

QUARTERLY ECONOMIC COMMENTARY

Spring 2008

**ALAN BARRETT
IDE KEARNEY
MARTIN O'BRIEN**

*The forecasts in this Commentary are based
on data available by end-February 2008*

Special Article

**The Decline of the Computer Hardware Sector:
How Ireland Adjusted**

by

Frank Barry and Chris Van Egeraat

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As part of the remit of the *Quarterly Economic Commentary*, articles on various aspects of the Irish economy and Irish economic policy are regularly published along with the forecasts and commentary. Authors are invited to submit papers for consideration to either of the *QEC*'s co-editors, Alan Barrett and Ide Kearney at: ESRI, Whitaker Square, Sir John Rogerson's Quay, Dublin 2 (e-mail Alan.Barrett@esri.ie or I.Kearney@planet.nl). The following guidelines should be followed:

All articles should be up-to-date and policy-oriented. The content should involve the application of economic theory, data analysis or the application of lessons from the international literature. Review articles are also welcome where lessons for policy are explicitly addressed. Articles should normally comprise 4-10,000 words, excluding tables. All articles will be anonymously refereed by members of the editorial board or by an external referee chosen by the editors. The editors may also, where appropriate, seek the comments of policy experts outside of the academic community.

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Frank Barry and Chris Van Egeraat

SUMMARY TABLE

	2006	2007	2008	2009
OUTPUT				
(Real Annual Growth %)				
Private Consumer Expenditure	5.7	6.5	3.0	3.3
Public Net Current Expenditure	5.3	5.0	4.0	3.5
Investment	3.1	1.5	-7.4	0.0
Exports	4.4	6.6	5.4	5.7
Imports	4.4	6.0	4.0	5.3
Gross Domestic Product (GDP)	5.7	4.9	1.8	3.1
Gross National Product (GNP)	6.5	4.6	1.6	3.0
GNP per capita (constant prices)	3.8	2.0	0.3	1.9
PRICES				
(Annual Growth %)				
Harmonised Index of Consumer Prices (HICP)	2.7	2.9	2.9	2.5
Consumer Price Index (CPI)	4.0	4.9	3.4	2.2
Wage Growth	4.9	5.5	4.0	3.5
LABOUR MARKET				
Employment Levels (ILO basis (000s))	2,039	2,100	2,099	2,123
Unemployment Levels (ILO basis (000s))	93	102	135	141
Unemployment Rate (as % of Labour Force)	4.4	4.6	6.0	6.2
PUBLIC FINANCE				
Exchequer Balance (€m)	2,264	-1,619	-5,339	-7,524
General Government Balance (€m)	5,107	904	-2,319	-4,110
General Government Balance (% of GDP)	2.9	0.5	-1.2	-2.0
General Government Debt (% of GDP)	25.1	25.3	27.2	29.6
EXTERNAL TRADE				
Balance of Payments Current Account (€m)	-7,271	-8,834	-8,337	-8,669
Current Account (% of GNP)	-4.9	-5.6	-5.1	-5.0
EXCHANGE AND INTEREST RATES (end of year)				
US\$/€ Exchange Rate	1.32	1.43	1.51	1.50
STG£/€ Exchange Rate	0.67	0.70	0.76	0.76
Main ECB Interest Rate	3.50	4.00	3.75	3.75

SUMMARY

It has been evident for some time that 2008 was likely to be a year of slow economic growth. The leading indicators for house building that emerged last year suggested that this sector would contract in 2008. The absence of an SSIA effect also pointed to lower consumption growth in 2008. In the more recent weeks and months, most of the international developments are such that they will have the effect of compounding the difficulties that the economy is facing this year. Among these developments are the appreciation of the euro, the slowing in economic growth in the United States and the on-going difficulties in international financial markets.

For 2008, we now expect GNP to grow by 1.6 per cent in volume terms and for GDP to grow by 1.8 per cent. Much of the slowdown in growth is related to an anticipated contraction in investment of 7.4 per cent in 2008. This is due, in turn, to a contraction in housing investment of about 30 per cent. Consumption is expected to grow by 3 per cent in 2008, well down on the figure estimated for 2007 of 6.5 per cent.

As a result of the slower pace of economic growth, there is expected to be no net employment growth in 2008. The rate of unemployment is forecast to increase to 6 per cent. The public finances are expected to move further into deficit. We now anticipate a General Government deficit of 1.2 per cent of GDP, above the Government's Budget Day forecast of 0.9 per cent of GDP.

For 2009, we expect a modest recovery. Against a background of an improving international climate and with the easing in the contraction in house building, we expect GNP to grow by 3 per cent and for GDP to grow by 3.1 per cent. The contraction in investment in 2008 will no longer be present. Consumption is forecast to grow by 3.3 per cent and export growth is anticipated to increase to 5.7 per cent.

This recovery will lead to a resumption of employment growth. We expect to see an extra net 24,000 jobs created in 2009. However, the rate of unemployment will continue to increase in 2009 and will reach 6.2 per cent. For both 2008 and 2009, our forecasts are based on a rapid slowdown in inward migration. The deterioration in the public finances is expected to continue in 2009, in spite of the recovery, with the General Government deficit forecast to reach 2 per cent of GDP.

On inflation, we expect to see an easing in the rate of *CPI* inflation in 2008 and 2009 due largely to a more benign interest rate environment. *CPI* inflation is forecast to average 3.4 per cent in 2008 and 2.2 per cent in 2009 while *HICP* inflation is forecast to average 2.9 per cent in 2008 and 2.5 per cent in 2009. The easing in *HICP* inflation between 2008 and 2009 is partly related to an anticipated easing in wage pressures as a result of a weakening in the labour market.

In the *General Assessment*, we draw attention to two issues. First, we note again the deterioration in the public finances and suggest that the Government will find it difficult to contain this deterioration. Second, we highlight the importance of growth in services exports for recent economic growth and for our forecasts.

NATIONAL ACCOUNTS 2007 (Estimate)

A: Expenditure on Gross National Product

	2006 €m	2007 Estimate €m	Change in 2007				
			€m		%		
			Value	Volume	Value	Price	Volume
Private Consumer Expenditure	82,483	90,919	8,436	5,361	10.2	3.5	6.5
Public Net Current Expenditure	24,939	27,808	2,868	1,247	11.5	6.2	5.0
Gross Fixed Capital Formation	46,027	47,012	985	709	2.1	0.6	1.5
Exports of Goods and Services (X)	139,766	148,633	8,867	9,218	6.3	-0.2	6.6
Physical Changes in Stocks	1,476	664	-812	-812			
Final Demand	294,691	315,035	20,344	15,854	6.9	1.4	5.4
less:							
Imports of Goods and Services (M)	120,997	129,793	8,796	7,298	7.3	1.2	6.0
less:							
Statistical Discrepancy	-1,011	-1,011	0	-44			
GDP at Market Prices	174,705	186,253	11,548	8,599	6.6	1.6	4.9
less:							
Net Factor Payments (F)	-25,575	-27,075	-1,500	-1,773	5.9	-1.0	6.9
GNP at Market Prices	149,130	159,179	10,049	6,796	6.7	2.1	4.6

B: Gross National Product by Origin

	2006 €m	2007 Estimate €m	Change in 2007	
			€m	%
Agriculture, Forestry, Fishing	3,195	3,259	64	2.0
Non-Agricultural: Wages, etc.	72,426	78,923	6,497	9.0
Other:	59,649	62,530	2,881	4.8
Adjustments: Stock Appreciation	-329	-200		
Statistical Discrepancy	-1,011	-1,011		
Net Domestic Product	133,931	143,502	9,571	7.1
less:				
Net Factor Payments	-25,575	-27,075	-1,500	5.9
National Income	108,356	116,427	8,072	7.4
Depreciation	18,436	19,903	1,467	8.0
GNP at Factor Cost	126,792	136,331	9,539	7.5
Taxes less Subsidies	22,338	22,848	510	2.3
GNP at Market Prices	149,130	159,179	10,049	6.7

C: Balance of Payments on Current Account

	2006 €m	2007 Estimate €m	Change in 2007
			€m
Exports (X) less Imports (M)	18,769	18,840	71
Net Factor Payments (F)	-25,575	-27,075	-1,500
Net Transfers	-465	-600	-135
Balance on Current Account	-7,271	-8,835	-1,564
as % of GNP	-4.9	-5.6	-0.7

FORECAST NATIONAL ACCOUNTS 2008

A: Expenditure on Gross National Product

	2007 Estimate €m	2008 Forecast €m	Change in 2008				
			€m		%		
			Value	Volume	Value	Price	Volume
Private Consumer Expenditure	90,919	95,754	4,835	2,728	5.3	2.3	3.0
Public Net Current Expenditure	27,808	30,449	2,642	1,112	9.5	5.3	4.0
Gross Fixed Capital Formation	47,012	44,728	-2,284	-3,491	-4.9	2.8	-7.4
Exports of Goods and Services (X)	148,633	157,876	9,244	8,033	6.2	0.8	5.4
Physical Changes in Stocks	664	531	-133	0			
Final Demand	315,035	329,338	14,303	8,470	4.5	1.8	2.7
less:							
Imports of Goods and Services (M)	129,793	137,273	7,480	5,156	5.8	1.7	4.0
less:							
Statistical Discrepancy	-1,011	-1,011	0	-26			
GDP at Market Prices	186,253	193,076	6,823	3,340	3.7	1.8	1.8
less:							
Net Factor Payments (F)	-27,075	-28,341	-1,266	-710	4.7	2.0	2.6
GNP at Market Prices	159,179	164,735	5,557	2,609	3.5	1.8	1.6

B: Gross National Product by Origin

	2007 Estimate €m	2008 Forecast €m	Change in 2008	
			€m	%
Agriculture, Forestry, Fishing	3,259	3,324	65	2.0
Non-Agricultural: Wages, etc.	78,923	82,073	3,149	4.0
Other:	62,530	64,296	1,765	2.8
Adjustments: Stock Appreciation	-200	-200		
Statistical Discrepancy	-1,011	-1,011		
Net Domestic Product	143,502	148,482	4,980	3.5
less:				
Net Factor Payments	-27,075	-28,341	-1,266	4.7
National Income	116,427	120,141	3,714	3.2
Depreciation	19,903	20,832	929	4.7
GNP at Factor Cost	136,331	140,973	4,642	3.4
Taxes less Subsidies	22,848	23,762	914	4.0
GNP at Market Prices	159,179	164,735	5,557	3.5

C: Balance of Payments on Current Account

	2007 Estimate €m	2008 Forecast €m	Change in 2008	
			€m	%
Exports (X) less Imports (M)	18,840	20,603	1,763	
Net Factor Payments (F)	-27,075	-28,341	-1,266	
Net Transfers	-600	-600	0	
Balance on Current Account	-8,835	-8,338	497	
as % of GNP	-5.6	-5.1	0.5	

FORECAST NATIONAL ACCOUNTS 2009

A: Expenditure on Gross National Product

	2008 Forecast €m	2009 Forecast €m	Change in 2009				
			€m		%		
			Value	Volume	Value	Price	Volume
Private Consumer Expenditure	95,754	100,596	4,842	3,112	5.1	1.8	3.3
Public Net Current Expenditure	30,449	33,037	2,588	1,066	8.5	4.8	3.5
Gross Fixed Capital Formation	44,728	46,086	1,358	4	3.0	1.0	0.0
Exports of Goods and Services (X)	157,876	168,549	10,672	9,049	6.8	1.0	5.7
Physical Changes in Stocks	531	425	-106	0			
Final Demand	329,338	348,693	19,355	13,325	5.9	1.8	4.0
less:							
Imports of Goods and Services (M)	137,273	146,635	9,361	7,281	6.8	1.4	5.3
less:							
Statistical Discrepancy	-1,011	-1,011	0	-33			
GDP at Market Prices	193,076	203,069	9,993	6,077	5.2	2.0	3.1
less:							
Net Factor Payments (F)	-28,341	-29,983	-1,643	-1,141	5.8	1.7	4.0
GNP at Market Prices	164,735	173,086	8,351	4,913	5.1	2.0	3.0

B: Gross National Product by Origin

	2008 Forecast €m	2009 Forecast €m	Change in 2009	
			€m	%
Agriculture, Forestry, Fishing	3,324	3,391	66	2.0
Non-Agricultural: Wages, etc.	82,073	85,964	3,891	4.7
Other:	64,296	67,820	3,524	5.5
Adjustments: Stock Appreciation	-200	-200		
Statistical ..				
Discrepancy	-1,011	-1,011		
Net Domestic Product	148,482	155,963	7,481	5.0
less:				
Net Factor Payments	-28,341	-29,983	-1,643	5.8
National Income	120,141	125,980	5,839	4.9
Depreciation	20,832	22,013	1,181	5.7
GNP at Factor Cost	140,973	147,993	7,020	5.0
Taxes less Subsidies	23,762	25,093	1,331	5.6
GNP at Market Prices	164,735	173,086	8,351	5.1

C: Balance of Payments on Current Account

	2008 Forecast €m	2009 Forecast €m	Change in 2009	
			€m	%
Exports (X) less Imports (M)	20,603	21,914	1,311	
Net Factor Payments (F)	-28,341	-29,983	-1,643	
Net Transfers	-600	-600	0	
Balance on Current Account	-8,338	-8,669	-332	
as % of GNP	-5.1	-5.0	0.1	

THE INTERNATIONAL ECONOMY¹

The main developments in the international economy can be summarised as follows:

- Growth prospects in the major economies have worsened for 2008 as the impacts of the credit crisis have become more apparent, but the downturn is expected to be short lived.
- Growth in the Euro Area is expected to moderate in 2008 to 1.8 per cent and improve to 2 per cent in 2009. Inflationary pressures remain high but are likely to moderate this year. We assume the ECB main refinancing rate will be 3.75 per cent by year end.
- Tighter credit conditions in the UK are likely to depress consumer spending and investment this year, causing real GDP growth to slow to 1.8 per cent, but a weaker sterling is expected to improve exports and overall growth in 2009.
- The US economy is forecast to grow by 1.5 per cent as consumer spending weakens and housing investment falls as credit conditions worsen. Further interest rate cuts and the planned fiscal stimulus are expected to contribute to the US avoiding a prolonged recession, with growth of 1.9 per cent expected in 2009.
- Prices for oil and food, which have increased sharply in recent months are expected to moderate, leading to an easing of inflationary pressures globally.
- The euro is expected to strengthen against the US dollar and sterling in 2008, but remain stable in 2009.

Euro Area

The strong pace of economic growth in the Euro Area in 2006 appears to have continued into 2007, with real GDP growth for last year now estimated at 2.7 per cent. It seems increasingly unlikely that the Euro Area will fully avoid the wider consequences of the turmoil on international financial markets, and in particular the anticipated slowdown in the US economy in 2008. We expect growth to fall to 1.8 per cent this year. Exports and investment supported growth in 2007 but it is expected that falling unemployment and an increase in wages will help stimulate domestic consumption growth, making it the driver of real GDP growth in 2008. A potential offsetting effect is the tightening credit conditions faced by European households and businesses. The latest *Euro Area Bank Lending Survey* (ECB, January 2008) suggests that banks significantly tightened their credit standards in the final quarter of 2007 and were expecting similar tightening in the first quarter of 2008. The continuing appreciation of the

¹ We are grateful to Adele Bergin for assistance in compiling the *International* forecasts.

euro against the US dollar and sterling is expected to contribute to export growth easing over our forecast horizon.

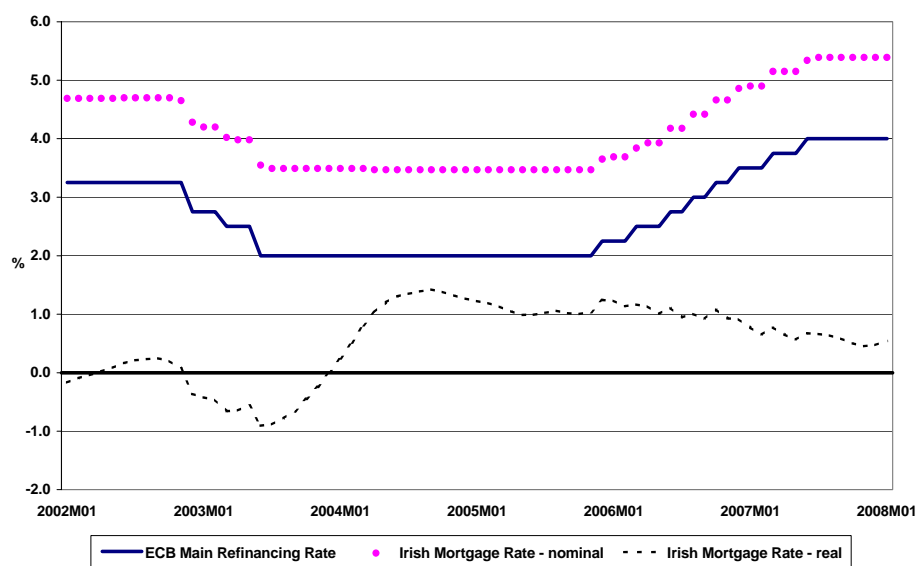
For 2009 we expect real GDP growth to rise to 2 per cent. This is accompanied by a further fall in unemployment to 6.8 per cent and an improvement in real wage growth as consumer price inflation moderates. Inflation as measured by the *Harmonised Consumer Price Index* was estimated at 3.2 per cent in January, well above the ECB's target of close to but below 2 per cent, primarily as a result of higher commodity prices. It is expected that these inflationary pressures will ease as commodity price growth moderates in the second half of 2008. The strengthening of the euro and the general slowdown in economic growth should also help to stem inflation. However, the ECB President Jean Claude Trichet has consistently warned that the current high level of inflation must not become anchored in inflation expectations and feed through to wage demands. If these so-called "second round effects" were to materialise, it is possible that the ECB would not loosen monetary policy. For our forecasts we have made a technical assumption of a 25 basis points cut in the ECB main refinancing rate from 4 per cent (Figure 1) to 3.75 per cent in September 2008. Our assumption is dependent on wage increases in the major Euro Area economies, particularly Germany, remaining below the currently high rate of inflation and that commodity prices stabilise this year. It must be noted that in the current climate it is important to monitor developments in the inter-bank lending rates, such as Euribor, given their potential impact on credit availability.

Turning to the prospects for the larger Euro Area economies, German real GDP growth is estimated at 2.6 per cent for 2007. The prospects for the German economy this year and next mirror those for the Euro Area as a whole. Growth is expected to fall to 1.6 per cent in 2008 as a weaker export performance this year acts as a drag on overall activity. Offsetting this is the continuing increase in domestic demand, with personal consumption expected to pick up marginally as unemployment falls to 7.8 per cent and earnings grow by 2.5 per cent. Inflation, which is currently running at the highest rate in 14 years, is expected to moderate as oil and food prices stabilise. In 2009 real GDP growth is forecast to return to trend of about 2 per cent.

The French economy is estimated to have grown by 1.9 per cent in 2007. This performance is likely to continue in 2008, as both domestic and external demand growth is expected to fall. We anticipate real GDP growth of 1.7 per cent in 2008. Marginal improvements in employment are expected this year, but personal consumption growth is expected to remain subdued as higher prices offset increases in wages. With the government maintaining a more prudent fiscal stance, the budget deficit is expected to remain stable over the forecast horizon. The forecast for real GDP growth in 2009 is 1.9 per cent, primarily as a result of a slight increase in private investment growth.

For 2007 the Italian economy is estimated to have grown by 1.8 per cent, driven by increases in personal consumption primarily due to improved labour market conditions. Export activity slowed significantly towards the end of 2007, and this is likely to continue in 2008. A moderate increase in consumer prices is expected to dampen consumption growth this year. Coupled with lacklustre investment growth, real GDP growth is expected to fall to 1.3 per cent in 2008. While export growth is expected to recover somewhat in 2009, it is not sufficient to increase overall economic growth, which we expect to remain at 1.3 per cent next year.

Figure 1: Interest Rates*



*Mortgage rate used is the Irish Representative Building Societies Mortgage Rate.
 Source: Central Statistics Office.

United Kingdom

Real GDP is estimated to have grown by 3.1 per cent in the UK in 2007. Much of that growth was concentrated in the first half of the year, with a significant slowdown in activity recorded in the last three months of 2007. Growth in 2007 was mostly driven by domestic demand. However, as the year came to an end, the ongoing correction in the housing market and the wider effects of the credit crunch began to limit investment and consumer spending growth. Survey evidence from the Bank of England (BoE) suggests that, although the spread between inter-bank lending rates and the main BoE policy rate has fallen, banks have tightened credit conditions for their customers. This is likely to further depress consumer spending and business investment in 2008. As a result overall economic growth is forecast to slow to 1.8 per cent this year with unemployment rising to 5.8 per cent.

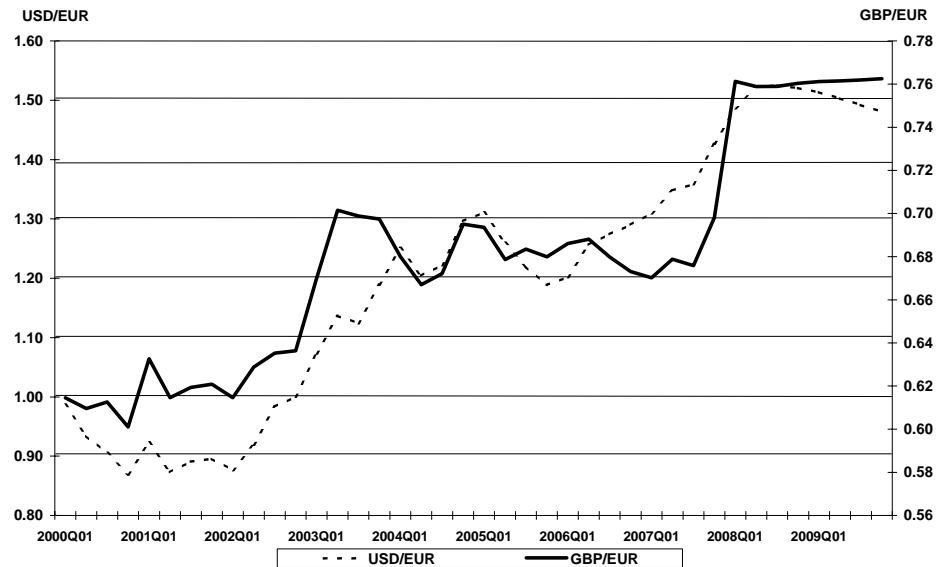
In 2009 real GDP growth is expected to rise to 2.2 per cent. The improvement next year is partly due to an increase in exports as the depreciation in sterling makes UK goods and services more competitive. A weaker sterling exchange rate (Figure 2) contributes to import prices being higher for much of 2008, which is expected to lead to higher inflation. In its latest *Inflation Report* (February, 2008) the BoE acknowledged that inflation will rise sharply in the near term alongside a significant slowing in economic growth. However, commodity prices are expected to stabilise towards the end of 2008, so that it is likely that monetary policy will be further eased. Unemployment is expected to increase marginally in 2009 to 5.9 per cent.

United States

In 2007 the US economy grew by an estimated 2.2 per cent. Personal consumption growth and a robust increase in non-residential construction were the main drivers of growth last year. The correction in the housing market deepened, as residential construction output and housing transactions fell sharply. The wider effects of the credit market turmoil as a result of the sub-prime crisis are expected to weigh heavily on growth in 2008. We anticipate real GDP growth will fall to 1.5 per cent in 2008, with the likelihood of the US being technically in recession during the year, i.e. two

successive quarters with a fall in real output. Unemployment is expected to rise to 5.5 per cent in 2008 as tighter credit conditions and rising inflation constrain domestic demand.

Figure 2: Exchange Rates



Source: Central Bank & Financial Services Authority of Ireland (historic) and National Institute of Economic and Social Research (NIESR) (forecast).

A number of mitigating factors are expected to prevent the US from remaining in recession beyond the end of this year. First, the \$168 billion fiscal stimulus proposed by the Bush administration and recently approved by Congress should contribute to stimulating demand, particularly business investment in 2009. Second, the Federal Reserve has publicly maintained its view that risks to economic growth remain firmly on the downside and it is willing to loosen monetary policy significantly in the coming months. This is despite the current rise in consumer price inflation driven by elevated commodity prices. Third, the expected depreciation of the US dollar in 2008 should help support export growth this year and next, which will contribute to the US current account deficit narrowing to a forecast -4 per cent of GDP in 2009. We expect real GDP growth to increase to 1.9 per cent in 2009. However, the impact of the recovery will take time to materialise as earnings growth is anticipated to be low at 2 per cent and unemployment is expected to increase to 6.3 per cent.

While risks to growth remain on the downside, risks to inflation are still on the upside. Should commodity prices fail to stabilise in 2008, there remains a danger that inflation expectations would rise above the Federal Reserve's preferred level of 2 per cent. This would particularly be the case if interest rates were cut too aggressively in attempts to promote economic growth. US policymakers may face a difficult balancing act as 2008 progresses to help avoid stagflation and a longer period in recession.

Table 1: Short-term International Outlook

Country	Real GDP Growth			Consumer Price Inflation*			Average Earnings Growth			Unemployment Rate % of Labour Force			Current Account Balance % of GDP		
	2007	2008	2009	2007	2008	2009	2007	2008	2009	2007	2008	2009	2007	2008	2009
	UK	3.1	1.8	2.2	2.3	2.7	2.0	3.7	4.5	3.8	5.4	5.8	5.9	-4.8	-4.1
Germany	2.6	1.6	2.0	2.3	2.1	1.5	1.6	2.5	2.0	8.4	7.8	7.3	6.1	4.5	4.4
France	1.9	1.7	1.9	1.6	2.9	2.3	3.0	3.4	2.7	8.3	8.0	8.1	-0.8	-1.8	-2.2
Italy	1.8	1.3	1.3	2.0	2.3	2.0	2.0	2.7	2.4	6.0	6.1	6.1	-2.9	-2.7	-2.4
Euro Area	2.7	1.8	2.0	2.1	2.5	2.0				7.4	7.0	6.8	-0.1	-0.3	-0.5
USA	2.2	1.5	1.9	2.9	3.7	2.1	4.5	4.0	2.0	4.6	5.5	6.3	-5.5	-4.9	-4.0
Japan	1.9	1.6	1.7	0.0	0.0	0.2	-0.2	2.0	2.2	3.8	3.8	4.0	4.7	4.5	4.7
China	11.3	10.3	10.0	4.8	5.2	5.6							11.2	9.7	9.4
Ireland	4.9	1.8	3.1	2.9	2.9	2.5	5.5	4.0	3.5	4.6	6.0	6.2	-4.7	-4.3	-4.3

Source: NIESR.

* HICP for Euro Area countries and the UK, CPI otherwise.

The Japanese economy is estimated to have grown by 1.9 per cent in 2007. Much of this growth is accounted for by a strong export performance. A significant slowdown in construction activity in the second half of 2007 is likely to continue into 2008. Combined with continued stagnation in personal consumption growth, this suggests domestic demand is unlikely to support economic growth to any great extent over our forecast horizon. Despite unemployment falling to 3.8 per cent in 2007, a level it is expected to maintain in 2008, earnings actually fell by 0.2 per cent last year. While earnings growth is expected to pick up in 2008 and 2009, by 2 per cent and 2.2 per cent respectively, the worsening international scenario is likely to curtail export growth and thus real GDP growth. We expect the Japanese economy to expand by 1.6 per cent in 2008 and 1.7 per cent in 2009. Against this backdrop, consumer prices are expected to grow only marginally in 2008 and 2009, and consequently the Bank of Japan will be reluctant to increase its main policy interest rate above the current level of 0.5 per cent.

China continues to benefit from double-digit rates of real GDP growth, with estimates for 2007 showing the economy grew by 11.3 per cent last year. Exports remained an important component in overall economic growth, with the trade surplus increasing by 48 per cent in 2007. However, domestic demand has also increased significantly. Indications that export growth may have begun to slow as 2007 came to an end do not suggest any dramatic reduction in Chinese economic growth over our forecast horizon. Real GDP is forecast to increase by 10.3 per cent in 2008 and 10 per cent in 2009. Inflation remains a concern for Chinese policymakers, and despite the People's Bank of China continued tightening of monetary policy, price pressures remain a key indicator of an overheating economy. The continued, albeit less restrictive, pegging of the Chinese renminbi to the US dollar effectively implies China is importing US inflation. Allowing a more rapid appreciation of the renminbi against the US dollar would contribute more positively to the central bank's desire to curb inflationary pressures.

The prospects for growth in Ireland's main trading partners in 2008 have significantly worsened since our previous *Commentary*. Combined with these developments the euro has appreciated strongly against both the US dollar and sterling. Meanwhile, the sharp increases in commodity prices are causing inflationary pressures to emerge across the globe. Both food and oil prices have seen sharp increases in recent months. Most commentators expect commodity prices to stabilise in 2008.

The effects of the credit crunch on the broader international economy are beginning to become apparent. Some commentators had believed that the Euro Area and emerging economies would escape much of the negative impact of slower US growth in 2008. While it is the case that the global economy is less reliant on the US than before, the so-called "decoupling hypothesis"² was unlikely to hold to any great extent. This is particularly the case for a country such as Ireland, which has extremely close trade and investment linkages with the US.

² Decoupling refers to the ability of the Asian and European economies to withstand a significant reduction in US economic growth without any major impact on their own economic performance. See the International Monetary Fund's *World Economic Outlook*, April 2007, for a more detailed appraisal.

Our forecast is that the current downturn in the global economy will be short lived. Given the pro-active stance that the Federal Reserve and the Bank of England have taken on cutting interest rates, and the likelihood of further interest rate cuts in both jurisdictions, it is likely that growth in the US and the UK will improve in 2009. The fiscal stimulus budgeted for in the US should also contribute to growth prospects there improving next year, and improving Ireland's export growth potential along with it. The ECB may also begin loosening monetary policy, which should stimulate growth in 2009 and help curb the strengthening of the euro. It remains important, however, that fiscal and monetary policy avoid encouraging currently high rates of inflation globally to become entrenched in inflation expectations. If this happens and a period of stagflation takes hold, the adjustment period out of the current downturn could take longer.

THE DOMESTIC ECONOMY

General

The downward revision of prospects for 2008 that characterised recent *Commentaries* continues. Expectations of significant contractions in house building in 2008 have been compounded by a downward trend in consumer confidence. This is related in part to growing concerns regarding the health of the US economy and, by extension, to growing concerns about the world economy. For 2008, we now expect GNP growth of 1.6 per cent and GDP growth of 1.8 per cent. Investment is expected to contract by 7.4 per cent, thereby placing a large drag on growth. As a result of the low growth, no employment growth is expected in 2008 and the rate of unemployment is expected to rise to 6 per cent.

For 2009, we expect an improvement in the growth performance. Partly as a result of an anticipated improvement in the international environment and a levelling off in house building, we expect GNP growth to be 3 per cent in 2008 with GDP growth of 3.1 per cent. While employment growth will resume (with a net increase of 23,000 expected), the rate of unemployment will move slightly upwards again to 6.2 per cent. Part of our expectation for 2009 is based on the anticipation that services exports will continue to perform well and thereby facilitate on-going growth in the services sector.

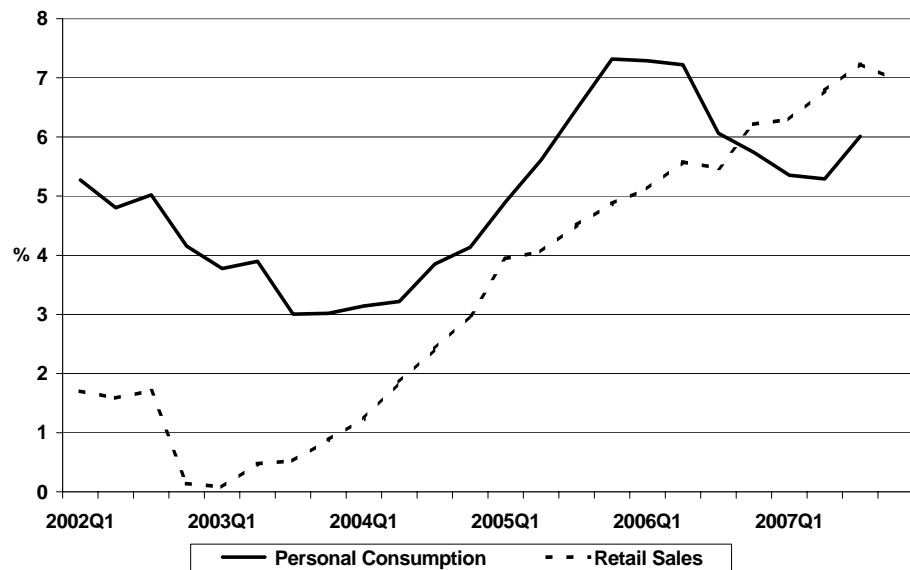
Consumption

Consumption grew strongly in 2007 and we estimate that the growth rate for the year will have been 6.5 per cent. This is based partly on the most recent *Quarterly National Accounts (QNA)* and also on the most recent *Retail Sales Index (RSI)*. According to the *QNA*, consumption was growing at a rate of 6 per cent in the year ended 2007 Q3 (Figure 3). The *RSI* grew by 6.5 per cent in volume terms in 2007. Observed growth in the overall *RSI* may sometimes be distorted by the motor trade but this is not the case for 2007. Excluding the motor trade, the *RSI* growth was 6.4 per cent.

Looking ahead to 2008, it is clear that consumption growth will be significantly lower and for several reasons. First, now that the SSIA effect has largely moved through the economy, this once-off boost to consumption in 2007 will not be present in 2008. Second, the latest reading of the IIB/ESRI *Consumer Sentiment Index* shows a continuation of the downward trend that was experienced throughout much of 2007 (Figure 4). The February reading of 63.5 was down on the January figure of 67, but more significantly, was well down on the 2007 average reading of 77.2. This downward trend in sentiment is, of course, related in part to developments in the economy that will

themselves tend to impact negatively on consumption growth. Of these, the stagnation in employment is the most important.

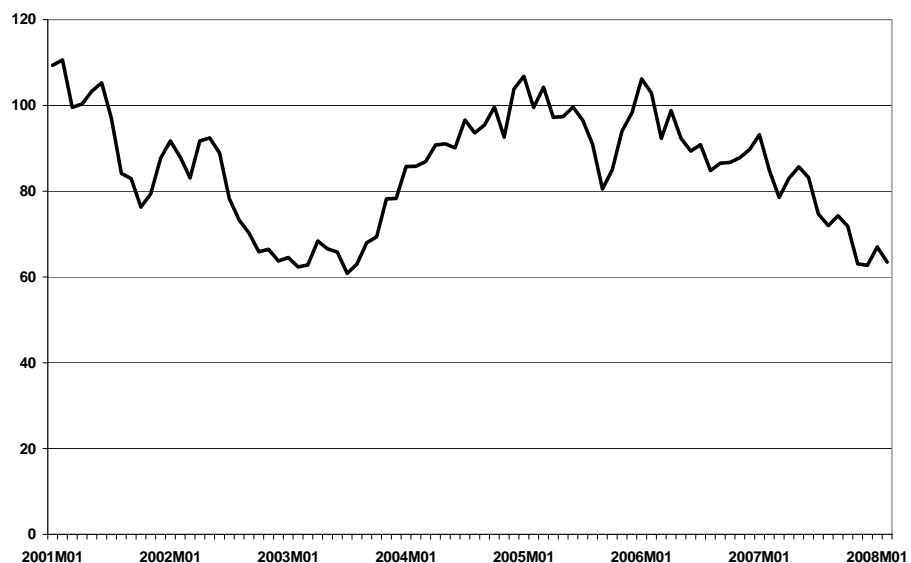
Figure 3: Growth in Consumption and Retail Sales



Source: *Quarterly National Accounts and Retail Sales Index*, CSO.

Based on these considerations, we expect consumption in 2008 to grow by 3 per cent in volume terms and by 5.3 per cent in value terms. To get a sense of where this downturn is coming from, it is useful to draw on our projections for incomes, presented in greater detail below. For 2007, we estimate that gross personal income grew by 9.3 per cent in nominal terms. The corresponding figure for 2008 is forecast to be just 5.1 per cent again in nominal terms, with the difference between the two being largely explained by the different rates of employment growth. For 2009, we expect a modest rebound in consumption growth and forecast a growth rate of 3.3 per cent in real terms as employment growth resumes and consumer confidence improves.

Figure 4: IIB/ESRI Consumer Sentiment Index



According to the *QNA* for 2007 Q3, investment had grown by 3.5 per cent in the year ended in that quarter. This represented a deceleration from the corresponding figure of 7.1 per cent in the previous quarter. Given this trajectory, we estimate that investment grew by 1.5 per cent in 2007, down on the 2006 figure of 3.1 per cent. It can be seen from Table 2, however, that this aggregate figure for investment growth in 2007 hides vastly different trends across housing, other building, and machinery and equipment.

The contraction in housing investment has been discussed extensively in previous *Commentaries* because of its large impact on both the investment growth figure and on the growth figures for GNP and GDP. It now appears that housing investment contracted by 9.3 per cent in volume terms in 2007, beginning a process of adjustment whereby housing output will return to long-run sustainable levels. House completions are estimated to have been 78,028 in 2007, a fall of around 10,000 on the 2006 figure and of around 15,000 on the peak of 93,000 recorded in the year ended Q3 2006. In contrast, other building is estimated to have grown by 12 per cent in volume terms in 2007 due to the National Development Plan and buoyancy in the commercial building sector. Investment in machinery and equipment is also estimated to have grown strongly, at a rate of 13 per cent.

In 2008, house completions remain a crucial variable for the forecast of overall economic growth. House registrations were recorded at 37,878 for the year ended December 2007, down from 45,175 for the year ending in the previous quarter and also down from 66,649 in the year ended December 2006. With data on commencements showing a similar move, we now expect 50,000 house completions in 2008. This will translate into a percentage volume fall of 29.3 per cent.³

With growth in other building forecast to remain buoyant at 12 per cent, building and construction in total is forecast to register a volume contraction of 12.3 per cent in 2008. In spite of forecast growth of 8 per cent in investment in machinery and equipment, total investment is forecast to fall by 7.4 per cent in volume terms this year.

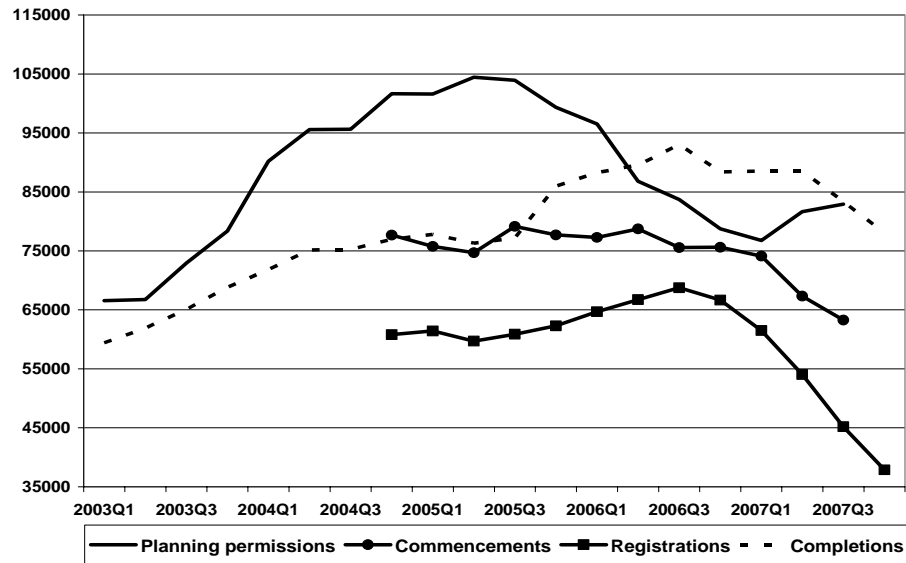
Looking ahead to 2009, although the bulk of the adjustment in housing output is expected to have occurred in 2008, our forecasts include a further, more modest decline in housing output in 2009. For 2009, we expect 45,000 house completions, 5,000 below our expectation for 2008. We also expect slower growth in other building in 2009 (at 2 per cent) relative to 2008 (at 12 per cent). This is based on an expectation that the slowdown in 2008 will have an impact on the commencement of retail and commercial developments in 2008 and hence on completions in 2009. With investment in machinery and equipment forecast to grow at a rate of 6 per cent, total investment is expected to register zero growth in 2009.

³ With regard to house prices, we believe that prices in the early part of 2008 will be recorded as being 15 per cent below their value in December 2006 when fully up-to-date data become available. The permanent tsb/ESRI index has shown a fall of 8 per cent between December 2006 and January 2008 but the January figures relate to transactions completed in October/November 2007. For 2008 and 2009, we expect generally stable house prices.

Table 2: Gross Fixed Capital Formation

	2006	% Change in 2007		2007	% Change in 2008		2008	% Change in 2009		2009
	€m	Volume	Value	€m	Volume	Value	€m	Volume	Value	€m
Housing	23,221	-9.3	-10.8	20,722	-29.3	-28.8	14,750	-7.1	-3.7	14,203
Other Building	13,216	12.0	18.2	15,616	12.0	17.0	18,278	2.0	5.6	19,296
Building and Construction	36,438	-1.6	-0.3	36,339	-12.3	-9.1	33,028	-2.3	1.4	33,498
Machinery and Equipment	9,589	13.0	11.3	10,673	8.0	9.6	11,700	6.0	7.6	12,588
Total	46,027	1.5	2.1	47,012	-7.4	-4.9	44,728	0.0	3.0	46,086

Figure 5: Housing Statistics



Source: Department of the Environment, Heritage and Local Government.

Government Spending and the Public Finances

The second set of monthly Exchequer returns for 2008 showed that the overall tax-take in the first two months of 2008 was 8.3 per cent below the figure for the first two months of 2007. While care should be taken not to read too much into this figure, the fall in stamp duties collected in January and February 2008 relative to January and February 2007 (44 per cent) is yet another indicator of the rapid slowdown in the property sector in the economy. Furthermore, falls in VAT and CGT tax take relative to the same period in 2007 are also in line with the apparent slowing in the economy.

Our growth forecasts for 2008 are now slipping well below the Department of Finance's Budget Day forecasts of GNP growth of 2.8 per cent and GDP growth of 3 per cent. In this context, the question arises of what the public finance outturn is likely to be in 2008 relative to official Budget Day forecasts.

Before addressing this question, it is important that we state explicitly how we arrive at our forecasts for the public finances. For 2008, we use official Budget Day forecasts of current and capital expenditure. However, our forecast of tax revenue differs from the official Budget Day figures because we use our own tax forecasting model. For 2009, we again use official figures for capital spending but provide our own forecast of current expenditure. We do so because the level of current spending for 2009 is decided upon in late 2008 and so any figure that appears in official documents before then is more of a technical assumption than a forecast. Plans for capital spending are generally less subject to change and so we take the official figures. For 2009, our tax revenue for forecasts are based on our own tax forecasting model.

For 2008, we now expect a General Government deficit equal to 1.2 per cent of GDP. The official forecast was for a General Government deficit of 0.9 per cent so, on our calculations, it appears that the outturn will be poorer than had been anticipated in the Budget. The discrepancy between our forecast for economic growth and that of the Department of Finance is greater than the discrepancy between our forecasts for the General

Government balance. The reason for this is that we use a higher tax elasticity with respect to economic growth relative to that used by the Department of Finance, as discussed in the previous *Commentary*.

These figures imply that the turnaround in the public finances since 2006 is now larger than previously estimated. A General Government surplus of 2.9 per cent of GDP was recorded in that year. If the forecast of a General Government deficit of 1.2 per cent of GDP is realised this year, the turnaround will be over 4 percentage points. As discussed in the previous *Commentary*, this in itself is not a concern if it represents a short-term response to an economic downturn. However, our forecasts for the public finances in 2009 point to the challenge of bringing the public finances back to a more sustainable trajectory.

For 2009, we have adopted a technical assumption that voted current expenditure will grow at a rate of 7.5 per cent, below the 2008 figure of 9.3 per cent and the 2007 figure of 12.3 per cent. With current revenues forecast to grow by only 3.7 per cent, the General Government deficit is forecast to widen further to 2 per cent of GDP in 2009. On the basis of these figures, the gross national debt as a percentage of GDP would rise from 25.1 per cent in 2006 to just under 30 per cent in 2009. While this would still be a low debt to GDP ratio by both historic and international standards, it is the prospect of it increasing at such a pace that is a concern.

Table 3: Public Finances

	2006 €m	Change %	2007 €m	% Change	2008 €m	% Change	2009 €m
Current Revenue	46,145	3.8	47,887	2.6	49,121	3.7	50,941
Current Expenditure	37,077	10.3	40,890	9.6	44,827	7.7	48,276
of which: Voted	32,915	12.3	36,959	9.3	40,390	7.5	43,419
Current Surplus	9,068	-22.8	6,997	-38.6	4,294	-37.9	2,665
Capital Receipts	1,871	-24.7	1,408	3.4	1,456	4.1	1,516
Capital Expenditure	8,675	15.5	10,024	10.6	11,089	5.6	11,706
of which: Voted	6,476	18.1	7,650	11.9	8,562	5.5	9,032
Capital Borrowing	-6,804	26.6	-8,616	11.8	-9,633	5.8	-10,190
Exchequer Balance	2,264.3		1,618.6		-5,339.1		-7,525.4
as % of GNP	1.5		-1.0		-3.2		-4.3
General Government Balance	5,107.3		903.7		-2,319.0		-4,110.7
as % of GDP	2.9		0.5		-1.2		-2.0
Gross Debt as % of GDP	25.1		25.3		27.2		29.6
Net Debt as % of GDP*	12.7		12.1		11.8		12.2

*Net of pensions fund and Social Insurance Fund.

If we were to use the figure for voted current expenditure growth for 2009 presented by the Department of Finance in Budget 2008, the projected

General Government deficit for 2009 is lower than our forecasts. The figure presented by the Department is 5.2 per cent (our figure is 7.5 per cent);⁴ our calculations suggest that the General Government deficit would be 1.6 per cent of GDP were current spending growth to be at that lower rate. Hence, even if we use the lower figure for growth in current public spending in 2009, the public finances will deteriorate in 2009 relative to 2008. We return to this issue in the *General Assessment* below.

Exports

The latest available data suggest that 2007 saw an improved performance in exports compared to that of the previous year. According to the *Quarterly National Accounts* for 2007 Q3, growth in the volume of exports of goods and services was 6.5 per cent on an annual basis. This compared with the 4.4 per cent growth recorded for 2006, and the growth appeared to be accelerating as 2007 progressed. While the growth to 2007 Q3 was dominated by the rapid expansion in services exports, which grew at 13.1 per cent in volume terms, merchandise export growth improved dramatically, increasing to 2.4 per cent in 2007 Q3 compared to 0.8 per cent for 2006. We estimate export volume growth of 6.6 per cent for 2007 as a whole, with the equivalent value measure being 6.3 per cent.

Following a disappointing year in 2006, merchandise export growth in 2007 is estimated to have increased markedly, with our estimate of volume growth for the year being 3.4 per cent. The growth in the volume of merchandise exports was particularly strong in 2007 Q2 and Q3. By contrast growth in the value of merchandise exports seems to have stagnated, reflecting the ongoing fall in export prices. According to the *Balance of Payments*, which only provides data in current prices, growth in the value of merchandise exports has remained low, with no growth in value recorded for the year ending 2007 Q3, while data from the latest *External Trade Statistics* estimate that the value of merchandise exports actually fell in December. Merchandise export prices are expected to continue falling over our forecast horizon as the *Wholesale Price Index* for manufacturing, a leading indicator of export prices, has maintained its downward trend. Consequently, our forecast for the growth in the value of merchandise exports remains below that of volume growth in 2008 and 2009, at 2 per cent and 2.5 per cent respectively in both years.

Overall export growth continues to be driven by the growth in services exports, which now account for over 40 per cent of total exports. Our forecasts suggest that 47 per cent of total exports in 2009 will be services. For the year ending 2007 Q3 services exports grew by 15.9 per cent in value terms. *Balance of Payments* data suggest that much of that growth was concentrated in financial services and business services, which grew by 19.7 per cent and 29.5 per cent respectively. We estimate that for 2007 as a whole services exports grew by 14.5 per cent in value terms, with non-tourism services exports growing by 15 per cent and tourism exports growing by 9 per cent. Services export growth is expected to moderate in 2008, although still contributing more than merchandise to total export growth. We estimate that

⁴ We use this higher figure for growth in voted current expenditure in 2009 because we think it will be difficult for the Government to achieve a lower rate of growth, given political pressures, and a rise in spending that will result from the increase in unemployment. It is, of course, possible that the lower rate of growth will be achieved.

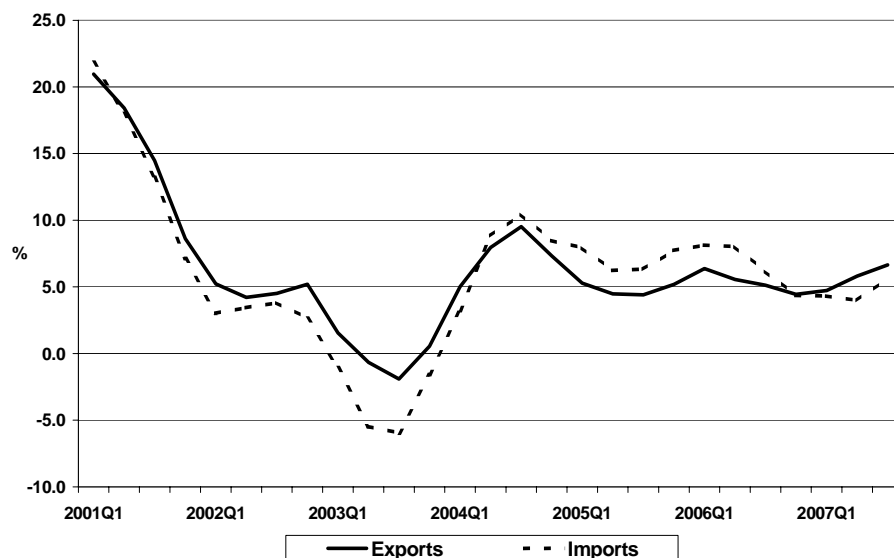
Table 4: Exports of Goods and Services

	2006	% Change in 2007		2007	% Change in 2008		2008	% Change in 2009		2009
	€m	Volume	Value	€m	Volume	Value	€m	Volume	Value	€m
Merchandise	83,355	3.4	0.8	84,022	2.5	2.0	85,702	2.5	2.0	87,416
Tourism	4,258	5.3	9.0	4,641	5.6	8.0	5,013	6.1	8.0	5,414
Other Services	50,793	12.0	15.0	58,412	9.8	12.0	65,421	10.3	12.8	73,763
Exports of Goods and Services	138,406	6.6	6.3	147,075	5.4	6.2	156,136	5.7	6.7	166,592
FISIM Adjustment	1,360			1,558			1,740			1,956
Adjusted Exports	139,766	6.6	6.3	148,633	5.4	6.2	157,876	5.7	6.8	168,549

almost 80 per cent of the value growth in exports this year will be accounted for by services. Our forecast for non-tourism services growth in 2008 is 12 per cent in value terms and 9.8 per cent in volume terms. Growth in the value of tourism exports is expected to decline to 8 per cent this year. For 2009 we anticipate growth in the value of non-tourism exports to improve slightly, rising to 12.8 per cent (10.3 per cent in volume terms). Tourism export growth in 2009 is expected to remain steady at 8 per cent in value terms; however, given the moderation in consumer price growth expected next year the equivalent volume measure increases to 6.1 per cent.

Our estimates for overall export growth in 2007 have been revised upwards since our previous *Commentary* as the latest available data suggest a strong export performance in 2007 Q2 and Q3. However, the international environment has become increasingly difficult, with the Euro appreciating and economic growth in our main export markets slowing. Indicators suggest that a slowdown in export growth can be expected in 2008. Our forecast for the total volume growth in exports for 2008 is 5.4 per cent (6.2 per cent in value terms). Our expectation is that much of the current downturn in the international economy will be concentrated in 2008. As such we expect a slight increase in total export growth in 2009, to 5.7 per cent in volume terms and 6.8 per cent in value terms. The responsiveness of labour costs to the worsening employment situation domestically is key to our forecasts for 2009, as it implies an end to the deterioration in Ireland's overall competitiveness.

Figure 6: Exports and Imports Volume Growth Rates (Annual Averages)



Source: *Quarterly National Accounts*, CSO.

Imports

Data from the latest *QNA* suggest that the volume of imports of goods and services grew by 5.8 per cent in the year ending 2007 Q3. This is an acceleration on the growth experienced during 2006 of 4.4 per cent. We estimate that for 2007 as a whole imports grew by 6 per cent in volume terms and 7.3 per cent in value terms. According to the latest *Balance of Payments* data, the value of tourism imports grew by 15.1 per cent in the year ending 2007 Q3. Our estimates for 2007 imply a 13 per cent growth rate for the value of tourism imports, alongside an 8 per cent increase in the value of non-tourism services exports. Merchandise import growth for 2007 is estimated at 6 per cent in value terms and 5 per cent in volume terms.

Table 5: Imports of Goods and Services

	2006	% Change in 2007		2007	% Change in 2008		2008	% Change in 2009		2009
	€m	Volume	Value	€m	Volume	Value	€m	Volume	Value	€m
Merchandise	57,967	5.0	6.0	61,445	3.9	5.5	64,824	3.9	5.5	68,390
Tourism	5,446	10.8	13.0	6,154	3.4	6.0	6,523	5.4	8.0	7,045
Other Services	57,025	6.7	8.0	61,587	4.1	6.0	65,282	6.6	8.0	70,505
Imports of Goods and Services	120,438	6.0	7.3	129,186	4.0	5.8	136,630	5.3	6.8	145,940
FISIM Adjustment	559			607			643			695
Adjusted Imports	120,997	6.0	7.3	129,793	4.0	5.8	137,273	5.3	6.8	146,635

Merchandise import volume growth was estimated at 1.6 per cent in 2006 by the CSO. In the year ended 2007 Q3 that growth had increased to 4.8 per cent. Looking across the various commodity groups, the *External Trade Statistics* estimate that some of the highest growth in the value of merchandise imports was found for food and beverages products, with growth for the year ending November 2007 of 10.4 per cent and 12.2 per cent respectively. Interestingly, the growth in the value of petroleum products only increased by 1.3 per cent over the same period, despite the growth in the price of oil on international markets.

The growth in the volume of services imports in 2006 is estimated at 7 per cent by the CSO. In 2007 Q3 that growth had moderated to 6.7 per cent, although it had increased substantially on Q2 growth of just 3.7 per cent on an annual average basis. As mentioned above, the *Balance of Payments* data suggests strong growth in tourism imports as 2007 progressed, with non-tourism services being the main driver of services import growth. An increase in the growth of the value of trade-related business services of 11.6 per cent in the year ended 2007 Q3 also helped offset the continuing decline in computer services and financial services imports.

For 2008 volume growth in imports of goods and services is forecast to slow to 4 per cent (5.8 per cent value), a further downward revision on our previous forecasts. This reflects the particularly sharp fall in the growth of personal consumption this year, which particularly impacts on services imports. Growth in non-tourism services imports is anticipated to fall to 4.1 per cent (6 per cent value) while tourism import growth is anticipated to decline rapidly to 3.4 per cent (6 per cent value).

The moderation in the growth of industry (excluding construction) in 2008 and 2009 contributes to the volume of merchandise import growth easing to 3.9 per cent in both years. In 2009 we anticipate growth in non-tourism services imports to return to 2007 levels, with tourism imports growth also increasing to 5.4 per cent (8 per cent value) as growth in personal consumption recovers somewhat. Overall, we expect volume growth in the imports of goods and services to be 5.3 per cent in 2009, with value growth of 6.3 per cent.

Balance of Payments

Our forecasts for merchandise imports and exports for 2008 and 2009 imply a further narrowing of the merchandise trade balance this year and next, by 7.5 per cent and 8.9 per cent respectively. This follows an estimated narrowing of 11.1 per cent in 2007. Both volume and price developments contribute to this trend. The deterioration in the merchandise terms of trade is also expected to continue, as our forecasts suggest merchandise export prices will continue to fall alongside rising import prices. Meanwhile, the opposite pattern is emerging in relation to services trade. Not only is Ireland exporting more services in volume terms than in previous years, but the unit price of our services exports is growing faster than the unit price of our services imports implying continued improvement in our services terms of trade. We estimate that these factors contributed to the services trade deficit falling by 36.8 per cent in 2007, and that it will continue that trend in 2008 and 2009. Indeed our forecasts suggest that Ireland will have a surplus in services trade next year. The strong performance from services is expected to compensate entirely for the contraction in the merchandise trade balance in 2008 and 2009, leading to the first improvement in the trade balance since

2002. We now expect the trade balance to rise from an estimated 11.2 per cent of GNP in 2007 to 11.8 per cent of GNP in 2008 and 11.9 per cent of GNP in 2009.

Table 6: Balance of Payments*

	2006 €m	Change %	2007 €m	Change %	2008 €m	Change %	2009 €m
Merchandise Trade Balance	25,388	-11.1	22,577	-7.5	20,878	-8.9	19,026
Service Trade Balance	-7,420	-36.8	-4,688	-70.7	-1,372	-218.6	1,626
Trade Balance in Goods and Services on Balance of Payments Basis	17,968	-0.4	17,889	9.0	19,506	5.9	20,653
% of GNP	12.0		11.2		11.8		11.9
Total Debit Flows	84,651	26.7	107,269	16.2	124,618	16.8	145,572
Total Credit Flows	59,870	35.5	81,146	20.0	97,375	20.0	116,850
Net Factor Flows	-24,781	5.4	-26,124	4.3	-27,244	5.4	-28,722
Net Current Transfers	-465		-600		-600		-600
Balance on Current Account	-7,278		-8,835		-8,338		-8,669
Capital Transfers	223		300		300		300
Effective Current Balance	-7,055		-8,535		-8,038		-8,369
% of GNP	-4.7		-5.4		-4.9		-4.8

*This table includes adjustments to *Balance of Payments* basis.

In relation to net factor flows, the latest *Balance of Payments* data estimate that the net factor income deficit widened by 3 per cent in the year ended 2007 Q3. Credit flows increased by 31.7 per cent over the same period. Of these credit flows, portfolio and other investment income had the largest increase of 35.6 per cent. Direct investment income saw growth of 10.6 per cent, an improvement on early 2007 figures but well below the 30 per cent growth seen for the year 2006. Debit factor flows tend to be much more volatile, growing by 22.7 per cent in the year ending 2007 Q3.

For 2007 we estimate that the net factor income deficit grew by 5.4 per cent. Our forecasts for 2008 and 2009 see net factor income grow by 4.3 per cent and 5.4 per cent respectively. There is a significant amount of uncertainty around these forecasts given the scale and volatility of the underlying flows. Together with our forecasts for the trade balance, this implies an effective current account balance equivalent to -5.4 per cent of GNP estimated for 2007, improving in 2008 to -4.9 per cent of GNP and in 2009 to -4.8 per cent of GNP.

Measures of Growth

Based on our forecasts for the expenditure components, our forecast for GNP growth in 2008 is 1.6 per cent. As regards growth in GNP per capita, our forecasts suggest growth of 0.3 per cent. Clearly these figures are very low relative to recent experience and, if taken in isolation from our forecasts for 2009, might have appeared to signal an end to Ireland's recent history of economic growth being above that of our European neighbours.

However, the figures for 2009 show that a recovery is expected. We forecast GNP growth of 3 per cent and growth in GNP per capita of 1.9 per cent. With slower inward migration forecast for 2009 relative to 2008, the proportionate difference between growth in GNP and GNP per capita is lower. Although a recovery is anticipated in 2009, we do not foresee a return to the growth rates that were experienced for much of this decade. However, this steadier pace of economic growth is likely to be more sustainable. This point on sustainability is well illustrated by the figures in Table 7 on the proportion of housing investment in GNP. From its peak of 15.6 per cent in 2006, we expect to see this falling to 8.2 per cent in 2009.

Table 7: Measures of Growth

Growth Indicators	2005	2006	2007	2008	2009
GNP	4.9	6.5	4.6	1.6	3.0
GNP adjusted for Terms of Trade	3.8	4.5	3.2	0.7	2.5
GNDI	3.7	4.0	3.1	0.7	2.5
National Resources	3.6	4.0	3.1	0.7	2.5
GNP per capita (constant prices)	2.6	3.8	2.0	0.3	1.9
Consumption per capita (constant prices)	5.0	3.1	3.9	1.7	2.2
Personal disposable income per capita	6.7	3.7	6.3	3.8	4.1
Investment in Housing/GNP	15.5	15.6	13.0	9.0	8.2
Investment/GNP	31.0	30.9	29.5	27.2	26.6

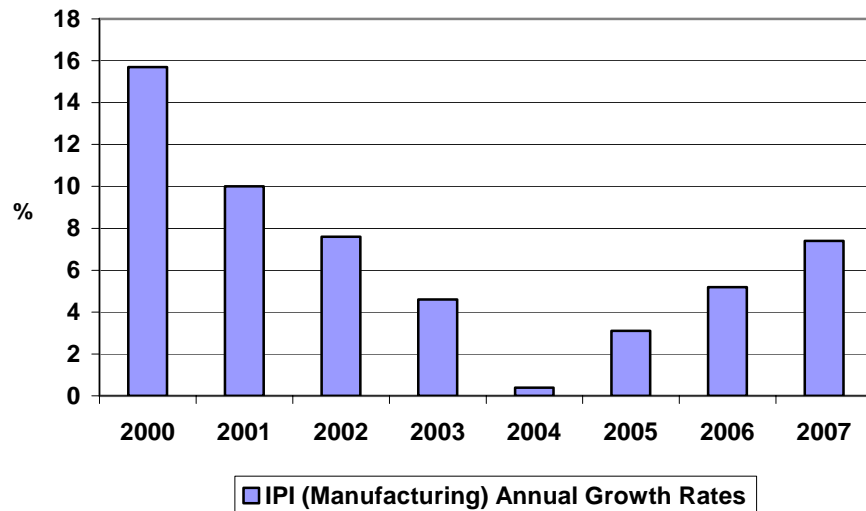
Sectoral Output

According to the *Quarterly National Accounts* for 2007 Q3, **industry** (including construction) grew by 5.7 per cent in the year ending in that quarter. As building and construction itself posted a growth rate of just 0.6 per cent in that period, the performance for industry (excluding construction) was even more impressive with growth of 7.5 per cent. This strong performance of industry is also seen in the figures from the *Industrial Production Index (IPI)* and it appears that the performance was maintained into the final quarter. The index for all industries grew by 7.1 per cent in 2007, with manufacturing industries growing by 7.4 per cent. Based on these figures, we estimate that industry (excluding construction) will have grown by 6 per cent in volume terms in 2007, although value growth will be lower due to price falls for manufactured goods. We estimate that construction itself will have experienced a contraction in 2007 (of 1.6 per cent in volume terms) and so industry in total is estimated to have registered growth of 3.9 per cent in volume terms last year.

It is useful to put the 2007 performance of manufacturing into its recent historic context and this is done in Figure 7. In the early part of the decade, manufacturing seemed to be on a path of decline. However, since 2004 the downward trend in growth has reversed and the recent performance has exceeded the expectations that would have existed in the middle part of the decade. The additional figures from the *IPI* suggest that the improved performance is very much concentrated in the modern sector as opposed to the traditional. For example, in 2007 the *IPI* for the modern sector grew by 9.1 per cent; the corresponding rate for the traditional sector was 2.5 per cent. The pattern shown in Figure 7 could be the result of increases in activities that are classified as manufacturing but that are in reality more service in

nature. We would need much detailed information to be more definitive on this point but it is an issue that should be explored more fully in the future.

Figure 7: Annual Growth Rate in the Industrial Production Index for Manufacturing



Source: Industrial Production Index, CSO.

For 2008, we see the non-construction side of industry growing by 3 per cent in volume terms. While this represents a solid performance, we do not see that the particularly strong performance of 2007 will be maintained partly because of the more challenging international context. For 2009, we also expect to see growth in this sector of 3 per cent. While the international context should improve, we think that the competitiveness losses suffered in recent years will make it difficult for manufacturing to take full advantage of the improved context.

This solid performance will be offset to a degree by the on-going difficulties that we foresee for construction in 2008 and 2009. Building and construction is expected to contract by 12.3 per cent this year and by a further 2.3 per cent in 2009. Overall, we expect industry to contract by almost 1 per cent in 2008 and to grow by 1.8 per cent in 2009.

Growth in **services** in the year ended 2007 Q3 was 6.1 per cent in volume terms, according to the *Quarterly National Accounts*. The corresponding growth rates for the various sub-sectors were as follows: distribution, transport and communications, 6.5 per cent; public administration and defence, 2.2 per cent; other services (including rent), 6.3 per cent. For 2007 overall, we expect that services growth will have been 5.9 per cent, largely due to strong growth in the non-public elements.

This strong performance by services should be seen in the context of increasing growth in non-tourism services exports, as discussed in the *Exports* section above. Non-tourism services exports are estimated to have grown by 12 per cent in 2007. This follows growth of 10.7 per cent in 2006, 10.8 per cent in 2005 and 11.6 per cent in 2004. One interesting dimension of this performance is that it occurred in the context of Ireland's loss of competitiveness. This suggests that the services side of Ireland's exports may have been less sensitive to price-related competitiveness losses relative to

Table 8: GDP by Sector

	2006	Change		2007	Change		2008	Change		2009
	€m	Volume	Value	€m	Volume	Value	€m	Volume	Value	€m
Agriculture	3,918	-10.0	2.0	3,996	1.0	2.0	4,075	1.0	2.0	4,157
Industry:	53,043	3.9	2.4	54,329	-0.9	-1.1	53,738	1.8	1.9	54,734
Other Industry	37,906	6.0	3.5	39,233	3.0	2.0	40,018	3.0	2.0	40,818
Building & Construction	15,137	-1.6	-0.3	15,096	-12.3	-9.1	13,720	-2.3	1.4	13,916
Services:	96,417	5.9	10.0	106,092	3.4	6.1	112,511	4.3	6.7	120,097
Public Administration & Defence	5,485	2.5	7.0	5,869	1.0	4.5	6,133	1.0	3.0	6,317
Distribution, Transport and Communications	23,075	5.0	6.6	24,592	2.0	3.8	25,521	2.0	3.8	26,487
Other Services (including rent)	67,857	6.4	11.5	75,631	4.1	6.9	80,857	5.4	8.0	87,293
GDP at Factor Cost – output basis	153,378	4.8	7.2	164,416	1.9	3.6	170,325	3.4	5.1	178,987

merchandise exports or that services may have experienced higher productivity growth. Either way, the trend allows us to be somewhat optimistic about the potential of services exports in 2008 and 2009 and, by extension, about services output generally.

For 2008, we expect output from the services sector to grow by 3.4 per cent in volume terms. This growth is driven by services other than public services and distribution, communications and transport. For 2009, we expect overall growth of 4.3 per cent in services, again led by other services, for which growth of 5.4 per cent is expected.

For **agriculture**, positive price developments should see the value of output growth exceeding that of volume growth in both 2008 and 2009. However, growth rates are expected to be modest at 1 per cent in volume terms and 2 per cent in value terms in both years.

Employment

The *Quarterly National Household Survey* for Q4 2007 showed that employment (when seasonally adjusted) grew by 67,800 in the year ending November 2007, an amount equal to 3.3 per cent. As employment had grown by close to 90,000 in each of 2006 and 2007, it seems clear that the rate of growth in employment is now easing. As regards the sectoral breakdown of employment change, the biggest increase in both absolute numbers and in proportionate terms was in wholesale and retail. Employment in this sector grew by almost 24,000 or by 8.2 per cent. The next biggest increase, again in both absolute and proportionate terms, was for financial and other business services, where employment grew by 21,000 (or by 7.6 per cent). Construction posted a decrease of 5,500 jobs (or almost 2 per cent), a trend that was unsurprising given broader developments in that sector.

The apparent weakening in the labour market is also evident from the FÁS/ESRI *Employment and Vacancies Report*. As shown in Figure 8, in January the Net Employment Expectations indicator showed a reading of -11 per cent. This can be interpreted as suggesting that the percentage of employers expecting a decline in employment in their firms is 11 percentage points higher than those expecting an increase. More tellingly, the index has been on a downward trajectory since April of last year and is now recording levels that are equal to the low points of August 2003 and November 2004. At both of those points, the index showed a fairly rapid turnaround but we are less confident that this will occur now.

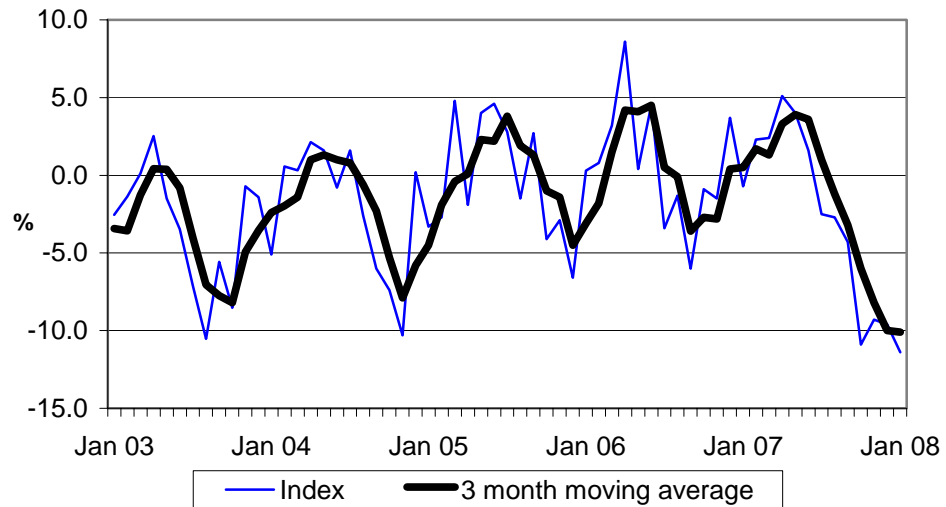
Turning to our forecasts, with economic growth for 2008 now forecast to be well below 2 per cent, the stark implication for employment is that we envisage no growth this year. When combined with anticipated growth in the labour force, this implies that the unemployment rate will rise to 6 per cent. We expect that net inward migration will decline rapidly in 2008 relative to 2007 (down to 20,000 from close to 70,000.⁵

For 2009, the pick-up in economic growth is expected to translate into an increase of 23,000 jobs (or 1.1 per cent). As this is a relatively modest rate of employment growth, the rate of unemployment is expected to move up

⁵ This is already evident in the slowdown in PPS numbers issued in recent months.

slightly again in 2009, to 6.2 per cent. This rate is based on the expectation that net inward migration will fall again in 2009, down to 10,000.

Figure 8: The FÁS/ESRI Net Employment Expectations Index (and its 3 Month Moving Average)



Source: FÁS/ESRI *Employment and Vacancies Report*, January 2008.

As noted in previous *Commentaries*, the headline figures on employment growth hide a much more dynamic picture at a sectoral level. Although zero net employment growth is forecast for 2008, this consists of an extra 19,000 jobs in services and 19,000 less in industry, including construction. For 2009, the net figure of 23,000 is made up of 29,000 added jobs in services and 6,000 fewer jobs in industry, including construction. Underpinning our forecasts is a somewhat optimistic view of how those individuals losing jobs will be able to react, for example, through exiting the labour force, returning to home countries in the case of immigrants, or finding jobs in the areas of employment growth. Should this view prove to be overly optimistic, then our current forecast for the unemployment rate would rise.

Table 9: Employment and Unemployment

	Annual Averages 000s			
	2006	2007	2008	2009
Agriculture	117	115	115	114
Industry	560	569	550	544
Services	1,362	1,416	1,435	1,464
Total at Work	2,039	2,100	2,100	2,123
Unemployed	93	102	135	141
Labour Force	2,132	2,202	2,234	2,264
Unemployment Rate %	4.4	4.6	6.0	6.2
Net Migration	71.8	67.3	20.0	10.0
of which: Inward Migration	107.8	109.5	65.0	62.0
Change in Participation Rate*	1.1	0.8	0.5	-0.2

* Note: Participation rate measured as share of population aged 15-64 years.

As the CSO is in the process of replacing its sectoral surveys of earnings with the new *Earnings, Hours and Employment Costs Survey (EHECS)*, our latest information on earnings growth comes partly from those existing sectoral surveys and partly from the *EHECS*. In Table 10, we present the latest figures on earnings growth by sector along with information on the source and time period.

Table 10: Annual Wage Growth (Based on Weekly Earnings, Except for Construction Which is Hourly)

Sector/Sub-sector	Annual Wage Growth (%)	For Year Ended	Source
Industry	5.9	2007 Q2	EHECS
Of which:			
<i>Mining and Quarrying</i>	-1.3	2007 Q2	EHECS
<i>Manufacturing</i>	6.3	2007 Q2	EHECS
<i>Electricity, Gas and Water Supply</i>	4.6	2007 Q2	EHECS
Financial Intermediation	11.7	2007 Q2	EHECS
Construction	6.0	September 2007	Sectoral survey
Distribution	3.9	September 2007	Sectoral survey
Business Services	4.4	September 2007	Sectoral survey
Public Sector	4.5	September 2007	Sectoral survey

It is clear from Table 10 that wage growth in 2007 was buoyant. For the year as a whole, we estimate that wages will have grown by 5.5 per cent and, as a result, will have exceeded that of many of our trading partners. Given our forecast for a weakening in the labour market in 2008 and 2009, we expect nominal wage growth to be lower. For 2008, we expect nominal wages to grow by 4 per cent and by 3.5 per cent in 2009.

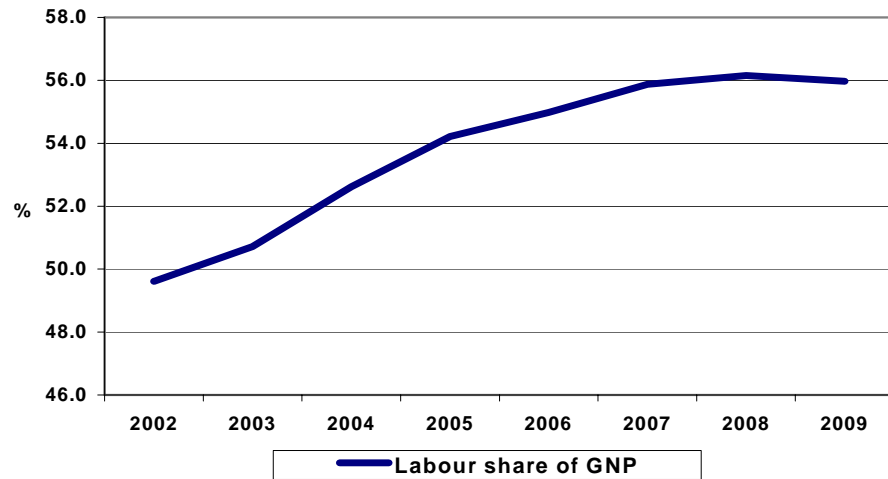
One of the consequences of this easing in wage growth is that the deteriorating trend in wage-related competitiveness will be halted. This has been a matter of concern discussed in previous *Commentaries*. It can be seen from Figure 9 that labour's share of GNP (one indicator of competitiveness) rose steadily from below 50 per cent in 2002 to 56 per cent in 2007. Our forecasts for 2008 and 2009 show this trend levelling off. Hence, while our forecasts do not show a reversal of the trend, they do suggest that the rising labour share seen in recent years may have ended.⁶

Given the zero rate of employment increase forecast for 2008 and the forecast for wage growth of 4 per cent, non-agricultural wage income is forecast to grow by 4 per cent. This represents a contrast with 2007 where our estimate for the corresponding figure is 9 per cent. Gross personal income is forecast to grow by 5.1 per cent in 2008, again a large decline from the 2007 value. We do not expect that the slowing of income growth will lead to a significant rise in borrowing, whereby people try to maintain consumption levels. Instead, we foresee consumption being adjusted and

⁶ The increase in importance of knowledge-based services would tend to lead to an increase in labour's share of GNP. Hence, all things being equal, we might have expected the line in Figure 8 to keep sloping upwards even in the absence of ongoing competitiveness losses.

hence the savings rate staying essentially unchanged between 2007 and 2008 at 6 per cent.

Figure 9: Labour's Share of GNP, 2002 to 2007 Plus Forecast Values for 2008 and 2009

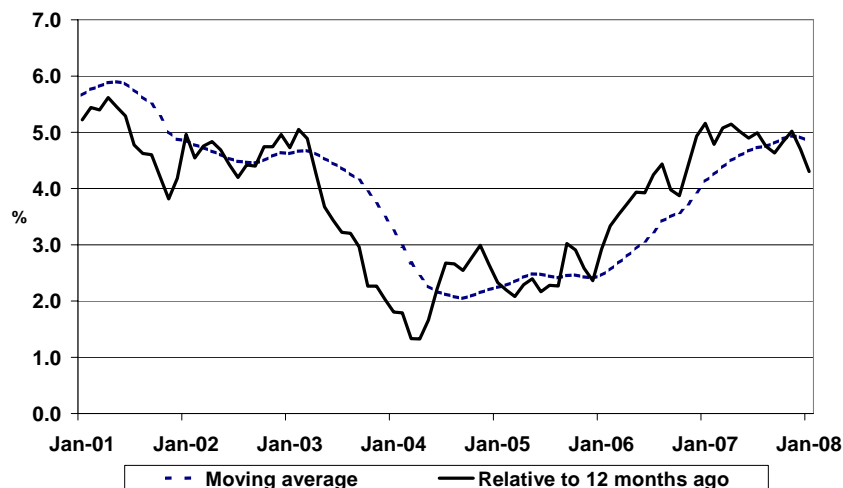


For 2009, the pick-up in employment will add to non-agricultural wage income growth but we expect that this will be offset somewhat by lower earnings growth. Overall, non-agricultural wages are forecast to grow by 4.7 per cent, with gross personal income forecast to rise by 5 per cent. Although our forecast for real consumption growth in 2009 is higher than that in 2008, our lower inflation forecast for 2009 implies lower growth in nominal consumption in 2009. This in turn contributes, in part, to our forecast for a slight rise in the savings rate between 2008 and 2009.

Consumer Prices

According to the *Consumer Price Index (CPI)*, inflation for the year 2007 averaged 4.9 per cent. This was the highest annual rate of inflation since 2001. In January 2008 the *CPI* registered a 4.3 per cent increase compared to the same month in 2007, slightly below that recorded in December 2007 of 4.7 per cent. This slight moderation in consumer price inflation has contributed to the twelve month moving average inflation rate (Figure 10) falling, albeit marginally, for the first time since late 2005.

Figure 10: CPI Inflation Rate



Source: *Consumer Price Index*, CSO.

Table 11: Personal Disposable Income

	2006	Change		2007	Change		2008	Change		2009
	€m	%	€m	€m	%	€m	€m	%	€m	€m
Agriculture, etc.	3,195	2.0	64	3,259	2.0	65	3,324	2.0	66	3,391
Non-Agricultural Wages	72,426	9.0	6,497	78,923	4.0	3,149	82,073	4.7	3,891	85,964
Other Non-Agricultural Income	16,383	5.2	849	17,231	8.2	1,422	18,653	4.0	739	19,392
Total Income Received	92,004	8.1	7,409	99,414	4.7	4,636	104,050	4.5	4,697	108,746
Current Transfers	18,031	15.4	2,775	20,806	7.0	1,456	22,262	7.4	1,656	23,918
Gross Personal Income	110,035	9.3	10,184	120,220	5.1	6,092	126,312	5.0	6,352	132,664
Direct Personal Taxes	21,371	10.6	2,268	23,639	3.5	825	24,464	4.1	1,009	25,473
Personal Disposable Income	88,665	8.9	7,916	96,581	5.5	5,267	101,848	5.2	5,343	107,191
Consumption	82,483	10.2	8,436	90,919	5.3	4,835	95,754	5.1	4,842	100,596
Personal Savings	6,181			5,662			6,094			6,595
Savings Ratio	7.0			5.9			6.0			6.2
Average Personal Tax Rate	19.4			19.7			19.4			19.2

The relatively high rate of inflation experienced during the twelve months ending July 2007 was primarily driven by the rise of the mortgage interest component of the *CPI*. Over 60 per cent of the annual rate of inflation recorded during the Summer of 2007 was attributable to rising mortgage interest rates related to previous ECB decisions to increase its main refinancing rate. Given the main ECB rate has not increased since June of last year, the impact of the mortgage interest component on overall *CPI* inflation has diminished, although it remains the largest factor accounting for 32.6 per cent of the inflation rate recorded in January 2008. Our forecasts are based on the technical assumption of a 25 basis points cut in the ECB rate to 3.75 per cent in September 2008 and that rate remaining at that level for the remainder of our forecast horizon to the end of 2009.

Inflationary pressures are now increasingly driven by the elevated prices for commodities such as food and oil since the Autumn of 2007. The evolution of food prices in recent months reflects some potentially short-run supply constraints in tandem with longer-term increases in demand. The continued increases in the living standards of emerging economies such as China and India are likely to lead to demand for basic foodstuffs to increase globally over the coming years. However, this is likely to be reflected in food price growth slightly above the historical trend for a lengthy period of time, not the relatively concentrated spike in food price inflation seen in the last few months. The importance of supply-side shortages is more consistent with the current pace of food price inflation. Adverse weather conditions globally in 2007 have meant that harvest yields of wheat and other staple cereals were well below average. For the current high rate of food price inflation to continue throughout 2008, such weather conditions restricting supply would have to be repeated. A second supply-side issue is the increasing amount of agricultural land being used to produce crops for bio-fuel as opposed to food. While this may reflect a longer-term trend, the added shortages as a result of weather conditions would have to continue for the coming year for food prices to continue to grow at their current pace (7 per cent in January 2008 compared to January 2007).

Prices for petrol, diesel and home heating oil have all increased significantly alongside the price of oil on international markets. Compared to January 2007, prices for these goods increased by 15.2, 16.2 and 32.3 per cent respectively in January 2008. While oil prices are likely to continue rising there are a number of factors to suggest that their pace of growth will fall through the course of 2008, primarily related to the general slowdown expected in the global economy this year which should cause demand growth to slacken. Also the strengthening of the euro against the US dollar has helped, and should continue to help contain the feed through of increased oil prices on the overall *CPI*.

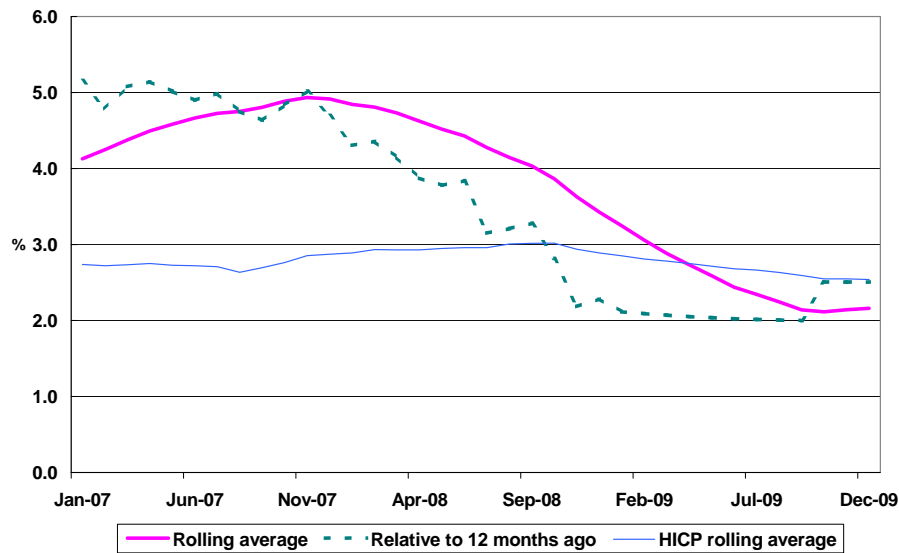
Table 12: Inflation Measures (%)

	2001	2002	2003	2004	2005	2006	2007	2008	2009
CPI	4.9	4.6	3.5	2.2	2.4	3.9	4.9	3.4	2.2
Mortgage Interest	24.7	-7.6	-8.3	5.4	12.3	31.4	40.4	6.7	-5.7
HICP (Ireland)	4.0	4.7	4.0	2.3	2.2	2.7	2.9	2.9	2.5
HICP (Euro Area)	2.3	2.2	2.1	2.1	2.2	2.2	2.1	2.5	2.0

Using the EU *Harmonised Index of Consumer Prices (HICP)*⁷ Ireland's inflation rate remains above the Euro Area as a whole. Inflation as measured by *HICP* averaged 2.9 per cent for the twelve months ending January 2008 in Ireland. The comparable rate for the Euro Area was 2.3 per cent.

With the forecast moderation in commodity prices and the assumption of an ECB interest rate cut, we anticipate the rate of inflation to fall in 2008, averaging 3.4 per cent for the year as measured by the *CPI* (2.9 per cent *HICP*). In 2009 we expect consumer price inflation to moderate further to 2.2 per cent (2.5 per cent *HICP*). The projected fall of 5.7 per cent in the mortgage interest component of the *CPI* in 2009 contributes to that measure of inflation being below the *HICP* measure next year.⁸ We expect Ireland to remain above the Euro Area in terms of inflation in 2009, with the *HICP* increasing by 2 per cent for the currency bloc as whole next year, in line with the ECB's target.

Figure 11: Inflation Profile 2007-2009 (Forecast 2008M02 Onwards)



Source: *Consumer Price Index, Harmonised Index of Consumer Prices*, CSO and own forecasts.

⁷ The *HICP* excludes mortgage interest, building materials, concrete blocks, union subscriptions, motor car insurance, dwellings insurance, motor car tax and motorcycle tax.

⁸ For a detailed discussion of the treatment of mortgage interest, and its influence on the overall *CPI* in Ireland see McCarthy, C. "Owner Occupied Housing Costs and Bias in the Irish Consumer Price Index", ESRI *Quarterly Economic Commentary*, Autumn 2007.

GENERAL ASSESSMENT

As we approach the end of the first quarter of 2008, it is becoming increasingly clear that 2008 will be a year of low economic growth relative to the recent past. The downturn in house building continues to explain much of this low growth and this had been anticipated for much of 2007. In the latter part of 2007 and into 2008, new factors have been added to the economic context and they have all tended to be negative from the perspective of economic growth. With falling consumer confidence, an appreciation in the euro, slowing growth in the United States and the on-going problems on international financial markets, there have been few developments to offset the challenges that are confronting the Irish economy in 2008.

This slow growth in 2008 will impact in a number of ways and these have been discussed above. Employment will stagnate this year and, as a result, the rate of unemployment is forecast to rise to 6 per cent, up from 4.6 per cent in 2007. The public finances will slip deeper into deficit. Our estimates suggest that the General Government deficit will reach 1.2 per cent of GDP this year, compared to the Government's Budget Day forecast of 0.9 per cent.

For 2009, our forecasts present a more optimistic picture with growth in GNP expected to recover to 3 per cent. Much of the recovery between 2008 and 2009 is due to our anticipation that the contraction in house building will be concentrated in 2008 and moderate in 2009. However, with the international climate expected to improve, we also foresee an increase in export growth in 2009 relative to 2008. The general pick-up should also see consumption rising, some increase in employment and improved consumer confidence.

While these remarks capture the broad essence of how we see economic developments unfolding over the next 21 months, we want to look at two particular issues, both of which have been alluded to above. We look first at the deterioration in the public finances and then at the importance of services exports for our overall view.

Public Finances

We noted in the section on *Government Spending and the Public Finances* that the General Government balance is expected to move from a surplus of 2.9 per cent of GDP in 2006 to a deficit of 1.2 per cent of GDP in 2008. This forecast is based on our own tax forecasts. If the tax forecasting elasticities of the Department of Finance were used, the estimate of the 2008 deficit would be even larger. For 2009 we foresee an improvement in the rate of economic growth and hence an increase in the rate of growth of current revenues (see Table 3). However, we also see a further deterioration in the public finances. This arises whether we use a figure for current expenditure growth in 2009 of

5.6 per cent (the official figure contained in the Budget book of 2008) or our own forecast of 7.7 per cent.

It could well happen that the outturn we present for 2009 will not materialise but in order to avoid this the Government will have to constrain public spending to a greater extent than we have assumed. We believe that this will be difficult. Efforts to control spending in 2008 may be understood and accepted in a context of an economic slowdown. However, a second year of curtailment will not be as readily accepted in the changed context of an economic recovery. For these reasons, we expect that the public finances will present a challenge in 2009 and decisions made in 2008 should be mindful of this. In this context, the recent decisions by the Benchmarking body to severely restrict special increases is to be welcomed.

Services Exports

As regards our second area of focus, services exports, it is useful to present some nominal absolute figures (as opposed to percentage increases) to provide a sense of their growing importance to the Irish economy. In 2007, services exports (excluding tourism) grew by an estimated €7.6 billion. For 2006, the corresponding figure was €6.4 billion. In both of these years, the growth in merchandise exports was just under €700 million. In 2007, growth in GNP at current market prices was €10 billion so the services export growth of €7.6 billion formed a high proportion of the overall growth.

Much of our forecast for economic growth is based on an expectation of continued strong growth in services exports. For 2008, we are forecasting an increase of €7 billion in services exports. For 2009, this figure is over €8 billion. For 2009, overall growth in nominal GNP is forecast to be €8.3 billion which indicates the importance of services exports.

Services exports from Ireland have boomed in recent years even though competitiveness has been declining. The rise in services exports is seen in both volumes and values as prices have increased, in contrast to the situation for merchandise exports. This suggests that services exports may be less price-sensitive than merchandise exports. This also helps to explain why Ireland's export performance in 2006 and 2007 has been good, even though merchandise exports virtually stagnated in value terms. It is on the basis of these recent trends that we are forecasting the levels of growth outlined in this *Commentary*. Generally, we have no concrete reasons to expect a change from recent trends. One possible exception to this would be concerns surrounding employment and output in the financial services sector given the turmoil in global financial markets. Were Irish-based activities to be impacted upon negatively, our services-growth figures might be overly optimistic. In truth, we do not have sufficiently good data to assess this concern. One piece of data that we can point to is employment growth in financial and other business services in the last quarter of 2007. Employment in this sector grew by 5,000 in that quarter and so no downturn is evident from this data.

It is clear that our forecasts would be very vulnerable to any change in the outlook for services exports. For this reason, we will need to monitor this sector closely and in particular to assess in more concrete terms if our hypothesis regarding its insulation from competitiveness pressures relative to merchandise exports is correct.

SPECIAL ARTICLE*

The Decline of the Computer Hardware Sector: How Ireland Adjusted

By

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*Articles are published in the *Quarterly Economic Commentary* in order to foster high-quality debate on various aspects of the Irish economy and Irish economic policy. All articles, whether authored by ESRI staff members or others, are refereed to ensure that they contain a level of analysis that satisfies accepted academic standards. For most articles, the comments of policy experts from outside of the academic community are also sought. While the ESRI aims to ensure that the refereeing process is both fair and rigorous, it does not accept responsibility for any views expressed in the published articles.

THE DECLINE OF THE COMPUTER HARDWARE SECTOR: HOW IRELAND ADJUSTED

Frank Barry*, Chris Van Egeraat**

Abstract

By the late 1990s Ireland had become one of the major European centres of computer hardware production, accounting for 5 per cent of global computer exports and about one-third of all personal computers sold in Europe. Ireland at this stage also accounted for around 6 per cent of global exports of electronic components. The sector has experienced a sharp decline since then as production has relocated eastwards to China and to Central and Eastern Europe. About one-third of the jobs in the sector were lost between 2000 and 2004. This paper charts the history of the sector in Ireland and analyses the process of employment adjustment as the sector declined.

1. Introduction

International relocation of industrial sectors is a continuous process, driven by industry-specific factors such as those emphasised by the product life-cycle model and country-specific changes in comparative advantage. The present phase of globalisation is also heavily influenced by developments in information and communications technology and by the integration of China, India and the former Soviet bloc into the global marketplace.

While certain groups of workers and owners of specific types of capital are undoubtedly hurt by industrial relocation, the consequences are generally thought to be beneficial at both the global and the national level when factor-market adjustments are complete. The adjustment process can take a substantial length of time in a recessionary environment or in the presence of

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labour-market rigidities however, and these short-term costs must be set against the long-term benefits.¹

Ireland has been fortunate that the substantial loss of computer hardware employment over the course of the new millennium has taken place under generally benign macroeconomic conditions which have facilitated the reallocation of labour. The paper seeks to chart the adjustment process that has characterised this period. We find that adjustment costs in the Irish case have been lower than might have been anticipated, both because workers found it relatively easy to acquire new jobs and because the departing companies had relatively limited linkages.

In addition to official statistics, the paper also makes use of newspaper accounts and of data collected through interviews. As part of a larger study, three rounds of semi-structured and structured interviews were conducted with general managers of five branded microcomputer makers located in Ireland (for more detailed information see Van Egeraat and Jacobson, 2004). In 2006 additional interviews were conducted with representatives of a range of bodies including the industrial promotion agencies, employment agencies and labour unions. These unstructured interviews specifically dealt with the redundancy process. This more diffuse and retrospective information helps us address the question of what became of those whose existing jobs disappeared.

We find that adjustment took several forms: (i) As hardware assembly firms pulled out, they were frequently replaced by firms operating in related though higher-wage or higher-technology segments. (ii) The assembly firms that remained shifted their Irish operations from assembly into higher value-added non-manufacturing functions such as sales and technical-support call centres and logistics. (iii) The fact that both short-term and long-term unemployment remained low as the hardware sector contracted suggests that displaced workers were able to move to other jobs relatively easily. Though the sector is of course small relative to the size of the total economy, this suggestion is supported by the qualitative evidence offered here.

The paper is structured as follows. Section 2 begins with an overview of trends in the global and European geographies of the computer and computer components sectors and traces the evolution of Irish exports and employment in these and related services sectors. Section 3 follows with a micro-level account of the history of the computer hardware sector in Ireland. Section 4 discusses the outcome of labour shedding within a number of important hardware firms and traces, to the extent possible, the movement of displaced workers to other firms and other sectors. A final section offers some concluding comments.

¹ There is a vast theoretical literature analysing the public-policy issues that arise here; see e.g. the surveys by Kletzer (2004), Baicker and Rehavi (2004) and Barry and Walsh (2008). The latter also review the literature on the impact of international offshoring on wages and labour-market adjustments in the home country.

2. Ireland and the Changing Geography of the Computer Hardware and Related Services Sectors

Barry and Curran (2004) provide data on the evolution of the shares of various countries in world computer hardware exports, charting the decline in importance over the 1990s of the more advanced countries in the case of each of the triad regions (Europe, Asia and the Americas) and the increase in export shares emanating from the periphery. In Europe, Ireland's share expanded while that of France, Germany and the UK declined, while in the Americas the shares of Mexico and Costa Rica rose as those of Canada and the US declined. As Table 1 shows, however, the Irish share declined again over the course of the new millennium, as Central and Eastern Europe and, more significantly, China entered the picture.²

While Ireland lost ground in both Computers and Electronic Components over the latter period, however, it gained market share in Digital Integrated Circuits. The products in this trade category are of a higher value-added nature than the products in the Electronic Components category. The trade category SITC 77641 includes integrated circuits for a variety of devices, including consumer electronics and automobiles. In the Irish case, the bulk of these exports are accounted for by microprocessors for computers, so Ireland's share of world exports in digital integrated circuits for computers is understated in the table. These data are suggestive of a refocusing within the hardware sector from lower value-added computer components to higher value-added segments.

Table 1: Country Shares in World Computer Hardware Exports

	SITC 752			SITC 75997			SITC 77641		
	Computers			Electronic Components			Digital Integrated Circuits		
	1992	2000	2005	1992	2000	2005	1992	2000	2005
Ireland	2	5	4.6	5	6	2.5	0.4	2.4	2.7
United Kingdom	9	8	3.5	7	4	3.7	7.0	3.6	2.8
Hungary	0	1	1.1	0	1	0.34	0	0.03	0.12
Czech Republic	0	1	1.5	0	0	0.49	n.d	0.04	0.23
China	0	6	28.3	1	4	15.4	0.0	0.6	6.9
World (values \$millions)	269,899			183,779			176,882		

Source: UN Trade Statistics by SITC (standard international trade classification) category.

Switching from trade to employment data and focusing now solely on Europe, Table 2 depicts the relative importance of computer hardware employment in selected EU25 countries. The table shows that the office machinery and computer and electronic components sectors are relatively important sectors in Ireland. The share of office machinery and computers in manufacturing in 2000 was more than eleven times greater in Ireland than in the EU25. The share of electronic components was also much larger than in the EU25 though less dramatically so than in the case of office machinery as electronic components production tends to be more globalised.

² The UK and China are included as benchmarks, while the inclusion of the Czech Republic and Hungary is designed to illustrate the inroads being made by the CEEC.

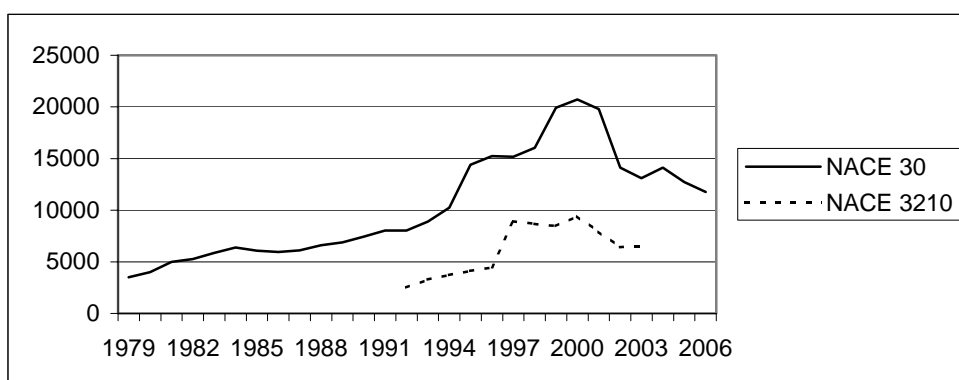
Table 2: Computer Sector Employment as a Share of Total Manufacturing in Various EU25 Countries

	Office Machinery and Computers			Electronic Components	
	Nace 30			Nace 321	
	2000	2003	2004	2000	2003
Ireland	8.0	5.7	6.4	3.7	2.9
UK	1.4	1.0	0.9	1.1	0.8
Czech Republic	0.3	0.6	0.7	1.4	1.3
Hungary	1.5	1.5	1.0	2.8	1.9
EU25	0.7	0.6	n.d.	1.0	0.9

Source: Eurostat.

The share of both sectors has been falling significantly in recent years however, as have absolute employment numbers. Raw employment numbers are plotted in Figure 1, and recent trends in Ireland, the US, the EU15 and the CEEC10 in Figures 2 and 3.³

Figure 1: Irish Employment in Computers and Components, 1979-2006

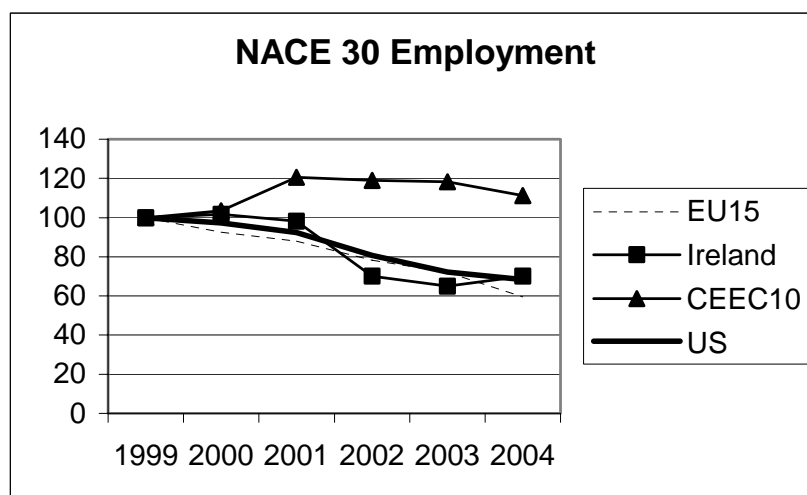


Source: Eurostat; Central Statistics Office *Census of Industrial Production*.

The fall in Ireland's global export share suggests that the decline in Ireland's computer hardware sector is ascribable to shifting comparative advantage rather than to a global high-tech downturn in the wake of the dot-com bubble.

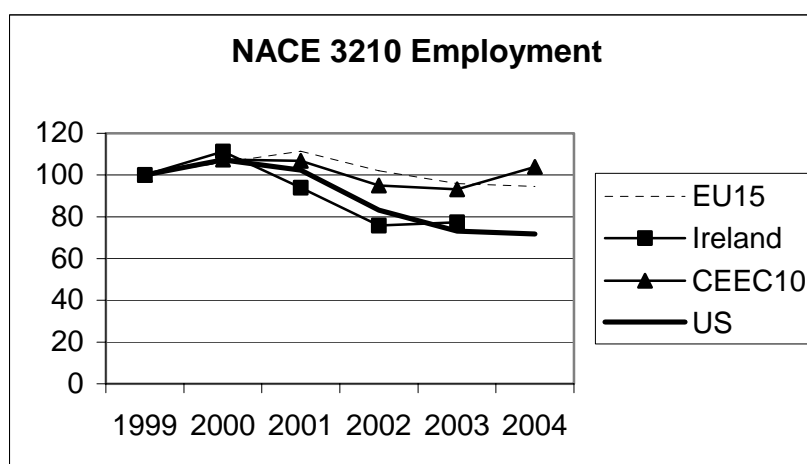
³ The CSO employment figures for the two NACE categories include employment in services activities carried out in enterprises where the majority of output is classified as manufacturing. Our knowledge of the main companies involved suggests that on balance the figures overstate the number of computer hardware jobs in Ireland. A small shift of employment can lead to a company being reclassified from manufacturing to services (if the change is sustained for two years) in which case the loss of hardware jobs will be overstated. On balance, we believe that this leads to a modest overstatement of the fall in hardware employment. As will be illustrated in the case studies of the main companies in the sector, however, the reduction in computer hardware employment is genuine and significant.

Figure 2: Employment Trends in Computers, 1999-2004



Source: Eurostat and US BLS.

Figure 3: Employment Trends in Electronic Components



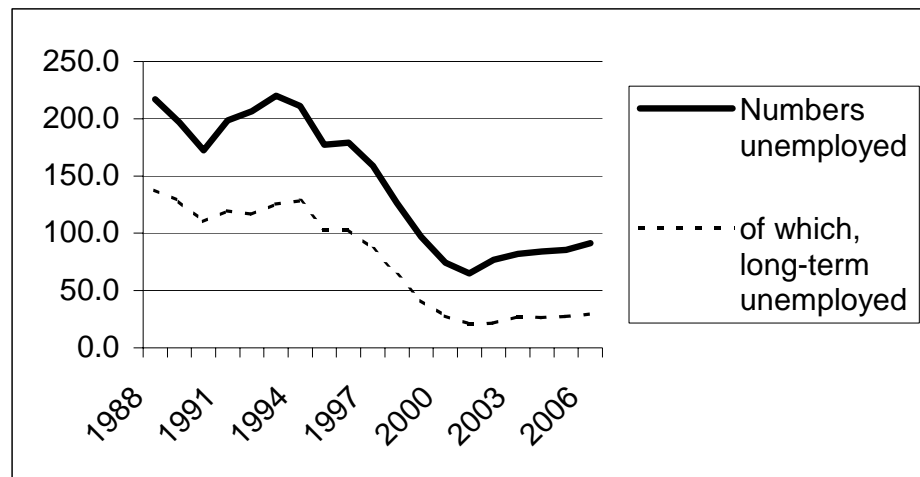
Source: Eurostat and US BLS.

Note: The CSO reports that the local unit data for NACE 3210 are confidential for the years 2002-2005 while the enterprise level data are also confidential for 2004 and 2005.

Over this period, however, the Irish labour market remained buoyant, with unemployment declining from a total of 159,000 in 1997, representing a rate of 10 per cent, to around 91,000, yielding a rate of around 4 per cent, in 2006. The rate of long-term unemployment (of over 1 year's duration) declined even more precipitously, from 5.6 per cent (86,000) to 1.4 per cent (30,000), as seen in Figure 4.

Hence, it is unlikely that displaced workers would have encountered anything like the difficulties they might have encountered in other European countries in trying to find alternative employment. It is our contention – for which the case study analyses offer supportive evidence – that many of these displaced workers would have found employment in the expanding services sector, and in particular in computer-related service activities.

Figure 4: Unemployment and Long-Term Unemployment in Ireland



Source: *Quarterly National Household Survey* (April), Central Statistics Office.

Ireland's strong showing in attracting FDI projects in these services areas is illustrated by data from UNCTAD (2004, p. 162) which show that Ireland – with about 1 per cent of the EU15 population – captured 17 per cent of new call-centre FDI projects and 7 per cent of new IT-services FDI projects in the 2002-03 period.⁴ Data on computer and information services *exports* are unfortunately not available for all countries (notably India) and are hence frequently combined with exports of “other business services”. As Van Welsum and Rief (2006, Figures 1 and 2) show, not only did Ireland achieve outstanding growth in this combined category between 1995 and 2003, it was also starting – unlike many of the other high-growth countries – from a relatively high base.

Turning to the employment data, Table 3 presents data from the Annual Services Inquiry, showing that for the five-year period 1999 to 2004 employment in computer services and related services activities grew by nearly 10,000, an increase of 53 per cent. Total services employment grew by 43 per cent, creating 220,000 new jobs.

The Forfás *Annual Employment Survey* represents another data source, this time on internationally-traded services. From this we calculate employment in business process services export (BPSE) activities other than in international financial services. Around half of the indigenous BPSE segment and one-third of the foreign-owned BPSE segment is thought to be in software and computer services and the remainder comprises a variety of other services including call centres, shared services, supply chain management, sales and marketing, intellectual property licensing, professional consulting and internet-based business.

⁴ It is well-known, furthermore, that while Ireland's share of global merchandise trade has declined in recent years, its share of global services trade has undergone a rapid expansion; Forfás (2005).

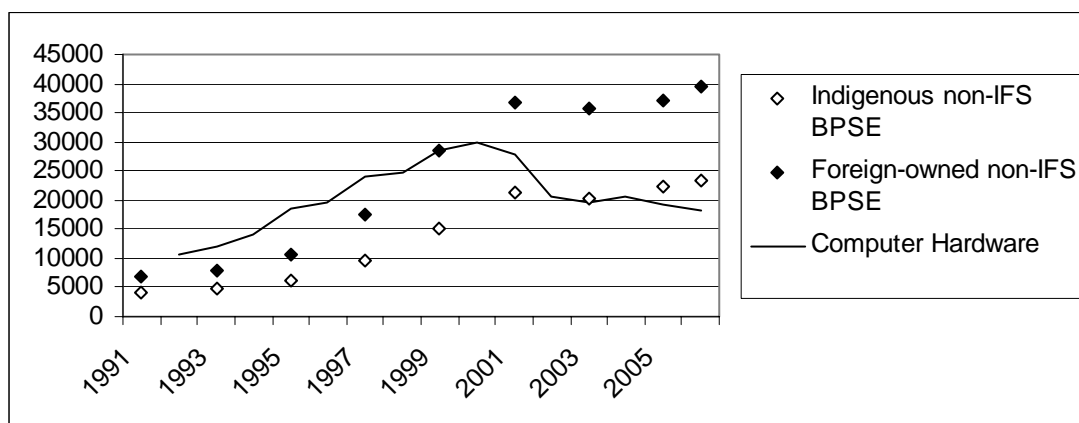
Table 3: Persons Employed in Computer and Related Services and in All Services

	Computer and Related Activities	All Services
1999	18,612	515,500
2000	18,779	553,700
2001	22,260	608,500
2002	22,211	668,876
2003	24,030	713,117
2004	28,426	736,969
2005	no data	740,419
Absolute increase 1999-2004	9,814	221,469
Percentage increase 1999-2004	+53%	+43%

Source: Eurostat and CSO *Annual Services Inquiry*.

Figure 5 charts the growth in employment in non-IFS BPSE activities against the decline in computer hardware employment (NACE 30 and 3210).⁵ As the figure illustrates, the indigenous BPSE segment now employs around the same number of people as the entire computer hardware sector, while the foreign-owned BPSE segment employs substantially more. Foreign-owned BPSE activities attained about the same level of employment as the entire hardware sector in 2000, gained almost the same number of jobs as the hardware sector shed over the next few years, and has continued its upward expansion since 2003. The indigenous BPSE segment has also grown rapidly over this period, and its current employment level is now at least equal to that in computer hardware.

Figure 5: Employment in Computer Hardware and Non-IFS Business Process Services Export Activities



Source: Forfás *Annual Employment Survey* and CSO *Census of Industrial Production*.

The strong growth in computer and related services and in BPSE activities raises the possibility that displaced hardware-sector workers found employment in these related services sectors (as well, of course, as in services

⁵ For confidentiality reasons, the most recent employment numbers available for NACE 3210 refer to 2003. We hold employment at this level, comprising 6,542 jobs, for the remaining years shown. We count all agency-supported international services as BPSE, from which we then exclude the international financial services component.

more generally). We will hence look at a number of case studies to try to track their subsequent employment paths.

3. The Rise and Decline of Computer Hardware Production in Ireland: Firm-Level Case Studies

Having begun with an overview of aggregate trends in the sectors under discussion, we now present a brief firm-level history of the computer hardware sector in Ireland.⁶

COMPUTER ASSEMBLY

In 1971 Digital Equipment Corporation, one of the pioneers in the minicomputer industry, set up a large-scale minicomputer manufacturing plant in Ireland. This was followed by five other minicomputer companies in the latter half of the 1970s, while Amdahl began to assemble mainframes. Most of these firms closed their Irish plants in the 1980s and were replaced by PC manufacturers, beginning with Apple in 1980. Zenith and Wang followed in the mid-1980s, with both closing their Irish facilities in the early 1990s. Digital, which had started assembling workstations and PCs in Ireland, closed its Irish assembly plants in 1993. These losses, however, were more than offset by the arrival of three new PC assemblers, Dell, Gateway and AST, while an indigenous subcontractor, Horman Electronics, began full system assembly for Apple.

A major breakthrough came in 1989 with the decision of Intel to invest in a sophisticated microprocessor wafer manufacturing plant as well as a PC and motherboard assembly plant. A large number of other companies followed in the early 1990s. By 1999, according to IDA calculations, 33 per cent of PCs sold in Europe were assembled in Ireland, while most operations also included other functions such as sales and technical support call centres, European logistics centres and, in some cases, regional headquarters.

Between 1998 and 2002, the Irish microcomputer assembly sector experienced serious job-losses and plant closures. Intel ceased system assembly in Ireland and consolidated assembly activities in Malaysia, Puerto Rico and, to a lesser extent, the US. Apple shed 450 jobs when the production of i-Mac systems was out-sourced, first to LG Electronics in Wales, subsequently to LG in the Far East, and finally to Foxconn in the Czech Republic. Horman Electronics lost its system assembly contract with Apple. AST and Gateway both closed their European operations. Thus, of the five microcomputer companies existing in 1998, by 2002 only Dell and Apple continued to assemble microcomputers, while Apple's system assembly operations had been seriously downsized.

COMPONENTS

The computer component and peripheral sector in Ireland experienced similar churning. In the second half of the 1970s a range of products such as memory, printers, components for disc drives, cables/interconnect material and floppy drives were produced in Ireland, while Digital had opened a plant to produce network components for in-house use. The economic crisis of the early 1980s saw a number of components manufacturers close their Irish plants, while few new investments emerged to replace them. Western Digital opened an automated controller circuit board manufacturing facility and the

⁶ This section draws on Van Egeraat and Jacobson (2004, 2005 and 2006).

Keyboard Company set up a facility to supply Apple, though this plant was closed in 1985 shortly after Apple took it over.

During the second half of the 1980s, a number of foreign companies began to assemble keyboards, mice and cables for the expanding local and European markets. BG Turnkey, an indigenous company, carried out simple sub-assembly activities for Apple in Cork and Apple started automated motherboard assembly for in-house use.

More substantial progress was made in the early 1990s. Existing and newly established indigenous companies captured an increasing share of the market for enclosures, cables, printed matter, packaging and supply-chain management services. One of the most significant developments was Intel's decision to invest in a high-tech microprocessor wafer fabrication plant. The accumulated base of component suppliers and system assemblers fed the perception of the creation of an integrated PC cluster, and by 1995 computer assemblers were thought to source 27 per cent of their material inputs in Ireland, up from 6 per cent in the mid-1980s.

In 1996 the IDA started to actively discourage large companies from locating certain manufacturing operations in Ireland, due to increasing competition from low-wage economies. These included peripherals and media, which depended on a lower cost base. New sub-sectors that began to be targeted included software development, contract manufacturing and computer networking/data-communication.

Ireland continued to attract a number of high-tech high-output manufacturing and service projects, notably successive Intel wafer fabrication plants. Furthermore, a substantial number of foreign contract electronics manufacturers (CEMs) continued to invest in enclosure manufacturing and subassembly plants. In most cases this involved the take-over of existing indigenous companies and plants. Between 1995 and 1998 however, a large number of low- and medium-tech component manufacturers closed their Irish plants and shifted production abroad, primarily to the Far East.

At one stage roughly 90 per cent of computer mice sold in Europe were manufactured in Ireland but this ended when Logitech closed its Irish operations. Keyboard manufacturers Keytronics, Alps and Mitsumi shifted keyboard manufacturing from Ireland to the Far East and continued in Ireland as distribution operations only. Seagate closed its hard disk drive assembly facility to consolidate production in the Far East. Disk drive component supplier Applied Magnetics closed. Both Intel and Apple shifted their labour-intensive motherboard assembly activities – also to the Far East – while Intel ceased its cartridge assembly activities to consolidate in the Philippines and Puerto Rico, refitting its Irish plant for wafer production. Six enclosure manufacturing and subassembly plants closed over the period 1999-2003 while other plants downsized.

LOCAL LINKAGES BETWEEN ASSEMBLY AND COMPONENTS

The Forfás *Irish Economy Expenditure* data suggest that local sourcing of components by microcomputer assembly firms increased rapidly from 6 per cent of material inputs in the mid-1980s to 27 per cent in the mid-1990s and 28 per cent in 1999. These figures, however, include expenditures on items purchased from local supply chain managers but manufactured in other

regions, as well as expenditures on complete systems manufactured by contract manufacturers with local operations. Such items should not be considered as vertical production linkages, however.⁷

More careful analysis by Van Egeraat and Jacobson (2005) which excludes items bought from local supply chain managers suggests that, on average, only 10 per cent of the parts and components sourced by assemblers in Ireland were manufactured in the country. The only items significantly sourced in the region were enclosures, motherboards-backpanels, network cards, non-English language keyboards, digital/printed media, cables/interconnect and packaging materials, and accessory kits.

Furthermore, the actual production activities in many plants added limited value to the product. For example, apart from digital printing activity, eleven kitting plants merely packaged media and other language-specific parts. Similarly, five keyboard localisation plants merely laser printed (non-English-language) keyboards that had been manufactured overseas. Similarly, the production activities of turnkey suppliers involved in rework activities added little value. Hence, the relocation of the computer hardware sector should not have as large a secondary effect on the economy as might otherwise be thought.

4. Inter- and Intra-Firm Adjustments Within the ICT Sector in Ireland

As seen earlier, the Irish computer hardware sector lost about 10,000 jobs, or one-third of its employment, between 2000 and 2004, with about two-thirds of the job losses occurring in NACE 30 (manufacturing of office machinery and computers). There was at the same time, however, a substantial restructuring into related services segments (and into services more generally), in some cases within the same firm.

The following sections detail the experiences of several computer assembly companies in transforming their Irish operations and trace, to the extent possible, what became of displaced workers.⁸

APPLE

Apple established a manufacturing operation in Cork in 1984. In 1998, however, by which time it employed a total of 1,900 workers in Ireland, it closed its Claris subsidiary in Dublin with the loss of 125 jobs.⁹ In July of that year, in the face of recent accumulated losses of \$1 billion, the company announced it was shifting its printed circuit board facility to the Far East, leading to the shedding of 150 full-time jobs and as many as 400 temporary posts from the company's Irish operations. At the same time, however, it was announced that the final assembly and test processing of the new low-cost

⁷ The fact that a company's Global HQ subcontracts production to a company that happens to have a plant in Ireland may have little to do with the fact that the company has a plant in Ireland. In this case it is not a local linkage.

⁸ A number of the computer assembly closures pre-2000 do not show up in the aggregate sectoral data mainly because Dell continued to expand until 2001. With regard to components, again some of the pre-2000 redundancies do not show up in the industry-level data because quite a number of companies (and particularly the high-tech element) were expanding up to 2001.

⁹ The material on Apple is based on reports carried in *The Irish Times* (July 2 and Sept 18, 1998; Jan 30 and Feb 2, 3 and 5, 1999; and Jan 13, Feb 16 and July 5, 2001).

and versatile iMac, on which the company pinned its hopes of recovery, would move to Ireland.¹⁰ The Irish operations were also focused on the production of the company's latest powerful G3 processor products for Europe, the Middle East and Africa (EMEA). Ironically, however, the subsequent success of the iMac led the company to outsource production to the Korean electronics company Lucky Goldstar, which shifted production to its facilities in Singapore, Mexico and Wales, leading to the announcement of a further 500 job losses in the Irish plant in 1999 (with most of the actual redundancies occurring in 2000-2001). Production of the G3 desktop computer, designed for the business market and with a much higher profit margin than the iMac, was to remain in Ireland and the company's European HQ was also to remain here.

By 2001, less than 400 of Apple's Irish workforce of 1,200 were involved in manufacturing. European customer support services and finance functions had been recently transferred to Ireland, which also functioned as a logistics centre for the company, and its Cork location was transformed from a manufacturing base to a services campus. Local management had responsibility for sourcing and logistics and acted as landlord for R&D groups engaged in localisation and software, with the latter managed from the US.

Apple was the only unionised plant in the sector and workers were organised by the trade union SIPTU. SIPTU reports that the market was quite buoyant at the time of the job losses and that most workers found new employment relatively easily.¹¹ A substantial number of people are reported to have gone to Flextronics and to EMC (which is engaged in storage hardware manufacturing). Both were recruiting at the time and were looking for workers with similar skills, while a number of women were said to have used their redundancy payments as an opportunity to stay at home and spend time with their children (Interview with local SIPTU representative, June 2005).

GATEWAY

Gateway established a manufacturing and support hub for the EMEA region in Dublin in 1993. The operation was closed in summer 2001 when the company decided to refocus on the US market. Nine hundred staff were employed at its European HQ in Ireland at the time, 400 of whom were in lower skill manufacturing jobs and a further 250 in technical support. This was the single biggest redundancy announcement since US technology firm Seagate closed its operations in Clonmel, Co Tipperary, in 1997.¹²

Though the plant, like most foreign-owned high-tech operations in Ireland, was not unionised, the redundant Gateway employees, with the assistance of the Irish Congress of Trade Unions and SIPTU, received a redundancy package considered to be one of the most generous on offer within the industry. Gateway also agreed to repay Irish government grants of IR£19 million, though the figure was to be reduced if the company

¹⁰ Singapore had also been under consideration.

¹¹ One union contact recalls an incident during the writing of redundancy cheques when one person asked to be allowed to jump the queue "...because otherwise he would be late for work".

¹² The information on Gateway comes inter alia from *The Irish Times* articles of July 21, August 1, 9 and 17, Oct 30, Nov 22 and Dec 21, 2001.

outsourced some of its displaced workforce to other firms (such as Clientlogic, discussed below) which were also located in Ireland.

Telecom suppliers were expected to be particularly adversely affected by the closure of the plant, and hence were hopeful that Gateway would outsource its technical support services to an Irish company. At least 15 companies – based in the Republic, Britain and Europe – contacted Gateway to express interest in providing these services. Ultimately, Gateway signed an outsourcing deal with a Dublin-based Canadian firm, Clientlogic, which saved about 150 technical support jobs.¹³ Though demand for Gateway customer support services would decline over time because of its decision to exit the EMEA region, Clientlogic expected to be able to shift these workers to other client accounts such as British Telecom, Boots (Chemists) and Dublin-based electronics group Palm.

As well as receiving 75 per cent of Gateway's redundancy package, those who transferred to Clientlogic were offered exactly the same work conditions as before.¹⁴ Even given this lucrative offer to 115 of Gateway's technical support team of more than 200, only 60 took up the offer, revealing the buoyancy of the sectoral jobs market.

Many of the staff from Continental Europe were reported to have returned home on receipt of redundancy payments. Other foreign-language call centre workers brought their highly transferable skills to other local call centres such as Hertz. Many of the younger Irish staff were reported to have taken time off to travel. An IDA Ireland spokesman noted that it reflected a new psychology among the younger and more skilled elements of the Irish workforce and was quoted to the effect that "...the younger generation, who have gone through college, tend to be more flexible and optimistic than workers in traditional industries".

Unlike in the case of previous large redundancies, no government task force was set up on this occasion. FÁS established an on-site employment office for one month at the time of the closure, with 21 companies from North Dublin attending a jobs fair in Gateway to recruit staff for their operations.¹⁵ About one-quarter of staff who completed outplacement courses were reported to have found jobs before the plant's official closure. A further 250 Gateway staff indicated that they wished to take up FÁS evening classes in a range of skill areas. Many of these – a number of whom were veterans of previous redundancies by Amdahl, Motorola and others – secured employment within months.

These positive developments for those with technical and managerial skills should not mask the fact that production-line operatives, who tend not to have tertiary-level educational qualifications, fared less well according to the

¹³ The deal between Gateway and Clientlogic mirrored that agreed by Motorola and Celestica the previous year, when the two firms signed an international alliance. Under this agreement, most of the Motorola staff transferred to the electronics manufacturing firm.

¹⁴ Gateway also agreed to cover the tax liability on the once-off payments for employees transferring to Clientlogic.

¹⁵ Gateway revealed that upon the announcement of closure it had received inquiries from six different Irish-based companies, one of which was electronics manufacturer Flextronics, who were interested in hiring some of its staff.

specialist outplacement agency brought in by Gateway and the client management director at Clientlogic.

INTEL

Intel opened its European HQ in Ireland in 1989. PC and motherboard assembly began shortly thereafter, as did construction of a sophisticated microprocessor wafer manufacturing plant. The assembly operations reached their employment maximum of around 1,500 in 1997. It subsequently shifted its labour-intensive motherboard assembly activities from Ireland to the Far East, as did Apple; it ceased system assembly in Ireland and consolidated assembly activities in Malaysia, Puerto Rico and, to some extent, in the USA, and it consolidated cartridge assembly in its plants in the Philippines and Puerto Rico. It then refitted its Irish plant for much higher-level wafer production.

The Irish Times, in June 1999, reported that some 750 Intel employees involved in assembly functions were informed that their jobs would be gradually eliminated as the company upgraded its Irish operations to produce the latest microchips. Each of the assembly staff were offered retraining and redeployment to allow them to transfer to the new production process, for which the company estimated that an additional 1,000 employees would be required. Workers transferring from the assembly facilities had their existing pay grades preserved.

DELL

Similar processes operated in the case of Dell.¹⁶ Manufacturing operations were located in Limerick while a European logistics centre, a 140-strong European Product Group (involved mainly in localisation as well as product and process development) and a sales, technical support and marketing centre were located in Bray, near Dublin.

In 2001, the company announced a voluntary redundancy package for 200 of its 4,000+ employees in Limerick, the first in its 10-year history in the city. The job shedding was largely confined to office staff. The firm's 1,200 employees in Bray and in Cherrywood, in Dublin, were unaffected. Those affected were offered "competitive severance packages", including more than six weeks pay per year of service, extended medical and life cover, career counselling and out-placement assistance. The following year the firm announced the creation of between 100 and 200 full-time jobs at its call centre in Bray. Many of these were to be in highly skilled positions at Dell's new multilingual centre, offering technical support services for the firm's server and storage products.

AST (ARI SERVICES EUROPE)

AST was set up in Irvine California and began to operate in Limerick in September 1994. It was taken over by Samsung (Korea) in September 1997, by which time it had 4,000 employees globally, with locations in Limerick, Texas, California and China. At its high-water mark in Ireland it

¹⁶ The material on job losses in Dell comes from *The Irish Times*, May 24, 2001, and August 17, 2002.

had 750 employees. By December 1997 this had fallen to 450, all of whom had permanent contracts.

That month the firm announced that 150 Irish jobs were to be shed as part of a global restructuring plan. These 150 were expected to find employment at the nearby Dell and Cabletron facilities. The Irish facility was eventually sold to Dell and a substantial component of the workforce simply transferred to Dell.

In 1998 the company announced that it was withdrawing from the EU market for desktop computers and server machines (underlining the growing dominance of the PC market by the “big four” – Compaq, Dell, IBM and HP) to focus on portable notebooks. The smaller Limerick facility now operates as ARI Services, a purely services company owned by Samsung.

DIGITAL ELECTRONICS CORPORATION (DEC)

An indication of the possible long-term effects of jobs losses may be gleaned from analysis of the demise of DEC’s manufacturing operations in Galway City in the early 1990s.¹⁷ DEC began manufacturing in Ireland in 1971, producing computers for the local market and eventually moving into software, systems and support engineering.

The closure of the manufacturing plant in 1993, which resulted in 760 redundancies, was seen as devastating for the West of Ireland as the company’s net worth to the region was estimated at some IR£100 million per year.

The closure, however, created new opportunities in the region for the pool of skills that the company had employed. Digital itself established in-house programmes for job search, career change, new business start-ups and relocation, and this was supplemented by an Inter-Agency Task Force established by the Department of Enterprise and Employment. The most significant outcome was the establishment of Galway Technology Centre, the provision of additional training support and advisory services and funding for business start-ups, including via the conversion of tax on redundancy pay into seed capital grants.

Business support, training and “incubator” facilities together with informal networks among key ex-Digital staff all played a part in an ongoing transformation of the local economy. Several high-profile successes such as Toucan Technology encouraged other start-ups and helped attract major new investors such as Siebel Systems, while persuading existing ones such as Nortel and Compaq (which absorbed the software and computer engineering areas of Digital) to expand their operations. It also contributed to the emergence in Galway of Europe’s leading medical instruments cluster.

The year after the Galway closure, Digital opened a PC support centre in Dublin and later opened a multi-million euro call centre at a new site. At the time of the closure of the Galway plant the company employed 1,700 in

¹⁷ The material on DEC draws on Green *et al.* (2001), Giblin, Ryan and Moroney (2003) and Van Egeraat and Jacobson (2004).

Ireland. By 1998 employment numbers were back up to 1,400 (comprising its HQ in Dublin and what had been its European Software Centre in Galway).

IBM

IBM's restructuring in Ireland differs from that of the other computer assembly companies, largely due to its later establishment in Ireland as a hardware manufacturer. Its Irish presence began with a small sales operation in 1956. In the early 1980s it was one of the first companies to establish an international software facility in the country. After a period of downsizing in the early 1990s, the company acquired Lotus in 1995 as part of its corporate strategy shift from products to services and solutions. Re-named the Dublin Software Lab, this group brought IBM's total workforce in Dublin to 1,000 and added a significant software development component to its portfolio.

The real turnaround came in 1996 when the company started to invest heavily in Ireland as EU developments allowed it to rationalise its European operations. The company first opened a PC customer support centre, catering for 29 countries (including the US). The same year it began to develop its technology campus at Mulhuddart in County Dublin, which included its first Irish manufacturing operation as well as a range of other services. From the outset, manufacturing activities were of a relatively high value-added nature, including the manufacturing and testing of logic chips, production of disc drive platters in a clean room environment and, since 1999, production of customised high-end network servers.

Since then, the Irish operations have continued to restructure, driven by the continued corporate shift towards services, a search for efficiency in global production capacity and changes in local factor-market conditions. In 2000 IBM placed Dublin at the core of its global e-commerce strategy by establishing a supplier portal and data centre to support electronic business activities to corporate customers. The portal accounted for 40 per cent of IBM's global web-based procurement. In 2001, the hard disk drive operation was relocated to Germany but no redundancies followed among the 300 staff involved as new investment occurred in the remaining two manufacturing divisions and in high value added activities such as supply chain management (*The Irish Times*, 2 February 2001). IBM Ireland was unaffected by the corporate decision taken in 2002 to cut 20,000 jobs globally.

Within services the focus is gradually shifting from low to high-value-added activities. Maintenance of laptop computers and call centre support for personal computers have been re-located to lower cost locations, but again all staff were redeployed in higher value-added activities. The technical support call centre was transformed into a "dotcom centre" with staff selling services directly to clients rather than simply offering support. (*The Irish Times*, 16 August 2002). The Dublin Software Lab expanded and in 2004 launched the Dublin Centre for Advanced Studies, one of seven such centres run by IBM worldwide. Most recently the company created 300 new jobs in a range of projects, including three Competency Centres developing software in areas such as biomedical search and service-oriented architecture, an IBM Business Incubation Centre, a European Venture Capital Centre, an Innovation Centre and new supply chain operations. By 2006 IBM Ireland employed over 3,700 staff and its 2004 turnover stood at €2.5 billion.

The aim of the paper has been to study the process of employment adjustment as the computer hardware sector relocated out of Ireland over the early years of the new millennium. Our brief history of the sector revealed that there had been extensive churning both of firms and of activities over the entire period since mini-computer and mainframe assembly began in the 1970s. These early firms were replaced by new PC assembly firms in the mid-1980s and 1990s, so that by the late 1990s Ireland had become one of the major European locations for computer assembly.

Ireland at this stage also accounted for around 6 per cent of global exports of electronic components. This segment had also been characterised by extensive churning. Motherboard assembly and manufacturing of keyboards and computer mice shifted abroad over time while higher value-added manufacturing activities, notably the production of microprocessors, continued to expand. One producer, Intel, now accounts for a large share of Irish components employment, and is estimated to have invested some €6 billion in Ireland since it first set up operations in the country in 1989.

Over recent years, both segments have experienced serious job losses and a number of plant closures. The case studies illustrate the various paths followed by displaced employees. Plant closures have occasionally led to high-tech spin offs, as in the case of Digital and more recently in Motorola.¹⁸ Some displaced workers remained employed in their original companies but moved to other (higher value-added) manufacturing jobs following retraining, as seen in the case of Intel. Others, as in the cases of AST and Gateway, were able to move rapidly into expanding companies in the local area, serving as an indicator of the value of the skills accumulated in the sector. Other displaced workers chose to leave the labour force voluntarily.

A number of hardware companies, such as Apple, remained in Ireland and shifted their Irish operations, and some of their displaced workers, into services activities. As Grimes (2006) notes, "...the general trend is for an on-going shift away from hardware manufacturing towards a greater involvement in software, R&D and a range of other support services. The growth of internationally traded services activities in these technology corporations reflects an evolution towards a greater involvement in servicing other affiliates and the various 'geographies' of their client base, as they become increasingly internationalised."

In this regard, we pointed to the substantial employment growth in computer services and Business Process Services Export activities (BPSE) as the hardware sector declined. As many jobs were created in computer services as were lost in hardware over the early years of the new millennium, while non-IFS BPSE, and of course total services, expanded much more dramatically.¹⁹ The indigenous (non-IFS-related) BPSE segment now employs around the same number of people as the entire computer hardware sector, while the foreign-owned BPSE segment employs substantially more.

¹⁸ "Motorola Alumni Try Out as Entrepreneurs", Sunday Tribune, May 15, 2007. Spin-off activities will not necessarily be reflected in an increase in the number of companies in the sector because they do not necessarily occur in the same sector.

¹⁹ BPSE includes software and computer services and a variety of other services such as call centres. Some 35 per cent of Irish call centres are in the technology sector and Ireland is known to attract more high-value, less price-sensitive call centre activity than other offshore locations (Barry and van Welsun, 2005).

Clearly, not all employees would have found it equally easy to find new jobs. The international literature identifies older workers with low educational attainment as having the poorest re-employment prospects and this is confirmed in the Irish data. Denny *et al.* (2000), for example, show that the probability of being in employment rises with the level of educational attainment while O'Connell (1999) shows that the share of long-term unemployment in total unemployment increases with age.

The sector under discussion in the present paper is atypical in that it is characterised by higher educational attainment and a lower age profile than the manufacturing average, both of which suggest that workers displaced from this sector would have had better than average chances of finding new employment.²⁰ We also saw that the pools of skills that had been employed and expanded – even by hardware companies that later downsized and retreated – created new opportunities for the regions in which they had located.

It suggests that though the ability of displaced workers to move to new employment relatively easily was undoubtedly assisted by the overall buoyancy of the economy over the period under discussion, the adjustment problems associated with churning and displacement in sectors of this type may be substantially less than in traditional lower value-added sectors.

Might one expect this same relative ease of adjustment to occur if other low-age-profile sectors with equivalent or higher educational attainment profiles – such as Pharmaceuticals and Medical and Precision Instruments – were to shift eastwards? Perhaps not, since the skills structure in these sectors might be less closely related to cognate services activities than in the case of computer hardware. However, jobs in these other sectors appear to be less likely to be lost. The analysis of Forfás employment data in the Appendix shows that job persistence is greatest in the two sectors Chemicals and Chemical Products and Medical and Precision Instruments. The thrust of the various strands of evidence upon which we have drawn in the paper is to suggest that the flexibility of the labour market will be enhanced by the increasing educational attainment of the workforce and a concurrent expansion in the share of modern higher-technology sectors.

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²⁰ The most recent *Census of Population* (Volume 7, Table 16) shows that the Metals, Machinery and Engineering sector – the broad sector that includes computer hardware – has a younger age profile than overall manufacturing, while Barry (2007) shows that educational attainment in this sector is higher than the average for manufacturing. The average wage is also frequently used as a proxy for human capital. The *Census of Industrial Production* (2004, Table 13) reveals that the average wage in NACE 30 is 13 per cent above the manufacturing average. *CIP* (2000, Table 14) provides the most recent disaggregated data for NACE 3210. At that time, wages in this sector were above those for NACE 30 and were 8 per cent above the manufacturing average.

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APPENDIX: JOB PERSISTENCE ACROSS SECTORS

Forfás employment survey data allow one to track changes in job numbers in individual plants over time, and to determine how long these changes in employment numbers persist. This is frequently treated as a proxy for job life, though it does not capture intra-firm job turnover for example.

Results for job-creation persistence by sector three years after initial job creation are given in Table A1. Differences in sectoral job-persistence measures may simply reflect differences in plant size, plant age and nationality

Table A1: Percentage of New Jobs Remaining after 3 Years, by Sector*

	NACE	3 Years	Unadjusted Rank
Food Products	15	54	13
Drink and Tobacco	16	69	5
Textiles	17	52	16
Clothing	18	44	20
Leather and Footwear	19	33	22
Wood Products	20	50	19
Pulp paper and paper products	21	58	9
Publishing and Printing	22	57	10
Manufacturing of coke, refining	23	54	14
Chemicals and Chemical	24	74	1
Rubber and Plastic Products	25	56	12
Other Non-Metallic Mineral	26	53	15
Basic Metal Products	27	40	21
Fabricated and Structural Metal	28	51	18
Machinery and Equipment n.e.c.	29	57	11
Office Machinery and Computers	30	70	3
Electrical Machinery and	31	61	7
Electronic Equipment	32	70	4
Medical and Precision	33	73	2
Motor Vehicles and Equipment	34	59	8
Other Transport Equipment	35	63	6
Other Manufacturing n.e.c.	36	51	17
Recycling	37	27	23

*This is taken from background work prepared by Frank Barry and Eric Strobl for Walsh *et al.* (2003).

of ownership. Jobs created in younger plants are substantially more persistent than those in older plants while jobs created in foreign plants are more durable than indigenous ones. From a policy perspective, however, the fact that sectors differ across these characteristics is important and we do not therefore control for them (in the sense of reporting on what each sector's persistence rate would be, were age, size and nationality in the sector simply to reflect the manufacturing average).

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