scheme moving into surplus by 2007 (and remaining there), and a net asset position of the
public pillar alone at more than 30 percent of GDP by 2050 and at almost 190 percent for the
system as a whole (Figure 4). While the replacement rate, on average, in 2000 for a new
retiree was almost 60 percent, over time this would fall sharply with the shift in indexation.
After 20 years of retirement, the retiree's replacement rate, relative to the average wage,
would have fallen to about 33 percent. Thus, such a modification would place all of the
burden of the demographic shock (and then some) on retirees and would likely not be
politically sustainable. Nevertheless, it illustrates the power of compounding of productivity

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[34] In Scenarios 2 and 3, there is no assumed employment response to the capping of the
contributions to the 2ⁿᵈ pillar. Thus, the outcomes of these two scenarios are more optimistic
(relative to the baseline) than would be the case if the employment rate were to be negatively
affected.

# Figure 2. Hungary: Cap on 2nd Pillar Contribution

Panel A. Dependency Ratios

Panel B. Pension System Balances
(In Percent of GDP)

Panel C. Pension System Debt/Net Asset Position
(In Percent of GDP)

Sources: Ministry of Finance; staff estimates.

- 45 -
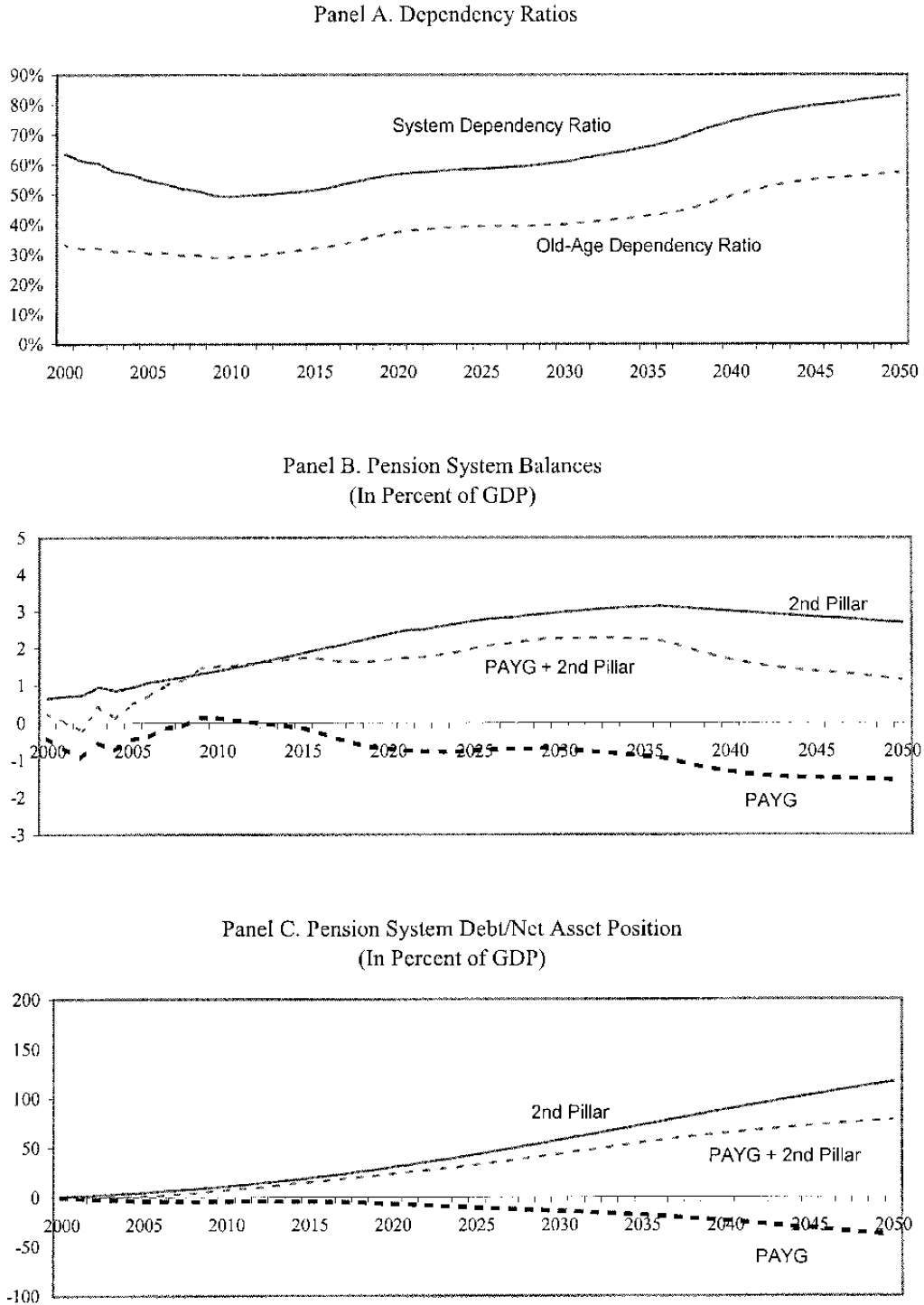
Figure 3. Hungary: Cap on 2nd Pillar Contribution, with 10 Percent Switchback to PAYG

Panel A. Dependency Ratios
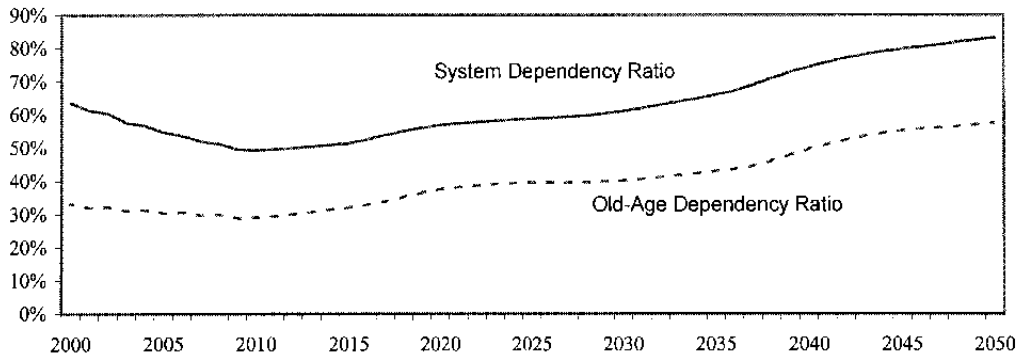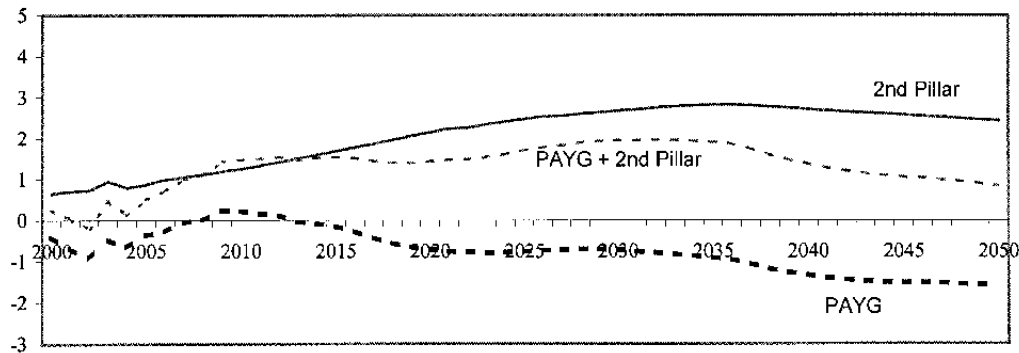
Panel B. Pension System Balances
(In Percent of GDP)

Panel C. Pension System Debt/Net Asset Position
(In Percent of GDP)

Sources: Ministry of Finance; staff estimates.

Figure 4. Hungary: Indexation to Consumer Prices

Panel A. Dependency Ratios

Panel B. Pension System Balances
(In Percent of GDP)

Panel C. Pension System Debt/Net Asset Position
(In Percent of GDP)
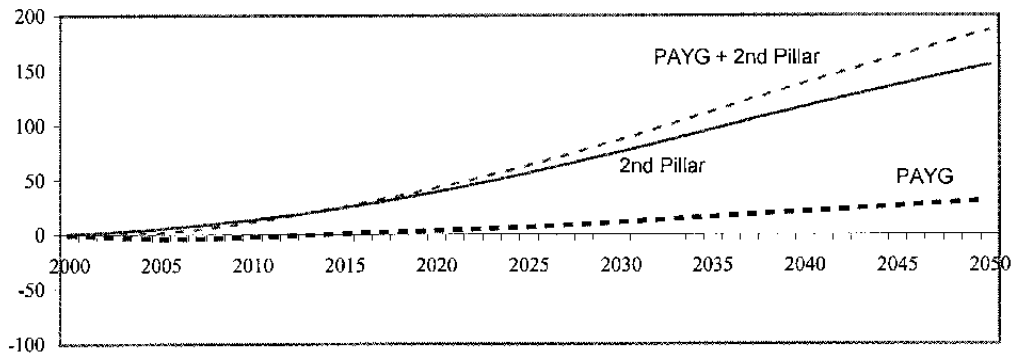
Sources: Ministry of Finance; staff estimates.

gains in a fast growing economy, while suggesting that some modification of the Swiss formula to reduce the 50 percent wage share in the indexation formula could bring the public system into balance, even with population aging.

Scenario 5: Increase in retirement age

58.   **At present, Hungary has a low effective retirement age.** As of 2000, the average age of new retirees via the old-age pension was 58 years, while the average age through an early retirement scheme or a disability pension was 57 years and 48 years, respectively. In the baseline scenario, in line with the changes to the statutory retirement age, the average age of new entrants into the old-age pension system is projected at 62 or higher by 2010, but early retirees continues to leave at ages not much higher than in 2000.

59.   **Scenario 5 therefore projects a rise in the statutory retirement age to 65 by 2015** (phasing it in gradually from 2009 through ½ year increments in the retirement age), as a variant of the baseline scenario. Figure 5 illustrates the outcome, with the system dependency and old-age dependency ratios shifting downward significantly.[35] Both ratios benefit from an increase/decrease in their respective denominators/numerators. The system dependency ratio in this scenario is some 10 percentage points smaller than in the baseline. The PAYG pillar even runs a small surplus during much of the following decade, before returning to deficit. With the cumulative debt of the public pension system 15 percentage points lower than in the baseline, the net asset position of the overall pension system is markedly higher. Moreover, GDP is also larger than in the baseline over the latter part of the period under consideration, boosted by the greater number of employed. As a result, not only are the balances (in percent of GDP) in the pension system considerably more favorable, but pensioners receive on average almost 9 percent more in benefits than in the baseline, thus illustrating the benefits of increasing the economic pie.

Scenario 6: Lower contribution rate to PAYG, endogenous employment response

60.   **As noted earlier, Hungary has a low employment rate, both on an international comparison basis and relative to its own history.** At the same time, Hungary's labor taxes are among the highest in the OECD. Thus, this scenario considers the impact on the pension system of a two-percentage point cut in the contributions rate to the PAYG, relative to the baseline, and allows for an endogenous rise in the employment rate in response to the lowering of taxes.[36] The assumed reduction in the tax wedge takes place in 2003. The elasticity of the employment rate to the change in the tax ratio (expressed as a percent of

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[35] Note that the definition of old-age, as used in this scenario, is based on the statutory age of retirement, implying a change in the "demographic" measure of old-age dependency.

[36] It is assumed that the economy is not operating at full employment at the time of the tax cut.

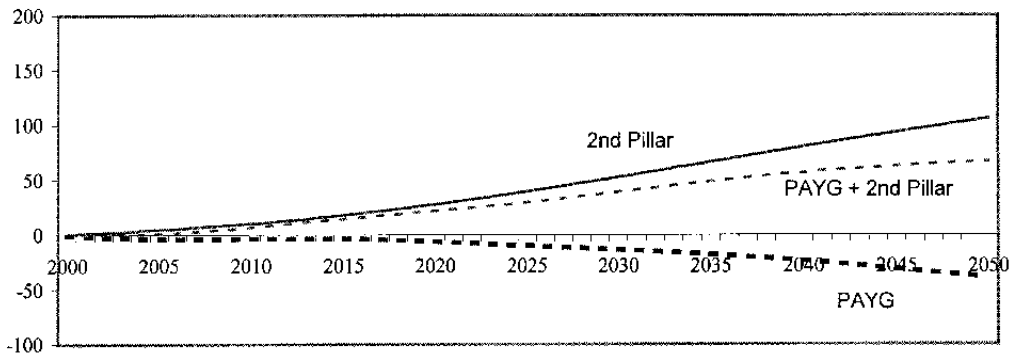# Figure 5. Hungary: Raise Retirement Age to 65
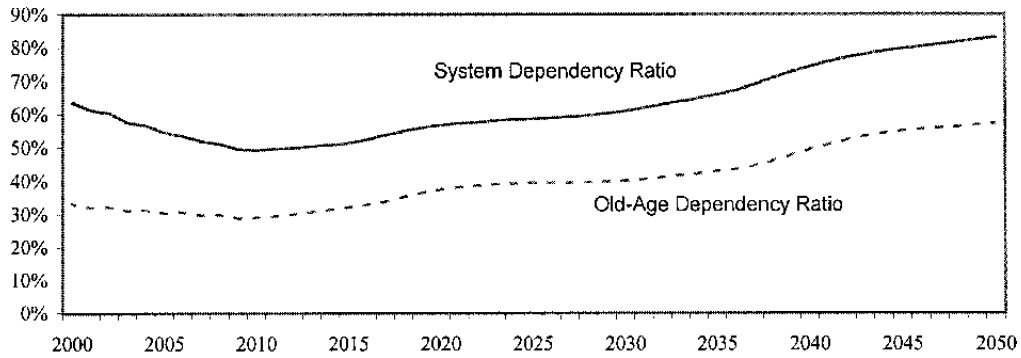
Panel A. Dependency Ratios
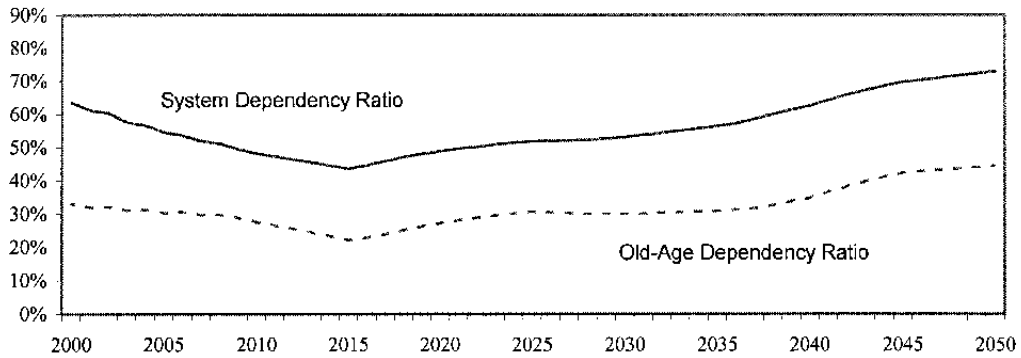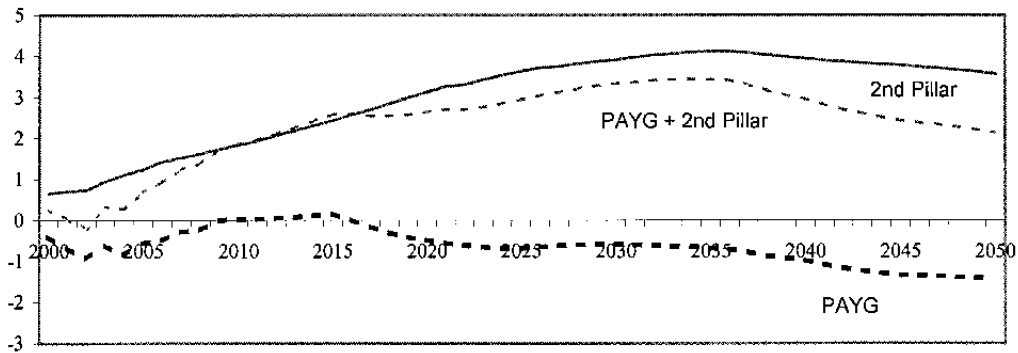
Panel B. Pension System Balances
(In Percent of GDP)

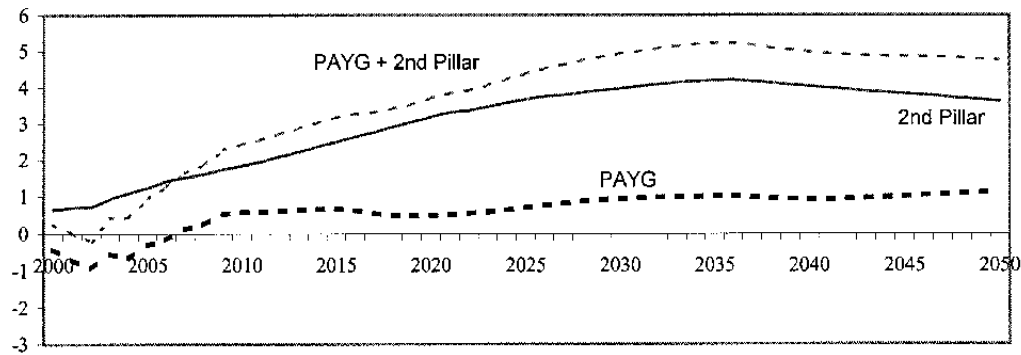Panel C. Pension System Debt/Net Asset Position
(In Percent of GDP)
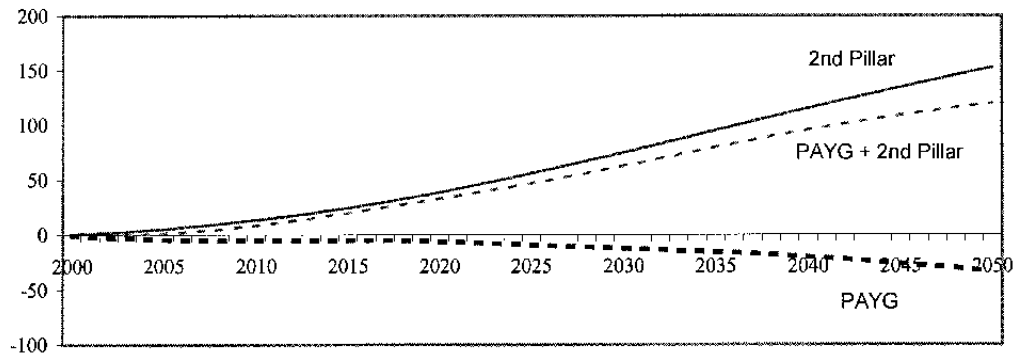
Sources: Ministry of Finance; staff estimates.

GDP) is assumed here to be -0.4, so that a one percentage point cut in the tax ratio translates into a 0.4 percent increase in the employment rate.[37][38]

61. **While the system dependency ratio edges down and GDP is correspondingly larger than in the baseline, the endogenous rise in employment is not enough to offset the impact on the system balances of the reduction in the contribution rate.** Indeed, this is the only scenario in which the PAYG pillar remains distinctly in deficit throughout the next five decades, with the public system debt reaching almost 65 percent of GDP by 2050, about 18 percentage points higher than in the baseline (Figure 6). This negative outcome hinges crucially on the assumption that, while the contribution rate is lowered, the PAYG benefits are not correspondingly reduced.

Scenarios 7a and 7b: Changes in productivity assumptions

62. **The final scenarios illustrate the impact of changing the assumptions on economy-wide productivity.** Scenario 7a assumes a general increase in productivity, such that real annual GDP growth is a half percentage point higher than in the baseline, beginning in 2010. Scenario 7b uses a simple model-based approach to project total factor productivity growth for the Hungarian economy. In the latter scenario, real growth is somewhat lower than in the baseline, but these results hinge crucially on assumptions about investment and human capital growth.

63. **The more rapid growth in Scenario 7a contributes to a sharp reduction in the public pension system deficits and cumulative debt.** This beneficial outcome is in large part due to the Swiss indexation system, whereby contributions increase (assumed in line with higher wages boosted by the faster pace of productivity growth), while benefits rise, but at a slower pace. By 2050, the debt of the PAYG system is some 12 percentage points lower than in the baseline (Figure 7a). Nevertheless, the PAYG benefits per pensioner are 10 percentage points higher, again a clear illustration of the win-win situation of increasing the overall output to be shared by the active and non-active generations.

64. **Scenario 7b employs an approach outlined in Doyle *et al* (2001), in which projections for total factor productivity (TFP) growth are derived, then used in a simple growth accounting framework to project GDP out to 2050.** The projections for TFP growth are based on a formula from Benhabib and Spiegel (1994), which includes variables

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[37] International Monetary Fund (1998) provides cross-country empirical evidence suggesting an elasticity of the employment rate to the tax ratio in the range of 0.3 to 0.5.

[38] Admittedly, one should not focus only on the pension system deficit and debt, but more broadly at the pressures on the fiscal accounts from total pension expenditure, as this gives an indication of how much other fiscal priorities must give way for spending on the demographic shock. And regarding labor market incentives, it is not just the social security contribution rate that matters, but the total labor tax rate.

Figure 6. Hungary: Reduction in Contribution Rate, Employment Response

Panel A. Dependency Ratios
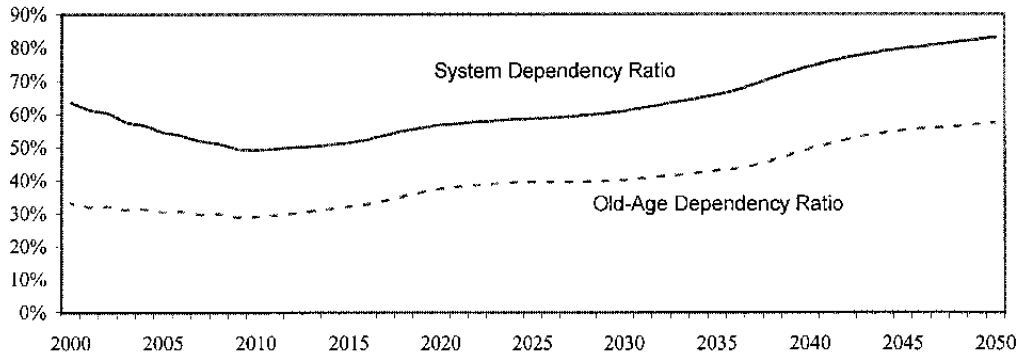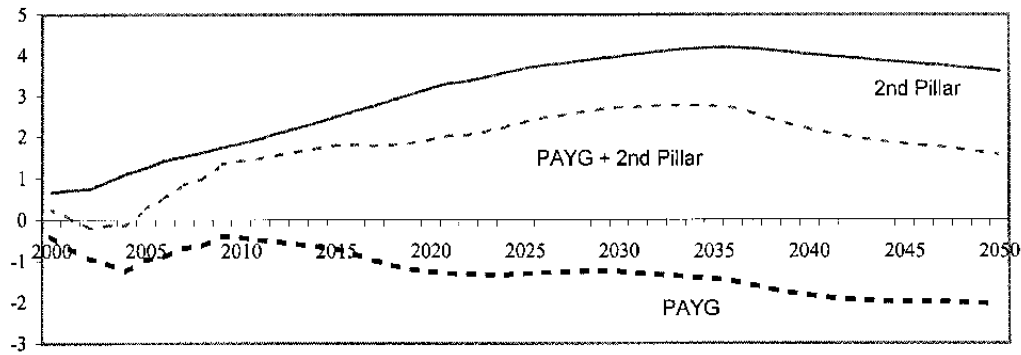
Panel B. Pension System Balances
(In Percent of GDP)

Panel C. Pension System Debt/Net Asset Position
(In Percent of GDP)

Sources: Ministry of Finance; staff estimates.

Figure 7a. Hungary: Higher Productivity Growth

Panel A. Dependency Ratios

Panel B. Pension System Balances
(In Percent of GDP)

Panel C. Pension System Debt/Net Asset Position
In Percent of GDP)
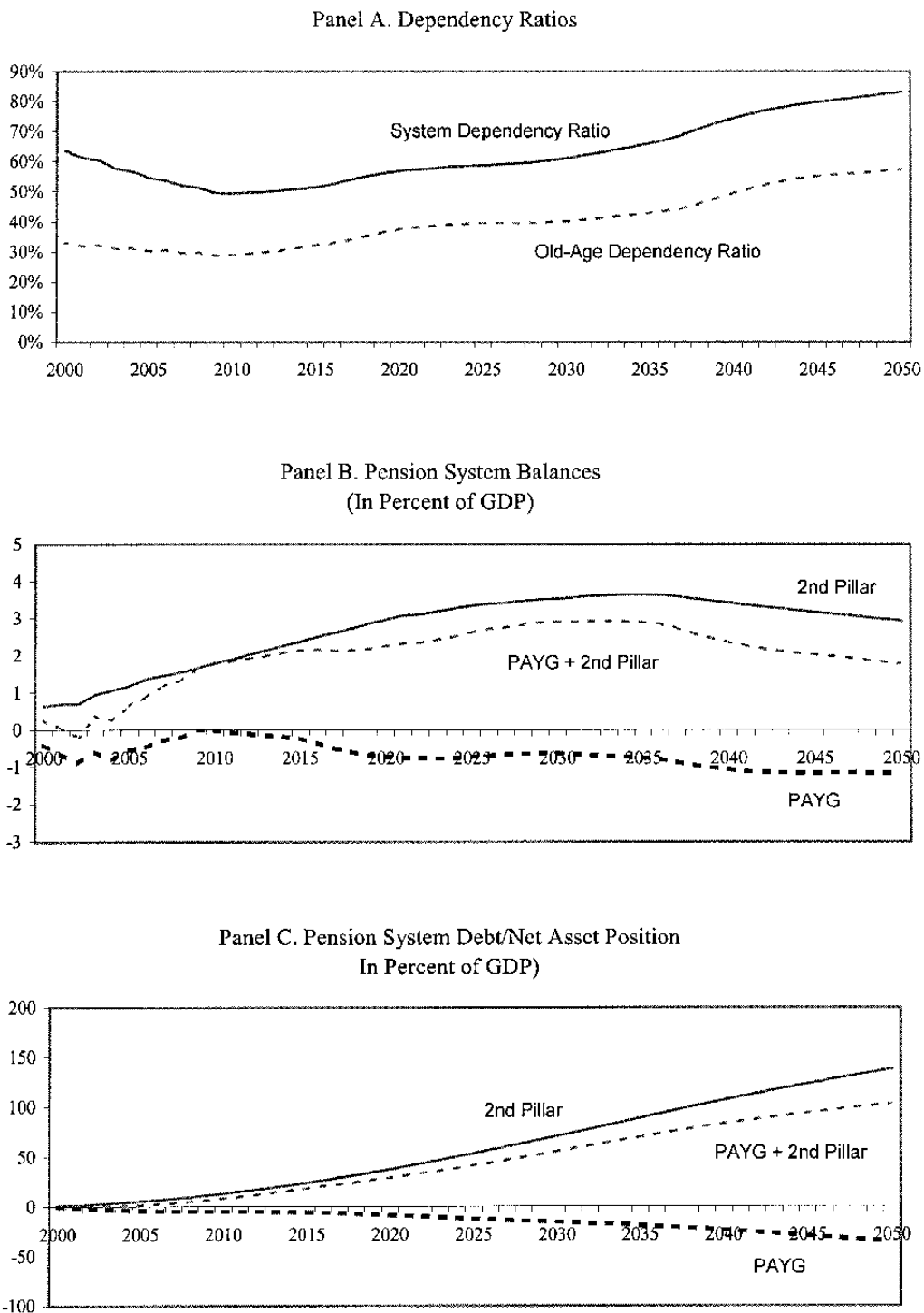
Sources: Ministry of Finance; staff estimates.

for human capital and for a country's per capita income relative to the United States.[39] A Cobb-Douglas growth accounting framework is then used for the GDP projections, with production function of the form, $Y = AK^{\alpha}L^{\beta}$, where Y is output, K capital, L labor, A a technological factor, and α and β are the respective elasticities of output to growth in capital and labor. In this exercise, it is assumed that α and β are 35 and 65 percent, respectively, an approximation for the share of capital and labor in GDP. To derive the long-run growth path, it is assumed that, from 2003 onward, the economy is in a steady state. That is, the capital-to-output ratio is held constant, implying that $dK/K = (dA/A)/\beta + dL/L$.

65.   **The outcome of the exercise in scenario 7b is much less positive, but also illustrates the importance of productivity growth.** As noted earlier, real GDP grows more slowly in this scenario than in the baseline, with the expected opposite results of those from Scenario 7a. Thus, by 2050, the cumulative debt of the public pension system is almost 10 percentage points higher than in the baseline, and the per capita PAYG benefit is about 9 percentage points lower (Figure 7b). The 2nd pillar appears to fare better, with the net asset position *in percent of GDP* marginally higher than in the baseline by 2050, but this reflects the much lower nominal GDP in scenario 7b; in fact, the per capita benefit from the 2nd pillar is some 3 percentage points lower than in the baseline. But the steady state assumption (described above for this scenario) proves critical, in that it implies a fairly muted growth rate in the capital stock, a conservative assumption for an economy undergoing rapid real convergence. If investment were to increase at a more realistic (and faster) pace, the outcome would be significantly more positive. This scenario thus highlights the importance of investment in human and physical capital in dealing with the demographic shock.[40]

66.   **The long-run implications of the reform scenarios are summarized in Table 7.** While public pension expenditure was 7.4 percent of GDP in 2000, this expenditure would decline significantly in each of the reform scenarios by 2050, reflecting the growing role of the 2nd pillar in the provision of pension benefits. Indeed, in most scenarios, the total share of pension benefits in GDP would remain close to 7 percent, with the 2nd pillar making up most

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[39] The formula is TFP growth = .0007*EDU*GAP + .0014*GAP, where EDU is the average years of schooling and GAP is the ratio of U.S. per capita GDP to that of Hungary in 1999 at current international prices. In this scenario, it is assumed that the average years of schooling of the labor force rise gradually from 8.9 years in 1999 to 11 years by 2050, and that U.S. per capita GDP grows at 2.5 percent per annum.

[40] Indeed, the Széchenyi Plan—Hungary's national development plan—was created with the intent to raise investment (in both physical and human capital) and, ultimately, the economy's productivity. The Plan includes a broad array of programs, including substantial expenditure on physical infrastructure (housing, motorway construction) to smaller programs in information technology, R&D, student loans, SME development, and even horse- and spa-related tourism. But it will be important to balance the explicit fiscal costs of such investment with the hoped-for implicit returns in terms of productivity.

Figure 7b. Hungary: Model-Based Total Factor Productivity Growth

Panel A. Dependency Ratios

Panel B. Pension System Balances
(In Percent of GDP)

Panel C. Pension System Debt/Net Asset Position
(In Percent of GDP)
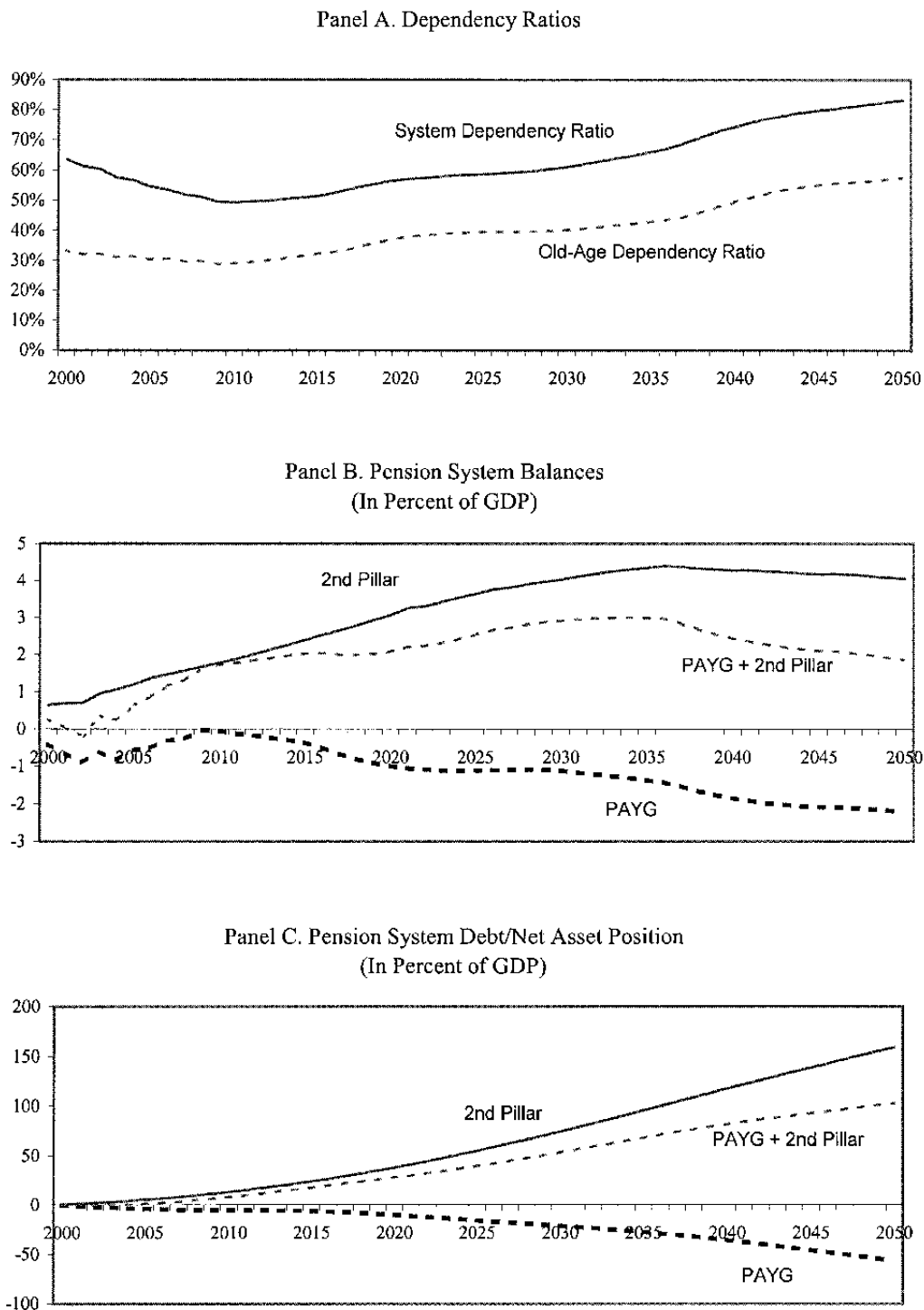
Sources: Ministry of Finance; staff estimates.

Table 7. Hungary: Long-Run Implications of Reform Scenarios
Results for Year 2050
(In Percent of GDP Except Where Specified)
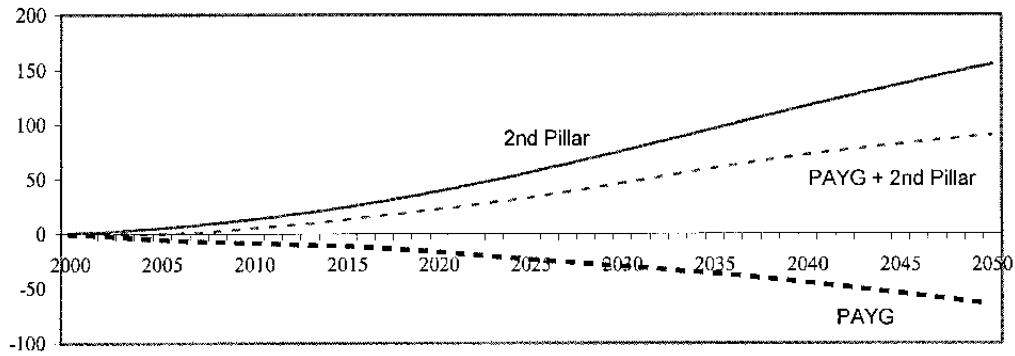
Scenario	Debt of PAYG system[1]	Net assets of 2nd pillar[1]	Public pension expenditure[2]	Total pension benefits[3]	Index of pension benefits[4]	Index of GDP[4]
1	48	155	5.6	7.2	100.0	100.0
2	38	117	5.6	6.8	94.4	100.0
3	39	106	5.8	6.9	95.0	100.0
4	-32	155	2.7	4.3	60.0	100.0
5	33	153	5.3	6.9	100.9	105.9
6	64	155	5.6	7.2	100.0	100.1
7a	35	138	4.8	6.1	108.7	127.7
7b	56	159	5.9	7.7	92.5	86.6

Sources: Ministry of Finance, staff estimates.
[1] Accumulation since 2000.
[2] PAYG system.
[3] Includes 2nd pillar benefits.
[4] The baseline, scenario 1, is set at 100.

of the loss in PAYG benefits.[41] But the scenarios differ considerably with respect to both real consequences and who pays for the impact of reforms:

- **Some of the scenarios are distinctly less favorable**. Scenario 4 places all the cost of reform on pensioners, with a sharp (and probably politically infeasible) cut in benefits. Scenario 7b indicates that both pension benefits and GDP would fall markedly, although the greater drop in GDP than in pension benefits implies that the active generations pay more of the price of the burden of aging. Scenarios 2 and 3, as noted earlier, would be even worse than shown in Table 7 (with the index of GDP below 100) if employment rates were to drop in response to the caps on the 2nd pillar contribution. Scenario 6 evidences only a marginal improvement in terms of GDP relative to the baseline, but with a marked deterioration in the public pension system debt, pushing the burden of aging even more onto future generations. In a broader analysis of the entire fiscal impact, this highlights the importance of keeping spending in check if taxes are to be lowered, as any endogenous response in the labor market will likely be insufficient to offset the losses in revenues.

- The **two obvious win-win reform scenarios** are 5 and 7a, with the former increasing both output and pension benefits through a rise in the retirement age and the latter demonstrating the benefits of a small, but permanent increase in productivity. Thus, the most promising approach to reform is of a broad-based nature, encompassing some parametric changes to the pension system itself (most notably, raising the retirement age) and economy-wide efforts to enhance growth potential, through not only physical and human capital investment, but also reforms to increase the flexibility of product and labor markets.

H. Concluding Remarks

67.   **The reform efforts of the 1990s went a long way toward addressing the sustainability of the pension system.** The parametric reforms to the PAYG system—most notably, increasing the retirement age and shifting to Swiss indexation—helped to shore up the unfunded public pension scheme. The introduction of a funded private pillar also reduced the dependence on the public pillar and the associated unfunded liabilities and, at the same time, could potentially induce greater labor force participation (including through a "whitening" of the gray economy) if the contributions to the 2nd pillar were viewed more as contributing to personal savings rather than as a tax.

68.   **Nevertheless, in the face of a rapidly aging population, Hungary's PAYG system is still projected to generate significant deficits over the longer run**—placing strains on the fiscal position, adding to public debt, and making it increasingly difficult for society to support its more vulnerable members without burdening future generations with excessive

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[41] On a per capita basis, however, with total benefits spread over 11 percent more pensioners, there will be less redistribution in their favor.

taxes. Unless the rate of employment is raised substantially, the shrinking labor force would imply too few workers to support a growing number of pensioners, while sharply curtailing the pace of economic growth. Moreover, the schemes for early retirement may have lessened the social impact in the early years of the transition to a market economy, but transition is now nearing completion, and early retirement (including through a liberal interpretation of disability) should be the exception rather than the norm.

69.   **Thus, a strategy of further reform—including by fostering employment creation and strengthening the growth potential of the economy—should be pursued to ease the future demographic pressures on the fiscal accounts.** Such a strategy should aim at appropriately rewarding a longer working life and providing stronger incentives to participate in the labor market. In this regard, more fully integrating both the older population and the Roma population into the labor force—through education, raising the statutory retirement age, lowering the high effective marginal tax wedge, and reducing work disincentives inherent in the social security system—would help to mitigate the impact of the demographic shock over the next several decades. Reducing the fiscal strains of the aging population would allow room for priority spending on public investment and help to avoid crowding out needed private investment. All this would sustain and enhance the economy's growth potential and contribute to making Hungary a lasting success story.

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INTERNATIONAL MONETARY FUND

HUNGARY

Statistical Appendix

Prepared by Paulo Drummond and Nancy Wagner (both EUI)

Approved by European I Department

May 8, 2002

Contents   Page

Tables

Table 1. Hungary: Gross Domestic Product and Aggregate Demand, 1997-2001

	1997	1998	1999	2000	2001
	(In Billions of Forint)				
Domestic Demand	8,537.7	10,299.7	11,676.8	13,679.9	15,194.8
Consumption	6,170.9	7,307.4	8,428.9	9,590.7	11,139.2
Private	5,270.1	6,282.8	7,272.1	8,297.0	9,502.7
Public	900.8	1,024.6	1,156.7	1,293.7	1,636.5
Investment	2,366.8	2,992.4	3,247.9	4,089.2	4,055.7
Gross fixed capital	1,898.9	2,384.6	2,724.5	3,179.8	3,484.7
Stockbuilding	467.9	607.8	523.4	909.4	571.0
Net exports	3.0	-212.3	-283.3	-529.2	-318.4
Exports	3,885.6	5,105.9	6,038.3	8,053.5	8,995.8
Imports	3,882.6	5,318.2	6,321.6	8,582.7	9,314.2
GDP	8,540.7	10,087.4	11,393.5	13,150.8	14,876.4
	(In Percent of GDP)				
Domestic Demand	100.0	102.1	102.5	104.0	102.1
Consumption	72.3	72.4	74.0	72.9	74.9
Private	61.7	62.3	63.8	63.1	63.9
Investment	27.7	29.7	28.5	31.1	27.3
Gross fixed capital	22.2	23.6	23.9	24.2	23.4
Stockbuilding	5.5	6.0	4.6	6.9	3.8
Net exports	0.0	-2.1	-2.5	-4.0	-2.1
Exports	45.5	50.6	53.0	61.2	60.5
Imports	45.5	52.7	55.5	65.3	62.6
GDP	100.0	100.0	100.0	100.0	100.0
	(Percent Change)				
Real GDP	4.6	4.9	4.2	5.2	3.8
Real domestic demand	4.4	7.8	4.0	5.1	2.1
of which:					
Household consumption	1.7	4.9	4.6	4.1	4.0

Source: CSO.

Table 2. Hungary: Household Disposable Income, 1997-2000

	1997	1998	1999	2000
	(In Billions of Forint)			
Wages and salaries	2,824.4	3,327.2	3,691.0	4,492.8
Employers' social security contributions	1,014.4	1,190.8	1,224.9	1,474.2
Compensation of employees	3,838.8	4,518.0	4,915.9	5,967.0
Mixed income	1,471.4	1,639.1	1,921.0	2,079.6
Property income	422.4	504.0	533.5	525.0
Social benefits in cash	1,158.4	1,405.8	1,583.4	1,748.7
Other current transfers, net	-1,698.9	-1,968.7	-2,200.0	-2,646.0
Disposable income	5,192.1	6,098.2	6,753.8	7,674.3
Social transfers in kind	1,063.9	1,288.6	1,445.5	1,607.8
Adjusted disposable income	6,256.0	7,386.8	8,199.3	9,282.1
Memorandum items:				
Final consumption	5,270.1	6,282.8	7,272.1	8,297.0
Saving	1,019.3	1,176.0	1,056.4	1,137.7
In percent of GDP	11.9	11.7	9.3	8.7
Saving rate (in percent) 1/	16.3	15.9	12.9	12.3

Source: CSO.
1/ Ratio of savings and adjusted disposable income.

Table 3. Hungary: Unemployment Indicators, 1997-2001

	1997	1998	1999	2000	2001
	(In Thousands, End-of-Period)				
Registered Unemployed	464.0	404.1	404.5	372.4	342.8
Skilled	165.8	144.8	145.8	131.9	120.8
Semi-skilled	115.9	102.7	102.3	92.6	84.7
Unskilled	99.9	88.0	86.5	85.1	81.8
Nonmanual	82.3	68.6	69.9	62.8	55.5
Job seekers by duration of unemployment	295.4	266.4	268.1	248.1	225.0
Less than 26 weeks	84.4	89.2	75.4	73	70.3
Less than one year and over 26 weeks	63.6	56.2	43.6	36.8	34.5
Over one year	147.4	121.0	125.3	112	93.3
	(In Percent of Respective Total)				
Registered Unemployed	100.0	100.0	100.0	100.0	100.0
Skilled	35.7	35.8	36.0	35.4	35.2
Semi-skilled	25.0	25.4	25.3	24.9	24.7
Unskilled	21.5	21.8	21.4	22.9	23.9
Nonmanual	17.7	17.0	17.3	16.9	16.2
Job seekers by duration of unemployment	63.7	65.9	66.3	66.6	65.6
Less than 26 weeks	18.2	22.1	18.6	19.6	20.5
Less than one year and over 26 weeks	13.7	13.9	10.8	9.9	10.1
Over one year	31.8	29.9	31.0	30.1	27.2
Memorandum items:					
Unemployment rate, in percent 1/	10.4	9.1	7.0	6.4	5.7
Persons obtaining unemployment benefits	136.7	141.6	150.4	122.5	125.9
Average benefit per month, in forint	16,141	18,895	22,406	23,273	27,454
Nominal growth rate, in percent	19.4	17.1	18.6	3.9	18.0
Real growth rate, in percent 2/	1.2	6.2	7.4	-6.2	11.2

Sources: CSO, Statistical Yearbook, and Monthly Bulletin of Statistics (various issues).
1/ Ratio of unemployed at end of year to the labor force in January of previous year.
2/ Deflated by the consumer price index.

Table 4. Hungary: Consumer Prices and Wages, 1997-2001

	Weights in 2001	1997	1998	1999	2000	2001
		(Average Annual Percent Change)				
Consumer prices		18.3	14.3	10.0	9.8	9.2
Market Goods and Services	67.4	16.7	13.5	7.3	8.4	10.0
Foods	19.0	18.1	13.8	1.3	10.0	15.1
Industrial Products	26.8	13.4	11.3	8.6	4.8	4.7
Market Services	20.3	19.5	16.5	12.1	10.9	11.6
Market Energy	1.3	20.1	11.8	11.8	21.3	17.6
Alcohol, Tobacco	9.1	18.9	15.3	11.5	11.0	11.2
Fuel	5.0	18.5	9.6	18.7	28.1	-2.3
Regulated Goods and Services	18.6	24.3	17.8	16.6	9.0	8.5
Wages						
Gross wages		22.3	18.3	16.1	13.5	18.1
Net wages		24.9	18.4	12.7	11.4	16.4

Sources: NBH, CSO and Monthly Bulletin of Statistics.

Table 5. Hungary: Producer Prices, 1997-2001

	1997	1998	1999	2000	2001
Industry	20.4	11.3	5.1	11.7	5.2
Mining	20.5	15.5	9.6	6.5	7.8
Manufacturing	17.8	8.6	6.8	16.0	8.7
Food, beverages tobacco	22.4	8.7	3.7	12.4	15.3
Textiles, clothes, leather, fur	15.6	12.9	9.7	6.2	4.0
Wood, paper, publishing, printing	9.4	10.1	6.6	10.4	5.3
Chemicals, petroleum, plastic	16.6	4.0	12.8	37.5	5.5
Nonmetallic mineral products	19.4	10.1	10.4	10.5	8.8
Basic and fabricated metals	13.3	14.1	1.4	8.4	4.7
Engineering	17.6	9.3	5.6	5.1	2.4
Other manufacturing	14.4	10.7	10.0	7.4	2.7
Electricity and water supply	34.1	17.8	7.7	9.4	11.7
Construction	19.9	10.7	10.3	11.2	10.1

Sources: CSO, Monthly Bulletin of Statistics, and data provided by the Hungarian authorities.

Table 6. Hungary: Consolidated General Government, 1997-2001 1/

	1997	1998	1999	2000	2001 Prel.
	(In Billions of Forint)				
Total revenues (ex. official privatization)	3,837	4,386	4,926	5,568	6,235
Interest and NBH receipts	199	156	129	123	118
Primary revenues	3,638	4,230	4,798	5,445	6,117
Central government taxes	3,077	3,590	4,068	4,704	5,266
VAT	675	797	942	1,154	1,244
Excises	335	418	464	506	540
Personal income tax	560	657	770	938	1,117
Social security contributions 2/	1,181	1,371	1,490	1,677	1,891
Employer contributions	958	1,130	1,222	1,390	1,545
Employee contributions	195	219	268	287	345
Local government and other	561	640	730	741	851
Expenditure and net-lending	4,245	4,868	5,350	6,048	6,718
Interest and NBH expenditure	867	797	859	802	726
Primary expenditures	3,378	4,071	4,492	5,247	5,992
Current	3,039	3,706	4,113	4,849	5,548
Pensions and social transfers	750	932	1,069	1,200	1,398
Enterprise and household subsidies	351	468	521	561	645
Other current expenditure	1,938	2,306	2,523	3,087	3,505
Capital 3/	340	365	379	398	444
Investment	255	289	304	311	346
Capital transfers 4/	85	76	75	87	98
Net interest	-667	-641	-730	-678	-608
Primary balance	260	159	306	198	125
Overall balance	-408	-482	-424	-480	-483
	(In Percent of GDP)				
Total revenues	44.9	43.0	42.9	43.0	42.5
Primary revenues	42.6	42.0	41.8	42.0	41.7
Central government taxes	36.0	35.6	35.4	36.3	35.9
Local government and other	6.6	6.4	6.4	5.7	5.8
Expenditure and net lending	49.7	47.7	46.6	46.7	45.8
Primary expenditure	39.6	40.4	39.1	40.5	40.8
Current	35.6	36.8	35.8	37.4	37.8
Capital 3/	4.0	3.6	3.3	3.1	3.0
Primary balance	3.0	1.6	2.7	1.5	0.8
Net interest	-7.8	-6.4	-6.4	-5.2	-4.1
Overall balance	-4.8	-4.8	-3.7	-3.7	-3.3
Gross debt	62.9	61.1	60.0	55.3	52.1

Sources: Ministry of Finance, and staff estimates.
1/ Official consolidated data for central budget, social security funds, extra-budgetary funds, and local governments.
2/ Contributions to the Pension Insurance Fund, the National Health Fund, and the Labor Market Fund.
3/ Central budget investment projects and local government capital expenditures.
4/ Housing grants and other capital transfers by central and local government.

Table 7. Hungary: General Government by Function, 1997-2000

	1997	1998	1999	2000	1997	1998	1999	2000
	(In billions of forint)				(In percent of GDP)			
State operating functions	522	634	695	962	6.1	6.3	6.1	7.3
General public services	274	362	388	605	3.2	3.6	3.4	4.6
a. Legislative and executive organs	165	227	227	288	1.9	2.2	2.0	2.2
b. Financial and budgetary activities and services	66	79	95	230	0.8	0.8	0.8	1.7
c. Foreign affairs	16	22	29	39	0.2	0.2	0.3	0.3
d. Basic research	12	16	18	20	0.1	0.2	0.2	0.2
e. Technical development	8	6	6	6	0.1	0.1	0.1	0.0
f. Other general public services	7	12	12	23	0.1	0.1	0.1	0.2
Defense	106	103	124	144	1.2	1.0	1.1	1.1
Law and order, public safety	141	170	183	214	1.7	1.7	1.6	1.6
a. Administration of justice	20	27	33	35	0.2	0.3	0.3	0.3
b. Law and order, public safety	97	115	118	135	1.1	1.1	1.0	1.0
c. Fire protection	11	14	16	25	0.1	0.1	0.1	0.2
d. Penitentiary administration and operation	13	14	16	19	0.1	0.1	0.1	0.1
Welfare functions	2339	2839	3161	3559	27.4	28.1	27.7	27.1
Education activities and services	404	481	544	630	4.7	4.8	4.8	4.8
Schooling prep. and elementary	131	152	178	192	1.5	1.5	1.6	1.5
Secondary education	38	44	56	70	0.4	0.4	0.5	0.5
Higher education	123	152	160	193	1.4	1.5	1.4	1.5
Other education	112	134	150	175	1.3	1.3	1.3	1.3
Health	381	461	504	552	4.5	4.6	4.4	4.2
Hospital operations and services	164	192	211	236	1.9	1.9	1.9	1.8
Family doctor and paediatric services	32	36	42	44	0.4	0.4	0.4	0.3
Clinic, medical, dental services	49	54	66	70	0.6	0.5	0.6	0.5
Public health activities and services	13	16	16	17	0.2	0.2	0.1	0.1
Other health (inc. Pharmaceuticals)	123	163	168	185	1.4	1.6	1.5	1.4
Sickness, maternity, disability benefits	142	167	202	224	1.7	1.7	1.8	1.7
Social Security and welfare services	1254	1537	1727	1895	14.7	15.2	15.2	14.4
Sickness, maternity, disability benefits	142	167	202	224	1.7	1.7	1.8	1.7
Pensions (inc. disability)	672	835	944	1051	7.9	8.3	8.3	8.0
Other social security provision	29	42	45	57	0.3	0.4	0.4	0.4
Unemployment benefits	60	78	69	64	0.7	0.8	0.6	0.5
Family and child care allowances	157	175	187	206	1.8	1.7	1.6	1.6
Other social supports	113	144	170	167	1.3	1.4	1.5	1.3
Social & welfare institutional services	81	96	109	126	0.9	1.0	1.0	1.0
Housing, municipal & community services	131	141	147	207	1.5	1.4	1.3	1.6
Entertainment, cultural & religious activities	95	121	142	172	1.1	1.2	1.2	1.3
Environment protection	74	99	98	103	0.9	1.0	0.9	0.8
Economic functions	428	540	604	711	5.0	5.4	5.3	5.4
Heating, motor fuel, energy supply	3	2	3	3	0.0	0.0	0.0	0.0
Agriculture, forestry, fisheries, and game	119	165	187	189	1.4	1.6	1.6	1.4
Mining and industry	18	20	19	24	0.2	0.2	0.2	0.2
Transport and telecommunications	179	227	251	301	2.1	2.2	2.2	2.3
Public road transport activities	104	130	138	175	1.2	1.3	1.2	1.3
Rail road transport and services	46	54	72	79	0.5	0.5	0.6	0.6
Telecommunication	7	12	10	14	0.1	0.1	0.1	0.1
Other transport and shipping	21	30	31	33	0.2	0.3	0.3	0.3
Other economic activities and services	108	126	145	195	1.3	1.3	1.3	1.5
State debt management	878	796	860	801	10.3	7.9	7.6	6.1
Items not assigned to functions	66	276	82	153	0.8	2.7	0.7	1.2
Gross domestic product	8541	10087	11394	13151	...	...	...	...

Source: Ministry of Finance.

Table 8. Hungary: Monetary Survey, 2000-2001 1/
(In Billions of Forint, at Current Exchange Rates, End-of-Period)

	2000				2001			
	Mar	Jun	Sep	Dec	Mar	Jun	Sep	Dec
Domestic claims	6248.9	6537.5	6941.6	7198.8	7110.3	6789.2	7271.4	7433.9
Domestic Credit	6003.1	6296.6	6697.2	6951.07	6872.8	6535.7	6986.1	7137.3
Non-financial corporations								
Credits	2556.1	2744.1	3004.1	3182.6	3318.0	3284.4	3446.5	3489.3
Forint	1649.0	1722.9	1845.2	1950.2	2067.4	2128.7	2225.9	2327.4
Foreign currency	907.0	1021.1	1158.8	1229.4	1250.6	1155.7	1212.4	1161.9
Other financial corporations								
Credits	134.2	148.8	173.2	215.8	216.6	290.2	326.4	357.2
Forint	89.0	90.4	98.2	119.9	115.7	152.8	147.7	154.5
Foreign currency	45.1	57.4	68.5	83.3	94.1	130.3	176.7	201.0
Consolidated Central Government	2822.7	2864.1	2930.3	2894.3	2643.9	2183.5	2354.4	2332.1
Local governments	49.2	53.0	52.3	56.6	53.0	59.2	58.7	72.2
Households	436.4	482.3	532.9	595.0	634.1	712.6	794.3	871.6
Forint	433.2	478.8	526.3	584.7	621.8	697.9	776.2	850.1
Foreign currency	3.2	3.5	6.6	10.2	12.3	14.8	18.1	21.6
Non-profit institutions	4.6	4.3	4.3	6.8	7.0	5.7	5.8	15.0
Net foreign assets	85.5	10.9	67.8	131.7	370.9	657.3	770.1	943.6
Broad money (M3)	5431.2	5469.6	5678.8	6052.0	6013.2	6163.6	6544.8	7092.7
M2	5278.8	5366.3	5590.3	5955.2	5911.0	6027.6	6410.5	6957.5
Currency outside monetary institutions	771.0	817.3	853.9	883.9	838.5	903.4	957.4	1037.9
Deposits	4507.8	4549.0	4736.4	5071.2	5072.5	5124.2	5453.1	5919.6
of which:								
Non-financial corporations	1284.1	1348.6	1408.3	1539.5	1473.0	1521.2	1585.8	1783.0
Forint	1039.7	1100.3	1149.8	1268.2	1173.0	1220.4	1278.2	1422.3
Foreign currency	244.4	248.3	258.4	271.3	300.0	300.8	307.6	360.6
Households	2914.2	2931.4	3041.3	3210.4	3278.0	3313.3	3426.5	3703.1
Forint	2250.4	2257.6	2313.2	2475.0	2509.8	2596.0	2689.1	2937.2
Foreign currency	663.8	673.8	728.2	735.4	768.2	717.3	737.4	766.0
Money market instruments	73.3	197.8	412.0	349.6	484.1	489.0	444.1	402.6
Other claims net	-829.9	-880.9	-918.6	-929.0	-983.9	-794.0	-1052.5	-882.2

Source: NBH's Monetary Survey.
1/ According to SNA sector definitions.

Table 9. Hungary: Interest Rates for the Non Financial Corporate and Financial Sectors, 1999-2001
(In Percent Per Annum)

	Dec	Mar	Jun	Sep	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	1999		2000									2001					
Loan Interest Rates																	
1 year or less maturity	15.40	12.64	12.10	11.66	12.83	12.70	12.19	12.36	12.37	12.25	12.08	12.22	12.17	12.04	11.95	11.65	11.18
More than 1 year maturity	15.80	13.09	12.60	12.32	13.42	13.10	12.91	12.87	12.69	12.44	12.53	12.72	12.50	12.49	12.39	11.85	11.15
Bills of exchange	16.28	12.70	12.20	12.12	12.89	12.60	12.34	12.61	11.81	12.34	12.06	11.87	12.30	11.71	11.60	12.10	10.66
Deposit Interest Rates																	
1 year or less maturity	11.94	9.43	8.80	8.41	9.49	9.20	9.16	9.28	9.04	9.02	8.98	9.08	8.85	9.05	9.09	8.81	8.40
More than 1 year maturity	13.02	10.00	11.70	10.05	9.40	9.30	9.52	9.00	9.22	8.34	8.53	9.38	9.35	8.89	8.26	8.08	7.70
Current account deposits																	
Minimum	1.00	0.50	1.00	1.00	0.69	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.80	1.00	0.50	0.50
Maximum	15.00	14.25	12.00	11.75	24.25	12.30	12.00	12.00	12.00	11.50	12.30	11.80	11.60	11.80	11.80	12.00	12.00
Interbank overnight interest rate	13.20	11.33	11.01	10.91	10.98	10.57	10.95	11.71	10.40	11.27	11.33	10.78	11.11	11.10	11.03	10.26	10.49
Treasury bill benchmarks																	
3-month	13.15	10.48	10.69	10.67	11.70	11.32	10.92	10.95	11.02	10.91	10.66	10.72	10.72	10.72	10.52	10.07	9.76
6-month	13.13	10.39	10.67	10.63	11.61	11.01	10.75	10.88	10.90	10.70	10.51	10.61	10.57	10.58	10.38	9.95	9.52
12-month	13.09	10.17	10.63	10.57	11.51	10.67	10.42	10.75	10.76	10.40	10.23	10.30	10.34	10.30	10.09	9.66	9.23

Source: NBH.

Table 10. Hungary: Balance of Payments, 1997-2001 1/

(In Millions of US Dollars)

	1997	1998	1999	2000	2001
Current account balance	-958	-2,270	-2,104	-1,321	-1,118
Goods, net	-1957	-2,337	-2,188	-1,765	-2,029
Exports 2/	19640	20,729	21,860	25,784	28,080
Imports 2/	21597	23,066	24,047	27,549	30,109
Services, net	2288	1,788	1,400	1,786	2,172
credit	5750	5,927	5,659	6,277	7,723
debit	3462	4,139	4,259	4,492	5,551
Of which: Travel, net	2542	2,405	2,214	2,333	2,625
Income, net	-1427	-1,868	-1,658	-1,571	-1,506
of which:					
Other investment income, (net)	-403	-277	-235	-291	-315
credit	593	328	309	359	418
debit	996	604	544	650	733
Transfers, net	138	146	341	230	245
Capital and financial account balance	797	3,093	4,765	2,494	986
Capital account	117	191	33	276	321
Direct investment, net 3/	1732	1,558	1,741	1,087	2,103
Abroad, net	-440	-481	-254	-556	-329
Of which : Equity capital, net	-292	-463	-252	-572	-321
In Hungary, net	2171	2,040	1,995	1,642	2,433
Of which : Equity capital, net	1811	1,416	1,654	1,349	970
Portfolio investments net	-588	-692	-565	-482	-403
Credit	722	713	414	510	601
Debit	1309	1,405	979	992	1,004
Other investment, net	-14	-663	1,019	1,526	-2,993
Assets, net	-595	-506	-1,189	-1,002	-3,443
Short-term, net	-476	-448	-563	-484	-2,561
Long-term, net	-119	-58	-626	-518	-882
Liabilities, net	581	-156	2,208	2,528	450
Short-term, net	937	290	540	1,204	324
Long-term, net 4/	-356	-447	1,669	1,324	127
Net errors and ommissions	18	31	-273	-106	79
Overall balance	-143	854	2,388	1,067	-53
Reserves change (increase -)	143	-854	-2,388	-1,067	53
Fund purchases, net	0	175	0	0	0
Memorandum items:					
Current account balance (In percent of GDP)	-2.1	-4.8	-4.4	-2.9	-2.1
Gross official reserves	8,629	8,992	11,584	11,118	10,925
(In months of imports)	4.8	4.7	5.8	4.8	4.4
Gross external debt 5/	24,971	26,259	30,956	30,437	33,877
(In percent of GDP)	54.6	55.8	64.5	65.7	65.1
Net external debt 5/	12,084	12,395	11,984	11,190	10,567
(In percent of GDP)	26.4	26.4	25.0	24.2	20.3

Sources: Data provided by the Hungarian authorities; and staff estimates.

1/ Reflects data and revisions as of May 6, 2002.

2/ Settlement basis.

3/ Excludes reinvested profits.

4/ Excludes IMF loans.

5/ Includes intercompany loans.

Table 11. Hungary: Directon of Trade, 1997-2001 1/
(In Percent)

	1997	1998	1999	2000	2001
Exports	100.0	100.0	100.0	100.0	100.0
Of which:					
EU countries	71.2	72.9	76.1	75.1	74.2
Of which: Germany	37.2	36.6	38.3	37.3	36.5
Austria	11.5	10.6	9.7	8.7	8.8
Italy	6.2	5.8	6.0	5.2	5.1
France	3.8	3.8	4.4	4.6	4.7
United Kingdom	3.3	3.6	4.4	3.6	3.2
The Netherlands	2.8	4.7	5.2	4.8	3.7
Belgium	2.4	2.6	2.9	2.7	2.9
Spain	1.5	1.7	1.5	1.6	1.6
Sweden	0.8	0.9	0.9	0.8	0.8
CEFTA countries	8.9	8.9	8.0	8.2	9.0
Of which: Poland	2.7	2.3	2.1	2.2	2.0
Czech Republic	1.7	1.6	1.5	1.7	1.9
Slovakia	1.4	1.4	1.1	1.0	1.3
Slovenia	1.5	1.0	1.1	1.0	1.0
Romania	1.7	2.5	1.9	2.0	2.4
CIS countries	7.2	4.5	2.4	2.5	2.6
Of which: Russia	5.1	2.9	1.4	1.6	1.4
The Ukraine	1.3	1.0	0.5	0.6	0.7
Other major foreign trade partners					
USA	3.2	4.5	5.2	5.3	5.6
Japan	0.5	0.4	0.3	0.6	0.6
China	0.1	0.1	0.3	0.1	0.2
Imports	100.0	100.0	100.0	100.0	100.0
Of which:					
EU countries	62.8	64.1	65.1	58.4	57.8
of which: Germany	27.2	28.2	29.2	25.5	25.5
Austria	10.6	9.6	8.9	7.4	7.9
Italy	7.4	7.6	7.7	7.5	8.4
France	4.0	4.9	4.7	4.4	4.8
United Kingdom	3.1	3.4	3.0	3.2	3.0
The Netherlands	2.6	2.5	2.5	2.2	2.4
Belgium	2.4	2.5	2.6	2.2	2.3
Spain	1.3	1.6	1.7	1.8	1.9
Sweden	1.2	1.2	1.2	1.1	1.1
CEFTA countries	7.2	6.9	7.3	7.5	7.9
Of which: Poland	1.7	1.8	2.1	2.0	2.3
Czech Republic	2.4	2.1	1.9	2.0	2.2
Slovakia	1.9	1.7	1.7	1.8	1.8
Slovenia	0.5	0.5	0.6	0.6	0.5
Romania	0.7	0.7	0.8	1.0	1.1
CIS countries	10.9	7.7	6.4	9.1	8.4
Of which: Russia	9.2	6.5	5.8	8.0	6.8
The Ukraine	1.3	0.9	0.8	0.7	0.8
Other major foreign trade partners					
USA	3.8	3.9	3.5	3.8	3.7
Japan	3.3	3.8	4.0	5.3	4.4
China	1.4	1.7	2.2	2.9	3.7

Sources: IMF Direction of Trade Statistics.
1/ Reflects data and revisions as of May 6, 2002.

Table 12. Hungary: Selected Social and Demographic Indicators 2000

Area characteristics
Size: 93,030 sq. km
Agricultural land (1995; in percent of total area):   66.4
Population per sq. km: 108.0

Population characteristics

Total population: 10.2 million
Average annual rate of growth (in percent):   -0.4
Life expectancy at birth: male: 67.1; female: 75.6
Deaths per 1,000 population (2001):   13.2
Live births per 1,000 population (2001):   9.7

Per capita GNI (World Bank Atlas method):   US$4,710

Health

Physicians per 10,000 population (1999):   36.2
Hospital beds per 10,000 population: 83.2

Education

Persons receiving full-time education, in percent of relevant age group (1997):

        Primary education: 98
        Secondary schools: 97
        Tertiary level education: 25

Sources: Central Statistical Office, and World Bank Social Indicators of Development.