ESRI Research Note

Irish Economic Performance 1987-2013: A Growth Accounting Assessment

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*David Byrne and Kieran McQuinn[1]

1. Introduction

In this Note we examine the contribution to Irish economic performance over the period 1987 to 2013 comparing it with that of 14 European countries. In particular, we note the relative performance of the Irish labour market, aggregate investment and trends in total factor productivity over this time. This work is part of a broader work stream assessing economic performance at a European level.

2. Assessment Framework

The analytical framework which we use to assess both Irish and European performance is based on the standard assumption that output is produced according to a Cobb-Douglas production function

$$Y_t = A_t K_t^{\alpha} L_t^{1-\alpha}$$

where Y_t is real output[2], K_t is capital input, L_t is labour input (defined in this paper as total hours worked), and A_t is total factor productivity. Output growth can then be expressed as

$$\frac{\dot{Y}_t}{Y_t} = \frac{\dot{A}_t}{A_t} + \alpha\frac{\dot{K}_t}{K_t} + (1 - \alpha)\frac{\dot{L}_t}{L_t}$$

Using data on output growth, capital growth and labour growth, Total Factor Productivity (TFP) growth can be calculated. As there is no official capital stock series for the Irish economy, we construct this series using a perpetual inventory method. To do this we assume that the initial stock of capital in 1970 equals the

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[1] Thanks to Frances Ruane and Alan Barrett for comments on a previous draft. Any remaining errors are the responsibility of the authors.

[2] For all other European countries, GDP is the output series used. However, in an Irish context, we use GNP owing to the relevance of the multinational sector to the Irish economy.

steady-state value implied by the Solow growth model in this year based on the trends at that point for GDP growth, the investment share of GDP and the growth rate of labour input. The rest of the capital stock series is then derived using the following definition:

$$K_t = (1 - \delta)K_{t-1} + I_{t-1}$$

with a depreciation rate of six per cent per annum. For more on the assumptions underpinning the growth calculations see McQuinn and Whelan (2007) and McQuinn and Whelan (2008).

Based on this approach, we now decompose Irish economic performance since 1987 along with that of 14 comparator European countries.[3] In Figures 1 to 4 we plot the annual growth rates for some of the key Irish macroeconomic series from 1987 to 2013.

3. Irish Performance in a European Context

Pre-Crisis 1987-2006

In the two decades preceding the 2007/08 financial crisis, Ireland exhibited one of the strongest growth performances amongst the countries in question. The Irish performance over the period has been attributed to a "belated convergence" phenomenon (see Honohan and Walsh (2002)). The eventual achievement of a relatively stable macroeconomic policy environment by the late 1980s enabled the coupling of a young, well-educated labour force on the supply side of the economy with a large increase in multi-national investment due to Ireland's competitive corporate tax regime. The growth which took place in Irish performance since the early 1990s thus resulted in Ireland catching up with its neighbours, which were more productive but experiencing lower rates of productivity increases.

In Tables 1 and 2 we present the components of output growth for 1987-1996 and 1997-2006 for 14 European countries: Sweden, the United Kingdom and the 12 Member States of the Euro Area as of 2002. In both ten-year periods, Ireland had the greatest output growth rate. Between 1987 and 1996, the largest contribution to Irish growth came from TFP, accounting for 4.3 percentage points of the 7.2 per cent total. The magnitude of Ireland's technology growth in this period is highlighted by the fact that the second-highest TFP growth rate,

[3] All of the data with the exception of the average work week is taken from the European Commission AMECO database. Data on the workweek is taken from the Groningen Growth and Development Centre (GGDC): http://www.rug.nl/research/ggdc/.

Finland's, was 2.2 per cent. Any analysis of trends in Irish TFP does come with some health warnings. For example, Honohan and Walsh (2002) discuss the role played by foreign direct investment (FDI) in Ireland's productivity growth for this period. They note that the growth rate in productivity of foreign-owned manufacturing enterprises (constituting over 90 per cent of manufacturing exports and almost 80 per cent of all exports) was much higher than in other sectors of the economy.[4]

Also, the OECD lists Ireland as among the five "best practice" member countries in terms of product market regulation. It is for this reason that Johansson et al. (2013) argue that Ireland would be the Euro Area country to receive the smallest benefit from structural reforms. This compares with countries such as France and Italy, for which significant gain from reforms is predicted. The relatively strong performance in Irish TFP for this period is corroborated by the recent release of purchasing power parity (PPP) adjusted TFP levels by the Penn World Tables (see Feenstra *et al.* (2013) for details). These new data clearly show that Irish TFP levels increased significantly vis-à-vis other European countries from 1990 onwards.

In the 1987-1996 period, labour growth was the next most important component of overall output growth, accounting for 1.6 percentage points, the second-highest growth rate among the EU states considered. Capital provided the smallest contribution to overall output growth in Ireland but the capital growth rate was nonetheless the third-highest in Europe.

Between 1997 and 2006 Ireland was again first in terms of overall output growth (4.9 per cent), however the ranking of contributing parts changed with respect to the previous decade. Capital growth accounted for 2.1 per cent of the total, and also was the largest capital growth rate among the EU states considered. This reflected the large increase in both residential and commercial property construction which occurred in the Irish economy over this period. Labour contributed 1.8 per cent to growth in Ireland, second overall to labour growth in Spain. For the Euro Area as a whole, labour grew by 0.4 per cent in the decade, an increase from 0.2 per cent growth in the previous decade. There was considerable heterogeneity among the Euro Area countries, however; Ireland,

[4] Honohan and Walsh (2002) argue that since Ireland has a particularly low standard rate of corporation tax on manufacturing among the advanced economies, certain transactions are often booked at transfer prices which have the effect of locating a very high fraction of the enterprise's global profits in Ireland. Thus, in many cases, the huge profits recorded by the Irish affiliates may have very little to do with the manufacturing activities being conducted in Ireland. In the present analysis, the use of GNP as opposed to GDP as the relevant output indicator does mitigate somewhat this effect.

Greece, Spain, Belgium and Finland all increased their rate of labour growth, while Sweden, France, the Netherlands, Austria and Portugal remained at or near zero growth. Germany was the only country to have negative labour growth between 1997 and 2006.

Irish TFP grew by 1.1 per cent between 1997 and 2006, which was among the highest rates in Europe in this period. Compared with the 1987-1996 period, however, the magnitude of productivity growth was much lower in Ireland. This is likely attributable to the increasing share of the relatively low-productivity construction sector in Irish output. In a European context, in contrast to the previous ten-year period in which every country had positive TFP growth, there was negative productivity growth in Italy, Spain and Portugal.

Tables 3 and 4 decompose labour growth[5] further into its constituent parts; population growth, the participation rate, the employment rate and growth in the average working week. Ireland's strong overall growth in labour in both decades can be attributed to growth in population and participation, with growth in the employment rate a feature of the earlier decade. Spain and Luxembourg were among the other states to have particularly large labour growth rates.

Between 1987 and 1996, Ireland had the largest employment rate growth, while also having the largest fall in average hours per week. This could represent growth in shorter-hours worked at the margin; a significant proportion of the gain in employment in this period was likely due to activation of people who were previously out of the labour force with many of them taking up part-time employment. As noted by McCarthy and McQuinn (2008), the increase in labour force participation in Ireland, particularly among women, was a sign of the dynamism of the Irish labour market. The participation rate in Ireland grew by 1.8 per cent and by 1.3 per cent in 1987-1996 and 1997-2006, respectively. This compares with growth in Euro Area participation rates of 0.3 and 0.4 per cent in the two ten-year periods. While Ireland's participation growth was particularly high, participation increases were widespread across Europe in both decades.

Post-Crisis: 2007 to the Present

In both the 1987-1996 and 1997-2006 periods, all 14 states we consider had positive output growth. In the subsequent five-year crisis period, however, only four had positive rates of output growth. The largest decrease in output was found in Greece, followed by Italy, Ireland, Portugal and Spain. Table 5

[5] Transformation of labour growth rates in Tables 1 and 2 by (1-α) matches the labour growth rates in Tables 3 and 4.

summarises output growth over the 2007–2013 for the different countries. The profound decline in Irish economic activity was, of course, related to the substantial credit boom which had accumulated in the period immediately preceding the financial crisis of 2007-2008. Thus, the Irish economy was, arguably, more exposed than most to the subsequent economic instabilities.

The capital stock in the Euro Area had been growing at rates between 2 and 3 per cent per year between the late 1970s and the onset of the crisis (McQuinn and Whelan (2013)). Table 5 shows relatively weak growth in the capital stock in the post-crisis period, as a result of a falling investment share of GDP. From Table 5 it is also evident that, like most European countries, the contribution to growth from increases in both TFP and investment declined significantly in an Irish context. Growth in the Irish capital stock was particularly hit by the post-2007 decline in activity in the construction sector as the credit bubble preceding the crisis had resulted in a significant over-supply of residential housing units.[6]

Developments in the Irish labour market were especially affected by the onset of the financial crisis. For the Euro Area as a whole, the unemployment rate rose from approximately 7 per cent at the onset of the crisis to 12 per cent by 2013. This EA-wide increase masks the heterogeneity in labour market outcomes for individual countries. While Germany and Austria maintained relatively low levels of unemployment, Ireland along with France, Italy, Portugal, Greece and Spain saw unemployment rise significantly above 10 per cent. Table 5 shows the considerable impact changes in the labour component had on output growth. The labour component fell by 2.6 per cent in Ireland, the largest decrease across the countries we consider.

We decompose the labour growth rates in Table 6. Ireland had the greatest fall in labour market participation between 2007 and 2012, in a reversal of the increasing participation of the previous 20 years. The significant flows out of the labour force in Ireland stopped the unemployment rate from rising further than it did. The elevated unemployment rates in Ireland during the crisis thus did not fully represent the scale of the weakness in the Irish labour market. Ireland was among the states with the largest decreases in the employment rate and the average working week. The only state for which employment grew over the period was Germany. On the other hand, population growth had a positive impact in every state except Germany.

6 At the peak of the construction boom between 2005 and 2007 an average of almost 85,000 housing units was being built per annum in the Irish property market. In the UK at the same time just over twice the amount of units (215,000) were being built, despite a fourteen-fold population differential.

4. Future Issues and Concluding Comments

The results presented in this Note are part of a larger body of work assessing the medium-term growth outlook for the Irish economy. The analysis enables Ireland's relative economic performance over the period 1987-2013 to be placed in an international context. In particular, it allows for a relative comparison of the main channels of economic growth; the labour market, investment and TFP. What is striking is that during the growth phase of the economy (1987-2006), the initial sub-period (1987-1996) appeared to be characterised by strong growth in TFP, while in the latter phase of the boom (1997-2006), greater contributions were forthcoming from labour and capital.

Overall, from an Irish perspective, the analysis suggests that at present, the domestic economy is operating some way below its potential level. The unemployment rate is above its long-run median rate of 7.9 per cent, while TFP growth is below the average of 2 per cent and the investment rate, which drives capital growth, is below its long-run average of 21 per cent. This suggests that, notwithstanding the positive growth trends which have emerged recently in the Irish economy, considerable slack still exists across all the main channels of growth.

Future work in this area will present a new estimate of potential output for the economy based on the standard growth accounting model presented here. It will also examine the implications for Irish growth of significant expected changes in population trends over the next 30 to 40 years with Ireland, like all major European countries, set to experience a significant decline in the proportion of people in the working age category.

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TABLE 1 Decomposition of Output Growth Rates: 1987-1996

Economy	Total	TFP	Capital	Total Labour
Belgium	2.2	1.3	0.9	0.0
Germany	1.9	1.3	0.8	-0.2
France	1.9	1.2	0.7	0.0
Greece	2.3	1.9	0.4	0.1
Ireland	7.2	4.3	1.2	1.6
Italy	1.6	0.8	0.7	0.1
Spain	2.8	0.4	1.2	1.1
United Kingdom	2.5	1.7	0.9	-0.1
Sweden	2.1	1.6	0.5	-0.1
Finland	2.0	2.2	0.4	-0.6
Luxembourg	4.9	1.5	1.4	2.0
Portugal	3.0	0.5	1.5	1.0
Austria	2.7	1.7	1.0	-0.1
Netherlands	3.1	1.2	1.0	0.9

Source: Own estimates.

TABLE 2 Decomposition of Output Growth Rates: 1997-2006

Economy	Total	TFP	Capital	Total Labour
Belgium	1.8	0.3	0.8	0.7
Germany	1.1	1.0	0.5	-0.4
France	1.7	0.8	0.9	0.1
Greece	4.2	2.0	1.2	0.9
Ireland	4.9	1.1	2.1	1.8
Italy	1.2	-0.2	0.8	0.6
Spain	3.3	-0.1	1.6	1.9
United Kingdom	2.9	1.4	1.1	0.3
Sweden	2.9	2.1	0.8	0.0
Finland	2.9	1.7	0.8	0.4
Luxembourg	3.7	0.6	1.7	1.4
Portugal	0.9	-0.3	1.2	0.0
Austria	2.0	1.1	0.7	0.1
Netherlands	1.6	0.7	0.9	0.0

Source: Own estimates.

TABLE 3 Decomposition of Average Labour Growth Rates: 1987-1996

Economy	Total	Population	Participation Rate	Employment Rate	Workweek
Belgium	0.0	0.3	0.4	0.0	-0.7
Germany	-0.2	0.4	0.2	-0.2	-0.7
France	0.0	0.4	0.4	-0.1	-0.8
Greece	0.1	0.7	0.4	-0.5	-0.5
Ireland	2.5	0.8	1.8	1.0	-1.2
Italy	0.1	0.0	0.2	-0.1	0.0
Spain	1.7	0.3	1.1	0.3	-0.1
United Kingdom	-0.1	0.3	-0.2	0.2	-0.3
Sweden	-0.1	0.4	-0.6	-0.4	0.5
Finland	-0.9	0.4	-0.5	-0.7	-0.1
Luxembourg	3.0	1.3	2.1	-0.1	-0.4
Portugal	1.5	0.2	0.5	0.0	0.7
Austria	-0.1	0.4	0.2	-0.1	-0.6
Netherlands	1.4	0.6	1.1	0.2	-0.5

Source: Own estimates.

TABLE 4 Decomposition of Average Labour Growth Rates: 1997-2006

Economy	Total	Population	Participation Rate	Employment Rate	Workweek
Belgium	1.0	0.5	0.6	-0.3	0.2
Germany	-0.6	0.0	0.3	-0.4	-0.5
France	0.1	0.7	0.0	0.0	-0.6
Greece	1.4	0.3	1.0	0.4	-0.4
Ireland	2.7	1.9	1.3	-0.1	-0.5
Italy	0.9	0.6	0.2	0.6	-0.4
Spain	2.8	1.5	1.3	0.6	-0.6
United Kingdom	0.5	0.5	0.4	0.0	-0.4
Sweden	0.0	0.4	0.3	-0.3	-0.4
Finland	0.6	0.3	0.3	0.4	-0.4
Luxembourg	2.1	1.3	2.3	-0.4	-1.1
Portugal	0.0	0.6	0.5	-0.7	-0.3
Austria	0.2	0.5	0.5	-0.2	-0.6
Netherlands	0.1	0.4	0.4	-0.2	-0.5

Source: Own estimates.

TABLE 5 Decomposition of Output Growth Rates: 2007-2012

Economy	Total	TFP	Capital	Total Labour
Belgium	0.4	-0.7	0.7	0.4
Germany	0.7	-0.1	0.4	0.3
France	0.0	-0.6	0.7	-0.2
Greece	-4.5	-3.0	0.8	-2.2
Ireland	-1.3	0.7	0.7	-2.6
Italy	-1.4	-1.0	0.4	-0.8
Spain	-0.8	0.1	0.9	-1.8
United Kingdom	-0.5	-1.3	0.8	0.0
Sweden	1.0	-0.4	0.9	0.5
Finland	-0.6	-1.2	0.7	0.0
Luxembourg	0.0	-2.8	1.5	1.3
Portugal	-1.2	-0.2	0.4	-1.4
Austria	0.6	0.0	0.5	0.1
Netherlands	0.0	-0.9	0.7	0.1

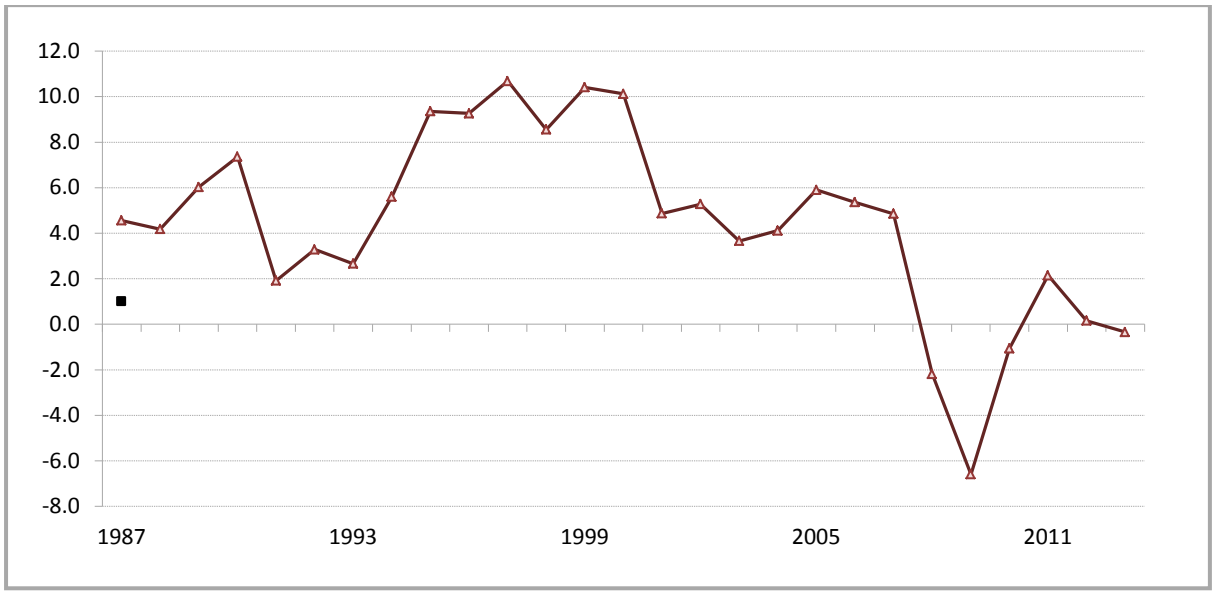
Source: Own estimates.

TABLE 6 Decomposition of Average Labour Growth Rates: 2007-2012

Economy	Total	Population	Participation Rate	Employment Rate	Workweek
Belgium	0.6	0.8	-0.1	0.0	-0.1
Germany	0.5	-0.1	0.3	0.7	-0.4
France	-0.3	0.5	-0.2	-0.4	-0.1
Greece	-3.3	0.2	0.4	-3.9	0.0
Ireland	-4.0	0.6	-1.8	-2.2	-0.6
Italy	-1.2	0.5	0.1	-1.0	-0.8
Spain	-2.7	0.6	0.4	-4.0	0.3
United Kingdom	0.0	0.7	0.0	-0.6	-0.2
Sweden	0.8	0.8	0.1	-0.3	0.3
Finland	-0.1	0.5	-0.1	-0.2	-0.3
Luxembourg	1.9	1.9	0.8	-0.2	-0.6
Portugal	-2.1	0.1	-0.5	-1.6	-0.1
Austria	0.1	0.4	0.6	0.0	-0.9
Netherlands	0.2	0.5	0.1	-0.4	0.0

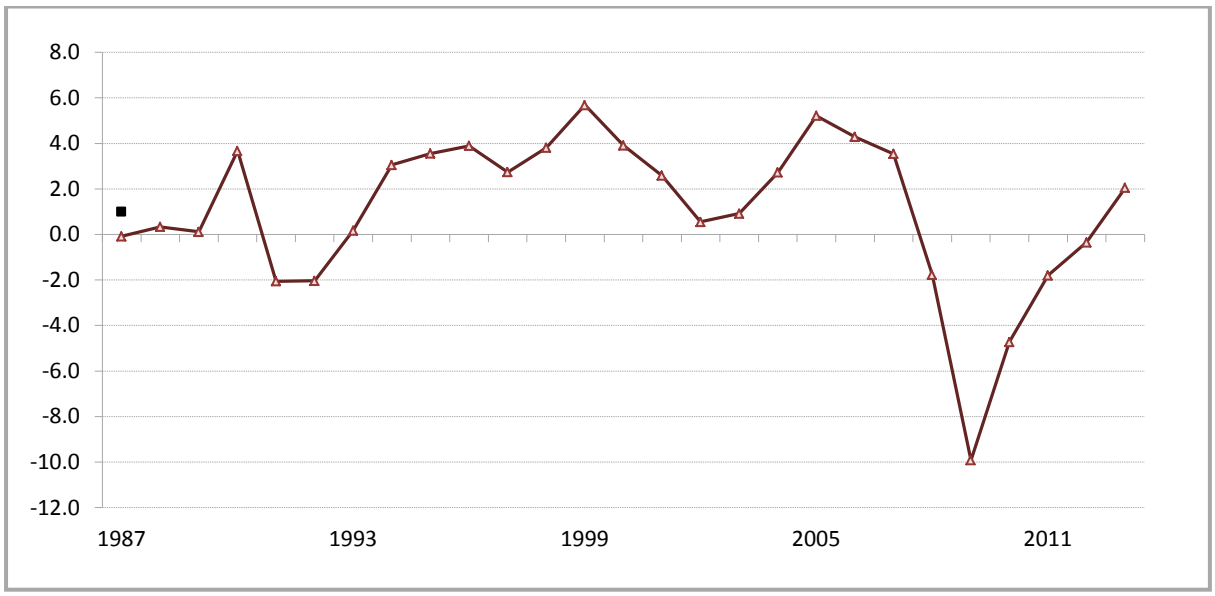
Source: Own estimates.

FIGURE 1 Year-on-Year Growth (%) in Real Irish GNP 1987:1 - 2013:1



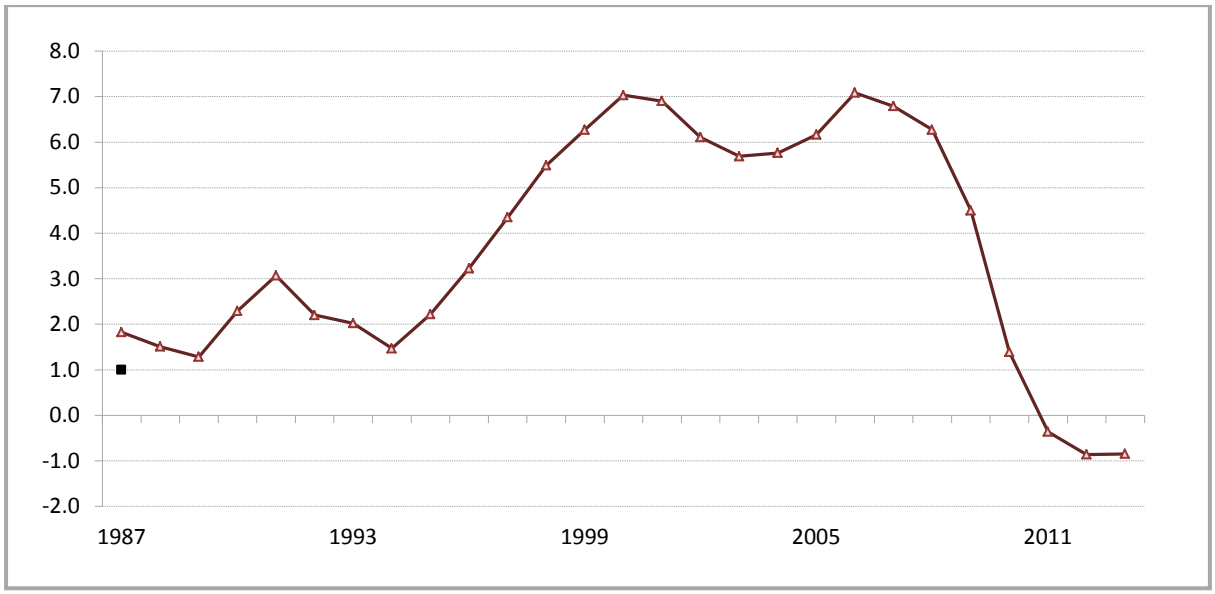
Source: AMECO.

FIGURE 2 Year-on-Year Growth (%) in Total Irish Hours Worked 1987:1 - 2013:1



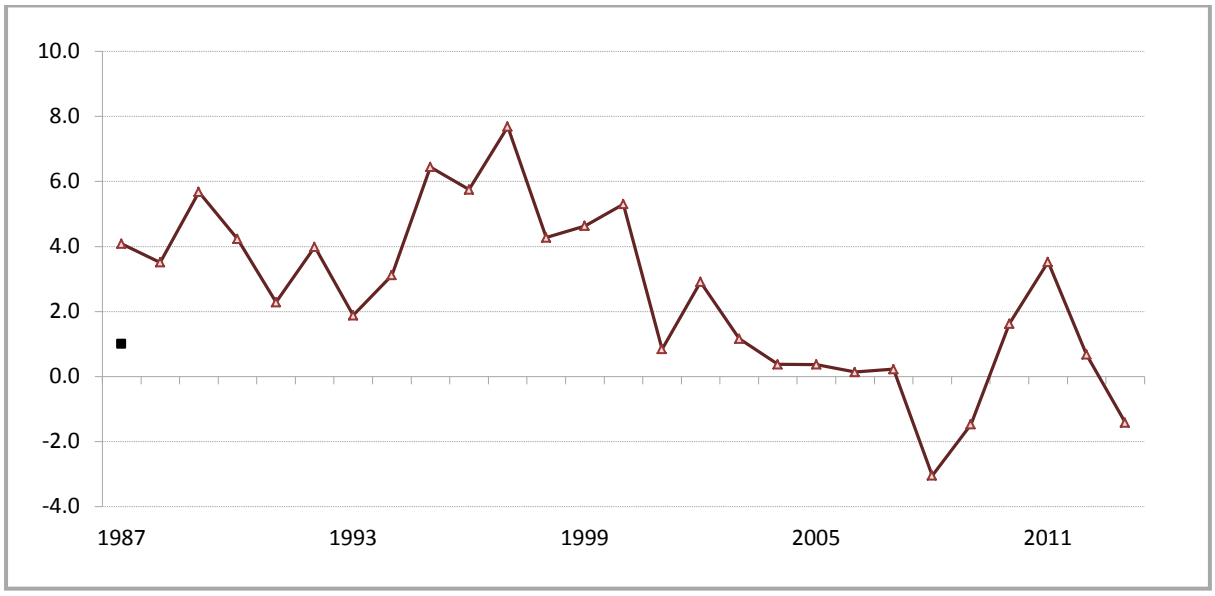
Source: AMECO + own estimates.

FIGURE 3 Year-on-Year Growth (%) in Irish Capital Stock 1987:1 - 2013:1



Source: AMECO + own estimates.

FIGURE 4 Year-on-Year Growth (%) in Irish TFP 1987:1 - 2013:1



Source: AMECO + own estimates.