

# ■ Can we be best again? The role of capital formation in long-term growth

BY VILLY BERGSTRÖM

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*During the quarter-century from the early 1970s living standards in Sweden slipped in relation to other countries. Catching up again calls for a high rate of capital formation, more people at work and a great deal of effort for research and development. The prerequisites for succeeding include a higher rate of investment, early entry to the labour market, a higher retirement age and lower sickness rates over a period of decades. Even if Sweden managed to achieve higher productivity growth, catching up with Denmark and Norway would take two to three decades.*

A sincere thank you to Annika Svensson in the Monetary Policy Department for providing data, particularly on the labour force.

Sweden has unquestionably lost its leading position in the “prosperity league”. Sweden was one of the world’s four most prosperous countries at the beginning of the 1970s. By the mid 1990s we had fallen below the average for the industrialised countries. There has been some recovery since then but most of our neighbours now have a higher standard of living than we do.

Numerous ways of coming to terms with this situation by strengthening economic growth in Sweden have been put forward in the economic debate. Regardless of whether the proposals concern taxes, social security, education or research and technical development, they need to act via three channels, that is, by affecting labour supply, capital formation or the technology factor. At a theoretical level, the recipe for growth is, after all, very simple. The crucial ingredients are the rates of increase for labour and capital and the pace of advances in technology.

While the Riksbank can contribute to the creation of a favourable environment for growth, monetary policy is not one of growth’s driving forces. Even so, the mechanisms of economic growth are of interest to the Riksbank because rapid growth makes the Bank’s tasks easier. The Riksbank tightens and eases monetary policy with a view to keeping demand more or less under control so that discrepancies between the conditions for production and the demand for consumption and investment goods

**Growth is dependent on the rates of increase for labour and capital together with the pace of advances in technology.**

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from households and firms, as well as the public sector's requirements, do not become unduly large. This stabilises the development of prices. High long-term growth (potential output) provides room for high total demand without this leading to inflationary pressure. So while monetary policy is not capable of increasing potential output, in the worst case it can – as we saw in the 1970s and 1980s – impair the conditions for high potential output by stimulating demand in the economy to such an extent that this leads to rapid inflation. That was what happened in the 1970s when a series of devaluations was accompanied by an excessively expansionary fiscal policy. The Riksbank accordingly distinguishes between two concepts of growth: “potential output”, which is determined by the supply-side factors I mentioned earlier, and “demand growth”, which consists of the development of consumption, investment and net exports.

## Productivity – a welfare indicator?

**It is the standard of living that is of interest and this does not necessarily improve just because the population and the labour force are growing.**

In country comparisons of growth, however, noting that growth in a country is high on account of a rapid increase in the labour force is not all that relevant. The interesting point is the standard of living, which does not necessarily improve because the population and the labour force are growing. What matters is the rate at which output per capita is rising, which brings us to the concept of productivity in a wide sense.

There are various ways of measuring productivity. Labour productivity in a country can be measured per inhabitant but the result then depends on the relative size of the working population. Measurements per person in active age groups are dependent in turn on labour force participation and absenteeism, e.g. due to unemployment or illness. Measures per person in employment are affected by the duration of working hours. A more “robust” indicator of labour productivity is output per hour worked. Such measurements avoid confusion from variations in labour force participation, overtime or other demographic changes that affect productivity but they do not tell us much about a country's living standards. High productivity per hour worked can be achieved by a few persons working a few hours, so that GDP per capita is low.

Finally I want to draw attention to the important concept of total factor productivity, which relates output to inputs of all factors of production. Output in terms of GDP is related to a weighted combination of the inputs of labour and capital. The result indicates the efficiency with which all production factors are being utilised. It shows in principle the extent to which output can be increased with unchanged inputs of labour and capital. The concept is synonymous with technological development.

The term productivity, without further qualification, refers to labour productivity measured in one of the above-mentioned ways, usually per employee or hour in the case of corporate sector productivity and per capita in the context of GDP and living standards. The latter concept is more closely related to a country's welfare than is economic growth, for which changes in the labour force play a part. It is noteworthy that for a long time the main factor behind the high growth in the United States has been a rapidly growing labour force; labour productivity there has not risen faster than in Sweden except in the past two years (2002 and 2003).

In the first half of the 20th century, Sweden was one of the countries with the highest rates of productivity growth, regardless of how this is measured. The result was increased prosperity. Swedish productivity growth then became even stronger in the 1950s and 1960s.<sup>1</sup> This was partly because strong demand in connection with post-war reconstruction led to decreased unemployment. Moreover, the liberalisation of trade in these decades resulted in increased competition and, above all, capital formation was rapid. In other words, the unemployed were drawn into production at the same time as production factors were allocated more efficiently than during the war years. This favourable productivity performance generated further improvements in prosperity. In 1970 Sweden came fourth in the OECD's "prosperity league", which meant that Sweden was one of the world's four most prosperous countries.

In the next two decades, however, productivity growth was considerably weaker and it is generally acknowledged that things did not go well for Sweden in either the 1970s or the 1980s. By the beginning of the 1990s Sweden had slipped to 18th place, below the average for the industrialised countries, since when we have climbed back a little. So what were the causes of the decline? Identifying the factors behind the weak growth in the twenty years from the mid 1970s to the mid 1990s can be instructive. The mistakes in that period need to be avoided in the future.

Unsuccessful economic policy in Sweden in the quarter-century after 1970 entailed a marked weakening of productivity growth. In order to explain labour productivity, the basic "recipe" for growth I mentioned earlier needs some modification. According to the modified version, changes in labour productivity (given certain conditions: living standards) are dependent on capital growth per employee and technology. This assumes a constant composition of the population, with a uniform distribution by age. The fundamental relationship for changes in the standard of living can then also be written as a function of capital growth per

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<sup>1</sup> This applies to output as well as labour productivity. For penetrating analyses of developments from 1870 to 1979 see Bentzel (1979) and Schöön (2000).

employee and technology. A complication to which I shall be returning is that in practice the distribution by age is not constant.

## Excessively slow capital formation contributed to weaker productivity growth in Sweden

The first oil crisis meant that most industrialised countries experienced decreased productivity growth some way into the 1970s.

What lay behind Sweden's poor performance in the 1970s and 1980s?

The first point to note is that a slackening of productivity growth occurred in most industrialised countries some way into the 1970s. It had to do with the supply shock in the form of the first oil crisis, when the price of oil tripled. Then came the second oil crisis at the end of that decade, when the oil price not only tripled again but did so from a considerably higher level. The oil-producing countries can be said to have imposed a tax on the industrialised countries in the form of massive net transfers. The price of oil is economically important in many ways. Oil provides energy for transportation and heating, so its price has a direct impact on costs for these purposes. Corporate expenditure is also affected because petroleum products are used as intermediate goods, for example as raw materials for plastic products.

A multifold increase in the price of such an essential input as oil necessitates adjustments to production processes and structural changes, besides entailing disruptions, so that productivity growth weakens at least for a time. The supply shocks accordingly caused problems in every country. In Sweden, however, productivity growth weakened more markedly than in other countries that were correspondingly dependent on oil.

The oil price shocks coincided in Sweden with a domestic cost crisis.

Many explanations have been suggested. Social welfare benefits were improved in this period. Sickness benefits were increased in 1974 and again in 1987, accompanied by legislation on job security and co-determination. Business costs rose and production was disrupted by absenteeism for sickness and other forms of leave that were also introduced.<sup>2</sup> While these factors are difficult to evaluate, it is probable that they contributed. So the oil price shocks coincided in Sweden with a domestic cost crisis that led to a loss of production. The collapse of the Bretton Woods system of fixed exchange rates was followed by a loss of discipline in the labour market. Sweden's currency was devalued five times between 1976 and 1982. Public sector expenditure rocketed and the policy of "bridging" the international slowdown in the mid 1970s meant that firms retained labour to a greater extent than in other countries and labour productivity rose more slowly. One can say that in the

<sup>2</sup> See Henrekson et al. (1992) for health insurance and Myhrman (1994) for labour market legislation.

absence of the norm the Bretton Woods system had provided, economic policy suffered a breakdown.

The dramatic changes that also occurred in capital formation in the mid 1970s unquestionably explain a part of the slowdown in productivity growth. The accumulation of capital is, of course, dependent on all manner of economic conditions for business enterprises and the public sector, including those I have mentioned earlier.

Investment activity is usually expressed in terms of gross fixed capital formation. This component of GDP includes the investments that are needed to make up for the wear and tear that all production entails. Deducting the part of gross investment that represents compensation for capital depreciation leaves what is known as net investment, which accordingly consists of additions to the real capital that is already at work in production in the form of machinery, factories and other buildings.

When we look at the figures on capital formation, it must be borne in mind that with the structural changes in the past quarter-century, capital now weighs less heavily in the Swedish economy. The structure of the corporate sector has changed. The manufacturing sector as a whole, including the “heavy” basic industries such as mining, the iron and steel industries and the pulp and paper mills, have shrunk relative to GDP at the same time as the production of services has expanded. The GDP share for the basic industries has decreased from 6.5 per cent in 1970 to little more than 4 per cent at present, while the share for the production of business services has grown from approximately 30 per cent to over 40 per cent. In other words, capital-intensive production has increasingly given way to production that is more dependent on human capital than on heavy machinery and plant.

Another factor that leads to lower figures for capital formation is the decline in residential construction. For productivity growth, however, residential construction is not as important as manufacturing investment. So the dramatic fall in capital formation does not necessarily imply an equally marked weakening of productivity growth. Still, net investment – the contribution to capital formation – fell by more than half in relation to disposable national income in the mid 1970s.<sup>3</sup> It therefore looks as though Sweden is investing less than before in capital formation that enhances productivity. This is evident from the limited extent of the structural changes compared with the drastic contraction of net investment relative to GDP.

**Capital formation also changed dramatically in the mid 1970s.**

**Production has shifted from capital-intensive operations to a greater dependence on human capital.**

**Net investment fell by more than half in relation to disposable national income in the mid 1970s.**

<sup>3</sup> Disposable net national income consists of GDP less reinvestment and net outward transfers (e.g. development assistance and net interest expenditure on external debt).

**This implies, for one thing, lower capital growth per employee or hour worked.**

This has two implications. One is that capital growth per employee or hour worked will be lower. The significance of capital input per employee will be readily understood if we take the drastic example of what a single worker with a pick and shovel can achieve compared with a hydraulic digger. The latter requires a great deal more capital per employee than digging with a spade and is much less of a physical strain on the worker. Another drastic example is the bucksaw or the crosscut compared with a modern forest harvester.

**For another, new capital brings new technology into the production process.**

These examples also illustrate the other implication, which acts indirectly: new capital brings new technology into the production process.<sup>4</sup> Investments are a means of bringing new technology, new methods and new research findings into practical production. So slower capital formation can be expected to lead to a slower development of production technology. A digger or a harvester is very much more than a substitute for a lot of spades or saws; it represents an entirely new technology that affects the entire production process – planning, transportation and ancillary services. The computerisation of forest harvesters has replaced entire corps of professionals such as forest engineers and forest keepers. So when capital growth per employee declines, we should expect productivity growth to slacken as a consequence of a smaller volume of capital as well as a slower pace of technological developments. Developments in IT, which lie behind much of real capital formation's effect on productivity, also enhance productivity in the administrative systems of manufacturing companies (as well as elsewhere).<sup>5</sup>

**Capital per employee grew more slowly from the mid 1970s onwards, which meant that new technology was not utilised to the same extent as before.**

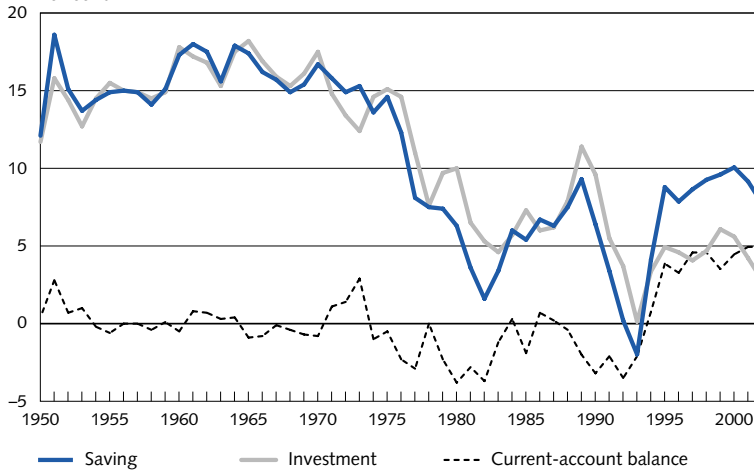
Figure 1 shows that capital formation – net investment as a share of national disposable income – decreased from a level of about 15 per cent in the mid 1970s to about 5 per cent at the turn of the century.<sup>6</sup> In other words, capital per employee grew more slowly from the mid 1970s onwards, which meant that new technology was not utilised to the same extent as before. Such a dramatic change is bound to have consequences. The balance on current account (the curve low down in the figure) was almost continuously in deficit for twenty years from 1975 because saving in Sweden fell even more than investment. It was not until the second half of the 1990s that a current-account surplus was restored in connection with a weakened currency, higher capital formation and even higher

<sup>4</sup> What I have in mind here is "embodied technological growth". New technology can also be incorporated in production processes through organisational changes and small, everyday improvements in productivity with a given capital stock, that is, without investment; this is referred to as "disembodied".

<sup>5</sup> As the discussion here concerns the decreased volume of net investment, it should be mentioned that even reinvestment (the difference between net and gross) brings new technology into production processes.

<sup>6</sup> The calculation involves deducting computed capital depreciation from gross fixed capital formation to give net investment, which represents the change in the stock of capital. The measurements of gross investment are fairly precise, while depreciation is estimated in a relatively standardised way.

**Figure 1. Saving, net investment, and current-account balance relative to disposable national income**  
Per cent



Source: Berg (2000) updated.

saving. That means that there are resources in Sweden for capital formation without increased saving. I shall be returning to that.

To illustrate the importance of the lower capital formation, Table 1 presents data for productivity in the period when the major shift occurred. By the 1980s a lower rate of capital growth had been established. Capital growth per employee (capital intensity) had more than halved both in manufacturing and in the corporate sector as a whole. Productivity growth followed suit; it more than halved from the high figures in the 1960s.

**TABLE 1. CAPITAL INTENSITY AND PRODUCTIVITY GROWTH RATIO AND PER CENT**

	Manufacturing		Corporate sector	
	Capital/employee	Productivity	Capital/employee	Productivity
1963–70	8.3	7.6	6.5	5.3
1970–80	6.3	3.4	6.2	3.2
1980–86	2.8	3.2	3.0	2.0

Source: Sparfrämjandet (1989).

From Figure 1 it will also be seen that the capital formation Sweden achieved in relation to total resources in the 1960s has not been restored and the fluctuations have been greater after the mid 1970s. The average proportion we invest in new capital is roughly one-third of what it used to be. A difference is the increase in saving compared with investment, which means that Sweden is exporting capital and has a current-account surplus.

**In the first half of the 1990s, rationalisations and the elimination of relatively unproductive enterprises meant that productivity growth rose but also high unemployment.**

Although the rate of capital formation continued to be relatively low, the weak trend for labour productivity in Sweden's corporate sector in recent decades was broken in the first half of 1990 and productivity growth picked up. But this was not caused by capital formation. It was extensive rationalisations and the elimination of relatively unproductive enterprises in connection with the economic crisis in the early 1990s that gave higher productivity growth but they also resulted in high unemployment. Sweden became less prosperous relative to other OECD countries. High unemployment and a falling GDP meant that we slipped down to below the average living standard.

With a view to creating conditions for a more sustainable long-term economic trend, in this period there were also changes in Sweden's economic policy. A realignment of fiscal and monetary policy resulted in greater stability and predictability; this probably made the economy more efficient in that resource allocation was no longer driven by inflation expectations. The reforms of the tax and social security systems presumably had similar effects.

**In the late 1990s Sweden managed to achieve higher growth and recovered some of the ground that had been lost earlier.**

At the same time, Sweden's adherence to the EU's common market and deregulations in a number of important markets resulted in stronger competitive pressure. Moreover, high growth in the private compared with the public sector and the development of information and computer technology in the second half of the 1990s probably contributed to the higher productivity growth. In the late 1990s Sweden managed to achieve growth rates that were higher than for many years, with rapidly rising real wages, and recovered some of the ground that had been lost earlier.

But in view of the relatively low rate of capital formation since the 1970s, there are grounds for wondering about Sweden's future growth prospects. Will we be able to recover something of our earlier prominence as a relatively prosperous industrialised country? What does the low capital formation imply in this context? Will labour force growth be sufficient to cope with the need for care in an aging population? Let us start by considering the latter question.

## Will the supply of labour be sufficient?

Besides productivity, a country's long-term growth potential is determined by the supply of labour, which depends on how many of its inhabitants are capable of working and for how many hours each of them is prepared to work.



The number of hours worked rose after the crisis in the early 1990s. The underlying factors included increased labour demand, more people in the economically active age group (20–64 years) and comparatively low absenteeism for sickness. In recent years, however, the upward trend for hours worked has been broken. The main reason is the rising number of persons on sick leave since 1997–98. Absenteeism for sickness, as measured in the usual ways, is higher in Sweden than in any other EU country. Holiday and other leave has also risen, while overtime and additional working hours have decreased. Neither has the Swedish labour market been sufficiently successful in utilising people born abroad; the participation rate for this group has been considerably lower than for persons born in Sweden.

**The number of hours worked rose after the crisis but in recent years the upward trend has been broken.**

In the future, moreover, demographic developments according to Statistics Sweden will be less favourable for the labour force than they have been to date. The active age group will admittedly continue to grow but the net increment will diminish because of a sharp rise in departures from this group. The latter has to do with the fact that people in the large birth cohorts from the 1940s are now approaching retirement. This could have a negative effect on potential growth.

**Demographic developments will be less favourable in the future.**

In the coming ten years it is calculated that the number of persons over 65 will rise by 270,000, which gives an average annual increase of approximately 1.6 per cent, whereas the number in the active age group rises by 170,000 or by only approximately 0.3 per cent a year. This ongoing shift from active to passive generations will continue after that: from 2012 to 2030 the number of over-65s is calculated to rise by about 1.3 per cent a year while the number in the active age group is virtually unchanged.

All this calls for measures to increase the future labour supply. Lower absenteeism for sickness and fewer people retiring early can contribute to this. There will also be a growing need for people to enter working life at an earlier age, as well as for a higher participation rate among older age groups, perhaps with a higher retirement age. At present, moreover, there is an unutilised labour reserve among the immigrant population. The average employment rate for people born abroad is about 30 per cent lower than for persons born in Sweden. Measures for improving the labour market integration of persons with a foreign background could make a positive contribution to labour supply.

**This calls for measures to increase the future labour supply.**

If the Government's target of halving sick leave is achieved, the annual increase in hours worked, for example, could be 0.4 percentage points higher up to 2008. An additional 0.1 percentage point a year could be gained if the labour reserve among people with a foreign background were to be utilised to the same extent as among persons born in Sweden.

This would be positive for potential growth. But as the increment to the active population would stop at half of one per cent and only apply for a time, the maintenance burden on the active group would still grow.

## More pressure on the public finances

**The active age group in Sweden will need to maintain an increasingly large proportion of young and elderly people.**

The unfavourable age structure in the future is not only a challenge in terms of potential growth. It will have other consequences, too. The trends imply, for instance, that the number of over-65s will increase from 17 per cent of the population today to 23 per cent in 2030, while the proportion in the active age group decreases from 59 to 54 per cent. This means that the active age group in Sweden will need to maintain an increasingly large proportion of young and elderly people. At present, each person in the active age group maintains 0.70 inactive persons who are either younger or older. By 2030 it is calculated that this maintenance burden will have risen to 0.84 persons, an increase of 20 per cent.

The increase in the maintenance burden is explained by large birth cohorts reaching the retirement age – in the period 2005–15 for those born in the 1940s and in the years around 2030 for those born in the 1960s – together with an assumed increase in life expectancy. Looking at just the over-65s, today their number per person in the active age group is 0.29, while by 2030 the ratio is calculated to have risen to 0.42.

**Today's problems with public sector financing are trivial compared with what they will be if nothing is done.**

The problems we see today with public sector financing and high tax pressure are trivial compared with what they will be if nothing is done. The age structure of the population implies large requirements for welfare services and thereby increased pressure on the public finances. At the same time, a lower labour supply and thereby lower output lead to lower central government revenue.

Even with a more balanced demographic development, the problems would still grow. The structural shift towards a growing proportion of services in production contributes to this. People who produce services demand the same wages as employees elsewhere, yet productivity growth for services is considerably lower than in industries exposed to competition. The latter undergo continuous rationalisation with a growing capital input per employee, whereas this is harder to achieve in all kinds of services. As a result, the relative price of services rises over time.

This is a problem in particular if, as is the case in Sweden and other predominantly social democratic countries, services are largely provided by the public sector and financed with tax revenue. Wage increases negotiated in the highly productive manufacturing sector spread to the production of services and may lead to increases in prices and taxes. This view may need to be qualified if it turns out that, unlike earlier innova-

tions, the so-called IT revolution paves the way for rationalisations in services industries, although the effects in such fields as medical care, social services and education will be limited.

## How can we respond to the challenge?

Many proposals have been put forward for coping with the active population's increased burden in the future. Increased saving today has been recommended, for instance by adding a percentage point or so to Government's target for the budget balance as a way of successively reducing central government debt.<sup>7</sup> It is envisaged that a lower central government financing requirement leaves more room for capital formation in the private sector (crowding in). Here a distinction needs to be made between two ways of securing the future for an ageing population: increased saving either without increased capital formation or as a way of providing resources for increased investment in Sweden and thereby a larger capital stock.

The first way results in a current-account surplus that ultimately generates interest income, dividends and other capital income that adds to Sweden's national income. The tax base does not grow to the same extent as with investment in Sweden because it is only a matter of capital taxes on dividends and other income from abroad. Still, this would be a solution if Sweden wants to import services in the future by locating care of our elderly to sunny countries like Greece and Portugal and letting young people study abroad. The imported services would be financed with the external assets. It is possibly this strategy that Japan is aiming for in relation to its Chinese and Korean neighbours.

The other response to the challenge is to stimulate capital formation in Sweden. Capital growth then rises to compensate for the slower growth of the labour force. Saving already exists in the form of the current-account surplus and could be utilised. The calculations from Berg (2004) indicate that a five per cent surplus would suffice to double capital formation's share of disposable national income. This approach can be seen as a natural consequence of a fall-off in labour force growth. Economic growth is maintained by stimulating its other source, capital formation. Capital is substituted for labour, giving a rising input of capital per hour worked (a higher capital intensity), rising real wages and a growing tax base that contributes to the continued financing of public activities such as care and social services.

**A distinction should be made between two ways of securing the future for an ageing population: increased saving without and with increased capital formation.**

**Increased capital formation adds to the tax base, making it possible to finance care and social services.**

<sup>7</sup> See SOU 2002:16 and SNS (2004).

The difference from investment abroad lies in the expansion of the tax base in Sweden and thus the potential to finance care and social services here. External investment contributes much less to the tax base compared with increased capital formation in Sweden. On the other hand, care and social services can be located to more temperate countries, in which case the drain on external assets leads to a smaller current-account surplus or a deficit. The importance of high real capital formation is considered in the next section.

## Basic industries – a good example!

**A high rate of capital formation can lead to increased output without a larger input of labour.**

With a high rate of capital formation so that capital intensity rises, increased output can be achieved without a larger input of labour or even with less labour. Sweden's basic industries are an example that points to a feasible way of coping with the unfavourable age structure of the population in the future. A resolute increase in capital intensity releases labour for the production of services. Such a process has been in progress for a long time in the form of declining employment in manufacturing and rising employment in services industries. It must continue and be accelerated. Developments in the basic industries illustrate how this can be achieved.

Those who debated the so-called new economy in the 1990s were prone to predict that the days of the traditional industrial society were over and that manufacturing faced the fate that agriculture previously experienced. The basic industries – in Sweden primarily mining, the iron and steel industry, paper manufacturing and wood products – are a component of the corporate sector that tends to be overlooked. Their role has admittedly diminished in recent decades, particularly for employment, but they remain important for net exports. While the rise and fall of the ICT sector in the course of some years has dominated the debate, an industrial evolution has been in progress for a long term in other parts of the corporate sector. It is, after all, in industries outside the ICT sector that much of the new technology's benefits have been and will be reaped. Neither are the services industries excluded from this.

**There have been major structural adjustments in basic industries.**

There have been major structural adjustments in basic industries. In the past forty years the average capacity of plants in forest industries, for example, has risen eight-fold for paper manufacturing and six-fold for pulp. Small plants have been closed and operations are now highly concentrated. Economies of scale and more stringent environmental standards have necessitated considerable investments. Today, about 3 per cent of world paper output is located in Sweden, which has 9 per cent of paper exports (of Sweden's output of paper and commercial pulp, almost

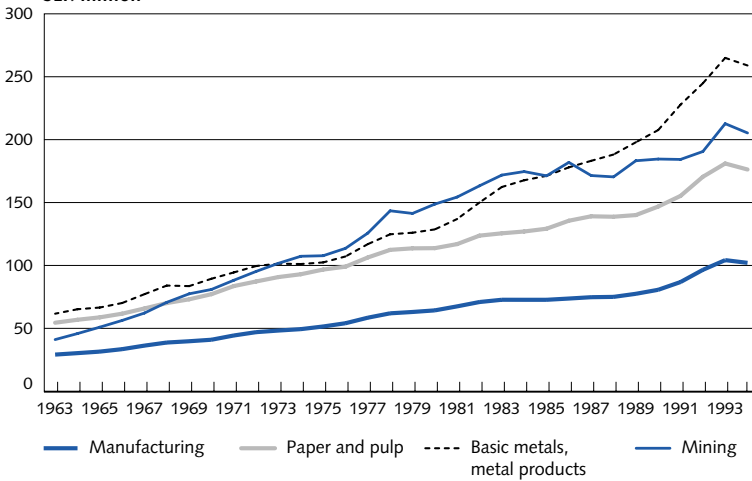
85 per cent is exported). The mining industry is admittedly smaller than it used to be; value-added here now contributes just over 1 per cent of the total for mining and manufacturing. But net ore exports, which hardly changed in the early 1990s, picked up towards the end of that decade to about 2 per cent of total net exports of industrial products.

The mining company LKAB contributes about 4 per cent of world trade in iron ore.<sup>8</sup> Employment at LKAB peaked at 8,297 persons in 1961, when the output of iron ore stood at 17.1 million tonnes. Today, 2,750 persons work there and now produce 21.5 million tonnes. Upgrading and further processing have raised the value of output from SEK 0.92 billion to SEK 6.2 billion in mines where workers and heavy labour are virtually absent. Drilling, loading and transportation are directed via computer screens in an office environment.

In spite of the competition from countries where trees grow much faster and ores are cheaper, plus the fact that technology in some fields has become easier to transfer between countries, the basic industries have weathered numerous crises over the years. The explanation for this and their comparative importance today is probably that their owners and executives have been quick to invest and adopt new technology while constantly attempting to refine their products and find new niches. They have rapidly substituted capital for labour (see Figure 2).

**The basic industries have weathered numerous crises over the years, probably by being quick to adopt new technology.**

**Figure 2. Capital stock per employee  
SEK million**



Sources: Statistics Sweden and the Riksbank.

<sup>8</sup> Ds 2001:63.

Thus, basic industries in Sweden have achieved the essential adjustments to modern structures and then more than held their own in international competition. This is a striking contrast to the rusting steel industry and the problems for forest industries in the United States, where import tariffs are being used in an attempt to avoid having to adjust.

While Swedish manufacturing as a whole lost almost 20 per cent of its world market share relative to other OECD countries between 1970 and 1990, towards the end of the 1980s the basic industries staged a recovery. Productivity in the basic industries also developed more favourably than in other industries, with a strong positive trend, particularly in the second half of the 1980s.

Sweden has specialised in capital-intensive process industries, based on cheap energy and a good supply of raw materials, above all from forests. Thus, the main driving forces have been the supply of energy and raw materials, not cheap real capital. But within the framework of an overall contraction of capital formation in Sweden, a great deal of real capital has been invested in basic industries.

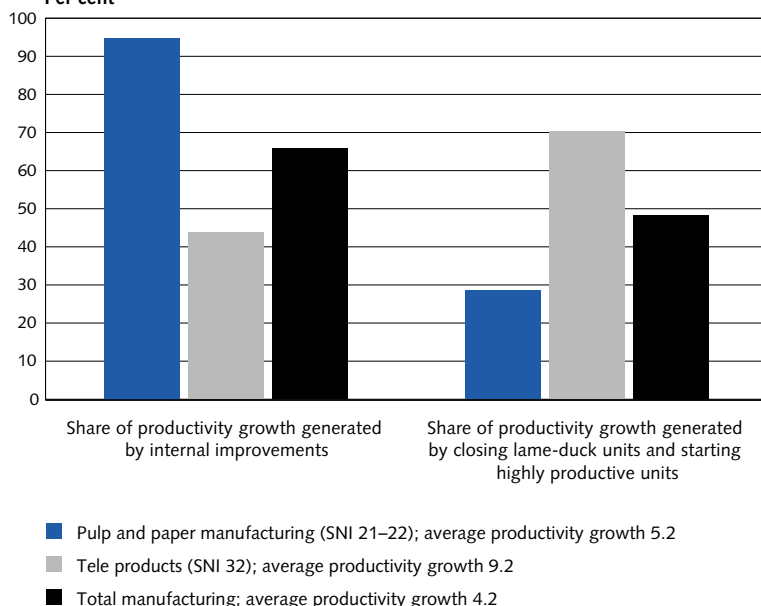
**A phenomenon of importance for the success of the basic industries is total factor productivity.**

Another phenomenon of importance for the success of the basic industries is total factor productivity. This is a reflection of advances in technology and indicates in principle the extent to which output in a given period can rise with unchanged inputs of labour and capital. It is largely via investment, however, that new technology is incorporated in production. Total factor productivity is dependent on the resources a country or an industry devotes to research and development (R&D), as well as on the ability to make day-to-day rationalisations and to adapt structures and organisations. The intensity of R&D in Sweden is higher than in other OECD countries in 12 out of 19 industries. This relative level of R&D intensity is particularly high in the basic industries, above all in the steel industry and paper manufacturing. In addition to the cheap supply of energy and raw materials, the success of the basic industries has to do with their strong commitment to R&D and investment in real capital, whereby new technology is harnessed to production processes.

It will be seen from Figure 3 that, in contrast to the manufacture of tele products, productivity in the pulp and paper industry has more to do with technical developments generated internally than with the closure of lame-duck plants.<sup>9</sup>

<sup>9</sup> The underlying calculation includes a small interaction term that is difficult to interpret intuitively but which causes the results to sum to 100 per cent.

**Figure 3. Decomposition of changes in total factor productivity 1990-98**  
Per cent



Sources: Statistics Sweden and the Riksbank.

It has been said that as relative R&D expenditures and capital investment have been particularly high in the basic industries, they have tended to “conserve” the traditional industrial structure. It has even been claimed that our living standard lags behind that of other countries because production factors have been locked into the traditional basic industries. This, of course, is not the case. The conclusion to be drawn instead is that if the corporate sector as a whole had been as alert as the basic industries and put as much into R&D relative to other countries, then Sweden would not have declined into relative poverty.

The basic industries have invested a great deal and thereby maintained output and released labour for other types of production. So the weak investment trend I mentioned earlier has not applied to them. Elsewhere it is all the clearer that capital formation in Sweden has decreased sharply. A case in point is neglected infrastructures such as roads, streets and other facilities. Rail transport functions poorly and the low level of investment will soon become apparent in the field of housing, where we are still benefiting from the high investment in earlier decades.

**If the corporate sector as a whole had gone in for R&D as much as the basic industries relative to other countries, Sweden would not have declined into relative poverty.**

## Can we be best again?

**If we manage to raise potential growth, the Riksbank will not need to tighten monetary policy on that account.**

Economic growth is currently a focal subject for political debate in Sweden. It is a question of restoring a relatively high living standard and coping with the consequences of the unfavourable demographic tendencies – not least in view of the public finances. Besides, if we manage to raise potential growth, the Riksbank will not need to tighten monetary policy on that account.

It is important that conditions are created for an increased labour supply in the future. This includes enabling people with a foreign background to get a job. Moreover, ways should be found so that economic policy reduces the distortionary effects of the system of benefits and taxes, not least as regards people's propensity to work and the desire to launch new enterprises in all walks of economic life.

**A fundamental prerequisite for success is to restore a high rate of capital formation and thereby the introduction of new technology.**

Creating conditions for long-term growth is above all a matter of increased productivity. A fundamental prerequisite for success is therefore the restoration of a high rate of capital formation and thereby the introduction of new technology. But with a large current-account surplus, it is not increased saving that is needed most. Capital exports can be replaced by investment in Sweden. A higher investment intensity can release labour for the production of services, where substituting capital for labour is not as feasible as in the production of goods. Developments in basic industries also show that efforts for research and technical development can generate substantial gains in productivity and that traditional industries do not necessarily belong to the past.

Sweden's basic industries have demonstrated an ability to survive; they have coped with major structural upheavals and show stable growth. They are also the industries in Sweden that have achieved most, relative to other countries, in the level of technology, productivity and innovative ability. Other industries and branches of the corporate sector should emulate the basic industries in a drive for capital investment and R&D so as to release labour for the services industries where rationalisation is less feasible.

**Certainly Sweden can be one of the best again. But it calls for diligence, new enterprises, increased investment and a healthier population.**

So certainly Sweden can be one of the best again. But it calls for diligence, new enterprises, increased investment and a healthier population. Declining from being one of the richest countries to a relatively poor industrialised country took twenty years. In order to recover a leading position, productivity needs to rise some tenths of a percentage point faster than in other countries year after year for several decades. That is what happened when Sweden rose out of poverty to become a prosperous



country between 1870 and 1970. So what is needed is a long period of sustained effort.<sup>10</sup>

Here are some estimates to illustrate this. Compared with Sweden, in 2002 the standard of living (represented by GDP adjusted for purchasing power) was roughly 30, 20 and 10 per cent higher, respectively in the United States, Norway and Denmark.<sup>11</sup> The Riksbank usually counts on the sustainable average annual growth of total productivity in Sweden being between 1.5 and 2 per cent. Assume that the same applies to the United States, Norway and Denmark (even though the United States seems to be in a better position), and that Sweden can maintain a rate that is half a percentage point higher ( $\lambda = 0,005$ ) than in those countries. In terms of our earlier history, that would not be out of the question. How long would it then take to catch up with the living standard in those countries; alternatively, how rapidly would our productivity need to grow to achieve this in ten years ( $t=10$ )? The results of the calculations are presented in the following table.

	$\lambda=0.005$	$t=10$
USA	52 years	+ 2.62 %
Norway	36 years	+ 1.82 %
Denmark	19 years	+ 0.95 %

If Sweden managed to generate a rate of productivity growth that was constantly half a percentage point higher than in the United States, catching up would take more than half a century. The corresponding estimates show that catching up with Norway would take 36 years and with Denmark 19 years. The differential is not unreasonable. Somewhat higher growth than in other countries transformed Sweden in a hundred years from one of the poorest countries in Europe to one of the most prosperous in the world by the early 1970s. But it did take a long time and we were aided by not being involved in two world wars!

Catching up in the course of a decade, on the other hand, appears to be out of the question. Annual productivity growth would need to be over 2.5 percentage points higher than in the United States and average more than 4 per cent ( $1.5+2.62$ ). Not even catching up with Denmark in ten years looks possible as productivity growth would then have to be a full percentage point higher in Sweden throughout this period.

**If Sweden managed to generate a rate of productivity growth that was constantly half a percentage point higher than in the USA, catching up would take more than half a century.**

<sup>10</sup> Cf the analyses in Schöön (2000) and Bentzel (1979).

<sup>11</sup> According to The Economist (2002).

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