

# Long-term growth forecast for the Finnish economy

To make the correct economic policy choices one must have a view of the long-term growth prospects for the economy, as these policy choices will have implications for decades ahead. Of the factors that will influence economic growth in the decades ahead, the easiest to anticipate is population ageing, which will depress labour supply and hence reduce the economy's growth potential. In contrast, it is much harder to estimate future trends in productivity. The slower productivity growth since 2008 could be viewed as a temporary phenomenon that will be followed by a return to the earlier trend of rapid productivity growth, but it could also be a more permanent change. In any case, the share of output taken by services, with their slower productivity growth, will grow in the immediate decades ahead as the population ages, which foretells much more sluggish GDP over the next few decades.

To make the correct economic policy choices one must have a view of the long-term growth prospects for the economy. This is particularly important in the area of fiscal policy. Assessments of the long-term sustainability of the public finances have to take a position on economic developments decades into the future. Securing the sustainability of general government finances has become one of the key challenges for the immediate years ahead.

Estimates of long-term economic growth are generally based on developments in the available labour resources and a view of the likely developments in labour productivity. The estimation of labour input is generally straightforward, as it is based on the long-term

population forecast published by Statistics Finland. Productivity developments are much harder to foresee. In Finland, estimating average productivity across the economy as a whole is particularly difficult, due to both the heterogeneous and strongly fluctuating productivity trends in different industries and the recession experienced in recent years.

Estimates of the growth outlook are fundamentally affected by whether the slowdown in productivity growth since 2008 is seen as a transitory phenomenon to be followed by a return to the earlier trend of rapid productivity growth, or whether it represents a more lasting slowdown. The slower productivity development may be thought of as demand-led, ie a consequence of the recession that began in autumn 2008, whereupon it is natural to assume productivity growth will in future return to the figures recorded prior to the financial crisis. On the other hand, the slower productivity growth may also be interpreted as a consequence of the receding of factors that temporarily boosted productivity, and that it is therefore structural and permanent in nature. Such temporary factors were the general closing of the industrial productivity gap in the 1970s and 1980s and the strong Nokia-led growth in ICT-sector productivity in the wake of the 1990s recession.

Of the factors that will influence economic growth in the decades ahead, the easiest to anticipate is population ageing. This will impact on the productivity of the Finnish economy as a whole through the change it brings to the structure of output in the economy. The share of output contributed by social and



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healthcare services and other personal services will grow. This will mean output being slanted more towards sectors with low productivity growth, which will inevitably reduce average productivity growth across the economy.

This article examines possible developments in the Finnish economy over the next 20 years from the perspectives outlined above. It presents estimates of the pace of GDP growth during the next two 10-year periods and breaks growth down into its constituent components of labour force growth, capital deepening and growth in total factor productivity.

From an economic policy perspective, the growth estimates set out in the economic stabilisation programme play a key role. These are based on assessment principles agreed jointly at EU level.<sup>1</sup> Long-term growth estimates have also been produced sporadically by domestic Finnish forecasting agencies. At

<sup>1</sup> For the latest growth assumptions of the European Commission's Ageing Working Group (AWP), see European Commission (2011).

the summer seminar for economic researchers in Jyväskylä in 2008, the Research Institute of the Finnish Economy (ETLA), the Labour Institute for Economic Research (PT) and Pellervo Economic Research (PTT) in conjunction with the Ministry of Finance published economic forecasts stretching as far ahead as 2028. In spring 2012, leading economic forecasters were requested to make similar long-term estimates. The present article serves as an introduction to that by the Bank of Finland.

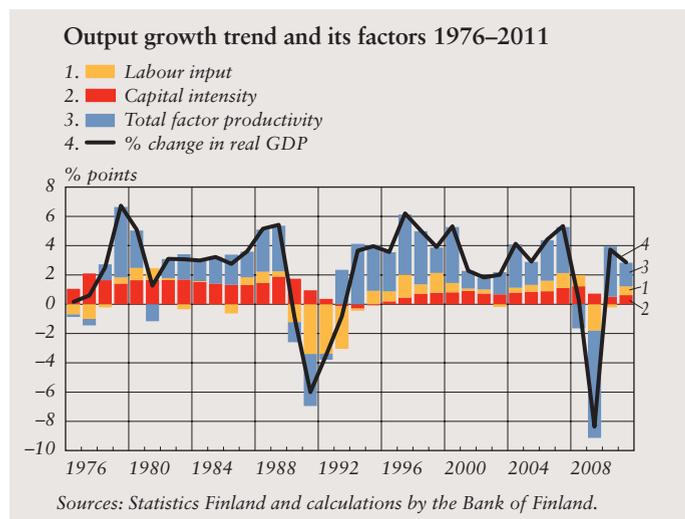
### Sources of economic growth

A breakdown of output growth between the growth contributions of labour productivity and labour and capital inputs effectively illustrates the development phases of the Finnish economy and also the direction of growth policy.<sup>2</sup> From the mid-1970s through to the recession in the early 1990s, growth in both GDP and labour productivity was largely a consequence of growth in the capital stock (Chart 1). The high investment ratio in the economy was supported by the initial low level of the capital stock and economic policies that favoured investment. The roots of these pro-investment policies stretch back to the 1950s and the drive to accelerate our country's industrialisation.

In addition to growth in the capital stock, productivity also gained from the catching-up effect, i.e. the possibility of

<sup>2</sup> According to Matti Pohjola, who has examined the factors contributing to growth in the Finnish economy, Finland for a long time lagged behind the rest of Europe in labour productivity, but has in recent years closed the gap. Even so, labour productivity in Finland remains weaker than in the United States. In recent years, a strength of the Finnish economy relative to other European countries has been the favourable trend in labour supply. (Pohjola 2011)

Chart 1.



narrowing the productivity gap relative to more advanced economies by adopting technical innovations developed elsewhere. A strong input into raising the educational level of the population can also be considered as part of growth policy, as the ability to exploit technical advances depends on the educational level of the labour force. Since the mid-1990s, growth in total factor productivity has replaced investment as the source of growth. In the post-recession years, one of the tools of active growth policy has been the provision of support for R&D investment. Since the end of the 1990s, economic growth has also gained from an increase in the size of the labour force.

The global financial crisis that began in autumn 2008 and the deep recession that followed it accelerated the restructuring of the Finnish economy. Before the economic crisis, industrial output was already moving from Finland to the emerging economies close to the rapidly expanding markets in eg China and India. However, the crisis caused a stiffening of global competition and forced Finnish companies to seek out more cost-effective production processes. The volume of industrial output in Finland, as in many other advanced economies, has contracted substantially in just a short period, and industrial employment has declined.

The restructuring of the economy was still bolstering labour productivity growth in the early years of the new millennium.<sup>3</sup> Since then the situation has changed radically. Before the recession, the growth in the share of the

<sup>3</sup> See Box 3, above.

economy attributable to general government and private services was already beginning to weaken improvements in productivity. At the same time, the decline in the output share of electronics and electrical engineering depressed average productivity growth in industry.

In considering the possible developments in the various factors that contribute to economic growth over the next two decades, we have drawn on a calculation framework in which the economy is divided into three sectors: general government, manufacturing industry and private economic activities other than manufacturing. This division allows us to take account of the different paces of productivity growth in the different sectors of the economy. It also allows us to examine how population ageing impacts on labour supply, the distribution of output between sectors and productivity.

Output in each sector ( $Y$ ) is determined by a neo-classical Cobb-Douglas production function that takes the form  $Y=AK^\alpha L^{1-\alpha}$ . Parameter  $\alpha$  indicates the weight of capital ( $K$ ), and  $(1-\alpha)$  correspondingly the weight of labour ( $L$ ) in output, and its value in each sector is set at 0.5. The levels of output calculated for each sector are finally aggregated to produce the total output for the economy as a whole.<sup>4</sup>

<sup>4</sup> In calculating total output for the economy as a whole, account is taken of changes in relative prices between sectors, which are estimated as following developments in sector-specific labour inputs.

## Development of labour force, capital stock and productivity

### Labour force

The development of labour supply is decisively affected by demographic trends. However, in an ageing economy another important factor is the choices made by workers approaching retirement age. The forecast for labour supply for the years 2013–2032 has drawn on Statistics Finland’s most recent (published in 2009) population forecast for age groups 15–74 and a model for forecasting cohort-specific labour force shares developed at the Bank of Finland<sup>5,6</sup> (Chart 2).

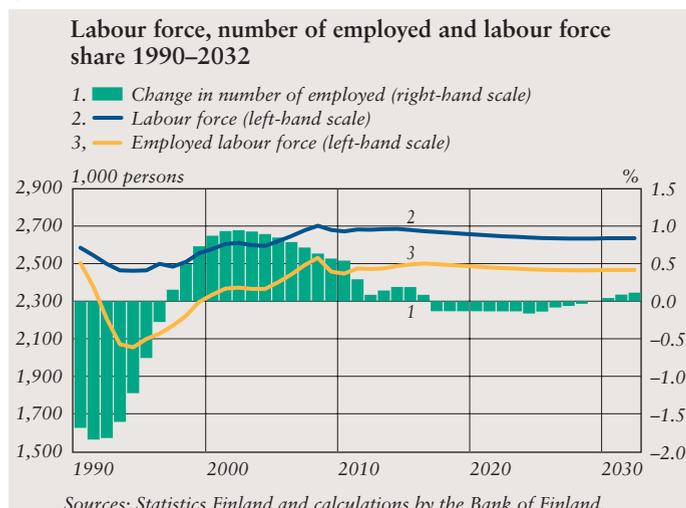
<sup>5</sup> Kinnunen & Mäki-Fränti (2011).

<sup>6</sup> The cohort-specific labour supply forecast was based on an econometric model in which the labour force participation rates of 21–64-year-olds born in different years were explained on the basis of age and year of birth. In accordance with the estimated results, the calculation assumes that cohort-specific participation rates were rising until the beginning of the 1970s. Thus, as older cohorts made way for younger ones, these higher participation rates compensated for the fact that the new cohorts entering the labour market were smaller than the preceding cohorts. The present calculation differs from the calculation of labour force contained in the forecast by examining 15–74-year-olds instead of 21–64-year-olds. The labour force shares of 15–20-year-olds and 65–74-year-olds are assumed to be unchanged from 2012 onwards.

Estimated on the basis of the population forecast and the cohort-specific labour force share model, the labour force (15–74-year-olds) would be almost 60,000 persons fewer at the start of the 2030s than it is now. A higher employment rate would compensate for much of the labour force reduction, such that labour input would decline altogether by around just 23,000 persons over the period 2013–2032. According to this calculation, the size of the labour force would have a small negative impact on growth during the next two decades.

As well as the overall size of the labour force, economic growth is also influenced by how the labour force is distributed between the different sectors of the economy. In the three-sector calculation framework, public sector labour demand is determined by output growth in public services, as the calculation assumes no rise in public sector productivity. Growth in public services output is based on the increased need for services as the population ages. The volume of services output other than age-related services output is assumed to persist at the level of the initial year, 2012.<sup>7</sup> Industrial and other private production are left with the remaining portion of the total labour input. Under these assumptions, over the years 2013–2032 the labour force will grow around 9% in the public sector and around 3% in manufacturing industry and other private production.

Chart 2.



<sup>7</sup> See Kinnunen & Kostiainen (2010).

### *Capital stock*

The capital stock in manufacturing industry has been growing at approximately 0.4% per annum since 1995. A shortage of investment has led to fears that Finland's industrial base is being eroded. The slowing pace of tangible investments has, however, been compensated by a growth in intangible investments. R&D expenditure has also been growing, but as this is entered in the National Accounts as consumption rather than investment, it is not visible as growth in the capital stock. Elsewhere in the private sector, growth in the capital stock accelerated until the middle of the first post-millennium decade, easing off thereafter.

The estimate for growth in the capital stock of manufacturing industry over the years 2013–2032 is based as far as 2014 on the Bank of Finland's short-term forecast published in the forecast article in this issue of the Bank of Finland Bulletin. From 2015 onwards, the pace of growth in the manufacturing capital stock is expected to gradually ease. From 2017 it will grow 0.2%, and from the mid-point of the forecast period (2013–2032) just 0.15% per annum. The assumption regarding the slow pace of capital stock growth is based on recent years' low rate of investment in manufacturing. In the calculation, the capital stock of other private production grows at an average 1.3–1.5% per annum. The public sector capital stock has grown around ½% per annum since 1995. The pace has not been even, as public investment has typically been employed as an instrument to smooth out the ups

and downs of the economic cycle, most recently in the last recession. Public sector investment is, in fact, expected to slow during the years 2013–2032 and grow more slowly than employment, whereupon the impact of capital formation on growth will be mildly negative.

### *Total factor productivity*

Growth in total factor productivity will in the coming years be slowed most strongly by the ongoing change in the production structure of the economy. Total factor productivity growth has until now been primarily a feature of manufacturing industry. Manufacturing's share of GDP is, however, shrinking, while the share of services is growing. Population ageing is increasing demand above all for health and care services. In these, it is hard – or often not expedient – to replace labour input with other inputs, which is why productivity growth in these services is below average.<sup>8</sup>

Improvements in total factor productivity were at their fastest over the years 1995–2001, when it is estimated to have grown over 6% per annum. Thereafter, the pace has been slower even in manufacturing. The average annual rate over the past decade has been 4%. Total factor productivity

<sup>8</sup> Growth in the share of services output, and particularly output in social and health care services (due primarily to an ageing population), serves to reduce average productivity growth across the economy as a whole. As estimated using a general equilibrium model, growth in the number of pension recipients and growth in public consumption together cause a loss in productivity that affects labour productivity growth by an estimated average of 0.2% per annum. Here, the point of comparison is the baseline scenario, in which population growth remains even and the age structure remains unchanged. See Kinnunen & Railavo (2011).

Over the years 2013–2032 total factor productivity in the Finnish economy as a whole is forecast to grow at an average rate of less than 1 percentage point per annum.

growth in the rest of the private sector has been slower than in manufacturing, barely exceeding 2% per annum.

Over the years 2013–2032 total factor productivity in the Finnish economy as a whole is forecast to grow at an average rate of less than 1 percentage point per annum. This is considerably slower than during the past 40 years, when total factor productivity growth averaged over 3% per annum. As in previous decades, total factor productivity is expected to grow by far the fastest in manufacturing industry, at 2.7% per annum. Of all the sectors in the economy, industry has been able to exploit new technology most effectively, and the technological intensity of industry has grown rapidly. Industrial productivity has also been boosted by specialisation, but it is

assumed this will be slower in the future.

The average pace of growth in total factor productivity in other private production is forecast at 0.9% per annum, with the annual pace expected to slow somewhat as we enter the 2020s. Total factor productivity in general government is assumed to grow at a pace that will compensate the growth-slowing impact of the low level of investment. This means it is assumed that developments in ICT could over the long term give more support than before to productivity growth in both public sector and private services production. Public sector services production in particular has room to more fully exploit the potential benefits of ICT. Exploitation of these benefits is assumed to be slightly front-weighted.

Table 1.

Average growth sector by sector			
	2003–2012	2013–2022	2023–2032
<b>Total economy</b>			
GDP, %	1.9	1.5	1.3
Labour input, %	0.4	0.0	0.0
Labour productivity, %	1.5	1.5	1.3
Total factor productivity, %	0.9	1.0	0.7
Capital intensity, %	0.6	0.5	0.6
<b>Private sector</b>			
Output, %	2.3	1.7	1.5
Labour input, %	0.4	-0.2	-0.2
Labour productivity, %	1.8	1.9	1.7
Total factor productivity, %	1.1	1.2	0.9
Capital intensity, %	0.7	0.7	0.8
<b>Public sector</b>			
Output, %	-0.6	0.4	0.4
Labour input, %	0.2	0.4	0.4
Labour productivity, %	-0.8	0.0	0.0
Total factor productivity, %	-0.9	0.1	0.1
Capital intensity, %	0.1	-0.1	-0.1

Sources: Statistics Finland and calculations by the Bank of Finland.

### Growth forecast to the year 2032

Finnish GDP is estimated to grow on average 1.5% per annum over the years 2013–2022, and 1.3% per annum in 2023–2032 (Table 1). Thus, the pace of growth will slow somewhat from that experienced in the past ten years. At the level of the total economy, economic growth in both ten-year periods will come from labour productivity growth in the private sector.<sup>9</sup> Labour input is expected to grow in the public sector, but at the level of the total economy the impact on growth will be around zero. The growth impact of labour productivity in the private sector will be 1.9% in the first ten-year period, and 1.7% in

<sup>9</sup> Manufacturing industry and other private production, which are distinguished in the three-sector model, have been combined in the table to constitute a single private sector.

the next ten years, and labour productivity itself will be increased mainly by growth in total factor productivity. A slight improvement in total factor productivity is also expected in the public sector, but this will only suffice to compensate the slower pace of public investment.

Increasing the level of productivity in public service production and extending the length of working careers have been key goals of economic policy in recent years. The impact of these factors on average economic growth can be illustrated by the use of sensitivity analyses.

Such an approach is complicated by the fact that the National Accounts do not genuinely measure the volume of public service production, with output

Table 2.

Alternative scenario in respect of long-term economic growth: general government productivity grows ½% per annum			
Total economy	2003–2012	2013–2022	2023–2032
GDP, %	1.9	2.0	1.9
Labour input, %	0.4	0.0	0.0
Labour productivity, %	1.5	2.0	1.9
Total factor productivity, %	0.9	1.5	1.3
Capital intensity, %	0.6	0.5	0.6

Sources: Statistics Finland and calculations by the Bank of Finland.

Table 3.

Alternative scenario in respect of long-term economic growth: labour input growth accelerates			
Total economy	2003–2012	2013–2022	2023–2032
GDP, %	1.9	1.7	1.5
Labour input, %	0.4	0.1	0.1
Labour productivity, %	1.5	1.6	1.5
Total factor productivity, %	0.9	1.1	0.9
Capital intensity, %	0.6	0.5	0.6

Sources: Statistics Finland and calculations by the Bank of Finland.

*The main sources of economic growth will be the developments in labour productivity via growth in total factor productivity.*

being calculated on the basis of labour input. Thus, even if faster productivity growth in public service production were in reality to increase economic wellbeing, this would not be directly seen as a quantified growth in output.

The first sensitivity analysis contains the assumption that public sector productivity will grow annually by ½%. It is also assumed that the volume of public service production will remain unchanged, whereupon the improved productivity will free up labour resources for use in the private sector, with its faster productivity growth. This would accelerate the pace of economic growth and rising living standards across the whole economy. If productivity in the public services were to grow ½% per annum, economic growth in the years 2013–2032 would rise to around 1.9–2.0% (Table 2). In this case, GDP in 2032 would be around 10% higher than in the baseline scenario.

In the second sensitivity analysis the assumption is that the pace of labour input growth is 0.1% per annum faster than in the baseline scenario. This would raise output growth to 1.5–1.7% (Table 3). This is under the assumption that public sector labour input would remain unchanged and the increase in labour input would focus entirely on the private sector. Growth in the private sector's share of GDP would also mean growth in average labour productivity. Under this scenario, GDP in 2032 would be around 4% higher than in the baseline scenario.

Thus, increased public sector efficiency or labour input growth as

envisaged in the calculation would speed up economic growth only slightly. However, more efficient public sector output, in particular, would ease the problem of general government sustainability, thereby reducing the need to tighten taxation and also contributing in this way to economic growth.

*Future trend in public finances of key importance*

The long-term growth outlook for the economy sets the context for economic policy decisions such as the fiscal policy stance. The estimates presented in this article regarding available labour resources, growth in the relative share of the service sector and the currently observable sectoral productivity trends presage much slower GDP growth over the next few decades. Neither labour supply nor investments in physical capital will any longer support growth to the extent of recent years. Hence the main sources of economic growth will be the developments in labour productivity via growth in total factor productivity.

Over the next 20 years, total factor productivity growth will come primarily from general technological development and investments in intangible assets. The pace of total factor productivity growth will be limited by the currently ongoing change in the production structure of the economy. The GDP share of services will grow in the forecast period in proportion as the population ages and the demand for services increases. The declining GDP share of industrial output will also be partly due to changes in the global distribution of

labour. The deep recession in the wake of the financial crisis already accelerated the shift of industrial output from Finland to closer to the final product markets. The GDP share of industrial output would appear to be settling permanently on a more moderate growth path than even in the middle of the last decade. Although the greatest scope for improvement in total factor productivity lies in both privately and publicly produced services, productivity growth in service sectors will be much lower than what has been seen in industrial output in Finland in recent years.

As the population ages, a growing proportion of Finland's labour resources will be engaged in tax-funded activities. If productivity development in public services continues to be sluggish, as assumed in the estimates presented here, the costs of public services will also rise strongly relative to the general trend in prices. If the rise in prices is taken into account, public services will bind even more economic resources than the volume development of public output would suggest. When, further, pension expenditure growth will be at its height over the next 15 years or so, there is a considerable risk that general government debt will become unsustainable. If we want to get a grip on the accumulation of debt under the present calibration of public services and current productivity trends, taxes will have to be raised, which will in turn reduce labour supply and further dampen growth in output.

From the perspective of economic growth, the most effective policy will

involve measures that boost labour supply and increase general government productivity. If economic restructuring is successful, the economy may grow faster than estimated here. The growth figures could also be boosted by unexpected technical innovations that would cause a leap in productivity in individual sectors. Economic policy cannot, however, be formulated on the basis of hoping for the best.

*Keywords: forecasts, economic growth, productivity, restructuring*

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