

Speech

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Sweden's economy and new information technology

Ministry of Industry, Employment and Communications

First I want to express my thanks for the invitation to discuss Sweden's economic development with you in a wider perspective. I am delighted to do so. Today I shall be leaving monetary policy a little to one side and looking beyond the economic fluctuations of a short-term nature that are usually the centre of attention. Thus, I do not intend to talk about current monetary policy. Instead, I want to discuss economic developments in a longer perspective. I shall also be taking a look at economic policy through the driving mirror to see what lessons we can draw from the past. First, however, there is the matter of the new economy, which only six months ago was such a ubiquitous topic.

What happened to the discussion about the new economy?

There has been much talk of the new economy in recent years, in Sweden as well as elsewhere. It is not entirely clear what the term stands for and its meaning tends to vary with the speaker. But it often refers to new information technology in general and the internet in particular. It has been used, for example, to explain and sometimes justify rapidly rising share prices for companies in the domain of information technology, known for short as IT companies. It has also featured, however, in the view that the economic laws under which we live have ceased to apply, leaving our economies in a state of bliss. Constantly accelerating productivity growth should lead to an unending boom, so that we central bank governors can sit back and stop worrying about the tensions that strong growth usually generates between supply and demand, with the risk of rising inflation.

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Reality, however, does not seem to have kept pace with these notions. Share prices for IT companies have fallen steeply. In the course of last year the average value of the Nasdaq exchange, perhaps the prime indicator of the aggregate value of international IT companies, was almost halved. IT shares have also fallen markedly on the Stockholm exchange as well as elsewhere. Moreover, a number of new companies in this sector have collapsed.

Developments in the U.S. economy are a reminder that time-honoured relationships do still apply, even in a phase of rapid transformation with major technical innovations. An economy that is expanding rapidly will ultimately generate imbalances and rising prices. That was why the Federal Reserve had to tighten the monetary stance so that the high growth in the United States would be subdued.

My attitude to talk about a ‘new economy’ or a ‘new economic era’ has been sceptical for a number of reasons. One is that I had difficulty in accepting the idea that economic relations we have observed for decades, perhaps even centuries, could suddenly cease to hold. Technologies do change, very quickly at times, but the fundamental economic relationships are not easily overturned. Another reason is that history shows that talk of a new economy tends to coincide with periods of strong economic speculation.¹

Information technology will be a major engine for growth

The fact remains, however, that in recent decades we have seen notable technological breakthroughs with far-reaching economic impacts. To understand what this has meant, we need to go back further than to the birth of the internet. The crucial advance occurred perhaps in the 1970s, when it was suddenly possible to construct a complete computer as a tiny chip — a microprocessor. Microprocessors in turn were the fruit of development work lasting several decades. Today computers have innumerable applications, partly because they have become so much cheaper. In the past four decades computer prices have dropped by an average of around 20 per cent a year. So a computer with a price tag of 10,000 kronor today would have cost almost 50 million kronor in the early Sixties. This has paved the way for computerisation in a wide variety of fields, besides involving something of a revolution in methods of production and patterns of consumption.

Some observers draw parallels with earlier revolutions in economic history, for example the introduction of steam-engines in manufacturing in the 18th century and the breakthrough for the combustion engine and electric motors in the late 19th century.

A closer look at these two earlier industrial revolutions shows that in Sweden the impact of the steam-engine was delayed. Developments here had more to do with the transformation and commercialisation of farming in connection with land reforms. It simply took time to build up the institutional arrangements that made a widespread use of steam-engines possible. Sweden did not begin to participate in the first industrial revolution until the middle of the 19th century, when the

¹ See Shiller, J. (2000), *Irrational Exuberance*, Princeton University Press, Chichester, West Sussex.

construction of railways gave steam locomotives a crucial part to play in the new form of communication.

At the time of the second industrial revolution, however, when the conditions for production were changed again by the petrol engine and the electric motor, Sweden was in a better position to reap the benefits. In that the social structure was more suited to adopting and utilising the new technology, the pace of modernisation was faster. Production became increasingly efficient as the industrialised society took shape. Electrification, motor vehicles and aviation all left their mark on developments in much of the 20th century.

At the same time, it was probably not the new inventions as such that provided the conditions for the rapid economic growth in the 19th and 20th centuries. It was rather their economic applications and how they spread — thereby altering patterns of production and consumption — that determined the magnitude of their impact on long-term growth. Bringing about such a development involves ensuring that it is supported by the ways in which various parts of our society function. Economists talk of society's institutions or a market economy's infrastructure. This refers to everything from the structure of government and the degree of economic stability to how the judicial system functions, with ownership playing a major role, the quality of education and the structure of taxation.² As I said, a major cause of Sweden's earlier difficulties in utilising steam-engines was that various social systems were not able to latch onto the new technology and use it productively. Sweden simply lacked the conditions for this initially.

A historical view of transformation and development

One of several possible approaches to an analysis of economic developments connected with various industrial revolutions was put forward by the Austrian economist Joseph Schumpeter in his theory of development clusters and long cycles. This approach has been developed in Sweden by economists and economic historians such as Erik Dahmén, Johan Åkerman, Lars Magnusson and Lennart Schön.³

Changes in technology are often cited as a basic cause of the long cycles. Technical innovations tend to be developed in clusters that play a central part in the transformation of manufacturing. These concepts are not all that easy to define but roughly speaking it is a matter of new technology leading to extensive changes in the business community, as well as in society in general. The economy is launched into a process of transformation — a sort of struggle between old and new. New products are introduced as well as new forms of production. Patterns of

² See e.g. Myhrman, J. (1994), *Hur Sverige blev rikt* (How Sweden became prosperous), SNS Förlag, Stockholm.

³ See Magnusson, L. (1996), *Sveriges Ekonomiska Historia* (Sweden's economic history), Tiden Athena, Stockholm; Schön, L. (2000), *En Modern Svensk Ekonomisk Historia* (A modern Swedish economic history), SNS Förlag, Stockholm; Åkerman, G. (1932), Om konjunkturvåxlingarnas nödvändighet och grundorsak (On the necessity and basic cause of economic fluctuations), *Ekonomisk Tidskrift* 1. For a survey of Erik Dahmén's work and contributions to economic research, see Eklund, K. (1986), Springtime for Dahmén. A Renaissance for Schumpeterianism in Sweden, *Skandinaviska Enskilda Banken Quarterly Review* 2.

consumption also change and so does the demand for education. Growth shifts to other parts of the country. The new demand stimulates the growth of capital markets. All these developments influence the public debate and the political system. Bit by bit, the entire economy responds to the new technology. That is what happened in many parts of the world when the steam-engine was successfully developed in the late 18th century. It also occurred after new sources of motive power led to the electric motor and the combustion engine in the late 19th century.

This phase gives way in time to a process of rationalisation. The new technology is standardised and spreads to more and more segments of the economy. Growing competition makes the business climate tougher. Certain investments may turn out to have been mistaken. The struggle to survive makes rationalisation necessary. Excessively large capital stocks begin to shrink.

The various phases may be accompanied by economic setbacks and even full-blown crises. History is full of examples. Seen from this angle, the crises in the late 1840s, early 1890s, early 1930s and mid 1970s were of a structural nature.⁴

By the same token, the run-up to the crisis in the 1970s can be briefly described as follows: in the wake of the second industrial revolution, heavy industries such as iron, steel, coal and cement had contributed to the emergence of a new infrastructure in the industrialised world. The growth of these industries had been particularly strong in the decades after world war two. In a sense, this infrastructure can be said to have originated in the development clusters that fed off the introduction of electric motors and combustion engines at the end of the 19th century and led successively to new social developments in the first half of the 20th century. By the late 1960s the industrialised countries were moving into a phase of rationalisation. There was a great deal of surplus capacity, particularly in the major iron and steel sector. Together with the oil crisis and the collapse of Bretton Woods, the post-war international currency system, this plunged many industrial countries into an acute structural crisis. The extent of the crisis was, of course, influenced by economic policies; I say that as a reminder that the development I have described is not predetermined.

The crisis for this former development cluster is sometimes seen as being connected with what we could accordingly call the third industrial revolution, namely the coming of the microprocessor. This has launched a new phase of transformation as the emergence of a new development cluster leads economic developments in new directions.

Temporary setbacks not unusual when times are changing

The setbacks, however, are not necessarily confined to traditional industries. Other types of economic reversals may also occur in periods of structural change. They may take the form of financial problems of varying severity. During the transformation process, investors and creditors perceive new profitable opportunities. Share prices rise and banks are willing to lend to new enterprises and novel projects. However, as share prices and the supply of credit are governed

⁴ See Lennart Schön, *ibid.*

by expectations of future gains, undue optimism may sometimes cause them to rise too fast. Sooner or later, such bubbles based on expectations will burst and this tends to be associated with problems in the banking sector. The years 1907, 1920 and 1990 are three examples of this. For a number of decades in the middle of the 20th century there was a notable absence of serious bank crises; one explanation may be that credit markets were tightly regulated. But the regulations also created other problems, though it would take too long to go into that here.

Around the 1890s, when the Swedish economy took a great leap forward, new banks were established in quick succession and credit expanded rapidly. This was followed by massive price increases for shares and real estate. The bank crisis that occurred when the boom finally peaked in 1907 had far-reaching consequences: four banks closed, five were reconstructed and fifteen smaller banks were taken over by larger establishments.

After world war one there was a new wave of speculation. The prospect of large profits and the inflow of capital contributed to a stock-market boom when bourses achieved a breakthrough as suppliers of venture capital. In 1918 the Stockholm Exchange reached a turnover that at constant prices was unrivalled until the late 1980s. Another factor behind the flourishing stock markets was that commercial banks lent more and more extensively with shares as collateral. The trend ultimately peaked and the mood became less optimistic, as sooner or later it always does. When the high value of the risky assets that had served as collateral fell, a crisis was precipitated in the banking system as well as in the economy as a whole.

The bank crisis in the early 1990s is still such a recent event that I shall not dwell on it here. But it is worth noting that there was a similar crisis in the 19th century. As early as 1857 the government was obliged to intervene to safeguard the payment system in connection with a bank crisis: Skånes Enskilda Bank was threatened and finance minister Gripenstedt came to its rescue. Barely two decades later, in 1878, another bout of excessive optimism and unduly strong credit growth led once more to a bank crisis when the boom was over. On that occasion the crisis hit Stockholm in particular. Stockholms Enskilda Bank was most vulnerable, having increased its commitments in private railroad construction in the 1870s. Government efforts saved the bank by establishing a fund in the National Debt Office so that the bank could mortgage its illiquid railroad bonds.

These examples illustrate how excessive optimism is liable to lead to things getting out of hand and resulting in imbalances. The course of economic developments may then be checked for the time being but once the problems have been overcome, a new expansive phase begins. I leave you to draw your own parallels with the previous rapid price rise for IT shares and last year's subsequent correction. The bursting of what some have called an IT bubble in the stock market is thus not the end of the new information technology's era. It is rather a symptom of what might possibly be termed 'temporary growing pains'. It remains to be seen how serious this setback will be, above all for the U.S. economy, but sooner or later the transformation will pick up speed again.

How far have we come in the IT revolution?

Turning now from history to our own time, the question of how far we have come is obviously not an easy one to answer. It has been calculated that the economic impact of technical advances such as IT takes forty to fifty years to materialise in full.⁵ If the microprocessor's breakthrough in the early 1970s constitutes the starting point, then it will presumably be another couple of decades before any sizeable economic effects are discernible. Counting instead from the invention of the computer in the mid 1940s, however, means that we could already be in the beginning of a phase of rising productivity and growth. Nevertheless, I believe it is still early to be able to provide an unequivocal answer to this question.

What is clear is that electronics and microprocessors have revolutionised telecommunications and household appliances such as TV sets, videos and music equipment. We give little thought to the fact that microchips are now to be found in the simplest kitchen appliances. They are a part of our daily round. Bear in mind, moreover, that there are no doubt applications that have not yet been exploited with the more powerful and, above all, cheaper capacity of new computers.

Electronic techniques were used in the 1970s to produce electronic components and equipment. In the 1980s, computer hardware and programmes were developed, along with various services that made it possible to incorporate computers in many fields. The pressure for change has shifted to software and know-how. In the 1990s software became more standardised and attention focused on attempts to create new infrastructure, for instance by extending the internet. The new infrastructure has enabled globalisation to take a large step forward. A good example of a field where the new technology has been utilised for strong growth is the financial sector. No one now dwells on the fact that the financial sector largely stands or falls with the new technology; it has become commonplace.

TV satellites and the internet have paved the way for new and better means of communication. That in turn has provided a base for the growth of many new types of services. Many people now use the internet for bank transactions. Buying and selling goods on the internet is still fairly limited but is growing. Today, most people in Sweden have access to news and entertainment from all parts of the world. Firms have had to adapt to new markets and new conditions for distribution. New enterprises and new rules follow in their wake.

As the new technology becomes cheaper, it also becomes available for more and more applications. One example is biotechnology, where the conditions for research and product development have changed completely.

New companies are now being established. Swedish enterprises have quickly gained a leading position in the new fields. Sweden can be said to act as something of a European centre for the new information technology. Even the older companies, such as large state-owned enterprises, are adapting to the new technology.

⁵ Greenwood, J. & Yorukoglu, M. (1997), 1974, *Carnegie-Rochester Conference Series on Public Policy*, June, pp. 49–95.

The ability to transform a small, open economy is again proving feasible. The key to growth has been the capacity to introduce innovations and get the whole economy to expand on a wide front in connection with the historical ‘revolutions’. But as I have shown, growth is not just a matter of the innovations as such; it also involves their spread. In other words, an invention by itself is not enough. A country must also possess or create the appropriate structures that can enable growth to really get going. Perhaps one of the principal driving forces is knowledge, as Alfred Marshall, the father of modern political economy, already pointed out in the late 19th century.

Remember that a long time usually elapses before these changes occur in earnest. Railways existed as a technical innovation well before the construction of railroads took off. The automobile saw the light of day long before the era of motoring. So the development of new systems and new infrastructure takes time — in some cases a long time. Basically it is a matter of societal changes and they do not happen overnight.

At the same time, these periods of change are crucially important for economic development. In the centuries before the 1800s economic growth measured as GDP per capita averaged only 0.1 to 0.2 per cent a year. At that rate, doubling the standard of living took roughly 500 years. The change was obviously hardly noticeable to a single generation. In the first half of the 19th century, when agriculture was transformed in Sweden, GDP growth per capita averaged 0.4 per cent a year. Even at that rate, standards of living did not improve dramatically. From 1850 up to the present, however, per capital GDP has grown at an average annual rate of about 2 per cent, leading to a notable change in our living conditions. With that rate, the standard of living doubles every 35 years, which means that a marked improvement has been experienced by each generation.

Concluding remarks

The points I have tried to make in the light of the historical perspective can be summarised as follows:

- Despite falling prices for IT shares and the economic slowdown in the United States, the IT revolution has come to stay. In fact it has only just started.
- The development of the new information technology will continue in the coming decades and bring about considerable changes in many walks of life. This refers, of course, to new production processes, new products, new forms of consumption and new consumable goods and services. This may affect the location of production and thereby employment. But everything suggests that the new technology will also give rise to new lifestyles, affecting culture and perhaps even the political system and economic policy. All this will happen in ways we cannot predict today, although certain historical patterns are perhaps discernible.
- Future economic developments will suffer setbacks, either milder or more troublesome than those in the past, depending not least on the general direction of economic policy in each period. The setbacks will probably mean

that the economy moves backwards one step after already taking two steps forwards.

- The forcefulness of the economic advance will probably also depend on the extent to which various institutions in society manage to support rather than obstruct the transformation; in other words, how well the educational system, taxation and various social security systems, for example, are suited to the new era's inherent requirements.
- To conclude with some words about the role of the central bank in the environment I have just described, I should say that it involves promoting the payment system's stability and efficiency in the face of fluctuations in expectations and production. One way of doing this is to combat both inflation and deflation. Another is to ensure that banks and other financial enterprises do not take undue risks. In these ways it is hopefully possible to mitigate the effects over time of the setbacks that tend to be associated with a process of rapid transformation.