6. PRODUCTIVITY OVER THE CYCLE

Labour productivity growth - trend versus cycle

MFP over the cycle

LABOUR PRODUCTIVITY GROWTH – TREND VERSUS CYCLE

Labour productivity is a key driver of economic growth and living standards. It is hence important for policy makers to analyse the structural factors determining productivity growth. One simple way of doing this is by decomposing the time series of labour productivity growth into a *trend* (or structural) component, on the one hand, and a *cyclical* component, on the other hand.

Definition

Labour productivity is defined here as real value added per hour worked (Annex A). Its decomposition into a trend and cyclical components is done in two steps. *First,* average annual growth is calculated for each cycle, where the economic cycle is defined using the chronology of turning points in the OECD's *Composite Leading Indicators*. *Second,* the individual average growth rates for a given cycle are linked so as to develop a time series of smoothed trends. The smoothing follows a geometric average, *i.e.,* assuming that annual labour productivity growth is constant between the mid-points of each cycle.

Comparability

Filter techniques, such as the Hodrick-Prescott (HP) filter are commonly used to compute trend series. However, applying an HP filter accurately necessarily makes assumptions about the future evolution of the time series of labour productivity growth and its components.

The method used here is similar to that used by the Australian Productivity Commission (see also Parham, 2003). Its main advantage is its simplicity. In contrast to the HP-Filter, it does not impose a priori assumptions about cycle lengths, but instead takes the actual lengths of cycles into account. Determining the cycle lengths and hence the trend may be somewhat arbitrary at the beginning and end of the time series, though. Care may hence be needed when interpreting these averages.

Overview

Over the past three decades, labour productivity growth followed very different trends across the G7 countries. In the second half of the 1980s and the first half of the 1990s some acceleration of productivity growth could be observed in Canada, the United Kingdom and the United States. In contrast, trend labour productivity growth showed a gradual decline almost throughout the period, from relatively high rates, in France, Germany, Italy and Japan. Interestingly, for almost all G7 countries, trend labour productivity growth has been declining since the second half of the 1990s up to 2007, the fall being particularly marked in Canada and Italy.

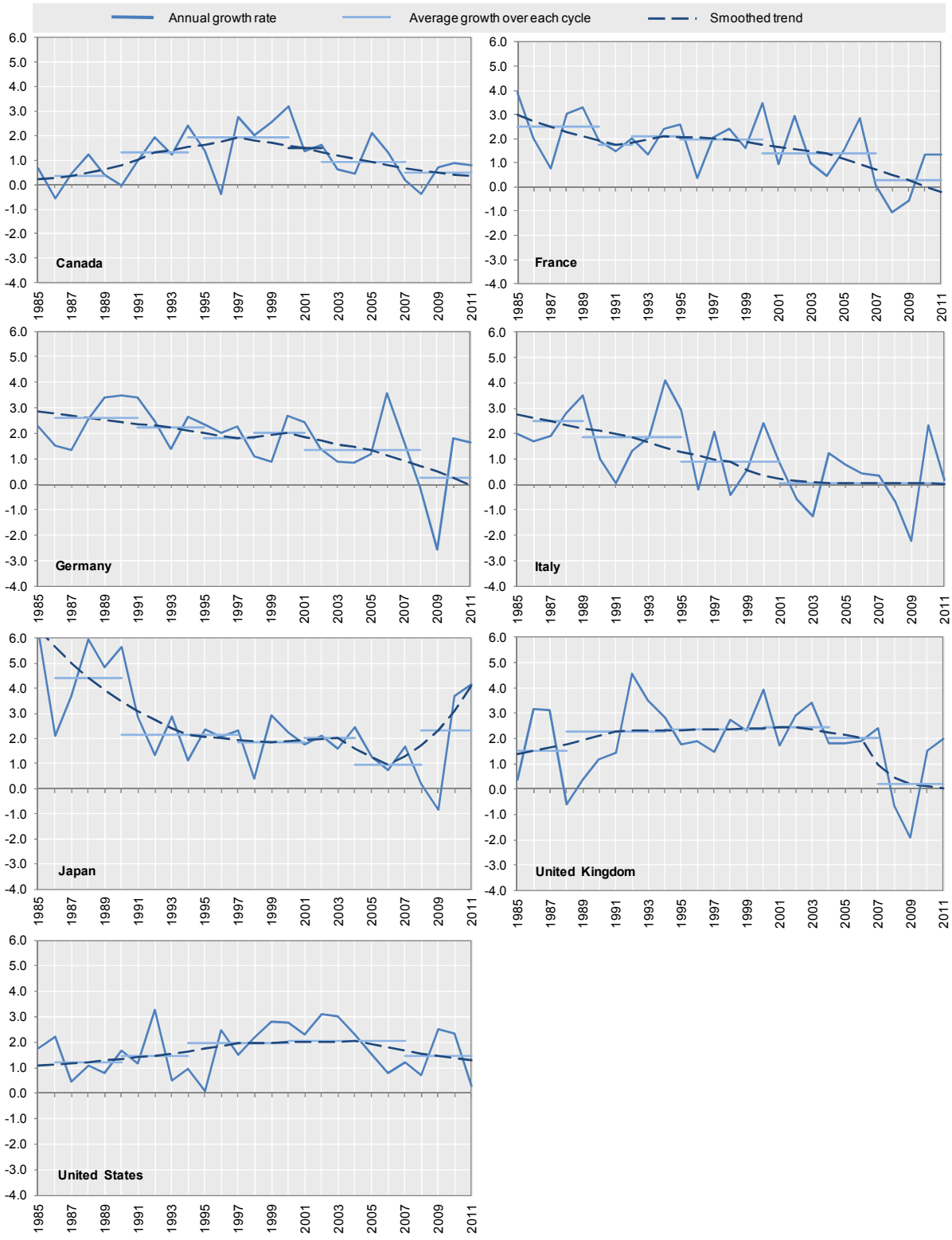
While one needs to be cautious in interpreting this as a post-crisis trend, average labour productivity growth over the 2007-2010 period declined significantly in Germany, France and the United Kingdom. Average productivity growth over the same period also fell in Canada and the United States but at a much more moderate rate.

Sources and further reading

- OECD Productivity Database, www.oecd.org/statistics/productivity.
- OECD Composite Leading Indicators, www.oecd.org/std/leadingindicatorsandtendencysurveys.
- Parham, D. (2003), Sources of Australia's Productivity Revival, Canberra, http://www.pc.gov.au/__data/assets/pdf_file/0018/9225/soapr.pdf.

Figure 6.1. Labour productivity growth and its trend

Total economy, percentage change at annual rate, G7 countries



StatLink http://dx.doi.org/10.1787/888932750398

MFP OVER THE CYCLE

A number of studies have indicated that MFP behaves cyclically, *i.e.,* it increases in an upturn and declines in a downturn. This has sometimes been interpreted as a paradox, as MFP has traditionally been perceived as exogenous technological change, which should typically not behave cyclically.

Definitions

Four factors help to explain this cyclical movement. Each of them is related to the definition of MFP as the part of GDP growth that cannot be explained by the rates of change of labour and capital inputs (see also Annex A). *First,* cycles in productivity growth may relate to imperfect competition and the potential to capitalise on increasing returns to scale during upturns. *Second,* labour input typically adjusts with a lag in downturns, as firms seek to retain workers even if not needed for current production so as to keep the human capital. *Third,* adjustment costs prevent an immediate up- or downsizing of production and capital, resulting in lower utilisation of existing capital stock in downturns. *Fourth,* the reallocation of resources to production of goods and services with higher or lower marginal productivities may be pro or counter cyclical.

Comparability

The appropriate measure of capital input for productivity analysis and within the growth accounting framework is the productive capital stock and its derived capital services (see Annex C). While these take into account the productivity of the different capital assets, no account is taken of the extent to which the existing capital stock is actually used, *i.e.,* the rate of capital utilisation, which may affect comparability over time and space.

Theoretically, measuring labour input by the total actual hours worked of persons employed should capture the rate of labour utilisation and hence account for the cyclical effects of labour input. Continuous labour force surveys provide a basis for measuring this. However in practice, total hours worked are often measured based on hours typically worked, or actual hours worked during a reference week which are then extrapolated over the year using additional data sources. These may not sufficiently capture variations in actual hours worked over the cycle (Annex B).

Through the use of cost instead of income shares of labour and capital, the OECD measure of MFP allows for non-constant returns to scale and imperfect competition (Annex A and C).

Overview

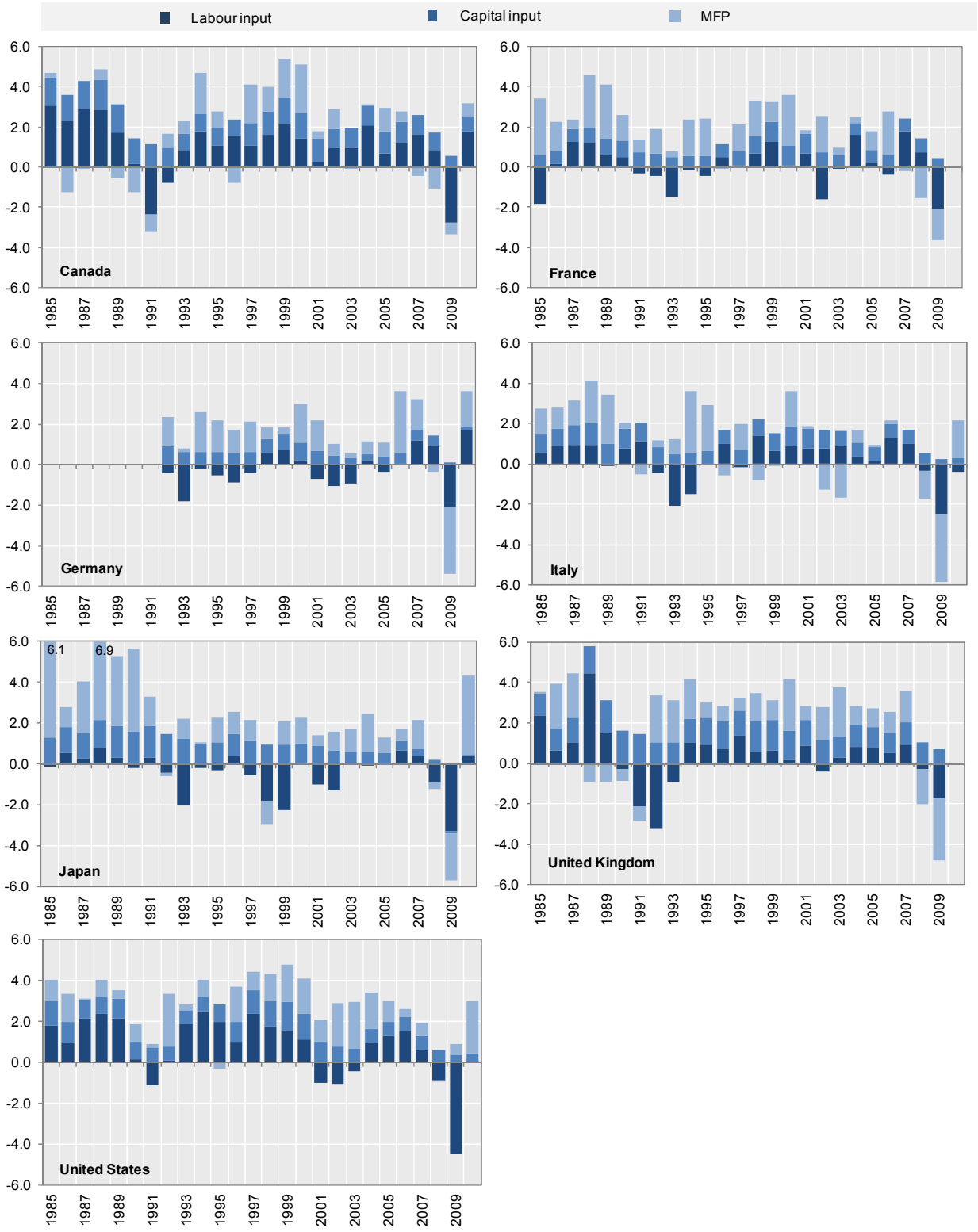
The empirical evidence confirms the cyclical pattern of MFP. In fact, MFP follows GDP growth very closely, not only in terms of the direction but also the size of the change. While the contribution of labour fluctuated relatively strongly for most G7 countries, up to 2007, adjustments in labour input typically lagged. The contribution of capital input changed little over the cycle, possibly reflecting adjustment costs. Moreover, capital input reflects the accumulation of past investment of all firms in the economy, and so although investment is typically relatively volatile, capital stock and capital services estimates are less so.

Sources and further reading

- OECD Productivity Database, www.oecd.org/statistics/productivity.
- OECD (2001), *Measuring Productivity – OECD Manual*, OECD, Paris.
- Schreyer, P. (2004), Capital Stocks, Capital Services and Multifactor Productivity Measures, *OECD Economic Studies*, Vol. 2003/2.
- Wölfl, A., D. Hajkova (2007), Measuring Multifactor Productivity Growth, *OECD Science, Technology and Industry Working Paper 2007/5*, OECD Publishing.

Figure 6.2. The contribution of labour, capital and MFP over time

Total economy, percentage change contributions at annual rate, G7 countries



StatLink http://dx.doi.org/10.1787/888932750417

From:
OECD Compendium of Productivity Indicators 2012

Access the complete publication at:
https://doi.org/10.1787/9789264188846-en

Please cite this chapter as:

OECD (2012), "Productivity over the cycle", in *OECD Compendium of Productivity Indicators 2012*, OECD Publishing, Paris.

DOI: https://doi.org/10.1787/9789264188846-8-en