

Potential Output in Ireland

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Plan for this Talk

- 1 Conceptual Issues:
 - ▶ What is potential output?
 - ▶ How can we go about measuring it and what are the uncertainties?
- 2 Frameworks for thinking about potential output:
 - ▶ Breaking output growth into labour input and labour productivity.
 - ▶ Production function approach.
- 3 Some reasons for pessimism:
 - ▶ Potential growth rates unlikely to return to anything close to the rates that prevailed in recent years.
- 4 Structural budget deficits
 - ▶ Definitions and uncertainties.
 - ▶ Importance to Ireland's current fiscal problems.

Part I

What Is Potential Output?

What Exactly Is Potential Output?

- Potential output can have lots of different meanings, so it's worth exploring a little.
- Originally associated with the notion of maximum *achievable* output, now associated with the maximum *sustainable* output.
- Two slightly different concepts:
 - ① Potential Output Growth: How fast can the economy grow along a sustainable growth path?
 - ② Potential Output Level: What would the level of output be when resource utilisation is at its long-run levels and the economy is growing at its potential rate? The difference between current actual output and this level is known as the *output gap*.
- Concept one (Potential Output Growth) is easier to understand. We can use time series data and cross-country patterns to help.
- Concept two (Potential Output Level) is far more difficult to put numbers on. And doing so and getting it wrong can have negative consequences.

Mean Reversion?

- Many models of potential output measure it as a slow-moving trend, which actual GDP tends to return to over time.
- Lots of unresolved technical issues about how to best extract this trend (Time trends, HP Filters etc.)
- Unfortunately, it's even not clear that the concept of output “reverting to trend” is correct.
- Consider two models for $y_t = \log Y_t$

$$y_t = \alpha + gt + \epsilon_t$$
$$\Delta y_t = g + \epsilon_t$$

where ϵ_t are mean-zero random shocks.

- In both models, the average growth rate will be g . However, in the first case output reverts back to its trend level of $\alpha + gt$ while in the second case, there is no such thing as a trend level.
- Both of these models can usually fit the data. In fact, statistical tests generally can't tell you which one would be better.

Permanent and Transitory Shocks

- In reality, both of these models contain elements of truth.
- Business cycles lead to fluctuations in output due to variations in resource usage. Recessions see increases in unemployment and reduced capital utilisation but these are usually temporary.
- In contrast, technology shocks—improvements in our efficiency at producing goods and services—usually stem from permanent improvements in the stock of knowledge or business know-how. Once we know how to produce something more efficiently, we usually don't forget.
- But permanent (or quasi-permanent) negative shocks are also possible. The higher tax rates and more stringent financial regulation are likely to have negative supply-side effects on the World and Irish economy for many years to come.
- For these reasons, it is generally difficult to be precise about the underlying level of potential output.
- At times of substantial structural change like now, this uncertainty is even greater than usual.

Part II

Potential Output: A Simple Framework

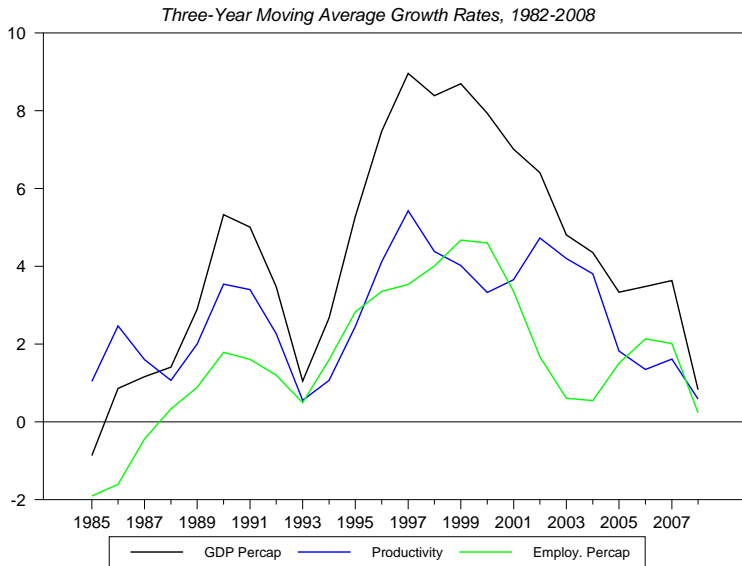
Contributions of Employment and Productivity

- Start with the simplest possible decomposition.
- Break output per head into the fraction of people working times the average productivity of workers:

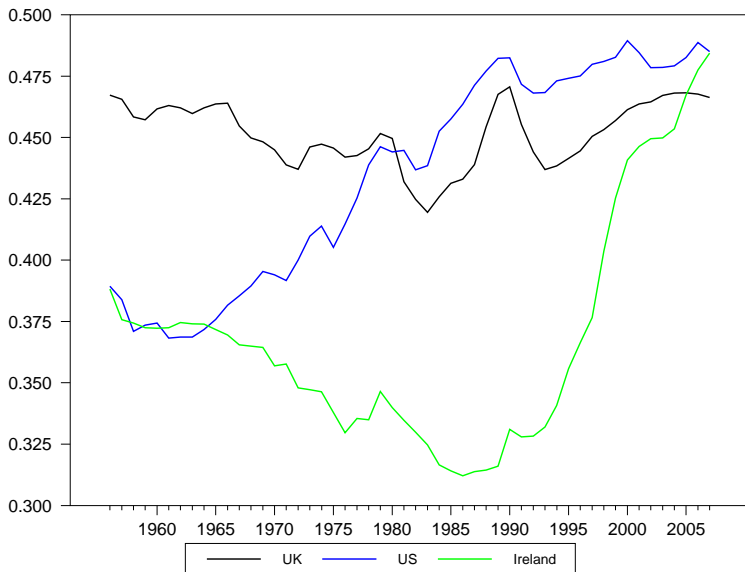
$$\frac{GDP}{Pop} = \frac{Emp}{Pop} \frac{GDP}{Emp}$$

- In most economies, productivity growth is the principle source of long-run increases in output per capita.
- However, during the long Irish expansion increases in the employment-population ratio played a very significant role.
- The 105% increase in GDP per head over 1986-2007 can be broken into 61% from labour productivity and 44% from a higher employment-population ratio.
- Productivity growth during the Tiger period was very good but not miraculous and had slackened considerably in recent years.

Contributions of Employment and Productivity



Comparisons of Employment-Population Ratios



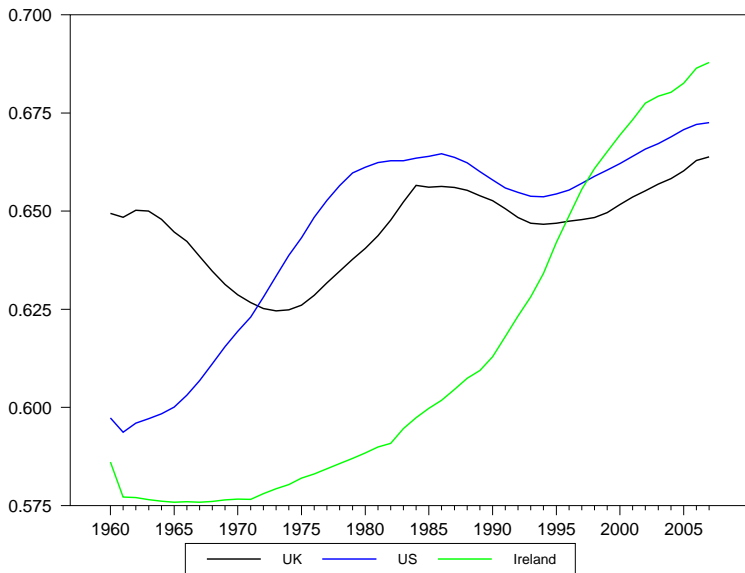
Decomposing the Employment Performance

- Useful to think of the employment performance using a three-part decomposition:

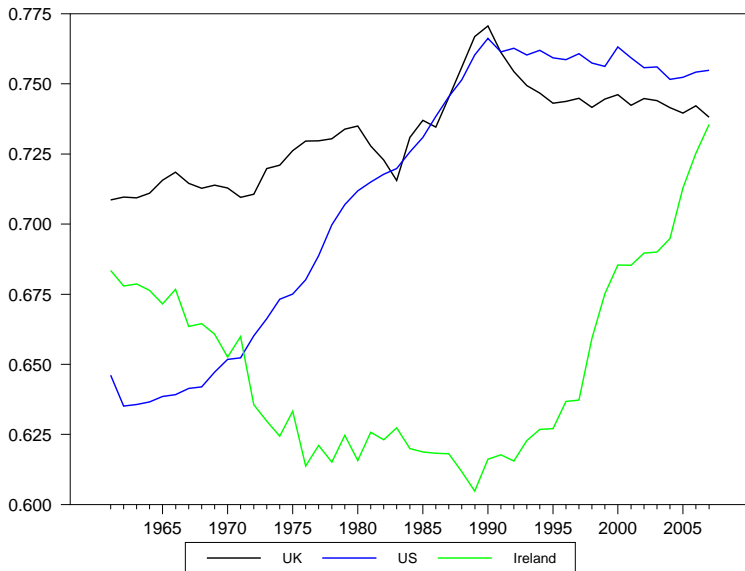
$$\frac{Emp}{Pop} = \frac{WorkingAge}{Pop} \frac{Lforce}{WorkingAge} \frac{Emp}{LForce}$$

- All three of these factors played important roles in boosting our employment to population ratio from its low of 30.8% in 1986 to its high of 48.3% in 2007.
- A breakdown of the log-difference of 0.44 in the employment-population ratio from 1986-2007 shows:
 - 0.133 due to demographics (increased share of working age).
 - 0.174 due to increased labour force participation.
 - 0.132 due to a lower unemployment rate.
- But, as of 2007, there appears to have been little room left for further improvement in any of these ratios. In fact, it is possible (likely?) that 2007 was a historical high point for each of these factors.

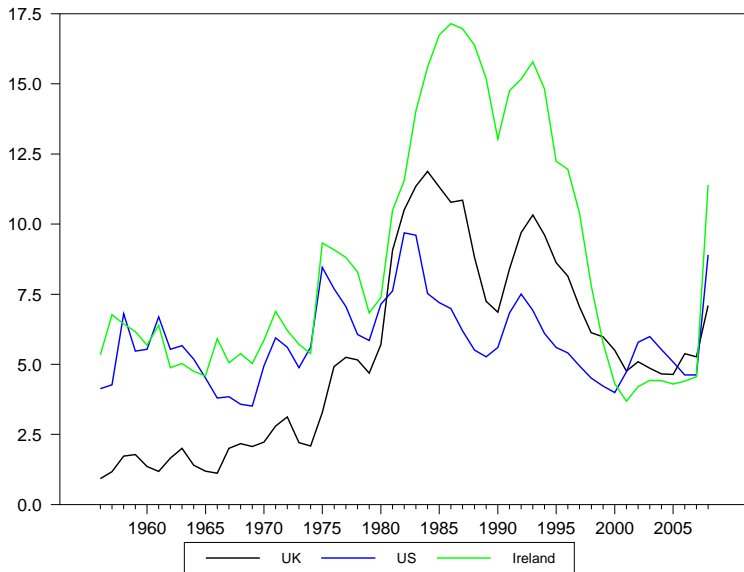
Shares of Working Age Population



Labour Force Participation Rates



Unemployment Rates



Production Function Approach

- If we are willing to make assumptions about the form of the production function, then we can also decompose labour productivity a bit further.
- Assume a Cobb-Douglas production function

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

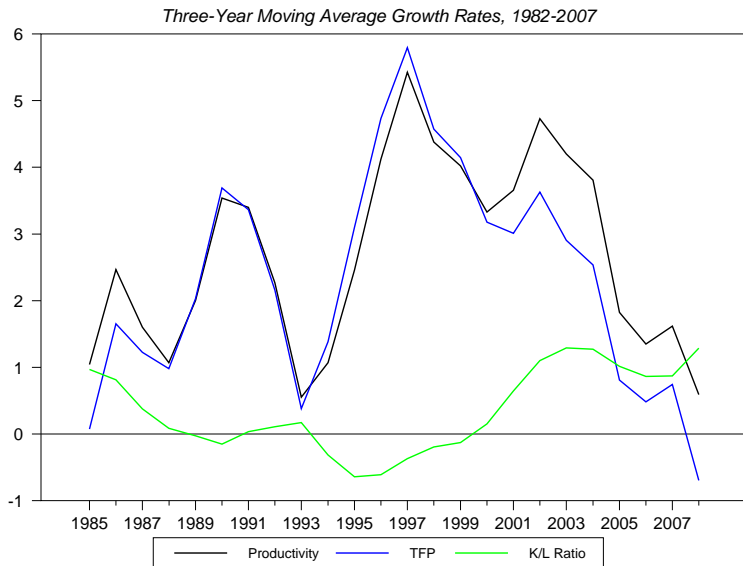
where Y_t is output, K_t is capital input, L_t is labour input and A_t is Total Factor Productivity (TFP).

- Then labour productivity can be written as

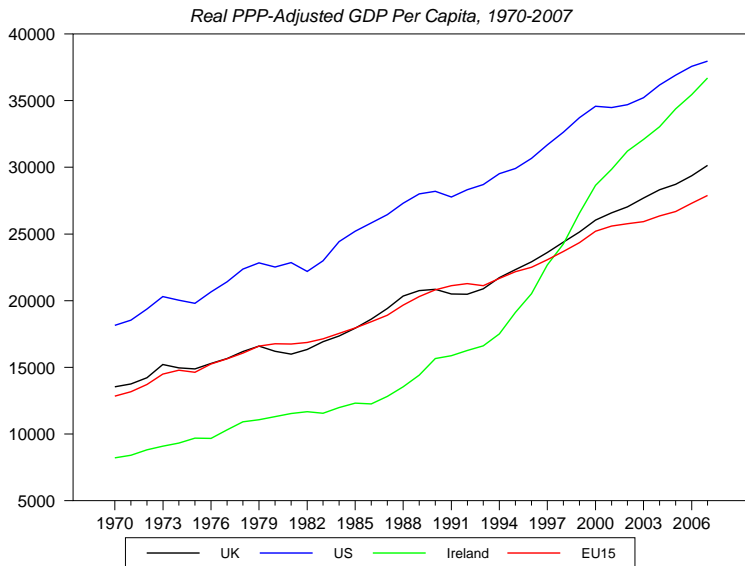
$$\frac{Y_t}{L_t} = A_t \left(\frac{K_t}{L_t} \right)^\alpha$$

- Using $\alpha = \frac{1}{3}$, I decomposed Irish labour productivity growth into the component due to capital deepening and the component due to TFP growth.
- Underlying our dropoff in productivity growth has been an even more steep decline in TFP growth. This is bad news because growth theory tells us this is the ultimate long-run determinant of productivity.

Contributions of TFP and Capital Deepening



Convergence. Overshooting?



European Productivity Performance

Table from McQuinn and Whelan (*CESifo Economic Studies*, 2008) showing alternative estimates of Euro area potential output growth as of end-2006 broken into contributions of TFP, capital, and labor.

| Description | Δy | Δa | Δk | Δl |
|--------------------------------|------------|------------|------------|------------|
| Case 1 : HP-Filter | 1.72 | 0.53 | 0.72 | 0.46 |
| Case 2 : 2000-2006 Averages | 1.79 | 0.57 | 0.76 | 0.46 |

Putting the Pieces Together

- As of 2007, even in the absence of a housing meltdown and global financial crisis, there were a number of reasons to believe that a period of sharply reduced growth was likely:
 - ① Employment-Population ratio was likely to fall. Share of working age population had peaked (according to CSO) and labour force participation and unemployment rates both reflected an over-heated labour market.
 - ② TFP growth had been steadily weakening since the start of the decade with little room left for catch-up technological progress.
 - ③ Underlying TFP growth in Europe was also very weak over recent years, so external forces were unlikely to be of much help.
- In thinking about output gaps, we need to factor in that we were starting with a very positive gap and be careful not to “straightline” potential as a continuation of pre-2007 trends.
- After a period of (hopefully) above-average catch-up growth during recovery, potential output growth for Ireland may be no more than a European norm of 2%.

Part III

Structural Budget Deficits

Output Gaps and Structural Deficits

- Both government spending, G , and taxation T , are affected by cyclical movements in output.
- One can write the budget deficit at any point in as a function of, among other things, the level of GDP:

$$D(Y_t) = G(Y_t) - T(Y_t)$$

- The structural budget deficit is defined as the deficit that would prevail if output was at its potential level, i.e. if $Y_t = Y_t^*$

$$D(Y_t^*) = G(Y_t^*) - T(Y_t^*)$$

- Some argue that the structural budget deficit should be the focus of fiscal policy, that large deficits would be expected when there is a big output gap and the long-run fiscal position will depend more on the size of the deficit once we return to “normal times.”
- Fine in theory, but do we know what Y_t^* is?

Dangers in Relying on Output Gap Estimates

- Previous research has shown that it can be dangerous for those making economic policy to rely too much on real-time estimates of the output gap.
- Research by Athanasios Orphanides has shown that reliance on output gap estimates appears to have been an important contributor to the “Great Inflation” of the 1970s.
- Real time estimates of output gaps from the Congressional Budget Office showed that US policy makers consistently thought the economy had a large output gap from the mid-1970s on and designed expansionary policy accordingly. Now, we know that underlying potential output growth had slowed.
- In our current circumstance, with international markets worried about the fiscal solvency of the state, I would not recommend putting much weight on uncertain estimates of the structural deficit when formulating policy.
- Whatever the structural deficit is, reducing the actual deficit (actual euros that we owe to actual people) as much as possible should be the target of current policy.