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**Working Paper**

## The Swedish external position and the Krona

Sveriges Riksbank Working Paper Series, No. 200

**Provided in Cooperation with:**

Central Bank of Sweden, Stockholm

*Suggested Citation:* Lane, Philip R. (2006) : The Swedish external position and the Krona, Sveriges Riksbank Working Paper Series, No. 200, Sveriges Riksbank, Stockholm

This Version is available at:

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SVERIGES RIKSBANK  
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200



# The Swedish External Position and the Krona

*Philip R. Lane*

NOVEMBER 2006

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# The Swedish External Position and the Krona

Philip R. Lane \*

Sveriges Riksbank Working Paper Series

No. 200

November 2006

## Abstract

This paper addresses the dynamics of the Swedish external position, with a particular focus on its inter-relation with the external value of the krona. We argue that financial globalisation means that a broader conceptual framework is required, whereby exchange rate fluctuations operate through the ‘valuation channel’ of external adjustment, in addition to the traditional trade balance channel. In the other direction, we highlight that the projected trend for the trade balance is an important influence on the long-term prospects for the krona. Finally, we seek to assess the future direction for the Swedish net foreign asset position by investigating the likely impact of demographic change and shifts in the Swedish position in the world income distribution.

Keywords: real exchange rate, external adjustment, Sweden.

JEL Codes: F0, F2, F3.

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# 1 Introduction

The goal of this paper is to understand the dynamics of the Swedish external position and its relation to the krona. The Swedish case is interesting for a number of reasons. First, it has run an increasingly-large current account surplus since 1994 (indeed, its trade balance has been in surplus since the mid-1980s). Second, Sweden is to the forefront of financial globalization, with rapid growth in the level of holdings of foreign assets and liabilities. Related to this point, capital gains on foreign assets and liabilities (the so-called valuation channel) have become increasingly important in driving the dynamics of the Swedish net international investment position, with large positive capital gains during the late 1990s that have been offset by substantial capital losses in more recent years. An important implication is that the valuation channel provides a new mechanism linking exchange rate fluctuations to the external position that operates in addition to the traditional trade balance channel.

In the other direction, the long-term path for the external position is recognised as an important influence on the trend behaviour of the real exchange rate. We investigate this relation, allowing for the impact of other forces (in particular, shifts in the terms of trade). In turn, this begs the question of what determines persistent movements in the net foreign asset position. Demographic structure, public debt and relative output per capita are among the relevant factors identified in previous cross-country studies: we probe the importance of these variables for the Swedish case.

The structure of the paper is as follows. In Section 2, we provide an empirical review of the dynamics of the Swedish external position, with a particular emphasis on the impact of the valuation channel of exchange rate shocks. Section 3 addresses the long-term influence of the external position on the trend value of the krona, while the determinants of the long-run external position are investigated in Section 4. Some conclusions are offered in Section 5.

## 2 The Swedish External Position: An Empirical Profile

In this section, we first document the evolution of the current account and the net foreign asset position and consider the underlying patterns in savings and investment rates. Next, we consider the scale and composition of Sweden's international balance sheet. We then introduce an accounting framework that is helpful in identifying the main factors driving the net position: in particular, the relative contributions of net exports versus the 'valuation channel.' We employ this framework to provide a decomposition of the Swedish net international investment position. In turn, this prompts an investigation of the roles played by the Swedish external capital structure and relative rates of return in different investment categories, with fluctuations in the exchange rate playing an important role in driving return differentials. The final part of this section links the trade balance and the valuation channel, since there is plausibly negative comovement between these terms.

### 2.1 The Swedish Current Account, Savings and Investment

Figure 1 plots the Swedish current account over 1970-2005. The figure shows that the Swedish current account spent most of the 1974-1993 interval in negative territory but that the current account has been in continuous surplus since 1994, with a strong trend growth in the surplus over this period. Figure 2 shows the patterns in savings and investment rates that lie behind the current account. Until 1994, these two series moved closely together, with the fluctuations in investment closely matched by similar swings in savings. However, savings and investment behaviour has diverged in recent years. In particular, the decline in the investment rate since 2000 has not affected the continuation of the trend increase in the savings rate that has been in effect since 1993.

Turning to the net foreign asset position, Figure 3 shows that the evolution of the net foreign asset position largely followed the cumulative current account balance until 1994, reaching a low of -41.3 percent of GDP in that year. Consistent with the improvement

in the current account, the net foreign asset position subsequently moved into positive territory, peaking at 23.1 percent of GDP in 2001. However, in spite of large current account surpluses, the period 2002-2004 saw a dramatic deterioration in the net foreign asset position, with 39.2 percentage points of GDP wiped out during this period to reach -16.1 percent of GDP at the end of 2004. There was some recovery during 2005, with an improvement to -8.6 percent of GDP by the end of that year. In the next subsection, we develop an accounting framework that is helpful in understanding the dynamics of the net external position.

## 2.2 An Accounting Framework

It is important to understand current account behaviour in the context of the overall evolution of the net foreign asset position (NFA). As has been emphasised by Lane and Milesi-Ferretti (2001a, 2004a, 2005a), capital gains and losses (i.e. valuation changes) on accumulated holdings of foreign assets and liabilities can swamp current account flows. Moreover, such valuation effects are growing in importance over time, in line with the spectacular increase in the gross scale of the international balance sheet (the ratios of foreign assets and liabilities to GDP have grown sharply in the last 15 years).

Following Lane and Milesi-Ferretti (2005a), the change in the net foreign asset position can be written as

$$B_t - B_{t-1} = CA_t + KG_t + E_t \quad (1)$$

where  $B_t$  is the net foreign asset position,  $CA_t$  is the current account balance,  $KG_t$  is the capital gain or loss on net foreign assets (equal to the change in stocks minus the underlying flows) and the term  $E_t$  includes factors such as capital account transfers (the so-called capital account balance) and errors and omissions that drive a wedge between a country's current account and net inflows of capital. In turn, the current account  $CA_t$  equals the sum of the balance on goods, services, and current transfers  $BGST_t$  and the investment income balance  $YLD_t = i_t^A A_{t-1} - i_t^L L_{t-1}$ , where  $A$  and  $L$  are external assets and liabilities, respectively, and  $i_t^A, i_t^L$  are the nominal yields on these assets and liabilities.

Indicating ratios to GDP with lower-case letters, we can express equation (1) as follows

$$b_t - b_{t-1} = bgst_t + \frac{i_t^A A_{t-1} - i_t^L L_{t-1}}{Y_t} + \frac{KG_t}{Y_t} - \frac{g_t + \pi_t}{(1 + g_t)(1 + \pi_t)} b_{t-1} + \varepsilon_t \quad (2)$$

where  $g_t$  is the growth rate of real GDP,  $\pi_t$  is the inflation rate, and the term  $\varepsilon_t$  includes the ratio of capital transfers and errors and omissions to GDP. The second and third term on the right-hand-side of equation (2) captures the effect of nominal returns on external assets and liabilities on the evolution of the external position. To see this more clearly, define  $kg_t^A$  ( $kg_t^L$ ) as the ratio of the capital gain on external assets (liabilities), measured in domestic currency, to the outstanding stock of external assets (liabilities) at the beginning of the period, so that  $KG_t = kg_t^A A_{t-1} - kg_t^L L_{t-1}$ . Then the gross real rate of return on foreign assets, measured in domestic currency, will equal  $1 + r_t^A = (1 + i_t + kg_t^A)/(1 + \pi_t)$ , and an analogous definition will hold for the rate of return on foreign liabilities  $1 + r_t^L$ . Using these definitions, we can derive

$$b_t - b_{t-1} = bgst_t + \frac{r_t^L - g_t}{1 + g_t} b_{t-1} + \frac{r_t^A - r_t^L}{1 + g_t} a_{t-1} + \varepsilon_t \quad (3)$$

This framework delivers several important insights. First, all else equal, a trade surplus improves the net external position. Second, there is a standard term to capture the impact of the gap between the rate of return on liabilities and the output growth rate, as is familiar from traditional analysis of debt dynamics. Third, when rates of return on external assets and liabilities differ, the gross scale of external assets and liabilities matters in addition to the net position, as is shown by the third term on the rightside of equation (3).

Equation (3) in the text can also be written as

$$b_t - b_{t-1} = bgst_t + \frac{r_t^W - g_t}{1 + g_t} b_{t-1} + \frac{(r_t^A - r_t^W)}{1 + g_t} a_{t-1} - \frac{(r_t^L - r_t^W)}{1 + g_t} l_{t-1} + \varepsilon_t \quad (4)$$

where  $r_t^W$  is the ‘global’ (or average) rate of return. Equation (4) highlights that global fluctuations in returns affect the net external position to the extent that a country is a creditor or debtor: an increase in the ‘global’ rate of return improves the net foreign asset position of a creditor but is adverse for a debtor.



In addition, ‘asymmetric’ return shocks - the deviations of returns on foreign assets and liabilities from the global return - is proportional to the gross scale of foreign assets and liabilities relative to GDP. The propensity for deviations from the global (average) rate of return depends on an array of factors. Among the most important are the external capital structure of a country - the split between equity and debt on each side of the international balance sheet - and the currency composition of external assets and liabilities.

## 2.3 External Capital Structure

The accounting framework highlights that the scale and composition of the international balance sheet is important in determining the contribution of the valuation channel to the dynamics of the external position. Figure 4 shows the tremendous growth in the scale of Sweden’s holdings of foreign assets and liabilities over 1970-2005: the increase has been nearly tenfold over this period, with a marked acceleration since the early 1990s. This increase in financial globalization is a common phenomenon across the advanced economies, as is demonstrated in Lane and Milesi-Ferretti (2001a, 2006a). As is highlighted in the accounting framework developed in the previous sub-section, the implication is that the influence of valuation effects on the dynamics of external position should be increasingly important over time.<sup>1</sup>

In addition to the overall scale of the balance sheet, the external capital structure also matters in terms of net equity and net debt positions. Accordingly, Table 1 shows the external capital structure of Sweden over 1995-2005. The table shows that Sweden has consistently maintained ‘short debt’ and ‘long FDI’ positions, while the portfolio equity component has shown trend improvement, moving from a negative to a positive net position since 2001. Its ‘long equity’ position means that the Swedish external position is positively affected by improvements in global equity returns, both in portfolio equity and foreign direct investment. Its ‘short debt’ position means that the financing costs of maintaining a

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<sup>1</sup>See also Tille (2003) and Gourinchas and Rey (2006) - these papers especially focus on the role of valuation effects for the external position of the United States.

leveraged position is adversely affected by an increase in interest rates, although the value of its net debt position will be favourably affected by a global decline in bond returns.

Overall, as is shown in Lane and Milesi-Ferretti (2006a), the Swedish external capital structure is similar to the typical profile for an advanced economy. As a group, the industrial countries maintain positive net equity positions vis-a-vis the rest of the world and most of these countries have negative net debt positions. If an equity risk premium exists, this leveraged portfolio should deliver positive net returns over the medium run. However, the corollary implication is that net external returns may be quite volatile, in line with fluctuations in international financial markets.

Of course, in addition to global trends, the geographical, sectoral and currency composition of Swedish external assets and liabilities also affects its exposure to asset return shocks in particular markets. In particular, a natural split is that the performance of the Swedish economy is a key determinant of the returns on its foreign equity liabilities and its krona-denominated foreign debt liabilities, while the returns on its foreign asset portfolio will be diversified across a wide range of destinations.

In the next subsection, we assess the relative contributions of net capital gains and other terms in driving the value of the Swedish external position.

## **2.4 The Dynamics of the Net Foreign Asset Position: A Decomposition**

Table 2 shows the decomposition of the dynamics of the net foreign asset position over 1996-2005. The table shows that there has been a persistent and sizeable trade surplus during this period. In addition, in line with trend improvement in the net external position (at least until 2001), there has been a trend improvement in the net investment income balance that amounts to 3 percent of GDP over this period. However, the most striking element of the decomposition is the dominant role played by net capital gains in driving the year-to-year fluctuations - with very large positive gains during 1997-1999 (and again in 2001) being partially offset by large capital losses in 2000 and 2002-2004. Moreover, the cumulative

impact of net capital losses has been large: the cumulative current account surplus during 1996-2005 was \$124 billion (34.6 percent of 2005 GDP), while the improvement in the net foreign asset position was only \$60 billion (16.7 percent of 2005 GDP).

In part, the valuation swings over this period can be related to the the boom and bust of global equity markets, in view of Sweden's long equity position - the global upswing during the late 1990s benefited the Swedish net position, while the post-2001 bust symmetrically had a damaging impact. However, in addition to global trends in equity returns, differentials between returns on Sweden's assets and liabilities matter and this factor is increasingly important, the larger is the scale of gross holdings of foreign assets and liabilities. Table 3 shows the rates of capital gain for various asset categories over 1996-2005. The table shows that Swedish (portfolio and FDI) equity liabilities have delivered higher capital gains than Swedish equity assets during this period. In the debt category, capital gains on portfolio debt assets and liabilities are highly correlated, while capital gains on 'other' debt assets have exceeded those on 'other' debt liabilities (the scale of capital gains in the 'other' category is much lower than in the other categories).

Accordingly, the data in Table 3 suggests that an important source of the cumulative capital losses in the Swedish external position has been the superior performance of the Swedish stockmarket relative to other markets. This is shown in Figure 5 that plots the capital gain differential between the Swedish and global equity markets over 1980-2005. However, it is important to underline that this should be interpreted as a benign type of capital loss on the external portfolio, since the primary beneficiaries of a rising Swedish stockmarket are domestic equity holders and the gains enjoyed by foreign investors just reflect the operation of international risk sharing. This, moreover, is perfectly consistent with the finding in Table 2 that Sweden's net external position has improved by less than may be expected by just looking at the current account - in the absence of current account surpluses, the natural pattern would have been that relatively strong returns in Sweden should map into a deterioration in its net external position.

A potentially important source of differences in rates of return between assets and lia-

bilities are movements in the external value of the krona. Lane and Milesi-Ferretti (2004a) describe the myriad potential connections between currency movements and relative returns. The simplest case is if foreign assets are denominated in foreign currency and offer a foreign-currency return that is independent of the bilateral exchange rate, while foreign liabilities are denominated in domestic currency and offer a domestic-currency return that is also independent of the exchange rate. In this case, exchange rate appreciation entails a capital loss on the foreign assets that are now worth less in terms of domestic currency, while the domestic-currency value of foreign liabilities are unaffected. More generally, a stronger domestic currency induces a relative capital loss if domestic and foreign market returns do not adjust to offset the impact of the appreciation.<sup>2</sup> While the application of uncovered interest rate parity in bond markets would indeed generate a compensating return differential in the case of expected exchange rate movements, this condition is widely rejected in the data. Moreover, in the case of equity markets, many factors determine equity returns, such that the case for a strict form of an ‘equity return parity’ condition is not strong.<sup>3</sup>

These considerations suggest that the strength of the connection between the exchange rate and relative returns cannot be determined as a theoretical principle but is rather an empirical matter. Accordingly, we investigate in Table 4 the relation between exchange rate movements and return differentials over 1980-2005. The table shows that appreciation of the trade-weighted krona is associated with lower capital gains on Swedish foreign assets relative to Swedish foreign liabilities and that the strength of this pattern has increased during 1996-2005.<sup>4</sup> This is in line with the pattern in Table 2, since the krona depreciated

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<sup>2</sup>There is a different pattern for emerging market economies that have liabilities that are primarily denominated in foreign currency, where exchange rate appreciation generates a capital gain.

<sup>3</sup>See Campbell et al (2006) for recent estimates of the co-movements between currencies and national equity returns.

<sup>4</sup>In this study, we employ the trade-weighted real effective exchange rate (the nominal effective exchange rate gives very similar results). The ideal is to use weights to better reflect the geographic and currency composition of external assets and liabilities. However, this is an arduous task - see, for instance, Lane and Milesi-Ferretti (2006c).

during 1996-2001 followed by appreciation during 2002-2004 and appreciation again during 2005.

Looking at the sub-categories, it is noteworthy that the exchange rate effect is especially strong for FDI and that it also emerges as significantly negative in the portfolio equity category during 1996-2005. (A more negative co-movement is also evident for the foreign reserves category and the 'other' category.) In contrast, there is positive co-movement between the strength of the krona and relative capital gains on foreign portfolio debt assets relative to portfolio debt liabilities, which is consistent with a pattern in which an increase in the interest rate differential between Sweden and other countries induces both krona appreciation and a relative capital loss on krona-denominated bonds versus other bonds.

It is important to emphasize that a pattern in which exchange rate depreciation is typically associated with positive net capital gains on the external account may not always hold. For instance, the step depreciation of the krona in 1993 was accompanied by significant net capital losses, since the Swedish stock and bond markets recovered strongly upon the exit from the currency crisis. The 2005 experience of the United States provides another example - although the dollar depreciated during 2005, this factor was outweighed by a large return differential between foreign and domestic equity markets in that year.

Finally, the preceding discussion has emphasised the role of the valuation channel as a source of fluctuations in the Swedish external position. However, it is important to take into account that the valuation gains or losses may not pass one-for-one into changes in the net external position. In particular, a positive wealth gain that is expected to persist may be associated with an increase in consumption - and/or, if there are credit constraints, a rise in investment - such that a capital gain may be partly offset by a decline in the current account. (Symmetrically, a capital loss may be counter-balanced by a decline in consumption.) Indeed, Figure 6 shows a negative correlation (-0.57) between valuation gains and the current account over 1996-2005. That said, in addition to the wealth effect outlined above, a negative correlation is also consistent with the operation of a common factor that induces both a valuation gain and a decline in the current account balance.

Establishing the relative importance of these alternative hypotheses is deferred to future research.

### 3 The External Position and the Long-Run Real Exchange Rate

The previous section has shown that fluctuations in the exchange rate are an important determinant of the net foreign asset position, where we placed particular emphasis on the valuation channel. At a lower frequency, it is also essential to take into account that the trend in the trade balance is an important factor in determining the long-run behaviour of the real exchange rate. In particular, there is considerable empirical evidence that a country that persistently runs trade surpluses also experience real depreciation - a phenomenon known as the ‘transfer problem’ (Lane and Milesi-Ferretti 2002b, 2004c).<sup>5</sup>

In this study, our empirical specification for the long-run real exchange rate is

$$\log(REER_t) = \alpha + \beta_1 * TBY_t + \beta_3 * \log(TT_t) + \varepsilon_t \quad (5)$$

where  $REER_t$  is the consumption-based real effective exchange rate,  $TBY_t$  is the trade balance on goods and services and  $TT_t$  is the terms of trade. Following Lane and Milesi-Ferretti (2002b), the transfer effect is captured by the coefficient  $\beta_1$  - a permanent shift in the trade balance of  $X$  percentage points of GDP implies a permanent shift in the real exchange rate of  $\beta_1 * X$ . The theoretical foundation for the transfer effect is extensively discussed in Lane and Milesi-Ferretti (2004c) - in general, a permanent trade surplus means that a country has permanently low expenditure relative to the value of its production, which depresses the relative price of nontradables. Although many studies have attempted to capture the transfer effect by entering the net foreign asset position as a co-variate of the real exchange rate, Lane and Milesi-Ferretti (2002b) argue that that the trade balance

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<sup>5</sup>See also Nilsson (2004), Lindblad and Sellin (2005) and Sellin (2006) on the determinants of the long-run value of the krona.

is a superior alternative, since the connection between the net foreign asset position and the trade balance may vary over time and across countries given the potential variation in the composition of the international balance sheets and the level of returns on foreign assets and liabilities.

The terms of trade is the other main variable in the model - an improvement in the terms of trade has both direct and indirect effects on the real exchange rate. First, home bias in consumption means that an increase in the relative price of exports directly raises the home consumer price level relative to the price level overseas. Second, an increase in the relative price of exports generates a positive wealth effect that may drive up the relative price of nontradables. While the terms of trade may be viewed as an endogenous variable for large continental-sized economies (such as the United States or the aggregate euro area), it may be better interpreted as an exogenous factor for small economies. This is especially true when the terms of trade is dominated by trends in global commodity prices: for instance, the correlation between the Swedish terms of trade and an oil price index is -0.76 over 1992-2004.<sup>6</sup>

Finally, we acknowledge that equation (5) is a very restricted specification. In particular, a relative productivity or relative output variable is typically also included. However, we found that such a variable added little explanatory power and, in the case of relative productivity, was available for fewer years. Moreover, especially since we estimate equation (5) by dynamic ordinary least squares (DOLS), adding this variable also causes a significant compromise in terms of degrees of freedom. For these reasons, we report the more parsimonious specification, although the fit of the regression is similar across the specifications.

Figure 7 plots the real effective exchange rate over 1970-2005. This series has shown prolonged swings, with depreciation during 1970-1983 followed by persistent appreciation until 1992-1993. Following the step depreciation upon the abandonment of its exchange rate peg, there was a temporary recovery in the krona during 1994-1996. However, 1997-

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<sup>6</sup>Besides fuel imports, it is difficult to identify the sectoral relative price shifts that lie behind the Swedish terms of trade, since so much of its trade is ‘intra-industry’ in nature.

2001 saw another bout of depreciation, driving the krona below its previous trough in 1983. More recently, 2002-2004 was a period of rapid appreciation, although this was partially corrected by depreciation during 2005. In broad terms, however, the general pattern has been towards depreciation.

Turning to the trade balance, Figure 8 shows that the trade balance displays a similar evolution to the current account (as was shown in Figure 1). The trade balance has been mostly in surplus throughout the 1970-2005 period and has been on a sustained upward path since 1990, albeit with a temporary dip during 1997-2000. Overall, however, a strong positive trend is clearly evident.

The dynamics of the terms of trade are shown in Figure 9. The terms of trade persistently weakened during 1970-1983 but then underwent a substantial recovery in the interval until 1995. Over the last decade, however, the terms of trade have resumed their negative trend.

Taking these figures together, the juxtaposition of a weakening real exchange rate with a growing trade surplus and declining terms of trade is consistent with standard models of the long-term determinants of exchange rate behaviour. We formalise this in Table 5, which shows the estimated relation between the real exchange rate and the trade balance and the terms of trade. In terms of the transfer effect, the point estimate in column (1) is that a permanent increase in the trade surplus of 3 percentage points of GDP is associated with a long-term real depreciation of 4.2 percent. While this elasticity is much lower than the available estimates for large economies such as the United States, it is line with the estimates found by Lane and Milesi-Ferretti (2002b) for the smaller industrial countries. For the terms of trade, Table 5 indicates an elasticity of about 0.5: a ten percent permanent decline in the terms of trade is associated with a five percent permanent real depreciation.

Figure 10 shows the fitted value from this regression and the actual value for the real exchange rate. The figure shows that the model does a reasonable job in capturing the long-term movements in the real exchange rate, even if it fails to capture the shorter-term fluctuations in the exchange rate.<sup>7</sup> With regard to the latter, Figure 11 plots the

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<sup>7</sup>Adding dummies for the periods of step devaluations in the model does not substantially alter the



short-term interest rate for Sweden, the euro area and the United States since 1999. It shows a positive interest rate differential during the 2002-2004 period of krona appreciation. Moreover, the interest rate differential subsequently turned negative, which is consistent with the depreciation of the krona during 2005. Accordingly, an integrated perspective on the behaviour of the krona points to long-term factors such as the evolution of the trade balance and the terms of trade, supplemented by the short-term impact of the interest rate differential.

The long-term model that we have developed in this section suggests that the future trend for the krona will be strongly influenced by the future evolution of the trade balance and the terms of trade. Regarding the former, an extrapolation of present trends suggests that the trade balance should remain significantly positive over the medium term. Moreover, the impact of capital losses in recent years is that Sweden is a net debtor, so that a decline in the trade balance cannot be projected from its current net external position. However, if future net returns are neutral or even positive, an accumulation of trade surpluses will mean that Sweden will accumulate a large net creditor position. In turn, unless the net foreign asset position grows in an unbounded fashion, this should induce a subsequent phase of trade deficits that would be associated with real appreciation. With respect to the terms of trade, we have highlighted that international fuel prices have exerted an substantial impact on the Swedish terms of trade in recent years. Accordingly, the long-term prospects for the krona will in part depend on the future trend in fuel prices, which are difficult to assess.

## 4 What Drives the External Position?

Our goal in this section is to assess the prospects for the future path of the Swedish external position. In particular, we seek to identify factors that lie behind the persistent increase in trade surpluses over the last decade. To this end, we follow the framework developed by Lane and Milesi-Ferretti (2002a) in which the long-term evolution of the net foreign performance of the model.

asset position is driven by relative output per capita, the level of public debt and relative demographic structures

$$NFAY_t = \alpha + \beta_1 * RELYC_t + \beta_2 * RELPUBDEBT_t + \beta_3 * RELDEMOG_t + \varepsilon_t \quad (6)$$

The theoretical foundations for this specification is described in detail by Lane and Milesi-Ferretti (2002a). An increase in Sweden's relative output per capita is expected to be associated with an improvement in its net foreign asset position for several reasons. First, to the extent that output levels converge over time, high relative output per capita may indicate that potential rates of return are higher elsewhere. Second, as is further elaborated by Engel and Rogers (2006), a country that expects to see its relative output per capita to diminish in the future should have a high current savings rate. Figure 12 shows the evolution of relative GDP per capita over 1970-2005: after a long period of relative decline, Sweden's relative position has markedly improved since 1997.

With respect to the second regressor, a decline in relative public debt should be associated with an improvement in the external position if the conditions that underpin Ricardian Equivalence fail to hold - that is, if an increase in government saving is not fully offset by a decrease in private saving, it will translate into an improvement in the net foreign asset position. Figure 13 shows the path for public debt in Sweden relative to other advanced economies - the improvement in the relative fiscal position in Sweden since the mid-1990s is striking.

Finally, relative demographic structure may affect the external position through its impact on both savings and investment rates. For instance, a country whose population is concentrated in those cohorts that are 'saving for retirement' will naturally have a higher savings rate than a country with a younger population, while the marginal product of capital will be negatively affected by a scarcity of younger workers - both channels predict that a country that is adapting to an ageing population will run current account surpluses.

Table 6 shows the estimated results for 1980-2005. It turns out that relative output per capita does not have explanatory power for the Swedish external position. However,

relative public debt is highly significant. Indeed, the estimated coefficient of  $-1.6$  is implausibly large - it must be the case that the improvement in relative public debt has been accompanied by other factors that are omitted from the model. Finally, the Wald test shows that relative demographic structure is highly significant. Figure 14 plots the estimated coefficients for each age cohort and shows that the net foreign asset position is increasing in the relative share of the population aged 40 and above, with the peak impact associated with the population share in the 55-59 age cohort. Figure 15 shows the actual and fitted values of the net foreign asset position. Although there is not a good fit during the early part of the sample, the model does a good job in tracking the evolution of the net foreign asset position since 1994.

It should be emphasized that the investment income and capital gains from accumulated surpluses can be drawn down to finance a higher level of consumption for a country with a population with a high proportion of retirees. Indeed, as is illustrated in Figure 16, Domeij and Floden (2006) project that the Swedish current account surplus will gradually diminish over the next several decades, in line with the shift in its relative demographic position.

We also note that the sensitivity of the net foreign asset position to the underlying fundamentals may have increased in recent years, due to the enlargement of the international financial system to incorporate countries from the former Communist Bloc and the improvement in risk diversification that has been permitted by the deepening of global financial markets. For Sweden, an especially relevant development has been the investment opportunities provided by the emerging economies in Central and Eastern Europe - these countries have been significant net importers of capital and Sweden is geographically and culturally well placed to be a major investor in this region (Lane and Milesi-Ferretti 2006c).

Another potential factor driving the sharp increase in the savings rate in recent years may be an increase in precautionary saving by households. This may be a response to increased individual-level uncertainty about earnings and employment, as a result of structural economic changes and reform of the social security and welfare systems, although it is beyond the scope of this article to investigate these hypotheses. A striking feature is

that household savings have increased since 2001, despite the continuing strong gains in housing prices (as is shown in Figure 17) - in some other advanced economies, house price appreciation has been associated with a substantial decline in household savings.

## 5 Conclusions

This paper has reviewed the recent behaviour of the Swedish external position, with special emphasis on its relation with the krona. We have emphasised that currency fluctuations have an increasingly large impact on the value of external assets and liabilities, since the massive increase in international financial holdings means that the valuation channel has increased in importance relative to the trade balance as a driver of the external position. However, we have also highlighted that valuation effects can also arise from shifts in asset prices in different markets and investment categories. In particular, its ‘long’ foreign equity position means that fluctuations in global equity values have an important influence on the Swedish net foreign asset position.

In the other direction, we have also shown that the long-run value of the krona is influenced by the trend for the trade balance - a persistent decline in the trade balance is associated with long-run real appreciation. In this way, the large trade surpluses in recent years have contributed to maintaining a depressed value for the krona while the prospects are for future krona appreciation if adjustment forces kick in that drive down the trade balance. In particular, the sustained accumulation of trade surpluses (reinforced by favourable net capital gains) will eventually generate a sufficiently large net creditor position that can be subsequently stabilized with a permanent trade deficit. Moreover, relative demographic trends point to a gradual decline in the trade surplus, which would also be facilitated by a decline in prudential savings by households.

However, our analysis also shows that other factors also influence the krona. In particular, there is a strong link between the terms of trade and the krona and the future evolution of the terms of trade is difficult to predict. Over the short run, interest rate differentials also matter - holding fixed the influence of the longer-term trend factors, the

recent increase in Swedish interest rates may contribute to a near-term strengthening of the krona.

## Appendix

Following Lane and Milesi-Ferretti (2002a), this appendix describes how demographic structure is captured in the specification for the net foreign asset position in equation (6) in the main text. We divide the population into  $J = 12$  age cohorts and the age variables enter the net foreign assets equation as  $\sum_{j=1}^{j=12} \alpha_j p_{jt}$  where  $p_{jt}$  is the population share of cohort  $j$  in period  $t$  and  $\sum_{j=1}^{j=12} \alpha_j = 0$ . We make the restriction that the coefficients lie along a cubic polynomial

$$\alpha_j = \gamma_0 + \gamma_1 * j + \gamma_2 * j^2 + \gamma_3 * j^3$$

The zero-sum restriction on the coefficients implies that

$$\gamma_0 = -\gamma_1(1/J) \sum_{j=1}^{j=12} j - \gamma_2(1/J) \sum_{j=1}^{j=12} j^2 - \gamma_3(1/J) \sum_{j=1}^{j=12} j^3$$

In turn, we can estimate  $\gamma_1, \gamma_2, \gamma_3$  by introducing the age variables into the specification as

$$\gamma_1 DEM_{1t} + \gamma_2 DEM_{2t} + \gamma_3 DEM_{3t}$$

where

$$\begin{aligned} DEM_{1t} &= \sum_{j=1}^{j=12} j p_{jt} - (1/J) \sum_{j=1}^{j=12} j \\ DEM_{2t} &= \sum_{j=1}^{j=12} j^2 p_{jt} - (1/J) \sum_{j=1}^{j=12} j^2 \\ DEM_{3t} &= \sum_{j=1}^{j=12} j^3 p_{jt} - (1/J) \sum_{j=1}^{j=12} j^3 \end{aligned}$$

Finally, the implicit  $\alpha_j$  coefficients can be recovered once we know  $\gamma_0, \gamma_1, \gamma_2, \gamma_3$ .

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Table 1: External Capital Structure, 1995-2005.

Year	Net Port Eq	Net FDI	Net Debt	NFA
1995	-7.8	16.0	-44.0	-36.2
1996	-12.1	12.5	-38.3	-38.3
1997	-11.3	31.5	-43.3	-23.1
1998	-9.1	49.7	-46.0	-5.7
1999	-10.4	57.1	-38.0	9.1
2000	-10.7	47.4	-38.7	-0.5
2001	13.0	61.0	-51.8	22.7
2002	16.7	34.1	-52.9	-2.5
2003	17.3	28.6	-51.1	-5.4
2004	15.7	17.2	-48.4	-16.1
2005	14.7	22.7	-45.5	-8.6

Source: Author's calculations based on Lane and Milesi-Ferretti (2006a).

Table 2: Decomposition of Net Foreign Asset Dynamics, 1996-2005

	NFA initial	D NFA	TB	INC	KA, EO	Growth	KG
1996	-36.2	-2.1	5.1	-3.0	-0.8	2.9	-6.4
1997	-38.3	15.3	5.3	-2.4	-1.6	-3.6	17.5
1998	-23.1	17.4	4.0	-2.2	-2.9	0.0	18.5
1999	-5.7	14.7	3.6	-1.2	-1.1	0.1	13.3
2000	9.1	-9.6	3.5	-0.8	-1.3	0.4	-11.4
2001	-0.5	23.3	4.2	-1.2	-4.3	-0.1	24.6
2002	22.7	-25.2	5.6	-0.3	-0.6	-2.1	-27.7
2003	-2.5	-2.9	7.3	0.2	-0.2	0.5	-10.7
2004	-5.4	-10.7	6.8	1.0	1.8	0.7	-21.0
2005	-16.1	7.4	6.4	0.2	-0.3	0.4	0.8
1996-2000	-36.2	35.7	22.7	-10.1	-8.0	-1.2	32.3
2001-2005	-0.5	-8.1	25.7	0.4	-1.8	0.2	-32.5

Source: Author's calculations based on Lane and Milesi-Ferretti (2006a).

Table 3: Rates of Capital Gain by Asset Category, 1996-2005

	Port Equity Assets	Port Equity Liabs.	FDI Assets	FDI Liabs	Port Debt Assets	Port Debt Liabs	Oth Debt Assets	Oth Debt Liabs	FX Reserves
1996	9.9	43.0	15.0	37.2	13.4	5.9	2.5	-0.3	9.4
1997	21.4	29.4	71.8	29.1	-12.1	2.2	-31.2	-66.3	5.2
1998	27.3	21.5	21.5	-10.6	6.7	13.4	-2.8	-14.4	2.5
1999	18.8	57.4	36.5	9.6	9.7	-0.3	-1.6	-5.6	-1.4
2000	1.1	-12.6	-11.8	0.1	16.9	24.5	1.2	0.5	9.4
2001	-6.1	-29.1	-3.8	-32.7	-2.4	8.0	-3.1	-5.8	13.1
2002	-25.5	-44.3	-40.8	-31.6	-3.9	-0.5	-1.7	-4.0	-2.6
2003	18.4	34.6	0.2	23.2	6.1	3.2	0.5	-2.8	-16.3
2004	11.7	26.9	9.4	43.3	11.5	11.0	4.1	3.0	8.6
2005	30.5	35.0	20.2	18.1	16.1	15.7	5.8	10.7	18.6

Note: Capital gain as a percentage of inherited position, expressed in domestic currency.

Source: Author's calculations based on Lane and Milesi-Ferretti (2006a).

Table 4: Correlation between Capital Gains Differential and the Exchange Rate

	1980-1995	1996-2005
Portfolio Equity	0.05	-0.52
FDI	-0.47	-0.76
Portfolio Debt	0.48	0.66
Other Debt	0.38	-0.26
Reserves	-0.05	-0.45

Note: Correlation between rate of change in real effective exchange rate and differential between rate of capital gains on foreign assets and foreign liabilities.

Table 5: Estimated Equation for Long-Run Real Exchange Rate

	(1) 1970- 2005	(2) 1980- 2005
Constant	2.55 (0.44)***	2.35 (0.74)***
Trade Balance	-1.41 (0.37)***	-1.79 (0.6)***
Terms of Trade	0.47 (0.1)***	0.52 (0.17)***
Adjusted $R^2$	0.6	0.45
ADF test	5.2***	4.3***

Note: DOLS(-1,1) estimation with Newey-West standard errors. ADF statistic to reject non-stationarity of residuals. First difference terms not reported. \*\*\*, \*\*, \* denote significance at 1, 5 and 10 percent levels.

Table 6: Estimated Equation for Long-Run Net Foreign Asset Position

	(1) 1980-2005
Relative GDP per capita	0.5 (2.4)
Relative Public Debt	-1.6 (0.52)***
$\alpha(\text{POP}<15)$	-0.33
$\alpha(\text{POP}>64)$	0.21
$\alpha_{max}$	0.46 (55-59)
$\alpha_{min}$	-0.46 (20-24)
Adj. $R^2$	0.89
Wald (Demog.)	35.0***
ADF test	5.45***

Note: DOLS(-1,1) estimation with Newey-West standard errors.  $\alpha$  coefficients on each population cohort (coefficients restricted to lie along a cubic function, as detailed in the appendix.) Wald  $\chi^2$  statistic for joint significance of the demographic variables. ADF statistic to reject non-stationarity of residuals. First difference terms not reported. \*\*\*, \*\*, \* denote significance at 1,5 and 10 percent levels.

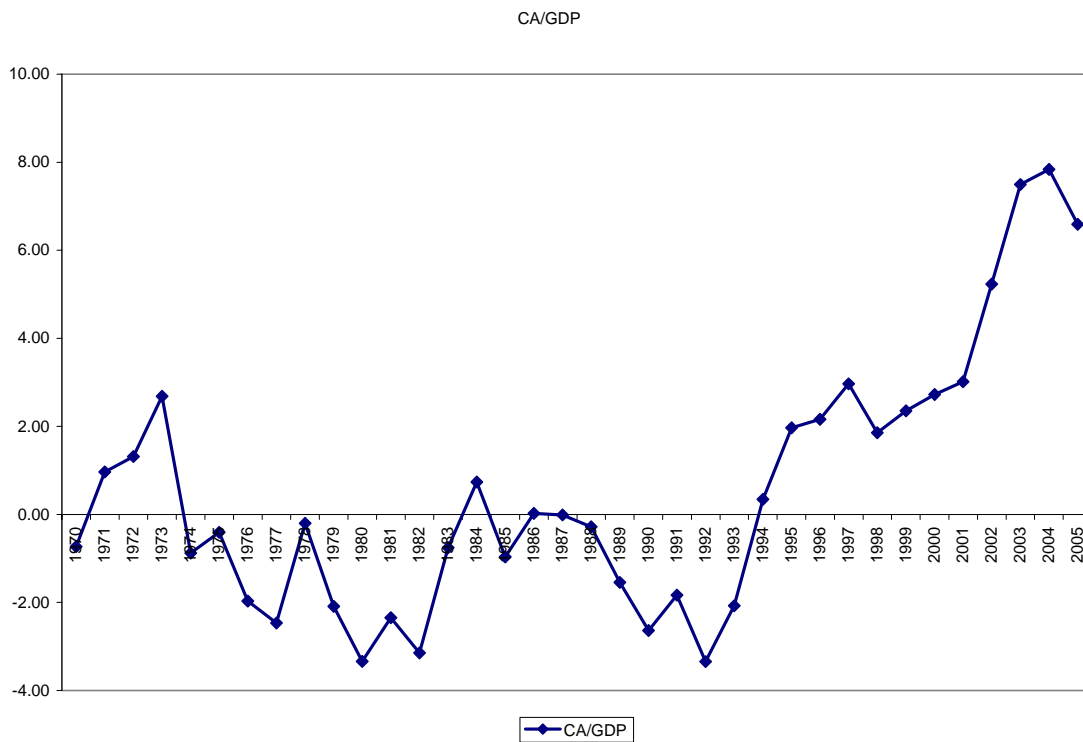


Figure 1: Current Account as a Ratio to GDP, 1970-2005.

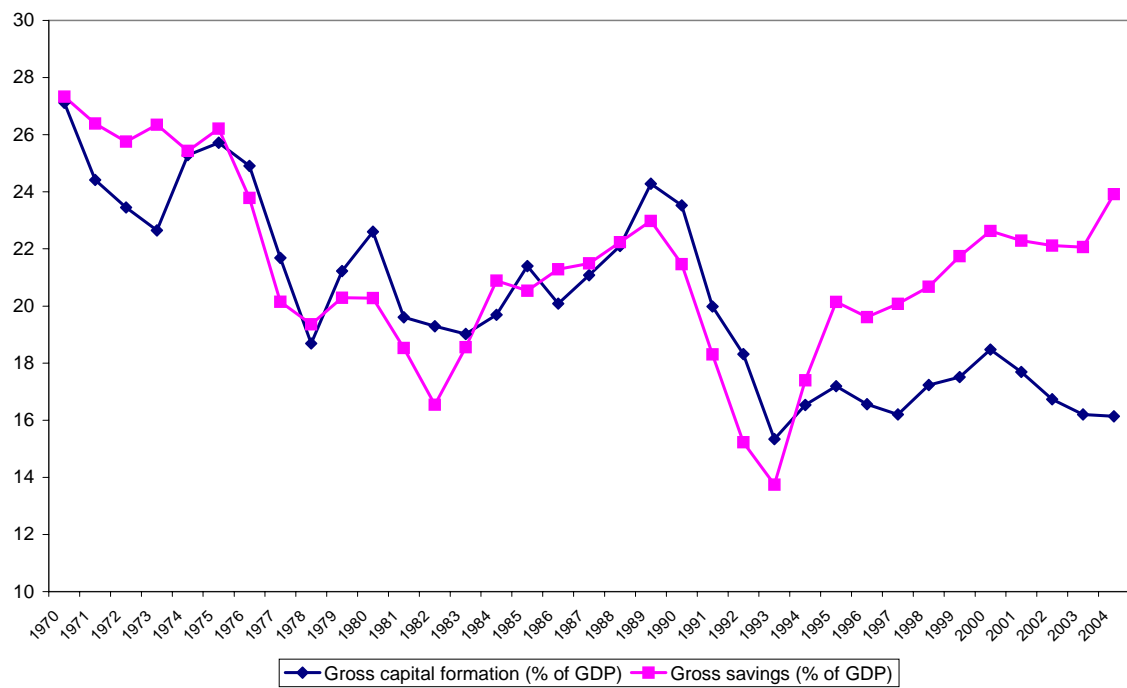


Figure 2: Savings and Investment Rates, 1970-2005.



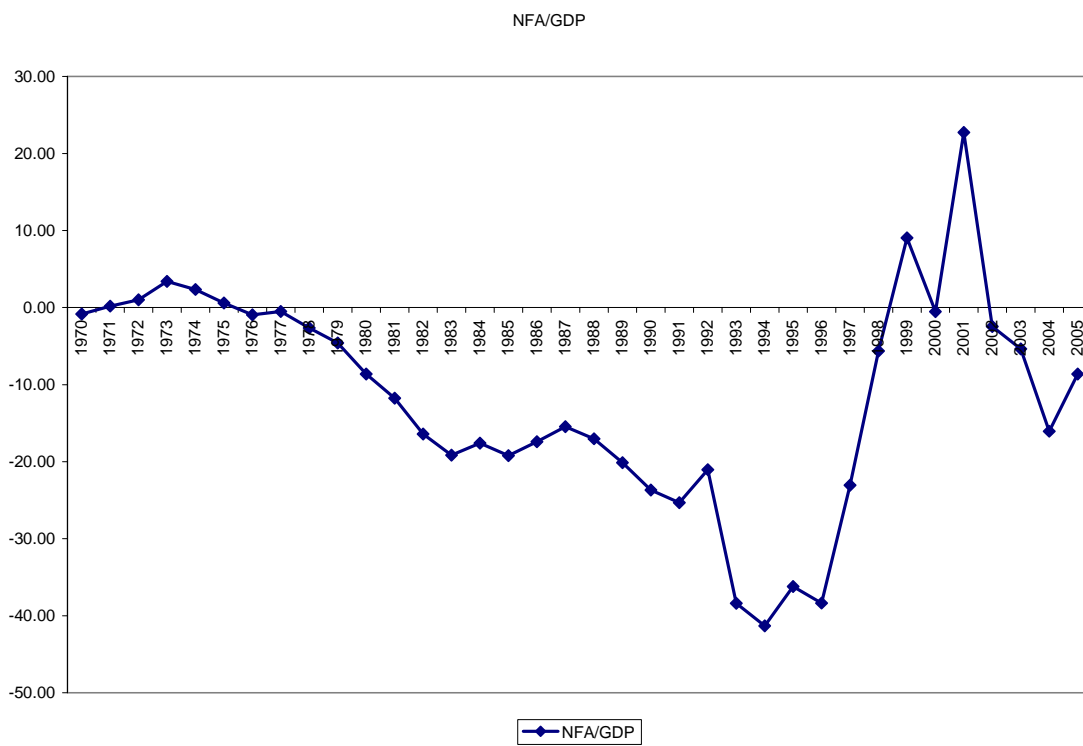


Figure 3: Net Foreign Asset Position, 1970-2005. Note: Expressed as a ratio to GDP. Source: Lane and Milesi-Ferretti (2006a).

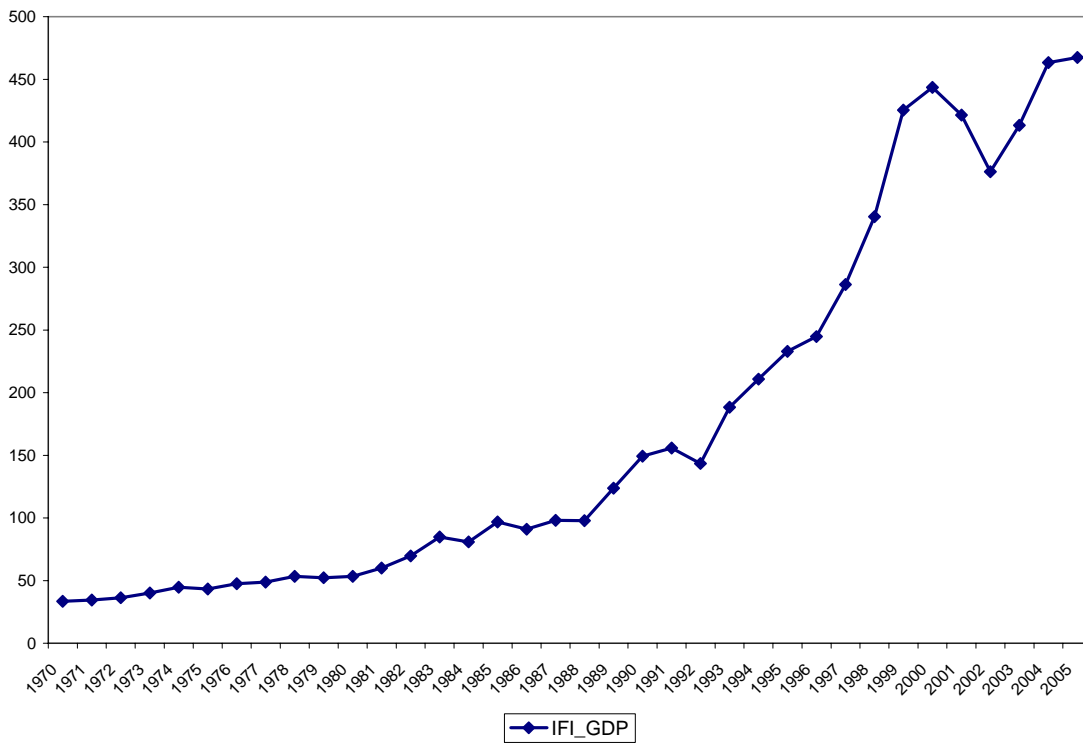


Figure 4: International Financial Integration, 1970-2005. Note: Ratio of foreign assets and liabilities to GDP. Source: Author's calculations based on Lane and Milesi-Ferretti (2006a).

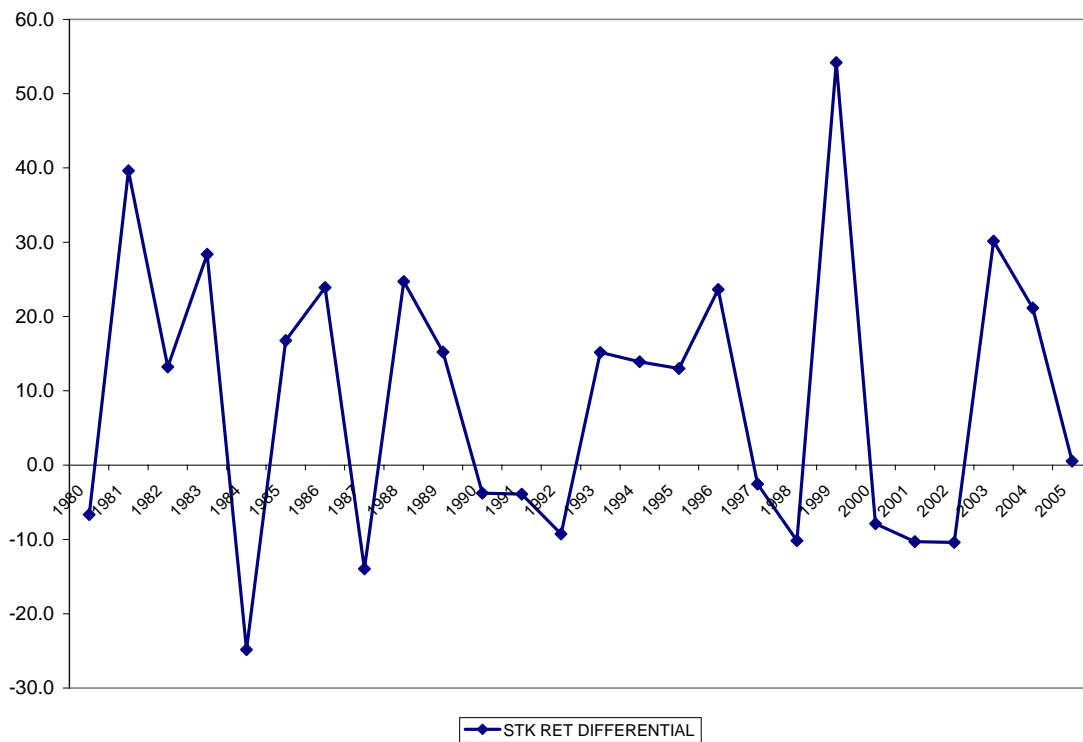


Figure 5: Capital Gain Differential between Swedish and Global Stockmarket Indices.

Source: Author's calculations based on MSCI data.

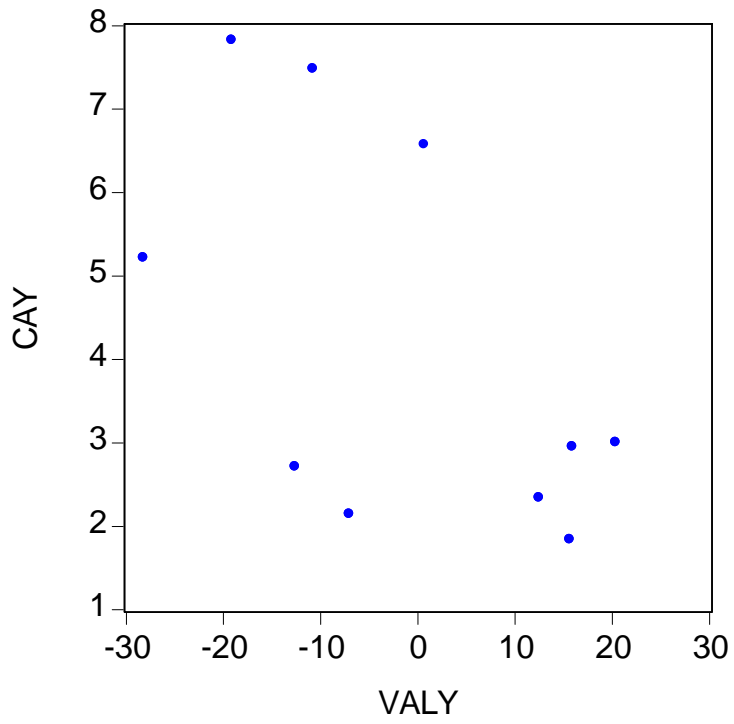


Figure 6: Scatter Plot of Current Account against Valuation Gain, 1996-2005. Note: Each is expressed as a ratio to GDP.

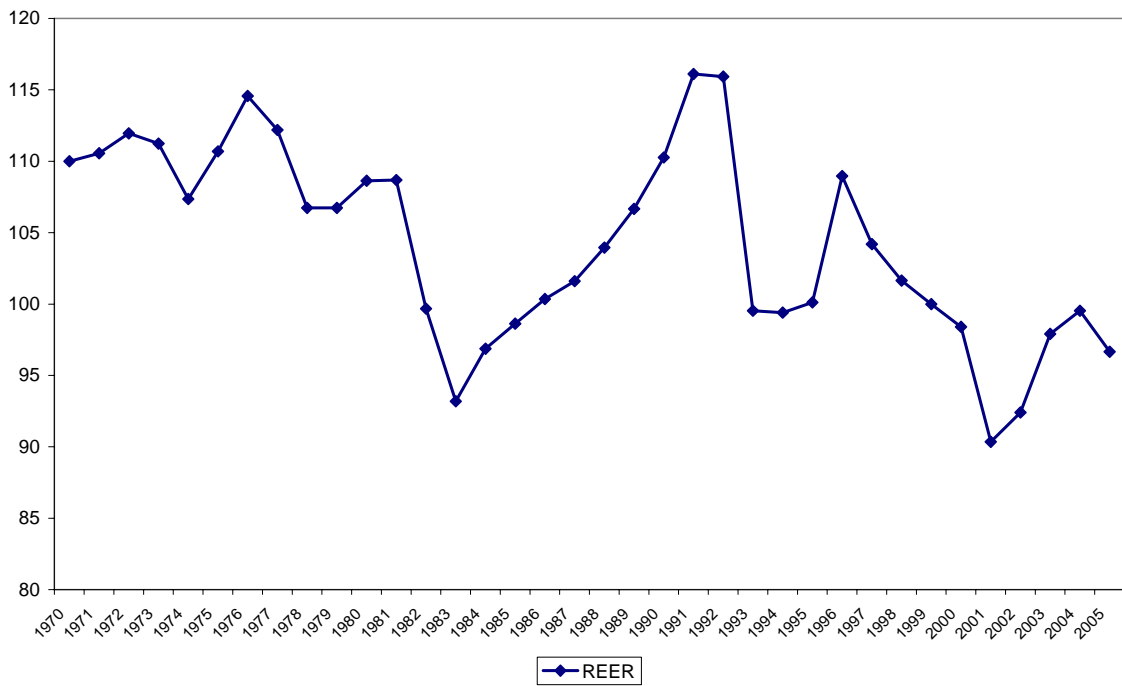


Figure 7: Real Exchange Rate, 1970-2005. Source: European Commission database.

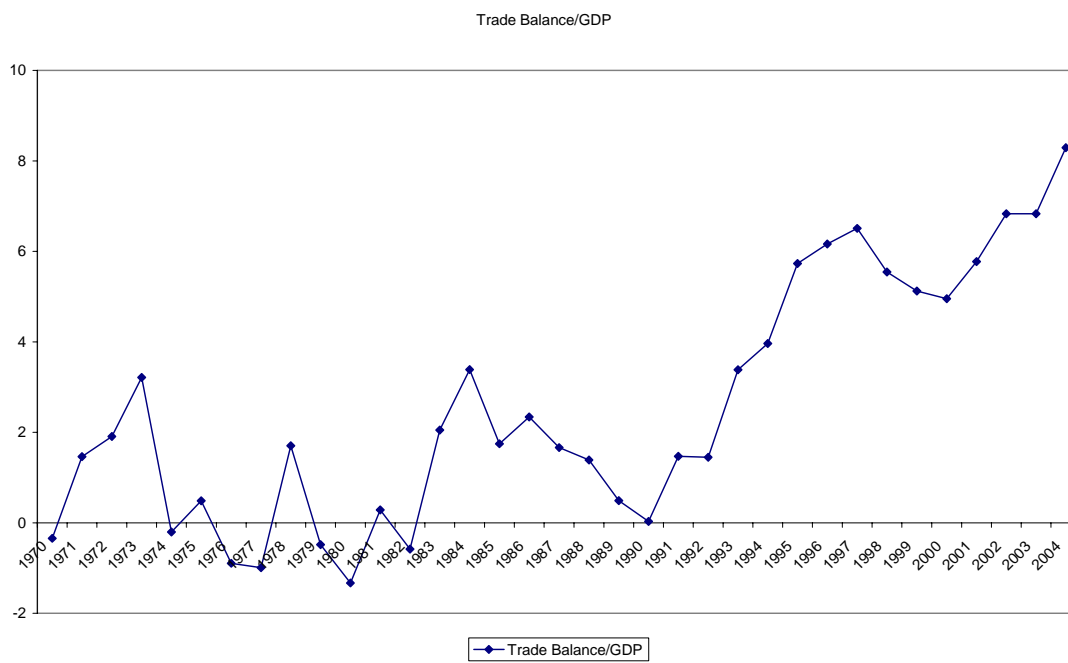


Figure 8: Trade Balance, 1970-2005. Source: IMF Balance of Payments Statistics.

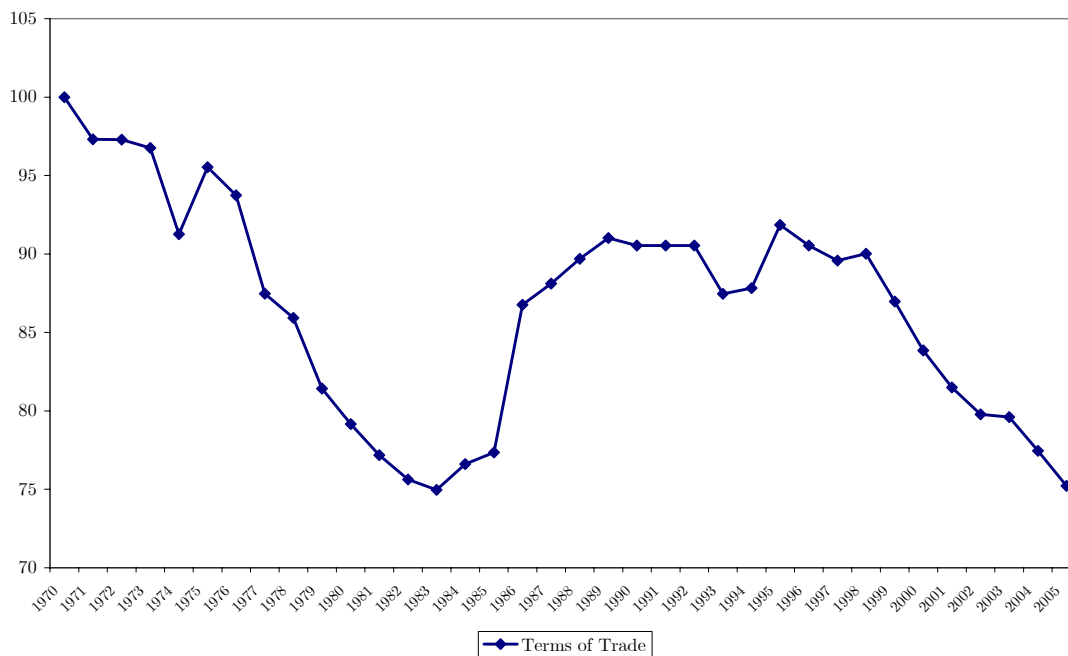


Figure 9: Terms of Trade, 1970-2005. Source: IMF's International Financial Statistics database.

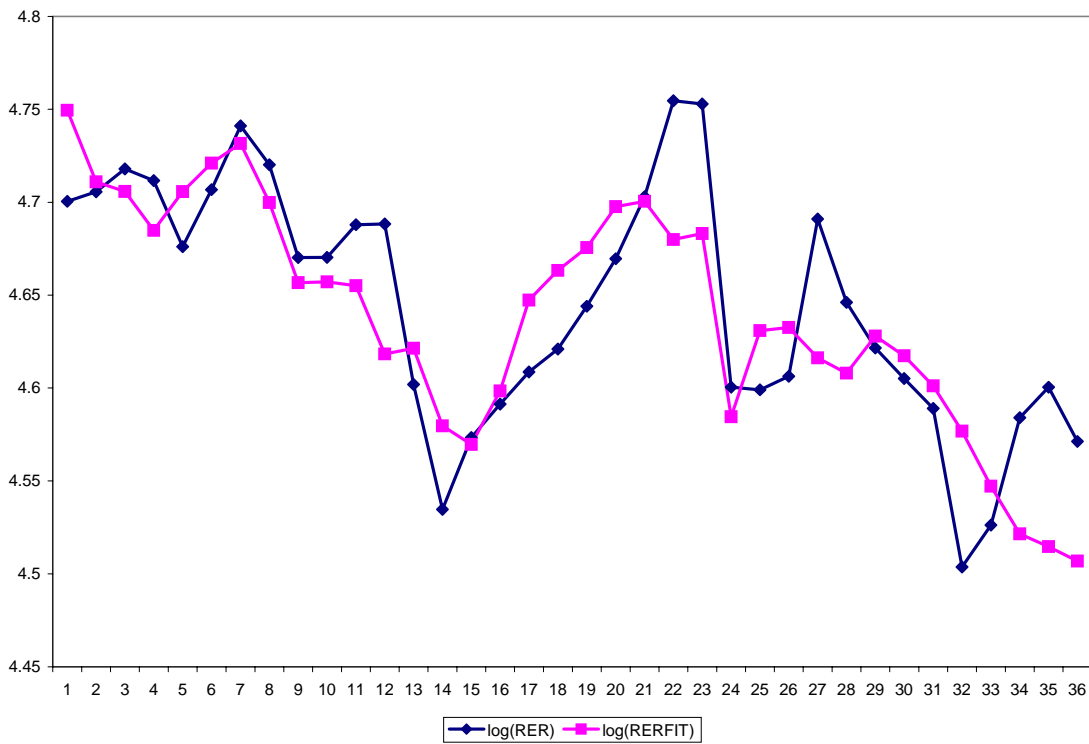


Figure 10: Real Exchange Rate: Actual and Fitted Values, 1970-2005.



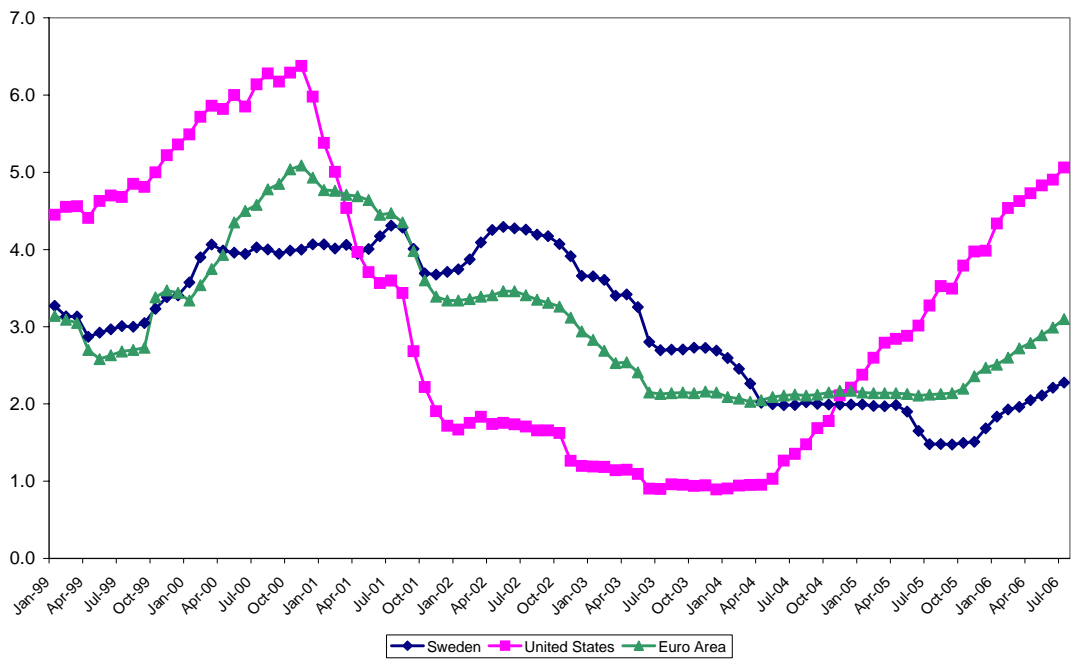


Figure 11: Short-term interest rates, 1999-2006. Source: Ecwin, European Central Bank.

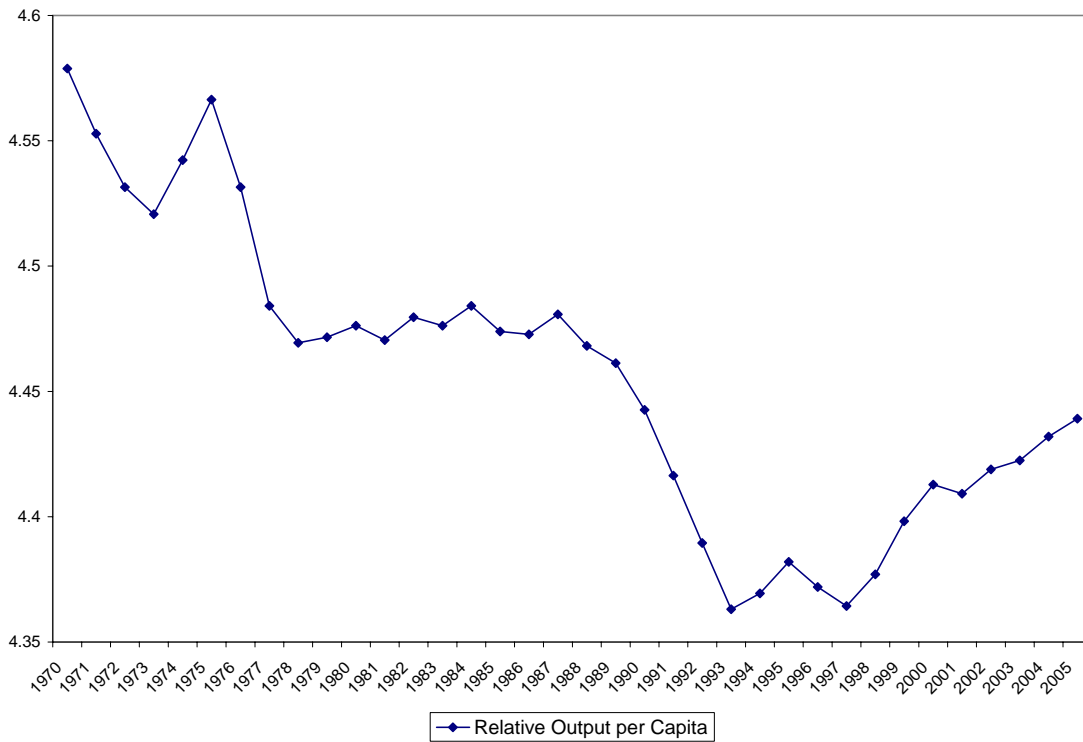


Figure 12: (Log) Relative Output per Capita, 1970-2005. Note: GDP per capita in Sweden relative to GDP per capita in trading partners.

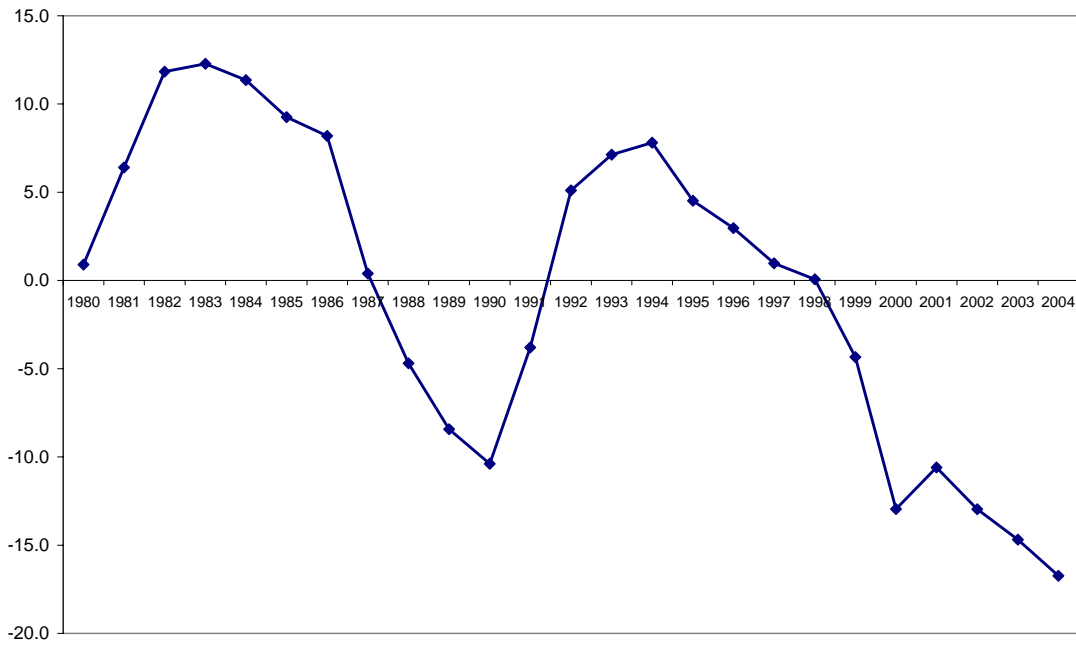


Figure 13: Relative Public Debt, 1980-2004.

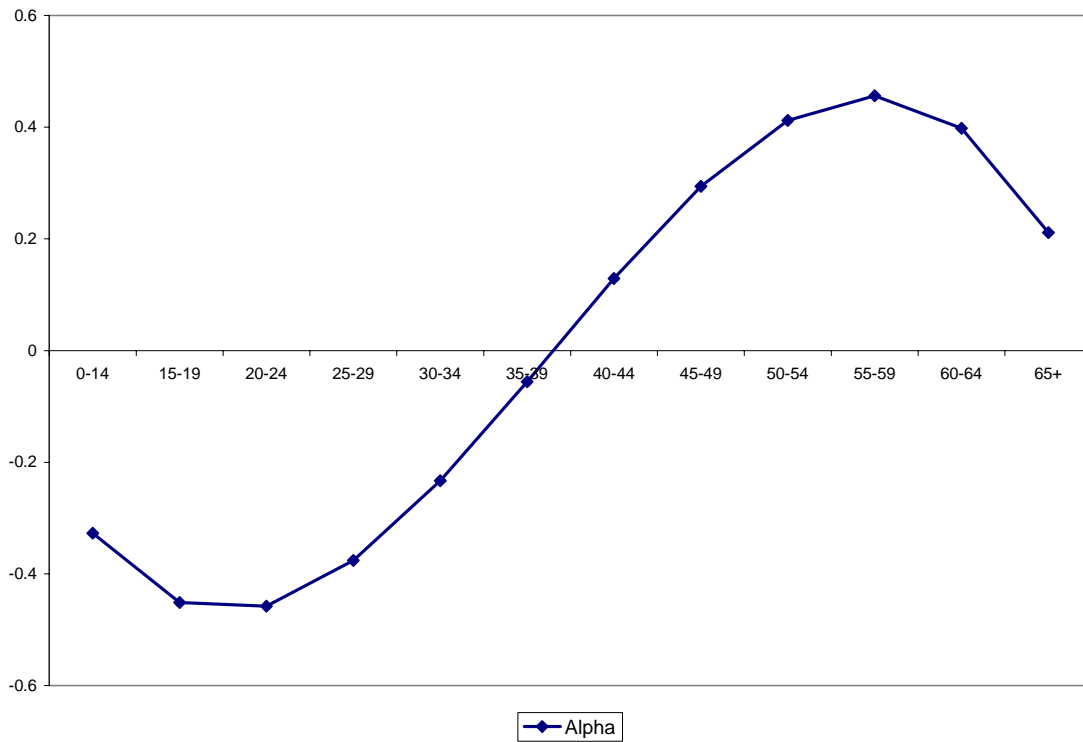


Figure 14: Sensitivity of Net Foreign Asset Position to Demographic Structure. Note: Plot of estimated  $\alpha$  coefficients for each age cohort.

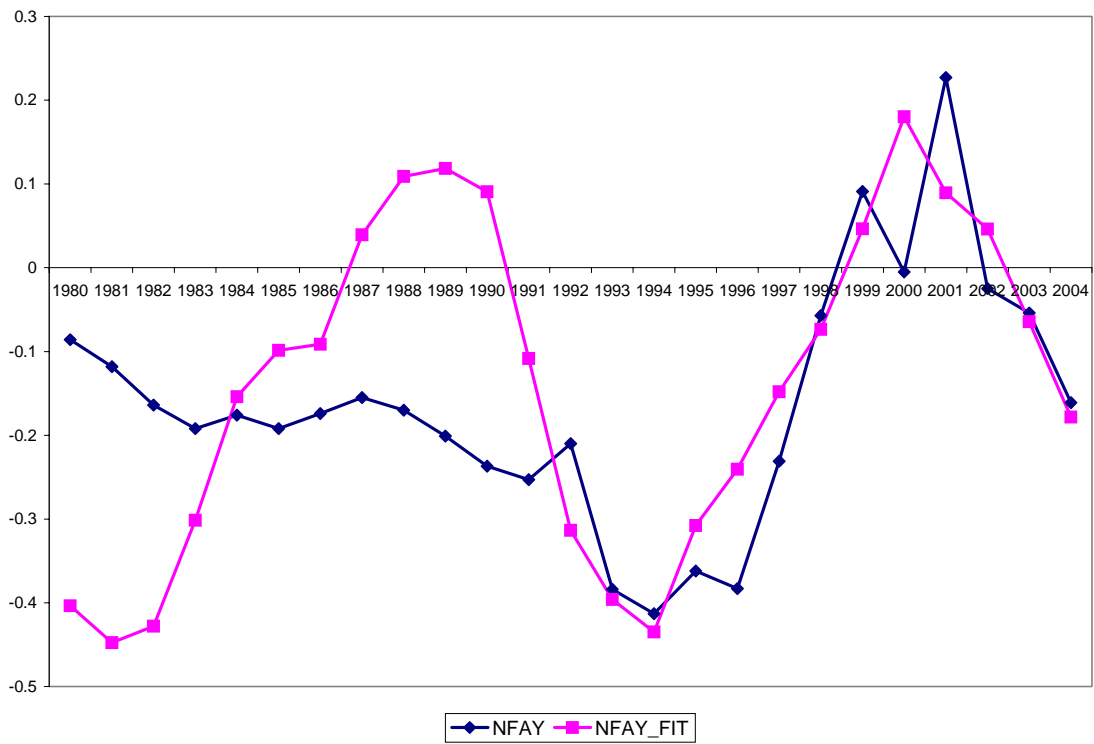


Figure 15: Actual and Fitted Values of Net Foreign Asset Position, 1980-2004.

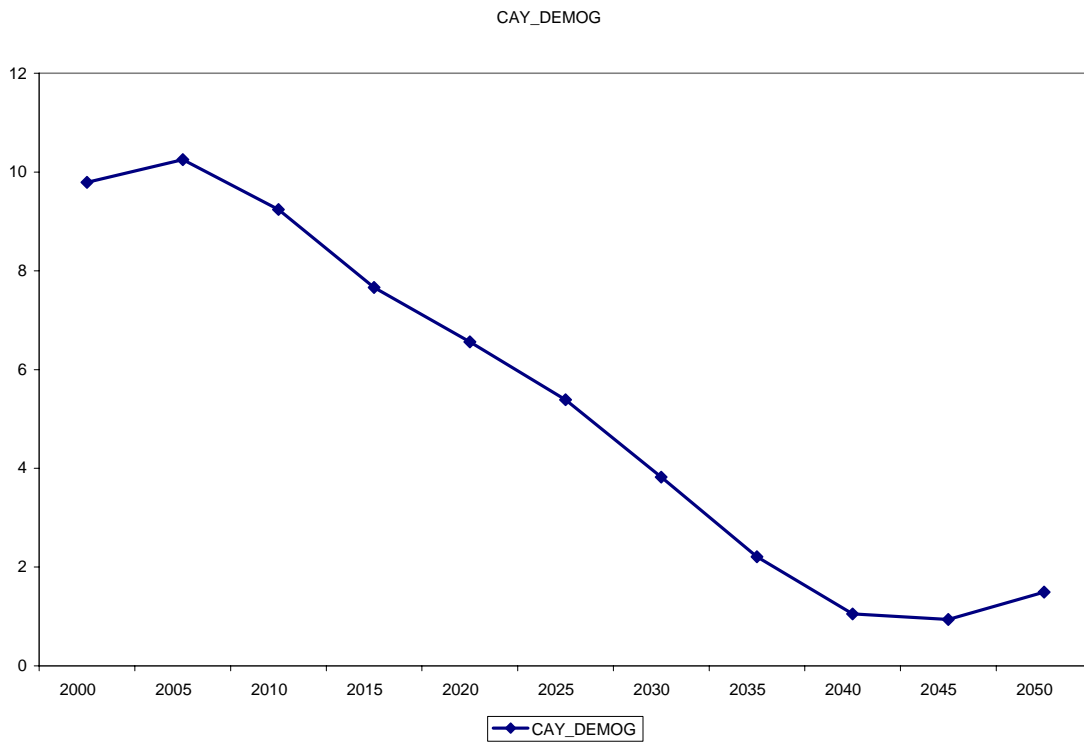


Figure 16: Projected Current Account Balance. Source: Domeij and Floden (2006).

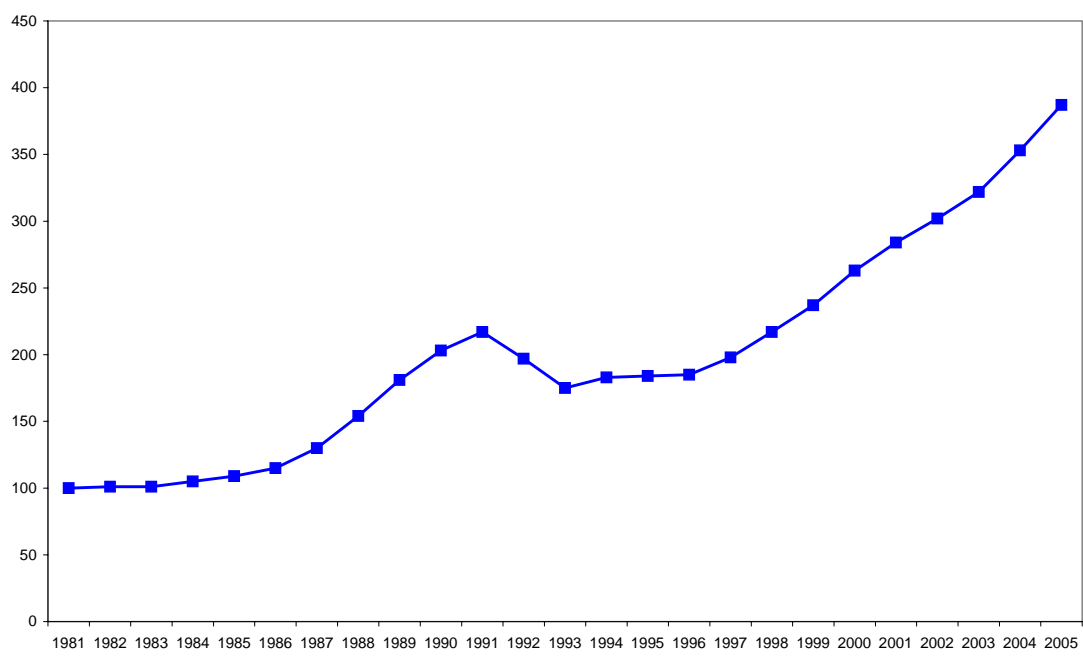


Figure 17: Housing Price Index, 1981-2005. Source: Statistics Sweden.

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