

## **Ireland: Selected Issues**

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IRELAND

**Selected Issues**

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Approved by the European Department

August 2, 2007

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## **Abstracts**

### **Spillovers to Ireland**

This chapter discusses Ireland's trade and financial linkages with key partner countries, and uses a vector autoregression to examine the impact of shocks to partner country GDP and shocks to Irish competitiveness on Irish GDP. Two main findings are that shocks to U.S. GDP have a much larger impact on the variance of Irish GDP than shocks to the euro area or the U.K. In addition, the share of the variance of Irish GDP explained by shocks to competitiveness rises with the forecast horizon, suggesting that past erosion of competitiveness may yet have a more substantial impact on economic activity.

### **Policy Challenges of Population Aging in Ireland**

Age-related government spending is projected to rise by 8 percentage points of GDP by 2050, the second largest increase in the euro area. To prevent a rapid build-up of debt, the rise in spending due to population aging will need to be offset by benefits reform, a reduction in other spending, or tax increases. This chapter uses the IMF's Global Fiscal Model to compare the effects of alternative fiscal adjustment strategies on employment and growth. The simulations suggest that a package of measures, including an increase in the retirement age, broadening the tax base, and raising indirect taxes, may be a more growth-friendly strategy than only raising the social security contribution rate.

### **Efficiency Gains of Private Credit Growth in Ireland**

Finance can benefit the economy through two main channels: a reduction in the cost of external finance and an improvement in resource allocation. Analysis of industries' relative performance in advanced economies suggests that these two channels work more effectively when the financial system relies more on arm's length transactions and the labor market is more flexible. This chapter shows that these results are applicable to Ireland, suggesting that measures to further increase the arm's length content of the financial system and efforts to maintain labor market flexibility could be beneficial.

## I. SPILLOVERS TO IRELAND<sup>1</sup>

### A. Background

1. **This chapter examines how shocks to key trading partners and to competitiveness affect economic activity in Ireland.** Issues to be addressed include determining the relative importance of shocks in different trading partners on Irish economic activity, as well as the relative importance of external versus domestic shocks. At the current juncture, which features a slowdown in the United States and strong growth in the euro area, the analysis helps shed light on the likely impact of these external developments on the Irish economy.
2. **As a small open economy in a currency union, Ireland is likely to be significantly influenced by events in the international economy.** The literature on international business cycles typically finds that countries with greater trade and financial linkages have more synchronized business cycles (see, for example, Imbs (2003), Kose, Prasad, and Terrones (2003a and 2003b) and Baxter and Kouparitsas (2004)). In this regard, the Irish economy is very open, with high shares of exports and imports to GDP (see below). Monetary policy is determined by the European Central Bank on the basis of developments in all euro area countries, so that developments in other euro area countries have a significant impact on monetary conditions in Ireland. Also, Irish banks are well integrated with the rest of the world (see, for example, Duggar and Mitra (2007) and the 2006 FSSA update), and are heavily dependent on external financial markets for their funding.
3. **Large FDI and migration flows also provide channels for the transmission of external shocks to Ireland.** In the last decade Ireland has been very successful in attracting a large number of multinational companies, with associated large inflows of foreign direct investment into its economy. Since multinational companies are concerned about global profits, external shocks can cause a reallocation of their investments and activities across different geographical regions, which would have an impact on Irish economic activity. Also, as noted by Honohan and Walsh (2002), the substantial acceleration of growth in Ireland since the mid-1990s has been fueled to a significant degree by increases in employment, fueled in part by inward migration. Although migration is governed by several factors, shocks in other countries can affect, at the margin, the relative attractiveness of migrating to Ireland, and thus affect Irish labor supply and output.

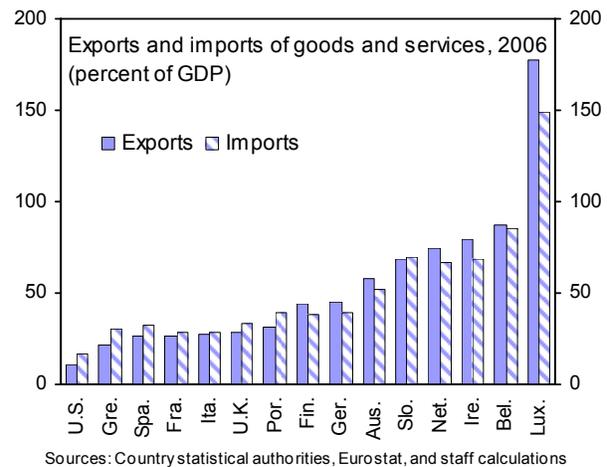
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<sup>1</sup> Prepared by Daniel Kanda

4. **The plan for this chapter is as follows:** Section B examines Ireland's linkages with its main partner countries; Section C uses VAR analysis to quantitatively assess how shocks in trading partners and to competitiveness affect Ireland; and Section D concludes.

## B. Linkages with Partner Countries

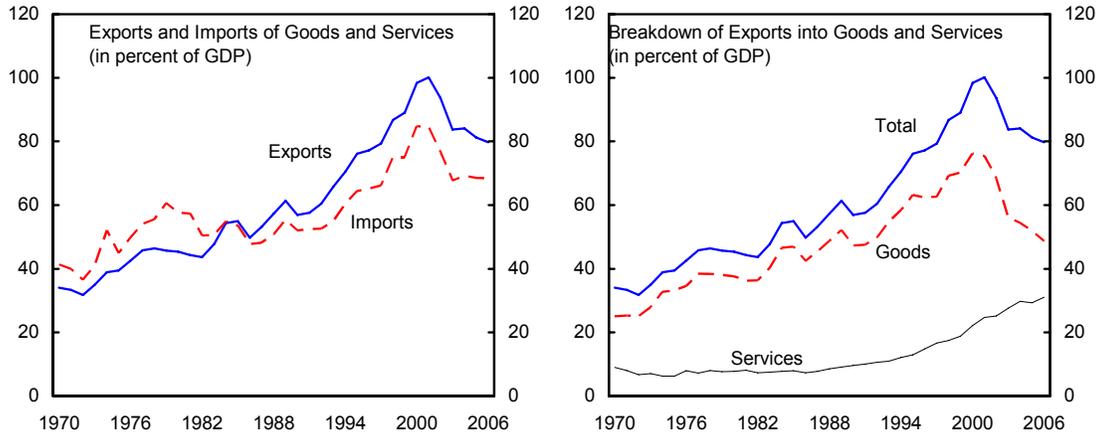
5. **Irish exports and imports, as a share of GDP, stand well above those of the typical industrial country.** A cross country comparison shows that as a share of GDP Irish exports and imports are well above the euro area average, and are also well above those in the U.S. and U.K. Within the euro area, only Belgium and Luxembourg have higher trade shares than Ireland.



6. **Annual trade data from 1970 reveals that the importance of trade for**

**the Irish economy has grown substantially.** Between 1970 and 2000, the ratio of imports of goods and services to GDP doubled, peaking at over 80 percent, but it has since declined to 68½ percent in 2006. Exports of goods and services rose at an even faster pace, peaking at over 100 percent of GDP in 2000, before declining to about 80 percent in 2006. As a result, Ireland has enjoyed a surplus on the goods and services account since the mid 1980s. The importance of external trade in services has also increased steadily since the mid 1990s.

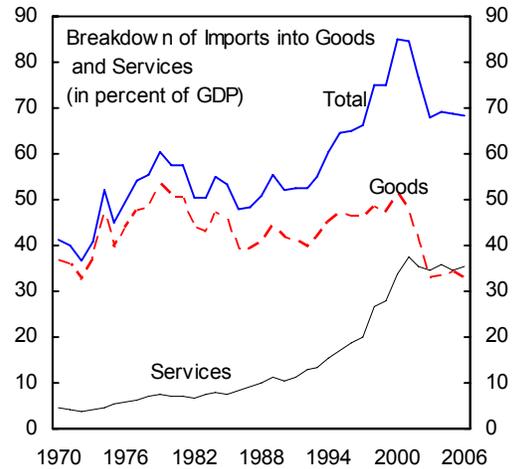
7. **Data on the direction of merchandise trade indicate that Ireland's biggest trading partners are the euro area, the U.S., and the U.K.** These trading partners account for the bulk of Irish merchandise exports and imports. The latest data available, for 2006, indicate that the euro area is Ireland's largest export market, accounting for 43¼ percent of Irish exports, followed by the U.S. and the U.K. with 18¼ percent and 17½ percent, respectively. On the imports side, the U.K. has the largest share (31¾ percent), followed by the euro area and the U.S., with 23¼ percent and 11¼ percent shares, respectively.



Direction of Trade (percent of total)

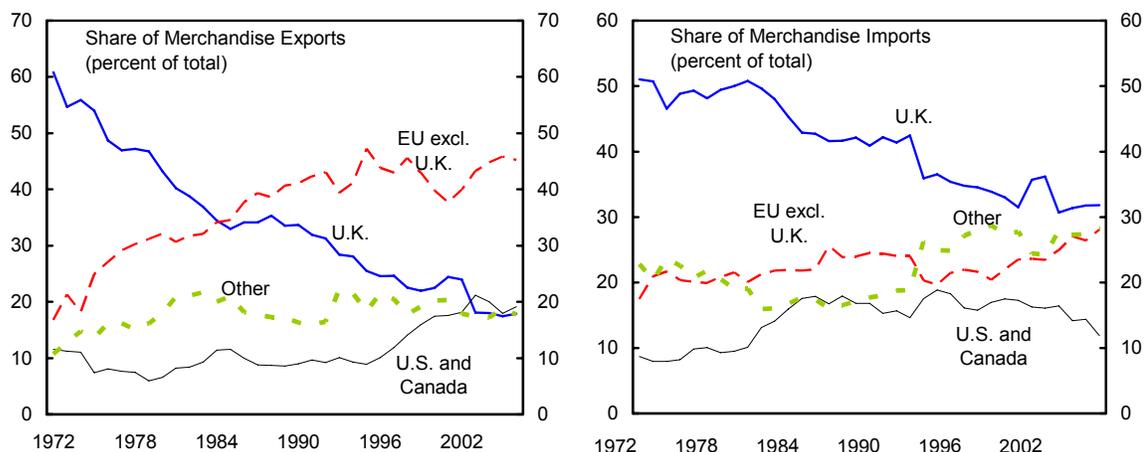
	2005	2006
<b>Exports</b>		
EU-23 1/	46.5	46.3
o/w euro area	43.7	43.2
U.S. and Canada	18.2	18.7
o/w U.S.	17.8	18.3
U.K.	17.7	17.5
Other	17.6	17.5
<b>Imports</b>		
EU-23 1/	25.5	27.0
o/w euro area	22.2	23.3
U.S. and Canada	14.4	11.9
o/w U.S.	13.9	11.3
U.K.	31.8	31.7
Other	28.3	29.4

1/ EU-25 excluding UK and Ireland



Sources: CSO and Staff calculations

8. **The relative importance of these trading partners has varied significantly over time, however.** The share of the U.K. in Irish exports and imports has fallen steadily since the 1970s, whereas those of the euro area have risen. The share of the U.S. in Irish exports has risen strongly since the mid 1990s, but its share of Irish imports has fallen recently. The share of exports and imports to other countries has also increased gradually.



Sources: CSO and Staff calculations.

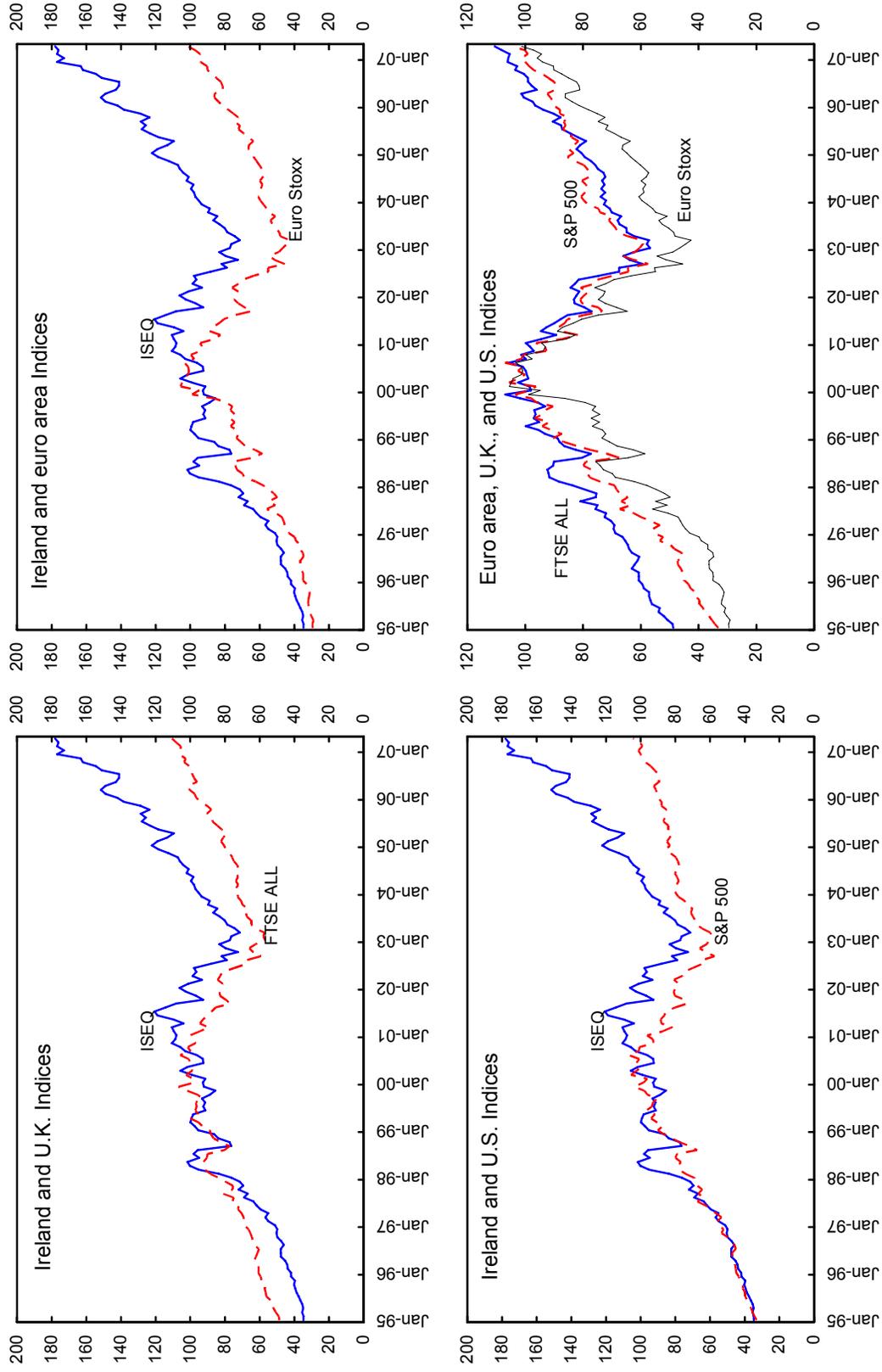
9. **Regarding multinational companies in Ireland, U.S. companies dominate.** Data from IDA Ireland indicate that almost one-half of all multinationals are U.S. companies. Moreover, the U.S. companies have had a disproportionate impact on employment, accounting for over 70 percent of all employment by multinationals. Firms from continental Europe and the U.K. also have a significant presence in Ireland.

	Origin of IDA Ireland Supported Companies, 2005			
	Companies		Employment	
	Number of Companies	Percent of Total	Total Employment	Percent of Total
Total	1,010	100.0	132,728	100.0
U.S.	473	46.8	93,331	70.3
Continental Europe	345	34.2	27,350	20.6
U.K.	117	11.6	7,239	5.5
Other	75	7.4	4,808	3.6

Source: IDA Ireland Annual Report 2005.

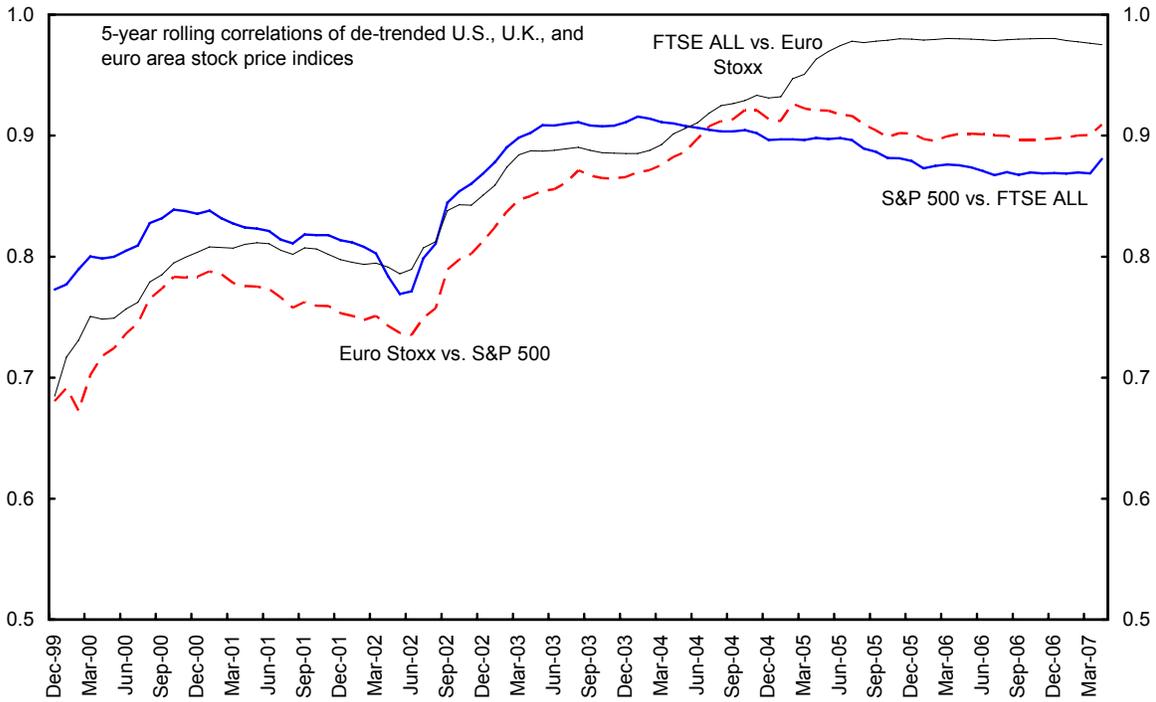
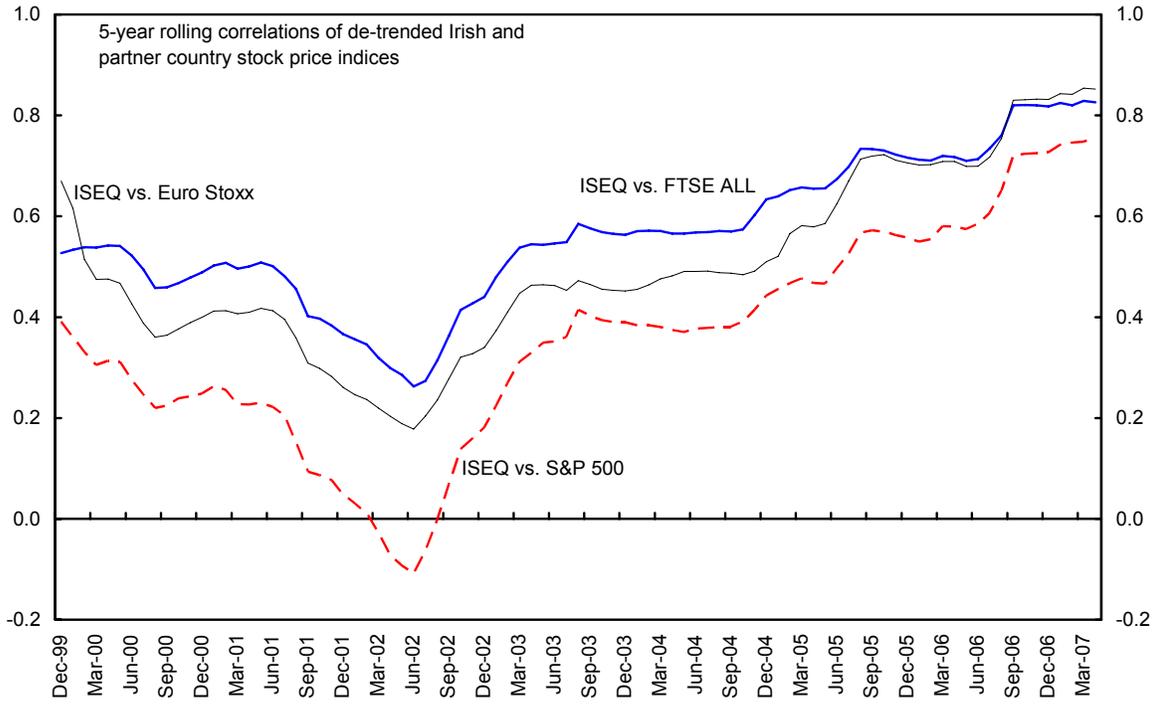
10. **There are also strong linkages between Irish and world financial markets.** This is confirmed by stock price indices as well as data on capital inflows and outflows. Figures I.1-2 present a comparison of the ISEQ, FTSE all-share, Euro STOXX, and S&P 500 indices. Clearly the ISEQ tends to co-move with the partner country indices, though it is sometimes out of phase with them. In particular, Figure I.2, which presents 5-year rolling correlations, indicates that between 1999 and 2002 the correlation of the ISEQ with the other indices declined, as the ISEQ responded to the downward trend in partner country indices (in the aftermath of the dot-com bust) with a lag. From 2003 onwards, however, the ISEQ has moved back into phase with the other indices, and 5-year rolling correlations with partner country indices have risen to a high level of around 0.8 in the past year, while correlations amongst the partner country indices have increased to an even higher level. In this same period the ISEQ has grown faster than the other indices, and has also been more volatile,

Figure I.1. Stock Price Indices in Ireland and Key Trading Partners: 1995–2007  
(2000=100)



Sources: Standard & Poor, Dow Jones, FTSE Group, Irish Stock Exchange, and staff calculations

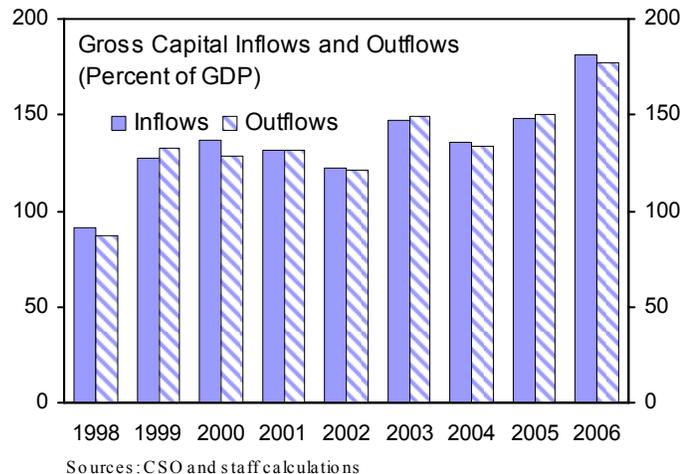
Figure I.2. Correlations of U.S., U.K., euro area, and Irish Stock Price Indices: 1999–2007



Sources: Standard & Poor, Dow Jones, FTSE Group, Irish Stock Exchange, and staff calculations

which could reflect a growing recognition of Ireland's economic success as well the relatively small size of the Irish stock exchange.

11. **And capital inflows and outflows are high and rising.** Data on gross capital flows also show large and growing inflows and outflows of capital. Both gross capital inflows and gross capital outflows have exceeded 100 percent of GDP since 1999. Following a mild decline after 2000, in the aftermath of the dot-com bust, both inflows and outflows have risen strongly since 2004, and both exceeded 170 percent of GDP in 2006, well above the peak reached under the Celtic tiger period. Reflecting these large flows, gross foreign assets and liabilities of Ireland both stood at around 10 times GDP at the end of 2005.

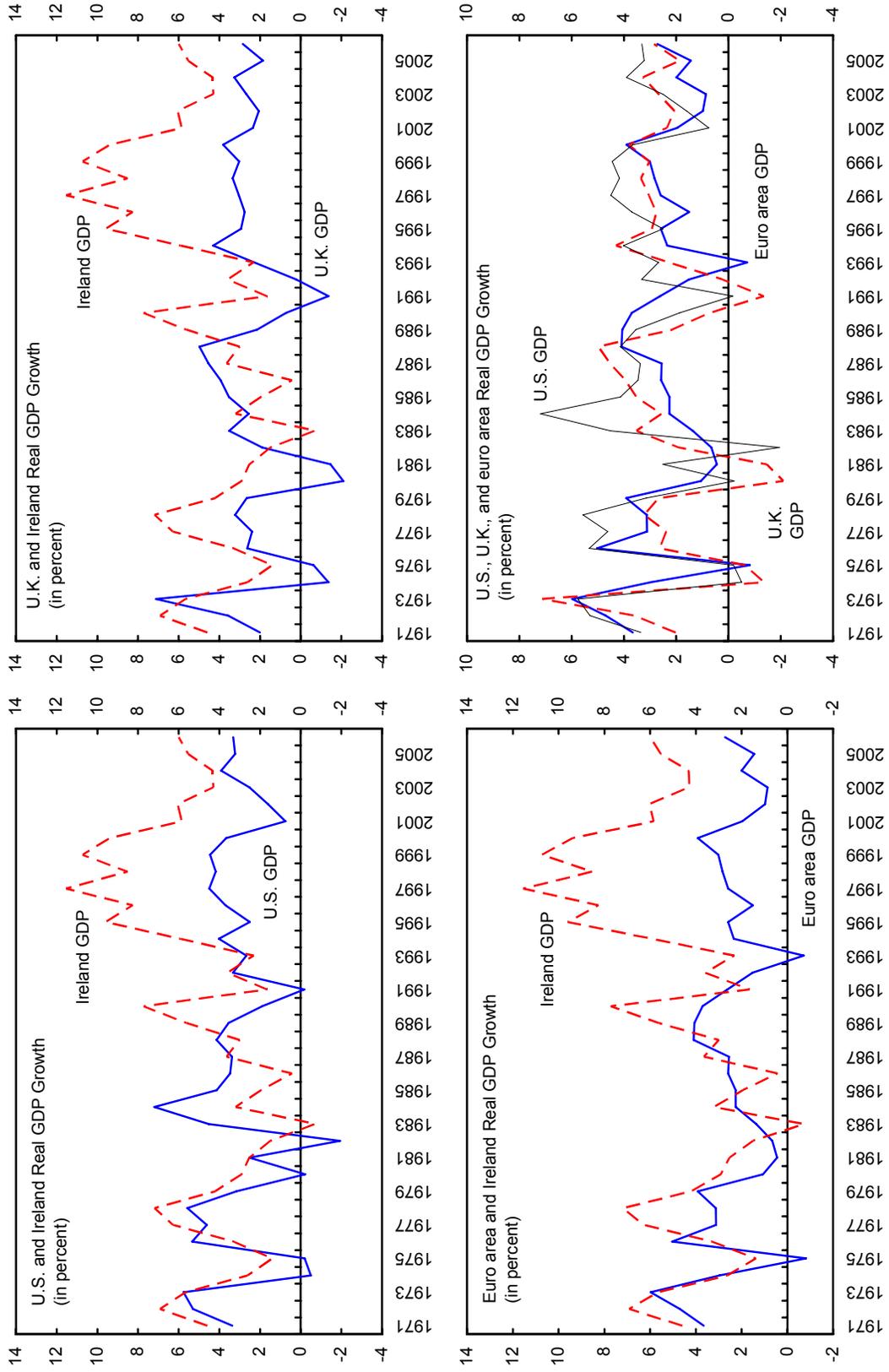


12. **Reflecting these linkages, there is a relatively strong relationship between real GDP growth rates in Ireland and its trading partners.** Figure I.3 indicates that peaks and troughs in Irish GDP growth typically occur in the vicinity of similar turning points in its partners, though the turning points are sometimes out of phase. Partner country cycles are also similar, which could reflect the influence of a common world business cycle (see Kose, Otrok, and Whiteman (2003)), common global shocks, or the dominance of the U.S. economy. Figure I.4, which presents 10-year rolling correlations of the respective output gaps, suggests that Irish cycles have typically been more synchronized with euro area cycles than with U.S. and U.K. cycles. Also, the correlation between euro area cycles and those in the U.K. and U.S. fell sharply in the early 1990s, as a trough in euro area growth significantly lagged that in the U.S. and U.K., possibly reflecting the impact of German reunification. However, the correlation between cycles in Ireland and the U.S. and U.K. has returned to a high level over the past 10 years.

### C. Econometric Analysis Using a VAR

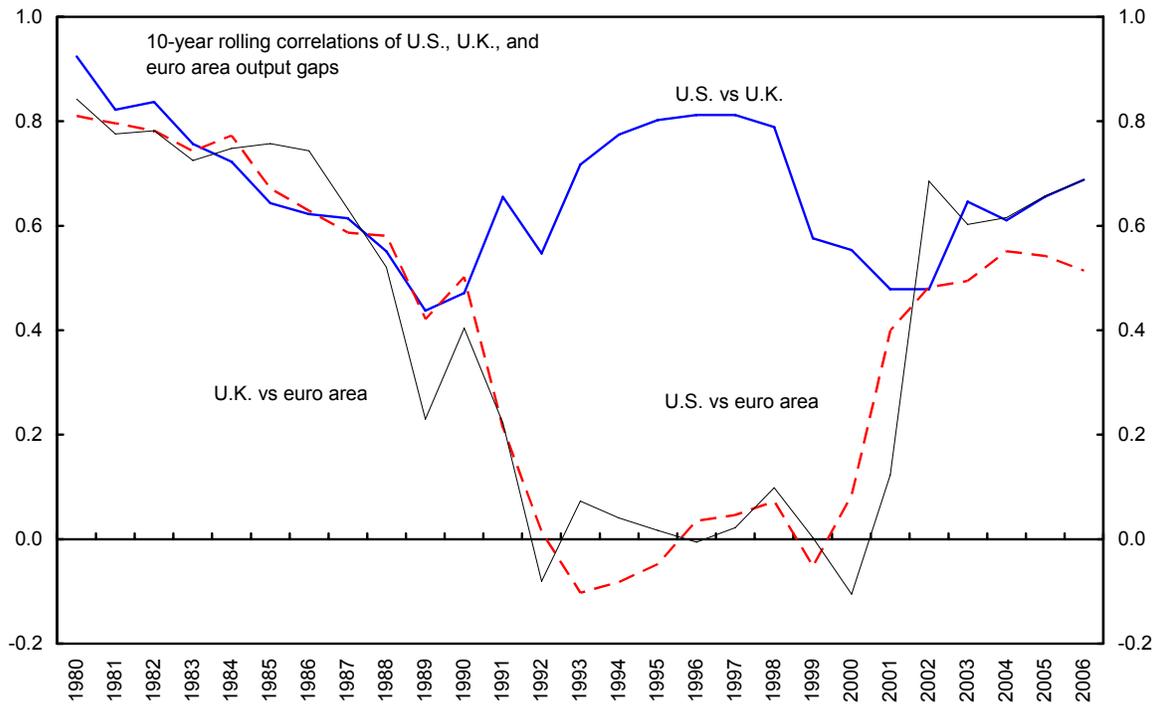
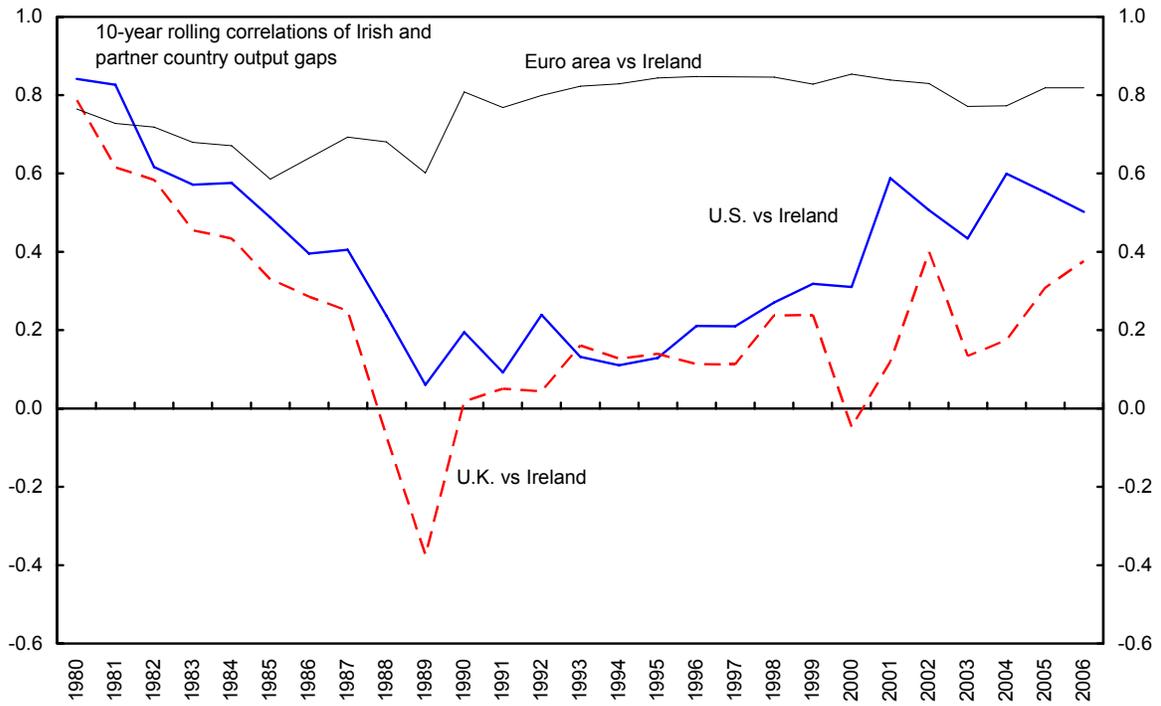
13. **To enable a more rigorous assessment of the impact of spillovers from external shocks on Ireland, a vector autoregression (VAR) was estimated.** A 5-variable VAR was estimated using quarterly data from 1997: Q1 to 2006: Q4. This period basically coincides with the Celtic tiger and subsequent period, where there has been high growth and no serious downturn, and so raises the possibility of bias in the estimation results. We are limited to this relatively short dataset because quarterly data for Irish GDP is only available for that period. In any case, given the dramatic transformation in the Irish economy since the mid 1990s, data

Figure I.3. Business Cycles in the U.S., U.K., euro area, and Ireland: 1971–2006



Sources: Country statistical authorities, Eurostat, WEO database, and staff calculations.

Figure I.4. Correlations of Output Gaps in the U.S., U.K., euro area, and Ireland: 1980–2006



Sources: Country statistical authorities, Eurostat, WEO database, and staff calculations

prior to this period may not be very useful in shedding light on the current impact of spillovers. All variables were seasonally adjusted and transformed into logs, and the VAR was estimated with four lags for each variable.

14. **The variables in the VAR included—in that order—euro area real GDP (excluding Ireland), U.S. real GDP, U.K. real GDP, Irish real GDP, and the unit labor cost based Irish real effective exchange rate (REER).** The shocks in the VAR were orthogonalized using a Cholesky decomposition, with the variables in the order specified above. As is well known, this implies that variables appearing earlier in the ordering are considered more exogenous, while those appearing later in the ordering are considered more endogenous. As a check, the ordering of euro area and U.S. GDP was reversed to see whether this changed the results. This exercise produced very similar results. The error bands of the impulse responses are the 16<sup>th</sup> and 84<sup>th</sup> fractiles of the distributions of the responses, corresponding to one standard deviation bands, and were computed by Monte Carlo integration using the software package *RATS*.

15. **Ng Perron tests rejected non-stationarity in all the variables.** Phillips (1998) shows that the presence of nonstationary or near-integrated data in a VAR leads to long-horizon impulse responses and variance decompositions that are not consistent, but rather approach a random variable. To examine this possibility, all the variables were subjected to unit root tests using the method of Ng and Perron (2001), which yields tests with superior size and power compared to the traditional Dickey-Fuller and Phillips Perron tests. Ng and Perron developed four test statistics, all with the same limiting distribution, and Table I.1 presents results for all the four tests for unit roots, generated using *Eviews* software. The tests rejected non stationarity in all the variables examined.

16. **However, we cannot rule out the possibility that some variables have near-unit roots.** Indeed, it is well known that it is difficult to reject the unit root hypothesis in many macroeconomic variables which exhibit high persistence, such as GDP, interest rates, and exchange rates. Bearing this in mind, we will in general restrict our analysis of impulse responses and variance decompositions to no more than an 8-quarter horizon.

17. **The variance decomposition indicates that a substantial part of the variance of Irish GDP is explained by shocks to U.S. GDP, particularly beyond a 2-quarter horizon** (Table I.2). Up to a 2 quarter horizon, fluctuations in Irish GDP are largely explained by shocks to Irish GDP itself, but with a significant part explained by shocks to euro area GDP. However, at longer horizons the share explained by shocks to U.S. GDP increases substantially. At an 8 quarter horizon, shocks to U.S. GDP explain 41½ percent of fluctuations in Irish GDP, while shocks to Irish GDP itself explain only 26½ percent of its variance. This is followed in importance by shocks to euro area GDP, the REER, and U.K. GDP, which explain 15 percent, 12 percent, and 5½ percent, respectively, of the variance of Irish GDP at this horizon. It is also noteworthy that although not very important at a 4 quarter

horizon, the share of fluctuations in Irish GDP explained by shocks to the REER (and thus to Irish competitiveness) increases significantly over a longer horizon.<sup>2</sup>

Table I.1: Ng Perron Unit Root Tests of the Variables in the VAR

	Test statistics 1/	Critical values		
		10 percent level	5 percent level	1 percent level
U.S. Real GDP				
Mza	-33.63 ***	-14.20	-17.30	-23.80
MZt	-4.10 ***	-2.62	-2.91	-3.42
MSB	0.12 ***	0.19	0.17	0.14
MPT	2.71 ***	6.67	5.48	4.03
U.K. Real GDP				
Mza	-16.88 *	-14.20	-17.30	-23.80
MZt	-2.88 *	-2.62	-2.91	-3.42
MSB	0.17 *	0.19	0.17	0.14
MPT	5.56 *	6.67	5.48	4.03
Euro Area Real GDP				
Mza	-127.49 ***	-14.20	-17.30	-23.80
MZt	-7.98 ***	-2.62	-2.91	-3.42
MSB	0.06 ***	0.19	0.17	0.14
MPT	0.72 ***	6.67	5.48	4.03
Ireland Real GDP				
Mza	-28.18 ***	-14.20	-17.30	-23.80
MZt	-3.75 ***	-2.62	-2.91	-3.42
MSB	0.13 ***	0.19	0.17	0.14
MPT	3.27 ***	6.67	5.48	4.03
REER (ULC based)				
Mza	-166.75 ***	-14.20	-17.30	-23.80
MZt	-9.10 ***	-2.62	-2.91	-3.42
MSB	0.05 ***	0.19	0.17	0.14
MPT	0.19 ***	6.67	5.48	4.03

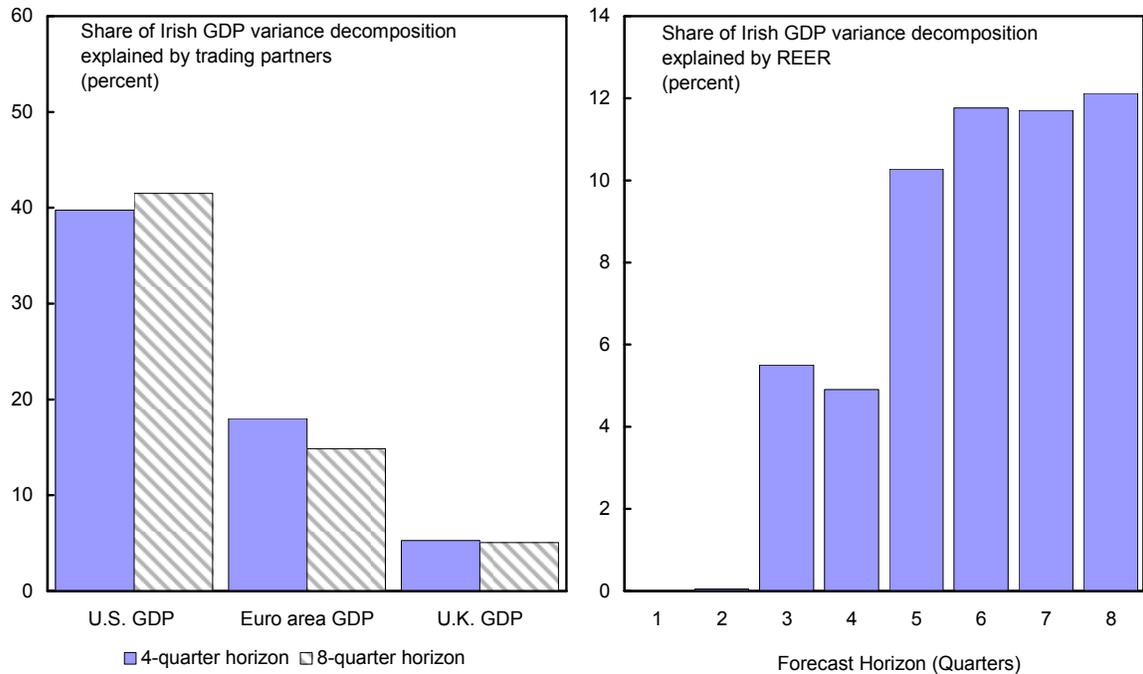
Source. Author's calculations

1/ \*\*\*, \*\*, and \* represent rejection of the unit root hypothesis at the 1 percent, 5 percent, and 10 percent levels, respectively.

Table I.2: Decomposition of Variance for Irish Real GDP

Horizon (Quarters)	Euro area GDP	U.S. GDP	U.K. GDP	Irish GDP	REER (ULC based)
1	18.1	1.0	6.3	74.6	0.0
2	21.0	16.3	4.9	57.7	0.0
3	18.9	37.2	2.8	35.7	5.5
4	18.0	39.8	5.3	32.0	4.9
5	16.7	38.5	4.9	29.7	10.3
6	16.3	37.8	5.5	28.7	11.8
7	16.0	38.3	5.4	28.5	11.7
8	14.9	41.5	5.1	26.5	12.1

<sup>2</sup> Also, examination of the variance decomposition at horizons longer than 8 quarters suggests that the importance of the REER increases further at longer horizons.

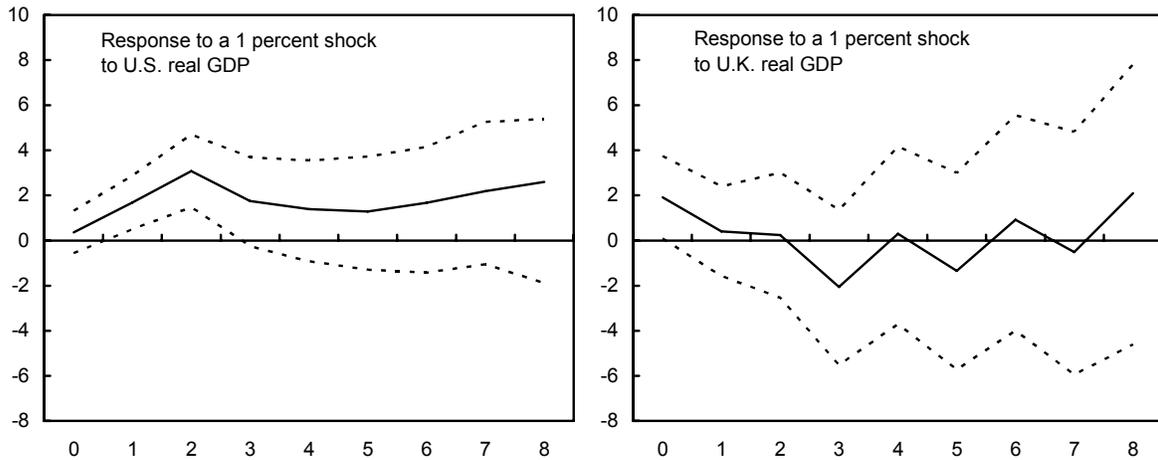


18. **In general, the impulse responses have the expected signs, but the shocks do not appear to have very persistent effects.** The impulse responses arising from shocks to GDP were normalized to present the percentage change in Irish GDP in response to one percent shocks in the other variables. In the case of shocks to the REER, however, the response to a one percent shock was rather small. Thus, the impulse response was normalized to present the percentage change in Irish GDP in response to a 4 percent shock to the REER.<sup>3</sup> The charts indicate, as would be expected, that positive shocks in the trading partners typically increase economic activity in Ireland, while an adverse shock to competitiveness (a positive shock to the REER) reduces Irish economic activity. Also, shocks to U.S. GDP have a larger and somewhat more persistent impact on Irish GDP than shocks to U.K. and euro area GDP. However, possibly reflecting the short dataset, the error bands are relatively wide, and all impulse responses are not significantly different from zero by the fourth quarter after a shock.

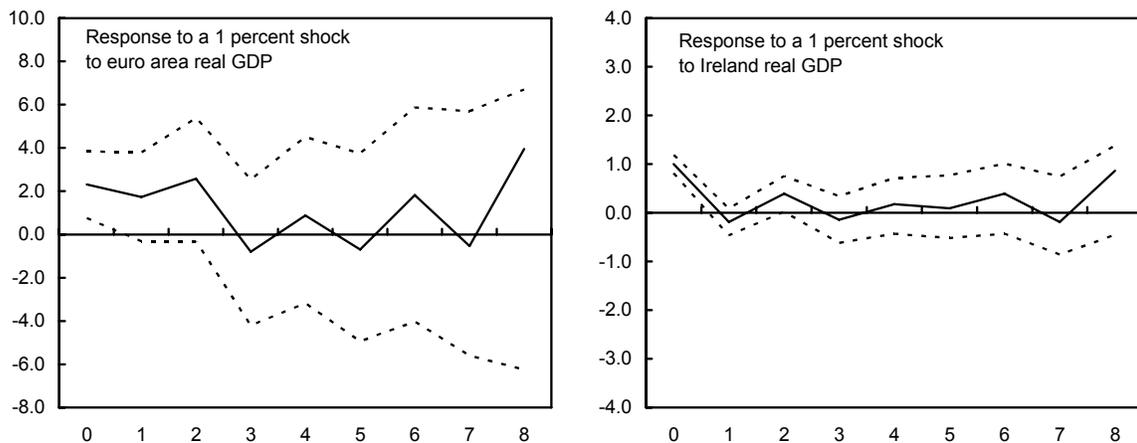
19. **Shocks to U.S. GDP have a significant impact on Irish GDP between one and three quarters after they occur.** The contemporaneous impact is small, and not statistically distinguishable from zero. However, the magnitude of the response increases strongly to a peak of about 3 percentage points after two quarters, and then declines. This impact is larger and more persistent than the effects of shocks to euro area and U.K. GDP, even though the EU area has a larger share of goods trade with Ireland. This could reflect several other factors, including the large presence of U.S. multinationals in Ireland and the associated

<sup>3</sup> 4 percent is the typical percentage change (annualized) observed in the REER data.

capital flows. It may also be that the share of the U.S. in trade with Ireland rises when trade in services is factored in. For example, exports of information technology and business services, which are likely to be heavily linked to multinational companies, constitute over one half of services exports. However, data on the direction of trade in services is not available to confirm this conjecture.

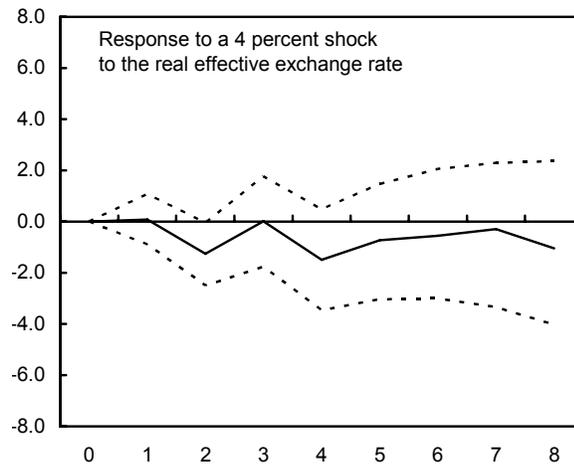


20. **In contrast, shocks to euro area and U.K. GDP have a strong contemporaneous impact on Irish GDP, but no significant effect thereafter.** In both cases, a one percent shock leads to a contemporaneous jump in Irish GDP of around 2 percentage points. Subsequently, however, the impulse responses cannot be statistically distinguished from zero, because of wide error bands. In the case of shocks to euro area GDP, the lower error band is very close to zero at a one and two quarter horizon, suggesting that the positive impact on Irish GDP could persist for up to two quarters before dissipating.



21. **Shocks to Irish GDP itself do not appear to be strongly propagated within the economy.** Following a contemporaneous one percent jump as the shock occurs, the impulse response falls to near zero after one quarter, then increases in the next quarter by about 0.4 percentage points before dissipating.

22. **Finally, adverse shocks to competitiveness significantly depress Irish GDP after a two quarter lag.** Up to one quarter following a shock to the REER, the impulse response is virtually zero. However, two quarters after a 4 percent shock Irish GDP declines by 1 percent, and there is a further dip in Irish GDP after 4 quarters which is close to being significant, suggesting that the effects could persist beyond the two quarter horizon. This view is lent support by the results of the variance decomposition, which shows the impact of shocks to competitiveness on Irish GDP increasing through the 8 quarter horizon.



#### D. Policy Implications and Concluding Remarks

23. **The results imply that the current slowdown in the U.S. economy carries a significant downside risk for Ireland.** U.S. growth in 2007 is projected to decline markedly, whereas euro area growth is expected decline only marginally, and U.K. growth is projected to pick up slightly. If downside risks to U.S. growth are realized, this is likely to have a significant adverse impact on Irish growth, since the impulse responses and variance decompositions suggest that shocks to the U.S. economy tend to have stronger effects on the Irish economy than those originating in other partner economies.

24. **Secondly, the past deterioration in Irish competitiveness may have a stronger adverse impact on Irish GDP over time than has been observed thus far.** The variance decompositions reveal that the impact of shocks to competitiveness on Irish GDP increases strongly at longer time horizons. This suggests that the past persistent increases in the REER could have a substantial negative impact on the Irish economy over a longer time horizon.

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## II. POLICY CHALLENGES OF POPULATION AGING IN IRELAND<sup>4</sup>

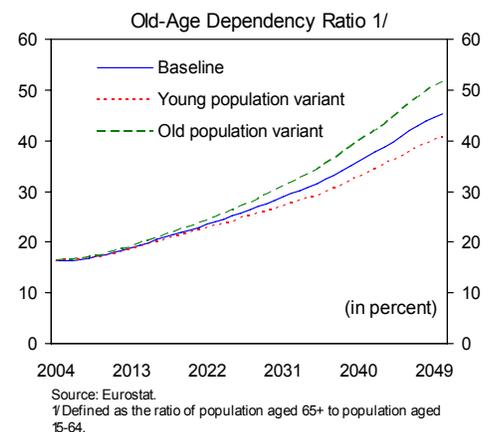
### A. Introduction

25. **Ireland will experience rapid population aging in the coming decades.** This demographic trend will put significant pressure on public finances. The European Commission’s Aging Working Group (AWG) projects that age-related spending would increase by 8 percentage points of GDP by 2050, with most of the increase accounted for by a rise in pension expenditure. In its 2006 report *Special Savings for Retirement*, the Pensions Board in Ireland proposed a substantial increase in the generosity of the pension system which, if endorsed by the government, would translate into an even steeper rise of age-related expenditure. At the same time, the expected decline of the population of working age in the long run could reduce the social security contributions base.

26. **This chapter attempts to assess the fiscal and macroeconomic implications of the projected increase in age-related spending.** To prevent a rapid build-up of debt, the rise in expenditure on pensions and health will need to be offset by a reduction of other public spending, substantial tax increases, and/or benefits reform. The IMF’s Global Fiscal Model is applied to quantify and compare the effects of alternative fiscal adjustment strategies on employment and growth.

### B. Demographic Trends and Fiscal Pressures

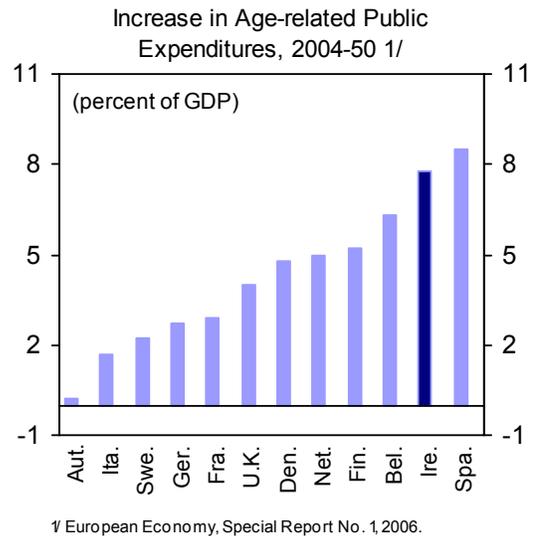
27. **The elderly dependency ratio in Ireland is expected to triple by 2050.** Based on Eurostat’s central projection<sup>5</sup>, the elderly dependency ratio would increase from 16 percent in 2006 to 45 percent in 2050. The population of working age is projected to begin declining gradually by mid-2030, although total population growth will remain positive until 2050. Under two alternative set of assumptions (“young population” and “old population”), the dependency ratio would increase to 41 percent and 52 percent respectively.



<sup>4</sup> Prepared by Dennis Botman (FAD) and Dora Iakova.

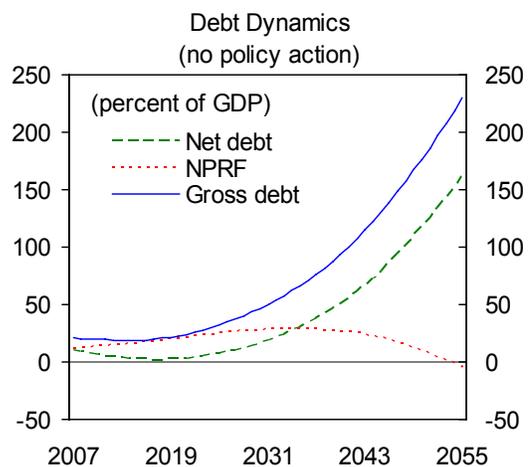
<sup>5</sup> The central projection assumes a mild decline in the birth rate from 1.98 to 1.8; an increase in average life expectancy by more than 6 years; and net migration inflows of 0.4 percent of the population annually in the medium term, declining to about ¼ percent of the population in the long term. The “younger population” projection assumes that the birth rate increases to 2, higher net migration flow, and lower increase in life expectancy than the central projection, while the “older population” version assumes that the birth rate declines to 1.6, lower migration, and higher life expectancy than in the central projection.

28. **These demographic trends would lead to a substantial rise in age-related expenditure.** In recent years Ireland's public pension system has become progressively more generous. The flat-rate pension value increased from 27 percent of gross average industrial earnings (GAIE) in 1997 to 34 percent of GAIE in 2007.<sup>6</sup> Assuming that the ratio of pension benefits to GAIE remains broadly at the 2007 level, the latest Stability Report projects that annual pension expenditure would increase by 6.5 percentage points of GDP between 2005 and 2050. Over the same period, health and long-term care expenditure is projected to increase by 2.6 percentage points of GDP. The rise in old-age spending is expected to be offset, in part, by a decline in education expenditure (of about 1 percent of GDP). These projections use the same methodology and assumptions as the European Commission's Aging Working Group (EC Special Report No 1, 2006). Even though Ireland has a less generous pension system than many EU countries, it will experience the second largest increase in age-related spending (see chart) since a number of other countries have recently introduced reforms that would reduce the effective benefit levels and remove incentives for early retirement.



29. **In the absence of fiscal adjustment, debt would grow to unsustainable levels.** The chart on the right illustrates the debt dynamics, taking as given the central AWG projections for age-related expenditure and assuming that all other revenue and expenditure stay constant as a share of GDP. The calculation makes the following assumptions:

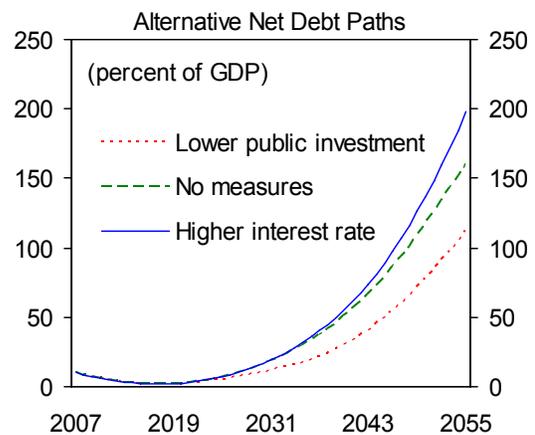
- The fiscal surplus gradually declines to zero by 2011 (since the stated medium-term goal is fiscal balance), the real interest rate is assumed to be 3 percent, and the real growth rate is the same as that assumed by the AWG (declining from about 5 percent in the near term to about 1½ percent in the long term).



<sup>6</sup> Ireland's pension system is a flat-rate benefit system, with most people above 65 (or 66) eligible for either a contributory or a non-contributory pension benefit. There is no formal indexation system.

- Based on announced government policy, the fiscal authorities are assumed to contribute 1 percent of GNP to the National Pensions Reserve Fund (NPRF) every year until 2055. The increase in the age-related spending is covered by debt issuance until 2025. After 2025, further rises in pension expenditure are financed by withdrawal from the NPRF, while the rise in other age-related expenditure is covered by debt issuance. Under such withdrawal assumptions, the NPRF would be exhausted shortly after 2050.
- Age-related expenditure as a ratio to GDP is assumed to stabilize after 2060 (with the increases in expenditure gradually declining to zero between 2050 and 2060). In the absence of reliable projections for the very long term, that will be the scenario used for the simulations in this paper.<sup>7</sup> In practice, it would be desirable to provide population projections and expenditure estimates of age-related spending over a horizon at least equal to the average life expectancy (similar to the practice of the US Social Security Board of Trustees).

30. **There is substantial uncertainty around this “no policy action” scenario.** On the upside, the assumption that all non-age-related expenditure would remain constant may be too pessimistic. Ireland is upgrading its infrastructure and currently maintains a relatively high level of public investment. It is reasonable to assume that eventually the investment rate will decline. The dotted line in the chart illustrates the level of net debt, assuming that public investment as a share of GDP gradually declines to the euro area average after 2020. On the downside, some of the assumptions underlying the age-related expenditure projections may be too optimistic. For example, the AWG projections assume a substantial increase in labor participation and employment rates, which may be unrealistic. The health care projections assume that per capita costs would grow at the same rate as wages, while the experience of many countries suggests that health care costs tend to grow faster than wages. Finally, it may be unrealistic to assume that the real interest rate on debt would remain at 3 percent as debt grows (especially if the process of simultaneous aging in many advanced economies leads to a shortage of savings and a rise of the worldwide risk-free rate). The solid line shows the accumulation of debt assuming that the real interest rate gradually increases from 3 to 5 percent.



<sup>7</sup> Such scenario would be equivalent to the outcome of a policy of automatic indexation of the retirement age to increases in the old-age dependency ratio beyond 2060.

31. **In practice, fiscal adjustment to address the rise in aging-related costs is likely to take place before debt rises to unsustainable levels.** In the analysis that follows, the macroeconomic effects of two strategies are compared. In the first strategy, fiscal consolidation is achieved by a gradual reduction in public investment after 2020, combined with an increase in social security contributions. In the second strategy, consolidation is achieved by a combination of measures: a gradual reduction in public investment, an increase of the retirement age, income tax base broadening, and an increase of the VAT tax rate. Finally, the desirability of greater prefunding of pension liabilities is discussed.

### C. Analytical Framework

32. **A two-country version of a dynamic general equilibrium macro model, calibrated to the Irish economy, is used to assess the macroeconomic impact of fiscal policy.** In the Global Fiscal Model (GFM), the effect of fiscal policy on real activity reflects responses from both aggregate demand and aggregate supply.<sup>8</sup> The model features the following departures from Ricardian equivalence:

- Consumers have finite horizons. As a result, even temporary changes in fiscal policy may affect consumption because any offsetting action required by the government's intertemporal budget constraint would be (in part) borne by future generations.
- A fraction of consumers are liquidity constrained. Liquidity-constrained consumers do not save and cannot borrow, and, therefore, any change in fiscal policy that affects their disposable income immediately changes their consumption as well.
- Taxes are distortionary, affecting labor supply and savings-investment patterns.

### D. The Effects of Alternative Adjustment Strategies

33. **In the simulations, it is assumed that the government aims to maintain the gross debt-to-GDP ratio close to its current level.** In the long term, this strategy is equivalent to maintaining a constant net debt-to-GDP ratio since, once the NPRF is exhausted, gross and net debt levels converge. Allowing debt to build up to a higher level before attempting to stabilize it is not inconsistent with sustainability, but the primary surplus (and the fiscal measures) necessary to support a higher debt level would be greater. In all scenarios, the maintained assumption is that the ratio of public investment to GDP will decline gradually to the euro area average after 2020 (a reduction of about 1½ percentage points of GDP).

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<sup>8</sup> See Botman and others (2006) for detailed description of the model, and Appendix I for the calibration for Ireland. Aggregate demand effects arise from the fact that consumers are impatient. Aggregate supply responses result from the distortionary effects of taxation.

34. **In the first strategy (“the baseline”), the social security contribution rates are increased gradually to keep gross debt broadly constant.**<sup>9</sup> Keeping gross debt constant would require a fiscal surplus of around  $\frac{1}{3}$  percent of GDP throughout the period. This can be achieved by raising the social security contribution rate by about 7 percentage points in the next 15 years. It can remain at that level until the NPRF runs out, since the rise in pension expenditure after 2025 is assumed to be financed from the NPRF (and the reduction in public investment after 2020 offsets the rise in health-related expenditure). After the NPRF is depleted, the social security rate needs to increase by about 20 points relative to its starting value (and even by more if age-related spending continues to rise after 2060).

35. **The increase in social security contribution rates would have a negative effect on labor supply.** Assuming labor elasticity to after-tax wages close to the middle of the range of existing estimates, labor supply would fall by  $3\frac{1}{2}$  percentage points due to the distortionary effects of labor taxes. In reality, labor supply could decline by more than that towards the end of the period, as the population of working age starts to shrink.<sup>10</sup> Despite the fall in labor supply, aggregate demand is likely to remain relatively high for most of the period. The reason is that after 2025, the increase in transfers to the population exceeds the increase in taxes as pension assets are distributed.

36. **In the second strategy, fiscal sustainability is achieved through a combination of measures.** Given the magnitude of the required increase of the social security contribution rate, it may not be feasible to rely only on this measure to achieve fiscal sustainability. In this alternative scenario, the combined effect of several measures is illustrated: a reduction in public investment of  $1\frac{1}{2}$  percentage points of GDP after 2020, an increase of the pension age by 2 years phased in gradually between 2033 and 2050 (it will affect those 40 years and younger in 2007), an income tax base broadening over the period 2021–24 (increasing revenues by about  $\frac{1}{4}$  percentage points of GDP), and a gradual increase in VAT to maintain gross debt broadly at its current level. In this scenario, the VAT rate would need to be raised by 4 percentage points by 2020, and by another 4 percentage points after the NPRF is exhausted.<sup>11</sup>

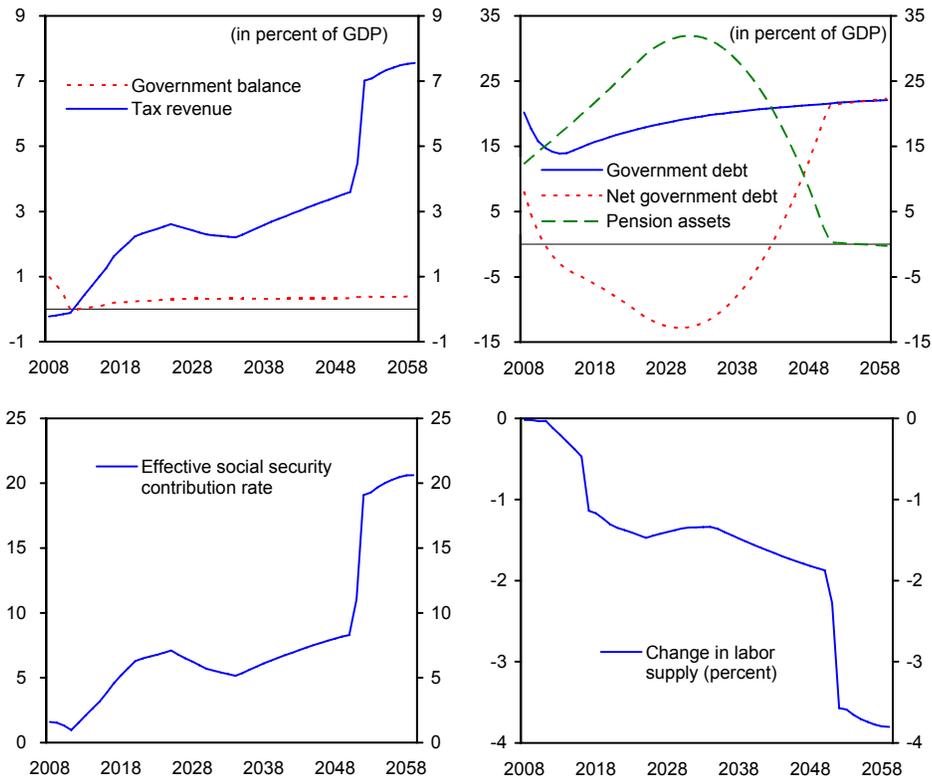
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<sup>9</sup> Even though in Ireland there is no requirement that the social security accounts should be balanced, raising the contribution rates to match, at least in part, the increase in outlays could be considered the default strategy.

<sup>10</sup> In the simulation it was assumed that the social security contributions levied on workers are increased. However, the growth effects would be the similar if the payroll taxes on employers were increased instead.

<sup>11</sup> The model allows for other taxes as well, including a tax on profits, although it is not included in the suggested package of measures. Capital is more internationally mobile than labor, so raising taxes on returns to capital could not only lower investment, but also lead to an exit of capital. The suggested package of measures is illustrative, and other options could be considered in practice, such as a higher increase of the retirement age and/or changes in other indirect taxes (property taxes for example).

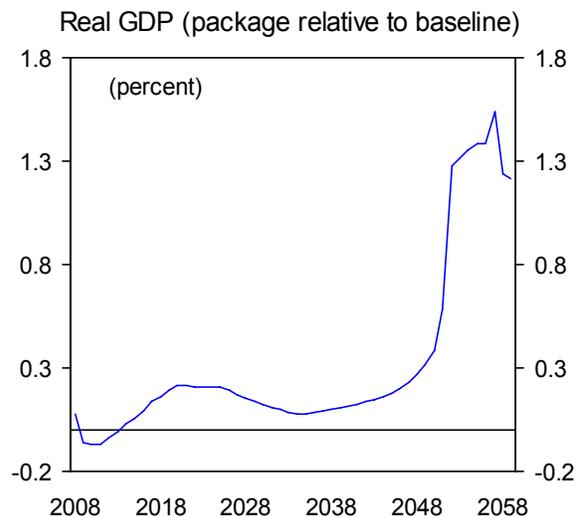
Strategy 1: Raising the Social Security Tax Rates



37. **Implementing this package of measures is more growth-friendly than raising the social security contributions.** The increase of the retirement age is equivalent to a reduction in (the lump sum) social security transfers.

As a result of budgetary savings from this measure, a smaller increase in distortionary taxes would be required. In addition, reducing income tax exemptions (tax base broadening) is less distortionary than raising the marginal tax rates. Similarly, the VAT is less distortionary than payroll taxes (social security contributions could be considered equivalent to a payroll tax) since it has a broader tax base—accumulated savings are also taxed—therefore the rates would not need to be increased as much. Shifting revenue from direct to indirect

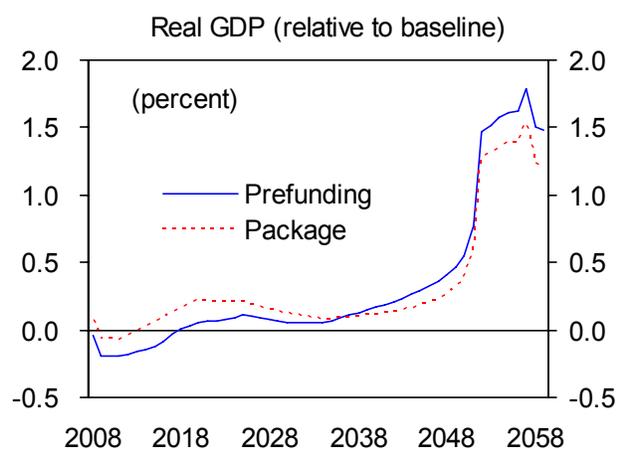
taxation is beneficial for employment and growth. Raising the VAT is especially appealing in an aging society where, while the direct tax base contracts, the indirect tax base is likely to be more stable. The chart on the right compares the growth effects of the package relative to



the baseline. The results are relatively robust to variations in the model assumptions (Appendix II).

38. **In general, policies that help raise productivity and labor participation would help ameliorate the growth effects of fiscal adjustment.** Such policies include increasing the flexibility of labor markets, ensuring greater competition in product markets, and encouraging investment in education and research (in addition to changes in the structure of taxation and raising the retirement age). Higher net migration flows (especially if the immigrants are relatively young) would increase GDP growth and could improve the fiscal position in the short run, but the effects would be temporary since the immigrants would also age.<sup>12</sup>

39. **Greater prefunding of age-related liabilities could also be considered.** It can be implemented either by adding more than 1 percent of GNP to the NPRF or by a reduction of gross debt. These two options are equivalent if the interest rate on debt is the same as the rate of earnings on the pension assets, although accumulating assets may be preferable to gross debt reduction from a political economy perspective. Higher prefunding may be desirable for a number of reasons. First, intergenerational equity could improve. A pay-as-you-go system results in a falling ratio of benefits to contributions as the elderly dependency ratio starts to rise. Second, aging will occur simultaneously in many countries, which may result in an increase of the world interest rate.<sup>13</sup> If that happens, having a lower public debt (or higher net assets) would be even more beneficial. Lower debt would also lead to a smaller crowding out effect. Finally, greater prefunding serves as insurance in case the actual increase in age-related spending is higher than projected.



Prefunding would result in some output loss in the short run (since taxes would be initially higher than in the absence of prefunding), but in the long run output would be higher than otherwise. For example, if the fiscal surplus is maintained at its current level (about 1 percent of GDP) until 2050, net debt would be close to zero at that horizon and fiscal balance can be

<sup>12</sup> See Fehr and others (2004) and Iakova (2007).

<sup>13</sup> Ford and Laxton (1999) find that 12.5 percent increase in debt in the OECD raises the real interest rate by 100 basis points. Botman and Kumar (2007) illustrate the effect of global aging pressures on an individual country's debt dynamics.

maintained thereafter. See the chart for the growth effects of that strategy relative to the package of measures discussed earlier (resulting in a surplus of 1/3 percent of GDP).

### E. Pension Board Proposals

40. **The Pensions Board recently has proposed expanding the generosity of the pension system.** The Pensions Board (which consists of representatives of all social partners) has identified as an issue the fact that a substantial fraction of the Irish population does not have private retirement savings and therefore relies entirely on the public pension system, which may not provide sufficient means for retirement. In a 2006 report, the Pensions Board has proposed to address this issue either by (i) increasing the generosity of the public pension system,<sup>14</sup> (ii) creating a compulsory private pension system with some government involvement or, (iii) a combination of the two.

41. **The generosity of the public pension system is a matter of social preference, however, the fiscal and growth implications of changes to the system need to be considered carefully.** The average replacement rates in Ireland are higher than those in the United Kingdom, but lower than in some continental European countries. The thinking behind the current system in Ireland is that the key role of the public pension system is poverty prevention, while the responsibility to ensure a desirable (higher) level of income after retirement is borne by the individual. Some of the Pension Board proposals, if implemented, would change the nature of the public pension system to one that attempts to ensure a desirable level of income. Depending on the degree of public funding, the expansion of the pension system could have negative effects on the fiscal position and growth greater than the effects discussed in the above analysis.<sup>15</sup> Many continental European countries, which aimed to provide a desirable level of income, have recently implemented politically difficult reforms to curtail the generosity of their pension systems.

### F. Conclusions

42. **Looking forward, a key policy challenge will be to balance social priorities with the need to maintain a competitive and vibrant economy.** The main findings of this analysis are the following:

- Substantial fiscal measures will be required to prevent a build-up of debt as age-related spending rises. If the increase in expenditure is matched mainly by a rise in social security contributions, a very large increase of the contribution rate would be necessary. A rise in the tax burden of that magnitude would have a negative impact

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<sup>14</sup> The proposed goal is to increase the flat rate pension from 34 percent of GAIE to 50 percent of GAIE.

<sup>15</sup> See the analysis of ESRI and Fitzpatrick Associates in Appendices A and B of Pensions Board (2006).

on labor supply. The model simulations suggest that using a package of measures, including an increase of the retirement age, could be a more growth-friendly strategy.

- Ireland has the advantage of starting from a healthy fiscal position. Careful planning could help ameliorate the long-term fiscal pressures. For example, targeting a small fiscal surplus (as opposed to balance) in the medium term would reduce the magnitude of the required adjustment in the long term. To safeguard fiscal saving, an increase in the annual contribution to the NPRF could be considered.
- The regular publication of a sustainability report, detailing the long-term fiscal projections, the risks around them, and possible measures to address the fiscal effects of aging, could be beneficial.<sup>16</sup> It could inform public opinion, provide a vehicle for early discussion of the costs and benefits of various fiscal measures and reform options, and help overcome any bias towards short-term planning.

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<sup>16</sup> While Ireland's annual Stability Program already includes long-term projections, a more detailed report could discuss the risks around the projections, possible policy measures to address long-term fiscal pressures, and the appropriate medium-term fiscal target.

## Appendix I. Parameterization of the Model

The model is parameterized to reflect key macroeconomic features of Ireland. In particular, the ratios of consumption, investment, government spending, wage income, and income from capital relative to GDP are set to their values in 2006. Similarly, key fiscal variables—revenue-to-GDP ratios from taxation of corporate, labor, and personal income and from consumption tax, as well as government debt and current government spending—have been calibrated to Ireland’s fiscal structure. The size of the Irish economy relative to the world economy is such that Irish policies would have only a minimal impact on the global rate of interest.

Key behavioral parameters are based on microeconomic evidence.<sup>17</sup> These include parameters characterizing real rigidities in investment, markups for firms and workers, the elasticity of labor supply to after-tax wages, the elasticity of substitution between labor and capital, the elasticity of intertemporal substitution, and the rate of time preference. Simulations examine the impact of changing the values of the following key parameters:

- **The wedge between the rate of time preference and the yield on government bonds.** This parameter, which determines consumers’ degree of impatience, has not been subject to extensive microeconomic analysis. The baseline value of the wedge is set to 10 percent (corresponding to a planning horizon of 10 years), with an alternative simulation using 1 percent, corresponding to a planning horizon of 100 years.
- **The fraction of liquidity-constrained consumers.** The baseline assumes that 40 percent of consumers experience liquidity constraints. These consumers have no wealth and consume one-fourth of aggregate consumption. An alternative simulation assumes that 10 percent of individuals are liquidity constrained.
- **The sensitivity of labor supply to the real after-tax wage (Frisch elasticity).** The baseline value (-0.1) suggests relatively elastic labor supply. An alternative simulation assumes almost completely inelastic labor supply (-0.01).
- **The elasticity of intertemporal substitution.** The baseline value for this parameter, which describes the sensitivity of consumption to changes in the real interest rate, is -0.33. The parameter value in the alternative simulation (-0.25) is consistent with the lower end of microeconomic estimates.

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<sup>17</sup> The structural parameters have been calibrated using evidence from Laxton and Pesenti (2003) and Batini, N’Diaye, and Rebucci (2005).

Other main aspects of the model are as follows:

- Consumption and production are characterized by constant elasticity of substitution functions. Firms and workers have some market power, so that prices and wages are above their perfectly competitive levels.
- The presence of traded and nontraded goods allows for a bias toward domestic goods in private or government consumption.
- There are two factors of production—capital and labor—that are used to produce traded and nontraded goods. Capital and labor can move freely between sectors but are not mobile internationally.
- Investment is driven by Tobin's  $Q$  with adjustment costs. Firms respond sluggishly to differences between the discounted value of future profits and the market value of the capital stock.
- Wages and prices are fully flexible. As a result, monetary policy is ineffective.

There are two kinds of financial assets, government debt (traded internationally) and equity (held domestically). In the standard version of the GFM, international trade in government debt implies the equalization of nominal interest rates across countries as capital markets are fully integrated. Alternatively, however, the model can be specified such that it contains a risk premium that depends on the level of public debt.

## Appendix II. Sensitivity Analysis

The results for the growth effects of the package of measures versus the baseline are relatively robust to variation in the model assumptions (Table A1). Only if labor supply is inelastic, there will be little difference between the two strategies, since raising social security contributions will not cause significant changes in labor supply. Consumption smoothing is more important with a lower intertemporal elasticity of substitution, therefore payroll taxes distort the labor-leisure choice by less in this case, reducing the beneficial effects of the adjustment package modestly. A longer planning horizon and/or fewer rule-of-thumb consumers, in principle, make the model more Ricardian and reduce the crowding-out effects associated with higher debt. However, since net debt changes broadly by the same amount in the two strategies, changing the horizon does not affect the significantly the relative benefits.<sup>18</sup>

Table A1. Sensitivity Analysis  
(Deviation of real GDP from baseline in NPV terms) 1/

	Package
Baseline parameter values 2/	9.3
Longer planning horizon 3/	10.4
Fewer rule-of-thumb consumers 4/	9.2
Less elastic labor supply 5/	2.1
Lower intertemporal elasticity of substitution 6/	5.3

Source: GFM simulations.

1/ Baseline increases social security contributions on workers and employers; sum of discounted deviations of real GDP from adjusting through a package or prefunding relative to the baseline; discount rate equal to market interest rate as determined in the model simulations.

2/ Planning horizon: 10 years; fraction of rule-of-thumb consumers equal to 40 percent; moderately elastic labor supply ( $\eta = 0.90$ ); and intertemporal elasticity of substitution equal to 1/3.

3/ Planning horizon equal to 100 years.

4/ Rule-of-thumb consumers equal to 10 percent.

5/ Inelastic labor supply ( $\eta = 0.99$ ).

6/ Intertemporal elasticity of substitution equal to 0.25.

<sup>18</sup> In fact, the small improvement of the performance of the package with a longer planning horizon comes from the accumulation of assets in the economy (as the marginal propensity to consume of optimizing consumers declines), which makes the VAT less distortionary as a larger share of the tax falls on wealth.

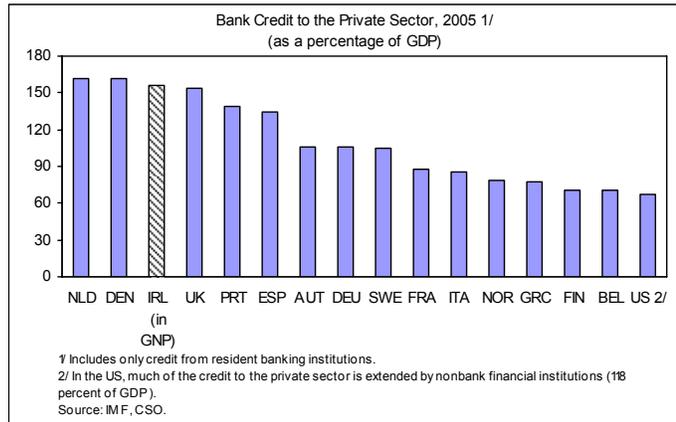
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### III. EFFICIENCY GAINS OF PRIVATE SECTOR CREDIT GROWTH IN IRELAND<sup>19</sup>

#### A. Introduction

43. **Ireland has experienced very rapid credit growth in recent years.** Household debt as a percentage of GNP increased from about 35 percent in 1995 to about 90 percent in 2006, while bank credit to the corporate sector has shown similar increase during the period, rising from under 30 percent of GNP to about 90 percent of GNP. In level terms, Ireland's private-sector indebtedness is among the highest in advanced economies.



44. **Against this backdrop, a key challenge for Ireland is to ensure that credit expansion yields the**

**greatest possible benefits.** By drawing on the experience of advanced economies, this paper attempts to shed light on the conditions under which credit growth would be most beneficial to the economy. The effects of finance on the real economy have been extensively investigated in the literature. However, most of the studies focus on the *unconditional* economic desirability of financial deepening. This paper, by contrast, explores specifically whether the type of financial system and the degree of labor market flexibility are important determinants of the economic value of increases in private-sector credit.

45. **This paper focuses on the channels through which finance benefits the economy**—rather than the simple correlation between finance and macroeconomic performance. Macroeconomic analyses are often susceptible to biases arising from omitted variables and reverse causality. To circumvent such statistical difficulties, this paper utilizes industry-level information and examines the mechanisms that underlie finance's contribution to the economy. In terms of econometric implementation, a panel setting is used for the regression exercise, as with many macroeconomic analyses; but here, cross-industry data instead of time-series data are used to supplement the cross-country information.

46. **While Ireland is not included in the cross-country study due to data limitations,<sup>20</sup> the policy conclusions that follow from the study are relevant for Ireland.**

<sup>19</sup> Prepared by M.-K. Tang.

<sup>20</sup> Some data on the measures of financial liabilities and of the financial system used in the study are not available for Ireland. More on the data issues is discussed below. The countries in the sample are Australia,

(continued...)

In particular, statistical analysis suggests that Ireland's experience is similar to the experiences of the countries included in the sample.

## B. Cross-Country Study<sup>21</sup>

### Channels through which finance benefits the economy

47. **General reduction in costs of external finance.** Owing to agency problems such as information asymmetry and moral hazard, firms tend to face a much higher cost of raising funds from outsiders than of making use of internal funds. To the extent that internal funds are typically insufficient to fully support firms' need for investment, firms' growth is often inhibited by the difficulty of raising external finance. Increased availability of finance should therefore promote firms' growth, if it implies less costly access to external finance by firms.

- **A test of this channel exploits the fact that different industries display different degrees of natural dependence on external finance.** How much external finance a firm would need depends on, among other things, industry-specific technological factors. For instance, firms in the chemicals industry tend to be more reliant on external finance than firms in the printing industry because the chemicals industry has a greater investment intensity and the realization of cash flows generated by its investment is less immediate. Some industries are therefore naturally more financially challenged than the others, and their development is likely to be more heavily determined by the external financial environment. A general reduction in costs of external finance should hence result in a higher increase in the relative growth of those more reliant industries.<sup>22</sup>

48. **Improvement in resource allocation.** Increased availability of borrowed funds may allow firms easier access to liquidity and fetch a higher liquidation value in case of default, hence lowering the insolvency risks and costs of default faced by investors. This may prompt investors to reduce their risk-hedging motive and more readily pursue projects with high expected returns, leading to more resources being directed to where they can create the most value.

- **One way to assess this channel is to examine the development of a country's rising industries relative to its waning ones.** In a more frictionless environment,

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Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Italy, Netherlands, Norway, Portugal, Spain, Sweden, U.S., and U.K.

<sup>21</sup> See Tang (2007) for more detailed discussion of the hypotheses and results of the study.

<sup>22</sup> See Rajan and Zingales (1998) for more discussion on this argument.

resources should more freely flow to “where there is most to be made of [them], as water runs to find its level” (Bagehot, 1873). More resources should hence get drawn to rising industries with better business opportunities, helping them to capitalize on favorable technological and market factors and to develop. At the same time, resources should also be more readily released from waning industries so as not to retard their natural decline.<sup>23</sup>

### **Under what conditions may the channels work more effectively?**

49. ***Type of financial system.*** The way credit is intermediated matters for how economic profits are shared between creditors and borrowers, and how financial claims are engineered and distributed. These in turn would affect where resources are directed and what they are used for.

- **Financial systems can be generally classified by the extent to which transactions are conducted at arm’s length.**<sup>24</sup> We use the financial index described in the September 2006 *World Economic Outlook* (IMF, 2006) as our specific measure of a financial system’s arm’s length content. The index comprehensively summarizes information on the banking sector, non-bank intermediation, and capital markets. In practice, a higher score on the financial index means, among other things, a higher degree of competition in the banking sector, more extensive use of financial innovations, and more developed capital markets.<sup>25</sup>

50. ***Degree of labor market flexibility.*** To the extent that marginal returns of financial capital invested in an industry depends on the amount of labor employed there, immobile labor may distort the destination and use of financial capital away from what would otherwise be efficient. The measure of labor market flexibility adopted here is the negative of the log of the employment rigidity index taken from *World Bank’s Doing Business 2003* edition.<sup>26</sup> It quantifies the difficulties faced by employers of hiring workers, firing workers,

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<sup>23</sup> For the study, whether an industry is considered rising or waning depends on how fast it grew in the preceding period (1987–95).

<sup>24</sup> Conceptually, a more arm’s length-based financial system is one in which transactions are less driven by long-standing relationships, information tends to be diffusely distributed but effectively aggregated by markets, financial claims are priced competitively, risks are more widely shared, and contracts are more easily enforced through the judicial system.

<sup>25</sup> See IMF (2006) for a more detailed discussion on the construction of the index.

<sup>26</sup> See <http://www.doingbusiness.org/MethodologySurveys/EmployingWorkers.aspx> for the survey questions and construction of the index.

and lengthening/shortening workers' work hours. A higher score on the measure refers to a more flexible labor market.

51. **Both country-level and industry-level data are used in the study.** Industry-level data on value-added and labor productivity are based on 56 2-digit industries (including services) in each of the 17 sample countries during 1987–95 (control period) and 1995-2003 (sample period). The main country-level data used include those on the non-financial private-sector financial liabilities, which include all loans and securities liabilities other than shares, and on the measures of arm's length content of the financial system and labor market flexibility mentioned above. Country-level changes in real interest rates are also included in the regressions as a control. In addition, country and industry dummies are added to take account of effects of any unobserved fixed factors.

## Results

52. **Results from the cross-country study suggests that the two channels work better where the financial system has a greater arm's length content and where the labor market is more flexible.**

- The effects of increase in corporate credit on the relative growth of industries dependent on external finance are more positive when a country has a more arm's length-based financial system (Table III.1, regression 2), and a more flexible labor market (Table III.2, regression 3).
- Likewise, increase in corporate credit appears to lead to faster growth of rising industries relative to the waning ones when the financial system has a greater arm's length content (Table III.2, regression 2), and the labor market is more flexible (Table III.2, regression 3).<sup>27</sup>

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<sup>27</sup> Similar results obtain when the dependent variable is replaced with labor productivity growth.

Table III.1. Relative Performance of Industries Dependent on External Finance  
Dependent Variable: Industry Value-Added Growth in 1995-2003

<i>Liabilities Measure</i>	1		2		3	
	Total Priv Sector Liabilities		Corporate Liabilities		Corporate Liabilities	
	<i>Coef est.</i>	<i>t-stat.</i>	<i>Coef est.</i>	<i>t-stat.</i>	<i>Coef est.</i>	<i>t-stat.</i>
Dependence on External Finance						
* Financial Index* Change in Liab to GDP	1.35	4.04 ***	2.24	3.93 ***		
Dependence on External Finance						
* Labor Mkt Flexibility* Change in Liab to GDP					0.18	3.54 ***
Dependence on External Finance						
* Change in Liab to GDP	-0.49	-3.42 ***	-0.88	-3.45 ***	0.60	3.82 ***
Dependence on External Finance						
* Financial Index	-0.03	-2.36 **	-0.01	-0.98		
Dependence on External Finance						
* Labor Mkt Flexibility					0.00	0.58
Dependence on External Finance						
* Change in Real Short-term Interest Rate	-0.27	-2.20 **	-0.28	-2.58 **	-0.29	-2.91 ***
Dependence on External Finance						
* Change in Real Long-term Interest Rate	0.23	2.13 **	0.23	2.72 **	0.25	3.24 ***
Growth in 1987-1995	0.02	0.24	0.02	0.19	0.02	0.24
Country fixed effects	Y		Y		Y	
Industry fixed effects	Y		Y		Y	
# Observations	355		355		355	
R-sq.	0.63		0.63		0.63	

The t-statistics are based on robust standard errors clustered by country

\*, \*\*, \*\*\* denote statistical significance at 10%, 5% and 1% level, respectively

Table III.2. Relative Performance of Rising Industries  
Dependent Variable: Industry Value-Added Growth in 1995-2003

<i>Liabilities Measure</i>	1		2		3	
	Total Priv Sector Liabilities		Corporate Liabilities		Corporate Liabilities	
	<i>Coef est.</i>	<i>t-stat.</i>	<i>Coef est.</i>	<i>t-stat.</i>	<i>Coef est.</i>	<i>t-stat.</i>
Growth in 1987-1995						
* Financial Index* Change in Liab to GDP	16.29	0.41	93.39	2.46 **		
Growth in 1987-1995						
* Labor Mkt Flexibility* Change in Liab to GDP					10.57	4.07 ***
Growth in 1987-1995						
* Change in Liab to GDP	-1.18	-0.08	-27.84	-1.79	45.09	5.60 ***
Growth in 1987-1995						
* Financial Index	0.41	0.27	0.37	0.55		
Growth in 1987-1995						
* Labor Mkt Flexibility					0.03	0.51
Growth in 1987-1995						
* Change in Real Short-term Interest Rate	-10.71	-1.55	-7.90	-1.39	-6.72	-1.59
Growth in 1987-1995						
* Change in Real Long-term Interest Rate	7.96	1.55	0.85	0.20	0.40	0.12
Growth in 1987-1995						
* Change in Real Long-term Interest Rate	-0.44	-0.77	-0.44	-1.21	-0.16	-1.26
Productivity Growth in 1987-1995						
Country fixed effects	Y		Y		Y	
Industry fixed effects	Y		Y		Y	
# Observations	471		471		471	
R-sq.	0.74		0.75		0.75	

The t-statistics are based on robust standard errors clustered by country

\*, \*\*, \*\*\* denote statistical significance at 10%, 5% and 1% level, respectively

53. **Moreover, the relative magnitudes of the coefficient estimates suggest that the working of the channels at the industry-level is mainly associated with increase in corporate credit, rather than household credit** (comparing regressions 1 and 2 in Tables III.1 and 2). This finding indicates that increased household leverage contributes little to the type of efficiency gains examined in the study. The fact that the effects on industries' relative performance appear to be driven by availability of finance to the corporates—rather than by unobserved factors that are merely correlated with borrowing by both the corporates and the households—also gives support to the premises of the tests and reaffirm their validity.

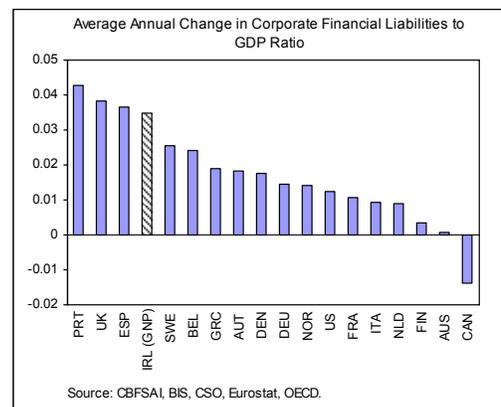
### C. Is the Cross-Country Study Relevant for Ireland?

54. **The implications of the cross-country study are likely to be relevant for Ireland if its industries behave in a way similar to what is implied by the sample countries' experiences.** To check if it is the case, we first make certain assumptions on the values for the variables for which Ireland does not have complete published data. We then compute for Ireland the implied “residuals” based on the assumed variable values and the coefficient estimates from the cross-country study, and test if the distributions of the implied “residuals” are significantly different from those for the sample countries' residuals.

55. **Results of statistical tests indeed confirm that the effects of increase in corporate credit on Ireland's industries are broadly similar to those in the sample countries.** In other words, the sample countries' experiences summarized by the cross-country study are likely to be relevant for Ireland.

#### How does Ireland compare to the sample countries?

56. **Corporate-sector financial liabilities as a share of GNP is assumed to increase by roughly 3.5 percentage points per year in Ireland during the sample period.**<sup>28</sup> Data on the balance sheet of the corporate sector in Ireland are not available. Accordingly, we use the change in the outstanding bank loans accumulated by Ireland's corporate sector to proxy for the change in their financial liabilities.<sup>29</sup>

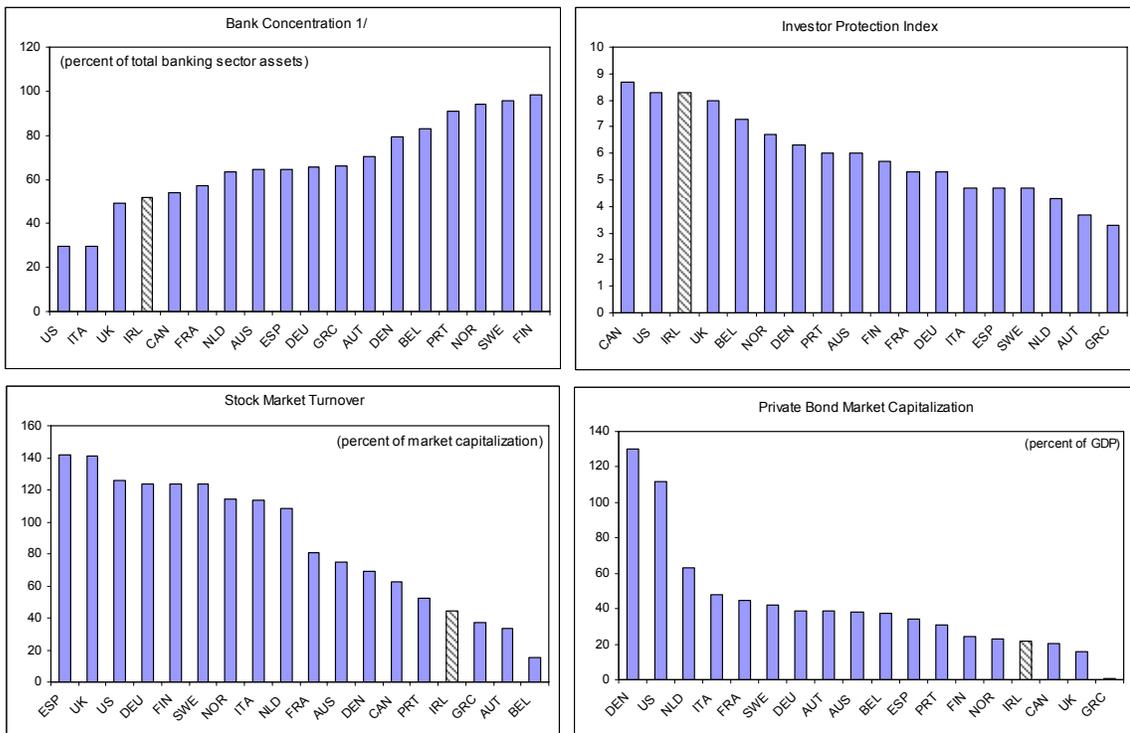


<sup>28</sup> Corporate financial liabilities in Ireland are expressed in terms of GNP to increase their comparability with other countries' corporate financial liabilities, which are expressed in terms of GDP.

<sup>29</sup> The outstanding bank loans include loans issued by both resident and non-resident credit institutions.

57. **For the measure on the arm’s length content of the financial system, Ireland ranks about 7<sup>th</sup> among the sample countries based on the subcategories of the measure for which data are available.** Due to data limitation, direct comparison between Ireland and the sample countries can be made in only 19 out of a total of 28 subcategories used to construct the financial index. Ireland scores well in subcategories such as bank concentration and investor protection. At the same time, it seems to lag behind its peers in terms of capital market development, as suggested by its low rank on stock market turnover and private bond market capitalization.<sup>30</sup> Overall, the financial index value we assume for Ireland is derived from what is implied by Ireland’s ranking (7<sup>th</sup>).

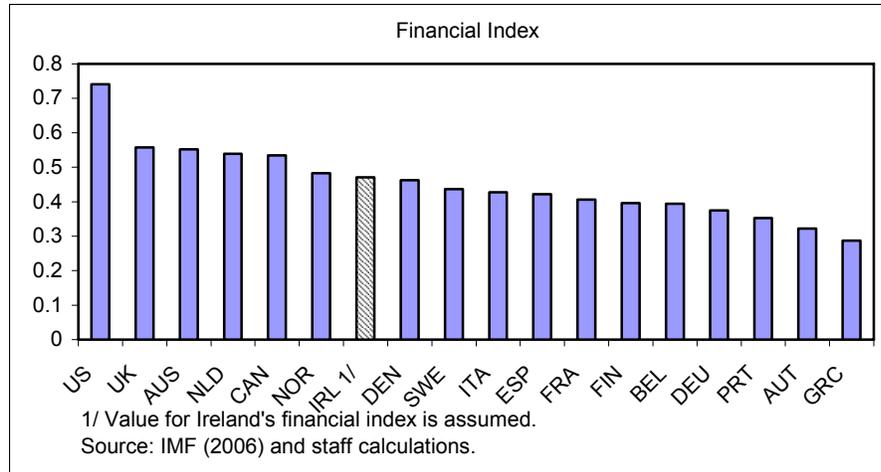
Select Subcategories of Financial Index, 2004



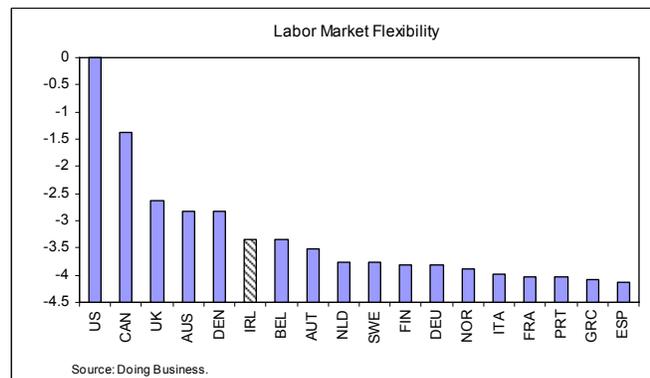
<sup>1/</sup>Share of bank assets owned by the three largest banks

Sources: Doing Business, Beck, Demirguc-Kunt, and Levine: A New Database on Financial Development and Structure

<sup>30</sup> See Appendix for how Ireland compares in the other subcategories.



58. **Ireland has a relatively flexible labor market.** The World Bank publishes an employment rigidity index—from which our labor market flexibility variable is derived—for Ireland as well as for the sample countries. While the labor market in Ireland ranks 6<sup>th</sup> on flexibility, it is considerably more rigid than in the U.S., Canada and the U.K.



### Statistical distribution of Ireland's "residuals"

59. **Overall, the implied "residuals" for Ireland do not appear to be different than the residuals for the sample countries.** Taking into account that FDI firms may rely more on their parents' finance and less on bank credit, we exclude the implied "residuals" for the industries in Ireland that have heavy FDI presence (chemicals, communications, and computer and related activities) when we pair-wise compare the distribution of Ireland's "residuals" with that of a sample country's for each of the 17 sample countries for each of the four main regressions (Table III.1, regressions 2–3, and Table III.2, regressions 2–3).<sup>31</sup> Even

<sup>31</sup> Results preserve if we also exclude the implied "residuals" for Ireland's property-related industries (construction and real estate activities).

at 10 percent significance level, the (two-sample) Kolmogorov-Smirnov test rejects the null of identical distribution in only 6 out of a total of 68 cases.<sup>32</sup>

60. **Furthermore, the implied “residuals” appear to be normally distributed.** For none of the four sets of implied “residuals” (excluding those for Ireland’s FDI-heavy industries) does the Shapiro-Francia normality test reject the null of normal distribution.

#### **D. Policy Implications for Ireland**

61. **Cross-country analysis suggests that economies with financial systems that rely more on arm’s length transactions and greater labor market flexibility derive larger benefits from the increased availability of corporate finance.** This implications for Ireland are as follows:

- While the arm’s length content of Ireland’s financial system is already high, it is important to maintain efforts in areas where it does well (e.g., bank concentration, investor protection, and corporate transparency).
- At the same time, further development of securities markets and stronger bank competition for SME business could be desirable. For example, a reduction in the stamp duty on securities transactions (which currently stands at 1 percent, one of the highest among EU countries) may boost not only the stock market’s currently low turnover, but also its capitalization as increased market liquidity would make securities issuance more attractive. In addition, the small number of banks with which a typical Irish firm maintains relationships signals that competition among banks for SME business might be an issue. In this regard, the recent introduction by the Irish Banking Federation of a voluntary code of practice on account switching for SMEs and the Financial Regulator’s recent launch of a cost survey of business accounts are welcome steps.
- Maintaining the flexibility of the labor market is also important. Ireland’s labor market is relatively flexible, but there are some signs that rigidities are increasing. For example, many companies have raised concerns about how labor legislation has increased over the years (Forfas, 2007). Also, the National Competitiveness Council reports that labor market regulations are increasingly impacting business activities in Ireland, although the effects are not yet considered important.

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<sup>32</sup> Distributions of the “residuals” for Ireland are significantly (at 10 percent level) different than those of residuals for Denmark, Finland, Greece and the Netherlands for regression 3 in Table III.1, and for Austria and Italy for regression 3 in Table III.2.

Table A1: Ireland's Rankings in Subcategories of Financial Index

Categories/subcategories	Ireland's ranking among 18 countries 1/
<b>Traditional Banking Intermediation</b>	
Interest spread	1
Share of bank assets in top 3 banks	4
Share of bank assets held by foreign banks	5
Average number of bank relationships maintained by firms	15
Credit information index	8
Public registry coverage	8
Public bureau coverage	1
Number of items reported in firms' public statements	6
Stock price synchronicity	3
<b>New Financial Intermediation</b>	
Asset-backed securities, gross issuance	10
Venture capital investment	13
Average daily turnover in foreign exchange and interest rate derivatives	8
<b>Financial Markets</b>	
Number of procedures involved in lawsuits	8
Time of procedures in lawsuits	11
Cost of going through court procedures	18
Investor protection index	2
Number of listed companies per person	10
Stock market turnover as a share of market capitalization	15
Private bond market capitalization	15

1/ Countries include Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Italy, Netherlands, Norway, Portugal, Spain, Sweden, U.S., and U.K.

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