

Japan: Selected Issues

This Selected Issues paper for Japan was prepared by a staff team of the International Monetary Fund as background documentation for the periodic consultation with the member country. It is based on the information available at the time it was completed on July 12, 2007. The views expressed in this document are those of the staff team and do not necessarily reflect the views of the government of Japan or the Executive Board of the IMF.

The policy of publication of staff reports and other documents by the IMF allows for the deletion of market-sensitive information.

To assist the IMF in evaluating the publication policy, reader comments are invited and may be sent by e-mail to publicationpolicy@imf.org.

Copies of this report are available to the public from

International Monetary Fund • Publication Services
700 19th Street, N.W. • Washington, D.C. 20431
Telephone: (202) 623 7430 • Telefax: (202) 623 7201
E-mail: publications@imf.org • Internet: <http://www.imf.org>

Price: \$18.00 a copy

International Monetary Fund
Washington, D.C.

INTERNATIONAL MONETARY FUND

JAPAN

Selected Issues

Prepared by Christopher Faulkner-MacDonagh, Papa N'Diaye (both APD),
Yougesh Khatri and Sumiko Ogawa (both OAP), Michael Keen (FAD),
Elena Loukoianova and Shinobu Nakagawa (both MCM)

Approved by the Asia and Pacific Department

July 12, 2007

Contents	Page
Executive Summary	3
I. Recent Developments and Outlook for Japan's Capital Flows	4
A. Introduction	4
B. Capital Outflows	4
C. Yen Carry Trades and Associated Financial Flows	9
D. Capital Inflows and Developments in Japanese Capital Markets	11
E. Summary and Policy Considerations	14
References	15
II. Capital Flows and the Yen-U.S. Dollar Exchange Rate	16
A. Introduction	16
B. Long-Term Value of the Yen	16
C. Transition to a Longer-Term Equilibrium	19
D. Conclusions and Policy Implications	25
Annex I. Overview of Existing Methodologies	26
Annex II. Framework	29
References	32
III. Tax Policy Challenges from Globalization and Aging: Issues and Options	34
A. Introduction and Background	34
B. Tax Policy Options	35
C. Conclusion	46
References	47

IV. Analysis of the Efficiency and Profitability of the Japanese Banking System	49
A. Background and Performance of Japanese Banks	49
B. Assessing Efficiency: An Application of Data Envelopment Analysis	54
C. Efficiency Analysis: A Cross-Country Perspective	56
D. Profitability Analysis	60
E. Conclusion and Policy Considerations	63
Annex. Data Envelopment Analysis Methodology	65
References	70
V. Japan: Boosting Productivity in Services—Priorities for Deregulation	71
A. Economy-Wide Reform Priorities	72
B. Sector-Specific Priorities for Deregulation	78
C. Government Initiatives to Boost Productivity	84
D. Conclusion	85
References	89

EXECUTIVE SUMMARY

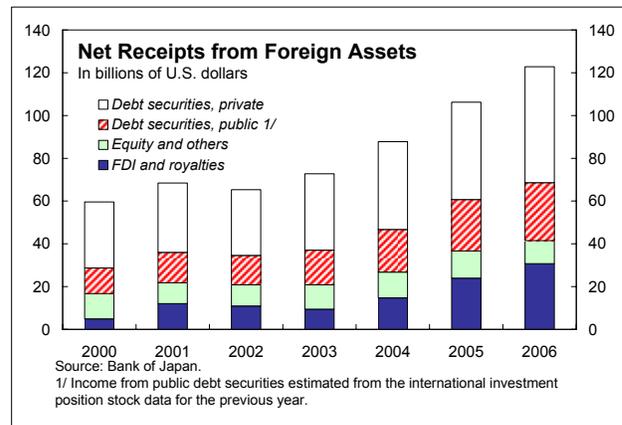
This year's Selected Issues papers for Japan builds on the main theme of the staff report for the 2007 Article IV consultation—the challenges facing Japan from the rapid pace of globalization.

- Chapter I “**Recent Development and Outlook for Japan’s Capital Flows**” examines the factors behind the recent surge in capital flows and their associated challenges for policies. Japanese households are rebalancing portfolios, away from cash and bank deposits to assets with higher returns, including overseas. The potential for further outflows, particularly to the rest of Asia is large. At the same time, improving growth prospects at home have contributed to greater inflows from overseas.
- Chapter II “**Capital Flows and the Yen-U.S. Dollar Exchange Rate**” presents econometric evidence on the influence of these capital flows on the medium-term dynamics of the yen. The paper finds that in the case of the yen-dollar rate, non-trade factors affecting capital flows are likely to delay the adjustment of the yen-dollar rate to its long-term equilibrium value.
- The tax system in Japan, as in other countries, faces increasing pressures from aging and globalization. Chapter III “**Tax Policy Challenges from Globalization and Aging: Issues and Options**” draws on recent international experiences and trends to identify and review some of the key tax issues and options for meeting these challenges.
- Strengthening further the financial system will enhance stability and intermediation, including for cross-border capital flows. Chapter IV “**Analysis of the Efficiency and Profitability of the Japanese Banking System**” examines the cost and revenue efficiency of the Japanese banking system using data envelopment analysis. The results suggest that further consolidation and cost-sharing arrangements, particularly among regional banks, would improve their profitability.
- Chapter V “**Boosting Productivity in Services—Priorities for Deregulation**” examines the reform priorities for raising productivity in the service sector. Further deregulation and market opening in key sectors, particularly in the distribution, network, and health sectors, together with economy-wide reforms, would help lift Japan’s growth potential and international competitiveness.

I. RECENT DEVELOPMENTS AND OUTLOOK FOR JAPAN'S CAPITAL FLOWS¹

A. Introduction

1. **In recent years, capital flows have picked up sharply, reflecting a more outward-oriented attitude by private Japanese investors.** Private holdings have been largely concentrated in debt securities, consistent with a widening of interest rate differentials, low market volatilities, and a generally conservative approach to investing. Households are also purchasing an increasing amount of equities in search of higher yield. Meanwhile, Japanese corporations are seeing a sharp increase in income from foreign assets, reflecting past projects that are now turning profitable.



2. **This paper examines the challenges posed by structural changes in Japan's financial flows—particularly from the ongoing reduction in home bias among retail investors.** Households could increase external holdings significantly over the next ten years—potentially providing a boost to some emerging market economies (most likely, to those in Asia). These outflows could also act as a headwind to movements in the yen exchange rate. At the same time, many may not be fully aware of the risks of investing abroad, and regulators may need to strengthen oversight. Furthermore, as financial flows expand and the types of assets become more complex, policymakers will require better information on cross-border flows. Finally, further deregulation to foreign ownership and reforms to deepen domestic financial markets could catalyze capital inflows to Japan and help offset downward pressure on the yen.

B. Capital Outflows²

3. **In an effort to diversify portfolios and earn higher returns, Japanese investors have increasingly looked overseas.** Holdings of foreign assets have almost doubled since 2000, to about \$5¼ trillion in 2006 (120 percent of GDP). While official intervention during 2003–04 led to a modest increase in assets, the more recent trend has been driven by private investors. Holdings have risen across a broad range of privately-held foreign assets (global

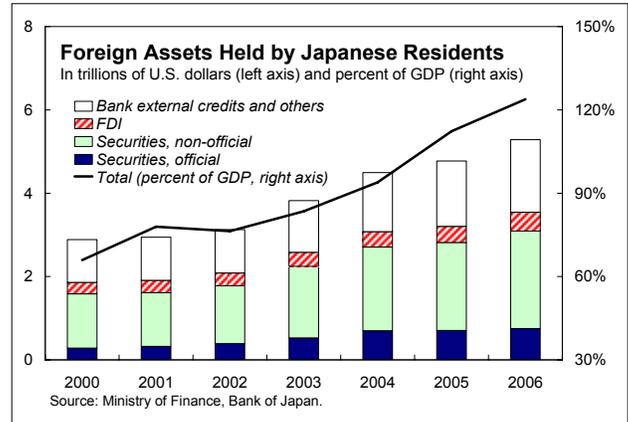
¹ Prepared by Shinobu Nakagawa and Chris Faulkner-MacDonagh.

² Data on the stocks of foreign assets are from several sources: primarily, from the flow of funds; however, international investment position data are used for FDI. The flow data have similar trends, but are noisier.

securities, FDI, and bank credits). Outside the banking sector, however, private investments are mostly concentrated in global securities (equities, debt, and money market instruments).³

Global Securities Investment: investor base and strategies

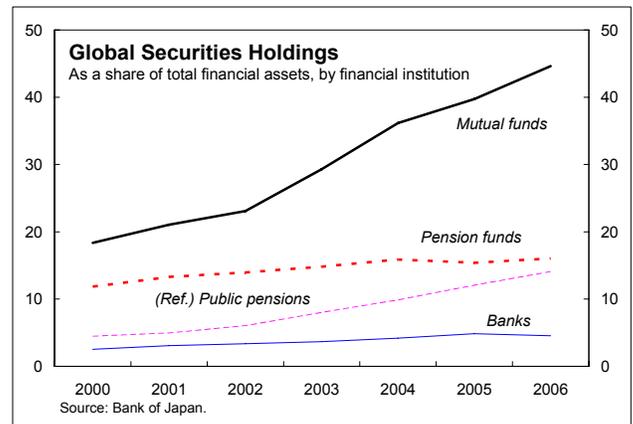
4. **Banks, insurance companies, and pension funds remain significant foreign investors.** Banks continue to account for a large share of foreign investment in securities and credits. (The share in the total has changed little from 2000.) However, their investments mostly reflect lending operations, owing to easier provisioning regulations and an extension of relationship banking to the foreign subsidiaries of domestic clients.⁴ While pension funds and life insurance companies increased holdings of foreign securities from 2000 to 2003, lately they have been net sellers, reflecting internal exposure limits.



	2000	2003	2006
Non-financial sector	400	506	752
Financial institutions	1,846	2,306	3,189
Banks	1,207	1,500	2,080
Life insurance	210	293	320
Pension funds	165	218	244
Mutual funds	85	134	382
Others	179	161	162

Sources: Ministry of Finance and Bank of Japan.
1/ Excludes official foreign reserves, trade credits, and FDI; includes external bank credits and global securities.

5. **Mutual funds have taken on greater foreign exposure, reflecting the preferences of individual investors.** Household clients helped drive mutual funds to rapidly increase purchases of global securities, which now represent nearly half of assets under management. This allocation is significantly higher than elsewhere in the financial industry, reflecting the willingness of households to diversify and to take greater levels of risks.



6. **Deregulation seems to have helped in fostering a change in the risk appetite of Japanese households.** Banks (in 1998) and Japan Post (in 2005) were allowed to sell mutual fund products at bank branches. Sales have been brisk, and currently, bank originations

³ While valuation changes (including from the yen's depreciation) helped lift the value of securities holdings from 2000 to 2006, net purchases of securities accounted for around two-thirds of the increase in the stock.

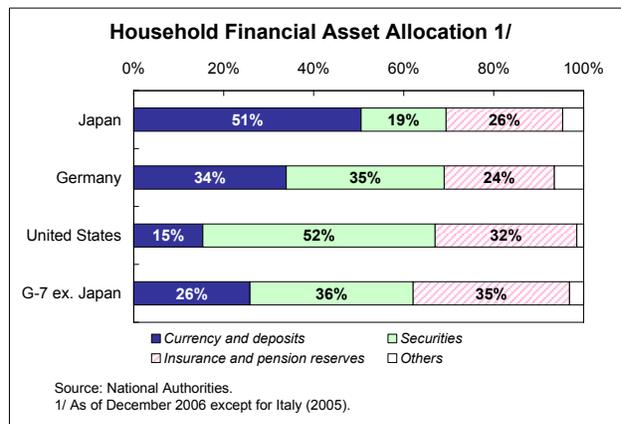
⁴ Nakagawa (2006) discusses recent trends in Japanese bank operations abroad.

account for more than half of total assets under management. Banks have proved a popular sales channel, because, at one location, clients can conduct multiple transactions and search for products that match their investment strategies.

7. **However, Japanese households have approached foreign investment cautiously.** In general, they prefer sovereign bonds in mature markets and selected emerging economies with liquid debt markets. Bonds have been popular, because the principal—in large part—has been protected, while households have received regular income, similar to interest on bank deposits. More recently, these funds have lost their appeal somewhat, since yields have declined (especially relative to other investment classes) and investors have been more attuned to the benefits from portfolio diversification. This has prompted some funds to begin offering more “exotic” strategies, including equity index funds in emerging countries (such as in Brazil, Russia, India, and China) and to a lesser extent, foreign-domiciled hedge funds.

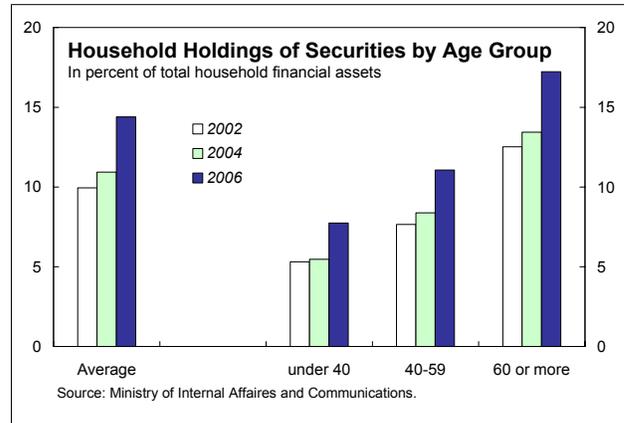
Global Securities Investment: outlook

8. **Currently, individuals still hold a very large share of financial assets in currency and deposits.** Bank savings and cash represent around half of households’ \$13 trillion in financial assets, a share that is twice as high as the average in other G-7 countries. Conversely, the share of Japanese holdings of securities is much lower. This aggregate, however, masks a recent rebalancing of households’ portfolios, away from currency and deposits (whose share has declined by 5 percentage points since 2001) to securities—including mutual funds.



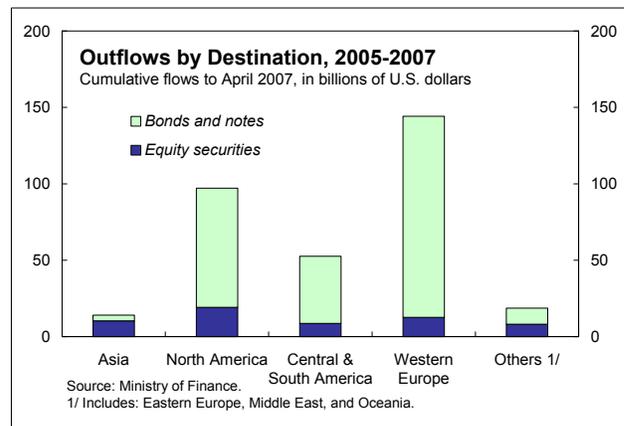
9. **Population aging is likely to add momentum to global securities investment.** Those above the age of 60 hold the bulk of household financial assets and have the highest proportion of assets in securities. This age group holds a larger share of riskier assets than younger cohorts partly because its life expectancy is higher—and investment income lower—than anticipated. In addition, with some uncertainty regarding the benefits under the public pension system, some investors are also seeking to reduce reliance on it for income. If current investment patterns continue, there could be larger holdings of riskier assets, including foreign ones, as the baby boom generation enters this cohort.

10. **These trends suggest that the large capital outflow from the household sector is likely to continue for some time.** If households continue to rebalance portfolios at a similar pace as in the recent past, there would be an annual shift of around 1 percent of total assets (over \$120 billion) from deposits to securities (foreign and domestic). At this pace, the process would take around 10–15 years before the portfolio allocation becomes similar to the other G-7 countries



(but still with higher shares in currency and deposits). Assuming that mutual funds continue to comprise around one-quarter of securities holdings, and that external investments account for around half of mutual fund assets, the annual outflow could be around \$15 billion per year.⁵ The cumulative outflow would be about \$225 billion (in current prices and exchange rates), lifting household's external exposure to around 5 percent of assets.

11. **Asian economies could receive much of these flows.** While foreign investment is largely concentrated in U.S. and European assets, Asia's share is steadily rising. In response, Japanese asset management companies have entered into alliances across the region, and banks have sold a greater number of Asia-focused funds.



12. **Nevertheless, several factors could delay these developments.** The bulk of these outflows are being driven by strong returns abroad, relative to Japanese markets. At the same time, mutual fund fees remain high—at around 3 percent of assets. If the current, benign global environment ends, and markets sour, these fees would cut into returns, possibly wiping out the incentive to invest externally. Alternatively, a strong rebound in the Japanese economy could lift domestic markets and yields. Financial deregulation and innovation could spark the introduction of new products and encourage investors to keep their money in Japan. Over the longer term, the structural outflows are likely to diminish, as retirees begin to draw down assets.

⁵ Balance of Payments data suggest a somewhat faster pace is possible. Net outflows coming from Japanese mutual funds have averaged around \$75 billion, annually, over the past two years.

Outward FDI: characteristics and outlook

13. **FDI from Japan has also increased steadily during the last decade.** Globalization pressures have encouraged firms to locate distribution centers closer to customers or to seek cheaper production bases. This process has continued largely unabated, except in 1998–1999, when the Asian financial crisis caused a temporary, large-scale withdrawal. Japanese FDI reached a record \$450 billion at year-end 2006 (about 10½ percent of GDP).

	2000		2006	
	Dollars	Percent	Dollars	Percent
Total	278	100	450	100
North America	138	50	163	36
United States	132	47	156	35
Asia/Pacific	59	21	121	27
China	9	3	30	7
ex. China	51	18	91	20
EU	55	20	119	26
Other	26	8	46	10
Latin Am.	21	8	39	9
Cayman Is.	9	3	21	5

Source: Bank of Japan.

14. **The largest stock of FDI remains in North America, but Asia and the EU are increasingly serving as important bases of operations.** North America's share of FDI has fallen sharply since 2000, offset by gains in Asia and the EU. Unsurprisingly, China serves as the largest host of Japanese FDI in Asia, accounting for around one-quarter of the regional total. Investments in Australia, Hong Kong SAR, Singapore, and Thailand account for most of the remainder. In general, Asian and North American investments are in industrial sectors. European FDI appears to be somewhat more concentrated, with most firms located in financial centers (the Netherlands and United Kingdom) and in the financial industry.

15. **FDI outflows are likely to continue growing.** In its annual survey of foreign operations, the Japan Bank for International Cooperation (JBIC, 2006) reports that 83 percent of manufacturers plan to expand overseas. Respondents note that higher growth opportunities abroad serve to offset limited possibilities in domestic markets. As Japanese corporations expand, they are likely to encourage further investment in overseas financial subsidiaries that would support the offshore operations.

	Total	Transportation Equipment	Electrical Machinery	Chemicals & Pharmaceuticals	Wholesale and Retail Trade	Finance and Insurance
Total	450	80	58	42	50	81
North America	163	43	22	19	22	20
Asia/Pacific	121	16	22	11	12	11
China	30	5	7	2	3	2
EU	119	17	14	10	15	21
Other	46	4	0	2	1	29

Source: Bank of Japan.

C. Yen Carry Trades and Associated Financial Flows

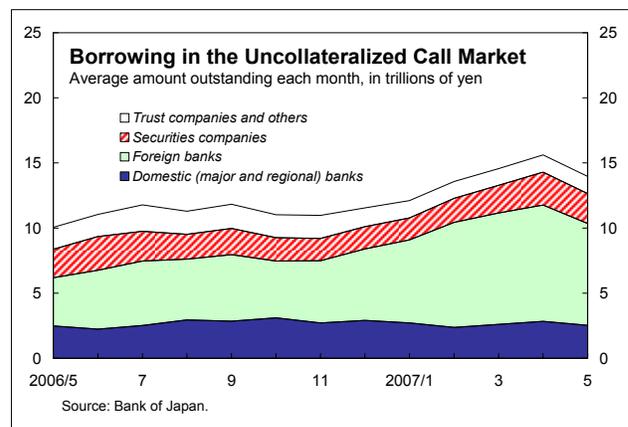
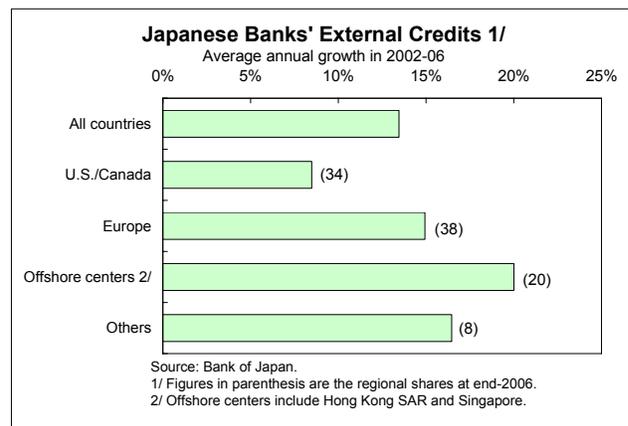
16. **Some recent capital outflows have also involved yen carry trades, the practice of borrowing in yen at low cost to invest in higher-yielding non-yen instruments.** A widening of interest rate differentials, coupled with low volatility, has raised incentives for such trading. To the extent that these positions are leveraged, there is a risk of a disorderly unwinding. Such was the case in October 1998, when the U.S. dollar fell by almost 15 percent against the yen. While the effects on the real sector were minimal, the unwinding of short positions by hedge funds and large financial institutions led to a rapid drying up of liquidity. This resulted in unprecedented price disconnects and market seizures.

17. **While there are no data on the outstanding size of carry trade positions, the indirect evidence from the possible sources of funding suggests that carry trades have been limited to date.**

- **Bank lending to foreign institutions.**⁶

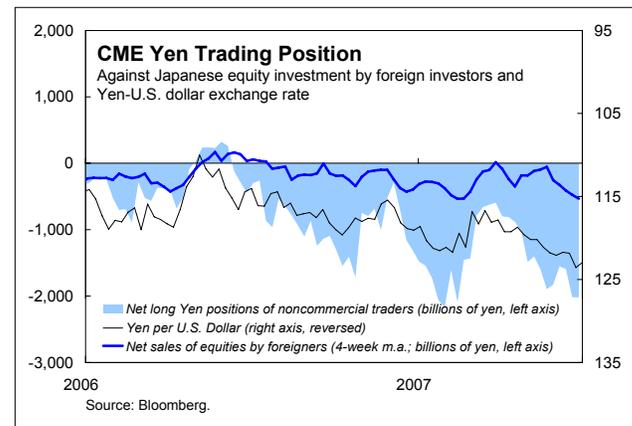
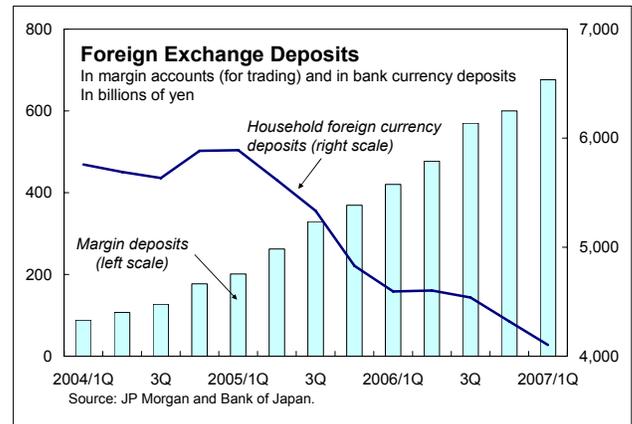
Although large, most bank credit is extended to U.S. and EU-based affiliates of Japanese firms. Also, lending to financial centers (where many hedge funds are domiciled) has risen only modestly, suggesting a small role for either hedge funds or banks in financing carry positions from this channel.

- **Foreign banks' borrowing in short-term money markets.** Foreign banks are active borrowers, but market commentators reckon much of this funding is for yen-yen transactions (such as yield curve arbitrage) that have no impact on the exchange rate. The short-term nature of this financing also limits the impact on the yen.



⁶ Low cost, yen-linked loans have reportedly become more common in some markets. For example, in South Korea, yen-denominated loans are estimated to have increased by around \$5 billion in 2006, much reportedly to SME importers. This is small relative to the won-denominated loan portfolio of banks, which stood at around \$750 billion at end-2006.

- Derivatives-based lending in yen.**⁷ The notional stock of contracts in the yen swap markets is smaller than U.S. and euro positions, so the size—of itself—does not indicate risk. (There are many reasons for purchasing swaps, including for financial trading and international trade.) In addition, the amount outstanding has changed little since 2004, suggesting these markets have played only a small role in carry trades. Finally, borrowers may not be able to pay off loans quickly, or may be worried about the impact on their credit ratings from a default—so it is not clear that trouble with these loans would spark a rapid or disorderly unwinding. Instead, adjustment would likely be protracted, thus imparting inertia to the process.
- Foreign exchange margin trading.**⁸ The recent, sharp rise in margin trading may actually reflect structural factors. (Transaction fees are lower on margin deposits than foreign currency deposits at banks.) Furthermore, the average account sizes are small (reportedly around \$6,000), and losses could easily be absorbed by most investors. Finally, conventional foreign currency deposits have fallen (creating a capital inflow) faster than the rise in margin accounts, potentially offsetting any affect of margin trading on the yen.
- Short-yen trading positions.**⁹ Even though the short-yen positions of non-commercial traders have tracked movements in the yen-U.S. dollar exchange rate well, it is not clear if this market is representative. First, traders must self-report whether they are “noncommercial”—and not all of these



⁷ It is possible to take advantage of Japanese interest rates without borrowing in yen. Banks serve as an intermediary between counterparties in the yen swap market (who are long in yen) and borrowers (who take on currency risk in exchange for low interest rates). Reportedly, these transactions have risen in Europe and Asia, but there are no data. However, some have pointed to the large stock of yen currency swaps as a risk.

⁸ Margin trading allows investors to leverage deposits in margin trading accounts (up to 10–20 times) to take currency positions in the foreign exchange market. The actual leverage is unknown, but appears to be smaller.

⁹ Non-commercial short-yen positions at the Chicago Mercantile Exchange (CME) are cited by some as an indicator of speculative yen carry trades. Market commentary suggests that the global short-yen position is around ten times that in the CME.

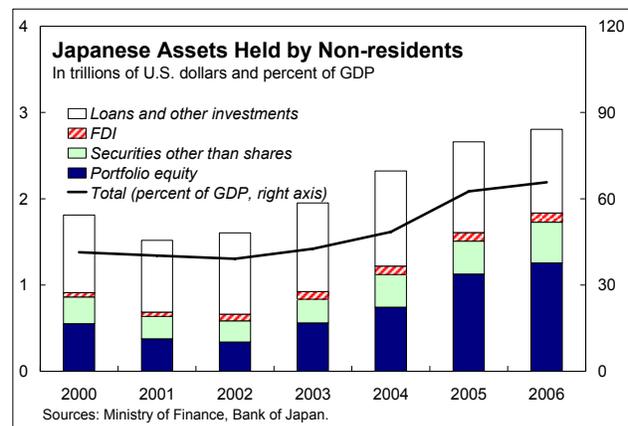
traders are speculators. Recent data suggest these positions could be used to hedge currency risk in Japanese stock trades. Second, only a small amount of foreign exchange trading goes through these markets.

18. **In light of the considerable uncertainties surrounding the size of the carry trade, it is difficult to draw conclusions about its significance.** The wide range of estimates on the carry trade reflects a diversity of views regarding which market is the “best” indicator, and market sizes differ greatly—from around \$100 billion to nearly \$2 trillion. Since there is limited evidence of a yen carry trade in any one funding market, it is likely that the stock of leveraged trades is closer to the lower end of most estimates. In addition, even estimates at the upper end would still be smaller than holdings of securities by longer-term investors.

19. **Furthermore, the maturation of markets over the past decade gives additional comfort regarding the adjustment process.** First, interest rate differentials are expected to narrow gradually, so market participants have ample opportunity to unwind positions. Second, the long-side of the carry trade appears to be spread across a number of currencies (while in 1998, it was narrowly concentrated on the U.S. dollar), suggesting that any adjustment may involve less movement in the dollar-yen rate. Third, global macro hedge funds are less important at present, and hedge funds have shown flexibility in unwinding their positions, thanks to better risk management techniques. Fourth, the investor base in Japan is more diversified—and holdings remain heavily concentrated in yen assets—adding stability to the financial landscape. Finally, financial markets are in general deeper than a decade ago and better able to absorb asset price volatility. That said, there is still a possibility that an unwinding of carry trades could have a harmful effect in shallower or less liquid markets.

D. Capital Inflows and Developments in Japanese Capital Markets

20. **Capital inflows are also growing.** Overseas investors hold about \$2¾ trillion in Japanese assets at end-2006, only about half of the outward stock. Furthermore, foreign investment registered only a small increase over 2000–04. More recently, foreign holdings of Japanese assets have picked up in tandem with the improvement in the economy.



21. **Traditionally, foreigners have participated in Japan’s capital markets primarily through lending.** Until 2002, loans represented nearly half of foreign investments in Japan and were focused exclusively on corporate clients and households. However, the scope of lending is now broader, with securities lending accounting for around 15 percent of overall lending. At the same time, traditional operations have slowed and the value of loans outstanding has fallen.

22. Much of the recent rise in foreign ownership of Japanese assets reflects investments in the stock market.

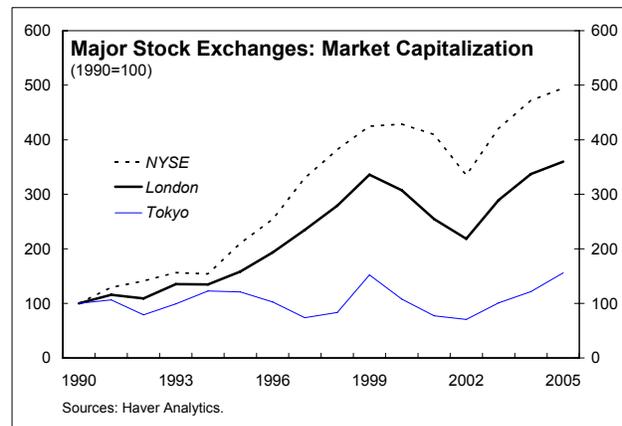
Foreigners have been net purchasers of Japanese equities since late 2003, with monthly net inflows averaging around \$8½ billion. As a result, foreign participation in the stock exchanges has jumped sharply and, in 2006, accounts for nearly one-quarter of the trades—and almost half of the daily turnover. The rise of Asian investors has been particularly striking, as their participation in the Tokyo market rivals that of North American investors.

	Volume traded (shares)		Turnover (yen)	
	2000	2006	2000	2006
Total	14.5	41.9	20.7	56.1
Domestic				
Foreign 2/	3.4	13.1	6.1	20.8
North America	1.2	3.2	2.3	5.3
Europe	1.4	6.7	2.4	10.6
Asia	0.6	3.1	1.2	4.6

1/ Includes first section (blue chip), second section (smaller firms), and Mother's market (growth and emerging industries).
2/ Purchases of shares.
Source: Haver Analytics.

23. Other portfolio investments by nonresidents remain small, particularly in the bond market. Private bonds and other structured instruments represent less than 5 percent of foreigners' investments in Japan, reflecting the generally small size of these financial markets. Holdings of public sector bonds—particularly central government bonds (JGBs)—is more significant, accounting for around 10–15 percent of foreigners' portfolios. Nevertheless, the share of JGBs held by overseas investors is low—at just under 6 percent in 2006—compared with those in other advanced countries. (Overseas investors hold around 29 percent of government bonds in France; 47 percent in Germany; 27 percent in the United Kingdom; and 46 percent in the United States.)

24. The Japanese authorities recognize the importance of developing domestic capital markets further. Thanks to deregulation and promotion efforts by the Ministry of Finance, the ratio of foreigners holding JGBs has nearly doubled since the beginning of the decade. By other measures, the capital markets—including the stock markets—remain smaller than their international counterparts. In addition, the Council of Economic and Fiscal Policy (CEFP) released its interim report outlining some strategies for promoting Tokyo as an international financial center (Box I.1).



Box I.1. Promoting Tokyo as an International Financial Center

In mid-April, the Council of Economic and Fiscal Policy (CEFP) published its interim report titled, “Toward Creating Financial and Capital Markets with True Competitiveness.” The report focuses on three areas—enhancing market infrastructure, promoting financial innovation, and upgrading the regulatory system—for promoting Tokyo as an international financial center.¹ It makes only broad recommendations, but does raise the possibility of more sweeping changes. Measures in the report include:

Enhancing infrastructure to make more accessible the Tokyo market

- Create a comprehensive exchange covering securities, financial futures, commodities, and crops.
- Expand assets allowed in mutual funds, such as foreign real estate funds.
- Improve the market for securitized products and syndicated loans.
- Adopt the International Financial Reporting Standards and encourage greater use of English.

Promoting financial deregulation and innovation

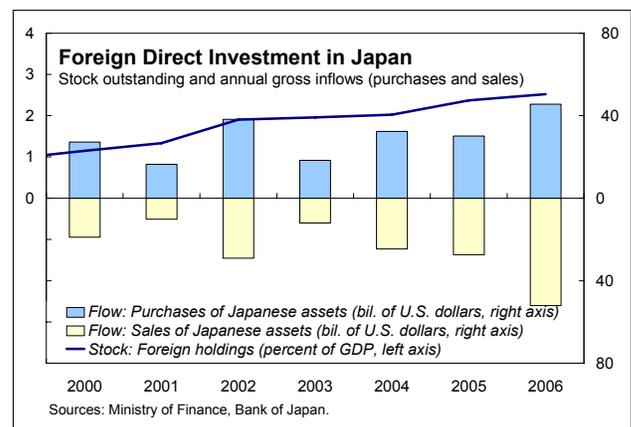
- Review rules separating banking and securities sectors, while introducing proper firewalls to prevent possible conflict of interests.
- Consider adopting a comprehensive tax on all financial income.
- Promote greater financial literacy and more professionals (especially lawyers and accountants).

Enhancing the transparency and predictability of the regulators

- Introduce cost-benefit analysis when evaluating regulations.
- Adopt a principle-based regulatory approach and safe-harbor rules.
- Enhance the function of self-regulatory organization, including for the stock exchange.
- Relax professional regulations, while enhancing general investor protection.
- Strengthen the function of the Securities and Exchange Surveillance Commission (for example, by reviewing the inspection and law-making functions and the use of surcharges).

¹ The report is modeled after the November 2006 “Interim Report of the Committee on Capital Market Regulations” that outlined a range of recommendations for improving the competitiveness of U.S. capital markets.

25. **The attraction of FDI has received particular attention, because foreign ownership of firms remains limited.** Since 2000, foreigners have bought up Japanese companies at a rate of around \$30 billion per year, with gross purchases in 2006 reaching a record level. But gross sales have also been large, and net inflows have been only marginally positive over this period. Furthermore, the FDI stock is low by international standards; the average stock of



FDI liabilities in the eurozone, United States, and United Kingdom is around ten times higher (just above 25 percent of GDP). Recognizing the need for additional action, the government has set a target to lift foreign ownership to 5 percent of GDP over the medium term. Recent steps to facilitate greater foreign ownership include permitting “triangular mergers” for subsidiaries of foreign institutions (used by private equity funds in merger and acquisition strategies), which became effective in May 2007.

E. Summary and Policy Considerations

26. **Given the possibility that a structural rebalancing in Japanese balance sheets is underway, there is significant potential for continued capital outflows.** Japanese households will likely increase their purchases of foreign securities, particularly in Asia. Rapid population aging will also add to the momentum for holding global securities, not only by households through mutual funds, but also by public pensions, whose portfolios are still relatively home biased. As for outward FDI, Japanese corporations are showing a continuing appetite for further investment in manufacturing and financial activities. Emerging Asia is often cited as a region where further expansion could occur. Yen carry trades may also play a role in fueling outflows, but are likely to be smaller than these longer-term factors.

27. **Against this backdrop, possible concerns for policymakers include:**

- **Retail investor protection.** As global exposure increases, investors should be aware of the risks—particularly from exchange rates. The Financial Services Agency plans to require financial institutions to provide full disclosure of the inherent risks, including the maximum amount at risk.
- **Better risk management at financial institutions.** Japanese financial institutions may need to adopt more sophisticated risk management, by considering the effects of a broader range of risks in emerging markets—such as regulatory uncertainty and liquidity difficulties.
- **Further development of domestic capital markets.** Deeper and broader markets could help promote capital inflows and work toward reducing global imbalances. Current plans to bolster Tokyo’s role on international capital markets could play an important role, as would further financial deregulation.
- **Greater information sharing on cross-border capital flows.** The increase in financial flows between countries has made surveillance more challenging. Greater information sharing could help in this regard.

References

Japan Bank for International Cooperation (JBIC), 2006, *Survey Report On Overseas Business Operations by Japanese Manufacturing Companies—Results of JBIC FY 2006 Survey: Outlook for Japanese Foreign Direct Investment (18th Annual Survey)*. November (JBIC Institute: Tokyo).

JP Morgan, 2006, “Sustainability of Unwinding of Yen Carry Trade,” *Global Foreign Exchange Research* (JP Morgan: Tokyo) March 6.

Nakagawa, Shinobu, 2006, “The Reemergence of Japanese Banks in Asia,” *Japan: Selected Issues*, in IMF Country Report No. 06/276, July.

II. CAPITAL FLOWS AND THE YEN-U.S. DOLLAR EXCHANGE RATE¹

A. Introduction

1. **A weak yen has fueled the perception that its evolution is disconnected from the economic fundamentals that determine its long-term value.** The yen has continued to depreciate against major currencies since last year. In 2006 the yen lost 5½ percent of its value against the U.S. dollar and 9¼ percent in real effective terms. This trend has continued so far in 2007. Yet, Japan’s fundamentals have strengthened markedly in recent years.²
2. **The economy has expanded at a healthy pace since 2002, exceeding potential growth in the last three years.** Activity has been supported by rapid gains in labor productivity, with the largest advances in the tradable sector (which maintains its secular positive productivity gap over the non-tradable sector). At the same time, Japan’s external position has remained favorable: the current account surplus reached just under 4 percent of GDP in 2006, further raising the stock of net foreign assets.
3. **Against this background, this chapter tries to shed some light on possible sources of the disconnect between the current and long-term value of the yen-U.S. dollar exchange rate.** It does so by building on the analysis in Chapter I and by assessing the dynamics of the yen–dollar exchange rate in response to cyclical and structural factors, including developments in Japanese investors’ behaviors, global risks appetite, demographic trends, and ongoing structural reforms. The main conclusion is that, although the yen could be expected to appreciate over the medium to longer run, non-trade factors are likely to delay the adjustment, barring a sudden change in investors’ sentiment.

B. Long-Term Value of the Yen

4. **The yen is undervalued relative to its long-term level in many assessments.** Estimates of the long-term value of a currency can be obtained in a variety of ways—none of which is without shortcomings or pitfalls (Annex II.I). There are four popular approaches to estimating equilibrium exchange rates: the reduced-form equilibrium real exchange rate (ERER) approach, the macroeconomic balance (MB) approach, the external sustainability (ES) approach, and the global general equilibrium model approach (GGEM).³ Most existing measures of Japan’s equilibrium exchange rate based on these approaches suggest that the

¹ Prepared by Papa N’Diaye.

² Theory and empirical research identify a long list of “fundamentals” or longer-term determinants of exchange rates. These include in comparative terms: (relative) productivity growth in the tradable and non-tradable sectors (Balassa-Samuelson effect), the net foreign assets position, the current account, the commodity terms of trade, openness, the fiscal balance, real interest rate differentials, and demographics.

³ See Annex II.I.

yen is below its long-term level against major currencies and in real effective term (Table II.1). The range of estimated undervaluations is large.

Author	Approach	Type of Exchange Rate	Period	Estimation Technique	Assumption	Percent Undervaluation
Benassy et al	ERER	Yen/\$	2003	Panel data/cointegration		14-22
Consensus	PPP	Yen/\$	Nov-06			18
Courdet-Couharde	MB	CPI-Based REER	2002-2003	Panel data	S-I norm 1.9	16-20
Courdet-Couharde	MB	Yen/\$	2002-2003	Panel data	S-I norm 1.9	36-37
Deutsche Bank	ERER	Yen/Euro	Aug-06	Time series		20
IMF	MB	CPI-Based REER	Mar-07	Panel data, 4 year averages	S-I norm 1.8	Significant
IMF	MB	Yen/\$	Mar-07	Panel data	S-I norm 1.8	Significant
IMF	MB	Yen/Euro	Mar-07	Panel data	S-I norm 1.8	Significant
IMF	ERER	CPI-Based REER	Mar-07	Panel data/cointegration	fundamentals at 2012	Significant
IMF	ERER	Yen/\$	Mar-07	Panel data/cointegration		Significant
IMF	ERER	Yen/Euro	Mar-07	Panel data/cointegration		Significant
IMF	ES	CPI-Based REER	Mar-07	Panel data	Stable NFA at 2005	Significant
IMF	ES	Yen/\$		Panel data	Stable NFA at 2005	Significant
Morgan Stanley	EREER	Yen/\$	Oct-06	Time series		20
Mussa 1/		yen/\$	2004		Global imbalances	35
Obstfeld	GGEM	CPI-Based REER	end 2005	Simulations	Narrow Japan's current account surplus from 3.5 percent of GDP to zero	19-38

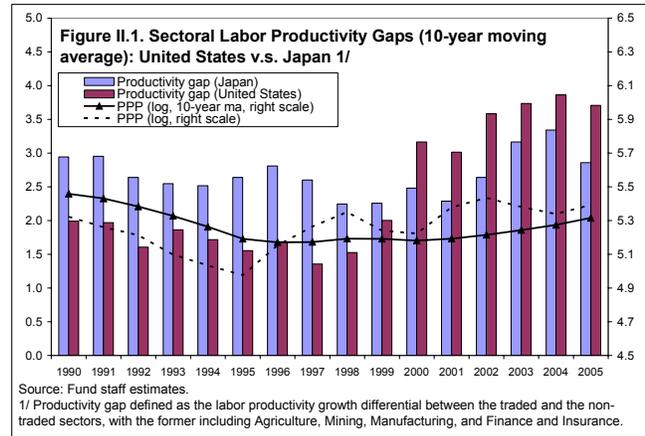
5. Estimates of the equilibrium value of the yen are subject to large statistical uncertainty and reflect the interplay of factors often pointing in different directions.

Uncertainties relate to data definition, model specification, and the restrictiveness of the underlying assumptions to capture multilateral consistency in estimated equations of equilibrium exchange rates.⁴ The influence of offsetting factors is most apparent in the case of productivity differentials and demographics, which are found to have a significant explanatory power on the long-term value of the yen.⁵ In particular:

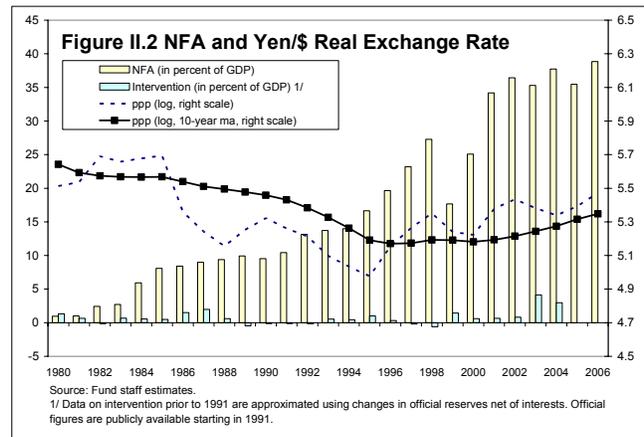
⁴ The uncertainty that surrounds and limitations of estimates of equilibrium exchange rates (including those of the IMF Consultative Group on Exchange Rate (CGER)) have been discussed in many studies (See for example Coudert and al. (2005), IEO report (2007), Dunaway and al. (2006)).

⁵ Isard and Faruqee (1998).

- Productivity differentials* suggest a long-term value of the yen closer to the *lower* bound of the range of estimates in Table II.1. The differential in labor productivity growth between the tradable and non-tradable sector (productivity gap) in the United States has surpassed that in Japan since 2000 (Figure II.1).⁶ This is mainly because the pick up in productivity in the tradable sector has been more rapid in the United States than in Japan. This shift in productivity gap differentials has been accompanied with a trend real depreciation thereafter, in line with the predictions of the Balassa-Samuelson effect.⁷ This trend could be exacerbated by productivity-boosting reforms in the non-tradable sector in Japan and lead to a weaker real yen in the longer term.⁸ (By contrast, reforms that unlock productivity gains in all sectors would tend to increase wages, demand, and prices, strengthening the yen in real terms over time.)



- By contrast, *demographic factors* suggest estimates of the long-term equilibrium of the yen closer to the *higher* end of the range of estimates in Table II.1. The effects of demographics are generally captured through the evolution of net foreign assets (NFA), which increase with the old-age dependency ratio. Higher long-run NFA will in the transition be associated with a weaker yen (to generate the current account surplus needed to raise NFA) but eventually call for a more appreciated



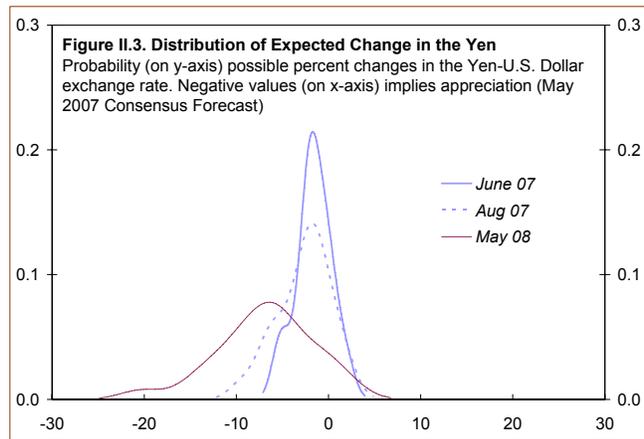
⁶ From the perspective of the Balassa-Samuelson effect, productivity gains that are concentrated in the tradables sector should lead to a real appreciation, while productivity gains equally spread across the tradables and non-tradables sector would leave the real exchange rate unchanged.

⁷ See Tille and al. 2001 for an analysis of labor productivity gaps and the dollar exchange rate.

⁸ Simulations using the IMF Global Economy Model suggest that product market reforms in Japan that aim at raising productivity in the non-tradables sector would lead to a real depreciation of the yen, if the gains are concentrated only in that sector (see Laxton, Pesenti, and N'Diaye, 2006).

currency.⁹ On this reasoning, Japan's strong accumulation of assets since the mid 1990s points to a large undervaluation of the yen relative to its longer-term value (Figure II.2).

6. **Be that as it may, conventional analyses of misalignment provide little clues on how, if, or when an exchange rate adjustment will take place.** This is in part because estimates of equilibrium exchange rates are not forecasts. The assessment that a currency is misaligned relative to its long-term value does not necessarily imply that an imminent adjustment is likely.¹⁰ At best, some empirical studies on the dynamics of exchange rates indicate a tendency for currencies to revert to their equilibrium gradually (perhaps in three to five years), but this convergence is conditional on the absence of any disturbance to fundamentals. A gradual appreciation seems consistent with current markets expectations. For example, the May foreign exchange consensus forecast indicates that on average analysts expect the yen to rise by about 7 percent by the first half of 2008, although there seem to be a great deal of uncertainty on the magnitude of such a rise (Figure II.3).



C. Transition to a Longer-Term Equilibrium

7. **The process of adjustment of exchange rates to their long-term level is influenced by capital flows.** With an emphasis on cross-border trade in goods and services, many existing models of equilibrium exchange rates do not explicitly account for capital flows.¹¹ These flows have become important determinants of the supply and demand conditions in currency markets (Figure II.4). In the case of Japan, capital flows dwarf trade flows.¹² The average *daily* turnover in yen foreign exchange markets worldwide (about

⁹ It has been shown that countries with relatively high NFA (which could reflect demographics) can “afford” more appreciated real exchange rates—and the associated trade deficits—while still remaining solvent (see Faruqee (1995), Gagnon (1996), and Lane and Milesi-Ferreti (2002, 2004)).

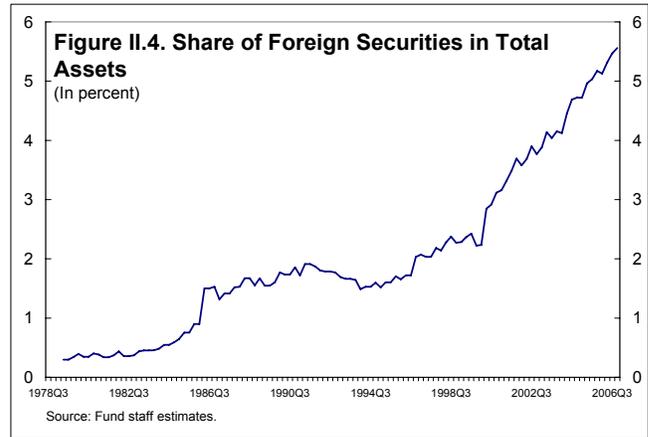
¹⁰ Isard and al. (2001).

¹¹ Some exceptions may be constituted by reduced form models of equilibrium exchange rates, such as the BEER or the NATREX.

¹² Some models of equilibrium exchange rate (such as the macroeconomic balance approach) that rely on the saving-investment balance as a measure of net saving outflows could be considered as models of capital account balance from a medium-to long-term perspective (Isard and Faruqee 1998). In these models, short-term changes in capital flows (e.g., changes in portfolio flows) affect the short-run levels of exchange rates and not their

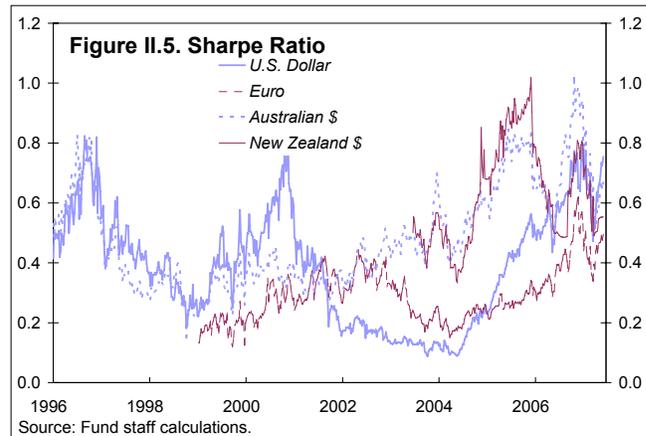
(continued...)

\$360 billion in dollar equivalent) exceeds the *annual* dollar value of net trade in goods and services by about a factor of two. An alternative modeling strategy would bring to the fore a possible role for capital flows and changing investor's appetite for a country's assets at least in the transition to a long-term equilibrium pinned out by other economic fundamentals.



8. **In the case of Japan, ongoing capital flows represent an adjustment to secular and cyclical forces, such as a decline in the home bias, large interest rate differentials against yen assets, and globally low volatility in asset markets.**

- *Secular decline in home bias and portfolio diversification.* The stock of overseas investment has doubled since 2000 to 121 percent of GDP as at end 2006.¹³ Japanese investors (particularly retail investors) are increasing their holdings of foreign securities, reflecting a decline in their preference for domestic assets and deregulation in the banking sector. This portfolio rebalancing is probably supported by population aging as retirees seek higher returns abroad.
- *Large interest rate differentials* have also played a part in generating capital outflows. Some of these outflows, which are more speculative in nature, are carry trades. The magnitude of these carry trades is however difficult to gauge as there is no standard definition and the underlying transactions can be off-balance sheet.
- *Global search for yields.* The global environment of low volatility, ample liquidity, record corporate profits, and financial innovation has contributed to a search for yields and spurred capital flows. This environment has also created strong risk appetite and new linkages between different asset classes and segments of capital markets with shifts in



longer-term value as long-term capital flows are ultimately determined by the same economic fundamentals that determine saving outflows and trade (e.g., relative productivity).

¹³ See Chapter I.

portfolio choices and investment decisions. For example, low volatility (combined with large interest rates differentials) has boosted the risk-adjusted return (Sharpe ratio) for investing outside Japan (Figure II.5).

Capturing the effects of capital flows on the yen-dollar exchange rate

9. **The modeling strategy in this paper is to estimate reduced-form equations that link changes in the yen-dollar rate to capital flows as well as changes in conventional determinants of the long-run equilibrium exchange rate of the yen against the dollar.** The prototypical specification takes the form of the following error-correction model.

$$\text{Change in yen-dollar exchange rate} = f(\text{change in long-term determinants, deviation from equilibrium rate, capital flows}) \quad [1]$$

This equation is estimated using quarterly data starting in 1990 by the Generalized Method of Moments with a set of instruments defined in Annex II.II.

10. In this specification,

- *Long-term determinants* of the bilateral yen-U.S. dollar include: the relative price levels in Japan and the United States, the relative labor productivity, and the ratio of Japan's NFA to GDP. These variables are used to estimate an “augmented purchasing power parity” (PPP) relationship that allows to compute an equilibrium exchange rate (Annex Table II.1). The estimated equilibrium exchange rate provides information on the degree of undervaluation of the yen-dollar rate. For example, using the estimated long-term relationship and NFA values based on the cumulative WEO projection of the current account surplus together with forecast for labor productivity growth indicate a significant undervaluation in real terms.
- The *deviation from the equilibrium rate* is the difference between the actual yen-dollar exchange rate and the long-term equilibrium rate determined through the augmented PPP relationship, as described above.
- The effects of *capital flows* in the adjustment process are captured through the short-term interest rate differential, the long-term interest rate differential, the global volatility index, and through high-frequency changes in NFA, which capture portfolio rebalancing.¹⁴

11. **Estimates of alternative specifications of equation [1] are reported in Table II.2.** The estimated coefficients indicate the percentage change in the yen-dollar rate in response

¹⁴ See Annex II.II for details.

to changes in the variables described above. The results indicate a statistically significant impact of interest rates differentials, NFA, and volatility on the adjustment process of the yen-dollar exchange rate with significance levels (p-values) generally below 5 percent. For example:

- A narrowing of the interest rates differential between Japan and the United States (currently against yen assets) leads to an appreciation of the yen relative to the dollar.¹⁵
- An accumulation of NFA leads to a depreciation of the yen in the short run, but to an appreciation of the yen in the longer term (as discussed in paragraph 5).
- Higher volatility is associated with an appreciation of the yen relative to the dollar, supporting the view of reversal of short positions in the wake of a volatility shock.¹⁶

Table II.2. Yen-U.S. Dollar Bilateral Exchange Rate and Macroeconomic Variables

	Model 1		Model 2		Model 3		Model 4	
	value	p-value	value	p-value	value	p-value	value	p-value
Inflation differential	-1.900	0.000	-1.942	0.000	-1.335	0.000	-1.322	0.000
Relative productivity	-0.236	0.207			-0.972	0.000	-0.953	0.000
Long-term interest rates differential	-0.001	0.752						
Short-term interest rates differential	-0.010	0.001	-0.009	0.005				
Net foreign assets	2.349	0.000	2.266	0.000	2.293	0.000	2.293	0.000
Volatility	-0.002	0.002	-0.002	0.001	-0.002	0.018	-0.002	0.013
Correction to long-term equilibrium	-0.024	0.030	-0.026	0.018	-0.021	0.141	-0.022	0.110
Intervention	-0.008	0.002	-0.010	0.000	0.001	0.892		
Intercept	-0.024	0.000	-0.022	0.000	-0.028	0.000	-0.027	0.000
Sharpe ratio					-0.039	0.085	-0.038	0.077
Sharpe ratio squared					0.119	0.072	0.120	0.064
Adjusted R-squared	0.463		0.484		0.433		0.446	
S.E. of regression	0.035		0.035		0.036		0.036	
J-statistic	11.015		11.569		11.789		11.869	

Source: Fund staff estimates.

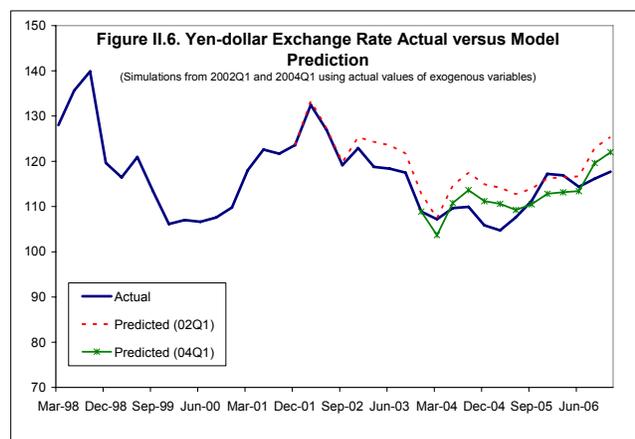
Notes: Models 2 and 4 exclude the variables with the highest p-values in the previous regression.

- The coefficient of the deviation from the long-term equilibrium suggests that only about 8–10 percent of the yen-U.S. dollar adjustment of the exchange rate toward its longer-term value takes place every year, other things being equal, suggesting a half-life of undervaluation of about five years.

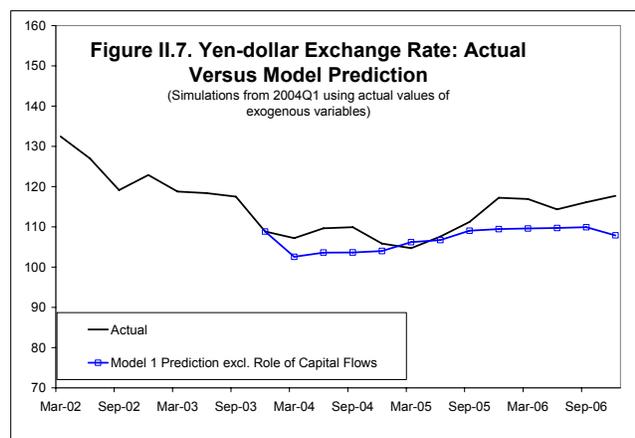
¹⁵ This result is against the uncovered interest parity, which has been shown not to hold at short horizons.

¹⁶ For the impact of volatility on exchange rates see BIS (2007).

12. **The estimated models fit the data relatively well.** The regressors explain between 40 and 50 percent of the changes in the yen-dollar rate. Within-sample dynamic simulations using model 1 above suggest that, taken together, these variables predict relatively well changes in the yen-dollar exchange rate (Figure II.6).¹⁷



13. **A counterfactual exercise based on these estimates allows a first assessment of the impact of the recent pattern of capital flows on the external value of the yen.** A comparison between the actual dollar-yen exchange rates and those predicted by Model 1 *without* the contributions of variables related to the capital account (e.g., interest rates, volatility, and high-frequency changes in NFA) suggests that in the absence of these factors the yen-dollar rate would have been about 9 percent more appreciated than the actual rate at end 2006 (Figure II.7). This result needs to be interpreted with care, but gives a first benchmark of the downward pressure from the pattern of capital flows in recent years.



14. **Although single-equation estimation gives some insights, it is not without weaknesses.** For example, the estimated impact of the inflation differential between Japan and the United States is incorrectly signed. This might be due to the fact that relative inflation captures information related to productivity differential in the absence of other restrictions that could be imposed in a multivariate model.

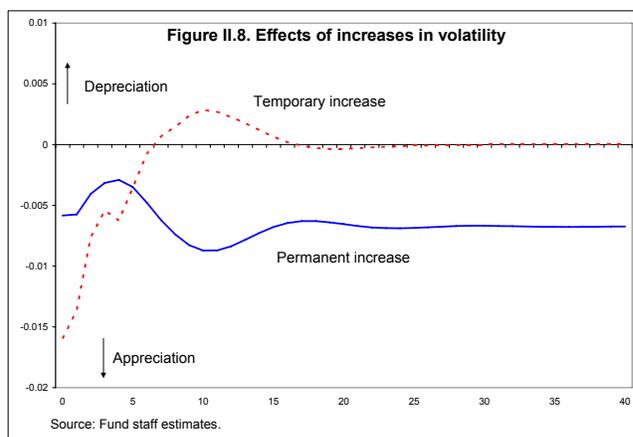
15. **Thus, a multivariate model is used to cross check the main results.** The evolution of the bilateral exchange rate is modeled in a structural vector error correction model (SVECM) that captures the interactions between the variables of interests, while ensuring the

¹⁷ For the simulations, Model 1 was written in level terms. The actual value of the yen-dollar rate in the quarter before the beginning of the simulation is used as a starting value for the one-period lagged exchange rate. The simulations use for every period the calculated value of the yen-dollar exchange rate and the actual values of the variables listed in paragraph 10.

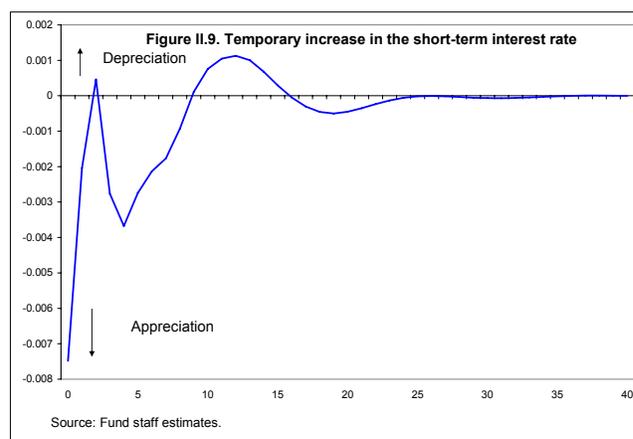
consistency between their short-run and long-run dynamics. The SVECM framework decomposes each variable into “factors”, some with temporary effects and other with long-lasting ones. The factors that have long-lasting effects explain both the short-run and long-run movements in the variables—that is they determine the trends and movements around these trends.

16. **The results from this multivariate approach are qualitatively similar to those in Table II.2.** For example:

- An increase in volatility, whether temporary or permanent, appreciates the yen in the short run. In the case of the temporary increase in volatility, the exchange rate appreciates for about 5 quarters, with some undershooting before returning to its initial level (Figure II.8). This response suggests that a global flight from risk or volatility shock could lead to a rapid appreciation of the yen against the dollar.



- A temporary increase in interest rates also leads to an initial appreciation of the yen, consistent with an overshooting model of exchange rate determination (Figure II.9).
- A permanent gain in (aggregate) productivity appreciates the yen both in the short run and the long run, while temporary gains generate appreciation pressures only in the short run.



- Higher prices in Japan than in the United States lead to a depreciation of the yen in the short run for temporary shocks, and in both the short run and the long run if the shock is permanent, consistent with the estimated augmented PPP relationship in Annex II.II. This result, which was not fully validated in the single equation approach (paragraph 11), provides support for a system approach.
- Finally, an alternative set of identification restrictions to analyze the effects of permanently higher NFA indicates that higher NFA would appreciate the yen in the long run, consistent with the predictions of many standard models.

D. Conclusions and Policy Implications

17. **Shifts in capital flows appear to play an important part in the adjustment process of the yen-dollar exchange rate to its longer-term value.** To the extent that the underlying drivers of capital outflows from Japan prove to be persistent, the adjustment of the yen to its longer-term equilibrium value (linked to real factors such as demographics and productivity differentials) may be slowed, although there is always the risk of a sudden change in investors' sentiment. In fact, there are reasons to believe that these outflows will persist for some time as discussed in Chapter I.

18. **Although capital flows play an important role in determining the evolution of the value of the yen, the role of other factors should not be forgotten.** Ultimately, the transitional dynamics of exchange rates are the reflection of offsetting forces, the relative importance of which is hard to predict. For example, structural reforms that unlock economy-wide productivity gains would strengthen the yen in the long run, although the initial effects could be in the opposite direction if those gains are concentrated in the non-tradable sector. The strengthening of the yen could be amplified by greater capital inflows as return on capital in Japan rises.

Annex II.I. Overview of Existing Methodologies

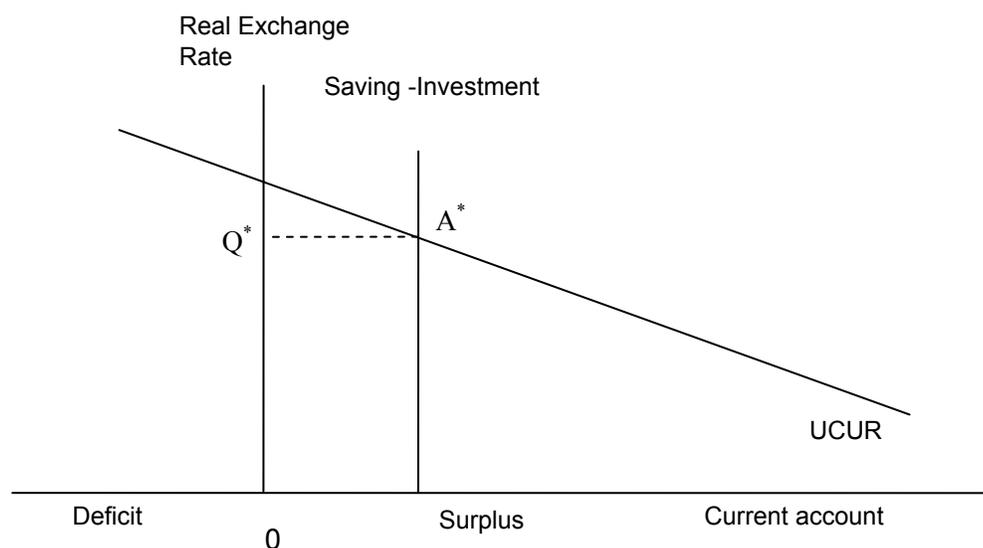
1. **There are four broad approaches to estimating equilibrium exchange rates:** the reduced-form equilibrium real exchange rate (ERER) approach, the macroeconomic balance (MB) approach, the external sustainability (ES) approach, and the global general equilibrium model approach (GGEM).

- **The ERER approach** uses the (augmented) PPP concept and involves the estimation of a single equation for the exchange rate as a function of key medium- to longer-term determinants. The determinants generally include factors that have been identified as major drivers of medium- to longer-term movements of the real exchange rates: (relative) productivity growth in the tradable and non-tradable sectors (Balassa-Samuelson effect), the net foreign assets position, terms of trade, openness, fiscal balance, real interest rates differential (Behavioral Equilibrium Exchange Rate concept by Clark and McDonald, 1998), and demographics. Based on some criteria that sometime involve pre-filtering techniques, long-term values of the key explanatory variables are used to derive the equilibrium real exchange rate. The difference between the actual value of the real exchange rate and its predicted equilibrium value indicates the degree of undervaluation or overvaluation. The most recent estimate by the IMF consultative Group on Exchange Rate (CGER) indicates a significant undervaluation of the yen in real effective terms.
- **The MB approach** is based on the fundamental equilibrium exchange rate concept (Williamson, 1994), which is the exchange rate consistent with internal and external balance. In this approach, the equilibrium exchange rate equalizes a country's sustainable saving-investment balance with its underlying current account balance (UCUR), when all economies are producing at potential output and the lagged effects of past exchange rate changes have been fully realized.¹ The approach involves three steps (Annex Figure II.1). In step 1, an equilibrium relationship linking the current account balance to a set of fundamentals is estimated. In step 2, an underlying current account balance is computed from the WEO medium-term current account projections (which assume that all economies are producing at potential output and the lagged effects of past exchange rate changes have been fully realized, point A in Annex Figure II.1). In step 3, the two previous steps are combined to derive an equilibrium real exchange rate (point Q^* in Annex Figure II.1), which intersects the sustainable savings investment balance schedule with the underlying current account balance schedule. The equilibrium real exchange rate varies with sustained shifts in a country's national savings, investment, or underlying current account balance. In addition to many of the factors enumerated above as major drivers of long-run real exchange rates, the level of development, economic crises, and

¹ Variants of the MB approach include the Natural Real Exchange Rate (NATREX) of Stein (1994, 2002).

the level of a country's financial development could also shift these variables on a sustained basis. For Japan, the saving investment norm is estimated at 1.8 percent of GDP implying a significant undervaluation in real terms.

Annex Figure II.1



Source: Isard et al. (2001)

- **The ES approach** considers the equilibrium real exchange rate as the real exchange rate that equalizes the current account balance to the level that stabilizes a country's NFA position to some benchmark level. As in the previous approach, it involves three steps. In step 1, the current account balance that stabilizes the country's NFA position to a given benchmark level is determined. In step 2, the projected medium-term current account estimates obtained in the MB approach are used. In step 3, the change in the exchange rate required to equalize the medium-term current account with its NFA-stabilizing level is determined. In addition to the information needed to obtain the medium-term current account, the approach requires assumptions on the country's potential growth rate, inflation rate, and rates of return on external assets and liabilities. In the case of Japan, the benchmark level of NFA is that at end 2005 (about 35¾ percent of GDP), indicating a significant undervaluation in real terms.
- **The GGEM approach.** In the context of the heightened risks of a disorderly unwinding of global imbalances, recent studies have focused on the needed adjustment of major currencies to facilitate the correction of domestic and external imbalances, supported or not by a set of policies consistent with those in the agreed strategy. Most of these studies use a GGEM à la Obstfeld and Rogoff (2005a, 2005b) and the IMF Global economy model where relative prices clear the world markets for traded goods as well as the

domestic markets for non-traded goods. While most studies beside those of the IMF focus on the possible U.S. dollar adjustments that would facilitate the reduction of the ballooning U.S. current account deficit, a recent study by Obstfeld (2006) suggests that to narrow Japan's actual current account surplus down to zero, the yen would need to appreciate in real terms by 19 to 38 percent. This implies an appreciation of over 10 percent for every 1 percent of GDP reduction in the current account surplus. In the GGEM framework, the extent of undervaluation or overvaluation depends critically on deep parameters such as the elasticity of substitution between traded and non-traded goods. The lower the elasticity, the sharper the price changes—hence real exchange rate changes—that are needed. Empirical evidence on these parameters is however limited in the case of Japan, weakening the assessment of required yen real appreciation. Nevertheless, a back-of-the-envelope calculation that assumes a 10 percent appreciation for every 1 percent of GDP decline in the current account surplus suggests that to bring Japan's 4 percent of GDP current account surplus to its CGER medium-term norm of 1.8 percent could require a real appreciation of the yen of as much as 22 percent. Put differently, in real terms the yen is estimated to be about 22 percent below its equilibrium value.

2. **As shown above, estimates of the yen equilibrium real effective or bilateral value vary widely depending on the approach used.** This wide range of estimates reflects the uncertainty inherent to estimating equilibrium exchange rates, which occurs in practice because of the following possible factors:

- Inherent “conceptual” differences: the ERER approach ensures the long-run consistency between the exchange rate and the set of fundamentals considered, the MB approach focuses on the flow of current account balance over the medium term, and the ES approach ensures consistency between the stock of NFA and the flows of current account balances.
- Other factors such as data availability, definition and measurement, as well as estimation and filtering techniques not only explain the differences between the approaches estimates of a country's equilibrium real exchange rate, but also cause large variations in the estimates from any given methodology (Dunaway et al. 2006).

Annex II.II. Framework

1. **The strategy involves estimating a set of single-equations models in a partial equilibrium setting and a structural vector error correction model.** The data used cover the period 1990Q1 to 2006Q4 and include the bilateral yen-U.S. dollar exchange rate, the relative price levels between Japan and the United States, the relative labor productivity, the ratio of Japan's NFA to GDP, the short-term interest rate differential, the long-term interest rate differential, the global volatility index, the ratio of foreign exchange intervention to GDP, and the Sharpe ratio.

Stationarity and cointegration

2. **Unit root tests were performed on all variables and the null hypothesis of a unit root could not be rejected in all cases except for the intervention series that was used in the single equation models only for parsimony reasons.** A test of cointegration indicated four cointegration relationships, which were identified by imposing restrictions as follows: (1) an augmented PPP relating the nominal bilateral exchange rate to the price differential (with a coefficient of one), relative productivity (with a negative coefficient), and the ratio of NFA to GDP (higher NFA appreciates the currency); (2) a term structure equation relating the short-term interest rate differential to long-term interest differential and volatility (high volatility raises the premium); (3) a relationship that links net foreign assets to productivity and long-term interest rates (wider long-term interest rate differential reduces NFA), and (4) a volatility equation that links volatility to the short-term interest rate differential and the level of the exchange rate.

Annex Table II.1. Cointegrating Equations

	Augmented PPP	Term Structure	Net Foreign Assets	Volatility
Exchange rate	1.0			69.1 [17.4]
Price differential	-1.0 n.a.			
Relative productivity	7.9 [7.4]		3.7 [7.7]	
Net foreign assets	1.0 [18.5]		1.0	
Short-term interest rate		1.0		-2.9 [-14.8]
Long-term interest rate		-2.0 [-10.7]	0.04 [13.6]	
Volatility		-0.5 [-18.8]		1.0
Constant	-41.2	6.2	-16.9	-355.4
LR test for binding restrictions (rank = 4):				
LR test for binding restrictions, Chi-squ:	3.2			
Probability	0.5			

Sources: Fund staff estimates.

Notes: Figures in brackets are t-statistics.

Single equation or partial equilibrium

3. The equations that are displayed in Annex Table II.2 of the text relate, depending on the specification, exchange rate changes to current changes in NFA, the change in long-term bond yield, the one-quarter lagged change in the short-term interest rate, the change in the volatility index, an error correction term from a long-run relationship estimated above (lagged by two quarters), the change in relative productivity, and the amount of intervention in relation to GDP, the change in the Sharpe ratio, and the change in the Sharpe ratio squared.

4. The equations were estimated using the Generalized Methods of Moments estimator with all current regressors treated as endogenous variables (price differential, relative productivity, long-term interest rate differential, volatility, net foreign assets, and intervention). The set of instruments for Model 1 and 2 include four lags of: the change in exchange rate, the change in the NFA-to-GDP ratio, the change in long-term interest rates, the change in volatility, the change in relative productivity, and the relative prices; the second-quarter lag of the error correction term; and two lags of the intervention-to-GDP ratio. For models 3 and 4, two lags of the change in the Sharpe ratio and three lags of the change in the Sharpe ratio squared were added to the previous set of instruments. After adjustments the number of observations in all models were 63.

Structural vector error correction model

5. The system considered included seven variables (the bilateral yen-U.S. dollar exchange rate, the relative prices between Japan and the United States, the relative labor productivity, the ratio of Japan's NFA to GDP, the short-term interest rate differential, the long-term interest rate differential, and the global volatility index). With four cointegration relationships amongst these variables, the system admits three common stochastic trends. That is, there are four disturbances that have only transitory effects on the variables and 3 other disturbances that have permanent effects and explain the trends that are displayed by the variables. These different disturbances are identified using three restrictions for the permanent shocks and six restrictions for the transitory shocks.

6. The identifying restrictions on the permanent shocks are: 1) the first permanent shock (a permanent volatility shock) has no long-run impact on the relative productivity and price differential, the second permanent shock (a permanent increase in relative prices) has no long-run impact on productivity. With regard to the transitory shocks, the following restrictions were imposed: the first transitory shock (a temporary productivity shock) initially leaves unchanged relative prices, short-term interest rates, and volatility; the second shock (a temporary inflation shock) initially leaves unchanged the short-term interest rate and volatility; the third shock (an interest rate shock) initially leaves volatility unchanged.

Data description

7. The data are from the IMF International Financial Statistics database, the Nomura database, the IMF External Wealth of Nations database, the CEIC database, and the Ministry of Finance of Japan. Most variables were expressed in deviation from their U.S. counterparts. In particular:

- Labor productivity is defined as relative output per man-hours.
- Price differential is the logarithm of the relative cpi indexes.
- Short-term interest rate is the difference between the discount rates.
- The long-term interest rate is the difference in the 10-year government bond yields.
- Volatility is the global volatility index (VIX) from the Chicago Board of Options Exchange.
- The Sharpe ratio is defined as the ratio of the short-term interest rate differential and the 3-month moving average of the actual volatility using one year of monthly exchange rate data.
- The net foreign assets data are expressed in relation to GDP and have been transformed in quarterly frequency from annual data.
- The intervention data are expressed in relation to GDP and from the ministry of finance after 1991. Positive data indicate yen selling and dollar buying.

References

- Bénassy-Quéré Agnés, Pascale Duran-Vigeneron, Amina Laréche-Révil, and Valérie Mignon, 2004, “Burden Sharing and Exchange Rate Misalignments Within the Group of Twenty,” in *Dollar Adjustment: How Far? Against What?* Ed. By C. Fred Bergsten and John Williamson, Washington: Institute for International Economics.
- Bank for International Settlements, Quarterly Review, March 2007.
- Clark, Peter and Ronald McDonald, 1998, “Exchange Rates and Economic Fundamentals: A Methodological Comparison of BEER and FEERs,” IMF Working Paper 98/00.
- Coudert, Virginie and Cecile Couharde, 2005, “Real Equilibrium Exchange Rate in China,” CEPII Working Paper No. 2005-01.
- Dunaway, Steven, Lamin Leigh, and Xiangming Li, 2006, “How Robust are Estimates of Equilibrium Exchange Rates: The Case of China,” IMF Working Paper 06/220.
- Faruqee, Hamid, 1995, ‘Long-Run Determinants of The Real Exchange Rate: A Stock-Flow Perspective,’ IMF Staff Papers, International Monetary Fund, Vol. 42 (March).
- Gagnon, Joseph, 1996, “Net Foreign Assets and Equilibrium Exchange Rates: Panel Evidence,” Federal Reserve Board International Finance Discussion Paper No. 574, (December).
- Isard, Peter, and Hamid Faruqee, 1998, “Exchange Rate Assessment: Extension of the Macroeconomic Balance Approach,” IMF Occasional Paper No. 167.
- Isard, Peter, Hamid Faruqee, Russell Kincaid, and Martin J. Fetherston, 2001, “Methodology for Current Account and Exchange Rate Assessments,” IMF Occasional Paper No. 209.
- Lane, Philip and Gian Maria Milesi-Ferreti, 2002, External Wealth, The Trade Balance, and the Real Exchange Rate,” *European Economic Review* (June).
- _____, 2004, “The Transfer Problem Revisited: Net Foreign Assets and Real Exchange Rates,” *Review of Economics and Statistics*, Vol. No. 86 (November).
- Laxton, Douglas, Paolo Pesenti, and Papa N’Diaye, 2006, “Deflationary Shocks and Monetary Policy Rules: An Open Economy Scenario Analysis,” NBER Working Paper No. 12703.
- Obstfeld, Maurice, 2006, “Implications for the Yen of Japanese Current Account Adjustment,” IMES Discussion Paper No. 2006-E-15.
- Obstfeld, Maurice and Kenneth Rogoff, 2005a, “The Unsustainable U.S. Current Account Position Revisited,” paper presented at the NBER conference on G-7 Current Account Global Imbalances, Newport, RI; revised version November 2005.
- _____, 2005b, “Global Current Account Imbalances and Exchange Rate Adjustment,” *Brookings Papers on Economic Activity*, 1:2005b, pp 67-146.

- Stein, Jerome L., 1994, "The Natural Real Exchange Rate of the U.S. Dollar and Determinants of Capital Flows," in *Estimating Equilibrium Exchange Rates*, ed. By John Williamson. Washington: Institute for International Economics.
- , 2002, "The Equilibrium Real Exchange Rate of the Euro: An Evaluation of Research," *Ifo Studien*, Vol. 48, No. 3, pp. 349–81.
- Tille, Cédric, Nicolas Stoffels, and Olga Gorbachev, 2001, "To What Extent Does Productivity Drive The Dollar," Federal Reserve Bank of New York Current Issues in Economics and Finance, Vol. 7, No. 8.
- Williamson, John, 1994, "Estimating Equilibrium Exchange Rates," Washington Institute of International Economics.

III. TAX POLICY CHALLENGES FROM GLOBALIZATION AND AGING: ISSUES AND OPTIONS²⁸

A. Introduction and Background

1. **The tax system in Japan, as in other countries, faces increasing pressures from aging and globalization.** This paper draws on recent international experiences and trends to identify and review some of the key issues likely to arise, and options for addressing them.

Aging and the need to increase revenue

2. **Fiscal pressures from an aging population arrive sooner in Japan than elsewhere—and are considerable.** By 2025, annual social security benefits are estimated to rise by about 50 trillion yen (Ministry of Health, Labor and Welfare (2006)), equivalent at annual growth of 3 percent in real terms, to around 5.5 percent of 2025 GDP. It will likely not be possible to finance this additional expenditure without tax increases given the cuts in other spending that would be required. This fiscal challenge is amplified by a net public debt ratio that, at around 90 percent of GDP, remains uncomfortably high. Spending adjustment has a role to play, but prudence requires planning for an increase in revenue of some percentage points of GDP. And the sooner action is taken, the less the increased need will ultimately be.

Challenges of globalization

3. **Tax systems worldwide are in a state of flux, as countries seek to adapt to the changing circumstances implied by globalization.**²⁹ The increased mobility of capital, in particular, poses a variety of difficulties. First, the location of real investments becomes more tax-sensitive, as the increased mobility of goods and services, consequent on trade liberalization and technological change, makes it easier to disassociate places of production and sale. Second, the more aggressive use of transfer pricing and similar avoidance techniques makes paper profits more ready to flow from high- to low-tax jurisdictions. And third, individuals find it easier to locate their savings abroad, with tax authorities often ill-placed to discover and tax the income so derived. In relation to commodity taxes, cross-border shopping and smuggling have in many countries also come to be significant constraints in tax-setting; high income individuals may also relocate in response to tax

²⁸ Prepared by Michael Keen.

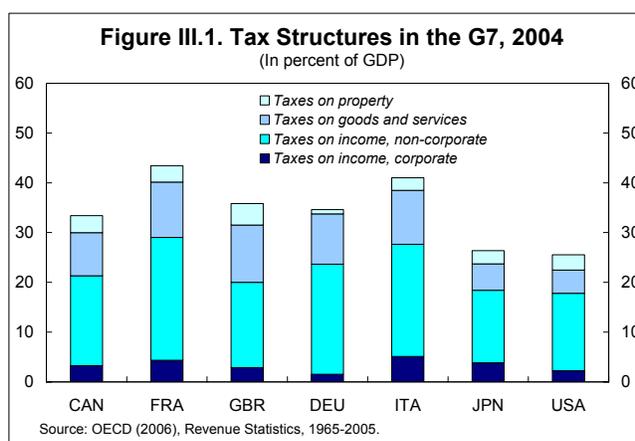
²⁹ Some aspects of globalization, it should be noted, point towards higher taxation. Since many countries find taxing foreigners attractive, for example, increased holding of equity in domestic firms by nonresidents may tend towards heavier corporate taxation.

differentials. All these factors are likely to lead to downward pressures on tax rates and hence revenue. The strength of these various forces will naturally vary across countries. Experience elsewhere, however, has shown the forces of globalization to have a powerful impact in shaping evolving tax systems, and Japan is unlikely to be an exception.³⁰

Key features of the present tax system

4. **The tax ratio in Japan is relatively low by the standards of high-income countries.** Revenue (including from social security) is around 26 percent of GDP, lower than in all OECD countries except Korea, Mexico, and the United States. An increase in revenues thus seems feasible. The question is how to achieve this in a way that minimizes adverse effects on growth, efficiency, and fairness, and overcomes political resistance to substantial tax increases.

5. **Figure III.1, which compares the level and composition of tax revenues in Japan with those of other G7 countries, provides some clues.** Beyond the low overall level, three features of current tax arrangements in Japan stand out. First is the relatively small amount raised by taxes on goods and services: only the United States—the only OECD country without a VAT—raises a smaller amount of GDP this way. Second, though less marked, is that the personal income tax also has a relatively low yield. Third, and in contrast, revenue from corporate taxation is relatively high. While there is no presumption that other countries' choices would be appropriate for Japan, these features do provide an indication of the most distinctive aspects of the Japanese tax system, which reform efforts should examine.



B. Tax Policy Options

6. **There are many elements of any tax system—both policy and administration—to which one should look for improvement and, perhaps, additional revenue.** The discussion here is not intended to be exhaustive.³¹ It leaves aside the possible scope for

³⁰ The increased international mobility of tax bases increases the risk that tax-setting by each country pursuing its own interest will lead to collectively undesirable outcomes and, hence, implies a potential case for international coordination. These issues are not considered here.

³¹ A full review of the Japanese tax system would need to address a far wider set of issues than touched on here, including: property and land taxation; the level and role of the excises; tax and wider fiscal policy towards
(continued...)

strengthening tax administration—including through the adoption of a common taxpayer identification number—to focus on design questions related to three pillars likely to be central to the development of the tax system in Japan:³² the corporate income tax (CIT), the consumption tax (a form of value-added tax, VAT), and the personal income tax (PIT).

Corporate taxation³³

7. **The corporate income tax (CIT) is a more important source of revenue in Japan than elsewhere.** Reflecting both its relatively high yield and the low overall tax ratio, the CIT has accounted for around 14 percent of all tax revenue, compared to an OECD average of about 10 percent.³⁴ This is also an area evidently affected by wider international tax developments, in terms of both statutory rate reductions—the OECD average falling from 41 percent in 1986 to 27 percent in 2007—and innovation in the fundamental structure of the tax. While revenue from the CIT is currently robust, the future of the CIT must thus be a central issue in considering the shape of the Japanese tax system in the coming years.

8. **The impact of any CIT—on incentives to invest, methods of financing, and avoidance activities—is usefully analyzed in terms of three tax rate concepts.** How the CIT affects these decisions depends not only on the headline rate of tax but also on its base, most notably the deductions provided for investment and financial expenses. Recognizing this complexity, there are three central summary statistics describing any CIT:

- The headline *statutory rate*: it is this (relative to statutory rates in other countries) that shapes the incentive to shift paper profits in or out of Japan by transfer pricing or financial arrangements;
- The *average effective rate* (AER), defined as the proportion of the lifetime pre-tax profit of some investment that is taken in tax (which may vary across different assets, and by methods of finance). All else equal, investors will locate any given project in the country that offers it the lowest AER; and

energy use and climate change; the tax treatment of SMEs; the proper scope of earmarking; complexities arising from the differing bases of, and interaction between, national and local corporate and personal income taxes; and the financing of local government more generally.

³² Macroeconomic aspects of alternative fiscal consolidation strategies are explored in Botman, Edison, and N'Diaye (2007).

³³ Dalsgaard (2007) provides a more complete discussion of CIT issues in Japan, including in relation to SMEs.

³⁴ Revenue figures are from OECD (2006), and for 2004, except where indicated.

- The *marginal effective rate* (MER), defined as the difference between the before- and after-tax returns on a project that the investor finds just worthwhile (which may also vary across assets and finance): this will affect how much an investor will choose to invest once they have decided in which country to locate the investment.

These three different measures of the tax rate,³⁵ although related,³⁶ provide distinct perspectives on the CIT. Table III.1 reports each for a range of all G7 countries.

Table III.1 Rates of Corporation Tax				
	Statutory Rate	AER 1/	MER 2/	
			Equity Finance	Debt Finance
Australia	30	26	24	-23
Austria	25	22	20	-18
Belgium	34	26	22	-35
Canada	36	28	25	-37
Finland	26	21	17	-23
France	34	25	20	-36
Germany	38	32	29	-37
Greece	32	21	12	-40
Ireland	12.5	11	10	-8
Italy	37	26	19	-48
Japan	40	32	28	-40
Netherlands	32	25	21	-29
Norway	28	24	22	-21
Portugal	28	20	15	-29
Spain	35	26	21	-38
Sweden	28	21	16	-29
Switzerland	34	25	20	-36
United Kingdom	30	24	20	-28
United States	39	29	24	-46

Source: Institute for Fiscal Studies, www.ifs.org.uk.

1/ Equity financed, investment in plant and machinery, rent at 10 percent.

2/ Investment in plant and machinery.

³⁵ To see the difference, consider a CIT that taxed only supernormal profit at, say, 30 percent. In this case, the MER would be zero, since profits in excess of the minimum required by the investor can be taxed at any rate and still leave the project worthwhile for the investor: if (and only if) a project would have been profitable in the absence of tax, it is also in this case profitable in its presence. The AER, however, would be 30 percent, this being the proportion of pre-tax profit taken in tax. Such a tax would be non-distorting for investments that could only be located in Japan (because of the zero MER), but—to the extent that the AER is higher or lower than 30 percent elsewhere—could clearly have an impact on those that could be located elsewhere.

³⁶ The AER is a weighted average of the statutory rate and the MER, the weight on the former being the ratio of the post- to the pre-tax cost of capital, (Devereux and Griffith, 2003).

9. **The most striking feature from international comparison of these rate measures is the high statutory rate in Japan.** At around 40 percent,³⁷ it will be the highest in the OECD after that in Germany falls to around 30 percent at the start of 2008. Reflecting this, Japan, along with Germany, also stands out as having the highest AER (an effect that would be even more marked for a project earning a higher rate of return than assumed in the table). The MER on equity-finance investments is also the second highest in the OECD, though the gap is in this case less marked as a consequence of the operation of the various deductions. The MER on debt finance, in contrast, is strongly negative: these investments enjoy a substantial tax *subsidy* at the margin, since the combined effect of depreciation allowances and nominal interest deductibility is that the cost of an investment is in effect deducted against tax twice, while the return is taxed only once. The high statutory rate makes the bias towards debt finance, present in all countries shown, especially strong in Japan.

10. **Looking forward, there will be pressure to reduce the statutory rate of CIT.** Tax planning—shifting profits to lower tax jurisdictions—is reportedly becoming more aggressive, and corporate inversion (the relocation of company headquarters abroad) is a significant concern. While there is good reason to suppose that the appropriate CIT rate is higher in Japan than in countries less important in world capital markets (not the least being the likelihood that such a reduction will trigger further cuts elsewhere),³⁸ it would clearly be wise to plan to deal with the likely pressure on the CIT. Two, related questions arise.

11. **One key question is whether revenue from the CIT can be preserved at roughly its current level.** The experience in other OECD countries is that, broadly, revenue has indeed been maintained despite large reductions in the statutory rate of CIT (Devereux, Griffith and Klemm, 2002). This reflects (at least in part) the tendency to accompany these rate cuts by measures to broaden the base of the tax, most commonly a reduction in the generosity of depreciation allowances (though it is not clear that these have been enough to account for the buoyancy of revenues).³⁹ In Japan, the scope for base broadening appears limited: as a rough indication of this, the productivity of the CIT—revenue relative to GDP,

³⁷ This comprises the national CIT rate of 30 percent and, giving rise to variation across localities—enterprise and inhabitants tax at prefectural level, and municipal inhabitant's tax.

³⁸ Smaller countries are expected to set lower tax rates than large because in considering a rate reduction they have relatively little revenue to lose from their narrow domestic tax base, compared to the large base abroad that they can hope to attract. There are also, perhaps, external benefits to the rest of the world from the maintenance of a relatively high tax rate in Japan, to the extent that a lower rate there would lead others to lower their rates too, aggravating the potential collective inefficiency from tax competition.

³⁹ Other possible explanations include a secular increase in the share of profits, notably of the financial sector (Devereux and Klemm, 2005), increased volatility of profits (which, with tax payable on positive profits but not rebated on losses, tends to increase expected tax payments; Auerbach, 2005), and/or a greater tax attractiveness of incorporation consequent on lower CIT rates (De Mooij and Nicodème, 2006).

divided by the main rate of the tax (a measure of the implicit CIT base)—was in 2005 around the OECD average for other than resource-rich countries.⁴⁰ Depreciation allowances for plant and machinery, in particular, seem to have been broadly in line with international norms until April 2007, when they were increased to more than double declining balance (allowable write-off also being increased from 95 percent to the more normal 100 percent); those for buildings, on the other hand, appear generous even before this.⁴¹ The credits provided for R&D expenditure (both the level and, until 2008, increases) may also merit reexamination: there is much evidence that such tax incentives do increase measured R&D (though they are of little benefit to new and perhaps more innovative companies, which may have insufficient taxable profit to benefit fully from such measures). But it is less clear that this brings the social (rather than private) benefits that warrant public support. Other countries, such as Germany, prefer to rely on targeted spending measures (through the support of research centers or programs, for example) to encourage R&D likely to generate substantial spillover benefits.

12. **A second question is whether more fundamental restructuring of the CIT would be appropriate.** The last few years have seen significant experimentation in this area, in two quite different directions. One set of reforms has been marked by tighter restrictions on interest deductibility, beyond standard thin capitalization rules (which deny deductions when debt-equity ratios exceed some level, commonly in the order of 3:1). The upcoming rate reduction in Germany, for instance, is to be accompanied by a restriction of interest deduction to no more than 30 percent of earnings before interest and taxes.⁴² These reforms represent a quite different kind of base broadening than has been typical, taking the system closer to a *comprehensive business income tax* (CBIT) in which interest deductibility is eliminated. Another set of reforms has moved toward the opposite extreme, extending deductibility, in various ways, to equity finance, and so taking the CIT closer to a tax on supernormal profit. Belgium, for instance, has adopted an *allowance for corporate equity* (ACE) system that allows a deduction for an imputed cost of equity finance,⁴³ while Estonia taxes only distributed profit. Each approach has its merits and weaknesses. The ACE, for example, achieves an MER of zero, whereas the CBIT does not. To maintain revenue,

⁴⁰ Japan's CIT productivity of 0.1 was around the median for the countries in Table III.1, and substantially exceeded only by Australia, Canada, Norway and—an exceptional case, with by far the lowest statutory rate—Ireland.

⁴¹ Internationally comparable figures on depreciation allowances are available at www.ifs.org.uk.

⁴² In similar spirit, Denmark is about to restrict interest deductions to the lesser of 55 percent of earnings before interest and taxes, and an amount calculated by applying notional interest to approved assets; and Canada proposes to restrict interest deductions related to income earned abroad.

⁴³ Forms of ACE have also been used in Brazil, Croatia, and Italy: Klemm (2006) reviews these experiences.

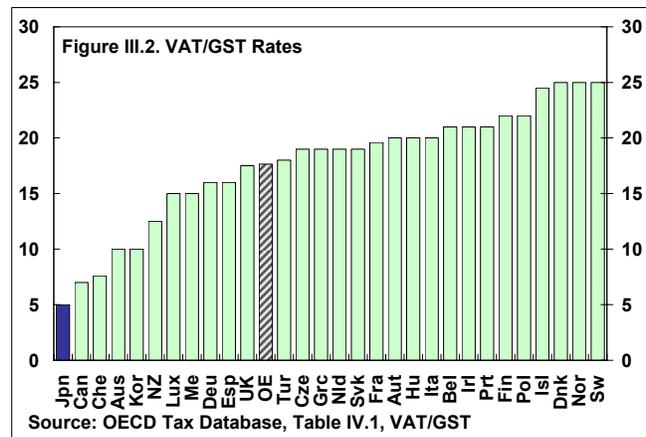
however, an ACE would require a higher statutory rate and, consequently, also a higher AER.

13. **Structural issues also arise in relation to international aspects of the CIT.** As in the United States, there has been some discussion in Japan of moving from the present worldwide system (with profits earned outside Japan subject to tax on repatriation, credit being given for taxes paid abroad) to an exemption system (in which they would be free of tax). This might improve the competitiveness of Japanese subsidiaries abroad, but at the same time is likely to worsen problems of transfer pricing and other forms of profit shifting.

14. **The challenge will be to maintain revenue from the CIT, with little prospect of a significant lasting increase.** While the structural issues just raised⁴⁴ will need to be faced in any fundamental review of the CIT, for more revenue, it seems, Japan will need to look elsewhere.

Consumption tax (VAT)

15. **Japan derives a smaller share of its tax revenue from this source than any other OECD country that has a VAT,** only 9.6 percent, compared to an average in the OECD (excluding the United States) of 19.5 percent. At 5 percent, moreover, the rate of VAT is far below the OECD average of nearly 18 percent (Figure III.2), and indeed is the lowest in the world (shared only with Panama, Singapore, Taiwan Province of China, and the Kingdom of the Netherlands—Netherlands Antilles). All this makes the VAT a candidate for meeting additional revenue needs. Assessing the case for this requires consideration of a range of issues of efficiency, fairness, and practicality.



16. **On efficiency grounds, a strong case can be made for the VAT as a marginal source of revenue.** Part of the reason follows from the equivalence, in present value, between a consumption tax applied uniformly to all commodities and a uniform tax on wages, profits, transfer receipts and existing savings: the former taxes an individual's use of funds, the latter taxes their sources.⁴⁵ A consumption tax thus provides a useful adjunct to

⁴⁴ On the comparison between CBIT and ACE, see Devereux and Sørensen (2005); on the comparison between worldwide taxation and exemption, see Mullins (2006).

⁴⁵ This equivalence is developed, for instance, in Ebrill et al (2001).

withholding in taxing labor income, notably in relation to small and informal enterprises. And so far as it bears on past savings, which reflect decisions already taken by the taxpayer, it has no distorting effect. There is also some evidence that countries which rely more heavily on consumption taxes (which, unlike capital income taxes, do not distort savings decisions) tend to grow faster in the long run (Kneller, Bleaney and Gemmell, 1999), and that many OECD countries have experienced efficiency gains from the VAT (which they have taken in part in the form of reduced reliance on more distorting taxes: Keen and Lockwood, 2006).

17. **The design of the VAT in Japan, moreover, has several strengths.** It compares favorably with most other OECD VATs, being levied on a relatively broad-base and at a single rate. This is evident, for example, in a C-efficiency ratio—VAT revenue divided by the product of consumption and the standard rate (which would be 100 percent for a textbook VAT levied at a uniform rate on all consumption)⁴⁶—of 65 percent. This is significantly exceeded in the OECD only by the much admired system in New Zealand. The implication of the broad-base is that raising the VAT rate to—purely for illustration—8 percent would increase revenue by nearly 1.5 percent of GDP.⁴⁷

18. **The widespread perception that the VAT is inherently regressive is much overstated.** It is true that VAT payments as a share of current income fall as the level of income increases (though only modestly so in Japan: see Dalsgaard and Kawagoe, 2000). But an individual's income in any one year is a poor indicator of their well-being, as it varies systematically over the lifecycle (potentially being lower for university graduates with good earnings prospects, for example, than for manual laborers in prime age). People's consumption, reflecting their own assessment of the spending they can sustain, may be a better measure of their true ability to pay tax. The equivalence noted above, moreover, stresses that the impact of any increase in the VAT rate will fall largely on those with accumulated savings at the time of the increase (more so, in particular, than would increased wage taxation): this will mostly mean the relatively old, which may have some appeal in terms of inter-generational burden sharing. More fundamentally still, the distributional impact of any tax in isolation is, or should be, of little interest: what matters is the combined impact of all taxes and spending. To the extent that raising additional revenue by the VAT enables increased spending that benefits the poor, including through the provision of state pensions, the net impact may well be progressive.

19. **This misperception may be difficult to overcome, however, so that any increase in the VAT rate could lead to calls for accompanying measures of redistribution.** With many workers outside the PIT, as noted below, there is little scope for offsetting adjustment

⁴⁶ Ebrill et al (2001) discuss the uses and limitations of C-efficiency measures.

⁴⁷ VAT revenue in 2003 was about 2.4 percent of GDP, or around 0.5 percent for each point of the VAT rate.

of the income tax rate schedule (short of introducing an earned income tax credit, a very substantial undertaking). Targeted spending measures are likely to be more effective. In particular, with the VAT falling in part on transfer income there may be pressure to adjust these payments for the increase in consumer prices (a point stressed by Hatta and Oguchi, 1992), and indeed social security payments are indexed to the CPI. To the extent that pension payments are for this reason increased, the additional revenue needed to deal with aging is of course further increased.

20. **There may also be calls to protect the poor against a general VAT increase by applying a reduced rate to some basic items.** While multiple VAT rates are indeed quite common in the OECD, the weakness of the case for their use has come to be widely recognized (so that most new VATs, such as that in Australia, are single rate). The key point here is that while the poor may spend a lower *proportion* of their income on some basic item, the rich may well spend a large *absolute* amount, and so derive more benefit from a reduced rate; in high-income countries, with a rich set of policy instruments available to them, there are likely to be better ways of pursuing equity aims.

21. **The general case for a single rate of VAT is reinforced in Japan by a particular practical consideration.** Uniquely, Japan implements its national VAT not by the usual invoice-credit method (with the right to credit for VAT paid on inputs resting on invoices provided by the supplier) but by subtraction (charging tax on the difference between purchases and sales as shown in accounts).⁴⁸ Though unusual, this appears to work reasonably well. A substantial increase in the standard rate, by making concealment of sales more attractive, could put the subtraction method under more pressure. Rate differentiation, however, would pose deeper challenges for the workability of the subtraction method, since (in order to give the proper implicit credit) it would become necessary for both sellers and buyers to identify the goods involved in any transaction. In this way, substantial elements of *de facto* invoice-credit taxation would become unavoidable, the question then arising of whether wholesale movement to such a system would be appropriate. This would be a major reform, requiring a wider assessment of the relative merits of the two approaches. It may be, for example, that the subtraction method is less vulnerable to refund-based frauds that have caused significant problems in other countries.

22. **Other technical issues that would arise in increasing the VAT rate appear manageable.** The main risk under the subtraction method is of giving excess implicit credit after the increase for commodities bought prior to the increase. Likely to be more of a concern is advance purchasing, especially of consumer durables, in anticipation of the

⁴⁸ There are a number of subnational VATs levied by subtraction, most notably the Italian IRAP, but these are levied at relatively low rates (a central rate of 4.5 percent in Italy). The IRAP does allow some modest rate variation across sectors.

increase. Recent experience in Germany shows that these effects can be significant, but not excessively disruptive. One estimate is that anticipation of the three point increase at the start of 2007 resulted in advance purchases of around 0.2 percent of GDP, with some marked sectoral effects (in automobiles, for example). More generally, the relative ease of the increase in Germany no doubt reflects the strong cyclical position at the time.

Personal income tax

23. **Two sets of issues arise regarding the PIT: the potential broadening of its base, especially on employment income, and the broad architecture of the tax.** These issues are separable, the main design issues relating to the treatment of income from capital rather than employment.

Base broadening

24. **The revenue yield of the PIT in Japan is amongst the lowest in the OECD, about 4.7 percent of GDP in 2004, compared to an OECD average of 9.1 percent.** This is not because marginal rates are low, at least on higher incomes: at about 50 percent,⁴⁹ the top marginal rate is now high by international standards. Rather it appears largely to reflect base erosion by such features as: a relatively high basic exempt amount and dependent allowances (removing about 20 percent of all employees, including part-time, from the PIT); an abatement for employment income (excluding from tax some fraction of such income, this fraction falling as income rises); and a variety of deductions (for life insurance premia, for example, and certain work expenses). Ishi (2001) estimates that (in 2000) the revenue cost of the various reliefs available under the PIT was around 5 percent of GDP. This is something of an upper bound, since some of the ‘erosions’ commonly included in such calculations—such as the relatively low rates applied to capital income—are, as will be seen, arguably appropriate. Nevertheless, there is evident scope for base-broadening measures that would increase revenue without increasing statutory rates of PIT.

25. **Some aspects of base broadening may have relatively little, and even potentially beneficial, effects on income distribution and incentives.** Reducing the basic exemption, for instance, would increase the amount of tax payable most for those taxpayers facing the highest marginal tax rate. For them, a reduction in exemption acts as a lump sum reduction in after-tax income that tends (through an income effect) to increase work effort. The precise incentive and distributional impact would of course vary across the potential measures. One general consideration, however, is that base broadening in itself would inevitably raise effective marginal tax rates, and so tend to worsen the labor market distortions created by taxing labor income. This could be mitigated by reducing statutory tax rates, though at some

⁴⁹ Inclusive of the typical prefectural and municipal inhabitant’s tax.

revenue cost. Given the fairly low effective marginal rates at present, especially at lower incomes (here taking account too of the relatively low rate of VAT, which as seen acts in large part as a tax on labor income), the adverse incentive effects of base broadening seem likely to be moderate.

26. **Eliminating the abatement for wage income is likely to require accompanying action to strengthen enforcement on the self-employed.** As in other countries the rationale for this provision—a source of complexity that serves only to apply a different schedule to employment income than to other income—is to provide rough parity between the employed and the self-employed given the greater ability of the latter to avoid or evade tax. This raises wider issues concerning the treatment of the self-employed, touched on later.

Grand designs for the income tax

27. **More fundamental issues also arise concerning the basic structure for the PIT.** This has been an area of considerable experimentation and innovation in recent years, reflecting in large part various challenges posed by globalization. The lessons from these experiences merit close attention, since without a clear view of the system it is intended to create, piecemeal measures that complicate and undermine its coherence and stability can hardly be avoided.

28. **For many years, the standard model for the income tax was the *comprehensive income tax*, as set out in the Shoup report and still formally the guiding principle in Japan.** This applies a progressive schedule to the sum of income from all sources. Technical problems in doing this—notably those from the difficulty of taxing capital gains as they arise rather than, as is in many cases more practical, when they are realized—have long been recognized. But increased capital mobility has brought to the fore a more intrinsic limitation: it becomes hard to enforce taxes on capital income at rates as high as those that many countries wish to apply to (less mobile) labor.

29. **There are three main alternative grand designs for the income tax.** One is an *expenditure tax*, which would simply exempt capital income or (if it is desired to tax super-normal returns) or provide a deduction for all savings but tax both return and principal when spent (if it is desired to tax them). The second is a *flat tax*, which—as adopted in many countries of central and eastern Europe—applies a single rate to all labor income (above some tax-free amount).⁵⁰ The third is a *dual income tax* (DIT), pioneered in the Nordic

⁵⁰ This should be distinguished from the Hall-Rabushka flat tax, which is a form of expenditure tax. Experience with flat taxes as recently adopted is reviewed in Keen, Kim and Varsano (2006).

countries, which applies a flat rate to all forms of capital income and a progressive schedule to labor income.⁵¹

30. **Which option is best suited to Japan?** Many countries provide expenditure tax treatment for some forms of long-term saving (and Japan already provides such treatment for pensions⁵²), but no country does this for all savings. (The general shift toward indirect taxation noted above, however, is to some degree a shift toward expenditure taxation.) Adoption of a flat tax has in some cases been part of a wider package including a reduction in exemptions and exclusions. But it is not clear why flatness itself—rather than judicious rate cuts—is needed for this. Moreover, it seems that the appeal of the flat tax has in many cases been as a way of signaling a fundamental regime change, marked by a greater commitment to market-oriented policies. This is clearly a far less vital concern in Japan. And while flat taxes can retain considerable progressivity, through the operation of a tax-free amount, current concerns at rising inequality in Japan mean that political support for applying a single marginal rate is likely to be limited.⁵³

31. **The DIT seems in many respects well suited for Japan,** as a flexible compromise between the difficulty, on the one hand, of taxing capital income without creating undue distortions and avoidance, and, on the other, an apparent social consensus on the desirability of marked progressivity. And indeed the present system is already in many respects close to a DIT: interest is taxed at a flat 15 percent, as are dividends (but with an option for inclusion in aggregate income) and taxable capital gains on most securities (with 50 percent exclusion of long-term gains). These features no doubt reflect a pragmatic recognition of the same forces that have led to explicit adoption of the DIT elsewhere.

32. **Moving to a full DIT would mean pursuing uniform flat taxation of capital income not as an exception but as an objective.** Such a direction for reform—which was advocated by Hatta (1992) for Japan even before its adoption by the Nordic countries, and favored by Dalsgaard and Kawagoe (2000)—would require a systematic review and equalization of the effective tax rates applied to different forms of capital income (including dividends, interest, capital gains, and income from real estate). Given the substantial degree of uniformity at present, the most substantial issues would be in the treatment of the self-employed and close companies. The difficulty is that these have substantial ability to exploit any difference between the effective rates on labor and capital income by in effect relabeling

⁵¹ Experience with the DIT is reviewed by Sørensen (1998) and Cnossen (2000).

⁵² Indeed the treatment of pensions is rather more generous than this, since contributions are deductible and funds exempt while cumulating, but pensions in payment are less than fully taxable.

⁵³ The present system has substantial elements of flatness for many taxpayers, around 80 percent of whom pay at a marginal rate of 10 percent. They account, however, for only around 35 percent of PIT revenue.

income: paying salary to a spouse for instance, rather than taking a profit. The Nordic countries have developed a range of ways to deal with these, differing in detail but in essence imputing some part of income to capital and taxing the rest as labor.⁵⁴ These schemes are cumbersome, but needed given that the gap between the two tax rates in these countries can be in the order of 20–30 percentage points. Where the gap is smaller, as would likely be the case in Japan, they are less necessary.

C. Conclusion

33. The challenges for tax policy design in Japan over the coming years—many of which are also faced by other countries—are substantial. Increasing revenue when many external pressures act to reduce it will not be easy. What this overview suggests, however, is that Japan is in many respects relatively well-placed to deal with these challenges. It has a relatively low initial tax ratio, a well-designed VAT, and a variety of country-specific factors that may make tax bases less mobile than elsewhere.⁵⁵

⁵⁴ These schemes are described in Sørensen (2005).

⁵⁵ As an island, it may also be less vulnerable than are countries with long, open land borders to the risk that high excise taxes will be undermined by illicit trade.

References

- Auerbach, Alan, 2006, “The Future of Capital Income Taxation,” *Fiscal Studies*, 27, pp.399–420.
- Botman, Denis, Hali Edison and Papa N’Diaye, 2007, “Strategies for Fiscal Consolidation in Japan,” IMF Working Paper 07/37.
- Cnossen, S., 2000, “Taxing capital income in the Nordic countries: a model for the European Union”, in S. Cnossen (ed.), *Taxing Capital Income in the European Union – Issues and Options for Reform*, Oxford University Press.
- Dalsgaard, Thomas, 2007, “An Overview of Corporate Taxation in Japan,” mimeo, IMF.
- _____, and Masaaki Kawagoe (2000), “The Tax System in Japan: A Need for Comprehensive Reform,” Economics Department Working Paper no. 231 (OECD: Paris).
- Devereux, Michael and Alexander Klemm, 2005, “Why Has the U.K. Corporation Tax Raised so Much Revenue?” *Fiscal Studies* 25, pp. 367–388.
- _____ and Rachel Griffith, 2003, “Evaluating Tax Policy for Location Decisions,” *International Tax and Public Finance* 10, pp. 107–126.
- _____, _____ and Alexander Klemm, 2002, “Corporate Income Tax Reforms and Tax Competition,” *Economic Policy*, pp. 451–95.
- _____ and Peter Birch Sørensen, 2005, “The Corporate Income Tax: International Trends and Options for Fundamental Reform,” mimeo (OECD: Paris).
- Ebrill, Liam, Michael Keen, Jean-Paul Bodin, and Victoria Summers, 2001, *The Modern VAT* (International Monetary Fund: Washington D.C.), 2001.
- Hatta, Tatsuo, 1992, “The Nakasone-Takeshita Tax Reform: A Critical Evaluation,” *American Economic Review* (Papers and Proceedings), Vol. 82, pp.231–236.
- _____, and Noriyoshi Oguchi, 1992, “Changing the Japanese Social Security System from Pay as You Go to Actuarially Fair,” in David Wise (ed), *Topics in the Economics of Aging* (Chicago: University of Chicago).
- Ishi, Hiromitsu, 2001, *The Japanese Tax System* (third edition) (Oxford: Oxford University Press).

- Keen, Michael, Yitae Kim and Ricardo Varsano, 2006, "The Flat Tax(es): Experience and Principles,": IMF Working Paper WP 06/218.
- _____ and Ben Lockwood, 2006, "Is the VAT a money machine?" *National Tax Journal*, Vol. LIX, pp.905-928.
- Klemm, Alexander, 2006, "Allowances for Corporate Equity in Practice," IMF Working Paper 06/259.
- Kneller, Richard, Michael F. Bleaney and Norman Gemmell, 1999, "Fiscal Policy and Growth: Evidence from OECD countries," *Journal of Public Economics*, Vol. 74, pp. 171–90.
- de Mooij, Ruud and Gaëtan Nicodème, 2006, "Corporate tax policy, entrepreneurship and incorporation in the EU," CESifo Working Paper 1883.
- Mullins, Peter, 2006, "Moving to Territoriality? Implications for the U.S. and the Rest of the World," *Tax Notes International*, September 4, 2006.
- Organization for Economic Co-Operation and Development, 2006, *Revenue Statistics, 1965–2005* (OECD: Paris).
- Sørensen, Peter Birch, 1998, "Recent innovations in Nordic tax policy: from the global income tax to the dual income tax", in P.B. Sørensen (ed.), *Tax Policy in the Nordic Countries* (Macmillan Press)
- _____, 2005, "Neutral Taxation of Shareholder Income." *International Tax and Public Finance*, Vol. 12, pp. 777–801.

IV. ANALYSIS OF THE EFFICIENCY AND PROFITABILITY OF THE JAPANESE BANKING SYSTEM¹

1. **Although the health of the Japanese banking system has improved, its profitability remains weak.** Banks recorded high net profit levels in FY2006, but this was largely due to one-time reversal of loan loss allowances. Excluding these volatile components, profitability remains low, as net interest margins continue to decline and remain below those in other advanced countries.² Thus, enhancing core profitability remains an important challenge for banks.

2. **This chapter analyzes the efficiency and profitability of Japanese banks during 2000–06.** The chapter uses data envelopment analysis (DEA) to analyze their cost and revenue efficiency. The results show that the performance of Japanese banks has steadily improved since 2001, but that there are significant differences within the banking sector. In particular, regional banks appear to be less cost and revenue efficient relative to both City and Trust banks. Overall, Japanese bank profitability is low compared to that in other advanced countries.

3. **The chapter proceeds as follows.** Section A analyzes the performance of the four segments of the Japanese banks—City banks, members of Regional Bank Association of Japan,³ members of the Second Association of Regional Banks,⁴ and Trust banks, and compares their performance with those of selected industrial countries—France, Germany, Spain, Switzerland, the United Kingdom and the United States. Using the DEA, sections B and C estimate and compare the efficiency of the four bank segments both across banks and across countries. Section D analyses the profitability of Japanese bank segments and their degree of risk taking. The paper concludes by outlining possible ways to improve their efficiency and profitability.

A. Background and Performance of Japanese Banks

4. **Japanese banks can be divided roughly between 12 major and internationally oriented banks and more than a hundred much smaller regional banks.** After City banks, Regional banks have the second largest market share in terms of deposits and loans—

¹ Prepared by Elena Loukoianova.

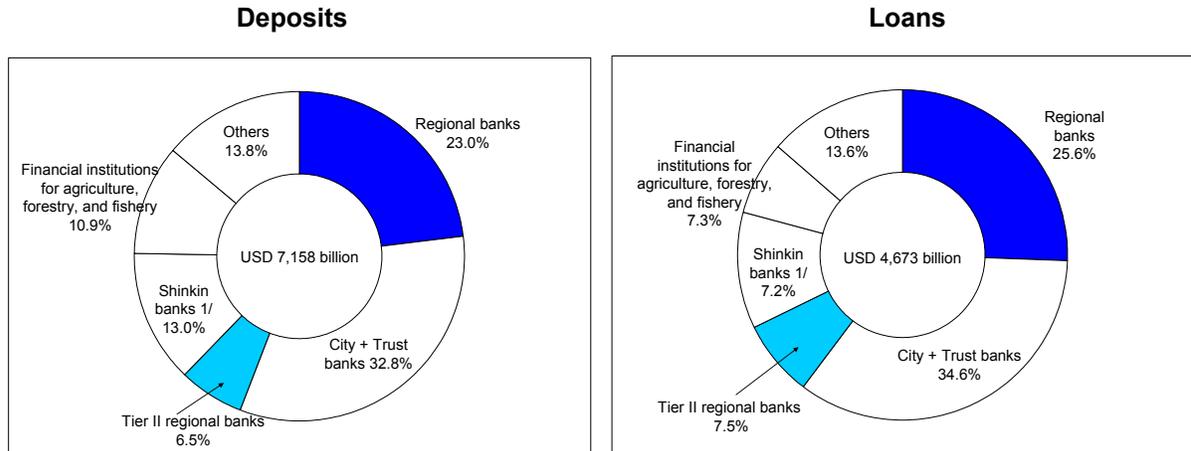
² Bank of Japan, 2007.

³ Hereafter, Regional banks.

⁴ Hereafter, Tier II regional banks.

at about 30 percent and 34 percent respectively (Figure IV.1). Banks may be classified into four main segments, reflecting differences in their business orientation:

Figure IV.1. Japan: Shares of Deposits and Loans of Private Financial Institutions
(March 31, 2006)



Source: Bank of Japan.

1/ Shinkin banks are smaller regional cooperative financial institutions.

- *City banks* operate as commercial banks, offering banking services mainly to large corporate customers. They operate across a wide spectrum of financial activities, dominating most segments in the domestic market, and some are also active internationally.
- *Trust banks* specialize in asset and wealth management, including providing advice and asset management services for pension funds. In addition, they are active in the real estate loan market.
- *Regional banks* focus their business mainly on retail banking in specific geographical areas. More than 80 percent of the loan customers of regional banks are local small and medium size enterprises (SMEs); and individual deposits account for approximately 70 percent of all the deposits. Regional banks function as the main financial service providers in the regions, accepting deposits and financing, providing payment services, and offering international and security services—such as retail sales of government bonds and mutual funds.⁵

⁵ Regional Banks Association of Japan, 2007.

- *Tier II regional banks* are smaller institutions that also focus their business on banking in specific geographical areas.⁶ Since their principal mission is to contribute to the region's social and economic development, emphasis is placed on meeting the financial needs of local individuals, corporations, SMEs, and public sector bodies.

5. **Performance varies significantly across banking segments** (Figure IV.2 and Table IV.1). Trust banks and City banks had the highest return on assets (ROA) and equity (ROE) respectively. On the other hand, Regional and Tier II regional banks had the lowest ROA and ROE, reflecting their poorer asset quality, limited product range, and smaller volumes. With their focus on retail and SME lending, they also had the highest shares of interest income in total income. Revenue and net income per bank employee and per branch also varied considerably across bank segments. Both group of regional banks showed much lower revenue and net income per bank employee and per branch than their major counterparts, as they provide mainly banking services through their wide branch networks.

Table IV.1. Japan: Indicators of Bank Performance, 2005
(Percent)

	Net interest income to assets	Total expenses to assets	ROA	ROE	Interest income to total income	Cost to income ratio
All banks	1.1	1.7	0.5	11.3	64.4	73.6
City banks	0.9	1.6	0.6	15.4	62.3	71.7
Regional banks	1.5	1.7	0.4	7.1	75.1	77.2
Tier II regional banks	1.8	2.1	0.2	5.0	76.1	82.5
Trust banks	0.9	2.3	0.7	10.4	41.8	68.9

Source: Japanese Bankers Association; and Fund staff calculations.

6. **Internationally, Japanese banks perform slightly below those in comparator countries** (Table IV.2). Their share of interest income in total income is higher than the average in the sample, reflecting their narrow product range and focus on traditional lending. Although the cost to income ratio is the highest among the group, this reflects low income—as also seen in the low return on assets—rather than high costs. However, in terms of revenue and net income per employed or branch, Japanese banks fare better than the sample average, due in part to their relatively low cost structure (Table IV.3). Indeed, only Switzerland and the United Kingdom show better performance in this area.

⁶ Originally, member banks of the Second Association of Regional Banks were established as joint stock companies under the Sogo Bank Law of 1951 and were referred as “Sogo Banks.” Over time, they started to operate like commercial banks and became regional banks. Although these banks carry out exactly the same operations as the original regional banks, their origins differ. As a result, the new regional banks have set up their own Second Association of Regional Banks independently of the Regional Banks Association of Japan.

Table IV.2. Indicators of Bank Performance in Comparator Countries, 2005
(Percent)

	Net interest income to assets	Total expenses to assets	ROA	ROE	Interest income to total income	Cost-to- income ratio
France	1.0	0.8	0.6	11.9	61.9	51.3
Germany	1.4	1.7	0.3	9.0	49.2	59.8
Spain	2.4	2.5	0.9	16.9	56.1	57.9
Switzerland	0.8	1.5	0.7	14.3	60.9	63.0
U.K.	1.6	0.9	0.8	11.8	68.0	40.5
USA	2.9	3.6	1.2	12.7	57.6	72.4
Average	1.7	1.8	0.8	12.8	58.9	57.5
Japan	1.1	1.7	0.5	12.6	64.4	73.6

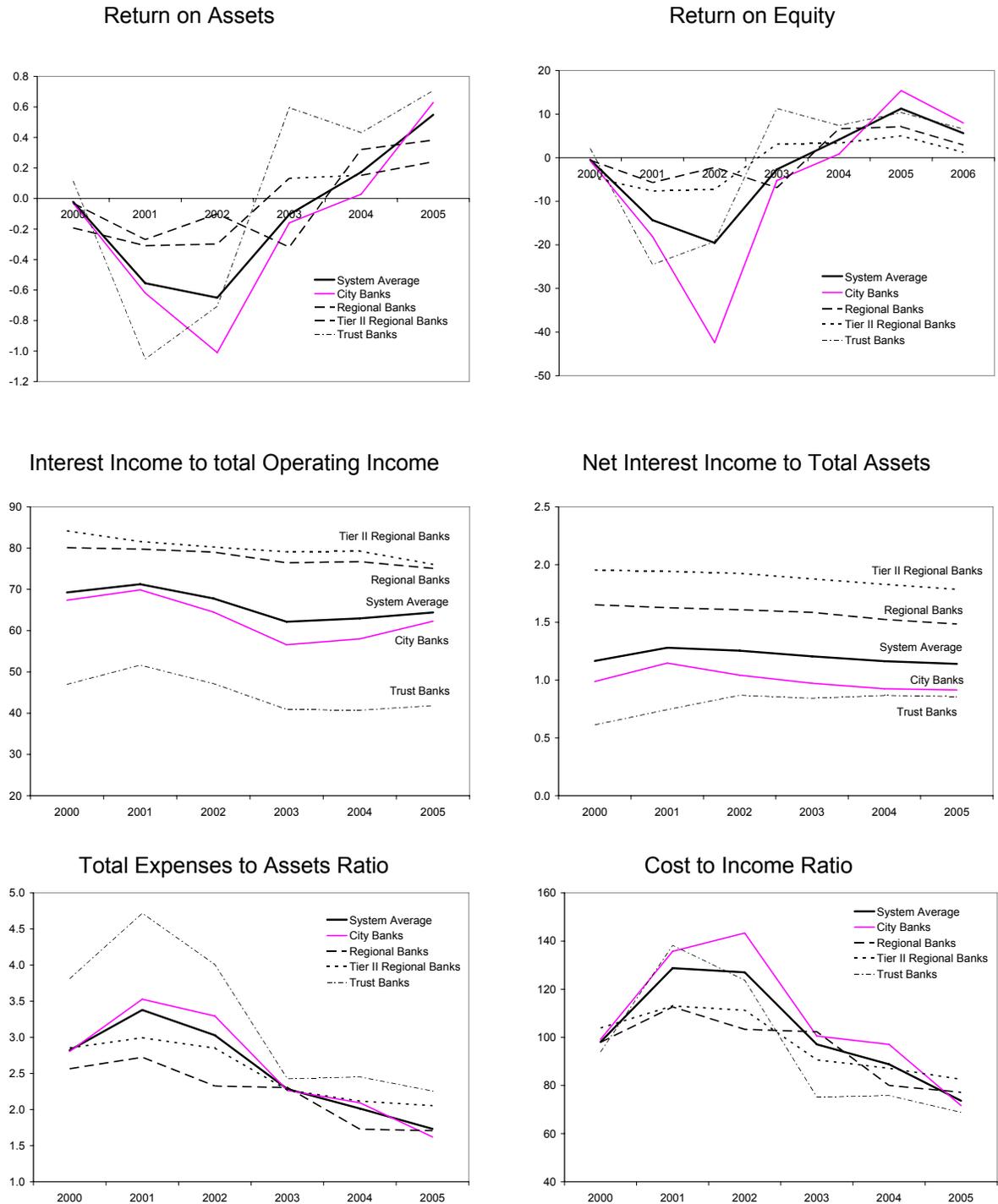
Sources: IMF; ECB; Swiss National Bank; Japanese Bankers Association; and Fund staff calculations.

Table IV.3. Indicators of Bank Performance in Comparator Countries, 2005
(Thousands of U.S. dollars)

	Revenue per employee	Revenue per branch	Net income per employee	Net income per branch
France	296.5	4701.6	103.1	1219.8
Germany	183.9	2943.7	86.8	219.4
Spain	265.9	1601.6	61.2	459.3
Switzerland	819.8	27959.3	189.1	6448.0
United Kingdom	688.4	24274.1	222.5	7847.2
United States	346.5	11060.1	62.3	1987.1
Average	433.5	12090.1	120.8	3030.1
Japan	547.6	11268.7	127.7	2627.8

Sources: ECB; Swiss National Bank; Japanese Bankers Association; and Fund staff calculations.

Figure IV.2. Japan: Performance Indicators of Japanese Banks, 2000–05.
(Percent)



Sources: Japanese Bankers Association; and Fund staff calculations.

B. Assessing Efficiency: An Application of Data Envelopment Analysis

7. **This section uses data envelopment analysis (DEA) to examine the efficiency of Japanese banks.** The DEA is a linear programming technique for evaluating performance and benchmarking in a multivariate setting.⁷ The methodology uses information on the input-output combination of individual entities to construct an efficiency frontier enveloping the data. This frontier is then used to assess efficiency of individual entities relative to a benchmark entity, chosen by the model. The DEA produces efficiency estimates without *a priori* functional restrictions on the production processes.⁸ The DEA can be used to assess either cost or revenue efficiency, depending on the setup. Cost efficiency looks at how banks use their inputs to produce a given level of outputs. Revenue efficiency examines how much output banks can produce using the same inputs. The results highlight to what extent banks are less efficient (i.e., are not exploiting potential efficiency gains) relative to their most efficient benchmark. The results of the DEA depend on two conditions: (i) the technologies used by the banks have to be comparable, i.e. they have to be dedicated to similar activities; and (ii) the set of inputs and outputs must adequately reflect the nature of their business activity.

8. **The DEA exercises for Japanese banks use a set of inputs and outputs aimed at capturing the nature of their banking activities.** Four banking segments were covered—City banks, Trust banks, and both group of regional banks. Here, the framework assumes that banks use three inputs to produce three outputs and that they intermediate funds between depositors and borrowers at the lowest possible cost. The outputs consist of (i) loans and bills discounted, (ii) trading and investment securities, and (iii) core operating profit. The first two represent a considerable part of bank assets and are customary to the literature. The third, core operating profit, is defined as a sum of net interest income and net non-interest income, less general and administrative expenses.⁹ The inputs include (i) deposits, (ii) number of employees, and (iii) number of bank branches. Deposits affect bank profitability, and bank branches are a proxy for measuring banks' distribution network.

9. **The corresponding input and output prices were estimated using Japanese banks' aggregated unconsolidated financial statements.**¹⁰ Output prices were estimated by

⁷ See Annex for a description of the DEA framework; and Fare, Grosskopf, and Lovell (1994), Zhu (2003) for detailed presentations of the DEA methodology.

⁸ In other words, the analysis does not require specifying a production function or a profit-maximization model for generating its results.

⁹ Sealey and Lindley, 1977.

¹⁰ Financial statements of the Japanese banks are provided by the Japanese Bankers Association.

dividing (i) interest income by the amount of loans; (ii) non-interest income by the amount of trading and investment securities; (iii) and operating income by the interest and fee generating volume of transactions. Input prices were estimated by dividing (i) interest expenses by the amount of total deposits, (ii) total personnel expenses by the number of employees, and (iii) other general and administrative expenses by the number of bank branches.

10. **The results indicate that in FY2005 Japanese banks featured higher revenue efficiency than cost efficiency** (Table IV.4).¹¹ The efficiency scores here are in percent with a score below 100 indicating that the bank is relatively less efficient than the benchmark (which by definition has a score of 100). For cost efficiency as measured under constant return to scale (CRS), Japanese banks as a whole had an average score of 69 percent, implying that the average gap between their input-output combinations and the efficient frontier was 31 percent. There are two benchmark segments, City and Trust banks. Both groups of regional banks were well below in terms of cost efficiency (44 percent and 32 percent of the benchmark level respectively). Average revenue efficiency under the CRS was estimated slightly higher at 87.8 percent, implying an efficiency gap of only 12.2 percent. Similar to the cost results, City and Trust banks were more revenue efficient than both groups of regional banks.

Table IV.4. Japan: Efficiency Scores, 2005
(Percent)

	Cost efficiency		Revenue Efficiency	
	Score	Returns to Scale	Score	Returns to Scale
Constant Return to Scale				
City banks	100.0	-	100.0	-
Regional banks	44.1	IRS	76.5	DRS
Tier II regional banks	31.7	IRS	74.9	DRS
Trust Banks	100.0	-	100.0	-
Mean	69.0		87.8	
Variable Return to Scale				
City banks	100.0		100.0	
Regional banks	44.8		92.0	
Tier II regional banks	38.2		81.3	
Trust Banks	100.0		100.0	
Mean	70.8		93.3	

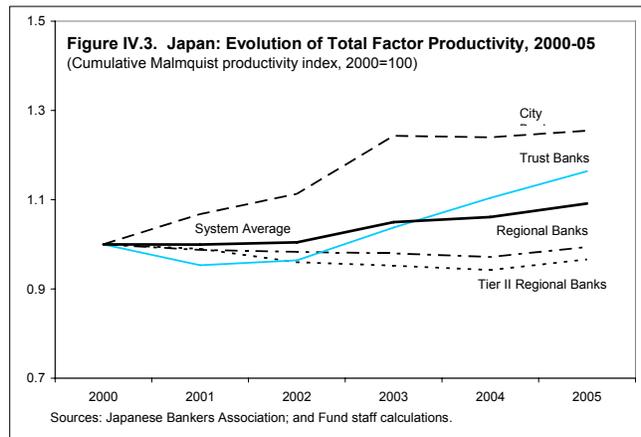
Sources: Japanese Bankers Association; and Fund staff calculations.

Based on DEA exercise with three outputs: loans, trading and investment securities, and core profit; and three inputs: personnel, number of branches, and deposits.

¹¹ The results were computed using end-FY2005 data aggregated by bank segments, and thus are indicative of their respective averages.

11. **The results suggest that both groups of regional banks have significant potential for improving efficiency.** A closer examination shows that, compared to City and Trust banks, regional banks are using more personnel and branches to attain their observed output. In other words, with the present input mix, these banks could produce more, if they utilized their inputs more efficiently. In addition, in the cost efficiency exercise, regional banks are estimated to be operating under increasing return to scale (IRS), suggesting that they are not sufficiently exploiting scale economies. These findings are not entirely surprising, since both groups of regional banks tend to be populated by small institutions.

12. **Total factor productivity (TFP) among Japanese banks improved during 2000–05** (Figure IV.3).¹² In addition to estimating efficiency, the DEA can also be applied to measure the evolution of productivity over time, i.e. total factor productivity. Overall TFP was estimated to have improved by about 9 percent annually during the period. City banks experienced the biggest improvement over the period by around 25 percent, followed by Trust banks—about 16 percent. On the other hand, TFP of both groups of regional banks was flat and even declined slightly by about 1 percent for regional banks and about 4 percent for Tier II regional banks.



13. **The relative inefficiency of regional banks, as well as their stagnant growth in TFP, suggest significant potential gains from further consolidation and cost-sharing arrangements.** Mergers, either among regional banks or with City and Trust banks, could improve cost efficiency and profitability by lowering operating costs. At the same time, regional banks could benefit from developing further cost-sharing arrangements, for example by outsourcing and centralizing some bank operations.

C. Efficiency Analysis: A Cross-Country Perspective

14. **This section presents a cross-country assessment of cost and revenue efficiency.** It uses information for banks in six industrial countries—France, Germany, Spain, Switzerland, the United Kingdom, and the United States. Two exercises were conducted using financial statement data: (i) for two to five of the largest (in terms of assets)

¹² The time evolution of TFP was assessed using a Malmquist productivity index (see Annex IV.I for a description of the methodology) using annual data for 2000–2005.

internationally active banks in each country,¹³ and (ii) for different bank segments, including at the regional level (Table IV.5).¹⁴ For Japan, the three largest financial groups used in the first exercise were Mitsubishi UFJ Financial Group, Mizuho Financial Groups, and Sumitomo Mitsui Financial Group. The DEA specification used here is almost the same as in the previous section, but instead of trading and investment securities, total securities were used due to data limitations. All financial data in the OECD database were converted into U.S. dollars at end-2003 market exchange rates.

15. **Among the large financial groups, the three largest in Japan compared well against their sampled peers** (Table IV.6). Two out of

three Japanese financial groups were benchmarks in terms of revenue efficiency, with the third group only slightly below the efficiency frontier. In terms of cost efficiency, all three Japanese financial groups were close to the overall average, but were less cost efficient than a number of the world's largest financial groups.¹⁵

16. **By banking segment, Japanese City and Trust banks compared well against their sampled peers, while both regional banks were below average in terms of cost and revenue efficiency** (Table IV.7). The results are consistent with the previous findings, as Japanese City banks are found to be the benchmark in the cross-country exercise, while Trust banks scored well above the total average. Both Japanese regional banks were slightly more efficient than the German and Spanish savings and cooperative banks, but less efficient than Swiss and German regional banks both in terms of cost and revenue.

Table IV.5. List of Sampled Bank Segments in Comparator Countries

Country	Bank Segment
France	Commercial banks Co-operative banks
Germany	Commercial banks Savings banks Co-operative banks Regional giro institutions
Spain	Commercial banks Savings banks Co-operative banks
Switzerland	Large commercial banks Cantonal banks Regional and savings banks
United States	Commercial banks Large commercial banks
United Kingdom	Commercial banks

¹³ Consolidated financial statements of bank groups for end-2005 are taken from the Bank Scope database. The number of branches for some banks was taken from individual bank financial statements or estimated from the best publicly available information.

¹⁴ The data were gathered from the OECD Banking Statistics for 2003 (the most recent information). The institutions included only resident banks, including their domestic and foreign branches and domestic subsidiaries, but excluding foreign subsidiaries.

¹⁵ See footnote to Table IV.6.

Table IV.6. Large Banks: Cross-Country Estimates of Cost and Revenue, 2005
(Percent)

Banks	Cost Efficiency		Revenue Efficiency	
	Score	Returns to Scale	Score	Returns to Scale
Barclays Plc	0.654	DRS	0.577	DRS
UBS AG ¹	0.511	IRS	1.000	-
HSBC Holdings Plc	1.000	-	0.844	DRS
Citigroup Inc	1.000	-	1.000	-
BNP Paribas	1.000	-	1.000	-
Royal Bank of Scotland Plc (The)	0.942	DRS	0.740	DRS
Bank of America Corporation	0.950	IRS	0.906	DRS
Crédit Agricole S.A.	0.955	IRS	0.635	DRS
JP Morgan Chase & Co.	0.859	IRS	0.887	DRS
Deutsche Bank AG	0.889	DRS	0.376	DRS
Société Générale	0.847	IRS	0.790	IRS
Santander Central Hispano Group-Banco Santander				
Central Hispano	0.993	DRS	0.540	DRS
Credit Suisse	0.487	IRS	0.443	IRS
Bayerische Hypo-und Vereinsbank AG	0.984	DRS	0.914	IRS
Dresdner Bank AG	0.567	IRS	0.614	IRS
Commerzbank AG	0.661	IRS	0.692	IRS
Banco Bilbao Vizcaya Argentaria SA	0.920	DRS	0.400	IRS
Caja de Ahorros y Pensiones de Barcelona, LA CAIXA	1.000	-	0.519	IRS
Average	0.845		0.715	
Kabushiki Kaisha Mitsubishi UFJ Financial Group-				
Mitsubishi UFJ Financial Group Inc	0.750	DRS	1.000	-
Mizuho Financial Group	0.817	DRS	1.000	-
Sumitomo Mitsui Financial Group, Inc	0.809	DRS	0.911	IRS
Japanese average	0.792		0.970	
Total average	0.838		0.752	

Sources: Bank Scope database; Japanese Bankers Association; and Fund staff calculations.

Based on DEA exercise with three outputs: loans, trading and investment securities, and core profit; and three inputs: personnel, number of branches, and deposits.

¹ Number of bank branches includes number of branches in Switzerland and worldwide subsidiaries, and does not include branches in other countries. Therefore, it can be underestimated, which affects its cost efficiency estimate.

Table IV.7. Cost and Revenue Efficiency Estimates, Cross-country
(Percent)

Bank Segment	Cost Efficiency		Revenue Efficiency	
	Score	Returns to Scale	Score	Returns to Scale
France				
Commercial banks	43.2	IRS	92.3	DRS
Co-operative banks	27.2	IRS	50.8	DRS
Germany				
Commercial banks	35.9	IRS	78.2	DRS
Savings banks	19.3	IRS	66.9	DRS
Co-operative banks	18.6	IRS	56.8	IRS
Regional giro institutions	100.0	-	100.0	-
Spain				
Commercial banks	52.6	IRS	81.4	IRS
Savings banks	28.9	IRS	57.0	IRS
Co-operative banks	21.3	IRS	38.7	IRS
Switzerland				
Large commercial banks	85.2	IRS	60.5	IRS
Cantonal banks	57.3	IRS	59.5	IRS
Regional and savings banks	68.7	IRS	56.4	IRS
United States				
Commercial banks	41.6	DRS	89.5	DRS
Large commercial banks	48.6	DRS	93.9	DRS
United Kingdom				
Commercial banks	47.9	DRS	100.0	-
Japan				
City banks	100.0	-	100.0	-
Regional banks	40.2	IRS	51.9	DRS
Tier II regional banks	30.6	IRS	51.0	IRS
Trust banks	74.7	IRS	71.7	IRS
Average	49.6		71.4	

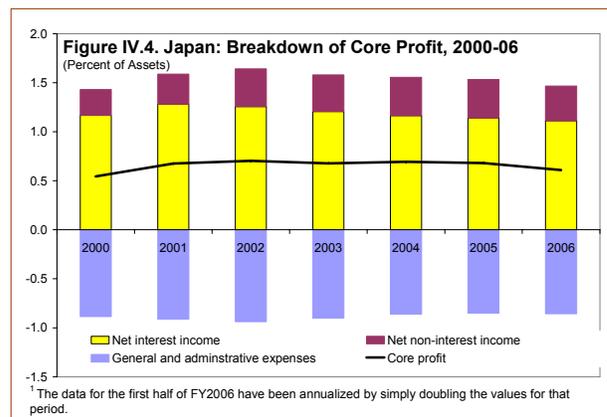
Sources: OECD; Japanese Bankers Association; and Fund staff calculations.

Based on DEA exercise with three outputs: loans, trading and investment securities, and core profit; and three inputs: personnel, number of branches, and deposits.

D. Profitability Analysis

17. This section examines the factors behind the low core profits of Japanese banks from an international perspective.

Bank core profits were almost flat in the period 2000–05 (Figure IV.4). Although they increased slightly in 2001–02, they fell or remained stagnant in 2003–05. All three components of core profits—net interest income, net non-interest income, and general and administrative expenses—remained largely unchanged during the period.



18. **In 2005, the overall ROA of Japanese bank was below those of other industrial countries, except for Germany** (Table IV.8). By banking segment, the ROA of City banks was lower than that of commercial banks in the United States, the United Kingdom and other industrial countries, while the ROA of Trust banks was comparable with that of big banks elsewhere. Japanese regional banks had a higher ROA than their peers in Germany and were comparable to those in Switzerland.¹⁶ The comparison suggests that a stronger focus on asset and wealth management, as is the case in other advanced countries, could raise the profitability of Japanese City banks and regional banks.

19. **While return on equity (ROE) in Japan has been improving in 1999–05, net interest margins have steadily declined.** In 2004–05, ROE in Japan turned positive after several years of negative returns (Table IV.9). In 2005, Japanese banks' ROE was close to the average for selected industrial countries. However, Japanese net interest margins have been declining faster than in industrial countries, widening the gap with other countries (Table IV.10).

20. **One possible reason for the weak profitability is the low level of risk-taking by Japanese banks.** As measured by the so-called Z-index,¹⁷ Japanese banks' risk taking fell

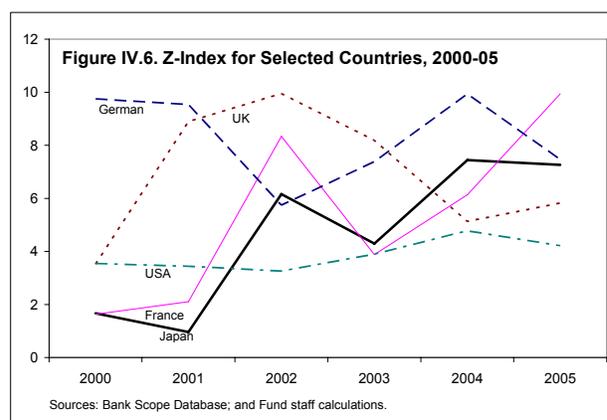
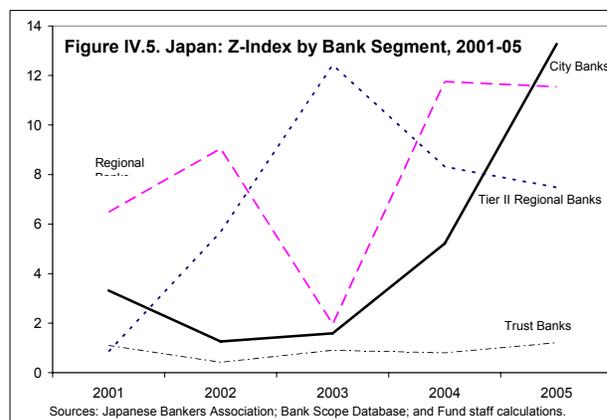
¹⁶ Note that the DEA efficiency analysis, which compared Japanese banks with those of other countries, was based on the OECD data for 2003. ROA of Regional banks in Japan was negative in 2003. ROA of Tier II regional banks in Japan was lower than that of regional and cantonal banks in Switzerland and local cooperative banks in Germany.

¹⁷ A proxy measure of bank's risk taking is given by an estimate of a bank's probability of failure, called Z-index. This index combines in a single indicator: (i) *profitability*, given by a period average return on assets (ROA); *leverage measure*, given by the period average equity-to-asset ratio (K) (equity here is defined as total equity from the balance sheet of a bank); and *return volatility*, given by the period standard deviation of return on assets (Vol(ROA)):

(continued...)

during 2001–05 (Figure IV.5). City banks, together with both groups of regional banks, reduced their risk taking while Trust banks maintained their high-level of risk-taking (low Z-index level) reflecting in part the higher volatility of their returns in asset management.

21. **Compared to other industrial countries, the Japanese banking system exhibited an average Z-index level in 2002–05 (Figure IV.6).** The banks in the United Kingdom and the United States exhibited higher degrees of risk-taking (lower Z-index level) in 2005 compared to Japan. Overall, this suggests that banks elsewhere may be assuming a higher risk-profile by offering a wider range of banking products, using more sophisticated products on a bigger scale, and being more involved in asset and wealth management.



22. **Likewise, Japanese banks would likely benefit from greater diversification of their products and activities and further deepening of the capital markets.** To some extent, the narrow product range of Japanese banks reflects the features of their financial system. Compared to other industrial countries, corporations rely less on capital markets for their financing needs while individual investors hold a larger share of their wealth in bank deposits. Banks in other countries with more vibrant capital markets engage in a wider range of activities, including greater securitization of their loan books, and offer more sophisticated deposit and savings products. However, the markets for more sophisticated financial products are growing, for example, in asset-backed securities and real estate investment trusts. Continued development of these markets could help banks to improve their product mix and overall profits.¹⁸

$$Z = \frac{ROA + K}{Vol(ROA)}$$

The Z-index increases with profitability and equity capital as percent of assets, and decreases with return volatility. Thus, a larger value of the Z-index indicates a lower risk profile for a bank (De Nicolo et al., 2003).

¹⁸ IMF, 2005.

Table IV.8. Average Return on Assets, 1999-05.
(Percent)

	1999	2000	2001	2002	2003	2004	2005
Japan							
City banks	0.08	0.03	-0.93	-1.00	-0.01	0.06	0.60
Regional banks	0.02	0.06	-0.30	-0.07	-0.05	0.43	0.50
Tier II regional banks	-0.60	-0.11	-0.35	-0.29	0.23	0.31	0.40
Trust banks	-1.97	0.25	-1.30	-0.77	0.80	0.78	1.00
System total	-0.4	0.0	-0.6	-0.7	-0.1	0.3	0.5
France							
Commercial banks	0.75	0.18	0.24	0.61	-0.16	0.63	0.83
Mutual or cooperative banks	0.63	0.82	1.03	0.75	0.74	0.82	0.85
Savings and provident banks	0.23	0.22	0.31	0.39	0.48	0.53	0.61
System total	0.4	0.5	0.5	0.5	0.4	0.5	0.6
Germany							
Commercial banks	0.47	0.80	0.19	0.10	0.04	0.27	0.54
Cooperative banks, local	0.25	0.20	0.24	0.32	0.27	0.29	0.56
Savings banks, central or regional	0.28	0.15	0.16	0.17	0.15	0.13	0.19
Savings banks, local	0.25	0.23	0.21	0.16	0.17	0.23	0.26
System total	0.2	0.2	0.2	0.1	-0.1	0.1	0.3
Spain							
Private banks	0.63	-0.10	-0.19	-3.43	0.17	0.91	1.45
Savings banks	0.91	-0.29	0.45
Credit cooperatives	1.21	0.72	0.78	0.73	0.77	0.58	0.55
System total	0.9	1.0	0.9	0.9	0.9	0.9	0.9
Switzerland							
Major banks	1.00	0.95	0.53	0.34	0.64	0.67	1.02
Commercial banks	1.50	1.19	0.61	-0.76	0.56	0.52	0.74
Merchant banks	5.02	5.41	2.91	1.97	2.86	3.51	3.40
Raiffeisen banks	0.17	0.17	0.15	0.15	0.16	0.16	0.16
Regional & savings banks of RBA-Hol	0.48	0.55	0.50	0.40	0.41	0.40	0.42
Other regional and savings banks	0.21	0.54	0.52	0.39	0.43	0.44	0.51
Cantonal banks	0.56	0.93	0.63	0.57	0.63	0.72	0.77
System total	0.8	0.9	0.5	0.3	0.5	0.7	0.7
United Kingdom							
System total	1.0	0.9	0.5	0.4	0.6	0.7	0.8
United States							
Commercial banks	1.04	1.12	0.99	1.09	1.04	1.14	1.16
Other commercial banks	1.45	1.45	0.98	0.52	0.92	0.58	0.57
Savings banks	0.70	0.52	0.46	0.68	0.76	0.80	0.93
System total	1.3	1.2	1.1	1.3	1.4	1.3	1.3

Sources: IMF; Japanese Bankers Association; Bank Scope Database; and Fund staff calculations.

Table IV.9. Selected Countries: Return on Equity (ROE), 1999-05.
(Percent)

	1999	2000	2001	2002	2003	2004	2005
France	9.1	9.7	9.6	9.1	8.5	10.6	11.9
Germany	5.4	6.1	4.6	2.9	-1.5	1.9	9.0
Spain	12.2	15.5	13.5	12.1	13.2	14.1	16.9
Switzerland	18.8	18.2	8.3	5.1	9.5	13.0	14.3
United Kingdom	26.0	13.5	7.7	6.1	8.6	10.9	11.8
United States	10.4	13.5	13.0	14.1	15.0	13.2	12.7
Average	13.7	13.5	9.5	8.2	8.9	10.6	12.8
Japan	-25.1	-0.5	-12.7	-17.9	-2.9	4.3	12.6

Sources: IMF; and Fund staff calculations.

E. Conclusion and Policy Considerations

23. **The DEA results point to potential efficiency gains, particularly for regional banks from cost-sharing arrangements.** Regional banks in fact have been taking steps to reduce costs by sharing computer systems, pooling risk management, and joint outsourcing, and should be encouraged to do more.¹⁹ Other ways to enhance efficiency that have been followed elsewhere include: (i) mergers and consolidation, (ii) greater use of cost-sharing arrangements, and (iii) formation of bank consortiums to centralize operations.

- **Consolidation with major or other regional banks.** Both regional and major—City and Trust—banks would stand to benefit from further regional consolidation. Major banks would likely find attractive regional banks' stable deposit and customer base, while regional banks could benefit from the economies of scale, new product lines, and new technologies from merging with larger banks. That said, consolidation might be held back over concerns over the weakening of regional ties. One way to address these concerns would be for merged institutions to have some regional representation on their managing boards.
- **Developing cost-sharing arrangements.** To reduce costs, smaller banks could outsource bank operations and develop centralized arrangements, for example, for risk management, information sharing, etc. Regional banks could also rely more on internet banking to reduce personnel and other administrative costs. For example, cantonal banks

¹⁹ For example, Bank of Yokohama and 13 other regional banks have agreed to jointly build a computer system in a bid to reduce operational costs (Nikkei News, March 23, 2007).

in Switzerland have developed expertise and production centers for credit card services, training, and information technology to lower costs.

- **Creating bank consortium to pool resources for asset and risk management.** This could improve efficiency by raising the scale of operations and expanding the range of investments. Centralized risk management could help regional banks to diversify their product mix, as in the case of Switzerland where cantonal banks have been jointly issuing a variety of bonds as well as working together in pension fund management.

24. **These measures could help regional banks to prepare for changes in the banking system that are likely to raise pressure for consolidation.** The planned privatization of Japan Post, whose branch networks overlap with those of regional banks, and growing interest by major and foreign banks to broaden their branch networks is likely to generate greater interest in regional banks.²⁰ At the same time, restructuring funds are looking to promote corporate rehabilitation in regional economies, for example by restructuring non-performing loans held by regional banks.²¹

25. **Further deregulation and development of the capital markets could also generate new business opportunities for banks.** The authorities have proposed ideas for enhancing Tokyo's appeal as an international financial center, including by relaxing the barriers between banks and securities companies, consolidating financial exchanges, and developing further capital markets. Although the proposals are still in the early stage of discussions, they hold the promise of new business opportunities for banks in asset and wealth management and other fee-earning activities.

²⁰ Such developments are already taking place: for example, in 2006, Bank of Fukuoka contributed capital to Kumamoto Family Bank and Kyushu-Shinwa Holdings Inc. and the integration of the management of regional banks or their merger took place in Yamaguchi, Hiroshima, and Wakayama prefectures. However, consolidation has been held back by tight "family" ownerships and close links with local borrowers.

²¹ Nikkei News (April 24, 2007).

Annex. Data Envelopment Analysis (DEA) Methodology

The DEA methodology is based on information on inputs and outputs of individual entities to construct an efficiency frontier enveloping the data. The model chooses a benchmark entity, which lies on this frontier and measures efficiency of other individual entities relative to the benchmark entity. Two alternative approaches are available in DEA to estimate the efficiency frontier. One is input oriented, and the other is output oriented. In the input-oriented model, the inputs are minimized and the outputs are kept at their current levels. IN the output-oriented model, the outputs are maximized and the inputs are kept at their current level.

The Basic Input-Oriented DEA Problem

The basic input-oriented DEA problem can be described as follows. Assume there is data on K inputs and M outputs for each banks, indexed by $i=1, \dots, N$. Let x_{ij} denote input i of bank j ; and y_{ij} denote output i of bank j . Under the assumption of constant return to scale (CRS), the basic DEA problem to estimate the relative efficiency of each bank is given by

$$\begin{aligned}
 & \min_{\theta_i, \lambda_j} \theta \\
 & \text{subject to} \\
 & \sum_{j=1}^N \lambda_j x_{ij} \leq \theta x_{i0} \quad i = 1, \dots, K; \\
 & \sum_{j=1}^N \lambda_j y_{rj} \geq y_{r0} \quad r = 1, \dots, M; \\
 & \sum_{j=1}^N \lambda_j = 1 \\
 & \lambda_j \geq 0 \quad j = 1, \dots, N.
 \end{aligned}$$

where bank with a subscript “zero” is one of the banks under evaluation, and x_{i0} and y_{r0} are the i -th input and r -th output of “zero”-bank respectively. θ_i is a bank-specific scalar that varies between zero and one and conveys the efficiency score of bank i (i.e. the distance between its input-output mix and the frontier, measured through a ray from the origin). Banks with $\theta_i = 1$ are benchmark institutions, and their input-output mix lies on the efficient frontier. The λ_j is a $N \times 1$ vector of bank-specific weights that conveys information on the benchmark comparators for bank i . For example, an efficient bank ($\theta_i = 1$) will be trivially its

isoquant I . Clearly, the input-output mix given by point a is inefficient, as it lies inside the production frontier entailed by the isoquant. A measure of the technical inefficiency can be given by the distance ab , which measures the amount by which the two inputs could be proportionally reduced without affecting output. Alternatively, technical inefficiency can be normalized using the ratio ab/ao and represented by its complement $TE = 1 - ab/ao = bo/ao$. The resulting measure, which is commonly used, varies from zero to one, with a larger value indicating higher technical efficiency. In particular, a value of one indicates that a specific input-output combination lies on the efficient isoquant.

Allocative efficiency can be assessed if information on input prices is available. Suppose input prices in the example are given by w_1 and w_2 and represented by the isocost line W . At the relative input prices, the cost-minimizing input mix is given by point d . Therefore, the technical efficiency point b entails an excess cost equivalent to the distance bc , relative measure of this allocative inefficiency is given by the ratio $AE = co/bo$.

Thus, total cost efficiency (CE) can be defined as the product of technical and allocative efficiency:

$$CE = \frac{co}{ao} \equiv \frac{co}{bo} \times \frac{bo}{ao} = TE \times AE .$$

These three measures are bounded by zero and one, where higher values imply a higher efficiency. Further, they can be readily interpreted as percent deviations. For example, a value of economic efficiency score of 0.8 implies a gap of 0.2, or that the bank is 20 percent less efficient than its benchmark comparator.

Measure of Total Factor Productivity – An Output-Oriented Malmquist Index

Total factor productivity can be assessed using an output-oriented Malmquist index.²³ Assume that for each time period $t=1, \dots, T$, banks produce an observed vector of M non-negative outputs, $\mathbf{y}_t = (y_{1t}, \dots, y_{Mt})$, using N non-negative inputs, $\mathbf{x}_t = (x_{1t}, \dots, x_{Nt})$, using an unobserved, possibly time variant, production technology,

$$S_t = \{(\mathbf{x}_t, \mathbf{y}_t) : \mathbf{x}_t \text{ can produce } \mathbf{y}_t\}, \quad t = 1, \dots, T.$$

By assumption, output set S_t satisfies usual regularity conditions, i.e. it is closed, bounded, convex, and satisfies strong disposability of outputs. This allows us to construct a well-defined output distance function,

²³ The description of the methodology here follows Fare et al., 1994.

$$D_t(\mathbf{x}_t, \mathbf{y}_t) = \inf \{ \theta : (\mathbf{x}_t, \mathbf{y}_t / \theta) \in S_t \}.$$

In other words, D_t measures the distance between the observed output of each bank at time t and the maximum output attainable with the observed input mix, given the technology available at time t . Notice that $D_t(\mathbf{x}_t, \mathbf{y}_t) = 1$ if and only if the observed input-output combination observed at time t lies at the boundaries of the technology frontier available at time t , otherwise, $D_t(\mathbf{x}_t, \mathbf{y}_t) < 1$.

Three additional distance functions, $D_t(\mathbf{x}_{t+1}, \mathbf{y}_{t+1})$, $D_{t+1}(\mathbf{x}_t, \mathbf{y}_t)$, and $D_{t+1}(\mathbf{x}_{t+1}, \mathbf{y}_{t+1})$ are defined in a similar way, either by redating the variables or by redating the technology, although in the first two cases, the resulting distances may exceed one (i.e. the observed input-output combinations may lie above the production set of the other period).

An output-oriented Malmquist productivity index can be expressed as

$$M_{t+1} = \frac{D_{t+1}(\mathbf{x}_{t+1}, \mathbf{y}_{t+1})}{D_t(\mathbf{x}_t, \mathbf{y}_t)} \times \left[\frac{D_t(\mathbf{x}_{t+1}, \mathbf{y}_{t+1})}{D_{t+1}(\mathbf{x}_{t+1}, \mathbf{y}_{t+1})} \times \frac{D_t(\mathbf{x}_t, \mathbf{y}_t)}{D_{t+1}(\mathbf{x}_t, \mathbf{y}_t)} \right]^{\frac{1}{2}},$$

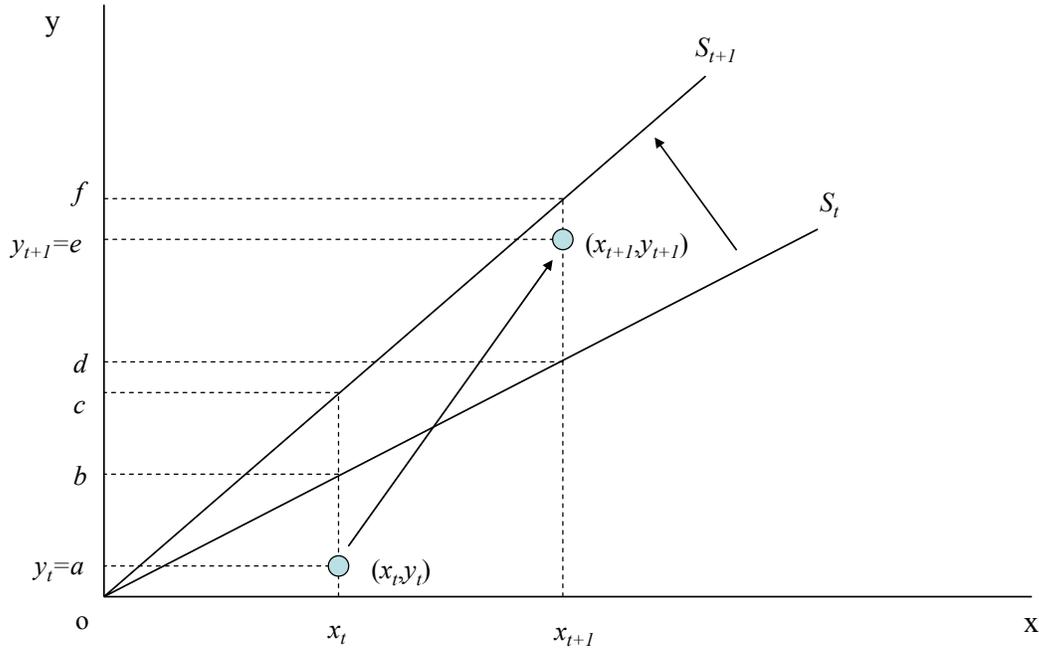
where the first term measures the change in relative efficiency between the two time periods (i.e. the catching up effect), while the term in square brackets measures the technical change (i.e. the evolution of the production frontier). The term under square brackets is a geometric mean of the distances between the two production functions, measuring the distances through the observed input-output combinations.

To illustrate, suppose that banks produce one output using a single input and a CRS technology (Annex Figure IV.2). At time t , the observed input-output mix is given by (x_t, y_t) and the maximum feasible production set – by S_t . Similarly, the observed input-output mix at time $t+1$ is given by (x_{t+1}, y_{t+1}) and the maximum feasible production set – by S_{t+1} . In this example, the two input-output combinations are technically inefficient, as they lie below their corresponding frontiers. A measure of the inefficiency at a specific point in time is given by the vertical distance between the corresponding input-output mix and its frontier. Since the distance is vertical, it indicates the amount by which the output can be expanded using the same amount of input. For period t , this distance is given by $D_t(x_t, y_t) = oa / ob$. Similarly, the distance for $t+1$ is $D_{t+1}(x_{t+1}, y_{t+1}) = oe / of$. These two distances vary between zero and one, with a larger value indicating higher technical efficiency. In principle, two parallel distance measures can be also defined, by comparing the input-output mix at a given point in time against the frontier of the other period. For instance, the distance between input-output mix at time t and the potential output under technology at

$t+1$ is $D_{t+1}(x_t, y_t) = oa / oc$. Similarly, by relabeling the variables, $D_t(x_{t+1}, y_{t+1}) = oe / od$.

The two last distances, however, can be greater than one, since the input-output combination in a specific point in time may fall outside the production set of the other period.

Annex Figure IV.2. An Illustration of the Distance Functions under CRS



In this example, the Malmquist index can be expressed as

$$M_{t+1} = \frac{oe / of}{oa / ob} \left[\frac{oe / od}{oe / of} \times \frac{oa / ob}{oa / oc} \right]^{\frac{1}{2}} = \frac{oe / of}{oa / ob} \times \left[\frac{of}{od} \times \frac{oc}{ob} \right]^{\frac{1}{2}}.$$

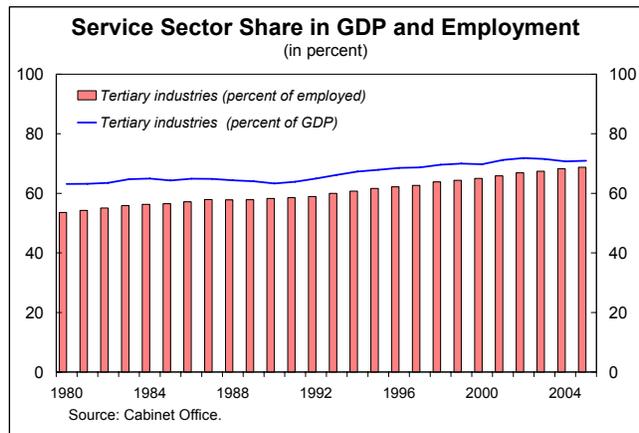
Under this metrics, a value of the index greater (less) than one means an improvement (deterioration) of productivity. In addition, improvements in any of the two components of the Malmquist index are associated with values exceeding one, while a deteriorations – with values less than one. Therefore, the overall index reflects the relative changes in these two components, which may be mutually reinforcing, neutral, or opposite.

References

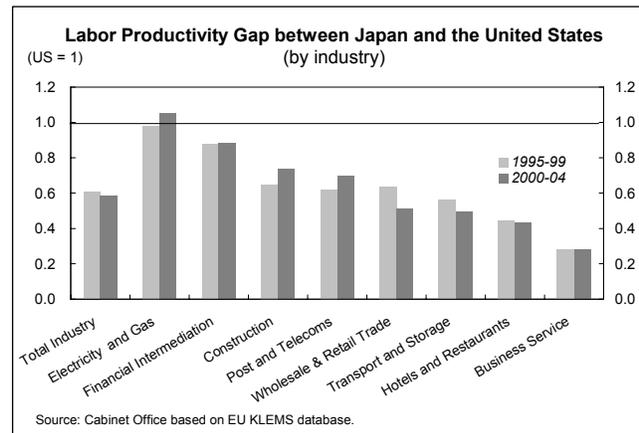
- Bank of Japan, 2007, *Financial System Report*, Tokyo: Bank of Japan.
- Brunner, A., J. Decressin, D. Hardy, and B. Kudela, 2004, "Germany's Three-Pillar Banking System Cross-Country Perspectives in Europe," IMF Occasional Paper No. 233, Washington D.C.: International Monetary Fund.
- De Nicolo, G., P. Bartholomew, J. Zaman, and M. Zephirin, 2003, "Bank Consolidation, Internationalization, and Conglomeration: Trends and Implications for Financial Risk," IMF Working Paper WP/03/158, Washington D.C.: International Monetary Fund.
- Fare, R., S. Grosskopf, and K. Lowell, 1994, *Production Frontiers*, Cambridge: Cambridge University Press.
- International Monetary Fund, 2005, "Why Is Japanese Banking Sector Profitability so Low?" in *Japan: Selected Issues*, (Washington D.C.: International Monetary Fund).
- Regional Banks Association of Japan, 2007, *Regional Banks in Japan 2006*, <http://www.chiginkyo.or.jp>.
- Sealey, C. Jr. and J. Lindley, 1977, "Inputs, Outputs, and a Theory of Production and Cost at Depository Financial Institutions," *Journal of Finance*, Vol. 32, Iss. 4, pp. 1251–66.
- Zhu, J., 2003, *Quantitative Models for Performance Evaluation and Benchmarking*, New York: Springer International Series in Operations Research and Management Science.

V. JAPAN: BOOSTING PRODUCTIVITY IN SERVICES—PRIORITIES FOR DEREGULATION¹

1. **Japan's service sector accounts for around 70 percent of GDP and employment, and its share has been steadily growing.**² During 2000–05, Japan's economy grew on average by 1.6 percent: the service sector accounted for around two-thirds of overall growth. The main non-financial service sectors are medical and healthcare, restaurants and hotels, education, wholesale and retail trade, real estate, and transport and communications.



2. **Overall productivity is improving, but productivity in services remains well below that of manufacturing and below the level in the United States.** During 1995–05, non-manufacturing labor productivity in Japan grew by 1 percent annually compared to almost 3½ percent in manufacturing; total factor productivity (TFP) has also lagged well behind (CAO, 2007).



3. **Japan has reaped significant rewards from past deregulation, and the potential benefits from further broad-based deregulation are substantial.** CAO (2007) estimates the benefits from deregulation of several industries starting in the 1990s to be around 5 percent of national income. Estimates of the potential static gains from regulatory reform over the medium-term range from 5–8 percent, and dynamic gains (i.e., additions to potential growth) could be substantial.³ Further deregulation holds significant promise for boosting Japan's growth potential and international competitiveness.

¹ Prepared by Yougesh Khatri and Sumiko Ogawa.

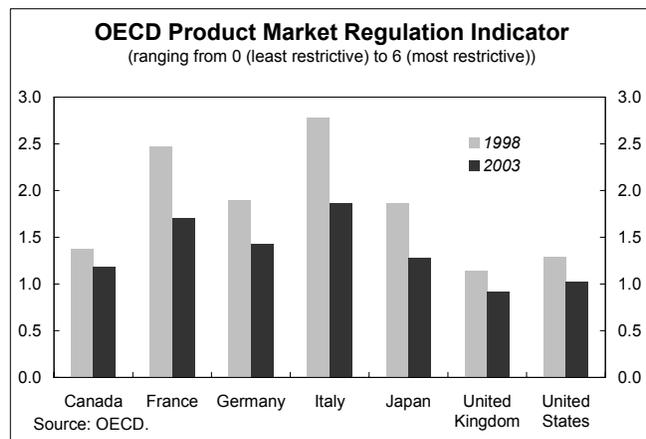
² Services are defined in the broad sense of the tertiary sector, and this chapter focuses on non-financial services.

³ See summaries of the various studies in Callen and Nagaoka (2002), Walker (2004), OECD (2005b), and IMF (2006).

4. **This chapter examines impediments to productivity growth in distribution, network industries, and health.** Sector specific issues and economy-wide factors that inhibit competition and market contestability, and limit the role of information and communications technology (ICT) and innovation, have combined to depress productivity in the service sectors. Reflecting the broad consensus about the benefits of deregulation, a worldwide trend towards more market-friendly regulatory frameworks and policies has prevailed since the 1980s.⁴ The Japanese authorities recognize the need for pushing ahead with regulatory reforms and have been active in this area.

A. Economy-Wide Reform Priorities

5. **Summary indicators of structural rigidities or competitiveness suggest that Japan is in line with many European countries, but lags the United States and United Kingdom.** Japan's rankings, according to a broad range of competitiveness indicators, have improved in recent years.⁵ The OECD's summary index of the restrictiveness of product market regulations (PMR) also improved but Japan did not make it into the list of "relatively liberal" countries.⁶



6. **Key economy-wide factors affecting service-sector productivity include: labor market flexibility, competition, entrepreneurship, ICT use, and the framework for innovation.** Labor market flexibility facilitates the move of labor and other resources to more productive sectors. Bloom et al. (2007) suggest that labor market flexibility and other factors that promote organization change in the United States allow U.S. firms to use ICT more effectively and help explain their faster productivity growth (Table V.1). The combination of these factors likely acts in a complementary and mutually reinforcing way to enhance productivity.

⁴ See the IMF *World Economic Outlook* (April 2004).

⁵ Japan's overall competitiveness ranking according to the World Economic Forum improved from 21 in 2000 to 7 in 2006; and the ranking according to the International Institute for Management Development improved from 16 in 2000 to 12 in 2006.

⁶ Summary indices of structural rigidities or competitiveness have generally been found to have a significant explanatory power in standard cross-country growth regressions (Porter, 1998; Dutz and Hayri, 2000).

Labor market flexibility

7. **Labor market flexibility has improved but much remains to be done.** The increasing share of “non-regular” workers in Japan to around one-third of total workers, improvements to the social safety net, the broader coverage of industries served by private placement agencies, and the longer dispatch period for short-term hires have all enhanced labor market flexibility. Still, labor market rigidities persist as long-standing features of the Japanese employment system, such as “lifetime employment” and “seniority-based wages,” (Callen and Nagaoka, 2002) will take time to change. Moreover, Japan ranks tenth in terms of employment protection in the OECD (OECD, 2006) and, according to the World Bank, first among the major industrial countries in terms of the difficulty of dismissing workers.⁷

8. **More flexible work hours and practices, compensated dismissals, and greater portability of pensions could enhance labor flexibility.** Immigration policy could also play a role in easing labor and skill shortages, while a further opening of the education sector to competition could accelerate human capital development.⁸

Overall competition policy

9. **The government has taken recent steps to enhance competition.** In January 2006, a strengthened anti-monopoly law took effect, while steps have been taken to enhance the resources and independence of the Japan Fair Trade Commission (JFTC). Some early results are evident from reports of large savings in public procurement and bid rigging prosecutions. The Diet is also reviewing bills to address “amakudari”—the practice of retiring senior civil servants joining a large corporation—which raises the risk of regulatory capture. Despite this progress, several key service industries remain sheltered (from domestic or foreign entry), particularly health, education, transport and electricity (Jones and Yoon, 2006). Japan also still features relatively low shares of imports and foreign direct investment compared to other industrial economies which may serve to limit the benefits of competition on productivity.

10. **As suggested by the OECD and others, competition could be further strengthened by:**

⁷ The employment protection legislation itself is relatively liberal, but the case law has set a high bar for dismissals in practice (Callen and Nagaoka, 2002).

⁸ Many of the Special Zone reforms relate to the education sector suggesting demand for greater flexibility. Opening up the tertiary sector would help upgrade competitiveness of Japanese universities (OECD, 2006). Reforms to increase participation rates, improve search, and reduce miss-match (through vocational training etc) would help reduce the negative growth contribution of the labor force.

- *Further enhancing competition policy*, including through adequate provision of resources to the JFTC; the monitoring of *ex-post* indicators of competition (such as margins and concentration); and reviewing the effectiveness of the JFTC’s new or enhanced tools, such as higher penalties (surcharges) and the leniency program.⁹
- *Opening up “government-driven” markets where possible*, such as medical services, nursing care and education, through further deregulation and more extensive use of market testing.
- *Accelerating the economy-wide roll-out of successful Special Zones reforms*. There are some 400 Special Zones where deregulation is implemented on a pilot basis. Reforms to allow joint-stock companies to operate hospitals and schools and reforms related to some social services could be considered for more rapid economy-wide rollout.
- *Implementing measures to introduce competition into markets with strong incumbents and the establishing independent sectoral regulators* in some industries could also help in this regard (OECD, 2006).
- *Promoting reforms to facilitate inward FDI*, including by accelerating regulatory reforms in product markets—particularly by reducing entry barriers to both domestic and foreign firms in sectors such as health, education, transport, and electricity; and further easing restrictions on FDI, especially in the service and network industries (Jones and Yoon, 2006).¹⁰

Barriers to entrepreneurship

11. **The entry (and exit) of new business is key to growth and innovation; however, entrepreneurship and the role of venture capital are very limited in Japan** (Callen and Nagaoka, 2002; OECD, 2006). Business start-ups account for around 4 percent of Japanese firms compared with around 10 percent and 14 percent respectively in the United States and Europe. Japan also fares poorly in international rankings of entrepreneurship, e.g. Japan was last in the International Institute for Management Development (IMD)’s entrepreneurship rankings, and second from last in the Babson Colleague Global Entrepreneurship Monitor.

⁹ The advisory panel to the government on the competition law recently suggested that surcharges should be set at levels that effectively discourage violations (surcharges are still low compared to EU) and be extended to broader anti-trust violations (such as predatory pricing).

¹⁰ In May 2007, the corporate code was amended to allow foreign subsidiaries in Japan to use their parent company shares in M&A. A recent clarification of the tax treatment of such M&A granted foreign subsidiaries under certain circumstances tax-deferrals (as enjoyed by domestic firms). As M&A is a major form of FDI, these are important changes that could boost FDI inflows, depending on how the conditions for foreign subsidiaries receiving the tax deferrals work in practice.

12. **Factors likely to affect new business start-ups include the availability of risk capital, the legal and administrative framework, and demographics** (i.e., younger people may be more likely to take risks and be entrepreneurial). Despite several policy and capital market developments favoring the financing of start-ups (Callen and Nagaoka, 2002), venture capital investment as a share of GDP was the second lowest in the OECD during 2000–03, while the share invested in hi-tech sectors was about half the OECD average. According to the World Bank *Doing Business* database, starting a business in Japan involves more processes, takes longer, and costs more than the average in OECD countries.¹¹ These indicators highlight *further developing capital markets* and *reducing legal/administrative burdens* as priorities for supporting startups and entrepreneurship.

Role of ICT and innovation

13. **ICT is an important driver of growth in Japan** (Box V.1), both in terms of its direct contribution to production and indirectly through efficiency gains. During 1980–04, ICT capital deepening is estimated to have contributed close to a ½ percentage point to gross value added growth. However, ICT’s contribution to capital deepening and overall TFP has declined progressively since the 1980s, before recovering somewhat during 2000–04 (Table V.1).¹² Some possible factors include labor rigidities and organizational structures that limit the scope for ICT productivity gains and its spread to other industries (Motohashi 2005, 2007a). In contrast, the United States has enjoyed productivity growth in both sectors that intensively use ICT (such as retail and wholesale trade, and financial services) as well as those that produce ICT. In other countries, including Japan, the ICT gains have been isolated mainly to the ICT producing sectors. Recent research suggests that the United States’ higher productivity growth from ICT since the mid-1990s is related to the organization of U.S. firms that permit more efficient use of new technologies (Bloom et al., 2007).

14. **The OECD has highlighted the need to upgrade Japan’s innovation system to boost productivity.** It points out that R&D intensity in Japan is relatively high, but the returns are low. Possible reasons include: the weak link between business and research organizations; the low degree of trade and investment openness which limit exposure to outside knowledge and ideas; a rigid education system; investor risk aversion; and regulatory frameworks in product markets, labor markets, competition policy and finance that fall short of supporting innovation (OECD, 2006). Conway and Nicoletti (2006) estimate the impact of nonmanufacturing product market regulations on ICT-using sectors in Japan to be among the highest in the OECD area. With knowledge-intensive industries accounting for only 17

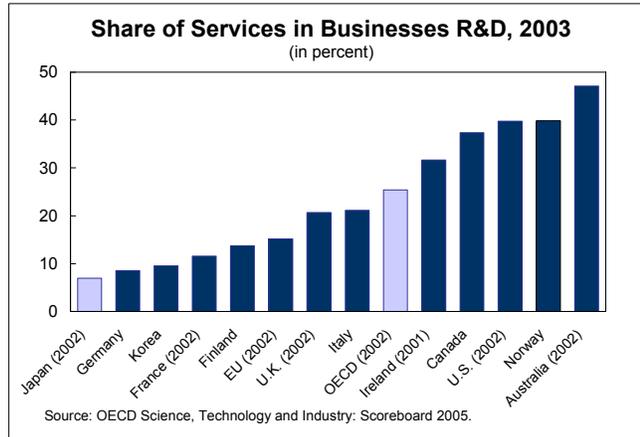
¹¹ For example, starting a business in Japan involves 8 processes, takes 23 days, and costs 7.5 percent of GNI per capita, compared to 5 processes, 5 days, and only 0.7 percent of GNI per capita in the United States.

¹² The low TFP during the 1990s probably reflects, at least in part, cyclical factors and structural problems during the “lost decade.”

percent of value added in Japan (compared with 23 percent in the United States) and the share of services in business R&D the lowest in the OECD, the level and efficiency of R&D investment may be important factors behind the low productivity in services.

15. Realizing fully the benefits from ICT and innovation would require broad ranging reforms to

strengthen the framework conditions, including to the labor and product markets and the competition and regulatory frameworks. These could be augmented by measures to *improve organizational flexibility within firms; further develop the financial sector to promote investment in intangible assets and risk/venture capital; increase openness to imports and direct investment; improve education and knowledge diffusion; and promote innovation-specific policies* (OECD, 2006).¹³



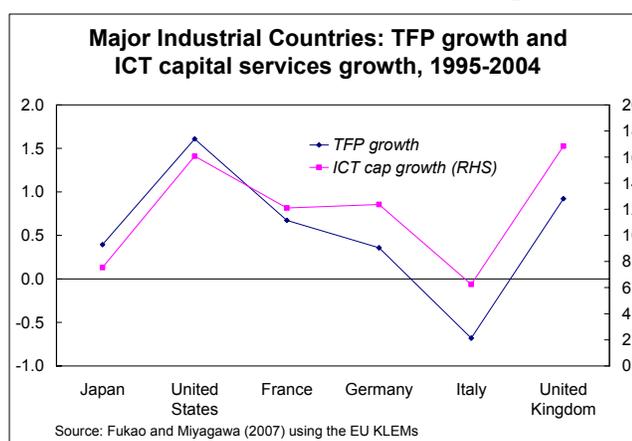
¹³ Innovation 25 is a long-term government strategy aimed at boosting innovation and potential output through regulatory and other reforms—see Box V.2.

Box V.1. ICT and Service Sector Productivity

ICT is an important driver of growth in Japan, contributing extensively to production, investment and exports (Jorgensen and Motohashi, 2005). ICT can contribute to growth directly through ICT capital deepening and TFP growth in ICT production, and indirectly through ICT use in other sectors (which would boost overall TFP if ICT use results in improved efficiency).

Table 5.1 shows that the contribution of ICT capital deepening to growth has progressively declined: from 0.5 percent (which was among the highest in the major industrial countries) during the 1980s, to 0.2 percent (among the lowest) by 2000–04. The contribution of TFP to growth also declined sharply from the being the highest of these countries in the 1980s to the lowest in 1990s, but recovered somewhat during 2000–04. TFP growth in ICT production is the highest among the major OECD economies (averaging nearly 7½ percent during 1995–2004), but because the share of the ICT production is small (as in most OECD countries), its contribution to overall TFP is limited.

In terms of the indirect effects of ICT on growth in Japan, Fukao and Miyagawa (2007) point to the close correlation between ICT capital services growth and TFP growth for 6 major industrial countries as evidence that ICT investment is associated with economic efficiency (Bloom et al. (2007) for empirical studies that further establish this link).



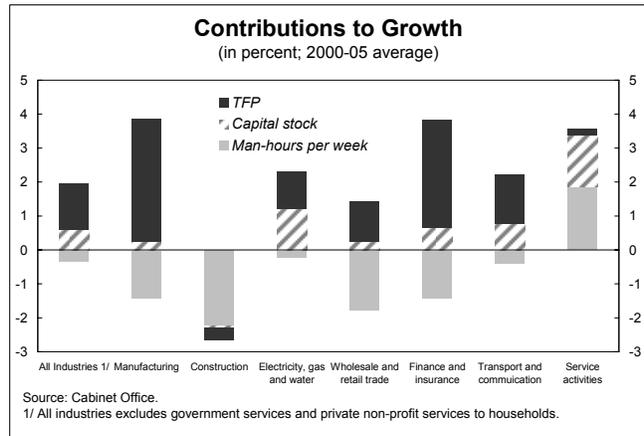
Low ICT capital deepening in services is likely to be an important factor behind the low productivity growth in services. Various studies (Fukao and Miyagawa, 2007) suggest the full realization of the direct and indirect benefits of ICT requires the simultaneous accumulation of complementary intangible assets, such as human capital, knowledge capital, organization capital, and social capital). Fukao et al. (2007) estimate that the intangible assets have grown more slowly in Japan, and that the ratio of intangible to tangible assets in Japan is much lower than in the United States. Various indicators suggest ICT usage in Japan is also somewhat lower than in the United States and the United Kingdom. For example, the percentage of students in Japan using a computer at school regularly was among the lowest in the OECD (OECD, 2006) while the use of e-commerce in Japan is also relatively low.

Structural rigidities likely combine to limit the potential benefits from (and thus investment in) ICT and intangible assets. Studies indicate that structural rigidities such as lack of competitive pressures in some segments, product market rigidities, and labor market rigidities reduce the scope for benefits from (and thus the incentive to invest in) ICT and intangible capital. The financial sector, through limited provision of venture capital and reliance on collateralized lending, may also distort growth in intangible versus tangible assets. An OECD study found Japan to be one of the few countries in which framework conditions has a negative impact on R&D spending (OECD, 2006). This suggests that a comprehensive package of reforms would yield greater overall benefits than piece meal reforms.

B. Sector-Specific Priorities for Deregulation

16. Wholesale, retail, and personal and social services are the least productive among the service sectors.

The breakdown of value added by sector (Table V.2) also shows low TFP growth in these sectors, and a relatively low contribution of ICT capital accumulation to growth.



17. One reason may be that these sectors face weak competitive pressures.

For example, Høj and Wise (2004) find mark-ups in the service sector, particularly construction and utilities, and the overall price level to be internationally high. This is also reflected in high concentration ratios and stability in market shares.

18. **These sectors also have more restrictive product market regulations than the OECD best performers.** The OECD's nonmanufacturing product market regulation indices (NMR) show that Japan and the rest of OECD have made progress in deregulation (Figure V.1) and that Japan was a relatively early mover in terms of deregulating its telecoms, rail and airlines. However, the timing and extent of reforms still lag that of the United States and the United Kingdom, and for *energy, transport, and communications* (ETCR), Japan is not on the list of "relatively liberal" countries. The impact of these nonmanufacturing sector regulations on the manufacturing sector (based on the extent of anti-competitive regulation in these nonmanufacturing sectors and their importance as suppliers of intermediate inputs to the manufacturing sector) are estimated to be the fourth largest in the OECD area (Conway et al., 2006).

19. **Weak market contestability and the limited role of ICT may also partly explain the low level of productivity.** Market contestability (important sectors such as healthcare and education are not open to either domestic or foreign investors) and barriers to greater ICT and innovation may also play a role. Based on low levels of productivity, the degree of restrictiveness in their regulatory framework, and the contributions to output and employment, the priority sectors for reform would be *distribution* (retail, wholesale, transportation) and *network industries* which are key inputs to other sectors. Added to these would be government services in sheltered sectors, particularly *healthcare* which now accounts for 8 percent of public spending and is rising.

Distribution (retail and wholesale trade and transportation)

20. **Deregulation in distribution has focused on relaxing restrictions in retail and wholesale, and on licensing and store size.** The result has been an increase in the number of large stores and discount outlets, and the replacement of “mom and pop” stores with vertically integrated franchises (Høj and Wise, 2004). In addition, steps have been taken to ease the licensing restrictions on liquor and drug sales, remove regulation on resale price maintenance for drugs, cosmetics, and other products, and relax restrictions on establishing large scale stores.¹⁴ Nevertheless, despite this progress, productivity in this sector remains relatively low at less than 60 percent of the U.S. level.

21. **The OECD notes that certain trading practices imposed by producers, such as standard prices and rebates, may be restricting competition** and that despite the rise in average store size, the number of large stores remains relatively low (Høj and Wise, 2004).¹⁵ A new Large Scale Retail Store Locating Law was introduced in 2000 which eased restrictions on business hours, location, and focus on environmental impacts (such as traffic).¹⁶ This move was welcomed, although some business groups have raised concerns about the unequal implementation of regional regulations related to large store location (i.e., resulting from local interpretation of construction, safety and environmental regulations).

22. **Productivity in distribution could be raised through:**

- *More consistent and transparent application of government regulations on large stores location at all levels of government (United States-Japan, 2007). Empirical studies highlight the greater efficiency of large stores (McKinsey Global Institute, 2000) and the importance of entry and exit of firms.*¹⁷ Closely monitoring the application of regulations

¹⁴ The OECD summary index for restrictiveness of retail distribution regulation improved from 5.1 in 1996 (the highest among the major industrial economies), to 2.4 in 2003 (within the range of the other major industrial economies). This improvement was mainly driven by reduced barriers to entry and operational restrictions.

¹⁵ Possible factors behind the small average store size include: (i) regulations on large-store entry; (ii) elements of the tax system that may discourage the exit of “mom-and-pop” stores; (iii) SME debt guarantees provided by the government under favorable terms; and (iv) benefits to traditional stores under the City Center Revitalization Law, such as financial support for building parking. (OECD, 2006; p. 154).

¹⁶ Restrictions on large scale stores are the main market entry restriction in OECD countries and are generally motivated by concerns about environmental impact and urban planning. Such restrictions can slow consolidation and modernization of the sector; hinder efficiency gains from scale economies; help incumbents maintain dominant positions; and reduce firms’ market power over suppliers (Boylaud and Nicoletti, 2001).

¹⁷ Foster, Haltiwanger, and Krizan (2006) find the contribution to overall productivity of “entry” to be greater than that from continuing establishments, and that large retail stores play an especially important role. Matsuura and Motohashi (2005) found for Japan that market entry of large supermarkets, and specialty stores, and convenience stores had a statistically significant positive effect on overall productivity in the retail sector.

on large store locations and a timely assessment of their impacts on efficiency in the retail sector would help build support for further easing of regulations.

- *Fuller utilization of ICT*, which is a major driver of productivity in retail trade (Doms, Jarmin, and Klimek, 2004; Bloom et. al, 2007). Removing the barriers to accumulating complementary intangible assets (Box V.1) and greater labor and product market flexibility would help promote a greater diffusion of ICT benefits.

23. **Deregulation in transportation has also proceeded, but user charges remain high.** In the 1990s, entry barriers and charges in the trucking, airline, rail and taxi industries were lowered, and vehicle registration and inspection were simplified. Harbors were also allowed to operate around the clock; the Japan Highway Public Corporation and Narita Airport Corporation were privatized, and landing charges at Narita were reduced in 2005. Nevertheless, despite these improvements, airport, port, and toll road charges in Japan remain high by international standards.¹⁸

24. **Measures to promote greater competition could lower transportation costs further.** As recommended by the OECD, this could be done by *deregulating the distribution, pricing and settlement of airfares, promoting greater competition between ports*, including through outright privatization; and *operating toll roads on a cost recovery basis* rather than through cross subsidization which would lead to more efficient development of highways.

Network industries

25. **The network industries in Japan (electricity, gas, and postal services) are dominated by vertically integrated firms that have limited new entrants.** In general, to ensure a market structure that promotes competition and nondiscriminatory access, the OECD has recommended that *legal or ownership separation*, rather than “accounting unbundling”, i.e., separate accounting of the vertically integrated utilities, be considered for the network industries. Creating *independent sector regulators* as part of an active *ex-ante* regulation for ensuring nondiscriminatory third party access could also spur greater competition (OECD, 2005). The next sections explore these issues in more details for the electricity, gas, and postal services and telecommunication sectors.

Electricity sector

26. **The electricity industry in Japan is dominated by ten vertically-integrated operators who are near monopolies in their supply areas.** After three phases of reform, about two-thirds of power sales have been liberalized (i.e., consumers have a choice of

¹⁸ See OECD (2004; 2005) and United States - Japan Business Council 2006 Policy Statement.

suppliers). The ten utilities remain vertically integrated, but accounting has been “unbundled”, allowing for separate accounting of their network and generation activities.¹⁹ Accessibility of private power suppliers to the distribution network has been improved, and the Japan Electric Power Exchange (JEPX)—a spot electricity market for day ahead delivery and forward contracts—was established to encourage supply of wholesale electricity across markets.

27. **However, little competition has developed among existing suppliers.** For example, among large customers, new entrants account for only 2½ percent of sales (May 2007), and only one of the ten general power utilities is supplying power outside its own supply area. Barriers faced by new entrants include high oil and coal prices (the existing utilities have hydro and nuclear plants); high transmission charges; strict “balancing requirements”;²⁰ and the limited volumes traded on the JEPX.

28. **Deregulation has resulted in lower electricity prices in recent years, but prices remain high by international standards, suggesting scope for improving efficiency and competition.** Discussions on the next round of reforms began in April 2007 with a view to begin implementation by 2008. To improve access for new entrants, the next round of reforms will likely consider among other things: *reviewing the balancing requirements and charges, enhancing connection capacity between the networks, further developing the JEPX, and amending the current transmission charge regulation* to strengthen incentives for grid investment. As highlighted by the OECD, consideration could also be given to *bringing together network operators into a separate firm* to enhance infrastructure investment incentives (OECD, 2005).

Gas utilities

29. **The natural gas industry in Japan comprises many (mostly private) vertically integrated regional companies, with four major companies meeting nearly 80 percent of total gas demand.** The gas pipeline network is fragmented with little connection between regions. Deregulation in gas utilities started in 1995 when supply to large scale customers was liberalized. After two phases of deregulation, about half of the retail market was

¹⁹ Vertical structures were maintained in order to secure stable supply and promote nuclear power generation. The approach has been to legally establish “information firewalls” (accounting unbundling) and prohibit cross-subsidization or discriminatory treatment. A Neutral System Organization (NSO) was established consisting of incumbents, new entrants, network users, and academic experts, to ensure the neutrality of governance (through formulating rules and monitoring implementation).

²⁰ Non-owner users of transmission network are required to contain the gap between demand and supply below certain levels within a window of time (usually a demand-supply gap of less than 3 percent in a 30 minute period—the range can however be negotiated).

liberalized by April 2007. An amended Gas Utility Law allowed regulated third party access (TPA) to the pipelines, which was later extended to cover all general gas suppliers and pipeline operators to ensure fair access to gas distribution.²¹ As of March 2007, there were 28 new entrants supplying gas to the liberalized segment (large scale customers), but they account for only around 12 percent of the liberalized retail volume.

30. **Internationally high industrial and household prices for natural gas suggest scope for further reforms.** In FY2008, the authorities plan to review past reforms and set the new agenda in which securing gas supplies will be a key theme. As suggested by the OECD, the agenda should aim to deepen competition by *enhancing the gas pipeline networks* and *improving TPA to terminals*, such as by moving from negotiated TPA to a regulated TPA approach.

Postal services and telecommunications

31. **Japan's postal services have been liberalized, with free entry into parcel, special, and standard letter segments.** In 1985, competition began in telecommunications with the entry of new common carriers in long distance and international services, followed by the privatization of NTT. In 1988, Japan's mobile phone network was liberalized, and in 2003 telecom services were unbundled (Callen and Nagaoka, 2002; Høj and Wise, 2004). This has resulted in significant competition in some markets. For example, internet access and cellular phone interconnection rates are among the lowest in the OECD. More recently, introduction of number portability for mobile phones has further increased competition among service providers.

32. **Further reforms should aim to level the playing field.** According to the OECD, further reforms could include *establishing independent regulators* and leveling the playing field by *removing ownership restrictions in telecoms*. In postal services, competition could be enhanced by *abolishing strict service obligations for general correspondence delivery operations* and *opening access to the Japan Post's facilities/services*. Measures could be taken to ensure *equal treatment for express mail delivery* between Japan Post and other companies, such as customs clearance regulations and procedures (United States-Japan, 2007).

Healthcare

33. **Initiatives are underway to improve efficiency in healthcare services.** They include measures to increase utilization of IT (such as by moving to online receipts and

²¹ To encourage new investment in pipelines, new pipelines are exempted from TPA obligations, or be allowed to charge higher rates, for a limited time.

improving availability of information on medical institutions)²² and reduction in approval time for new drugs and medical devices. The Ministry of Health, Labor and Welfare’s “Program for the Improvement of the Quality and Efficiency of Medical Care and Long-term Care Services” (May 2007) targets moving to “online” receipts by FY2011 and increasing the share of generic drugs to over 30 percent by FY2012. While joint-stock hospitals were approved under the Special Zones regulatory reform initiative in July 2005, so far only one has been set up due to the conditions requiring such hospitals to provide highly specialized and advanced medical services not covered by national health insurance.

34. **Reforms thus far have had a limited effect on containing healthcare costs which have been rising along with age-related illness and hospital stays.** Without for-profit hospitals, the role for competition in promoting efficiency, improving service standards, and containing costs remains limited.

35. **Studies by the Cabinet Office suggest greater use of commercial providers and ICT holds much potential for boosting healthcare efficiency.** This would involve:

- *Allowing a broader scope for the operation of medical joint-stock companies.*²³ Consideration could be given to allowing medical joint-stock companies to provide more mainstream medical services in Special Zones, with a view to expanding this nationwide. The current stringent conditions on the areas in which medical joint-stock companies can operate limit the potential benefits of private sector participation in healthcare.
- *Improving the functioning of the insurance system.* Insurers could play a more active role in the healthcare market as informed agents of patients. Further outsourcing of health insurance could be promoted (Iwamoto, 2003).
- *Reform of the pricing system* should aim to improve transparency of the reimbursement pricing system and, through engagement of industry participants, ensure a pricing system that supports innovation in pharmaceuticals and medical devices (EBC, 2006).
- *Better information disclosure.* Disclosure and dissemination of information by healthcare service providers, deregulation of advertisement, and mandatory issuance of receipts with descriptions of treatments, would help patients participate in their own treatment in a

²² In March 2007, the revised “Grand Design for the Use of Information Technologies in Medical, Health, Long-term Care, and Social Welfare Fields” was announced (an update of the 2001 plan).

²³ The *Three Year Plan for Promoting Regulatory Reform* of June 22, 2007 also considers this. Imai (2002) suggests that restrictions on service provision should be eased substantially to promote restructuring—including direct restrictions (such as on the number of hospital beds, medical students, etc), and indirect restrictions, notably the prohibition on “for-profit” companies running hospitals.

more informed way (Imai, 2002; Council for the Promotion of Regulatory Reform, 2006).

C. Government Initiatives to Boost Productivity

36. **The government's initiatives to boost productivity in the service sector are spread across several fronts** (Box V.2). The June 2007 *Basic Policies for Economic and Fiscal Reform* outlines a multi-pronged strategy to enhance Japan's growth potential (aiming to increase labor productivity growth by 50 percent in five years) and reforms to address globalization. The main points are:

- **Boosting productivity.** Improved labor utilization and greater dynamism at SMEs and in services will be pursued (among other things) by encouraging the accumulation of human capital and fostering IT investment and utilization. A "job card" system to facilitate hiring decisions and labor mobility through an official record of individual employment and training histories is under development, and long term job seekers will be provided "practical education programs." Strategies for boosting service innovation include building common infrastructures for e-business; and deregulation (focusing on areas such as medical services). Other elements involve policy innovation (such as the promotion of international joint drug trials, speeding up approval systems, and reforming the drug pricing system), university reform, and innovation reforms.
- **Addressing globalization.** To enhance Japan's growth potential, the authorities aim to: (i) at least triple the number of preferential trade agreements and EPAs in force over the next two years (ii) strengthen competitiveness of financial and capital markets (such as through development of comprehensive exchanges, and reviewing firewall regulations related to banking and securities); (iii) establish an "Aviation Liberalization Timetable" (under the "Asian open sky policy"); and (iv) pursue the *Asian Gateway Initiative* (which includes reformulating policies relating to foreign students, and promotion of tourism).

Box V.2. Selected Government Reform Plans and Strategies

The Government of Japan's basic policies aim to energize economic growth through innovation and openness, with policies and structural reforms drawing on the recommendations of:

- The Council on Economic and Fiscal Policy's (CEFP) *Course and Strategy for the Japanese Economy* (January 2007),
- The CEFP's *Program for Enhancing Growth Potential* (April 2007),
- The Council for the Asia Gateway Initiative's *Asia Gateway Initiative* report (May 2007),
- The Innovation 25 Strategy Council's *Innovation 25* report (May 2007), and
- The Council for the Promotion of Regulatory Reform's (CPRR) First Report (May 2007).

The government's annual *Three-Year Plan for Promoting Regulatory Reform* (June 2007), which draws on report of the CPRR (May 2007), lists regulatory reform plans or considerations in a wide range of areas. The "focus areas" include: reform of government-driven markets; education; IT, energy and transportation; welfare (child care and nursing care); medical care; competition policy and finance; and labor. The focus areas and some of the plans/considerations in the report are consistent with priorities suggested in this chapter.

D. Conclusion

37. **In sum, the objective of boosting service-sector productivity would best be achieved through a comprehensive and mutually reinforcing set of deregulation measures**—namely, enhancing frameworks for innovation and ICT utilization, product market reforms (including the sector-specific priorities above), greater labor market flexibility, financial market development, and enhanced competition and regulatory frameworks. The priority service sectors are in distribution (retail and wholesale trade, and transport), networks (which are also key inputs into all other sectors), and health (opening "government-driven markets" in social welfare areas, such as healthcare, to the private sector will become increasingly important with growing demand in the context of an aging population). The potential returns from broad-based deregulation are substantial and would play an important role in enhancing Japan's growth potential and international competitiveness.

Figure V.1. OECD Non-Manufacturing Product Market Indices (NMR)

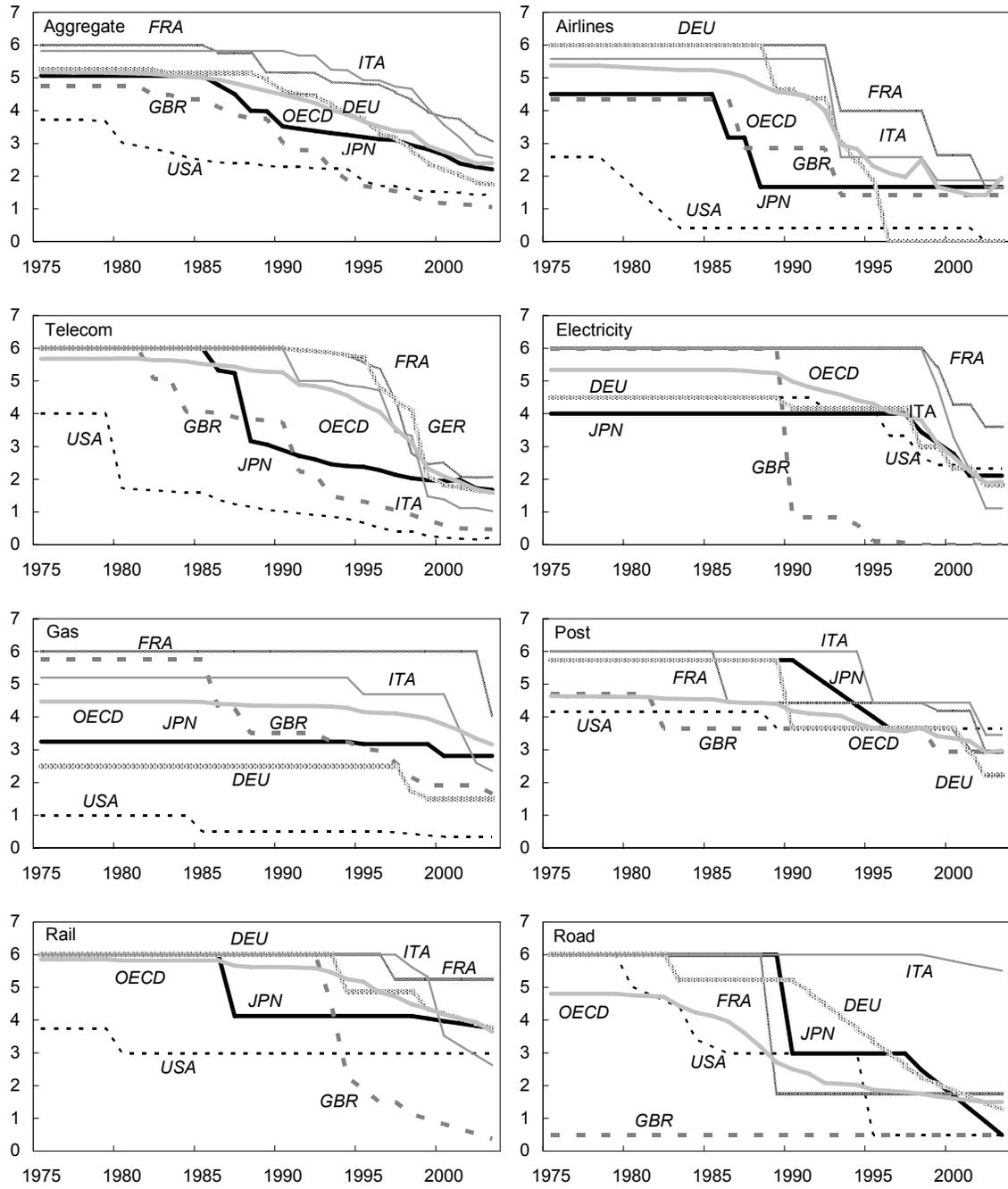
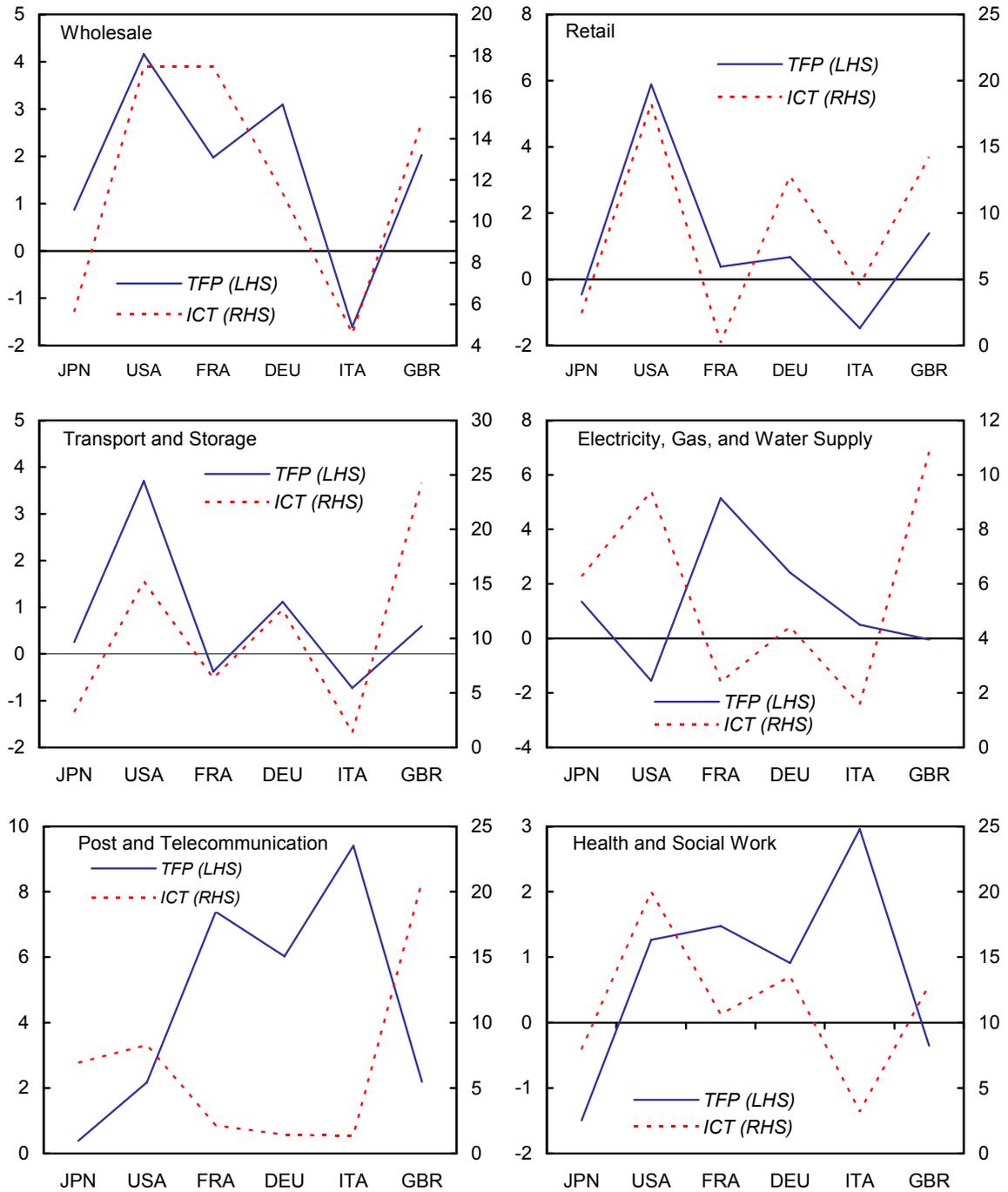


Figure V.2. TFP Growth and ICT Capital Services Growth by Sector, 1995-2004
(Percent change)



Source: EU KLEMs Database.

Table V.1. Gross Value Added Growth and Contributions

(Annual average volume growth rates, in percent)

	Market output	Total hours worked	Labor composition	ICT capital	Non-ICT capital	TFP
1980-1989						
United States	3.4	1.2	0.2	0.5	0.7	0.8
Japan	4.6	0.5	0.3	0.5	1.4	1.9
Germany	1.8	-0.3	0.2	0.2	0.5	1.1
France	2.2	-0.6	0.3	0.3	0.7	1.5
Italy	2.2	0.8	0.1	0.3	0.8	0.3
United Kingdom	3.0	0.0	0.0	0.5	0.8	1.7
1990-1999						
United States	3.3	1.0	0.3	0.7	0.6	0.7
Japan	1.6	-0.5	0.3	0.4	1.2	0.2
Germany	1.7	-0.4	0.1	0.4	0.9	0.8
France	1.8	-0.2	0.6	0.4	0.5	0.5
Italy	1.5	0.2	0.1	0.2	0.7	0.3
United Kingdom	2.5	-0.6	0.6	0.8	0.6	1.1
2000-2004						
United States	2.7	-0.8	0.4	0.7	0.4	2.0
Japan	0.7	-0.6	0.3	0.2	0.2	0.6
Germany	1.0	-0.5	0.2	0.4	0.4	0.5
France	2.1	0.2	0.3	0.4	0.6	0.6
Italy	1.4	0.8	0.2	0.2	0.9	-0.6
United Kingdom	3.0	0.1	0.5	0.8	0.3	1.2
1980-2004						
United States	3.2	0.7	0.3	0.6	0.6	1.0
Japan	2.5	-0.1	0.3	0.4	1.0	0.9
Germany	1.6	-0.4	0.2	0.3	0.6	0.8
France	2.0	-0.3	0.4	0.4	0.6	0.9
Italy	1.7	0.5	0.1	0.2	0.8	0.1
United Kingdom	2.8	-0.2	0.4	0.7	0.6	1.3

Table V.2. Japan: Gross Value Added Growth and Contributions

(Annual average volume growth rates, in %)

	Market output	Total hours worked	Labor composition	ICT capital	Non-ICT capital	TFP
1980-1989						
Market Economy	4.6	0.5	0.3	0.5	1.4	1.9
Electrical machinery, post and communication	11.2	1.8	0.2	1.4	1.5	6.3
Manufacturing, excluding electrical	4.5	0.2	0.1	0.2	1.7	2.2
Other goods producing industries	2.2	-0.5	0.4	0.2	1.0	1.1
Distribution services	3.8	0.3	0.4	0.2	0.7	2.2
Finance and business services	7.2	2.0	0.5	1.9	1.5	1.2
Personal and social services	3.4	1.3	0.4	0.4	2.3	-0.9
1990-1999						
Market Economy	1.6	-0.5	0.3	0.4	1.2	0.2
Electrical machinery, post and communication	7.5	-1.4	0.5	1.1	1.6	5.8
Manufacturing, excluding electrical	-0.1	-1.2	0.3	0.2	1.7	-1.1
Other goods producing industries	-0.9	-0.5	0.2	0.2	1.1	-1.9
Distribution services	2.3	-0.5	0.3	0.1	0.6	1.8
Finance and business services	4.3	0.7	0.4	1.2	1.0	1.0
Personal and social services	-0.3	0.3	0.2	0.2	1.4	-2.4
2000-2004						
Market Economy	0.7	-0.6	0.3	0.2	0.2	0.6
Electrical machinery, post and communication	7.7	-1.6	0.5	0.5	0.6	7.8
Manufacturing, excluding electrical	0.2	-0.8	0.3	0.0	0.0	0.7
Other goods producing industries	-1.7	-1.6	0.4	0.0	-0.1	-0.3
Distribution services	-0.8	-1.3	0.3	0.1	-0.1	0.2
Finance and business services	3.0	1.2	0.3	0.9	0.6	-0.1
Personal and social services	0.2	0.6	0.4	0.1	0.6	-1.4

Source: EU KLEMS database (<http://www.euklems.net>).

References

- Bloom, Nick, Raffaella Sadun and John Van Reesen, 2007, "Americans Do I.T. Better: US Multinationals and the Productivity Miracle" NBER Working Paper Series, WP13085, May
- Boylaud, Olivier and Giuseppe Nicoletti, 2001, "Regulatory Reform in Retail Distribution," *OECD Economic Studies*, No.32
- Cabinet Office, 2007, "Productivity in Japan," a mini-report presented to the Council on Economic and Fiscal Policy (CEFP), April, Tokyo
- Cabinet Office, 2007, "Kisei Kaikaku no Keizai Kouka (Economic Impact of Regulatory Reform, in Japanese)," March, Tokyo
- Callen, Tim and Takashi Nagaoka, 2003, "Structural Reforms, Information Technology, and Medium-Term Growth Prospects," in Tim Callen and Jonathan D. Ostry (Editors), *Japan's Lost Decade: Policies for Economic Revival*, IMF
- Conway, Paul, Véronique Janod, and Giuseppe Nicoletti, 2005, "Product Market Regulation in OECD Countries: 1998 to 2003," *OECD Economic Department Working Papers*, ECO/WKP(2005)6, April
- Conway, Paul and Giuseppe Nicoletti, 2006, "Product Market Regulation in the Non-Manufacturing Sectors of OECD Countries: Measurement and Highlights," *OECD Economic Department Working Papers*, ECO/WKP(2006)58, December
- Doms, Mark, Ron Jarmin, and Shawn Klimek, 2004, "Information Technology Investment and Firm Performance in US Retail Trade," *Economics of Innovation and New Technology*, Taylor and Francis Journals, Vol. 13(7), October
- Dutz, Mark and Aydin Hayri, 2000, "Does More Intense Competition Lead to Higher Growth?," World Bank Policy Research Working Paper No. 2320
- The European Business Council in Japan, 2006, The EBC Report on the Japanese Business Environment 2006.
- Foster, Lucia, John Haltiwanger, and C. J. Krizan, 2006, "Market Selection, Restructuring and Reallocation in the Retail Trade Sector in the 1990s," *Review of Economics and Statistics*, Vol. 88(4), November

- Fukao, Kyoji and Tsutomu Miyagawa, 2007, “Productivity in Japan, the US, and the Major EU Economies: Is Japan Falling Behind?,” presented at RIETI Policy Symposium “Productivity Growth in the Global Economy: Innovation in the Service Sector and the Role of Intangible Assets,” June, Tokyo
- Fukao, Kyoji, Sumio Hasegawa, Tsutomu Miyagawa, and Konomi Tonogi, 2007, “Intangible Investment in Japan: Measurement and Contribution to Economic Growth,” *RIETI Discussion Paper Series*, 07-E-034, May
- Haskel, Jonathan and Raffaella Sadun, 2007, “Regulation and UK Retailing Productivity: Evidence from Micro Data” preliminary
(http://www.aimresearch.org/prperformance_outputs.html)
- Høj, Jens and Michael Wise, 2004, “Product Market Competition and Economic Performance in Japan,” *OECD Economics Department Working Papers*, ECO/WKP(2004)10, May 2004.
- Imai, Yutaka, 2002, “Healthcare Reform in Japan”, *OECD Economics Department Working Papers*, ECO/WKP(2002)7, February 2002.
- IMF, 2006, *Japan: 2006 Article IV Consultation – Staff Report*, IMF Country Report, No. 06/275, July
- Iwamoto, Yasushi, 2003, “Issues in Japanese Health Policy and Medical Expenditure,” in Toshiaki Tachibanaki (Editor), *Social Security in Japan*, Edward Elger.
- Jones, Randall S., and Taesik Yoon, 2006, “Strengthening the Integration of Japan in the World Economy to Benefit More Fully from Globalization,” *OECD Economics Department Working Papers*, ECO/WKP(2006)54, November
- Jorgensen, Dale W., and Kazuyuki Motohashi, 2005, “Information Technology and the Japanese Economy,” *Scandinavian Journal of Economics*, Vol. 107, December
- Matsuura, Toshiyuki and Kazuyuki Motohashi, 2005, “Market Dynamics and Productivity in Japanese Retail Industry in the late 1990’s,” *Research Institute of Economy, Trade and Industry (RIETI) Discussion Paper Series*, 05-E-001, January
- McKinsey Global Institute, 2000, “Why the Japanese Economy Is Not Growing: Micro Barriers to Productivity Growth,” McKinsey Global Institute
- Motohashi, Kazuyuki, 2005, *Empirical Analysis of IT Innovation: Has IT Changed Long-term Japanese Economic Performance?*, RIETI, Tokyo (in Japanese)

- Motohashi, Kazuyuki, 2007(a), “Is Japanese Economy Losing its Competitiveness?— Examination through Analysis of Productivity and Innovation,” *Keizai Sangyo Journal*, Vol. 2007/2 (available from RIETI website: <http://www.rieti.go.jp/en/index.html>)
- Motohashi, Kazuyuki, 2007(b), “Firm-level Analysis of Information Network Use and Productivity in Japan,” *Journal of the Japanese and International Economies*, Vol. 21, March
- Nomura Research Institute, 2007, Focus feature 3: “Outlook for Abe’s Economic Policy— concepts and Realities Behind Plan to Boost Productivity by 50 Percent,” *Japan Economic Monthly*, May 2007
- OECD, 2004, *OECD Economic Survey of Japan 2003-04*, February 2004.
- OECD, 2005a, *OECD Economic Survey of Japan 2005*, March 2005
- OECD, 2005b, “The Benefits of Liberalizing Product Markets and Reducing Barriers to International Trade and Investment in the OECD,” *OECD Economics Department Working Papers*, ECO/WKP(2005)50, December
- OECD, 2006, *OECD Economic Survey of Japan 2006*, July 2006.
- Porter, Michael, 1998; “Measuring the Microeconomic Foundations of Economic Development,” in *The Global Competitiveness Report 1998*, the World Economic Forum
- Scarpetta, Stefano, Philip Hemmings, Thierry Tresselt and Jaejoon Woo, 2002, “The Role of Policy and Institutions for Productivity and Firm Dynamics: Evidence from Micro and Industry Data,” *OECD Economics Department Working Papers*, ECO/WKP(2002)15, April
- US-Japan, 2007, “Sixth Report to the Leaders on the United States-Japan Regulatory Reform and Competition Policy Initiative”, June 6, 2007.
- Walker, Chris, 2004, “Structural Reforms and Productivity Growth,” *Japan: Selected Issues*, Chapter 6, IMF Country Report, No. 04/247, August
- WEO, 2004, *World Economic Outlook*, International Monetary Fund, Washington D.C., April 2004.