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A handwritten signature in black ink, appearing to read "Jan Pieter Krahenen".

Prof. Dr. Jan Pieter Krahenen

A handwritten signature in black ink, appearing to read "Volker Wieland".

Prof. Volker Wieland, Ph.D.



The Boom-Bust Cycle in Finland and Sweden 1984-1995 in an International Perspective*

Lars Jonung¹, Ludger Schuknecht²,
and Mika Tujula³

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Abstract:

This paper compares the boom-bust cycle in Finland and Sweden 1984-1995 with the average boom-bust pattern in industrialized countries as calculated from an international sample for the period 1970-2002. Two clear conclusions emerge. First, the Finnish-Swedish experience is much more volatile than the average boom-bust pattern. This holds for virtually every time series examined. Second, the bust and the recovery in the two Nordic countries differ markedly more from the international pattern than the boom phase does. The bust is considerably deeper and the recovery comes earlier and is more rapid.

We explain the highly volatile character of the Finnish and Swedish boom-bust episode by the design of economic policies in the 1980s and 1990s. The boom-bust cycle in Finland and Sweden 1984-1995 was driven by financial liberalization and a hard currency policy, causing large pro-cyclical swings in the real rate of interest transmitted via the financial sector into the real sector and then into the public finances.

JEL Classification: E32, E62, E63

Keywords: Boom, Bust, Asset Price Cycles, Real Interest Rates, Financial Crisis, Finland, Sweden

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The Boom-Bust Cycle in Finland and Sweden 1984-1995 in an International Perspective

1. Introduction¹

Finland and Sweden experienced an intense boom in the late 1980s, followed by a sharp contraction in the early 1990s and an exceptionally long recovery roughly until the turn of the century. The intensity of this boom-bust cycle is unique in the economic history of the two countries – but it is not unique in an international context. Actually, a pattern of boom-bust is common to many countries in recent decades and, in this respect, Finland and Sweden are no exception. What is exceptional is that two such advanced welfare states such as Finland and Sweden with a tradition of full employment and well-developed social systems could end up in such a deep financial crisis with unprecedented decline in real output, dramatic rise in unemployment and exploding government deficits. The banking and currency crisis of the 1990s turned out to be one of the most severe ever to occur in the two Nordic countries – in some aspects the worst on record.²

For policy-makers, economists and the public the magnitude of the boom and bust of the 1990s came as a surprise.³ The common view was that “it couldn’t happen here”. After the crisis, however, a large volume of research has dealt with various aspects of the boom-bust cycle: its effects on the financial system, on the fiscal stance and on the real

¹ We would like to thank Claudio Borio at BIS for making data available to us. The construction of this data set is described in Appendix I in Borio, Kennedy and Prowse (1994). We are indebted to Claudio Borio, Michael D. Bordo, Thomas Hagberg, Timo Hirvonen, David Mayes, Heikki Oksanen and Sari Sontag for constructive comments, to Karel Havik for hard work with the charts and to Sophie Bland for editorial improvements.

² See Jonung and Hagberg (2005) for a comparison of the costs in terms of lost output, industrial production and employment of the six deepest crises in Finland and Sweden during the period 1870-2000. They conclude that the crisis of the 1990s was Finland’s most severe, as measured by the loss in output, and in Sweden it was the longest crisis on record. The cumulative loss in employment was the biggest ever – much worse than during the Great Depression of the 1930s in both countries.

³ This is clear from the memoirs by and interviews with policy-makers in Finland and Sweden. See the account in Jonung, Kiander and Vartia (2006).

economy and the role of economic policies in inducing and alleviating the crisis.⁴ As a rule this work has been focused either on the two countries' individual experience or on their joint record; hardly any systematic comparisons between the Finnish and Swedish boom-bust pattern and the international experience have been forthcoming.⁵ The purpose of this paper is to remedy this deficiency.

The paper is organized in the following way. First, we describe the methodology on which our empirical work is based as developed by Jaeger and Schuknecht (2004). They devise a technique to separate boom-bust episodes from standard business cycle phases for a large number of countries. In this way they arrive at a dating of boom-bust episodes, which we adopt when calculating the average behavior of the variables that we study in a comparative perspective.

Second, we present a brief account of the driving forces behind the boom-bust pattern in Finland and Sweden. Here we focus on the impact of financial deregulation combined with the defense of the fixed exchange rate policy in pushing the two countries first into a phase of overheating with rising inflation and loss of competitiveness, and subsequently into a deep financial crisis with falling output and rising unemployment. The twin crisis, the domestic banking crisis and the currency crisis for the Finnish *markka* and the Swedish *krona*, was eventually halted and resolved when the two currencies were allowed to float and the monetary stance could be relaxed. At the same time the strategy of the two central banks was changed, with inflation-targeting replacing the defense of the fixed exchange rate.⁶ This post-mortem of the boom and bust in the two Nordic countries helps us to identify a number of key variables, which we examine more closely in our cross-country comparisons.

⁴ See for example studies by Bordes, Currie and Söderström (1993), Englund and Vihrälä (2003), Honkapohja and Koskela (1999), Jonung, Strymne and Söderström (1996), Mayes, Halme and Liuksila (2001) and Åkerholm (1995).

⁵ An exception is Kokko and Suzuki (2003) who compare the Nordic crisis with the Japanese crisis.

⁶ Eventually Finland adopted the euro in 1999 while Sweden maintained its national currency after the euro referendum in 2003.

Next, we examine the boom-bust pattern of seventeen key time series in Finland and Sweden compared to their international averages using our dating methodology. We focus on three areas: developments in the financial system, in the real sector and in public finances. We find clear differences between the Nordic countries and our international sample. The boom-bust cycle was stronger in Finland and Sweden as measured by almost all the time series; in particular we find that the downturn and the recovery was much more severe.

We conclude that the Finnish and Swedish crisis of the early 1990s should be viewed as part of a full-fledged, textbook boom-bust cycle. This cycle was driven by financial liberalization and the hard currency policy, causing large swings in the real rate of interest transmitted via the financial sector to the real sector and then to the public finances. Strongly pro-cyclical monetary policies made the boom-bust pattern worse than elsewhere in the world.

2. Methodology for identifying booms and busts

Boom-bust cycles have attracted a growing interest by researchers in recent years, and there have been a number of theoretical and empirical studies on their causes and consequences. A major challenge is to identify empirically episodes of boom-bust, for which there is no commonly accepted method. See for example the work by Bordo and Jeanne (2002), one of the first attempts to measure boom-bust periods in a comparative setting. Borio, Kennedy and Prowse (1994), Borio and Lowe (2002), Detken and Smets (2004) and Helpling and Terrones (2004) apply different methods for constructing chronologies of booms and busts from various time series.⁷

Here we build our analysis on the results derived by Jaeger and Schuknecht (2004). They construct boom and bust phases in real aggregate asset prices by following a dating

method initially proposed by Harding and Pagan (2002), based on the so-called triangular methodology. This technique identifies the peaks and troughs of the asset price series (their turning points). Then Jaeger and Schuknecht (2004) calculate the duration of the period from trough to peak (the upswing) and from peak to trough (the downturn) and the amplitude of the asset price changes over these periods. By multiplying duration and amplitude, they arrive at a ranking of asset price upswings and downturns, the largest quintile of which is referred to as boom-bust episodes. This enables them to separate booms and busts in asset prices from more normal asset price movements. Using this method, a boom does not necessarily need to be followed by a bust, and vice versa.

In this way they arrive at a classification of booms and busts in real asset prices for 16 industrialized countries for 1970-2002, including the seven major industrial countries (G7), Australia, Belgium, Denmark, Finland, Ireland, the Netherlands, Spain, Sweden, and Switzerland as shown in Table 1. Altogether 20 boom and 20 bust phases are identified for this period. The duration of boom-bust cycles in asset prices usually ranges from 5 to 7 years, quite a prolonged period compared with the normal business cycle.

Jaeger and Schuknecht (2004) find that nearly all countries included in their sample went through booms and busts in real asset prices in 1970-2002. Germany, Italy and Belgium are the only ones that did not face persistent and large asset price swings that qualify as a boom phase in this period, while the United States and Germany did not experience a bust. The booms are mainly concentrated in the second half of the 1980s (eight episodes) and in the 1990s (nine incidents), while the busts mostly took place in the early 1990s (eight or nine events) and to a lesser extent in the late 1970s/early 1980s (seven incidents altogether).

They conclude that Finland and Sweden experienced a strong boom in real asset prices in 1986-89 and a particularly severe bust in 1990-93. In both countries the boom phase and the bust phase were relatively short. Their dating is consistent with the recent literature

⁷ See also Chapter II in *World Economic Outlook* of April 2003 and Chapter IV of April 2004 for an analysis of credit booms in emerging markets, IMF (2003, 2004). The approach of these

on the Finnish and Swedish financial crises of the early 1990s, which arrives at roughly the same dating of the boom and the bust in asset prices.⁸

For the purpose of comparing boom-bust phases across industrialized countries with those of Finland and Sweden in the late 1980s and early 1990s, we adopt the dating of Jaeger and Schuknecht (2004) and calculate the average behaviour for a number of macroeconomic variables deemed important to understand booms and busts. We examine a broader range of variables than they do. The computations are done in annual terms from $t-5$ to $t+6$, where $t=0$ is the observation for the peak year of the boom. Hence, $t-5$ to $t=0$ portrays representative developments during booms and $t+1$ to $t+6$ during busts. The calculations of the averages for industrialized countries exclude data for Finland and Sweden for the 1986-89 boom and the 1990-93 bust.

We do similar computations for Finland and Sweden covering the 1986-89 boom and the 1990-93 bust periods, where $t=0$ is set at 1989. This year is often considered the peak year of the asset boom in Finland and Sweden before the financial crises struck.⁹ Next, we plot in the same chart three time series: one for Finland, one for Sweden and one for the international average during boom-bust episodes. In this way we are able to compare the development of the same variables across booms and busts and across our three observational units: Finland, Sweden and the international sample. Lastly, using these charts we are finally able to analyze differences and similarities between Finland, Sweden and the international average. The charts allow us to consider a number of issues such as to what extent the Finnish and Swedish pattern differs from the average of our sample of countries and from each other, and to what extent the policy response in the two countries differs.

chapters is extended by Helpling and Terrones (2004).

⁸ See Jonung, Kiander and Vartia (2006).

⁹ The peak was reached in 1989 or in 1990 depending on which measure of economic activity is used. Here we focus on asset price movements. As asset prices peaked in 1989, we select that year as the peak year.

3. The boom-bust cycle in Finland and Sweden 1984-1995¹⁰

The evolution of the economies of Finland and Sweden during the last decades of the 20th century is identical in many respects. As the causes and consequences of the boom-bust cycle in the two economies were identical, there are strong reasons to describe them as economic twins, as do Jonung, Kiander and Vartia (2006).

Prior to 1985, extensive credit market regulations restricted the level of interest rates and the supply of credit in both countries. High inflation and high inflation expectations had been deeply rooted since the early 1970s, which combined with regulated nominal interest rates established low real rates for those companies and private individuals that were able to obtain loans through the financial sector. The tax system favoured borrowing, yet households and companies were severely restricted in their choice of loans. Consequently, large portfolio imbalances existed because of the prevailing system of nominal interest rates, inflation and tax rates. Knowledge about risk management and financial behaviour in unregulated freely functioning financial markets was lacking among in the private sector among households, companies and financial institutions.

Both countries maintained fixed exchange rates for their currencies at this stage. The fixed rate had strong political backing in the mid-1980s after the several devaluations during OPEC I and OPEC II came to be regarded as failures. According to the general consensus among economists and policy-makers, the fixed rate should serve as a nominal anchor for the domestic economy and should thus be defended vigorously against any speculation. Future devaluations were ruled out as an unsuccessful strategy as the beneficial effects of the devaluations of the past had turned out to be short-lived, with rapid increases in wages and prices rapidly eliminating the gains in competitiveness thus obtained.

¹⁰ This section is built on several sources, notably Jonung, Kiander and Vartia (2006) and Jonung, Stymne and Söderström (1996).

Around 1985 the domestic credit market was deregulated in both countries. Hardly any restrictive fiscal or monetary policy measures were taken in connection with or immediately following the financial deregulation. Nominal interest rates remained unchanged. Finland made a failed attempt in 1989 to dampen the boom by a revaluation of the *markka*. Fiscal policy remained relatively expansionary in both countries.

Consequently, lending from banks and other financial institutions in national and foreign currencies, in particular for property purchases, increased rapidly. Debt as a percentage of GDP rose markedly. The rate of inflation and inflation expectations increased. Real after-tax lending rates adjusted for inflation expectations were close to zero or negative for companies and households, which strengthened their demand for loans. Asset prices (prices on property, in particular commercial property, and shares) grew more rapidly than consumer prices. The rising asset prices formed the basis for rising collateral values and strong credit expansion. The financial system experienced a period of extreme expansion.

The outcome was a strong boom in the Finnish and Swedish economies in 1988-89 with overfull employment, rising consumption, and falling savings ratios. Residential construction was booming. The current account worsened as export performance weakened. Signs that the *markka* and the *krona* were overvalued emerged. The national budgets of the two countries turned into surplus during the peak on the back of property- and capital-based taxes as well as revenues from booming consumption and high wage growth. Public consumption and public expenditures grew rapidly during the boom as well. The strong international expansion in the second half of the 1980s contributed to the overheating of the Finnish and Swedish economies.

In 1990-91 the boom in the real economy was halted and turned into a bust by a combination of factors. Real interest rates rose internationally as a result of the German monetary policy reorientation due to the financing of the German reunion, putting strong upward pressure on Finnish and Swedish rates. The complete abolishment of capital controls in Sweden in 1989 initiated an outflow of private capital, reducing domestic

demand. The Swedish 1990-91 tax reform made borrowing less attractive and stimulated private savings, effectively raising real after-tax rates. In Finland stepwise limitations in the tax deductibility of mortgage rates in the early 1990s increased the after-tax cost of servicing debt.

Monetary policy was rendered more restrictive by the pegging of the Finnish and Swedish currencies to the ecu in 1991. Previously the exchange rate had been linked to a basket of currencies. But Finnish and Swedish interest rates increased when attempts were made to defend the fixed exchange rate against recurring speculative attacks in 1989-92. As the Finnish and Swedish currencies became overvalued due to rapid domestic inflation, the export sector started to encounter rising problems. For Finland the collapse of trade with the Soviet Union contributed to domestic problems.

A rapid and less than fully expected decline in the rate of consumer price inflation and inflation expectations in 1990-92 contributed to a sharp rise in real interest rates. Asset price deflation surfaced when the value of real assets was reduced by rapidly rising real interest rates. Balance sheets turned fragile when asset values, primarily property prices, fell below collateral values. Shareholders' equity was reduced. The number of bankruptcies increased extremely quickly. Asset price deflation showed a cumulative tendency. The sell-out of property forced down property prices which, in turn, triggered new sales.

Capital stocks became over-stretched when real rates of interest increased rapidly and remained high. As the balance sheets of households and firms were eroded, large negative wealth effects were set in motion. The level of consumption declined. The savings ratio of households increased rapidly. Investments plummeted, in particular within the construction sector. Unemployment soared and employment decreased drastically. Tax revenues fell and public expenditures rose. The government budget deficit increased dramatically.

A severe financial crisis occurred when the volume of non-performing loans increased rapidly. In 1992 the financial system of both countries was rocked to its foundations when the *markka* and the *krona* were exposed to major speculative attacks. An international currency crisis erupted in September 1992. The Finnish *markka* was set floating in September 1992. A floating exchange rate was introduced in Sweden two months later, in November 1992.

The floating of the domestic currencies eventually checked the downturn of the Finnish and Swedish economy. An upturn commenced in the following year and lasted for several years, but unemployment remained high. It did not start to decline until the mid-1990s and continued to fall thereafter. Wages and prices were kept fairly stable due to high unemployment. The recovery was driven by the strong upturn in exports. Export shares rose significantly in both countries. Inflation targets were introduced. Fiscal policy was directed towards lowering the budget deficit. The rate of inflation was kept at a low level, around two percent per annum throughout the period 1995-2000. The recovery after the boom-bust cycle was lengthy – it lasted until the downturn in worldwide economic activity around 2001. Still, Finnish and Swedish growth rates in the early 2000s stayed above the EU average.

4. The international perspective

The above account of the Finnish and Swedish boom-bust cycle demonstrates that financial developments – credit growth, asset prices and real after-tax lending rates – were principal factors driving the boom-bust cycle in Finland and Sweden. The deregulation of the financial markets should properly be seen as the start of the cycle – the impulse that initiated the whole process. This impulse, emanating from the financial sector, impacted on the rest of the economy and on public finances. Of course, there was also feedback from the real economy and public finances into the financial sector as well. For this reason we will start our empirical analysis by studying the behaviour of some

financial variables in a comparative perspective. We will then move on to the real economy and to public finances.¹¹

4.1 Financial and price developments

The international evidence demonstrates that several recent asset price cycles have started with a positive shock to the financial environment in the form of financial liberalization combined with favorable interest rates. Liberalization has triggered both a demand and a supply shock in credit as households and companies find it easier to borrow and banks and other financial institutions easier to lend. These developments have impacted significantly on domestic credit developments, causing a rise in domestic credit growth and contributing to the emergence of and fueling of a boom. After the boom runs its course, high debt and valuation losses of assets undermine private and financial sector net worth, resulting in a fall in collateral values and tightening of credit standards which in turn make it more difficult to lend and borrow.¹² Thus we start by examining the behavior of the volume of credit over the asset price cycle.

Domestic credit

Chart 1, displaying the growth rate of domestic credit in Finland and Sweden and the international average, demonstrates first of all that credit growth was extremely volatile in the Nordic countries. During the boom 1984-89, growth was higher than the international average. Credit growth in Finland and Sweden peaked at about 30 % and 20 % annual growth respectively in the boom. During the subsequent bust, the decline in growth was much stronger in the Nordic countries. Growth became negative for several years while it remained positive internationally.

¹¹ Appendix B displays the boom-bust pattern of six additional aggregates.

¹² See the financial accelerator literature, e.g., Bernanke, Gertler and Gilchrist (1999). Drees and Pazarbasioglu (1998) give an excellent account of the Finnish and Swedish boom-bust cycle from this perspective. See also Englund and Vihriälä (2003). The role of credit in the boom-bust cycle in Nordic countries is stressed by among others Borio, Kennedy and Prowse (1994).

This large difference in credit developments between the two Nordic countries and the international average, especially in the downturn – which we will also find for other economic variables in the following – is due to the fact that Finland and Sweden experienced a full-fledged and very rapid twin crisis – a deep banking crisis and a currency crisis at the same time – which severely disrupted financial intermediation. This was not the case for most of the other episodes in our sample.

Asset prices

The international evidence from asset price cycles suggests that rapid domestic credit growth during the boom phase is primarily channeled through asset markets, in particular the market for real estate. This is consistent with what one would conjecture from the fact that real estate demand in particular is strongly correlated with credit availability while supply only reacts with a lag. Chart 2 shows that inflation-adjusted real estate price increases averaged almost 10 % annually over the boom years. This gain was partly reversed in the bust when price declines averaged about 5 %. Given the average length of upswings and downturns (about 5 years), this translates into average real increases of almost 50 %, most of which was reversed during the downswing.

Looking at Finland and Sweden, the volatile picture of credit dynamics of Chart 1 is clearly mirrored in the real estate market in Chart 2. In Finland in particular, real estate price increases were dramatic, reaching up to 30 % in 1988, the year before the peak. The subsequent downturn was also steeper in the Nordic countries than elsewhere with a maximum year-on-year decline of 20 % for Finland.¹³ In both countries, the full capital gain in house prices was eliminated during the bust. Chart 2 also demonstrates that after Finland and Sweden adopted a floating exchange rate, the fall in commercial and residential property prices was halted.

¹³ Prices of commercial property were more volatile than those of residential property. Price movements were also more volatile in cities than in rural areas.

Consumer prices

Inflation, measured as the annual change in consumer prices, usually peaks after the top of the boom, judging from Chart 3. Here, it is important to distinguish the timing of boom-bust episodes as the busts of the late 1970s took place in a more inflationary environment than those of the early 1990s, and those of the late 1980s in a more inflationary environment than those of the late 1990s. Chart 3 presents the data for the average inflation rate for industrialized countries during different periods of booms and busts and compares them with Finland and Sweden.

It is striking how much inflation has come down over the past 20 years and that the recovery and the boom of the late 1990s did not show any pickup in inflation; rather, inflation continued on a downward trend in the 1990s. Even in the boom of the late 1980s, inflationary pressures remained relatively contained. However, at the end of the boom in the late 1980s, inflationary pressures in Finland and Sweden rose well above the average. In Finland inflation remained subdued while it rose sharply in Sweden during the bust, probably making the adjustment to the bust easier for the private sector than otherwise.

Private sector indebtedness

Strong credit growth that finances a real estate boom is prone to lead to growing indebtedness in the private sector. In the downturn, we expect that declining asset prices and wealth induce corporations and households to try to restore their balance sheets and to reduce their indebtedness. As data on private sector indebtedness is limited to a few OECD countries and is often only available from the mid-1990s, we can only look at a few individual countries and compare their experience with Finland and Sweden.

The data for the two Nordic countries in Chart 4 and 5 reveal that both household and corporate debt increased rapidly in the late 1980s and, in the case of Finland, well into the downturn of the early 1990s. The Nordic countries' corporate and household debt ratios of 30 % and 50 % of GDP in the boom do not look dramatic, compared with the figures in other countries. Australia, the Netherlands and Japan experienced corporate debt of

over 100 % of GDP and in a number of countries household debt was 60 % of GDP or higher. However, the increase in the debt ratio in the Nordic countries was higher than in most countries for which data is available. This was partly owing to the sharp depreciation of the Finnish *markka* and the Swedish *krona*, which resulted in a significant rise in the real value of the foreign-currency-denominated debt that many households and companies had contracted during the boom years.

As regards balance-sheet repair efforts in the downturn, Finland and Sweden also stand out amongst industrialized countries that experienced boom-bust episodes. In these two countries household and corporate indebtedness did indeed return to pre-boom levels. This is not the case in most other episodes where balance sheet repair is more limited so that private debt ratios end up higher after the downturn than before the boom.

Real interest rates

Many observers of the Finnish and Swedish record have regarded the crisis as a result of a very sharp rise in real rates of interest – adjusted for inflation, actual or expected, and taxes – at the end of the 1980s.¹⁴ They argue that the growth in credit was not only boosted by financial liberalization but also by a real after-tax interest rate environment that was extremely favorable to debt accumulation and especially debt for financing housing and construction investment. This comes out clearly in Chart 6. Real after-tax interest rates were negative or close to zero during the boom in both the Nordic countries and rose sharply – in particular in Sweden – during the bust phase.

Unfortunately, data on real after-tax rates is not available for most countries in our sample. However, when looking at the international pattern of real interest rates (not adjusted for taxation), the dynamics of the monetary policy environment in Finland and Sweden is not very surprising (and is consistent with growth and output developments, as we will see later). Real interest rates tend to be somewhat higher internationally during the boom than during the bust. Nevertheless, there is also no interest rate tightening to speak of as the boom proceeds (Chart 6). The real rate falls during the international bust phase.

¹⁴ See for example Jonung, Kiander and Vartia (2006).

This picture is markedly different from the experience of Finland and Sweden. Chart 6, displaying the real after-tax lending rate environment in the two Nordic countries, reveals that real after-tax rates were declining after the deregulation until the end of the boom in Finland and were negative in Sweden during the full boom phase. These very low after-tax interest rates fuelled the growth of credit in the boom years in the 1980s. Then real after-tax rates increased sharply in a few years, surpassing the international level, contributing to the bust and the downturn with its credit slump. In other words, Finland and Sweden featured a highly pro-cyclical monetary and fiscal policy environment.

As pointed out in the previous section, the pro-cyclical monetary policies in Finland and Sweden had their origin in a number of factors. Both countries pursued nominal exchange-rate targeting policies, the hard currency strategy. With the easy credit policies of the late 1980s, interest rates could be kept very low. As inflation picked up, as the *markka* and the *krona* became the subject of speculative attacks, forcing the Bank of Finland and the Bank of Sweden to raise domestic rates to high levels, and as the international financial environment became less favorable (notably in the context of German unification and the ERM-crisis), real interest rates increased significantly. On top of that, changes in the Finnish and Swedish tax regimes at the height of the boom reduced incentives towards accumulating debt and had a strongly pro-cyclical effect on real after-tax rates.

Exchange rates

For open economies, the exchange rate is the central asset price, and thus a major determinant of macroeconomic performance. For the average of boom-bust episodes, the real effective exchange rate appreciates in the upswing. The resulting deterioration of external competitiveness is typically corrected in the downturn when the real effective exchange rate depreciates (Chart 7).

Again the pattern is similar, though more extreme, for the two Nordic countries during the bust phase. As mentioned above, during the boom, the exchange-rate targeting

combined with easy credit resulted in a stable nominal exchange rate. In an environment of rising unit labor costs (discussed below), this translated into an appreciating real effective exchange rate. This development was reversed fully when both countries floated their exchange rates in 1992, roughly at the end of the second year of the bust. While the depreciation of the domestic currency initially exacerbated the net wealth position of holders of foreign debt, it also facilitated the rapid rebound through a readjustment in relative prices and competitiveness in the tradable sector. The exchange rate behavior of the *markka* and the *krona* is thus crucial for the understanding of the boom-bust cycle and, in particular, for the quick emergence of Finland and Sweden from the bust phase. The recovery was driven by the sharp rise in exports (see below).

The net foreign asset position (the current account)

Another way of assessing and comparing the effects of booms and busts on the balance-sheet position of an economy is to examine the net foreign asset position across countries. However, in the absence of such comprehensive data, we look at the annual flows as reflected in the current account position of the balance of payments of countries. Chart 8 shows the deterioration of the current account position for the average of boom-bust episodes and the subsequent correction of the imbalances in the bust. The average current account position turns from a small surplus to a deficit of almost 3 % of GDP at the end of the boom. By the end of the downturn, the imbalance was eliminated.

This pattern is similar for Finland and Sweden except for the very final years of the observation period. Initially, the current account position deteriorated by 5 % of GDP in Finland and by 3 % in Sweden. This changed little until the depreciation of the domestic currency in 1992. By the fourth year of the bust a dramatic improvement had been recorded and the current account has remained in strong surplus ever since.

Our stylized facts on financial and price developments during boom-bust episodes across industrialized countries demonstrate a common pattern of strong credit growth, asset price growth and deteriorating underlying private balance sheets in the boom. This picture is reversed in the subsequent bust. However, the pattern is much more

pronounced in the Finnish and Swedish cases where the bust in particular is deeper but also more short-lived compared to the international average. We conclude that the volatile pattern in Finland and Sweden is associated with very sharp changes in real interest rates and real exchange rates, much sharper and more dramatic than the average for industrialized countries.

4.2. Real developments

The pattern of changes in the current account position in Chart 8 is a constructive way to link the assessment of the financial position of countries over boom-bust episodes with that of the real economy to which we now turn.

Real growth

Real economic growth deviations from trend in boom-bust episodes are typically much more persistent than in normal business cycles. The period of above-average growth in the boom and below-average growth in the bust normally ranges from 5 to 7 years but it can be over 10 years long. Growth averages about 4 % for all boom episodes (Chart 9). In the bust, growth initially falls steeply and averages around 1 %. This finding of persistence is consistent with the view that rising asset prices and easy money stimulate demand in the boom before a correction in asset prices undermines individuals' net worth and forces an extended period of subdued demand when balance sheets are adjusted. In the boom, savings tend to fall while consumption and investment rise. This boosts growth and also fuels the (above-mentioned) deterioration in the current account. In the bust the opposite happens as the private sector raises its savings, reduces its spending and, thereby, improves not only its wealth position but also the whole country's external accounts.

As regards growth in Finland and Sweden, the pattern is similar to other international episodes. However, due to lower trend growth, the growth curve, especially in Sweden, is shifted slightly downward. Nevertheless, the negative growth experienced by the two countries in the downturn is staggering. It is closely linked to the disruptions during their

financial crisis, as discussed above. This negative development was exacerbated in the short run by the tightening of fiscal policies via tax increases and spending cuts, made to restore the confidence of foreign investors in domestic economic policies and currencies in both countries.¹⁵

Output gaps

Looking at output gaps in Chart 10, the extreme character of the Finnish and Swedish bust is revealed. As expected, Chart 10 shows a declining output gap for all countries in the boom and a rise in output gaps in the downturn. However, output gap developments were more volatile in the two Nordic countries. A positive gap of about 4 % was followed by a staggering output loss and negative output gap, measured at 6-8 %. Chart 10 also demonstrates the rapid rebound from the fourth year after the asset price peak. This recovery coincides with the crisis resolution and the exchange rate depreciation.

Consumption and investment

The experience of boom-bust cycles reveals that they are typically accompanied by extreme private investment cycles and somewhat less pronounced private consumption cycles. Real private consumption growth was about 4 % for all countries and about 5 % in Finland and Sweden over the boom (Chart 11). Annual investment growth was about twice as high and peaked at 15 % in the Nordic countries just before the crash (Chart 12). The downturn featured a strong slowdown in consumption and a slightly negative investment growth rate for the average of all episodes. By contrast, the investment figures were distinctly negative for Finland and Sweden. In fact, the cumulative decline in investment over the bust was about one quarter in Sweden and a staggering 50 % in Finland.

Exports

The previous findings on boom-bust episodes are consistent with developments in exports. As the tradable goods sector lost competitiveness, export growth remained constant or slowed down in Finland and Sweden as well as in the international context

¹⁵ The collapse of the trade between Finland and the former Soviet Union made the recession deeper in Finland. The role of the Soviet trade is discussed by Kiander and Vartia (1998).

(Chart 13). The slowdown continued well into the bust and was only reversed when the depreciation restored competitiveness. The rebound in the Nordic countries was much sharper than the average of the other episodes and contributed significantly to the rebound of the real economy as a whole.

Import developments are also consistent with this picture: rapid import growth in the boom was followed by a period of zero or even highly negative import growth, reflecting the reversing fortunes of domestic import competing industries in the boom-bust countries. This only reversed with a lag when the export boom was already well under way and thus created new import demand from this sector and the recovering economy.

Employment

The relatively subdued employment growth in Finland and Sweden in the boom and the stark fall in employment in the bust (Chart 14) stand out against the much more stable and balanced picture for the international average. The main reason for the modest employment growth during the boom in the Nordic countries is the fact that they were already operating at full employment when the boom started – in contrast to higher rates of unemployment in the industrialized countries in our sample. Thus the boom could not create much of an increase in employment – though it fell very sharply during the bust phase.

The sharp fall in Nordic employment reflects a marked restructuring of the Finnish and Swedish labor market due to the financial crisis, in particular due to the collapse of the construction sector and the fact that the public sector shed labor as well.¹⁶ In a historical perspective, the crisis of the 1990s made a stronger mark on employment than any other previous crisis.¹⁷ Employment has still not returned to its pre-crisis level ten years after the bust. Similarly, unemployment rates have remained high during the recovery phase.¹⁸

¹⁶ See Fregert and Pehkonen (2003).

¹⁷ See Jonung and Hagberg (2005).

Real labor costs

Real labor costs increase strongly during booms. Again this is consistent with the finding of booming consumption and housing investment and falling competitiveness (via rising labor costs and an appreciating real effective exchange rate). One way to measure this phenomenon is to look at the differential between real wages (compensation per employee) and productivity gains (Chart 15). For the average of all episodes, this figure is slightly positive, suggesting a small but persistent tendency to squeeze profits and to lose competitiveness. This process is reversed early in the bust, when productivity tends to rise faster than real wages.

For Finland and Sweden, we again observe a similar but more pronounced pattern. In the boom, real compensation rose much faster than productivity and, because of the fixed exchange regime, this led to a marked loss of profitability and competitiveness for the tradable sector. In the bust, real productivity-adjusted wages fell strongly, as wage restraint through rising unemployment and depreciation both took effect. This helped restore the profitability of the corporate sector and thus contributed to the strong turnaround.

This section on real economic developments demonstrates that growth, output gaps, consumption, investments, exports and employment developed favorably in the boom and negatively in the bust while real unit labor costs followed the reverse pattern. The main difference between boom-bust episodes and “normal” business cycles is, however, their persistence and magnitude. Finland and Sweden follow broadly the same pattern as that of other boom-bust episodes across industrialized countries. However, again both Nordic countries experienced more extreme fluctuations in these variables and the downturn appears to have been deeper and more short-lived.

¹⁸ Chart B2 in Appendix B displays the rate of unemployment.

4.3. Public finance developments

The behavior of fiscal aggregates illustrates the role of government in destabilizing as well as stabilizing the economy over boom-bust cycles. It reveals the role it has played in the underlying balance sheet cycle and thus how fiscal policy has impacted on aggregate demand through wealth effects. Changes in public debt reflect the design of discretionary fiscal measures and the workings of automatic stabilizers.

Fiscal balances

Unsurprisingly, fiscal balances tend to improve so much over extended boom periods that they are in surplus by the end of the boom (Chart 16). Jaeger and Schuknecht (2004) argue that this is mainly the result of strong revenue growth from tax bases that directly benefit from rapid asset price increases, like property taxes and taxable capital gains, and indirectly, through wealth effects on demand. This budgetary improvement masks the continued relatively strong expenditure growth experienced in many industrialized countries over boom episodes. In the downturn, revenue windfalls reverse while spending obligations through the workings of automatic stabilizers such as unemployment benefits increase faster so that fiscal balances go quickly and deeply into the red.

This pattern was experienced in an extreme manifestation by Finland and Sweden in the second half of the 1980s. Given an asset-price-sensitive tax system, revenue windfalls increased as shown by Eschenbach and Schuknecht (2004). Likewise, revenues from value added and wage-related taxes and social contributions rose sharply during the boom in consumption and the strong growth in wages, resulting in budget surpluses. These surpluses then turned into large deficits of 8-12 % of GDP within only a few years.

This pattern illustrates the sensitivity of fiscal balances to a major negative shock such as a financial crisis. It also reflects the fact that the financial crisis and bank failures spurred drastic government action. Corporate/bank bailouts together with increased welfare spending represented a partial socialization of the losses incurred by the private sector during the boom-bust cycle. Without these measures supporting the balance sheets of

households and firms, the depression would have become even more severe. The policy of large budget deficits constitutes a clear case of tax smoothing during an exceptional emergency such as the financial crisis.

Public debt

Public debt developments are consistent with and confirm the picture of the involvement of the public sector in the boom-bust cycles in Finland and Sweden via taxes and expenditure. This pattern is visible in the strong increase of public debt during bust episodes, much larger than the decline in public debt in the preceding boom. For all episodes, debt declines in the boom by an average of 10 % of GDP before rising in the bust by about 25 % of GDP (Chart 17). In Finland the debt increase was almost 50 % of GDP and in Sweden it was almost 35 % of GDP. In the case of Finland, a significant part of the rise in the debt-to-GDP ratio was related to the marked fall in nominal GDP and the depreciation of the Finnish *markka*.

Jaeger and Schuknecht (2004) also find that the maintenance of relatively strong expenditure growth in the boom and the additional pressures in the bust result in significant increases in the size of government – a ratchet effect. Tax increases feature prominently in the downturn to compensate for the reversal of revenue windfalls experienced in the boom and to contain fiscal imbalances.

Moreover, government policies have at times exacerbated boom-bust cycles through procyclical discretionary fiscal measures. In Sweden the budget surplus created by the boom was taken as an excuse for reducing taxes. The tax reform in Sweden that reduced debt-friendly tax incentives at the height of the boom contributed to subsequent balance-sheet problems and thus to the severity of the downturn. As many have commented in Sweden, the tax reform should have been instituted at the beginning of the boom – not at the end of it.

To sum up, we find an asymmetric participation of government in the “profits and losses” of boom-bust episodes – due to the workings of automatic stabilizers and the direct

financial support given to the financial system during the bust phase. In short, governments felt obliged to step in to socialize wealth losses made during the bust while not preventing the boom from developing by making fiscal and monetary policies contractionary. This was the case in Finland and Sweden in the early 1990s. The need to recapitalize the banking system was so large that the central bank did not and could not serve as a lender of last resort, as the solidity of the banking system was undermined. Instead, fiscal policy was used to support the financial system during the crisis.¹⁹

5. Summary

We have compared the boom-bust experience in Finland and Sweden during the last half of the 1980s and first half of the 1990s with the average boom-bust pattern calculated for a sample of industrialized countries in the period 1970-2002. Our examination brings out two clear conclusions.

First, the Finnish-Swedish experience is much more volatile than the average. In short, the boom as well as the bust is more intense in the two Nordic countries. This holds for practically every time series that we have examined: growth of credit, asset price inflation, real interest rates, real effective exchange rates, real growth, output gaps, consumption, investment, exports, employment, productivity, government budget deficits and government debt.

Second, the bust and the recovery in the two Nordic countries diverge far more from the international pattern than the boom phase does. The bust is much deeper, and the

¹⁹ Here we have compared the pattern in Finland and Sweden with the international pattern of boom-busts for industrial countries using the methodology of Jaeger and Schuknecht (2004). A comparison of the Nordic pattern with that of a sample of 28 emerging countries demonstrates that the boom-bust episode in the two Nordic countries has many similarities with those of emerging markets. See Chapter IV in *World Economic Outlook*, April, 2004 (IMF 2004). The similarity between the Nordic lending boom and the lending booms preceding the Asian crisis are striking. See Collyns and Senhadji (2003) and Kokko and Suzuki (2003).

recovery comes earlier and is more rapid than in the countries of our international sample.

How should we explain this highly volatile character of the Finnish and Swedish boom-bust episode? The prime determinant must be identified as the design of monetary and fiscal as well as regulatory policies in the 1980s and 1990s. In the mid-1980s, the Finnish and Swedish financial systems were deregulated, allowing for an extremely rapid increase in the supply of credit. During the long period of financial regulation, real rates of interest had been kept low or often negative by a combination of direct controls of nominal interest rates, high inflation and a progressive tax system allowing for deduction of interest payments on loans. Once the restrictions on commercial bank lending were abolished as part of the financial deregulation, household and firms were able to rapidly build up their debt at extremely low real rates. Actually, the real rate was still negative during several years of the boom phase. The monetary and fiscal authorities initially took no steps to raise the real rate when the process of credit expansion set in. Both monetary and fiscal policies were procyclical during the boom.

Eventually, the low or negative rates were replaced by high and rising rates at the end of the 1980s, which contributed to and reinforced other developments turning the boom into a bust. When the bust came, monetary and fiscal policies actually enforced the downturn as well. Several factors contributed to this highly pro-cyclical policy, most prominently the defense of the fixed exchange rate. For a short time in September 1992, the overnight rate of the Swedish Riksbank was set at 500 per cent. The cost of borrowing was increased by changes in the tax system in both countries.

Finland and Sweden were hit simultaneously by a twin crisis; a banking crisis and a currency crisis. Their financial vulnerability was increased by a significant foreign currency-denominated debt. The impact of the contractionary forces is apparent from the very sharp and sudden bust. Monetary policies were, on balance, slightly countercyclical

in the international experience, hence probably also explaining the more moderate boom-bust patterns.²⁰

Once the two countries abandoned the defense of the fixed exchange rate and allowed floating rates in the fall of 1992, the economy's downward slide was halted. The floating of the currency caused a sharp depreciation of the *markka* and the *krona*, which soon revived the export sector. The floating also allowed the central banks to lower nominal interest rates. Thus the boom-bust pattern in Finland and Sweden 1985-1995 was strongly driven by a financial liberalization and the design of monetary policy which caused very sharp swings in the real rate of interest which were transmitted via the financial sector to the real sector, first causing a strong boom and subsequently a sharp bust. Thanks to their dependence on international trade, the Nordic countries were able to stage a rapid recovery by means of the sharp depreciation of the currencies. The export share of both countries has increased significantly after the crisis.

To sum up, Finland and Sweden displayed a very prominent boom-bust pattern – more prominent than in the other industrialized countries in our sample. The development of the Finnish and Swedish economy should properly be regarded – and thus studied – as a highly representative example of a full-fledged boom-bust cycle. The experience shows that “nobody is safe” from booms, busts and crisis. The study might, therefore, hold valuable lessons for other industrialized countries, emerging markets and transition economies.

²⁰ Following the boom-bust of the early 1990s, financial stability issues emerged high on the agenda of policy-makers in Finland and Sweden. The issues involved are considered i. a. by Borio (2005).

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Appendix A. Data sources and definitions

Domestic credit

Source: IMF World Economic Outlook database.

Real estate prices

Nominal prices of existing and new dwellings deflated with consumer price index.

Source: BIS.

Inflation

Consumer price index.

Source: IMF World Economic Outlook database.

Household debt

Source: Riksbank and Suomen Pankki.

Corporate debt

Source: Riksbank and Suomen Pankki.

Real long term interest rate

Nominal long term interest rate – inflation rate (CPI) for other industrialised countries except for Finland and Sweden in which case the real after-tax rate is calculated for five year rate of interest for Finland and the ten year rate for Sweden.

Source: OECD Economic Outlook, IMF World Economic Outlook and Global Financial databases for other industrialised countries. For Finland and Sweden data are taken from Englund and Vihriälä (2003).

Real effective exchange rate

Source: IMF World Economic Outlook database.

Current account balance

Source: IMF World Economic Outlook database.

Real GDP

Source: OECD Economic Outlook database.

Output gap

Source: OECD Economic Outlook database.

Real private consumption

Source: OECD Economic Outlook database.

Real total investment

Source: OECD Economic Outlook database.

Real exports of goods and services

Source: OECD Economic Outlook database.

Total employment

Source: OECD Economic Outlook database.

Productivity adjusted real labour costs

The productivity adjusted real labour costs are defined as the difference between real compensation per employee growth and average productivity.

Source: OECD Economic Outlook database.

Government budget balance

General government net borrowing/net lending as a percentage of GDP. Data have been corrected for one-off UMTS receipts.

Source: European Commission Ameco, OECD Economic Outlook and IMF World Economic Outlook databases.

Government debt

General government gross debt as a percentage of GDP.

Source: European Commission Ameco, OECD Economic Outlook and IMF World Economic Outlook databases.

Data for Appendix B.

Stock prices

Nominal stock prices deflated with consumer price index.

Source: BIS.

Unemployment rate

Source: OECD Economic Outlook database.

Average productivity

Source: OECD Economic Outlook database.

Unit labour costs

Source: OECD Economic Outlook database.

Nominal government revenue

Source: European Commission Ameco, OECD Economic Outlook and IMF World Economic Outlook databases.

Nominal government primary expenditure

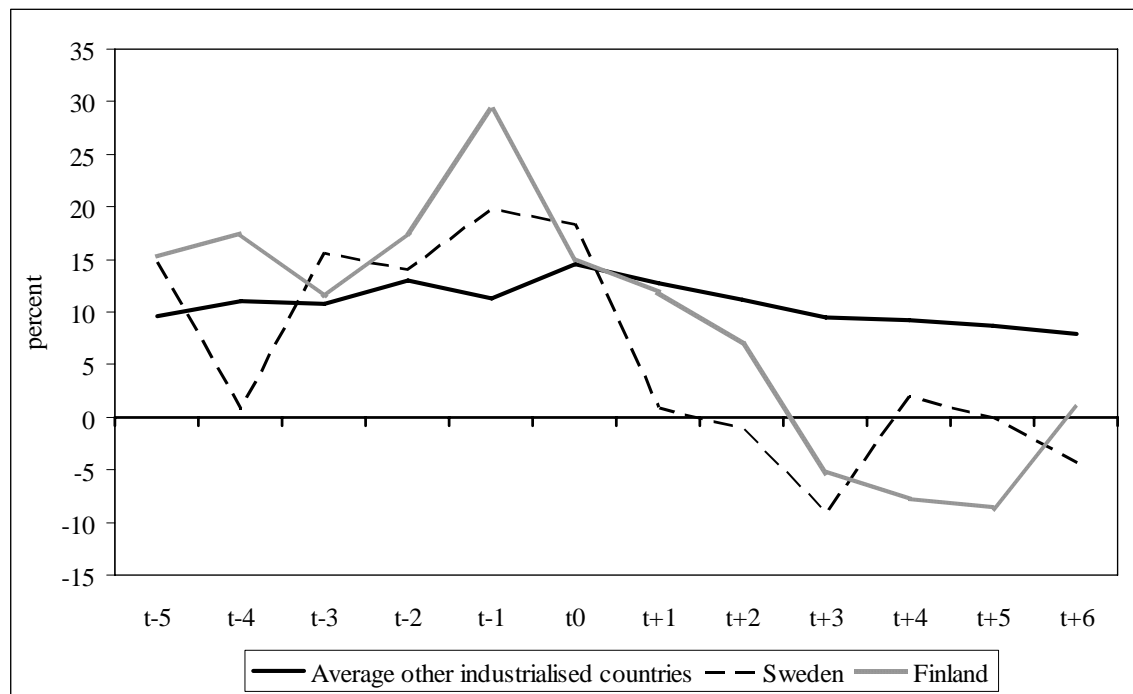
Source: European Commission Ameco, OECD Economic Outlook and IMF World Economic Outlook databases.

Table 1. Size distribution of identified boom-bust phases in real aggregate asset prices for industrialized countries, 1970-2002.

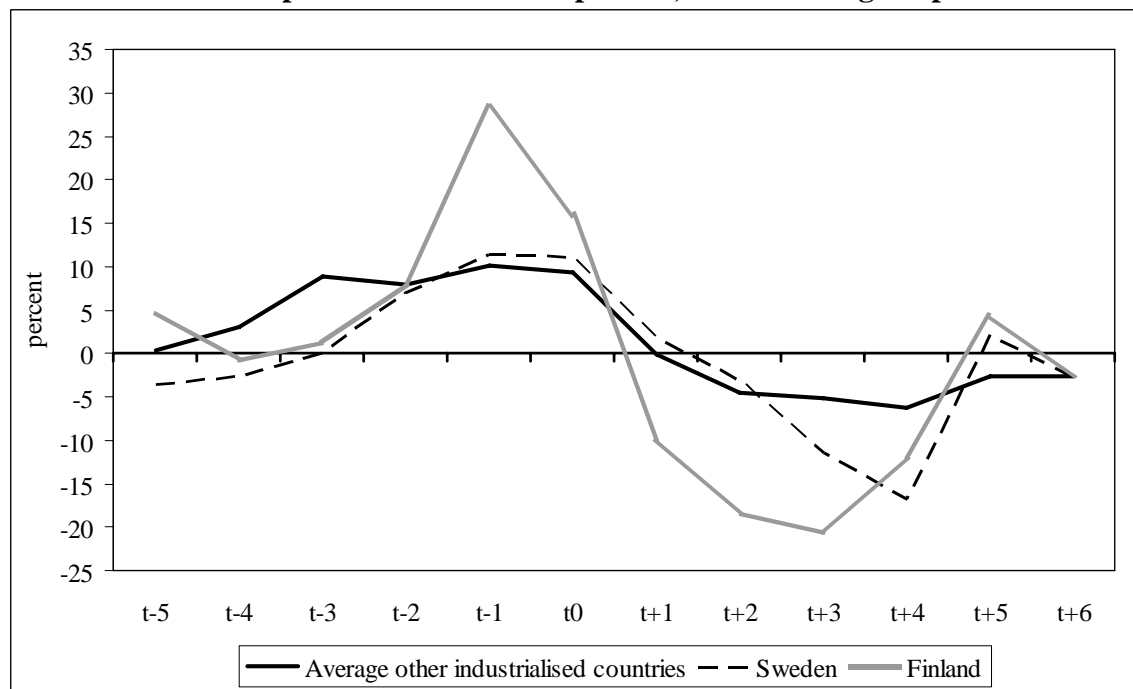
Boom Phases			Bust Phases		
Country	Years	Cumulative price change ¹⁾	Country	Years	Cumulative price change ¹⁾
Japan	1979-1990	358.0	Japan	1991-2002	-364.1
Sweden	1994-2000	329.6	Sweden	1977-1985	-185.1
Finland	1994-2000	293.1	Ireland	1979-1985	-173.3
Ireland	1994-2001	289.1	Italy	1991-1997	-173.1
Spain	1985-1990	249.4	Netherlands	1979-1983	-163.0
Netherlands	1993-2000	237.2	Finland	1974-1979	-155.1
United States	1995-2000	157.8	Finland	1990-1993	-135.4
United Kingdom	1983-1989	152.1	Spain	1991-1995	-124.6
Switzerland	1983-1989	110.9	Belgium	1980-1985	-115.2
Finland	1986-1989	92.2	Denmark	1977-1982	-113.5
Denmark	1996-2000	90.6	Australia	1973-1978	-113.4
United Kingdom	1995-2000	90.4	Spain	1979-1982	-111.3
Australia	1996-2002	89.2	France	1991-1996	-108.6
Sweden	1986-1989	88.1	Sweden	1990-1993	-108.0
Australia	1984-1989	87.7	United Kingdom	1974-1977	-106.3
Denmark	1983-1986	85.9	Switzerland	1990-1996	-104.0
Finland	1980-1984	84.9	Japan	1974-1978	-88.1
Spain	1996-2000	84.0	United Kingdom	1990-1994	-86.1
France	1986-1990	74.6	Italy	1981-1985	-80.7
Canada	1985-1989	74.3	Canada	1990-1995	-80.2

Source: Jaeger and Schuknecht (2004).

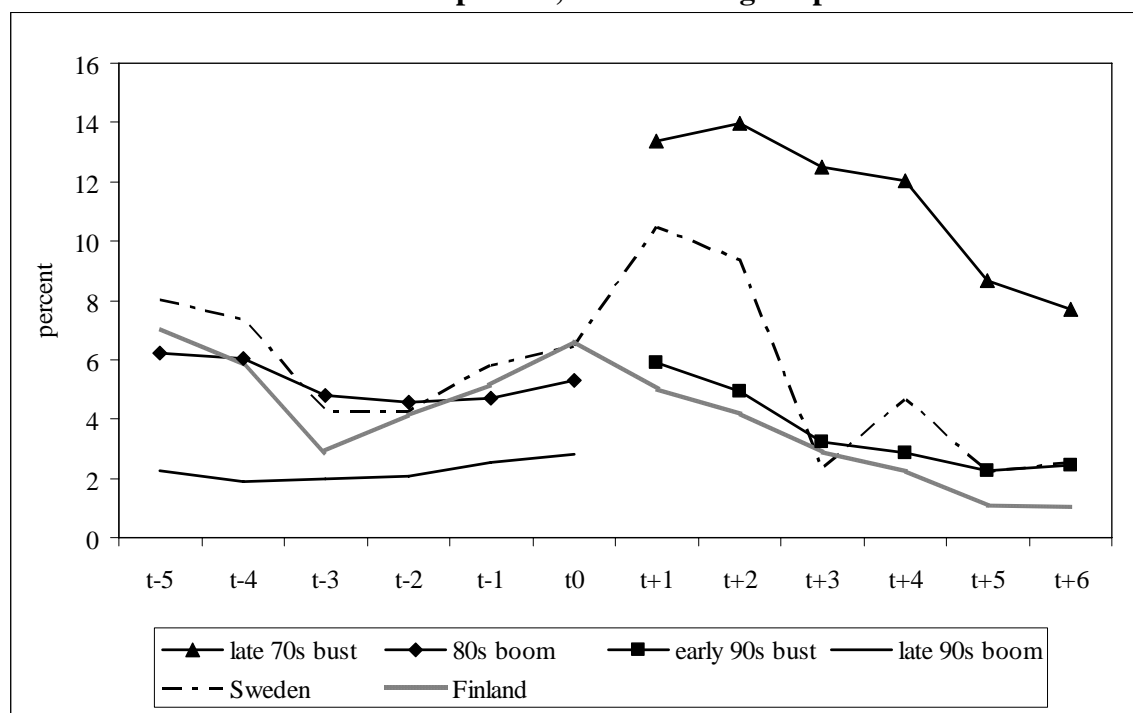
Comments: 1) Based on triangular approximation.

Chart 1. Domestic credit growth in boom-bust episodes, annual change in percent.

Data: See appendix A.

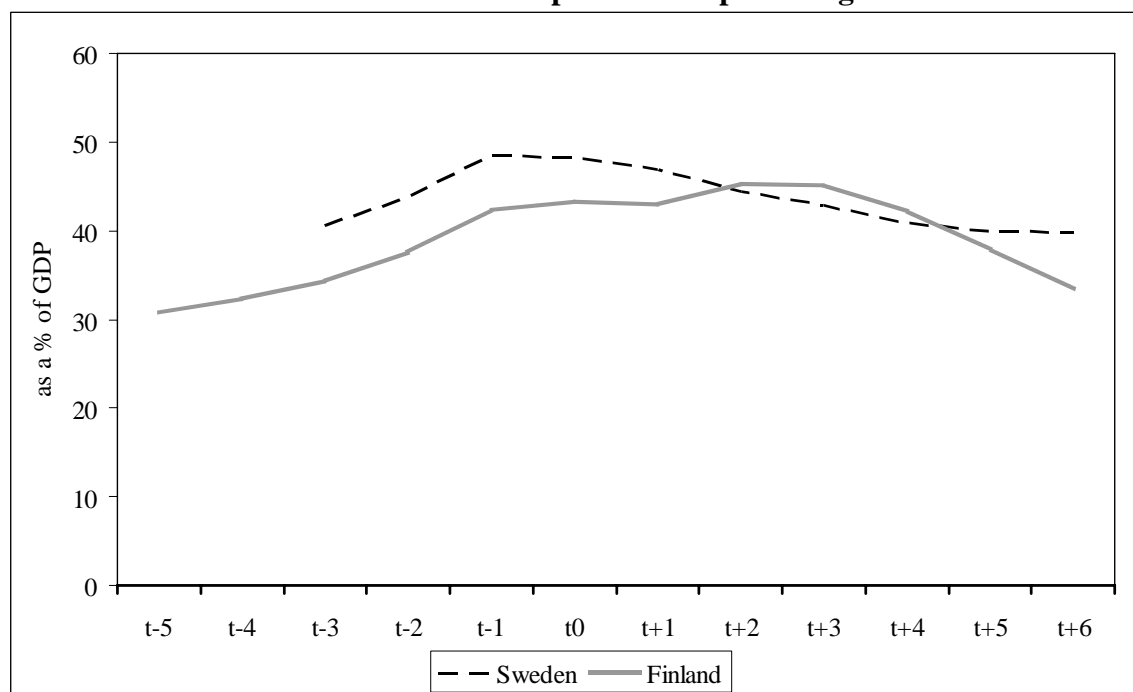
Chart 2. Real estate prices in boom-bust episodes, annual change in percent.

Data: See appendix A.

Chart 3. Inflation in boom-bust episodes, annual change in percent.

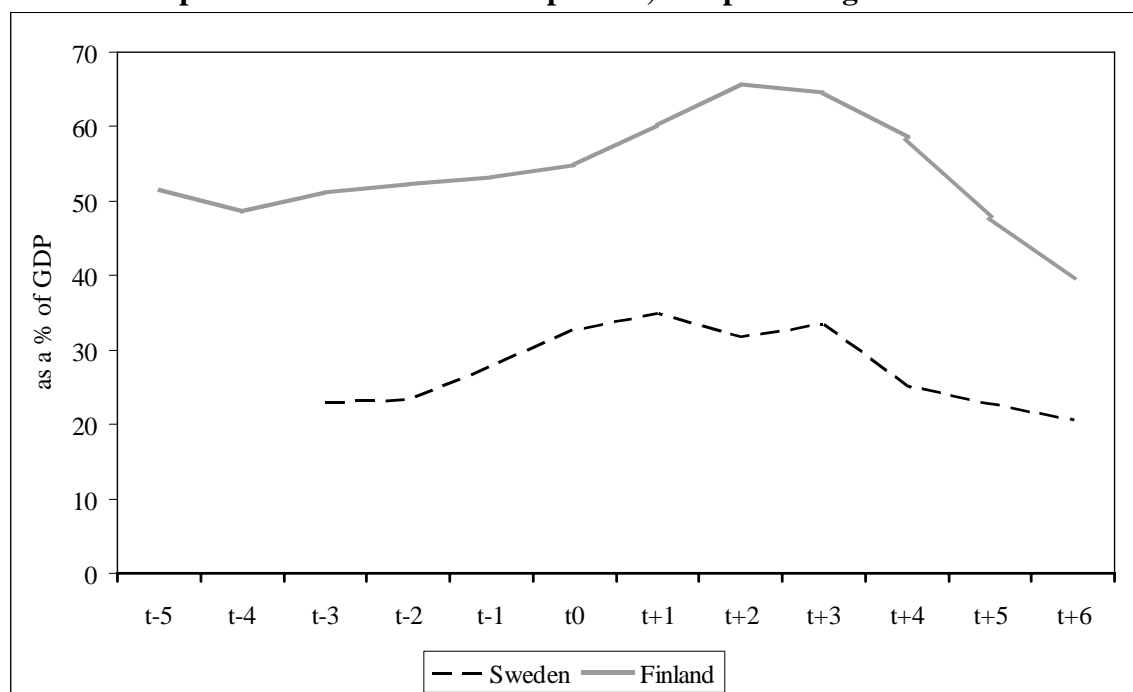
Note: Late 70s bust, 80s boom, early 90s bust and late 90s boom denote inflation for average other industrialised countries excluding Finland and Sweden.

Data: See appendix A.

Chart 4. Household debt in boom-bust episodes as a percentage of GDP.

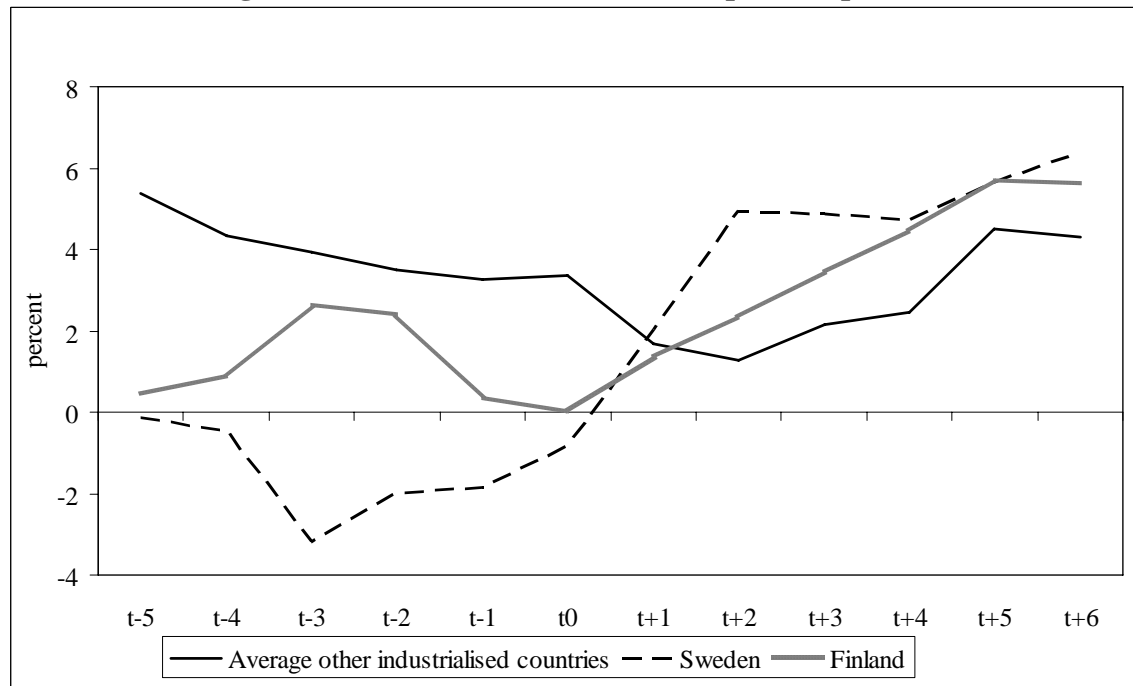
Data: See appendix A.

Chart 5. Corporate debt in boom-bust episodes, as a percentage of GDP.



Data: See appendix A.

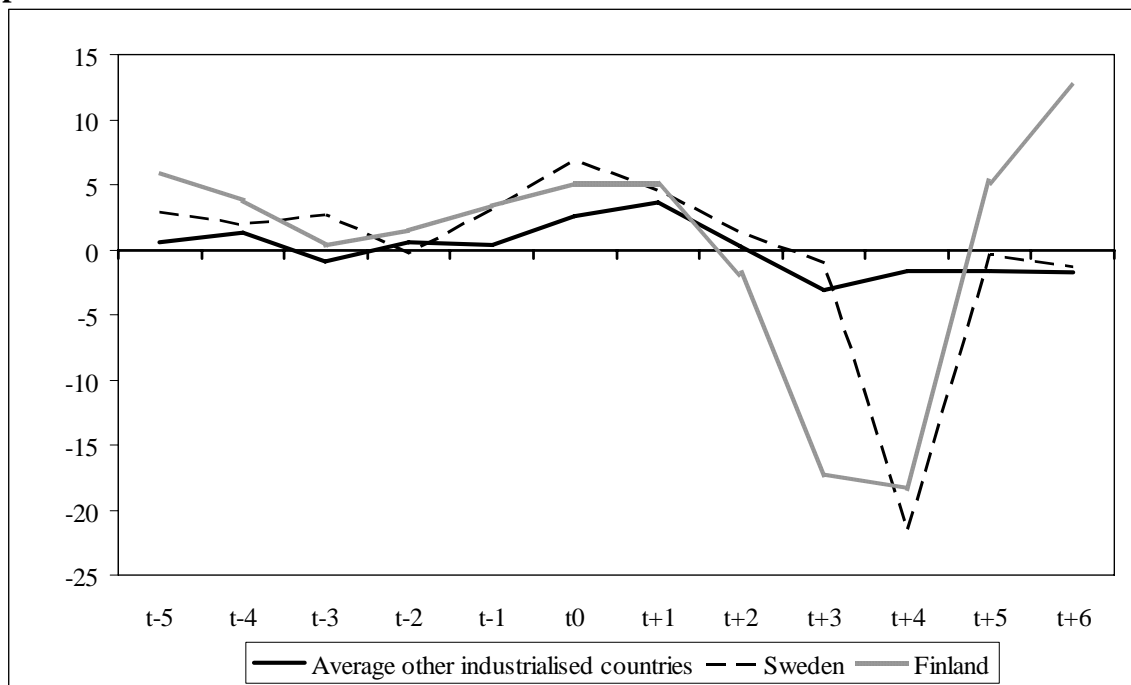
Chart 6. Real long term interest rates in boom-bust episodes, per cent.



Note: The real rate of interest for Finland and Sweden refers to the real after-tax rate. Lack of data prevents a calculation of real after-tax rates the international average.

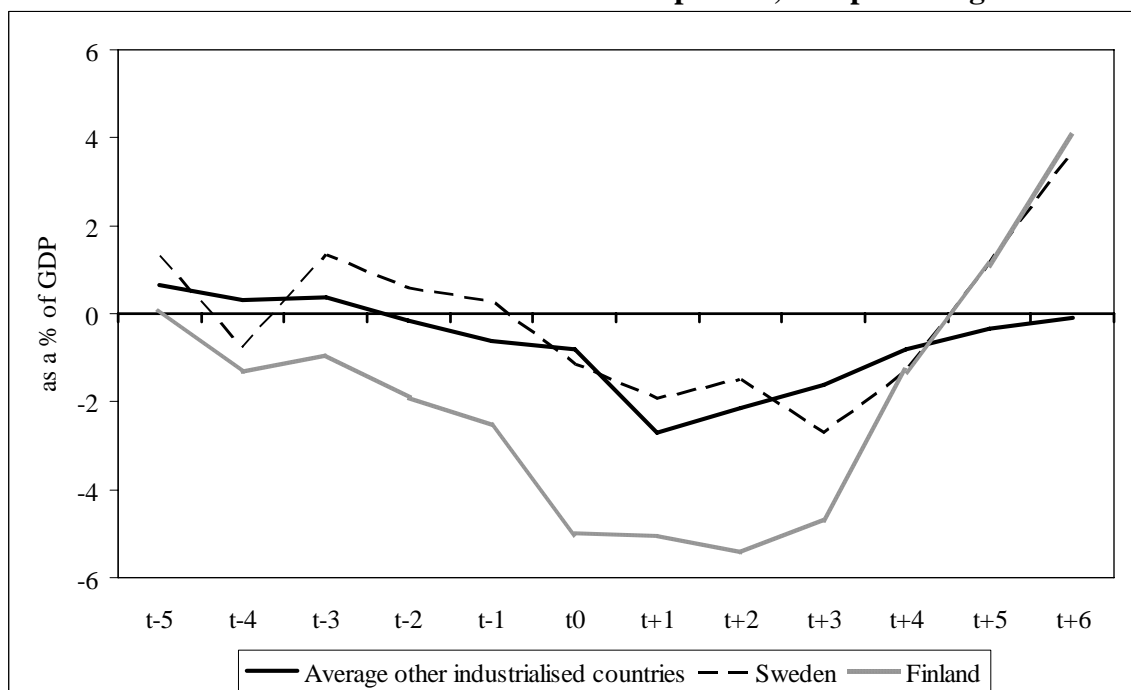
Data: See appendix A.

Chart 7. Real effective exchange rate in boom-bust episodes, annual change in percent.

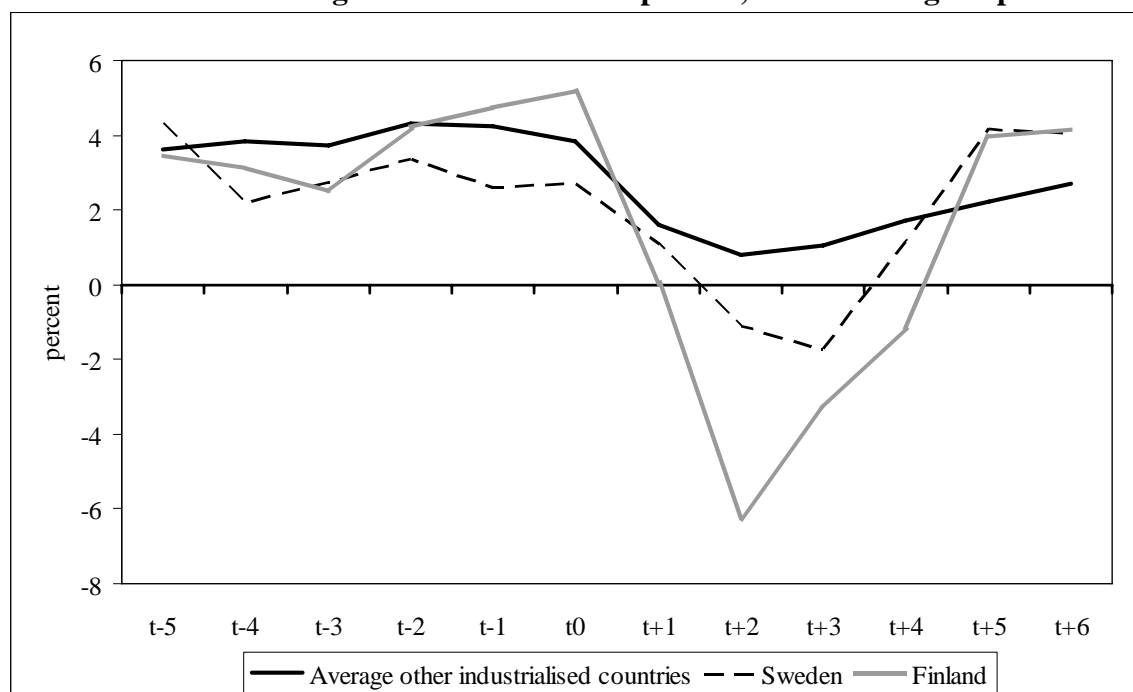


Data: See appendix A.

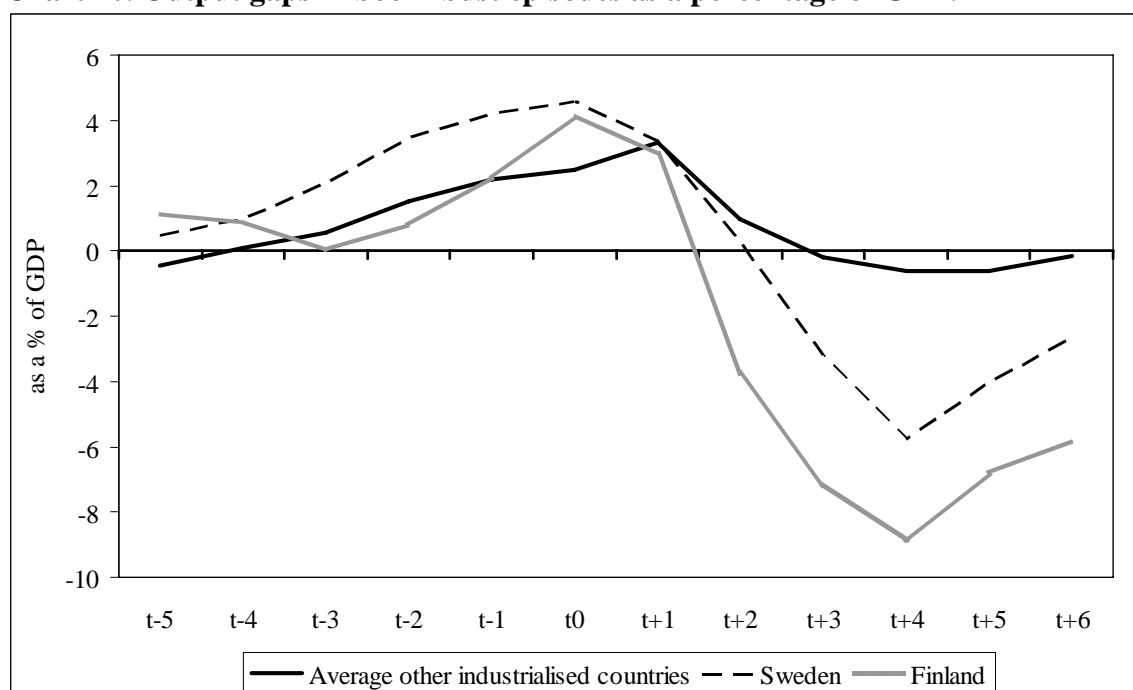
Chart 8. Current account balance in boom-bust episodes, as a percentage of GDP.



Data: See appendix A.

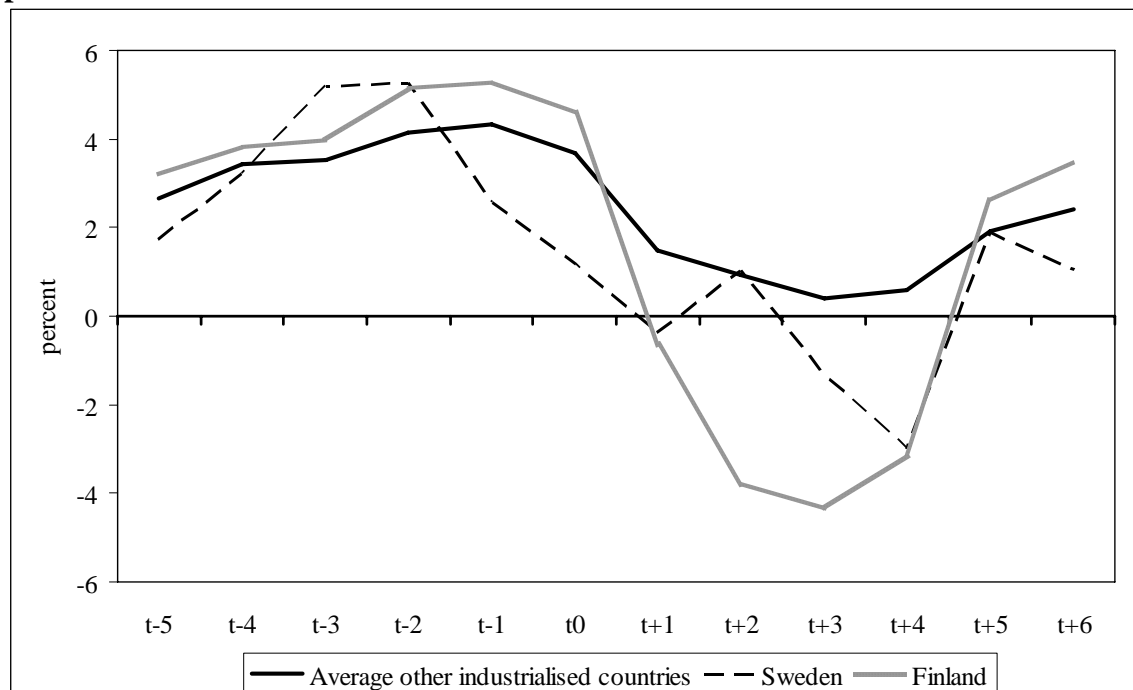
Chart 9. Real economic growth in boom-bust episodes, annual change in percent.

Data: See appendix A.

Chart 10. Output gaps in boom-bust episodes as a percentage of GDP.

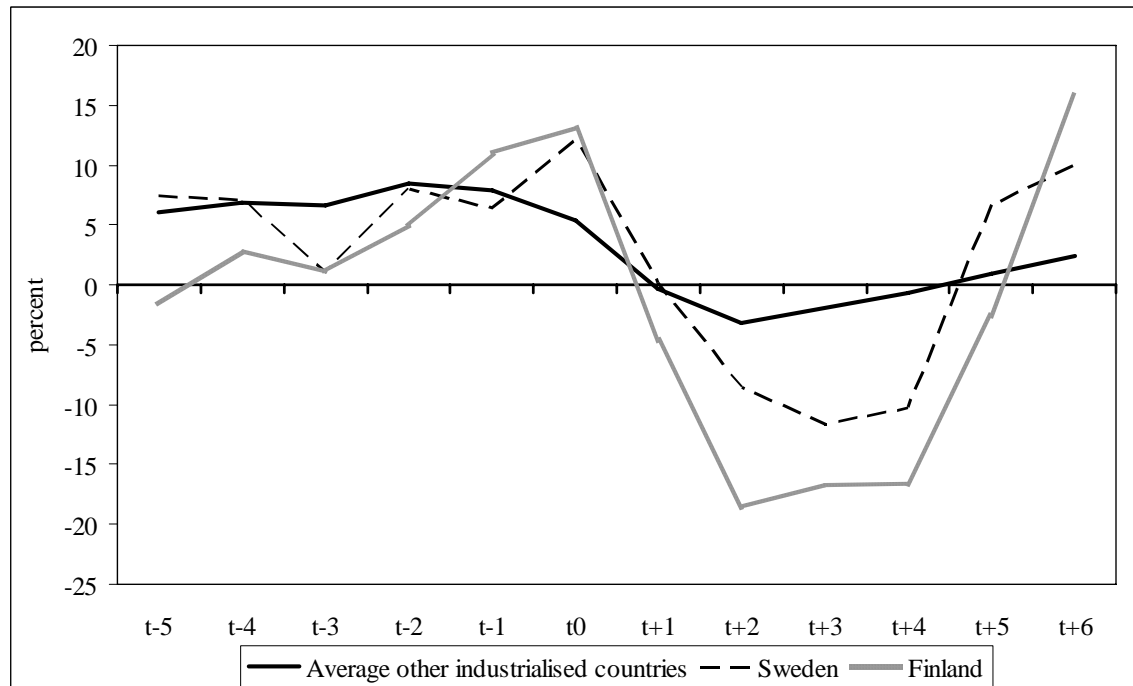
Data: See appendix A.

Chart 11. Real private consumption in boom-bust episodes, annual change in percent.

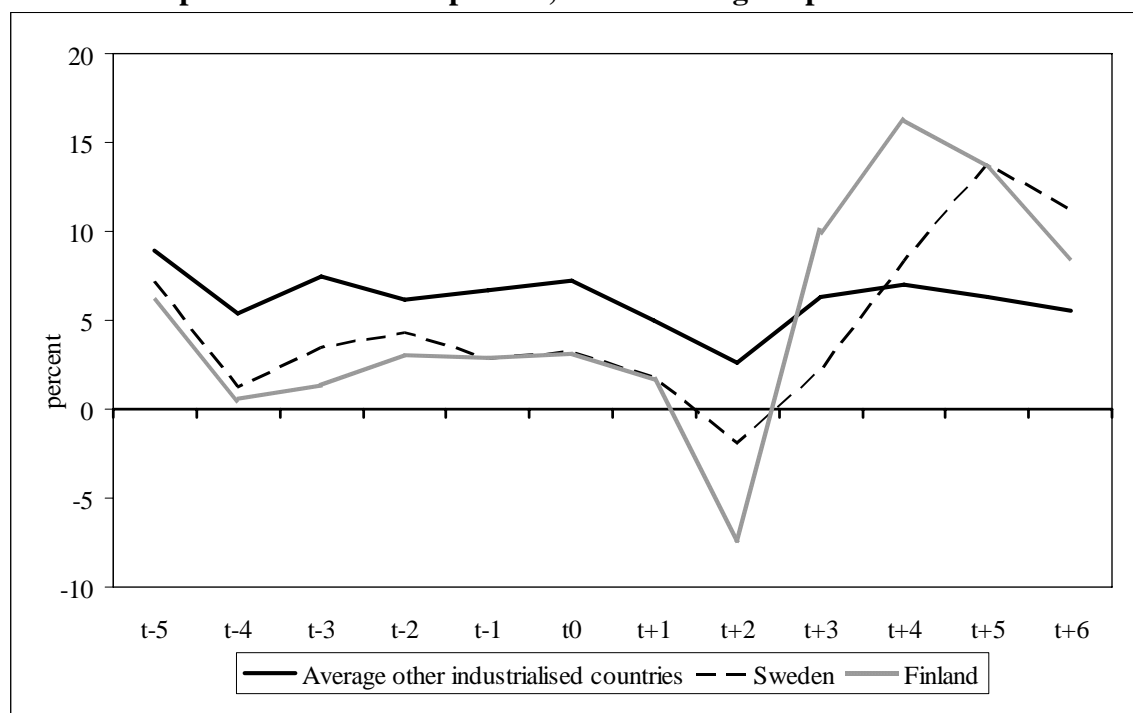


Data: See appendix A.

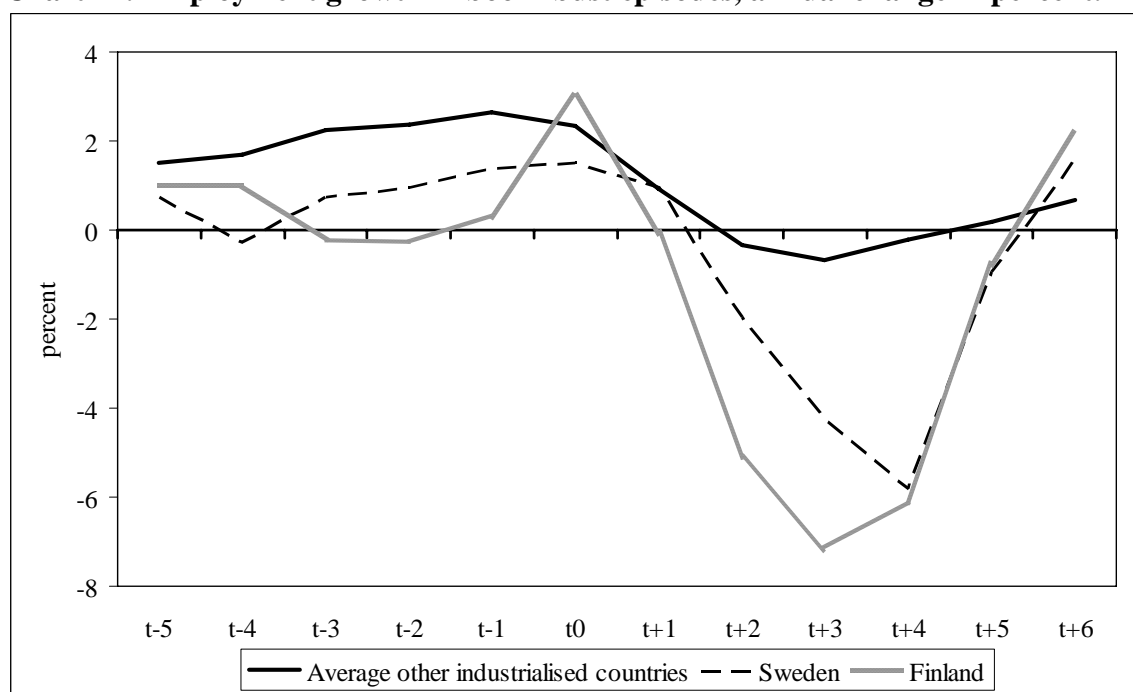
Chart 12. Real investment in boom-bust episodes, annual change in percent.



Data: See appendix A.

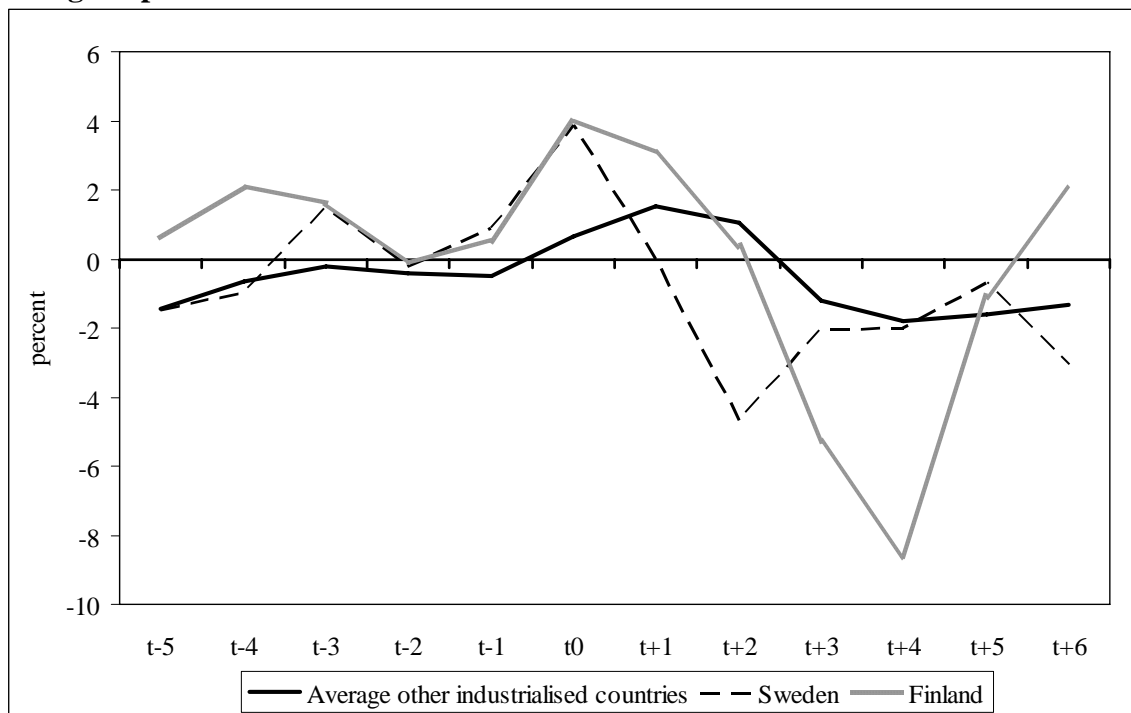
Chart 13. Export in boom-bust episodes, annual change in percent.

Data: See appendix A.

Chart 14. Employment growth in boom-bust episodes, annual change in percent.

Data: See appendix A.

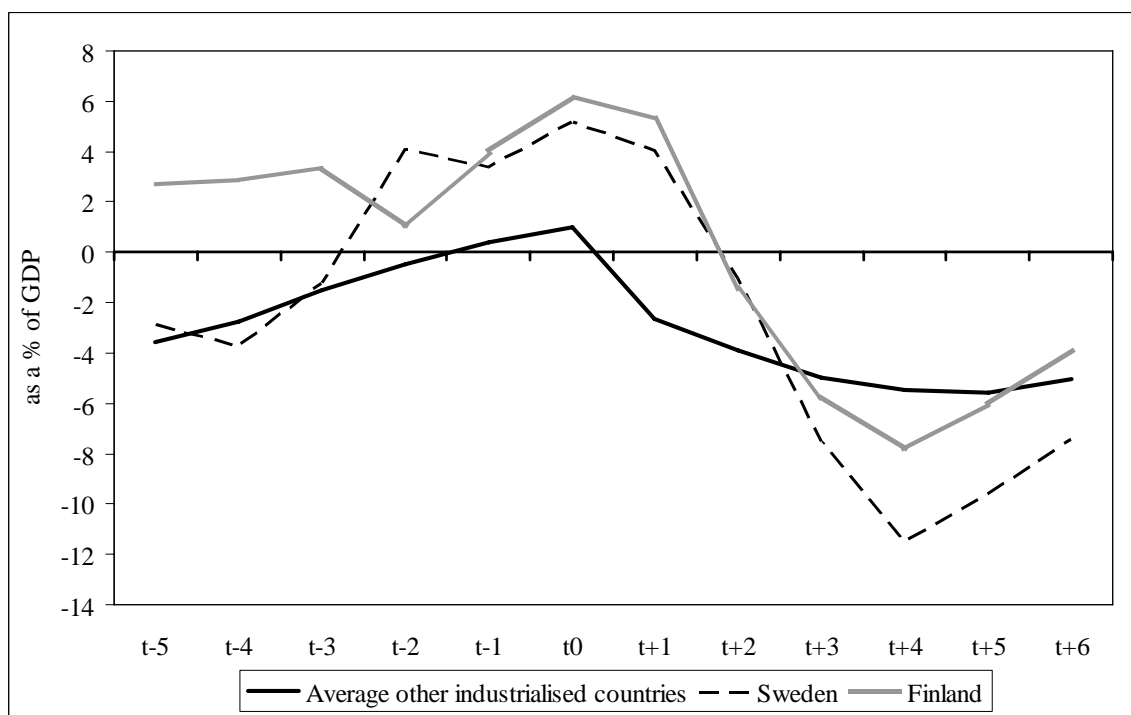
Chart 15. Productivity adjusted real labour costs in boom-bust episodes, annual change in percent.



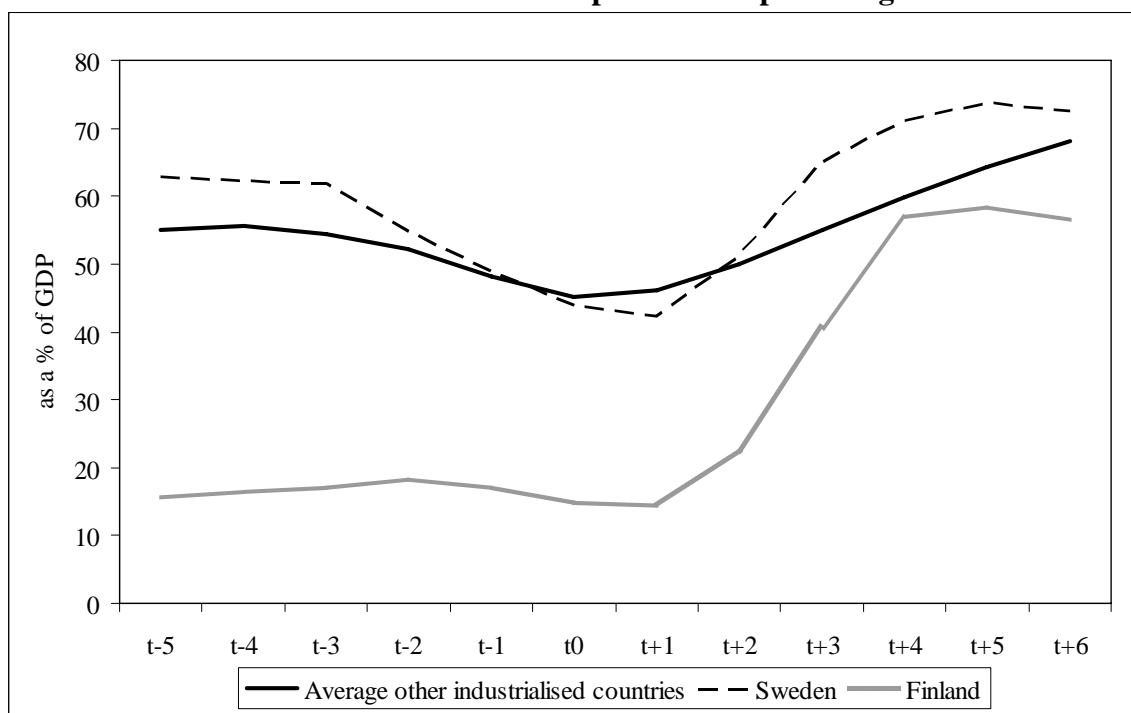
Note: The productivity adjusted real labour costs have been defined as the difference between real compensation per employee growth and average productivity.

Data: See appendix A.

Chart 16. Government budget balance in boom-bust episodes as a percentage of GDP.



Data: See appendix A.

Chart 17. Government debt in boom-bust episodes as a percentage of GDP.

Data: See appendix A.

Appendix B:

In this appendix we include five additional charts to illustrate boom-bust patterns. Chart B1 displays the behaviour of stock prices. As expected, stock prices rose rapidly during the boom phase. A peak in stock price growth around 50-60 % is registered for Finland and Sweden three years before the business cycle peak in 1989. The bust brought falling stock prices in both countries during three years. Subsequently a sharp rise followed.

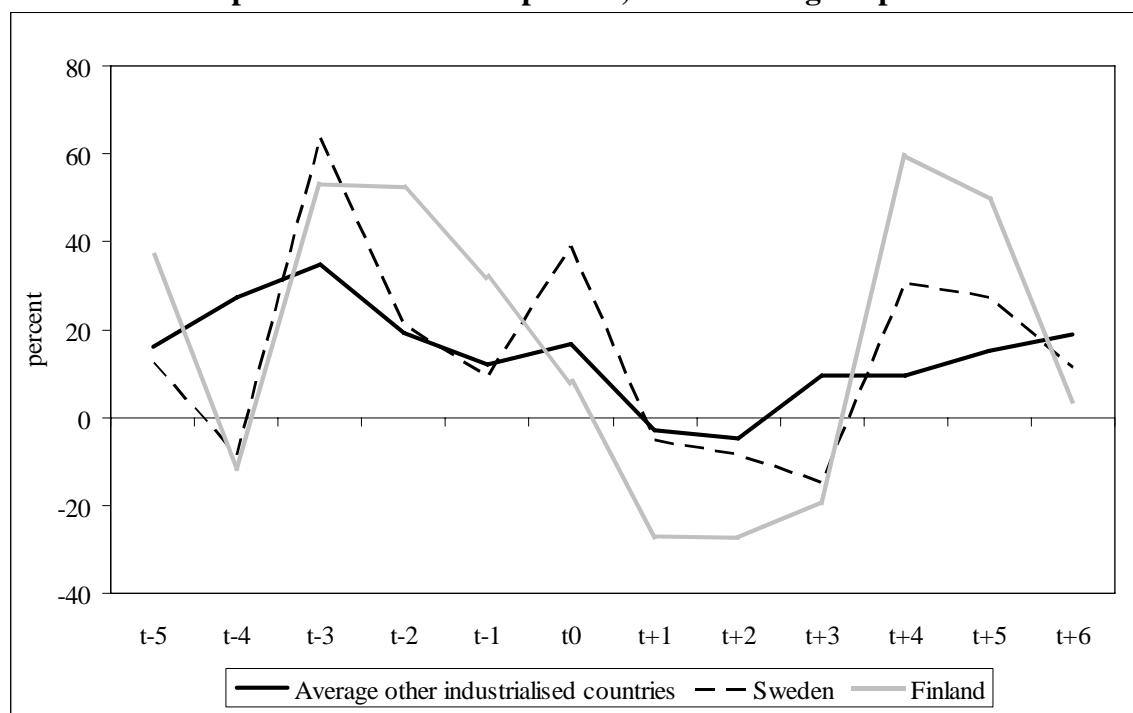
Unemployment in Chart B2 mirrors the behaviour of employment as shown in Chart 14. As the boom proceeds, unemployment falls steadily. In the two Nordic countries, the level is lower than the international average. The year after the peak, it shoots up sharply, in particular in Finland, reaching a maximum around 16 %. The Finnish rate surpasses the international level two years into the bust. The Swedish rate reaches the international average after four years into the bust, and then it declines below.

Average productivity growth in Chart B3 declines during the last years of the boom phase, becomes negative in Finland during the first years of the bust. Then it rises sharply in the two Nordic countries, reaching a growth rate far above the international average. Chart B2 illustrates the labour market shakeout created by the depression of the 1990s. The level of employment has not yet returned to its pre-crises level yet.

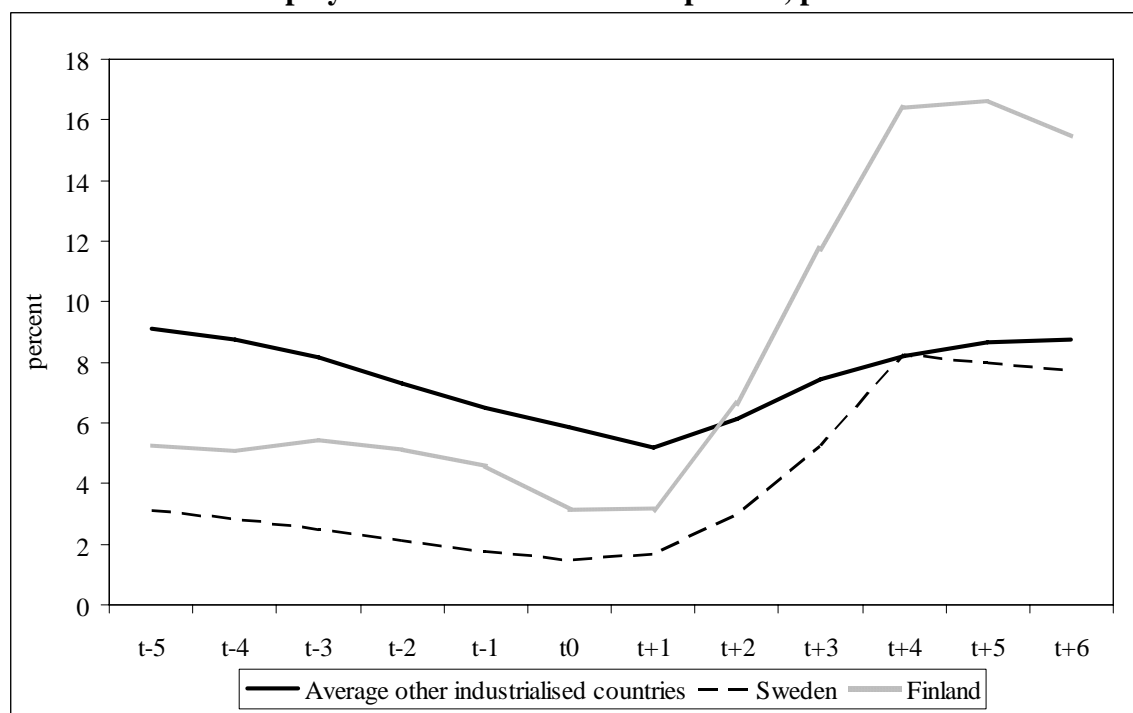
Unit labour costs in Chart B4 peak one year after the peak of the business cycle. It then falls sharply, most sharply in Finland and Sweden. The depreciation of the *markka* and the *krona* and the wage moderation owing to the emergence of sizeable output gaps during the bust are the main reasons for this pattern.

The boom in the two Nordic countries was associated with a higher growth rate of nominal government revenues (Chart B5) and in nominal government primary expenditures (Chart B6) than the international average. Likewise, the bust caused a more rapid deterioration. The picture in Chart B5 and in Chart B6 gives the same message as Chart 16 displaying government budget balances as a percentage of GDP and as Chart 17 showing government debt as a percentage of GDP.

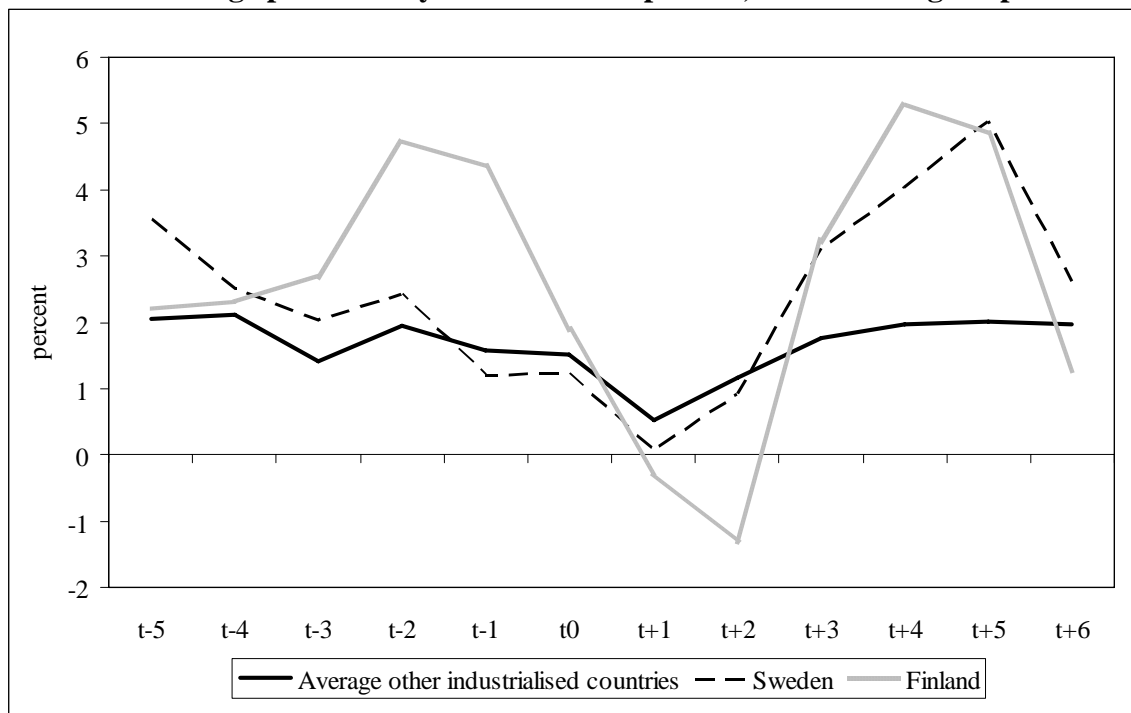
To sum up, the Finnish and Swedish pattern displayed in Chart B1-B6 is more volatile than the international average; in particular the bust is associated with larger changes. This result is consistent with the conclusions we have reached from the data underlying Charts 1-17.

Chart B1. Stock prices in boom bust episodes, annual change in percent.

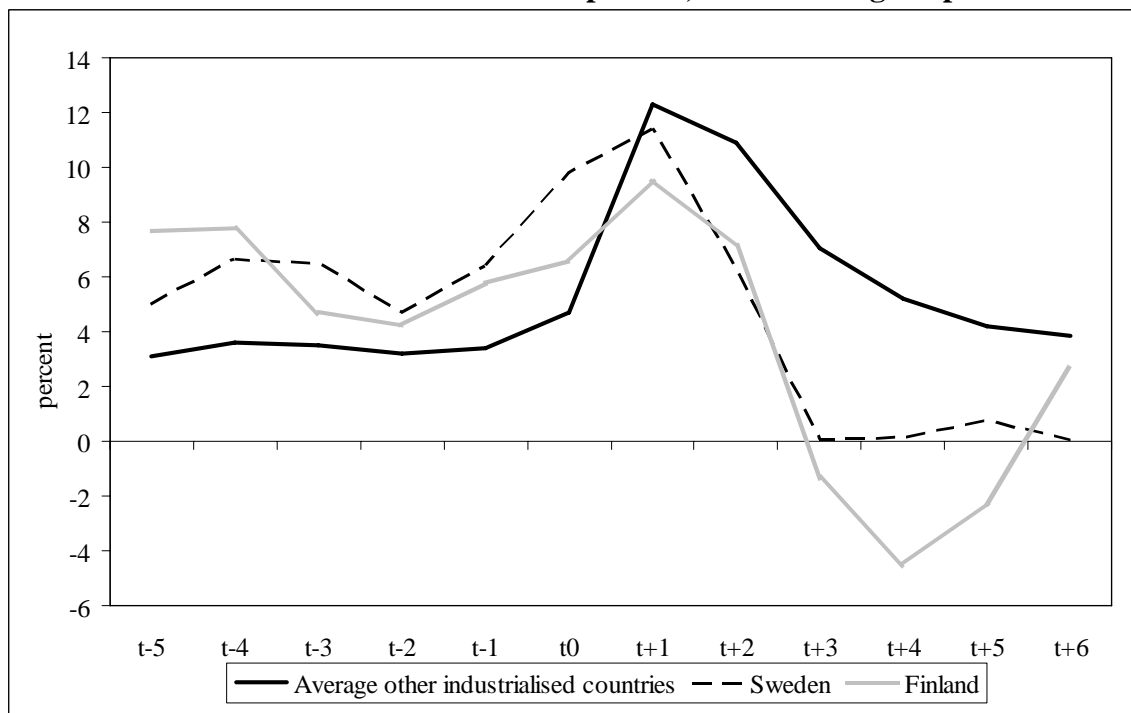
Data: See appendix A.

Chart B2. The unemployment rate in boom bust episodes, percent.

Data: See appendix A.

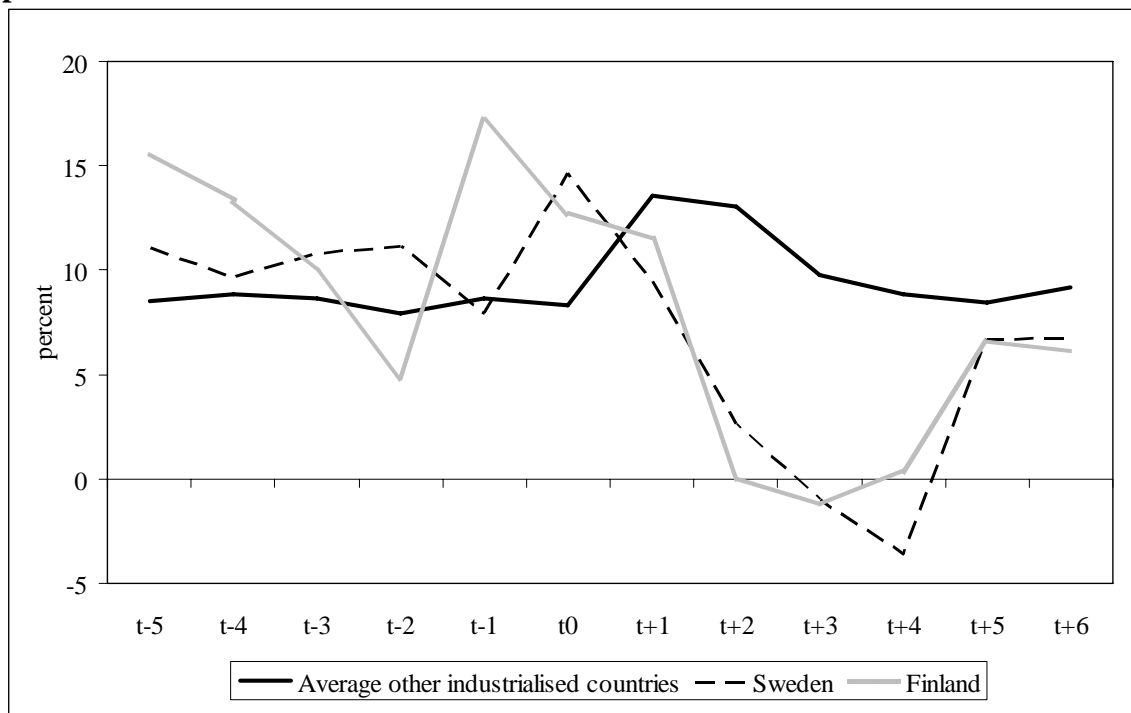
Chart B3. Average productivity in boom bust episodes, annual change in percent.

Data: See appendix A.

Chart B4. Unit labour costs in boom bust episodes, annual change in percent.

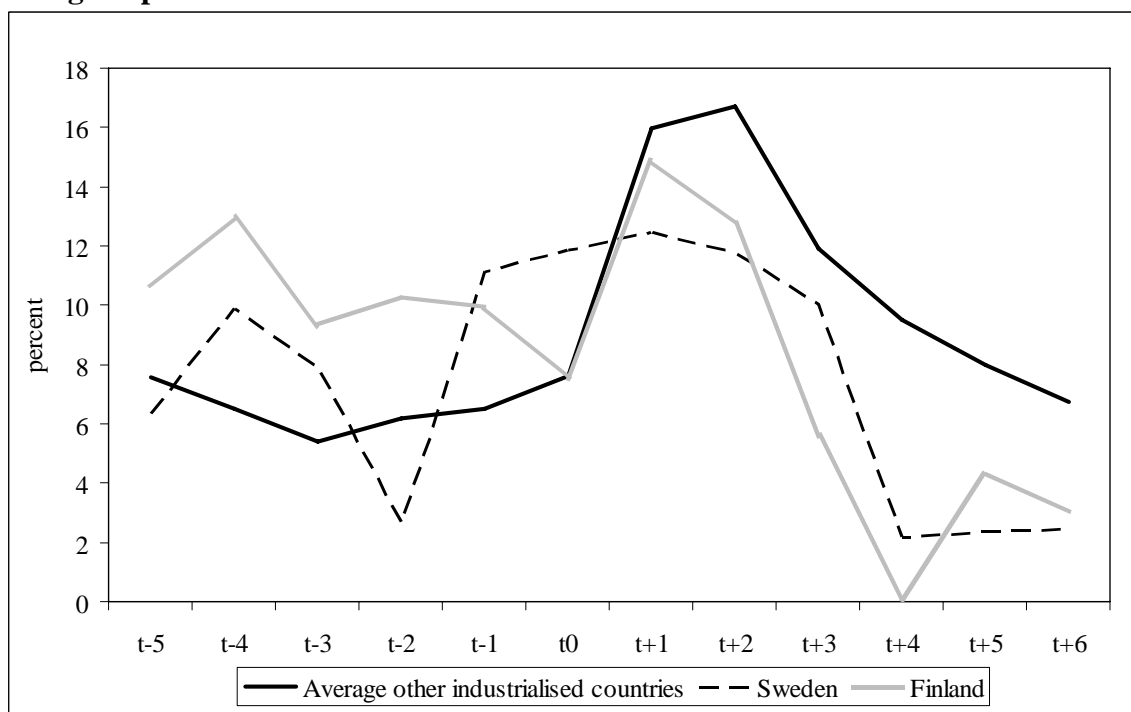
Data: See appendix A.

Chart B5. Nominal government revenue in boom bust episodes, annual change in percent.



Data: See appendix A.

Chart B6. Nominal government primary expenditure in boom bust episodes, annual change in percent.



Data: See appendix A.

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