

Preference dynamics and potential growth, getting the work done by Friday

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1. Introduction

This paper uses a model to connect preference dynamics with potential growth in order to explain the level and observed volatility of the latter and shifts in its determination.

Potential growth is the trend growth of the economy. Actual growth is regarded as the result of this structural growth and the deviation from it due to the business cycle stance.

Insight in the level of structural or potential growth of the economy is important e.g. for monetary policy and to assess the employment situation.

At first sight it is a puzzle why countries like the United States of America with a relatively high level of economic growth have relatively low saving ratios, low capital coefficients, relatively high population growth and relatively high immigration of relatively low skilled workers show a relatively high level of potential growth. Potential growth of the United States has remained at the same level of about 3-3.5 % per annum in the last three decades where the corresponding figure for the EU has come down from the same level to at present 2-2.5%. The capital coefficient for the German economy is close to 2 whereas the capital coefficient for the U.S. has been decreasing for the last decades and is approaching 1.

A possible explanation of this phenomenon could be an effect that is related to the well known Rybczynski theorem that demonstrates how changes in an endowment affect the output of the goods. This can occur e.g. if immigration takes place or as population growth or growth of the workforce occurs for other reasons. If a factor endowment in a country rises, and if prices of the output remain the same, then the output of the good that uses that factor intensively will rise, while the output of the other good will fall.

This effect, related to the Rybczynski Theorem (Rybczynski, 1955), could be called after the novel of Daniel Defoe (1719) the Friday effect after the service worker that is added to the economy of Robinson Crusoe. The economy of Crusoe at the beginning is a classical accumulation economy where technical progress is capital increasing and labour diminishing. Potential growth initially is influenced positively by high saving and investment ratios. What happens when Fridays comes to the island and services are produced subsequently may seem an immigration or labour supply effect following the Rybczynski theorem, but in fact is a demand or consumption led preference effect toward the service good.

Modelling of this phenomenon now has to show under which conditions these preference dynamics have the beneficial effect on potential growth.

2. Economic growth and growth determinants

Economic growth, the rise of production over time, is one of the most important issues in economics. The reason for this is that it is a key variable in the determination of employment and income.

Economic growth is considered not to follow a random walk but to follow a trend in the medium and long term.

In the short term cyclical deviations from this trend occur, over the whole business cycle income and production growth is considered to be close to its trend value or potential output growth. Another approach also allows for structural deviations that persist over the business cycle and depend e.g. on rigid sector composition of production (Eisen, Gotsis and Kolodziejak, 2002).

The trend is caused by underlying factors, which are the determinants of economic growth. These factors are endowments or production inputs at the one hand and their respective productivity on the other. Productivity is mainly responding to technological change, and economies of scale. Implicitly it is assumed in a classical way that over the whole business sector demand does not influence the level of potential output and growth.

In the history of economic thought it can be observed that the interest moves from the first sector of the economy, agriculture, to the second, industry, in the course of the 19th century which also marks the birth of economics as a science. This particular development had as its implication that focus of the science is still strongly on the accumulation of dead capital and embodied technical progress, although in most western economies the service sector became more important in terms of production and employment towards the end of the 20th century. The notion of Marx that dead capital is accumulated labour is insufficient to defend the focus that is still put on capital accumulation.

With this biased focus on dead capital and embodied technical progress it is understandable that economic growth is still sought to be explained mainly by capital endowment and productivity viz. embodied and disembodied learning effects influencing the productivity of the capital stock. Following the traditional concept of economic growth determination a capital stock that has been built will always result in production as long as labour costs are in accordance with the competitive position or technological position of that capital stock. Following this argument the capital stock of former Eastern Germany would have resulted in economic growth and wealth if only labour cost and exchange rates would have been much lower than in reality (Sinn and Sinn, 1992).

However, with the preferences of the consumers drifted to the output of the third and fourth sector of the economy, to commercial and non-commercial services, it is doubtful whether a capital centred approach to potential growth determination is adequate. This is sometimes solved by the introduction of human capital in the production function. In practice the approached chosen remains close to the old concept of embodied and disembodied technical progress and at the end of the day also this approach is more about technology e.g. the internet than about persons as living capital.

In our modelling approach we choose to introduce two different additive production functions for the two sectors of the economy, the capital intensive sector producing the industrial good y_1 and the labour intensive sector producing the output of services y_2 . At the same time the

model contains preference dynamics rather than a fixed preference structure laid down in a utility function with fixed parameters. Preferences e.g. are endogenously determined by aging and other demographic developments.

3. Preference dynamics

In standard economic analysis a utility function

$$(1) \quad U = f(y_1, y_2)$$

with e.g. the form:

$$(2) \quad \ln U = \beta \ln x_1 + \ln (1-\beta) x_2$$

describes the aggregated or representative preference structure of the consumers that by assumption can satisfy all their needs by buying quantities of the two goods that the economy produces (y_1, y_2). The relative quantities of y_1 and y_2 depend on relative prices, relative preferences (the shape of the utility function).

The income restriction of the economy is satisfied by the condition:

$$(3) \quad y = y_1 p_1 + y_2 p_2$$

In the standard analysis the production function is of the Constant Elasticity of Substitution (CES) type. Under the assumption of constant returns more commonly a production function of the particular Cobb-Douglas type is used:

$$(4) \quad \ln y = \alpha \ln L + (1-\alpha) \ln K$$

Where L is the input of labour and K is the input of capital.

In such a framework economic growth is driven by accumulation viz. expansion of the capital stock through investment/savings/withheld profits and its reduction by technical or economic depreciation

$$(5) \quad K = K_{-1} + I - \delta K$$

The demand for labour can then be derived from the transformation of the production function

$$(6) \quad \ln L = 1/\alpha \ln y + (\alpha+1) K$$

or

$$(7) \quad L = e^{(1/\alpha \ln y + (\alpha+1) \ln K)}$$

Resource constraints must be met in the equilibrium:

$$(8) \quad a_1^* y_1 + a_2^* y_2 = L$$

$$(9) \quad k_1^* y_1 + k_2^* y_2 = K$$

Contrary to these standard specifications, in order to grasp the effect on economic growth of preference dynamics our model allows for:

1. a variable preference distribution coefficient β
2. non-complementarity of labour and capital
3. a capital endowment determined production function for the goods sector y_1
4. a labour endowment determined production function for the service sector y_2
5. endogenous immigration relating to preference dynamics

4. Migration

In the recent decades in which as we described before the trend economic growth of the United States remained high and the capital coefficient low in relation to Europe immigration into the United States has steadily increased the share of immigrants in the total population. Borjas, Freeman and Katz (1997) report that this share rose from 4.8% in 1970 to 6.2% in 1980 and to 7.9% in 1990.

Recent immigrants tend to have much lower education levels than the typical U.S. worker (Borjas,1994) and tend to concentrate in states with relatively large populations of previous immigrants, such as California, Florida, New York and Texas.

The uniform finding of research is that immigration had almost no negative influence on native wages (Borjas,1995). U.S. regions seems to have absorbed immigrant inflows (or shocks to endowments more generally) by altering the mix of goods they produce, thus relieving pressure for wages to change (Hanson and Slaughter,1999). The focus on output mix is motivated by the Rybczynski Theorem (1955), a core result of Heckscher-Ohlin trade theory. This theorem states that when a region is open to trade with other regions, changes in regional relative factor supplies can be fully accommodated by changes in regional output without requiring changes in regional factor prices.

In this paper the Rybczynski Theorem is considered to be a result of preference dynamics. The production function of the economy changes in response to preference drift, sectoral change and consumption changes, an effect we have earlier given the name of the Friday effect following the story of Daniel Defoe. Robinson Crusoe incorporates Friday into his economy because his preferences have shifted toward services or, more closer to the Rybczynski Theorem, the immigration of Friday to the island triggers a change in Robison's preferences that was previously desired e.g. because of aging, but not possible.

From this point of view it is not far to the conclusion that immigration and demographic change meeting the need for preference dynamics that e.g. come with aging of the domestic population, like Robinson in Defoe's story, increase total utility in the economy and therefore total output.

In other words: immigration and demographic factors, interplaying of course with other major institutional factors of the American economy like a low replacement rate, may be a key factor behind the fact that potential or trend economic growth in the U.S. is higher than in Europe.

5. Conclusion

Nowadays the service sector plays a major role in our economy. In response to aging preference dynamics towards services may continue and deepen.

In our modelling exercise to be presented at the Economic Modelling conference we will show that changing the production function of the economy in accordingly provides us with a possible explanation of the potential growth puzzle.

The model is able to show that low accumulation, relatively low savings and a relatively low capital output ratio can nevertheless produce a superior result in terms of trend growth of the economy and therefore of employment and consumer satisfaction.

We may like to see the result in a long term perspective. In the 18th century *Physiocrats* like Turgot and Quesnay claimed that the earth is the sole source of production and wealth. In the 19th century the classical economist Karl Marx merely observed that in a capitalistic industrial economy capital accumulation is the key to income growth. Various neoclassical economists of the 20th century confirmed this basic result that saving is beneficial to trend growth. In the same 20th century John Maynard Keynes warned that demand might determine output much stronger than supply or accumulated capital and that it therefore should be stabilised to smooth economic development towards potential growth.

Aging problems and continuing preference drift towards services may teach in the 21st century the received wisdom of the Egyptians, Greek, Cretans and Romans and that on a sunny day immigrated to the island economy of Robinson Crusoe: *get the work done by Friday*.

References

Borjas, G.J. (1994), The Economics of Immigration, *Journal of Economic Literature*, 32, 1667-1717.

Borjas, G.J. (1995), The Economic Benefits of Immigration, *Journal of Economic Perspectives*, 9(2), 3-22.

Borjas, G.J., R.B. Freeman and L.F. Katz (1997), How Much Do Immigration and Trade Affect Labor Market Outcomes?, *Brookings Papers on Economic Activity*, 1, 1-90.

Defoe, D. (1719), *Robinson Crusoe*, London.

Eisen, R., D. Gotsis and A. Kolodziejak (2002), Regional Unemployment in Germany: High Rates and Persistence of Differences, in R. Eisen (Ed.), *Supranational Cooperation and Integration*, Frankfurt am Main.

Hanson, G.H. and M.J. Slaughter (1999), *The Rybczynski Theorem, Factor-Price Equalization, and Immigration: Evidence from U.S. States*, National Bureau of Economic Research, Working Paper 7074.

Rybczynski, T.N.(1955), Factor Endowments and Relative Commodity Prices, *Economica*, 22, 336-341.