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The Growing Financial Exposure of a Small Open Economy

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**Why Are Switzerland's Foreign Assets so Low?  
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**Abstract**

Switzerland's international investment position shows a puzzling feature since 1999: Large and persistent current account surpluses have failed to boost the value of Swiss foreign assets. In this paper, we link this pattern to the substantial increase in the leveraging of Switzerland's international assets and liabilities over the last twenty years, which we document in detail. We estimate the impact of exchange rate and asset prices movements on Swiss net foreign assets, and show that they led to substantial valuations losses since 1999, accounting for between one-quarter and one-half of the gap between the net foreign assets and cumulated current account flows. We show how these adverse valuation effects have erased Switzerland's advantage in terms of the yield on its net foreign asset position.

Key words: international leverage, valuation effect, external position

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## 1. Introduction

Switzerland is a standard example of a small open economy highly integrated with the rest of the world, both in terms of trade and financial flows.<sup>1</sup> In particular Switzerland stands out as a sizable creditor to other countries, with its net international investment position amounting to 114% of GDP at the end of 2005, a value well above that of other countries (Lane and Milesi-Ferretti 2006a).<sup>2</sup>

Against this background the title of this paper may appear misplaced, yet a closer examination reveals that Switzerland's net international investment position is surprisingly low for a country that has ran large and persistent current account surpluses. The Swiss net international investment position has gradually increased since 1985 to peak at 128% of GDP in 1999, followed by a narrowing to 114% of GDP in 2005 (Figure 1, solid line). The reduction in recent years is striking given current account surpluses that averaged 12% of GDP since 1999. One would expect these high savings by Swiss residents to have fed a steady increase in the net international investment position: cumulating net financial flows since 1985 leads to a net position of 203% of GDP in 2005 (Figure 1, dotted line). The gap between the actual net investment position and the sum of financial flows has been especially wide since 1999: over the last six years Switzerland invested CHF 357 billion in to the rest of the world, yet its net investment position improved by a mere CHF 9 billion, leaving a discrepancy equivalent to 76% of GDP.<sup>3</sup>

This paper shows how this discrepancy reflects the growing leverage between Switzerland's international assets and liabilities. We first document the composition of external assets and liabilities, with an emphasis on the currency exposure.<sup>4</sup> We then estimate the impact of exchange rates and asset prices fluctuations on Switzerland's net

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<sup>1</sup> In 2005 exports and imports totaled 69% of GDP, while financial flows in and out of Switzerland added up to 67% of GDP.

<sup>2</sup> Among European countries only Luxembourg holds a larger net asset position.

<sup>3</sup> While net capital outflows from Switzerland tend to be higher than the current account surplus, this issue does not invalidate our point. Since 1999 the current account surpluses totaled CHF 316 billion, still well above the increase in the net international investment position.

<sup>4</sup> The international relevance of valuation effects for the dynamics of a country net international position is documented in a growing body of literature (Gourinchas and Rey 2007, Lane and Milesi-Ferretti, 2006a,b, Tille 2003).

international investment position, focusing on the developments since 1999.<sup>5</sup> Our final step adds valuation gains and losses from exchange rates and asset prices movements to the dividend and interest income to assess the overall return on Switzerland's external assets and liabilities.<sup>6</sup>

Three main results emerge. First, the leverage of the Swiss external position has grown dramatically. At the end of 2005 gross assets and liabilities totaled about 10 times of GDP, a number three times as large as twenty years ago. By contrast the net international investment position increased by only a third during the period. Second, fluctuations in exchange rates and asset prices have led to substantial valuation losses over the period 1999–2004, equivalent to between 14 and 43% of GDP, depending on whether FDI is estimated at book or market value. Our analysis therefore points to valuation losses as being a sizable factor behind the discrepancy between the large current account surpluses and the stable net international investment position. Nonetheless, they only offer a partial explanation, accounting for between 27 and 58% percent of the discrepancy. The residual is driven primarily by valuation changes on equity liabilities in the early 2000's that we cannot attribute to asset prices. Third, while Switzerland earns a higher dividend and interest yield on its assets than it pays on its liabilities, this advantage disappears once capital gains and losses are taken into account.

The rest of the paper is organized as follows. Section 2 describes the external position of Switzerland in terms of the various categories of assets, and its currency exposure. Section 3 estimates the impact of exchange rates and asset price movements on the international investment position. Section 4 analyzes the yields and returns on Switzerland's external assets and liabilities and section 5 concludes.

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<sup>5</sup> Other contributions have looked at Switzerland external assets and liabilities. Lane and Milesi-Ferretti (2006a,b) find large valuation losses for Switzerland and attribute them to adverse movements in asset prices. As their work covers a broad range of countries, they focus on the impact on average indices of exchange rates and asset prices. By contrast, we compute detailed estimates of the impact of exchange rates and asset prices on the various components of the balance sheet. We also compute estimate of foreign direct investment holdings at market value to complement the official data at book values. Schmidt (2006) also points to the gap documented in Figure 1. Her analysis does not look into the components of the gap, and instead focuses on the implications for the Swiss terms-of-trade.

<sup>6</sup> On the determinants of the low yields on Swiss assets see Kugler and Weder (2007, 2004).

## 2. Leverage in Switzerland's external position

This section documents the leverage in Switzerland's international assets and liabilities. We briefly describe the data, present the detailed composition of Swiss external holdings and document the increase in international leverage, both in terms of holdings categories and in terms of currencies. The exposure of the net international investment position to exchange rate fluctuations is illustrated by constructing an asset-weighted exchange rate that complements the usual trade-weighted measure.

### 2.1. Description of the data

The Swiss National Bank Statistics (2006a,b) are the primary source of data.<sup>7</sup> The value of assets and liabilities at the end of the year is available from 1985 to 2005, and is broken down between foreign direct investment (hereinafter FDI), portfolio equity, portfolio debt, other (essentially banking positions) and official reserves. All data are at market value, with the exception of FDI, which is at book value. In addition to the total value for each category, a breakdown across currencies is available. Specifically, the value of positions denominated in Swiss francs and US dollars is available for the entire sample. Until 1998, the positions denominated in Deutsche marks are also included, while from 1999 onward the data show the positions denominated in euros, pounds and yens.

The data on holdings at the end of the year are completed with the corresponding annual financial flows from the balance of payments,<sup>8</sup> as well as the receipts and payments flows on assets and liabilities in the balance of payments.<sup>9</sup> The data for exchange rates are from the Swiss National Bank website (for the euro, dollar, Deutsche mark, yen and pound) and Datastream (for other currencies). Stock price indexes and

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<sup>7</sup> Data are available online at [www.snb.ch](http://www.snb.ch) under the monthly statistics bulletin.

<sup>8</sup> The positions for the "other" categories do not include the stock of precious metals, and the financial flows are adjusted accordingly by removing the exports and imports of precious metals. Until 1999, the financial flows for reserve assets are taken as the change in holdings minus the valuation change in assets in the Swiss National Bank data.

<sup>9</sup> As the receipts and payments do not distinguish between portfolio equity and debt instruments, we aggregate these categories for our computations of yields and rates of return.

bond price indexes are Datastream indexes. All exchange rates and prices are measured as December values.

## *2.2. The increase in leverage: overall assets and liabilities*

Switzerland's external position has become increasingly leveraged in the last ten years. Figure 2 shows the value of gross external assets (claims by Swiss residents on foreign entities, solid line), gross liabilities (claims by foreign residents on Swiss entities, dotted line) and the net international investment position (assets minus liabilities, thick line). Over the last twenty years, the value of both gross assets and liabilities tripled, with gross positions adding up to 1,047% of GDP at the end of 2005. The magnitude of this change dwarfs that of the net position, which only increased by a third over the period.

The increase in leverage displays substantial heterogeneity across the various categories of assets and liabilities. Figure 3 corresponds to Figure 2 for various categories of holdings, namely FDI, portfolio equity, portfolio debt and other.<sup>10</sup> The leverage between assets and liabilities is concentrated in portfolio equity and other holdings, while FDI and portfolio debt holdings show much less leverage with net assets relatively close to gross assets. The presence of large gross offsetting banking positions (in other) reflects the nature of Switzerland as a financial center, and echoes the pattern documented by Gourinchas and Rey (2007) for the United Kingdom. Moreover, the net asset position in FDI associated with the net liability position in portfolio equity owes partly to the presence of big multinational companies in Switzerland, which hold substantial stakes in firms abroad and whose own scattered shareholder's base is predominantly foreign.

## *2.3. The increase in leverage: currency exposure*

Leverage has also increased in terms of the currency composition of assets and liabilities. Figure 4 depicts the value of assets denominated in foreign currencies (solid

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<sup>10</sup> Official reserves consist only of gross assets and are not presented for brevity. The shares of the various categories in gross assets and liabilities are presented in the Appendix figures A.1 and A.2.

line),<sup>11</sup> liabilities denominated in Swiss francs (dotted line) and the net international investment position (thick line). The figure shows a sizable leverage with a large value of net assets denominated in foreign currencies offset by large net liabilities in Swiss francs, with both positions adding up to 465% of GDP at the end of 2005.<sup>12</sup> The leverage in terms of currencies has substantially increased, with the sum of assets and liabilities more than quintupling over the last twenty years. Until 1990, the overall position was entirely one-sided with only foreign currency assets. A closer look at net assets in foreign currencies shows a prominent role for in FDI (125% of GDP, Figure 5), portfolio equity (69%) and portfolio debt (68%).

The increase in Switzerland's holdings denominated in foreign currencies has been accompanied by a gradual shift in their composition until the late 1990s (Figure 6). While the US dollar accounted for half the holdings of foreign currencies twenty years ago, its share decreased to a third by 1997 and has remained stable since. The data do not indicate which currencies replaced the dollar, with half the holdings in 1999 being outside the dollar and Deutsche mark. The data possibly provide us with a lower bound on the role of the two currencies, as only holdings in the United States and Germany are taken to be in dollars and Deutsche marks respectively. The declining share of the dollar could reflect a shift towards financial centers, such as Luxembourg and Caribbean countries. While these centers have their own currencies, their exchange rates vis-à-vis the Deutsche mark and the dollar, respectively, have historically been very stable (Tille 2005). From a point of view of currency exposure, the effective shares of the two currencies may therefore be larger than presented in Figure 6. Since 1999, the data offer a more comprehensive breakdown and show a stable composition. The euro accounts for more than one-third of holdings, putting it on par with the dollar. The yen and pound jointly account for 17%, leaving 16% to other currencies.

The higher leverage between assets in foreign currencies and liabilities in Swiss franc implies that the Swiss international position is now more exposed to exchange rate fluctuations than in the past. For instance, a depreciation of the Swiss franc generates a

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<sup>11</sup> The assets in foreign currencies are a net measure, consisting of the foreign currencies positions in Swiss assets minus the foreign currencies positions in Swiss liabilities. Holdings in Swiss francs are computed similarly.

<sup>12</sup> The overall net position also includes assets in precious metals (5% of GDP).

capital gain by boosting the Swiss franc value of a given holding in foreign currency. Table 1 illustrates this aspect by showing how a depreciation of 10% affects the various holdings (in percent of GDP), contrasting the situation in 1995 and in 2005. Three points emerge from Table 1. First, the exposure has increased substantially, with a broad 10%-depreciation now translating into a valuation gain of 28.7% of GDP, an exposure twice as large as ten years ago. Second, the exposure has evolved differently across assets categories. It is concentrated in FDI and portfolio holdings, for which it more than doubled. In contrast, the exposure for other holdings and reserves has remained steady at a low level. Third, the exposure is dominated by the euro and the dollar, with a 10%-depreciation against these currencies leading to gains of 8.9 and 10.3% of GDP respectively.<sup>13</sup>

#### *2.4. Contrasting Switzerland's trade and financial exposure*

The external exposure of a country is most often summarized through trade-weighted measures, such as the effective exchange rate index, where each foreign country receives a weight that reflects its role as a trading partner. Our analysis offers a complementary asset-weighted metric, where the weights reflect the share of the various countries' currencies in foreign currency assets.<sup>14</sup> This alternative measure paints a picture of Switzerland's external exposure that substantially differs from the usual one. Figure 7 contrasts the shares of various currencies in Switzerland's foreign currency holdings (horizontal axis)<sup>15</sup> with the weights of the corresponding regions in the Swiss National Bank trade-weighted exchange rate index (vertical axis, from Fluri and Müller 2001). A point located below the 45 degree line indicates that the corresponding region plays a larger role as a financial partner than as a trading partner for Switzerland, in the sense that it accounts for a larger share of Swiss foreign currency assets than of Swiss exports.

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<sup>13</sup> Our estimate of exposure against the dollar is larger than in Lane and Milesi-Ferretti (2006a) who report an exposure of 6.8% of GDP at the end of 2004. The gap likely reflects the fact that their estimates are not computed from the currency breakdown estimates of the Swiss National Bank.

<sup>14</sup> The asset-weighted measure is constructed by the authors and should not be taken as official data from the Swiss National Bank.

<sup>15</sup> Specifically we take the 1999–2005 averages of the shares shown in Figure 6.

The United States play a substantially larger role as a financial partner. It accounts for 31% of Switzerland's foreign net assets, a weight twice as large as its share in Swiss exports. The opposite pattern is observed for the euro area, which accounts for 38% of foreign currency assets, despite being the destination of 62% of exports. The financial shares for Japan and the United Kingdom are in line with their trade shares. Other regions play a larger role as financial partners, likely due to the presence of financial centers among them.

The shares of the various currencies in Switzerland's foreign currency assets can be used to compute asset-weighted exchange rate that complements the trade-weighted measure of the Swiss National Bank. We construct such an estimate since 1999, with more details provided in Appendix A. The asset-weighted exchange rate shows larger movements, both in terms of trend and in terms of short-run volatility. Between December 1999 and December 2005 the Swiss franc appreciated by more on an asset-weighted basis (13.0%, Figure 8 and Table 2) than on a trade-weighted basis (9.8%), primarily due to the large movements against the dollar and the smaller movement against the euro. The asset-weighted exchange rate was also more volatile with a monthly standard deviation of 1.2 percentage points, against 0.9 for the trade-weighted exchange rate.

### **3. The drivers of Switzerland's net international investment position**

This section presents a detailed estimate of the factors driving the value of Switzerland's external assets and liabilities. We first document the gap between cumulated capital flows and the positions across categories. We then estimate the contribution of movements in exchange rate and asset prices to this gap. In doing this, we present an estimate of FDI positions at market value, complementing the official figures at book value.

### *3.1. A detailed characterization of the position-flows gap*

As pointed in Figure 1, the net international position of Switzerland shows a sizable gap from cumulated net financial flows. A closer look at the various categories of assets and liabilities shows a contrasted picture. Figure 9 displays the actual positions (solid line) and the cumulative financial flows (dotted line) for the various categories, both in terms of gross assets and liabilities and in terms of net positions.

FDI holdings are very close to the cumulative flows for gross assets and in net terms. While there is a gap for gross liabilities, the FDI position is substantially one-sided and this gap has a minimal impact on the net position. The close linkage is to be expected as FDI positions are evaluated at book value, and therefore do not reflect asset prices, a point to which we come back below.

Portfolio equity holdings, by contrast, show a large gap both for gross assets and liabilities. Simply cumulating capital flows leads to a very large underestimation of the current positions. The effect remains sizable in net terms, where the cumulated capital flows would lead to the mistaken inference of Switzerland being a net creditor. The resulting gap in net terms of 66% of GDP in 2005 represents the bulk of the total gap.

Turning to portfolio debt holdings, the cumulative flows are close to the actual positions, with a gap emerging only in recent years for gross liabilities. Interestingly the gap works in opposite directions on the two sides of the balance sheet, with cumulating flows leading to an overestimation of assets and an underestimation of liabilities.

In terms of other holdings, cumulating financial flows track gross assets and liabilities fairly closely. Nonetheless, the slight underestimation for liabilities leads to a sizable overestimation in net terms, due to the high degree of leverage in this category.

The reserve assets, not shown for brevity, closely match the cumulative flows until 1999, with a larger gap in subsequent years.

### *3.2. The dynamics of external assets and liabilities: concepts and method*

The value of international assets and liabilities is affected by several factors. The first factor is financial flows, with a current account surplus adding to a country's net

foreign assets. The second reflects the valuation effect from exchange rate movements, with an appreciation of the Swiss franc reducing the value, in Swiss francs, of a given position in foreign currency. Fluctuations in asset prices are the third factor, with a contraction in asset prices abroad reducing the value of Swiss residents' holdings of foreign securities. Similarly, an increase in asset prices in Switzerland boosts the value of foreign investors' claims, leading to a valuation loss for Switzerland. Finally, so-called other valuation effect captures the change in positions due to statistical adjustments, such as the broadening of the sample of firms covered in the FDI statistics in 2004.

The official data on the international investment position of Switzerland do not include a decomposition of the change of the position between consecutive years across the various factors described above.<sup>16</sup> We therefore construct estimates of the various valuation effects. It is important to bear in mind that our measures are estimates and do not constitute official data from the Swiss National Bank. More details on our estimation method are presented in Appendix B.

We estimate the impact of exchange rate movements by combining the positions in the various currencies with the changes in the corresponding exchange rates.<sup>17</sup> We only compute the estimates for positions where the currency is known. Our estimates therefore do not encompass the valuation impact from exchange rate movements in the other currencies. Moreover, our analysis assumes that positions denominated in foreign currencies are not hedged for exchange rate risk through derivative instruments. The presence of any hedging between Swiss and foreign residents would reduce the magnitude of the exchange rate valuation effect, but the data do not allow for an assessment of this dimension.

The valuation effect from fluctuations in asset prices is estimated using equity price indexes for portfolio equity holdings, and bond price indexes for portfolio debt holdings and reserves. No adjustment is undertaken for other (mostly banking) holdings. The indexes used reflect the currency composition of the positions, with portfolio equity assets in dollar adjusted using the US equity price index for instance. The price indexes used are Datastream market-wide indexes. Our approach therefore assumes that for

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<sup>16</sup> By contrast, such a decomposition is published by the Bureau of Economic Analysis for the United States.

<sup>17</sup> All exchange rates are measured in terms of Swiss francs per unit of foreign currency.

instance the allocation of Swiss investors' equity holdings in the United States reflects the sectoral composition of the US stock market index. This aggregate approach can lead to estimation errors if Swiss investors are more or less exposed to outperforming sectors than the market as a whole. As for the exchange rate valuation, we do not compute estimates for the positions in "other" currencies.

We compute an exchange rate valuation effect for the FDI positions at book value, but no asset price valuation as these holdings are not estimated at market value. As discussed in section 3.3 below, we therefore extend the data by computing estimates of FDI holdings at market value.

Our method allows us to split the change in a particular position from one year to the next between financial flows, exchange rate valuation, asset price valuation, and other valuation. As the later is computed as a residual, it includes statistical adjustments, the exchange rate and asset valuation components for the positions in the "other" currencies, for which the exact currency is unknown, as well as estimation errors and statistical adjustments.

### *3.3. Foreign direct investment: estimates of market value*

A limitation of the available data is that FDI holdings are not evaluated at market value, unlike the other categories. We thus add to the existing data by constructing estimates of FDI positions at market values relying on a geographical breakdown of the FDI holdings and financial flows, with the method detailed in Appendix C. We take the positions at the end of 1985 at their book value from the Swiss National Bank data. The exchange rate valuation effect is computed by applying the percentage change in the relevant exchange rates between December 1985 and December 1986 to this position. Similarly, we compute an asset price valuation effect using equity price indices.

A well-recognized issue in constructing such estimates is the treatment of reinvested earnings (Gourinchas and Rey 2006). These earnings are included in financial flows for FDI, but are also reflected in asset prices, leading to a problem of double-counting. We address this by removing them from the asset price valuation component.

The positions for the various countries at the end of 1986 are computed by adding the exchange rate and asset price valuation effects and the financial flows (including reinvested earnings). The procedure is then iterated year-by-year until 2005. Notice that our method makes no use of the FDI positions at book value beyond taking them as the starting values for 1985.

While our estimates of FDI holdings at market values are a useful complement to the official positions at book value, it is important to bear in mind that they are computed based on assumptions about the currency composition of holdings, as detailed in Appendix C, and should therefore be treated with more caution than official data.<sup>18</sup>

Our estimated of FDI positions at market values are presented in Figure 10 both in terms of the net position (top panel), and in terms of gross assets and liabilities (bottom panels). Each panel shows our estimate at market value (thick line), the official position at book value (thin line) and the cumulated financial flows (dotted line). The main difference from the estimates at book values is a surge in value in the late 1990's due to higher asset prices, followed by a sharp drop as equity markets weakened worldwide. The pickup in equity prices since 2002 is reflected in a renewed increased in positions at market value. In net terms FDI assets exceed the book value data in the late 1990's, but have since shifted down to similar levels.

The higher net position at market value in the late 1990's affects clearly the overall position. Figure 11 corresponds to Figure 1 with an additional line showing the net international position with FDI at market value, and shows that the position at market value broadly follows the book value, except for the late 1990's. This reinforces the puzzling pattern since 1999 as the position fell by 55 percentage points of GDP when FDI is computed at market value, compared to a reduction by 14 percentage points when we rely on positions at book value.

While our estimates do not constitute official data, they paint a reasonable picture. In order to assess the plausibility of our estimates, we first compare the overall valuation components in FDI positions with the ones for portfolio equity, the later being simply the difference between the changes in positions and financial flows. As equity and

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<sup>18</sup> Another approach is to combine earning streams and price-earning ratios, as done by Blomberg and Falk (2006) for Sweden. Given the marked fluctuations in price-earnings ratios, we opted for our method in order to limit the volatility of the estimates.

FDI positions both entail claims on profits, we expect that they would be affected by exchange rate and asset price movements in broadly similar way. The valuation effects are indeed very close both for gross assets (Figure 12, top panel) and gross liabilities (bottom panel),<sup>19</sup> with correlation in excess of 0.9 between FDI and equity. As an additional check, we compute the ratio between the positions at market value and the position at book value, and compare it the corresponding ratios for the United States where the Bureau of Economic Analysis publishes FDI positions at both market value and current cost. The ratios for Switzerland are comparable to the values for the US, both in terms of magnitude and in terms of dynamics (Figure 13), with correlations of 0.9.

#### *3.4. The dynamics of valuation effects*

The decomposition of the dynamics of Switzerland's international assets and liabilities since 1985 is presented in Figure 14 (with FDI at book value) and Figure 15 (with FDI at market value).<sup>20</sup> Each figure presents the decomposition for the net international investment position (top panel), as well as for gross assets and liabilities (bottom panels). Each panel depicts the overall changes in the position (line), and decomposes them between financial flows (grey bars), valuation effects from exchange rate movements (black bars), valuation effects from asset price fluctuations (white bars) and other valuation effects (stripped bars), all numbers being expressed as percentage of GDP.

Four facts emerge from both figures. First, net capital flows have always been positive since 1986, reflecting chronic Swiss current account surpluses. Second, fluctuations in asset prices matter, although their impact on the net position is somewhat muted when FDI is assessed at market value. Until 2000 the asset prices component shows net losses for Switzerland, as rising prices added to the value of foreign investors' claims on Switzerland, particularly in terms of equity holdings. The pattern was reversed in 2000–2002, where falling equity prices led to losses for foreign investors that were

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<sup>19</sup> The valuation effects for a given year are in percent of the position at the beginning of the year.

<sup>20</sup> The corresponding figures by categories are provided in the Appendix figures A.3 (FDI at book value), A.4 (FDI at market value), A.5 (portfolio equity), A.6 (portfolio debt), A.7 (other holdings) and A.8 (reserves).

only partially offset by losses on assets, leading to an improvement of the Swiss net investment position. The pickup of Swiss equity prices in 2005 led to a sizable valuation loss for Switzerland as the value of its liabilities rose. Third, exchange rate movements have a substantial valuation effect. This is associated with the movements of the Swiss franc against the US dollar, reflecting the strong exposure of Switzerland to the US currency. The weakening of the dollar in the late 1980s and, more recently, in 2001–2004 led to valuation losses. Those were partly offset in 2005 as the dollar strengthened. While movements in the exchange rate primarily affect the value of assets, they also have a sizable impact on liabilities, as a substantial share of other liabilities is denominated in foreign currencies. Fourth, exchange rate and asset price movements only account for part of the gap between financial flows and the change in the net investment position, leaving a sizable role for other valuation effects. This is especially the case since 2000, with large and persistent valuation losses that we cannot attribute to exchange rate and asset prices. While the other valuation effects are considerable in net terms, they are much smaller in terms of gross assets and liabilities as can be seen from the bottom panel.

### *3.5. A retrospective on the 2000's*

Our estimates of the drivers of international assets and liabilities allow us to take a closer look at the situation since the end of 1999, a period over which the gap between the net international investment position and cumulated capital flows has been particularly acute. We present our results both over the 1999–2004 period and the 1999–2005 period. This is motivated by the different pattern of the various effects, as shown below, and the fact that the 2005 data are still subject to revisions.

The numbers with FDI at book value are show in Table 3. The first column indicates the net investment position, while the second and third columns show gross assets and liabilities respectively, all figures being expressed in percentage of the 2005 GDP. As already discussed, the net international investment position barely changed (first row) despite a large current account surplus (second row), leading to a sizable gap, especially in terms of gross assets (third row).

The gap can in turn be decomposed across the various drivers discussed above. Between 1999 and 2004, exchange rate movements had a substantial impact on the Swiss net international investment position (fourth row), with the strength of the Swiss franc leading to losses of nearly one-third of GDP. Fluctuations in asset prices were favorable in net terms (fifth row), with capital losses on gross assets being more than offset by foreign investors' losses on their holdings in Switzerland. The two valuation effects add up to a loss of 14.2% of GDP, accounting for more than a quarter of the gap (seventh row).<sup>21</sup> While exchange rate and asset price valuation effects had a sizable impact, our analysis shows that they offer a partial explanation only, with the residual other valuation effect amounting to more than one-third of GDP (sixth row).

The limited ability of exchange rate and asset price movements to account for the gap between financial flows and the dynamics of the net investment position is primarily driven by liabilities. There is little puzzle for gross assets, as exchange rate and asset price fluctuations account for more than 80% of the total valuation losses. Notice that due to the large value of gross assets, this still leaves an unexplained valuation effect of 16.9% of GDP. Turning to gross liabilities, we estimate that exchange rate and asset price fluctuations lowered their value by 53.9% of GDP. This is well in excess of the observed valuation loss, leading to an increase in liabilities through the other valuation effect by 21.8% of GDP.

Extending the analysis to the end of 2005 alters the picture. The gap in net terms increases to 76.4% of GDP, due to a surge in the value of gross liabilities that cannot be attributed to financial flows. Exchange rate movements play a smaller role, as the weakening of the Swiss franc against the dollar in 2005 offset some of the earlier losses. By contrast the increase in Swiss asset prices in 2005 leads to a valuation gain for foreign investors, translating into a net loss for Switzerland with the two valuation effects accounting for nearly one third of the overall gap.

The results when taking FDI at market value are presented in Table 4. The gap between the net international investment position and the current account surpluses are more pronounced than when FDI is taken at book value, and amounts to 78.9% of GDP

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<sup>21</sup> As described below, our estimates of the valuation effect are more robust for the effects due to exchange rates than for the effects due to asset prices.

between 1999 and 2004. Exchange rate movements play a larger role in driving this gap, with the strength of the Swiss franc translating into a capital loss of 39.4% of GDP. With asset prices driving the market value of FDI, the contraction of stock prices outside Switzerland generates a direct loss, leading to a loss in net terms.<sup>22</sup> The two valuation effects now total 43.0% of GDP, accounting for more than half of the overall gap. Movements in exchange rate and asset prices again account for most of the gap for gross assets, but overstate the contraction in gross liabilities. Extending the analysis to 2005 again reduces the role for exchange rate movements and magnifies the valuation loss from higher asset prices in Switzerland. The two effects jointly account for one-half of the overall gap in net terms.

### *3.6. Limits of our estimates*

Our analysis shows that movements in exchange rates and asset prices led to substantial valuation losses for Switzerland, especially when FDI is evaluated at market value. Nevertheless, they only account for at most half of the overall gap, leaving a large role for the other valuation component. Our limited ability to account for the gap reflects several potential causes, such as changes in statistical methodology, the aggregate nature of our approach, and the high leverage in the Swiss balance sheet.

The other valuation effects are highly concentrated in some categories, as shown in Table 5, focusing on the changes in the net positions for brevity. The valuation impact of exchange rate movements is fairly evenly spread across portfolio equity, debt and FDI positions (at book value), with a larger impact on FDI at market value. Losses from movements in asset prices are concentrated in FDI (at market value).<sup>23</sup> The other valuation effect is driven primarily by portfolio equity, with portfolio debt also playing a sizable role. A closer inspection reveals the lumpy nature of this effect, suggesting that it reflects data revisions for particular categories in particular years. In terms of portfolio equity, the value of liabilities increased by 23% of GDP in 2000–2001 due to other

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<sup>22</sup> This result is to be expected given the direct role of exchange rate and asset price movements in computing our estimates of FDI at market value.

<sup>23</sup> By construction the gap in FDI holdings at market value is fully explained by exchange rate and asset price movements.

valuation effects. Similarly, 2001–2002 saw a valuation loss of 9.5% of GDP on portfolio debt assets. The sizable net loss from the other valuation channel in 2005 (14.9% of GDP) was primarily driven by a loss on portfolio debt assets (10.1% of GDP).

The statistical procedures used to establish the official positions data are regularly adjusted to improve the quality of the data. Prior to 1998 the financial flows on some holdings were essentially computed as the change in positions. This may account for the positions closely tracking cumulated financial flows until the late 1990s, as observed for portfolio debt positions for instance (Figure 9). In addition the broadening of the statistical surveys can add to the positions, without any counterpart in financial flows.<sup>24</sup> Focusing on the 2000's, the sizable negative other valuation component on portfolio debt assets could be due to the flow data missing the repayments of the principal on bonds reaching maturity, while the large other valuation component on equity liabilities could reflect the incomplete accounting of custody accounts. These are mere conjectures, and a more accurate assessment would require a finer analysis than our aggregate approach.<sup>25</sup>

Another contributing factor is that, according to our methodology, the impact of asset prices and exchange rate movements on the positions in the other foreign currencies is by construction included in the other valuation category. With such positions representing one-fifth of the foreign currency holdings, these valuation effects can be substantial.

Furthermore, our estimates of the valuation effect due to movements in asset prices are limited given the aggregate nature of our approach. Specifically, we rely on market wide price indexes and implicitly assume that foreign investors allocate their portfolio in line with the overall markets. If the portfolio of foreign investors in Switzerland is more heavily tilted than the overall market towards sectors that performed well, our method would underestimate their capital gains and the difference would show in the other valuation. Given the large size of gross positions, even a moderate error in the sectoral composition can substantially affect the precision of our estimates. Note that our estimates of the valuation effect due to exchange rate movements do not suffer from

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<sup>24</sup> Such statistical revisions in the FDI survey have led to sizable changes in holdings in 1993 (+15.0 bn on assets and +7.5 bn on liabilities) and 2004 (+17.9 bn on assets and +29.2 bn on liabilities).

<sup>25</sup> We thank the staff of the Balance of Payments Group of the Swiss National Bank for pointing these possibilities to us.

any such problem. They combine the official positions in the various currencies and the exchange rates, and are therefore more robust than the estimates of asset price valuation.

Finally and more generally, estimating the role of various effects in net terms is a difficult exercise given the substantial leverage between gross assets and liabilities, as this leverage magnifies the net impact of any estimation error on gross positions. Consider for example a small error of 1 percentage point in the return on gross assets. With assets amounting to 581% of GDP, this leads to a sizable error in net terms of 5.8% of GDP.

#### **4. Yields and total returns on Swiss foreign positions**

This section assesses the impact of the large valuation effects on the return on Switzerland foreign assets and liabilities. Following a brief outline of the concepts, we discuss the yield on the various positions, and then compute the overall returns including valuation changes.

##### *4.1. Methodology and concepts*

Given its sizable holdings of foreign assets, it does not come as a surprise that Switzerland has long earned a significant capital income surplus, which amounted to 14.1% of GDP in 2005. This surplus however reflects only the receipts and payments of dividends and interest, and is only a component of the overall return on assets and liabilities, which is also affected by valuation gains and losses.

The earnings on Switzerland's external assets and liabilities not only reflect its net creditor position, but are also likely to be substantially affected by the large leverage in the external position. In the presence of such leverage, differentials in yields across assets and liabilities can add up to substantial differences in the streams of earnings. Indeed, this aspect accounts for the limited capital income deficit of the United States, despite its sizable net debt (Heath 2007, Higgins and al. 2005).

Our analysis encompasses both yields and total rates of return. The yield is defined as the stream of dividend and interest payments in a year, expressed as a

percentage of the corresponding position at the beginning of the year. The balance of payment data provides us with the stream of receipts and payments for FDI (including reinvested earnings), portfolio holdings, combining equity and debt, other positions and official reserves.<sup>26</sup>

The total rate of return on a position is computed in a similar way as the yield, but adds the valuation gain. We consider two measures of returns. The *broad* rate of return use the overall valuation changes (i.e. the change in positions net of financial flows) without distinguishing between component reflecting exchange rate movements, asset prices and other factors. The *narrow* rate of return use the valuation changes without the other valuation component. By excluding the other valuation component, we neglect the impact of exchange rate and asset prices movements applying to the positions in “other” currencies. This shortcoming is counterbalanced by the advantage of omitting changes stemming from statistical quirks. Consider for instance a broadening of the survey of firms used in computing FDI positions. This will increase the value of holdings in the year where the broadening of the survey takes place, compared to earlier years. In our computation this change shows up as a valuation gain. Yet, it would clearly be inaccurate to interpret it as a capital gain on an existing position. Computing both the broad and narrow measures of total rates of return allows for a finer analysis.

Taking account of valuation gains substantially alter the earned income on assets and liabilities. Switzerland has benefited from a steadily growing surplus in terms of dividends and interest earnings (Figure 16, thick line). The net returns including valuation gains and losses have been substantially more volatile both in broad and narrow terms (thin and dotted lines). Since 2000 net returns have been substantially smaller than the net capital income, even when excluding the valuation losses that cannot be attributed to exchange rate and asset price movements.

To refine our understanding on the net earnings and returns on assets and liabilities, we break down the net asset income in the balance of payments between three components, with the details given in Appendix D. A similar exercise is undertaken in terms of total returns. Specifically the net income is written as:

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<sup>26</sup> We focus on the measure of FDI at market value, as the measure at book value leads to large fluctuations in yields in the late 1990s.

$$\begin{aligned}
NetInc = & \frac{r_A + r_L}{2} [Asset - Liab] \\
& + \frac{Asset + Liab}{2} \sum_{Ci} (\varpi_{A,Ci} - \varpi_{L,Ci}) \frac{r_{A,Ci} + r_{L,Ci}}{2} \\
& + \frac{Asset + Liab}{2} \sum_{Ci} \frac{1}{2} (\varpi_{A,Ci} + \varpi_{L,Ci}) (r_{A,Ci} - r_{L,Ci})
\end{aligned} \tag{1}$$

where  $i$  is an index of categories (FDI, portfolio, other),  $Asset$  and  $Liab$  are the values of total assets and liabilities,  $r_{A,Ci}$  and  $r_{L,Ci}$  are the yields on assets and liabilities in category  $i$ ,  $r_A$  and  $r_L$  are the yields on total assets and liabilities, and  $\varpi_{A,Ci}$  and  $\varpi_{L,Ci}$  are the shares of category  $i$  in total assets and liabilities.

The first row in (1) is the *net position* component. It captures the fact that Switzerland is a net creditor to the rest of the world, and shows the net income that it would receive if all assets and liabilities earned the same yield, computed as the average yield across the various assets and liabilities.

The second row in (1) is the *inter-category yield* component, which reflects the leverage between various categories of assets. A country is a net creditor in high-yield assets and a net debtor in low-yield liabilities earns a positive income even if its overall position is balanced.

The last row in (1) is the *intra-category yield* component, which captures the yield differential between assets and liabilities in a given category. A country that has a balanced position in all categories of assets can still earn a positive income if it gets a higher yield on its assets in a specific category than it pays on its liabilities in the same category.<sup>27</sup>

#### 4.2. Yields

In addition to being a net creditor, Switzerland has benefited from a yield advantage, paying a relatively low yield on its liabilities. Kugler and Weder (2007) look at the interest rates on short term deposits in Swiss francs and other currencies, and attribute the gap to a reverse peso problem with Swiss franc holdings offering an

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<sup>27</sup> For instance, the United States substantially benefits from such a yield differential in FDI holdings.

insurance against low probability events, such as wars. Kugler and Weder (2004) show that the yield gap in portfolio holdings is concentrated in fixed income holdings, with little gap for equity positions. Looking at disaggregated data for the holdings of Swiss investors, they point that the yield gap reflects the diversification benefits of assets denominated in Swiss franc.

Our analysis complements this evidence by taking a wider look across the various categories of assets and liabilities. The top panel of Table 6 shows the average yields on the various categories of assets and liabilities over the last twenty years, along with their volatility. Three main features emerge. First, yields are higher on FDI holdings than on the other holdings. With Switzerland being a net creditor in FDI, this translates into a favorable yield in its favor. Second, Switzerland has benefited from a sizable yield differentials between assets and liabilities in FDI and portfolio holdings, with a smaller gap in other holdings. These two factors translate into an aggregate yield gap of 1.2 percentage points. Third, yields on FDI have been most volatile, with little volatility gap between assets and liabilities.

The net capital income surplus now stands at a substantial 14.1% of GDP, an increase of 8.7 percentage points over ten years (Figure 17, thick line). The fact that Switzerland is a net creditor only accounts for less than half the current surplus, both in terms of magnitude and increase, with the net position component increasing by 3.4 percentage points of GDP to 5.9% in the last ten years (thin line). The favorable yield gap between assets and liabilities in specific categories contributes 3.6 percentage points of GDP to the surplus, but does not account for the increase over the last ten years (dotted line). The increase instead reflects the emergence of a favorable leverage towards high-yield categories, adding 4.5 percentage points of GDP to the net capital income in 2005 (rounded line).<sup>28</sup>

The change in composition of the Swiss external position indeed played a central role in maintaining the favorable aggregate gap between yields. The top panel of Table 7 shows the yield gap for the various categories and contrasts the situation before and after 2000. The yields gap has substantially fallen for all categories of holdings in the last six

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<sup>28</sup> The jump of the inter-category yield component during 2005 owes partly to a surge in reinvested earnings of FDI in this year. Balance of Payments accounting excludes reinvested earnings in computing portfolio earnings.

years, compared to the earlier part of the period. The stability of the aggregate gap simply reflects the leveraging of the position towards higher-yield categories of holdings, such as FDI.

#### *4.3. Rates of return*

While Switzerland has benefited from a favorable yield gap, the picture is reversed once valuation gains and losses are taken into account. The middle and bottom panel of Table 6 contrast the broad and narrow rates of return across the various categories of assets and liabilities.<sup>29</sup> Switzerland has suffered from substantial gaps on its FDI and portfolio holdings, with the rates of return on other holdings being essentially balanced. The rates of return have been most volatile for FDI. The volatility on portfolio liabilities is also substantial, and much larger than on assets. In aggregate terms, the gap between rates of return is substantial, amounting to between 0.9 to 1.4 percentage points. This gap is not due to valuation effects that cannot be traced to exchange rate and asset price movements, as the picture is similar in terms of broad and narrow rates of return.

The low net return on Swiss external assets primarily reflects the detrimental gap in terms of rates of return between assets and liabilities by categories. The decomposition of the broad and narrow returns across the three components in (1) is presented in Figure 18 and 19 respectively. The components are quite volatile, reflecting the substantial fluctuations in exchange rates and asset prices from years to years. Abstracting from the other valuation effect, the net narrow return surplus has averaged 7.1% of GDP in the last three years (Figure 19, thick line). Both figures show that the net position component (thin line) has led to a surplus, except for 2001–2002. In terms of narrow returns, this surplus averaged 11.2% of GDP in the last three years. The leveraging of the Swiss external position across the various categories has also been beneficial, as shown by the inter-category component (rounded line) which has been associated with surpluses, with the exception of 2001–2002. This component led to a narrow surplus of 9.6% of GDP in the last three years. Detrimental gaps in rates of returns within categories have

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<sup>29</sup> The returns for FDI are the same in both panels, as our series for FDI at market value do not include other valuation effect.

substantially lowered the net return of Switzerland, especially in recent years, as shown by the intra-category component (dotted line). This component reduced the narrow surplus by 13.7% of GDP in the last three years.

The detrimental gap in rates of return is not confined to recent years. The middle and bottom panels of Table 7 contrast the gaps until 1999 with the last six years. In terms of broad returns, the detrimental gaps were observed prior to 1999 in FDI and portfolio, even though they substantially widened in the last six years. The aggregate gap was nil in the early part of the sample owing to a favorable composition of the balance sheet and a small positive gap in other holdings. Abstracting from the other valuation effects, the narrow returns show substantial adverse gaps until 1999, even in aggregate terms with a gap of -1.6 percentage points. By that measure, the aggregate gap has narrowed to a still substantial -0.8 percentage point in recent years, primarily reflecting a narrowing of the adverse gap for portfolio holdings.

Our analysis shows that the favorable yield gap enjoyed by Switzerland on its foreign assets is overturned once valuation gains and losses are taken into account. While valuation losses have been especially acute since 1999, the pattern extends to earlier years, and is robust to the exclusion of valuation losses that cannot be attributed to exchange rate and asset price movements.

## **5. Conclusion**

The Swiss international position has been characterized by a growing leverage in the last ten years, both in terms of gross assets and liabilities and in terms of exposure to foreign currencies. As a result the net investment position of Switzerland is now substantially more exposed to fluctuations in the value of assets and liabilities. This is strikingly illustrated by the disconnect between a steady net investment position since 1999 and large current account surpluses.

We first document the increase in leverage and the international exposure of Switzerland, and then estimate the impact of exchange rate and asset price movements on the Swiss external position, including on a measure of FDI at market value. We find that both led to sizable capital losses in the 2000's, especially exchange rate fluctuations.

Nevertheless, they only offer a partial account of the recent disconnect. Our analysis points to sizable increases in equity liabilities in the early 2000's that cannot be attributed to movements in asset prices. Improving our understanding of the disconnect will likely require finer estimates in terms of the sectoral composition of the various assets and liabilities.<sup>30</sup>

The presence of valuation effects substantially affects the pattern of returns on external assets and liabilities. While Switzerland earns higher dividend and interest yields on its assets than it pays on its liabilities, the picture is reversed once valuation changes are included in the computation of overall returns.

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<sup>30</sup> The finest estimate would be computed on a security-level basis, as done in the benchmark surveys of equity and debt portfolio holdings undertaken in the United States.

## References:

Blomberg, Gunnar, and Maria Falk, 2006, “How do large current account surpluses co-exist with a weak international investment position”, Sveriges Riksbank *Economic Review* 1/2006, pp. 37-57

Cavallo, Michele, and Cédric Tille, 2006, “Current Account Adjustment with High Financial Integration: A Scenario Analysis”, Federal Reserve Bank of San Francisco *Economic Review*, pp. 31-45.

Fluri, Robert, and Robert Müller, 2001, “La révision des indices du cours du franc suisse, nominaux et réels, pondérés par les exportations”, Swiss National Bank *Quarterly Bulletin* 3/2001, pp. 42-47

Gourinchas, Pierre-Olivier, and Hélène Rey, 2007, “World Bankers”, presentation at the annual meeting of the American Economic Association, Chicago, January 5.

Gourinchas, Pierre-Olivier, and Hélène Rey, 2006, “From World Banker to World Venture Capitalist: US External Adjustment and the Exorbitant Privilege”, in: Clarida, R.H. (Ed.), *G-7 Current Account Imbalances: Sustainability and Adjustment*, University of Chicago Press, Chicago.

Heath, Alexandra, 2007, “What Explains the US Net Income Balance?”, Bank of International Settlements *Working Paper* no. 223.

Higgins, Matthew, Thomas Klitgaard, and Cédric Tille, 2005, “The Income Implications of Rising US International Liabilities”, Federal Reserve Bank of New York *Current Issues in Economics and Finance* 11, no. 12.

Kugler, Peter, and Beatrice Weder, 2007, “Why are Returns on Swiss Franc Assets so Low? Rare Events may solve the Puzzle”, *Applied Economics Quarterly*, forthcoming.

Kugler, Peter, and Beatrice Weder, 2004, "International Portfolio Holdings and Swiss franc Returns", mimeo, University of Mainz.

Lane, Philip, and Gian-Maria Milesi-Ferretti, 2006a, "Europe and Global Imbalances", paper presented at the 7th Jacques Polak Annual Research Conference, International Monetary Fund, Washington, DC, November 9-10.

Lane, Philip, and Gian-Maria Milesi-Ferretti, 2006b, "A Global Perspective on External Positions", in: Clarida, R.H. (Ed.), *G-7 Current Account Imbalances: Sustainability and Adjustment*, University of Chicago Press, Chicago.

Obstfeld, Maurice, 2004, "External Adjustment", *Review of World Economics* 140, pp. 41-568.

Schmidt, Caroline, 2006, "Bewertung des Nettoauslandsvermögens der Schweiz", KOF, *Konjunkturbericht* 1/2006, Analysen A3-A23.

Swiss National Bank, 2006a, "Position extérieure nette de la Suisse en 2005", Zürich, December 2006.

Swiss National Bank, 2006b, "Balance suisse des paiements 2e trimestre 2006", Zürich, September 2006.

Tille, Cédric, 2005, "Financial Integration and the Wealth Effect of Exchange Rate Fluctuations", Federal Reserve Bank of New York *Staff Report* no. 226.

Tille, Cédric, 2003, "The Impact of Exchange Rate Movements on US Foreign Debt", Federal Reserve Bank of New York *Current Issues in Economics and Finance* 9, no. 1.

## Appendix A: Asset-weighted exchange rate

Our analysis uses the trade-weighted exchange rate over 24 countries, taken from the Swiss National Bank, as well as the exchange rates between the Swiss franc and four major currencies, namely the dollar, the euro, the pound and the yen.

As these four currencies do not account for all external positions denominated in foreign currencies, we first construct an estimate of the exchange rate between the Swiss franc and the "other" foreign currencies. Given the data limitations in the currency composition of external assets, we simply take the exchange rate against the "other" currencies on a trade-weighted basis, which is constructed based on the trade-weighted exchange rate, the exchange rates vis-à-vis the four major currencies, and the weights of these currencies in the trade-weighted exchange in Fluri and Müller (2001).<sup>31</sup>

Our next step combines the five exchange rates (euro, dollar, pound, yen and other) with the shares of these currencies in Switzerland's net foreign currency assets. The shares from the international position data in year  $t$  are assigned to December of year  $t$ , with the weights between two December months being interpolated (using the average weights over the sample leads to similar results). The percentage change of the asset-weighted exchange rate between months  $m$  and  $m+1$  combines the changes for the five exchange rates,<sup>32</sup> weighted by the average shares for months  $m$  and  $m+1$ .<sup>33</sup>

## Appendix B: Exchange rate and asset price valuation

The valuation effect from exchange rate movements is computed by combining the currency breakdown in the position data with the December value of exchange rates taken from the Swiss National Bank website. The valuation effect in a year  $t$  is the product of the value (in Swiss franc) of the foreign currency denominated position at the end of year  $t-1$  and the percentage change of the exchange rate between the Swiss franc and the relevant currency between December  $t-1$  and December  $t$ .

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<sup>31</sup> The weights are 61.17% for the euro, 15.39% for the dollar, 6.79% for the pound, 5.09% for the yen and 11.56% for the other currencies.

<sup>32</sup> All exchange rates are taken in terms of Swiss Francs per unit of foreign currency.

<sup>33</sup> Undertaking the analysis on a narrow version of the index that excludes the "other" currencies leads to similar results.

Until 1998 included, the valuations are computed based on the dollar and Deutsche mark positions. As there are no data for the Deutsche mark for December 1999, the exchange rate valuation for 1999 combines the value (in Swiss franc) of the position denominated in Deutsche mark at the end of 1998 and the change in the Swiss franc - euro exchange rate between December 1998 and December 1999. From 2000 on, the valuations are computed based on the dollar, euro, pound and yen positions.

A similar method is used to compute asset price valuations, using the percentage change in the relevant asset prices instead of the exchange rate. Portfolio equity assets are combined with equity prices from Datastream for the United States (in dollar), Germany (in Deutsche mark), the euro area (in euro), the United Kingdom (in pound) and Japan (in yen). Similar to the exchange rate valuation, the effect for 1999 combines the Deutsche mark position at the end of 1998 and the percentage change (in terms of euro) of the euro zone price index between December 1998 and December 1999. Portfolio equity liabilities are adjusted along similar lines using the equity price index for Switzerland.

Asset price valuations for portfolio debt assets and official reserves are computed along similar lines using bond price indexes from Datastream instead of equity prices. Portfolio debt assets denominated in Swiss francs are adjusted using the bond price index for Switzerland. All portfolio debt liabilities are adjusted using the price index for Switzerland. As a liabilities denominated in foreign currencies are sizable, we checked that our results are similar when using the corresponding foreign bond price indexes for foreign currency denominated liabilities.

### **Appendix C: FDI holdings at market value**

The assets are estimated using a detailed geographical breakdown. The first column of Table A.1 lists the various countries considered. The second column indicates the currency in which we assume that holdings in a particular country are denominated (for instance, FDI assets in Africa are assumed to be in rand). The last two columns show the geographical breakdown of FDI assets at book value in 1985 and 2005.

Comparing the geographical breakdown of FDI assets in table A.1 with the currency composition of positions in the international position data shows that US dollar

holdings closely match the holdings in the United States. Assets denominated in pounds track the United Kingdom and offshore financial centers in “other Europe”, which are reported separately since 2000. We therefore add the holdings in these offshore centers to the United Kingdom positions. Assets in euro are close to the holdings in the European Union, without the United Kingdom and Sweden. The holdings in yen broadly (but not exactly) match the assets in Japan.

Due to data limitations, we assume that holdings in non-EU Europe are in euro, and use the euro area equity price index for this region. Offshore financial centers account for a large fraction (40%) of FDI holdings in Latin America. Given the historical stability of the exchange rate between the US dollar and financial centers in the Caribbean, we take FDI holdings in Latin America to be in US dollars. We also consider that assets in Asian countries outside Japan are in dollar as several of these economies kept the value of their currency stable against the dollar. All holdings in Africa are taken to be in Rand, as South Africa holdings dominate them, and evaluated using the South African equity price index. No adjustment for exchange rate and asset prices is done to the residual other position, which simply consists of cumulative financial flows.

On the liability side, all positions are taken to be in Swiss francs. While liabilities at book value show some holdings in foreign currency, these are negligible and we omit them for simplicity.

The FDI positions at market value are computed following an iterative procedure. The positions at the end of 1985 are taken at book value. We compute the asset price valuation for a given country by applying the percentage change in the corresponding equity price index in the local currency, taken from Datastream, to the initial position. The reinvested earnings are subtracted from this asset price valuation to avoid double-counting. As the data do not include a geographical breakdown of reinvested earnings, we take the share of reinvested earnings in financial flows for aggregate assets, and apply this share to the financial flows by regions to obtain an estimate of reinvested earnings by

regions.<sup>34</sup> Similarly, we compute the exchange rate valuation for a given country by applying the percentage changes in the relevant exchange rate to the initial position.

Our adjustment method for reinvested earnings is applied at the level of the individual regions. It differs from the approach by Gourinchas and Rey (2006) who use the geographical shares from the holdings at book value to construct weighted percentage changes in asset prices and exchange rate. The weighted changes are then applied to the total positions, and aggregate reinvested earnings are taken out of the asset price valuation effect. Applying this approach to our data leads to virtually identical results.

#### Appendix D: Decomposition of net capital income

The net capital income is simply the sum of the positions in asset and liabilities and the associated yields. Indexing the categories of assets by  $i$  we write:

$$NetInc = \sum_i [Asset_i \cdot r_{A,i} - Liab_i \cdot r_{L,i}]$$

where  $NetInc$  is the aggregate net capital income,  $Asset_i$  is the gross asset position in category  $i$ ,  $r_{A,i}$  is the yield on this position. Similarly  $Liab_i$  is the gross liability position in category  $i$ , and  $r_{L,i}$  is the yield on this position.

The net income can be decomposed between a component reflecting the net investment position and a component capturing the difference in yields between assets and liabilities:

$$NetInc = \frac{r_A + r_L}{2} [Asset - Liab] + \frac{1}{2} (r_A - r_L) [Asset + Liab] \quad (A.1)$$

where:

$$\begin{aligned} r_A &= \sum_{Ci} \varpi_{A,Ci} \cdot r_{A,Ci} & r_L &= \sum_{Ci} \varpi_{L,Ci} \cdot r_{L,Ci} \\ Asset &= \sum_{Ci} AssetCi & Liab &= \sum_{Ci} LiabCi \\ \varpi_{A,Ci} &= \frac{AssetCi}{Asset} & \varpi_{L,Ci} &= \frac{LiabCi}{Liab} \end{aligned}$$

<sup>34</sup> An alternative is to allocate the reinvesting earnings for a given year in proportion of the estimated FDI positions at the end of the previous year. The overall results are nearly identical under this alternative computations, with some gaps in individual regions.

The yield differential  $r_A - r_L$  in (A.1) can in turn be decomposed as:

$$r_A - r_L = \sum_{Ci} (\varpi_{A,Ci} - \varpi_{L,Ci}) \frac{r_{A,Ci} + r_{L,Ci}}{2} + \sum_{Ci} \frac{1}{2} (\varpi_{A,Ci} + \varpi_{L,Ci}) (r_{A,Ci} - r_{L,Ci}) \quad (\text{A.2})$$

The first term in (A.2) is a composition component, capturing the different weights of various categories in assets and liabilities, and the second term is a yield component, reflecting the yield difference between assets and liabilities in specific categories.

Combining (A.1) and (A.2), the net income is broken down between a *net position* component (first term in (A.1)), an *inter-category yield* component (second term in (A.1) and first term in (A.2)), and an *intra-category yield* component (second term in (A.1) and second term in (A.2)).

Table 1: Impact of a 10 percent depreciation of the Swiss Franc on the value of foreign currency holdings

Percent of GDP						
1995						
	Dollar	DM	Other			Total
FDI	1.0	0.3	2.6			3.8
Portfolio equity	1.0	0.4	1.7			3.0
Portfolio debt	1.4	0.8	1.4			3.6
Other	0.6	0.3	0.4			1.3
Reserves	1.0	0.1	0.1			1.2
Total	5.0	1.8	6.1			12.9

2005						
	Dollar	Euro	Pound	Yen	Other	Total
FDI	2.8	3.6	1.9	0.1	4.1	12.5
Portfolio equity	2.6	2.6	0.5	0.5	0.7	6.9
Portfolio debt	2.0	3.9	0.4	0.1	0.3	6.8
Other	1.2	-0.3	0.0	1.2	-0.5	1.6
Reserves	0.4	0.5	0.1	0.0	0.1	1.1
Total	8.9	10.3	2.9	2.1	4.6	28.7

Table 2: Appreciation of the Swiss franc  
December 1999 - December 2005, percent

Trade-weighted	Asset-weighted	Euro	Dollar	Pound	Yen	Other
9.8	13.0	3.8	17.7	12.4	27.1	18.8

Table 3: Drivers of international positions with FDI at book value

1999-2004, percent of 2005 GDP

	Net	Gross assets	Gross liabilities
Change in position	5.3	60.1	54.8
Financial flows	58.2	145.1	86.9
Gap: line 1 – line 2	-52.8	-84.9	-32.1
Exchange rate valuation	-28.8	-57.2	-28.5
Asset price valuation	14.6	-10.8	-25.4
Other valuation	-38.7	-16.9	21.8
Fraction of the gap accounted for by exchange rate and asset price valuation			
	26.8	80.1	167.7

1999-2005, percent of 2005 GDP

	Net	Gross assets	Gross liabilities
Change in position	2.1	145.0	142.9
Financial flows	78.5	188.6	110.2
Gap: line 1 – line 2	-76.4	-43.6	32.8
Exchange rate valuation	-17.7	-33.4	-15.7
Asset price valuation	-5.1	6.4	11.6
Other valuation	-53.6	-16.7	36.9
Fraction of the gap accounted for by exchange rate and asset price valuation			
	29.8	61.7	-12.6

Table 4: Drivers of international positions with FDI at market value

1999-2004, percent of 2005 GDP

	Net	Gross assets	Gross liabilities
Change in position	-20.8	12.0	32.8
Financial flows	58.2	145.1	86.9
Gap: line 1 – line 2	-78.9	-133.1	-54.2
Exchange rate valuation	-39.4	-67.7	-28.3
Asset price valuation	-3.6	-46.5	-42.8
Other valuation	-35.9	-18.9	17.0
Fraction of the gap accounted for by exchange rate and asset price valuation			
	54.5	85.8	131.4

1999-2005, percent of 2005 GDP

	Net	Gross assets	Gross liabilities
Change in position	-33.8	105.3	139.1
Financial flows	78.5	188.6	110.2
Gap: line 1 – line 2	-112.3	-83.4	28.9
Exchange rate valuation	-23.3	-39.1	-15.8
Asset price valuation	-32.4	-20.0	12.3
Other valuation	-56.5	-24.2	32.4
Fraction of the gap accounted for by exchange rate and asset price valuation			
	49.6	71.0	-12.0

Table 5: Drivers of the net international positions

1999-2004, percent of 2005 GDP

	FDI at book value	FDI at market value	Portfolio equity
Change in position	8.4	-17.7	-10.1
Financial flows	20.1	20.1	15.5
Gap: line 1 – line 2	-11.6	-37.7	-25.6
Exchange rate valuation	-8.9	-19.5	-9.0
Asset price valuation	0.0	-18.2	7.7
Other valuation	-2.7	0.0	-24.3
	Portfolio debt	Other	Reserves
Change in position	12.9	-9.1	3.1
Financial flows	32.9	-11.4	1.0
Gap: line 1 – line 2	-20.0	2.3	2.1
Exchange rate valuation	-7.1	-2.2	-1.5
Asset price valuation	5.9	0.0	1.0
Other valuation	-18.8	4.5	2.7

1999-2005, percent of 2005 GDP

	FDI at book value	FDI at market value	Portfolio equity
Change in position	32.6	-3.3	-32.6
Financial flows	35.3	35.3	19.2
Gap: line 1 – line 2	-2.7	-38.6	-51.9
Exchange rate valuation	-5.6	-11.4	-5.9
Asset price valuation	0.0	-27.2	-11.9
Other valuation	2.9	0.0	-34.2
	Portfolio debt	Other	Reserves
Change in position	11.8	-10.9	1.2
Financial flows	42.2	-14.4	-3.8
Gap: line 1 – line 2	-30.4	3.5	5.0
Exchange rate valuation	-4.2	-1.2	-0.8
Asset price valuation	5.8	-.-	0.9
Other valuation	-32.0	4.7	4.9

Table 6: Average and standard deviation of yields and rates of return  
1986-2005, percent

	Average			Standard deviation	
	Assets	Liabilities	Gap	Assets	Liabilities
	Yields				
FDI (market value)	6.8	4.8	2.0	3.2	3.3
Portfolio	3.6	2.4	1.3	0.7	0.4
Other	3.8	3.0	0.7	1.4	1.1
Reserves	3.9			1.0	
Total	4.3	3.1	1.2	0.7	0.7
	Broad rates of return				
FDI (market value)	12.3	14.0	-1.6	20.7	21.5
Portfolio	5.7	10.6	-4.8	9.6	18.2
Other	3.6	3.3	0.3	6.2	5.6
Reserves	5.4			9.9	
Total	5.8	6.8	-0.9	8.8	10.2
	Narrow rates of return				
FDI (market value)	12.3	14.0	-1.6	20.7	21.5
Portfolio	5.3	12.6	-7.3	7.7	18.9
Other	3.1	2.3	0.7	4.6	4.3
Reserves	3.5			8.2	
Total	5.4	6.7	-1.4	8.1	10.0

Table 7: Average gap between assets and liabilities  
Percent

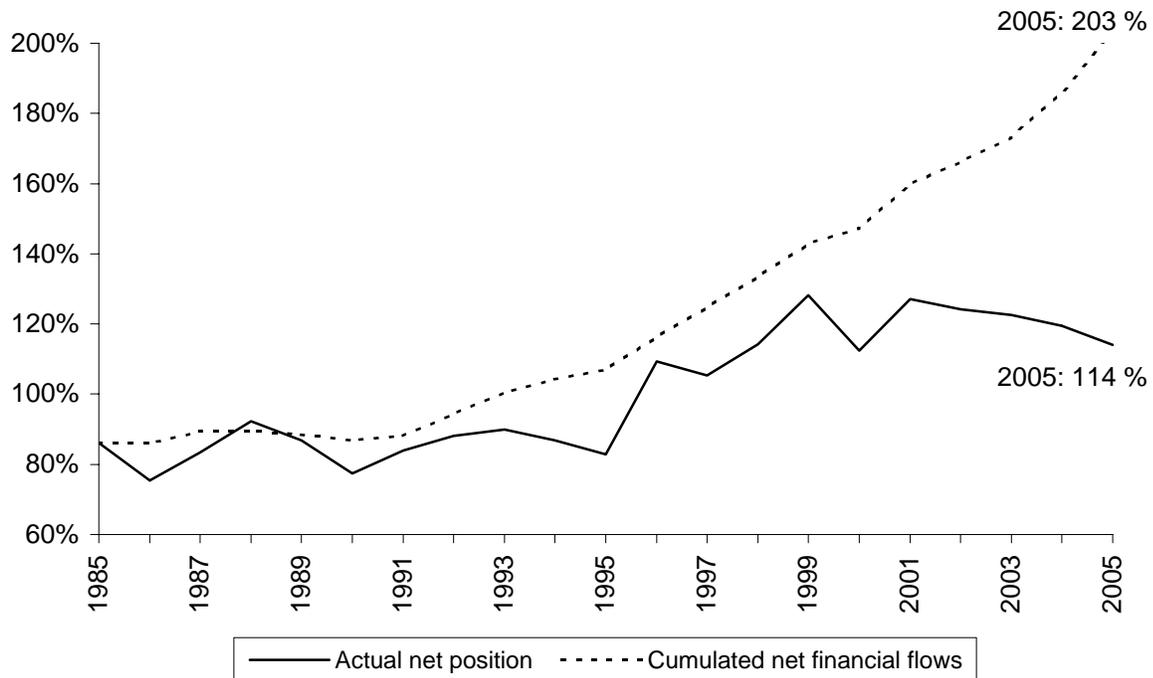
	1986-2005	1986-1999	2000-2005
	Yields		
FDI	2.0	2.2	1.5
Portfolio	1.3	1.5	0.8
Other	0.7	0.9	0.3
Total	1.2	1.2	1.2
	Broad rates of return		
FDI	-1.6	-0.7	-3.9
Portfolio	-4.8	-2.9	-9.3
Other	0.3	0.2	0.6
Total	-0.9	0.0	-3.2
	Narrow rates of return		
FDI	-1.6	-0.7	-3.9
Portfolio	-7.3	-9.6	-2.0
Other	0.7	1.0	0.2
Total	-1.4	-1.6	-0.8

Table A.1: Geographical breakdown of FDI assets

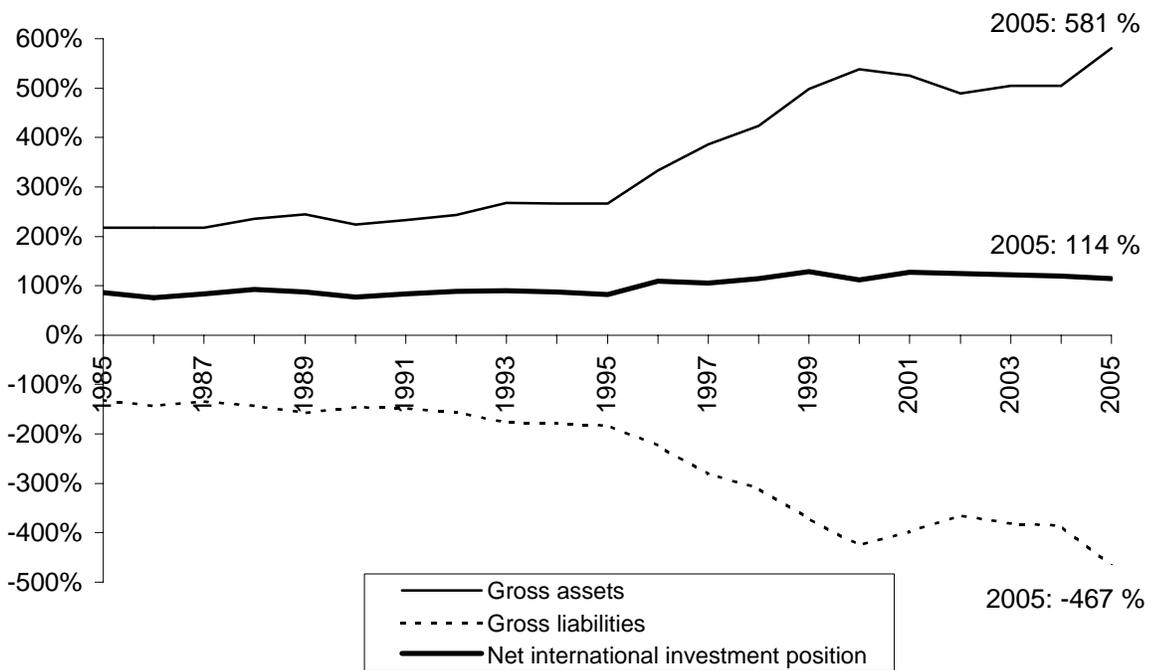
Country	Currency of denomination	Share of assets at book value	
		1985	2005
United Kingdom	Pound	5.3	14.6
European Union (non-U.K.)	Euro	40.1	32.4
Other Europe	Euro	3.7	1.9
United States	US dollar	30.3	20.1
Canada	Canadian dollar	2.3	1.6
Latin America	US dollar	8.9	18.8
Japan	Yen	2.7	1.6
Other Asia	US dollar	2.3	6.5
Africa	Rand	2.1	0.6
Australia	Australian dollar	2.1	1.9
Other	n/a	0.2	0.1

Exchange rates are taken from the Swiss National Bank website (Pound, Euro, US dollar, Canadian dollar, Yen) and Datastream (Rand, Australian dollar). The equity price indexes used in the valuation are taken from Datastream.

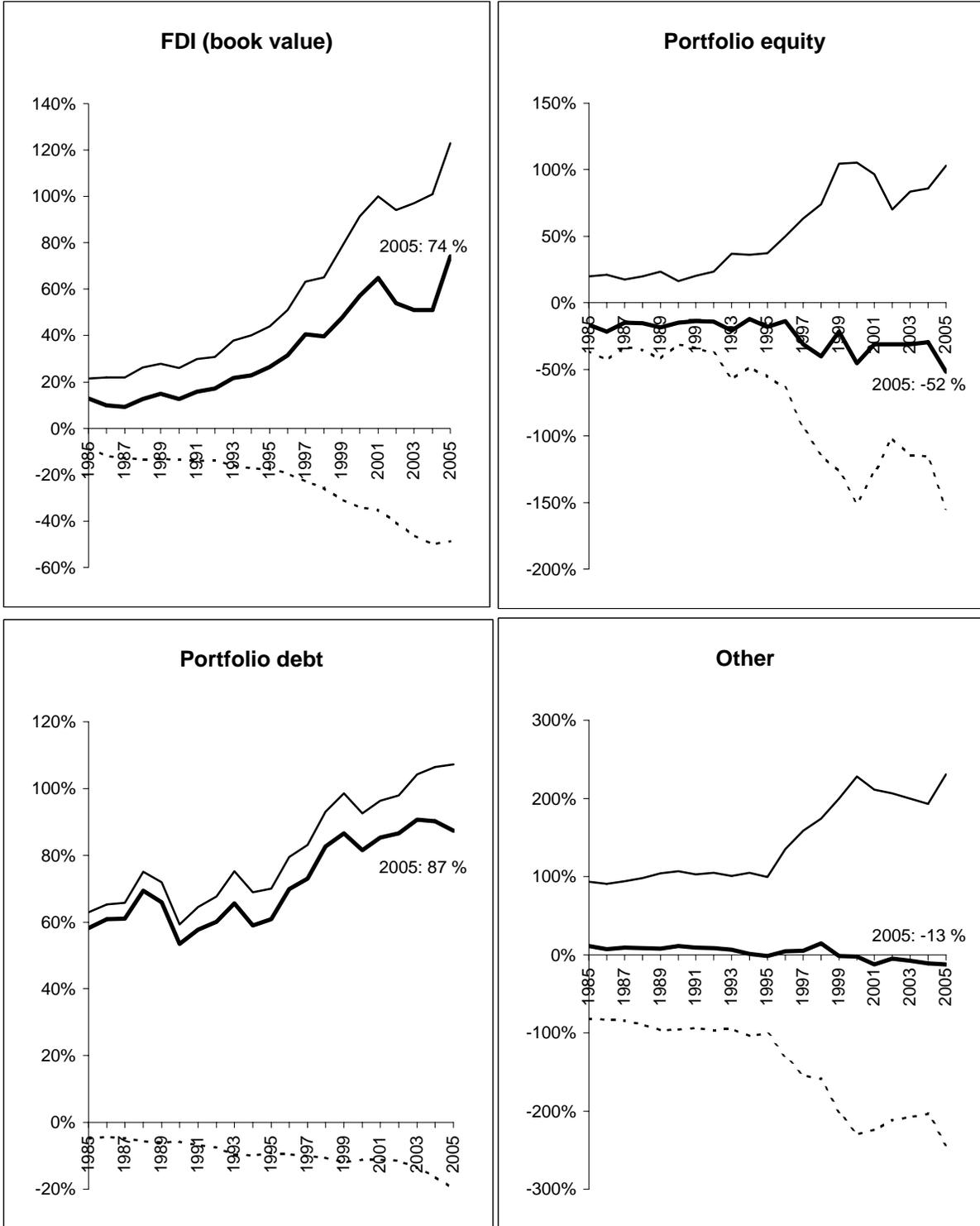
**Figure 1: Net international investment position**  
Percent of GDP



**Figure 2: Gross assets and liabilities**  
Percent of GDP

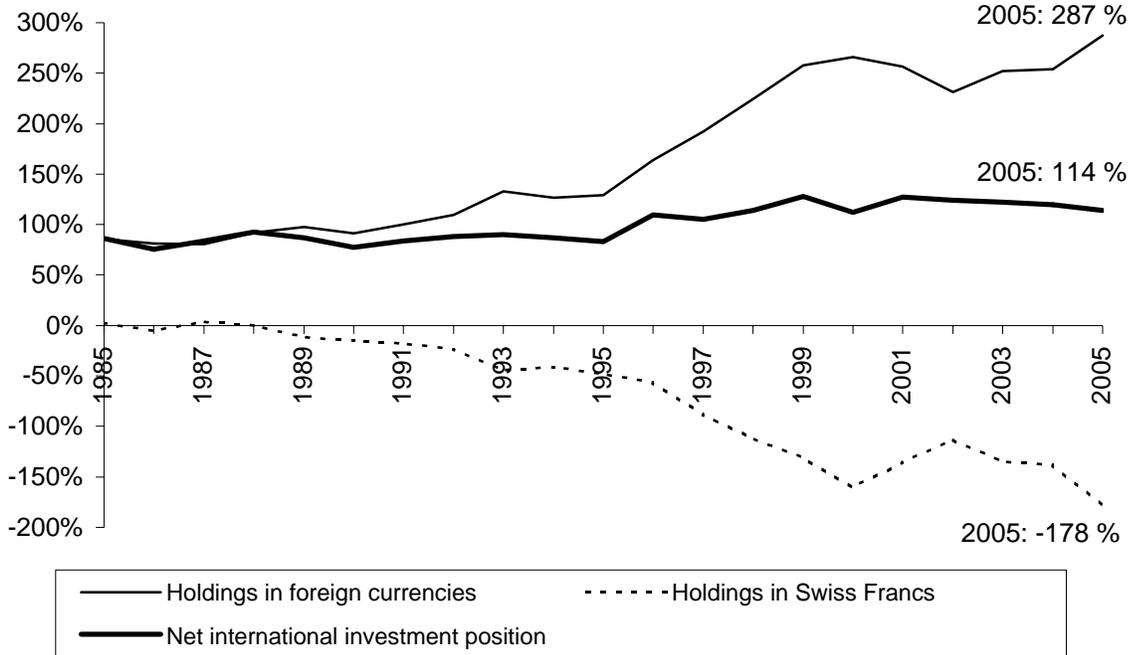


**Figure 3: Gross assets and liabilities by categories**  
Percent of GDP

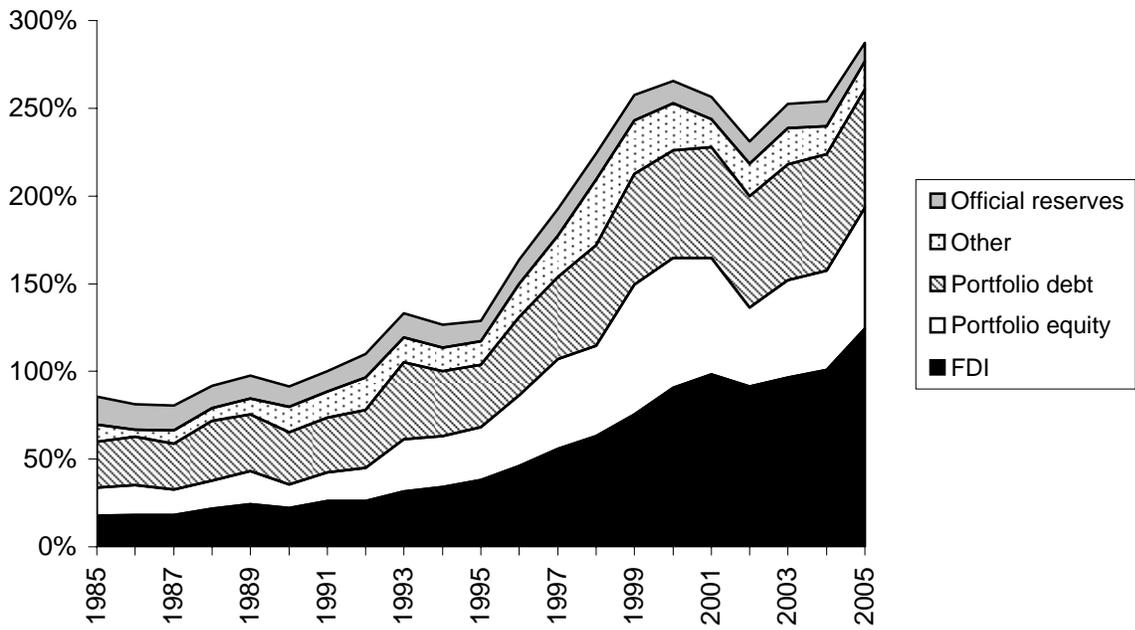


— Gross assets      - - - - - Gross liabilities      — Net position

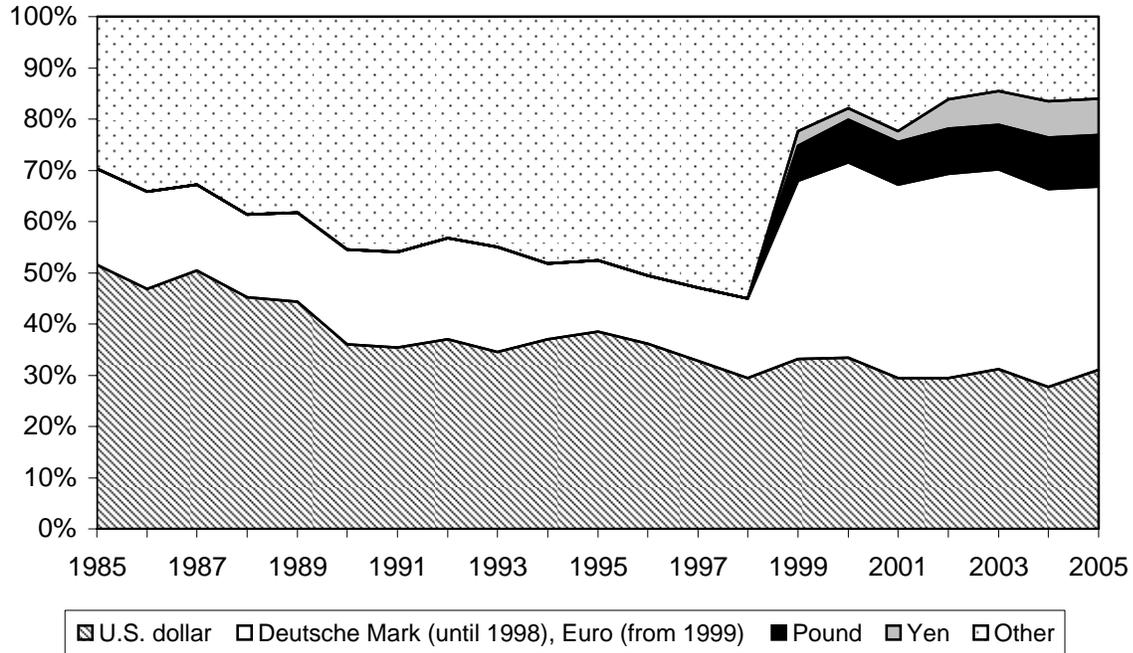
**Figure 4: Net positions by currencies**  
Percent of GDP



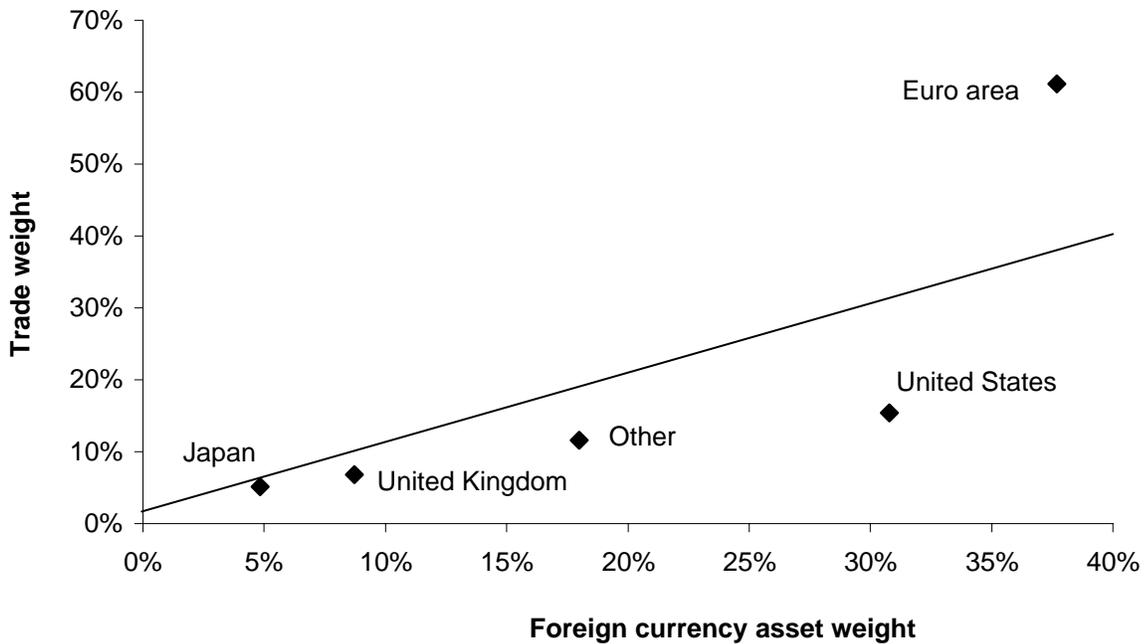
**Figure 5: Composition of net assets in foreign currencies**  
Percent of GDP



**Figure 6: Currency composition of assets in foreign currency**

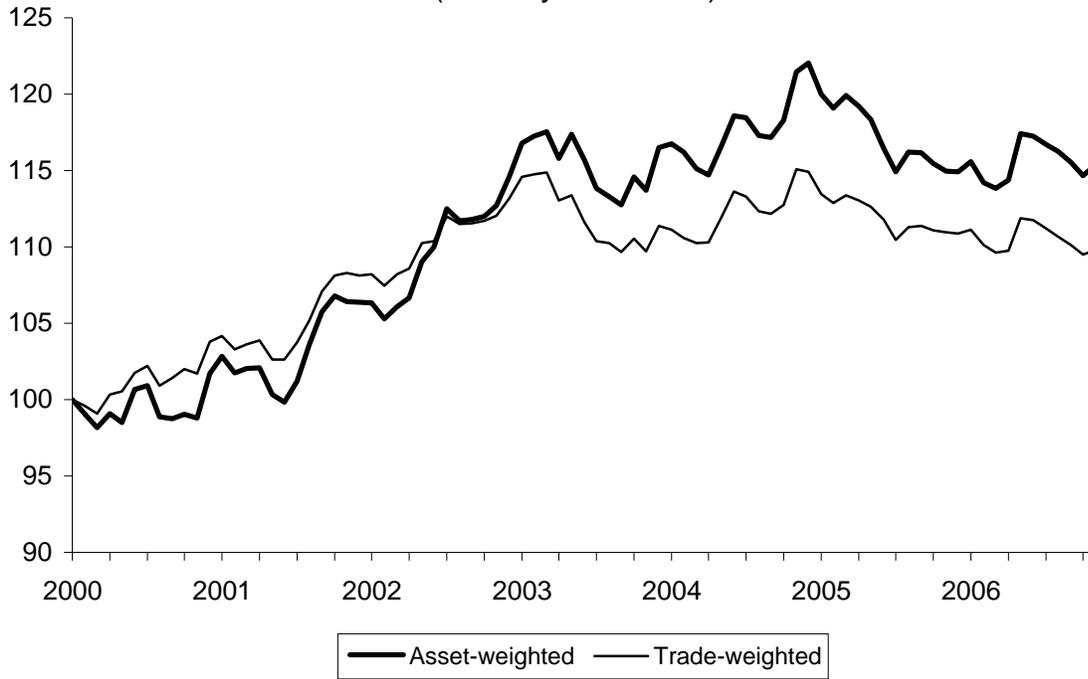


**Figure 7: Geographical composition of trade and of foreign currency holdings**

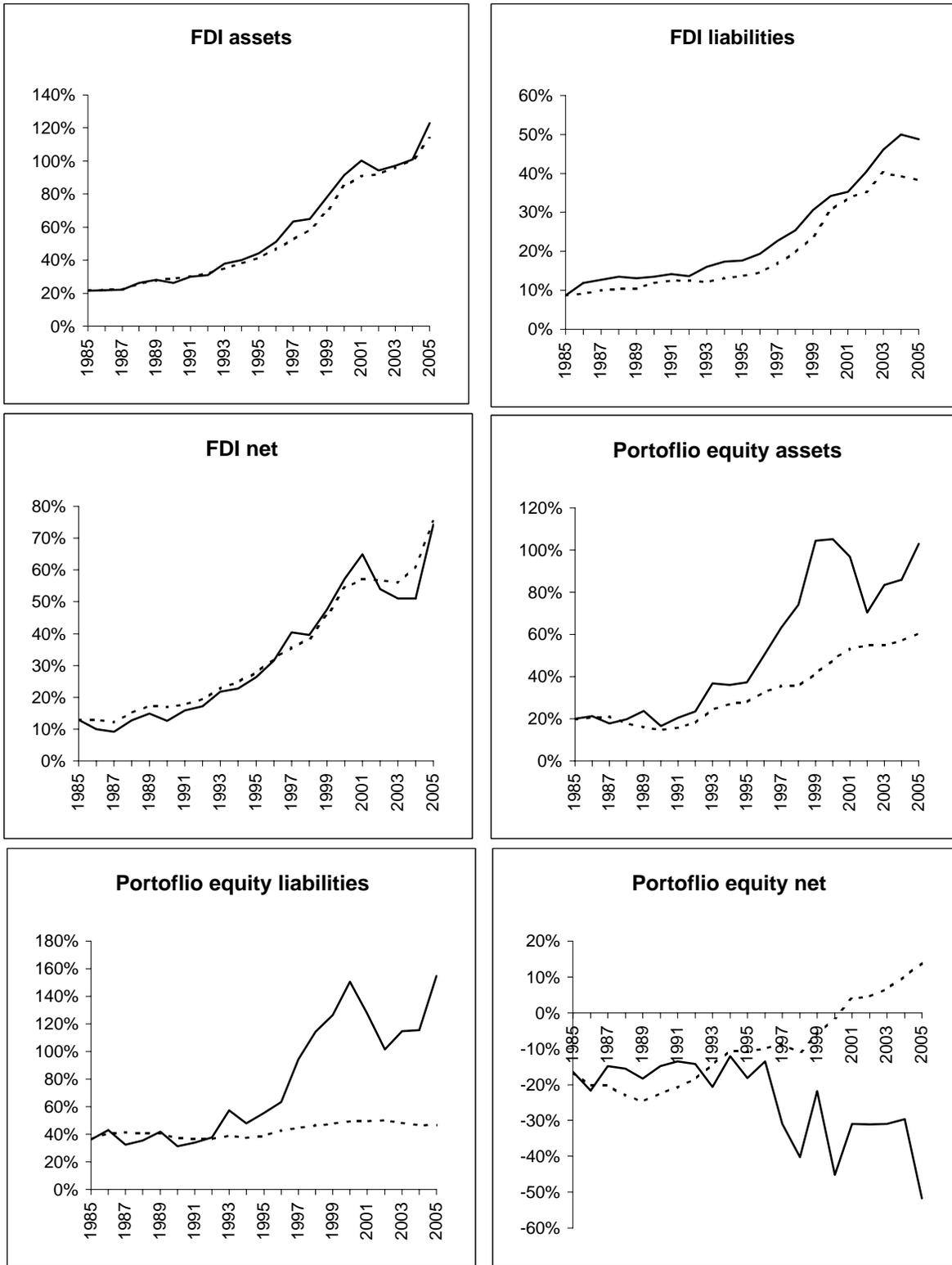


**Figure 8: Exchange rate indexes**

An increase is an appreciation of the Swiss Franc  
(January 2000=100)



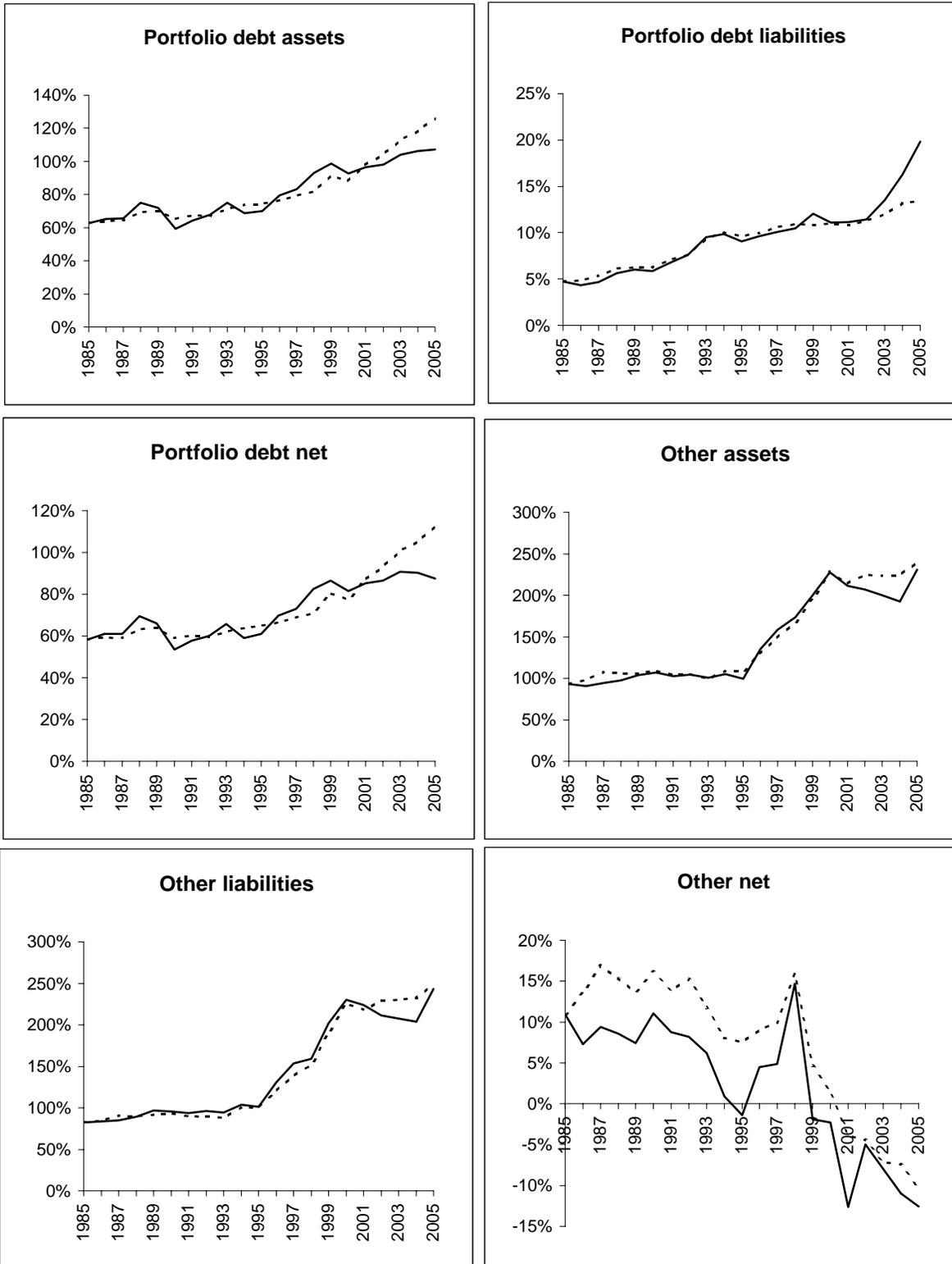
**Figure 9: Net international position and cumulative financial flows**  
Percent of GDP



———— Net international position

----- Cumulative net financial flows

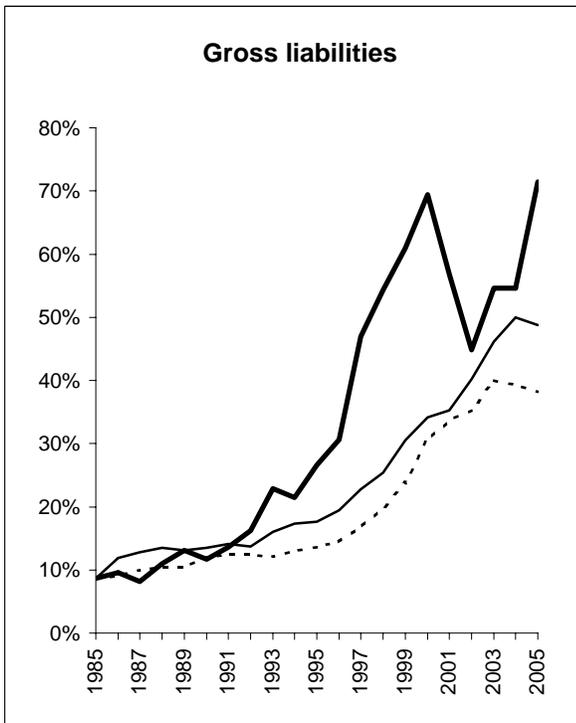
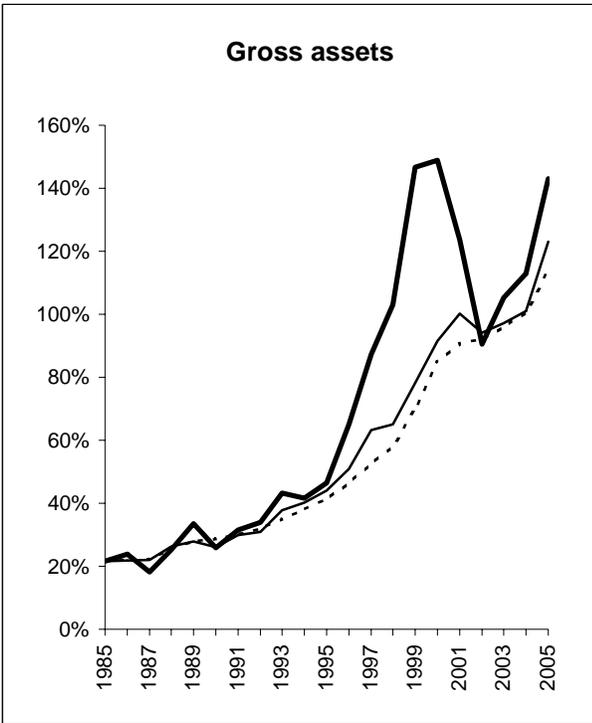
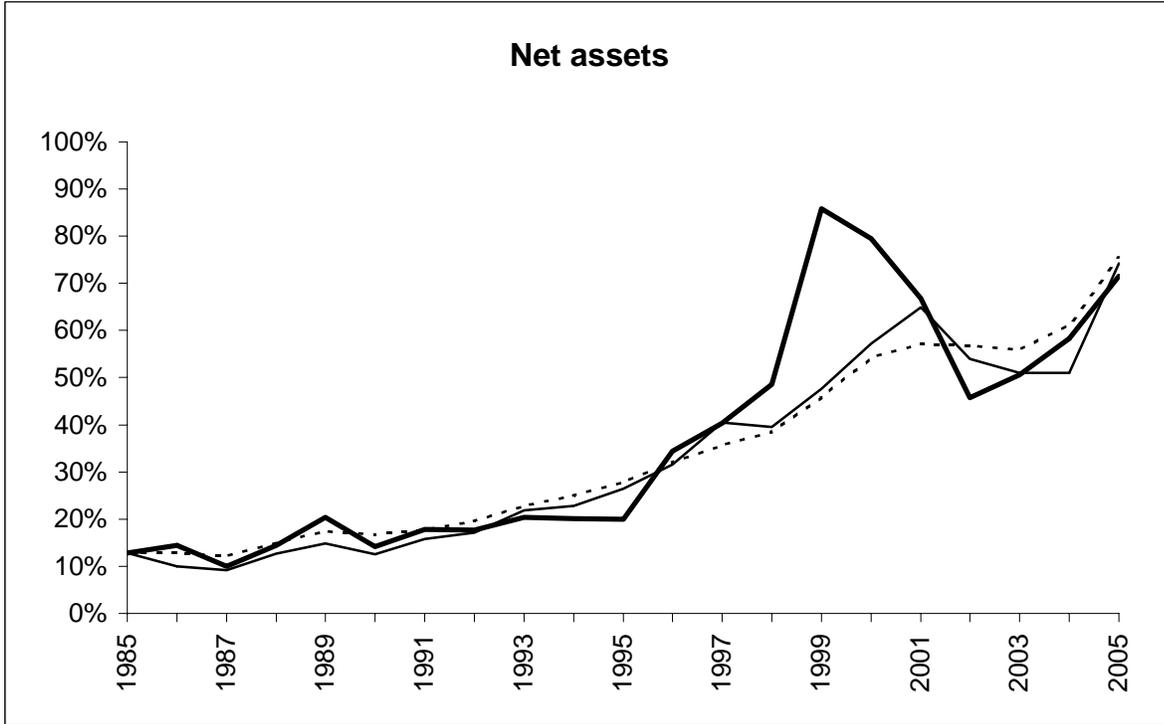
**Figure 9: contd**  
Percent of GDP



———— Net international position

----- Cumulative net financial flows

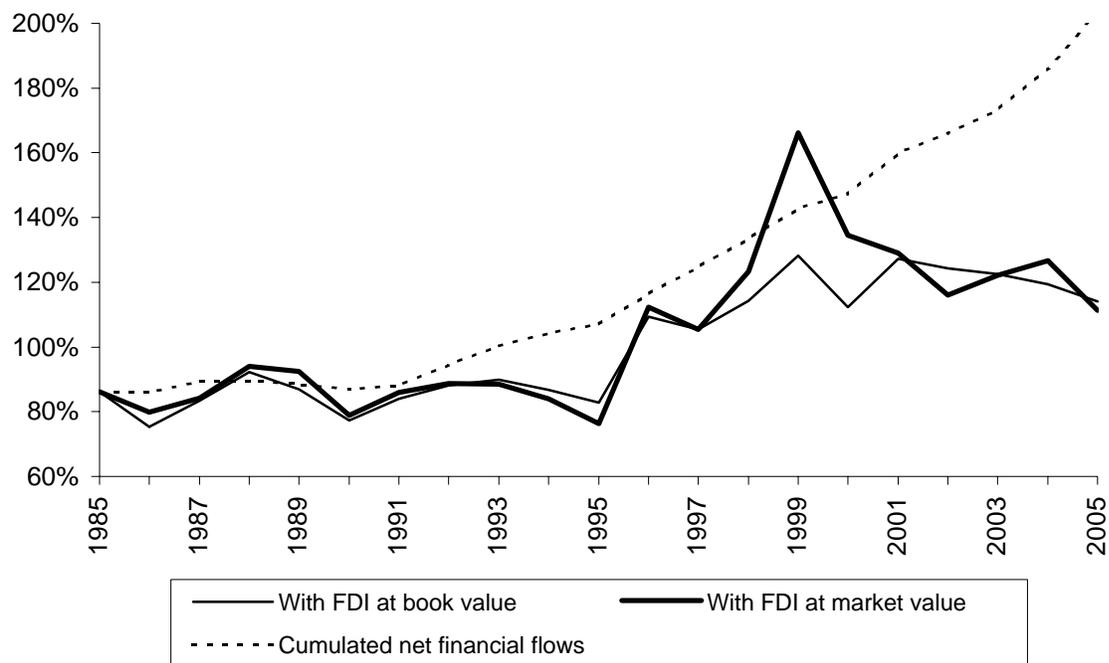
**Figure 10: FDI positions at book and market value**  
Percent of GDP



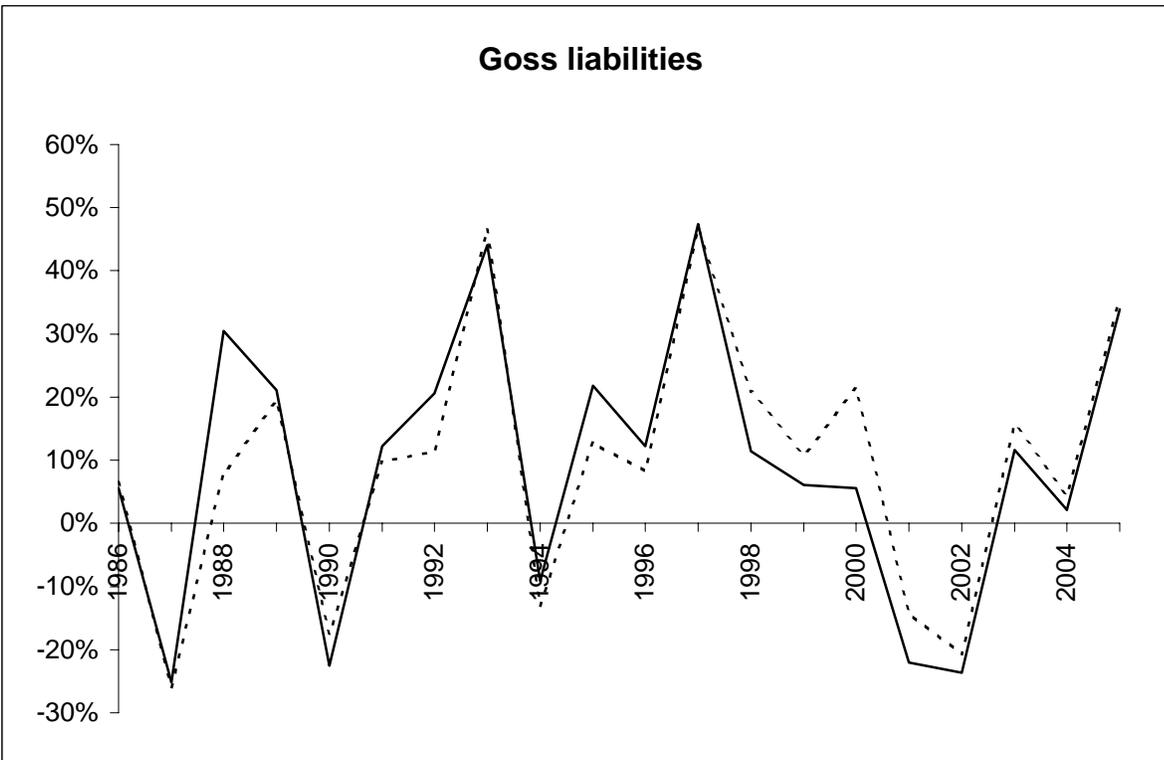
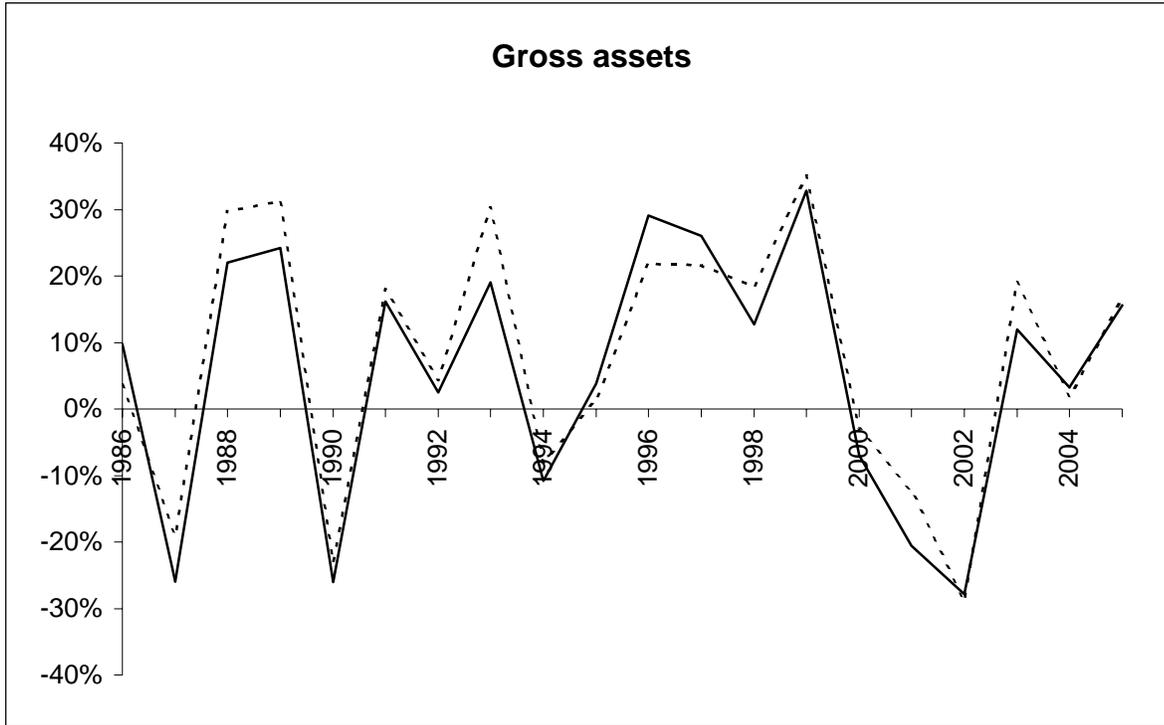
— Position at book value  
- - - Cumulated financial flows

— Position at market value

**Figure 11: Net international position**  
Percent of GDP



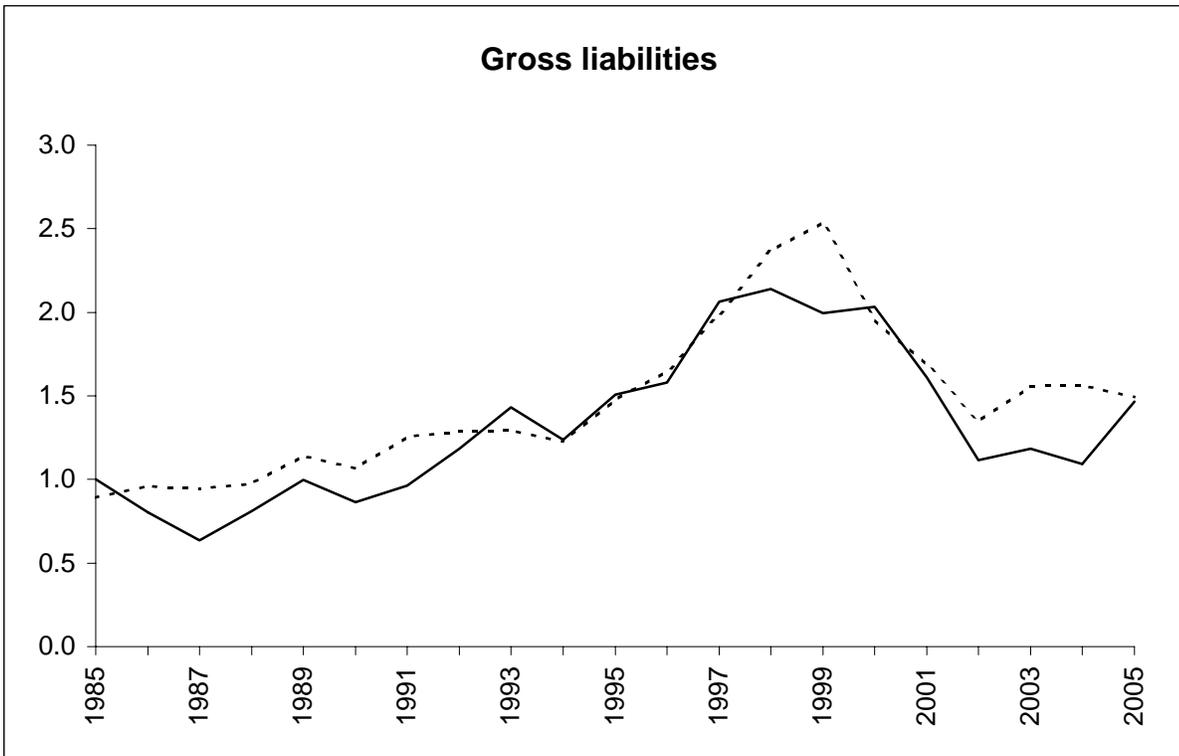
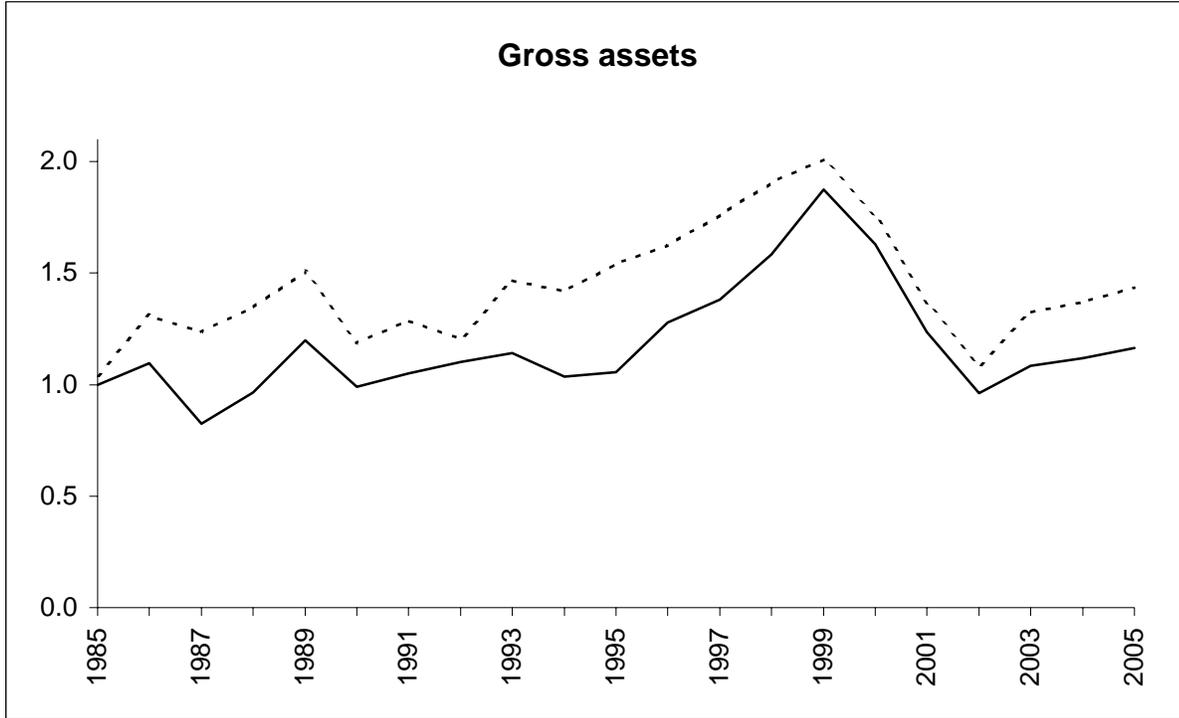
**Figure 12: Overall valuation effects: FDI at market value and equity**  
 Percent of initial positions



— FDI at market value

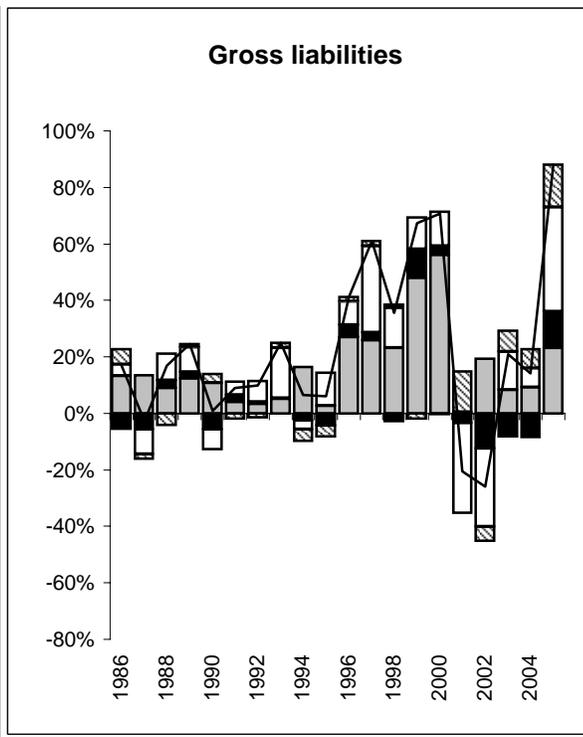
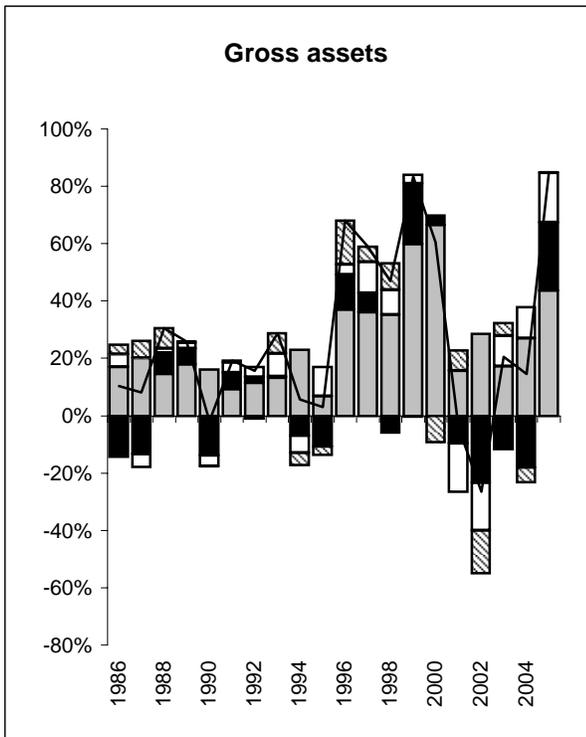
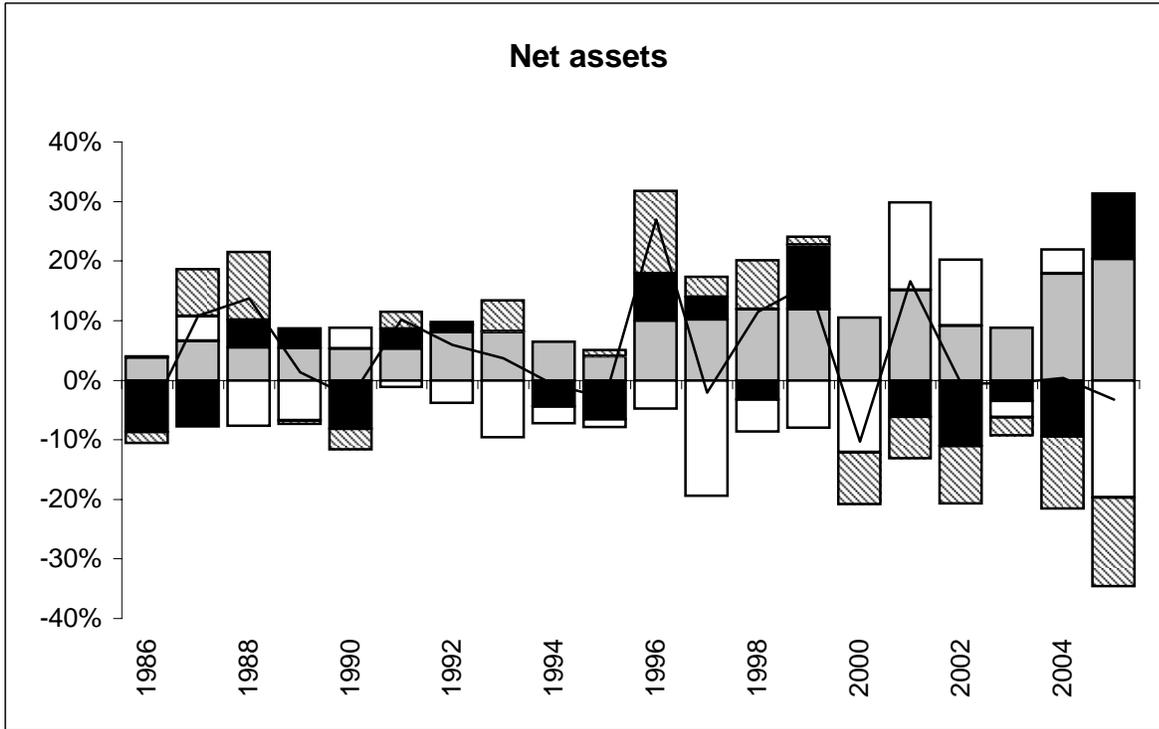
- - - Portfolio equity

**Figure 13: FDI positions: ratio of market to book value**  
Percent of initial positions



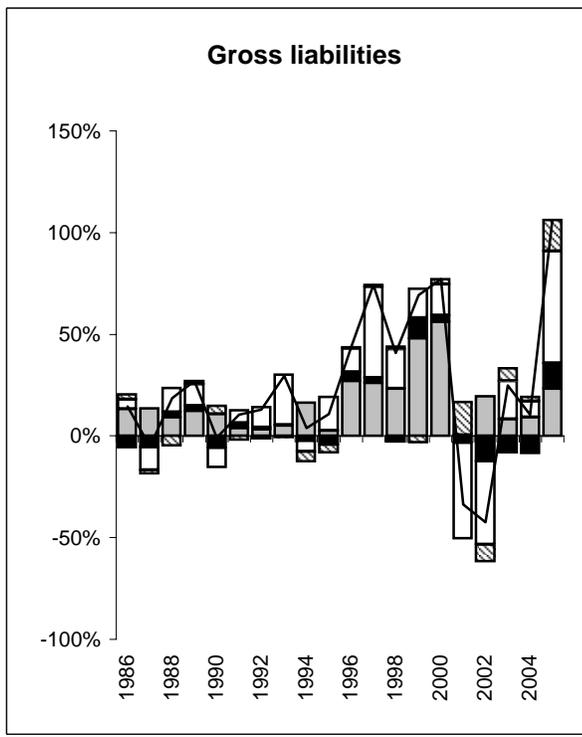
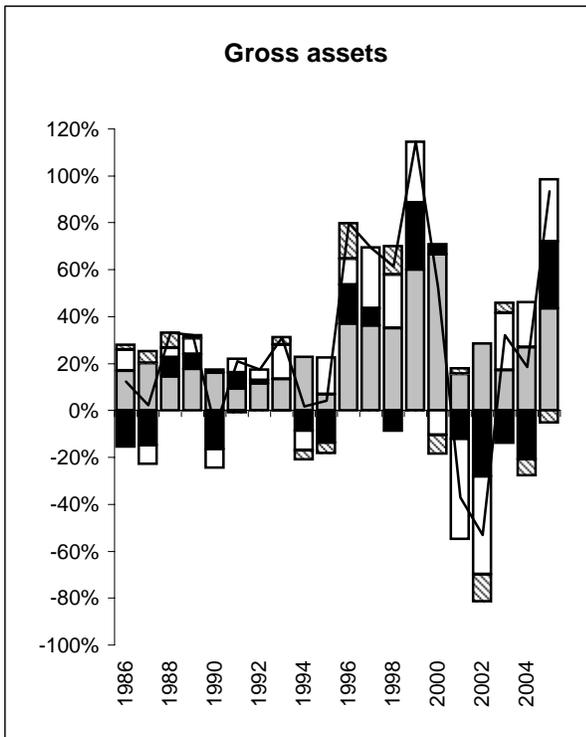
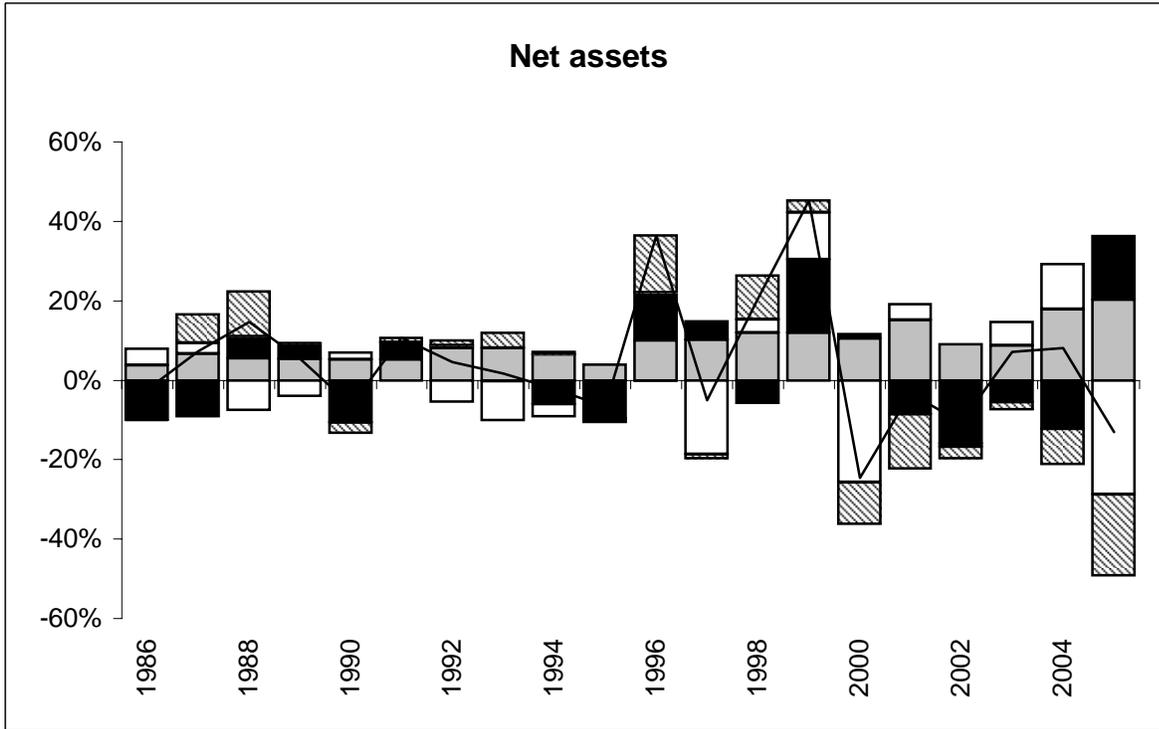
— Switzerland      - - - - - United States

**Figure 14: Dynamics of overall positions (FDI at book value)**  
Percent of GDP



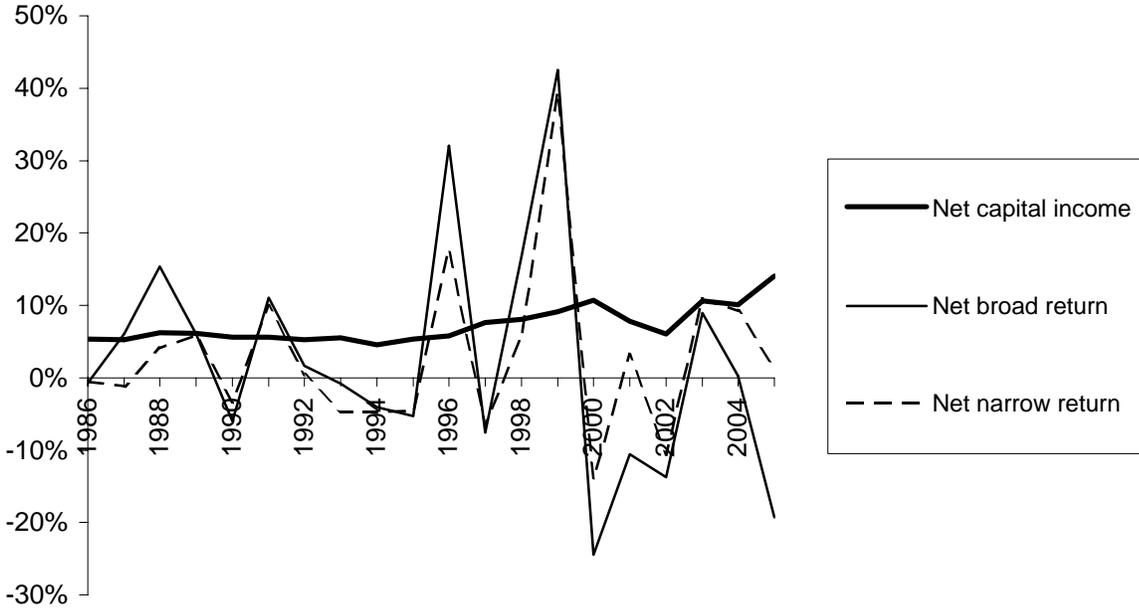
— Change in position    ■ Financial flows    ■ Exchange rate val.  
 □ Asset price val.    ▨ Other val.

**Figure 15: Dynamics of overall positions (FDI at market value)**  
Percent of GDP

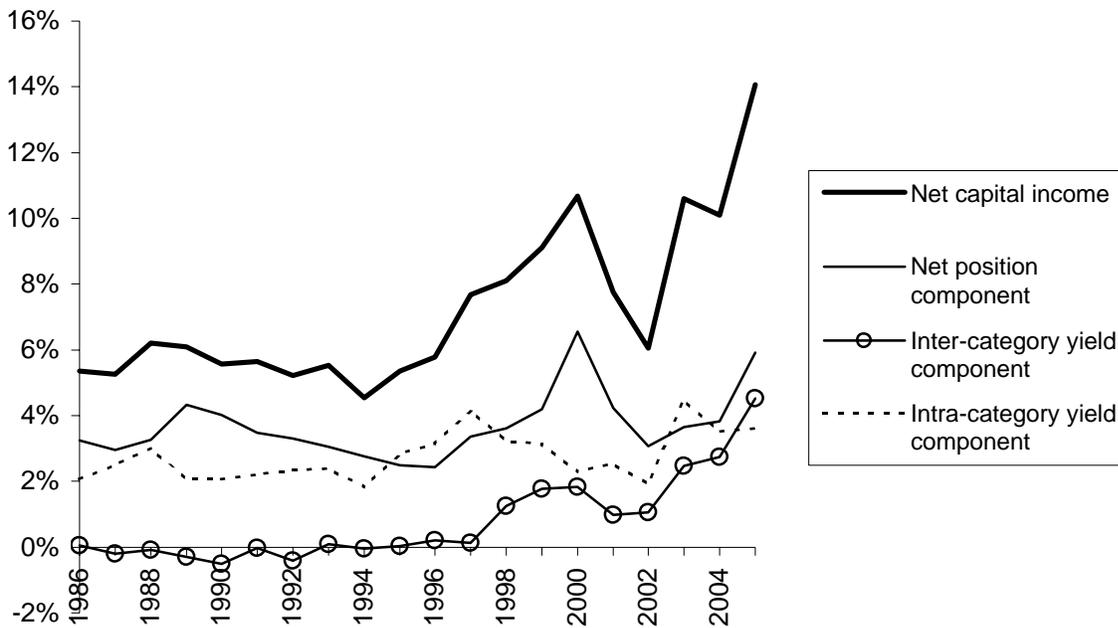


— Change in position      ■ Exchange rate val.  
 □ Asset price val.      ▨ Other val.

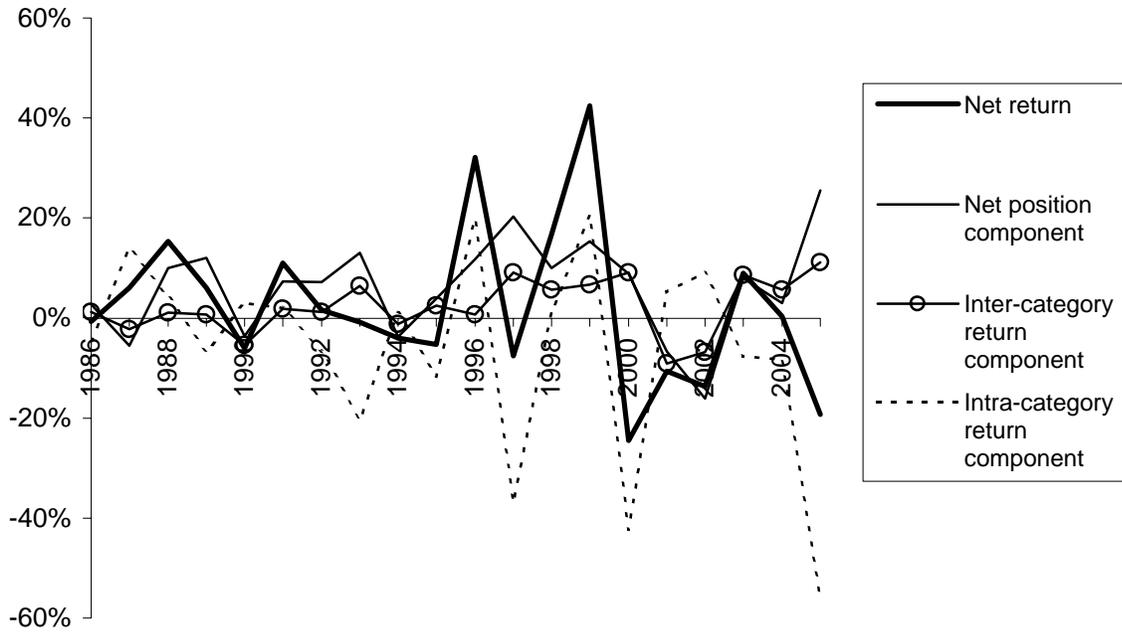
**Figure 16: Net capital income and returns**  
Percent of GDP



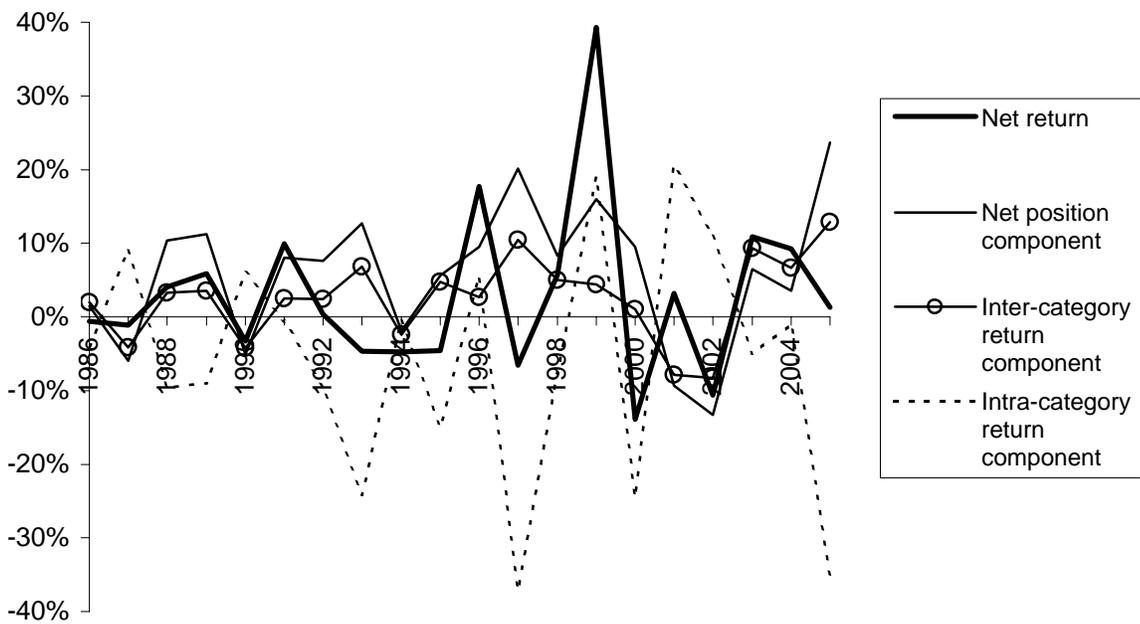
**Figure 17: Components on net capital income**  
Percent of GDP



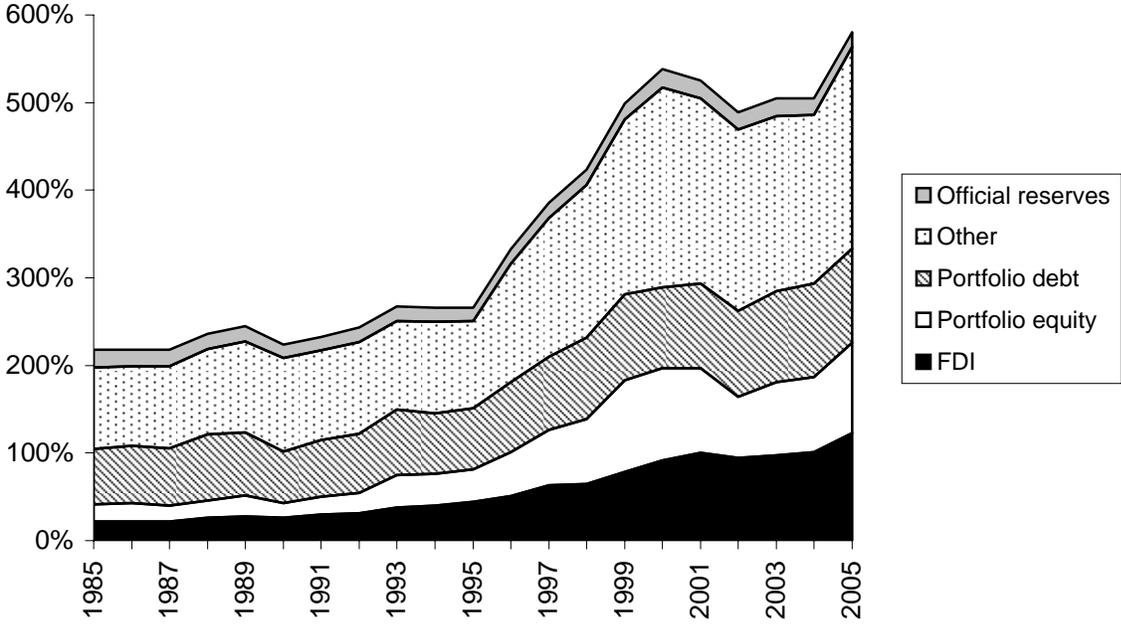
**Figure 18: Components on net broad return**  
Percent of GDP



**Figure 19: Components on net narrow return**  
Percent of GDP



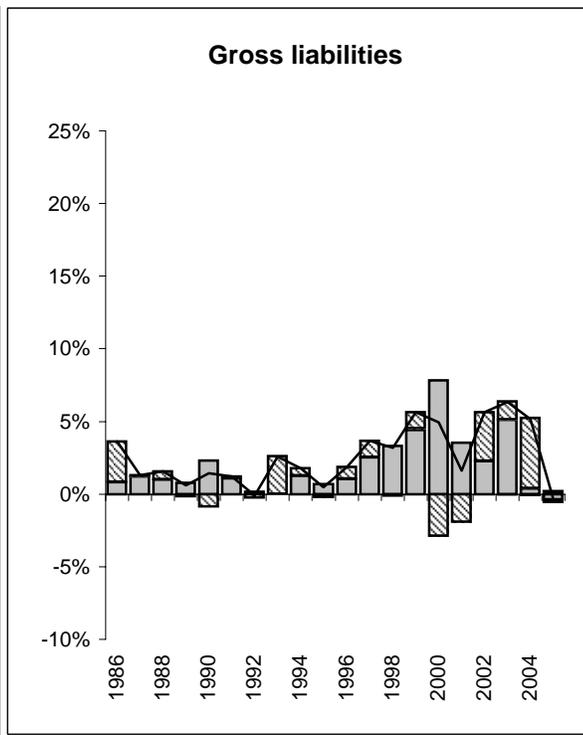
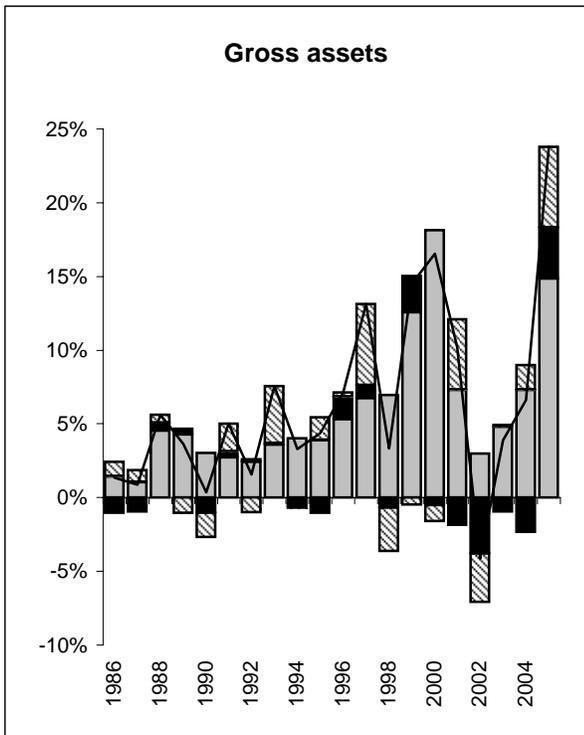
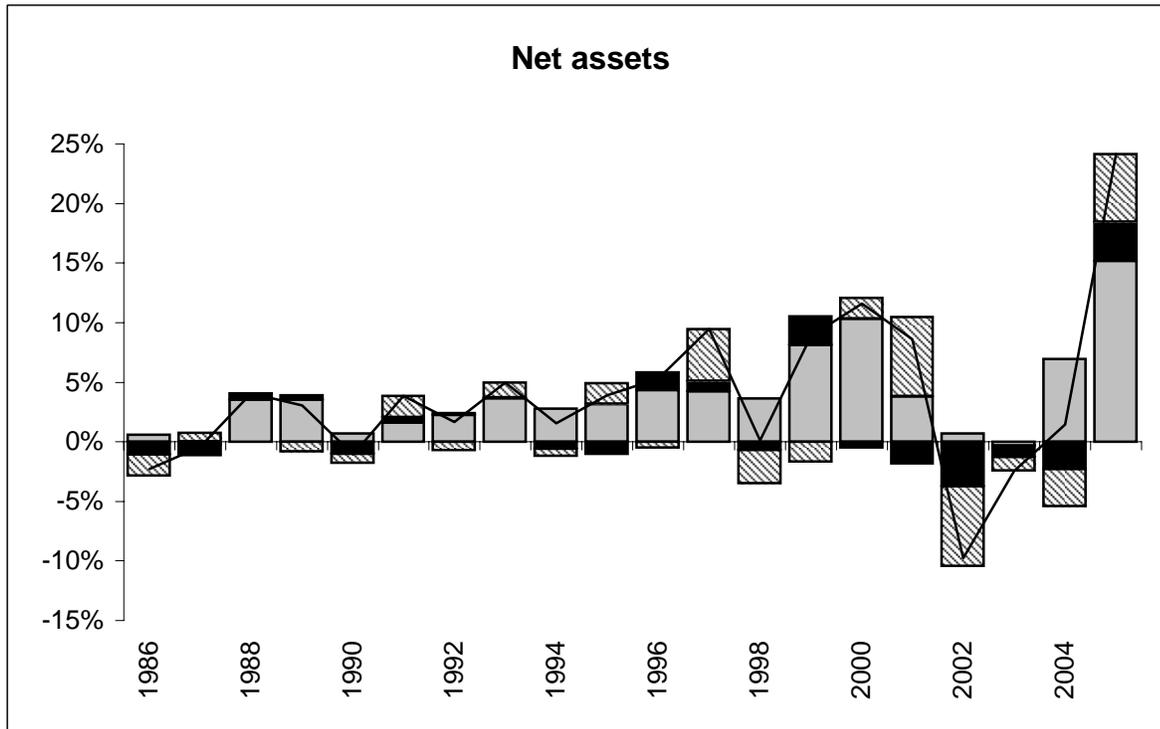
**Figure A.1: Composition of gross assets**  
Percent of GDP



**Figure A.2: Composition of gross liabilities**  
Percent of GDP



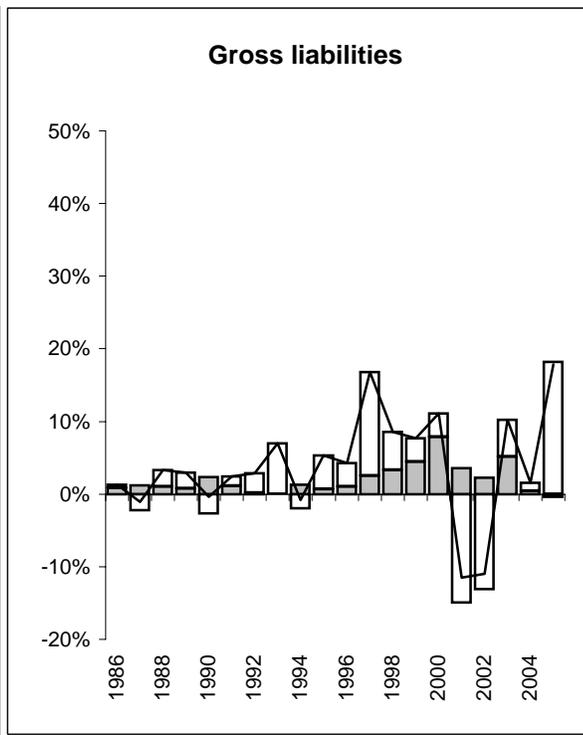
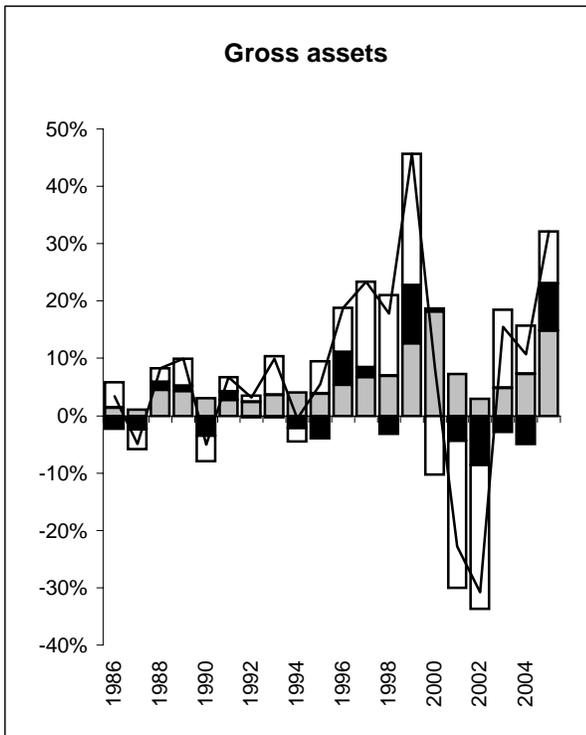
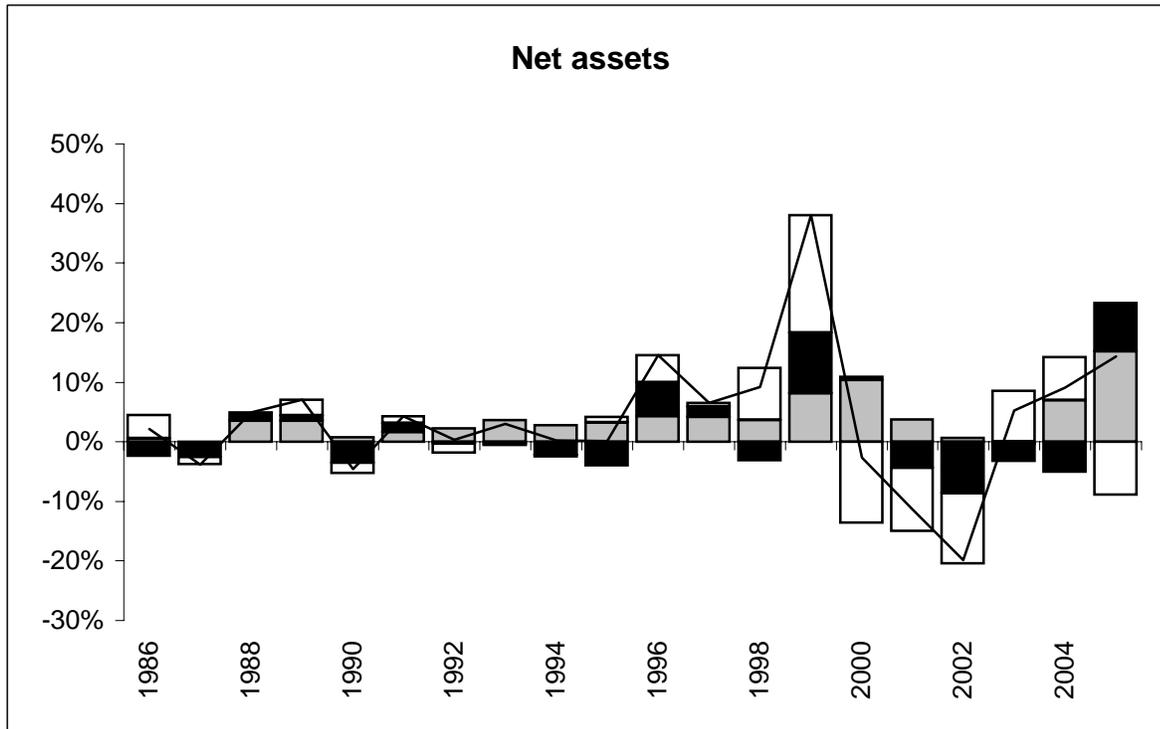
**Figure A.3: Dynamics of FDI at book value**  
Percent of GDP



Change in position    
  Financial flows    
  Exchange rate val.

Asset price val.    
  Other val.

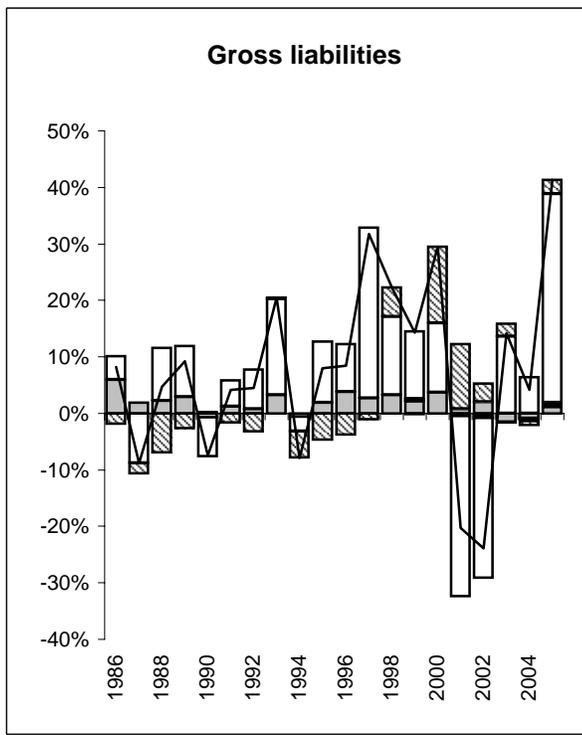
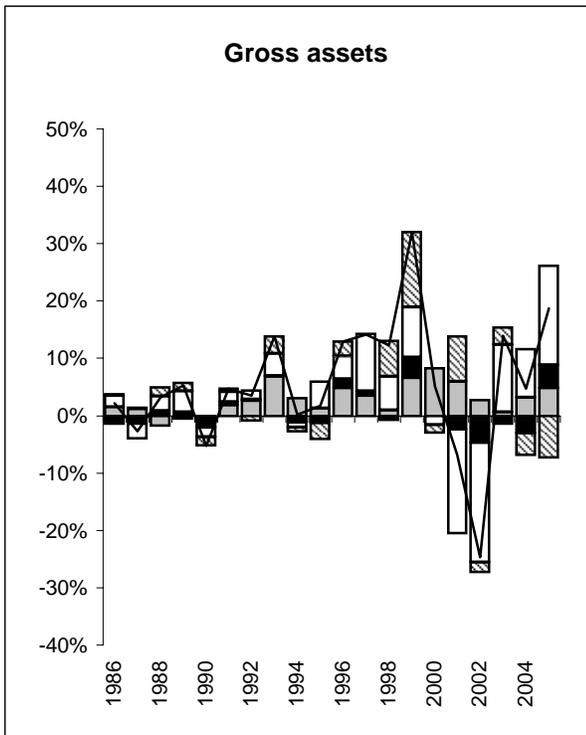
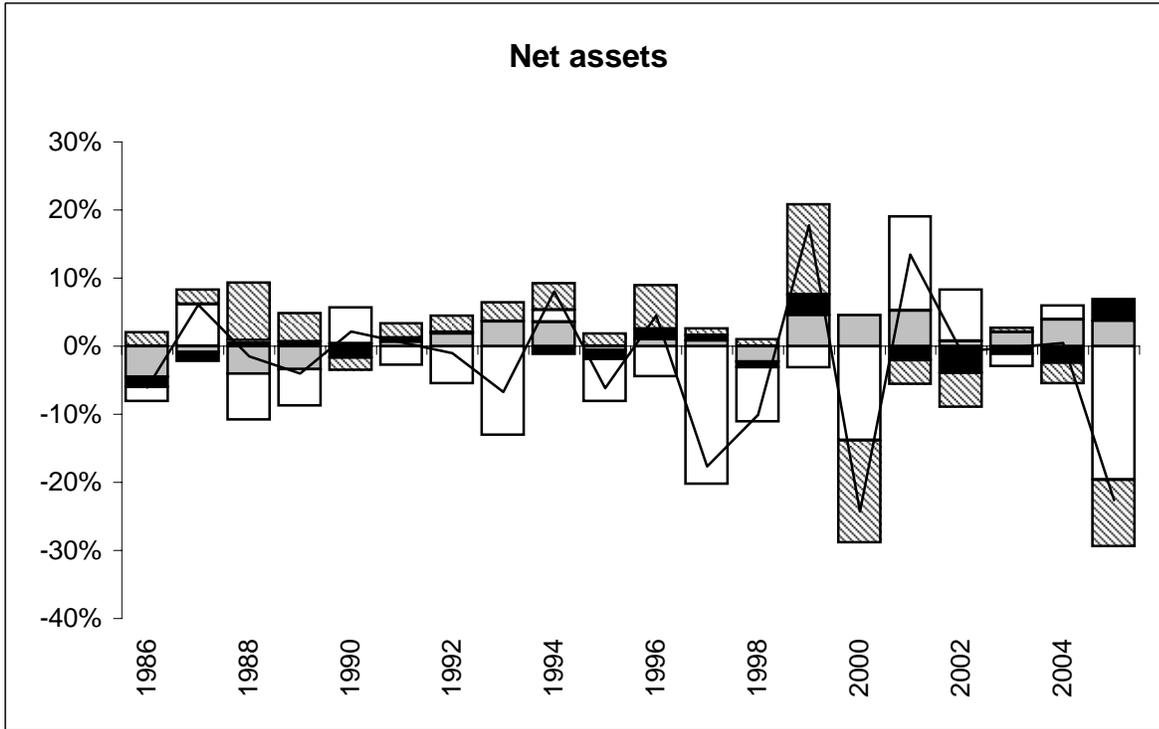
**Figure A.4: Dynamics of FDI at market value**  
Percent of GDP



Change in position    
  Financial flows    
  Exchange rate val.

Asset price val.    
  Other val.

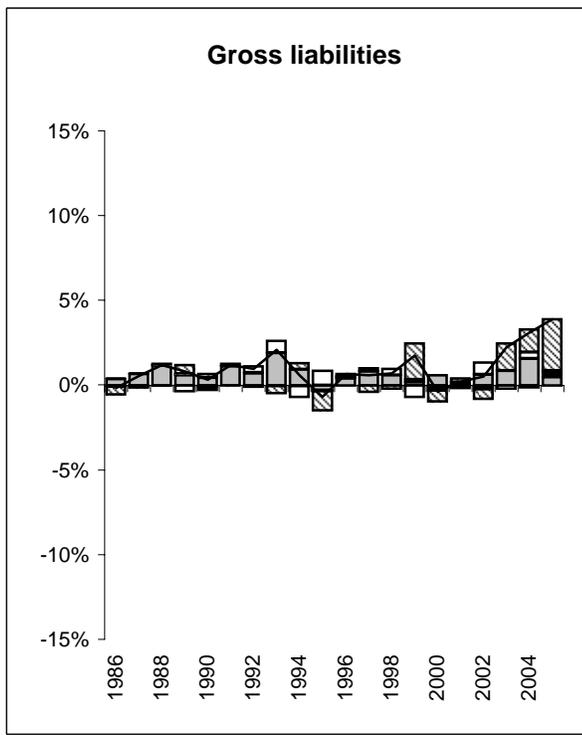
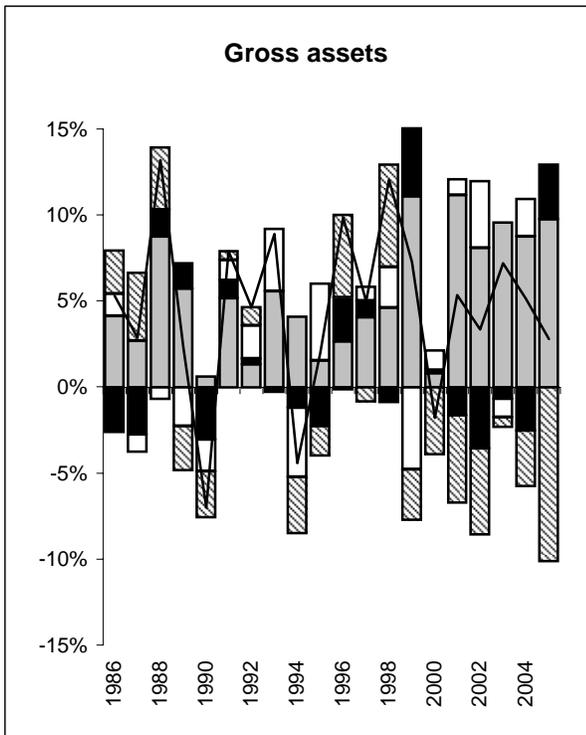
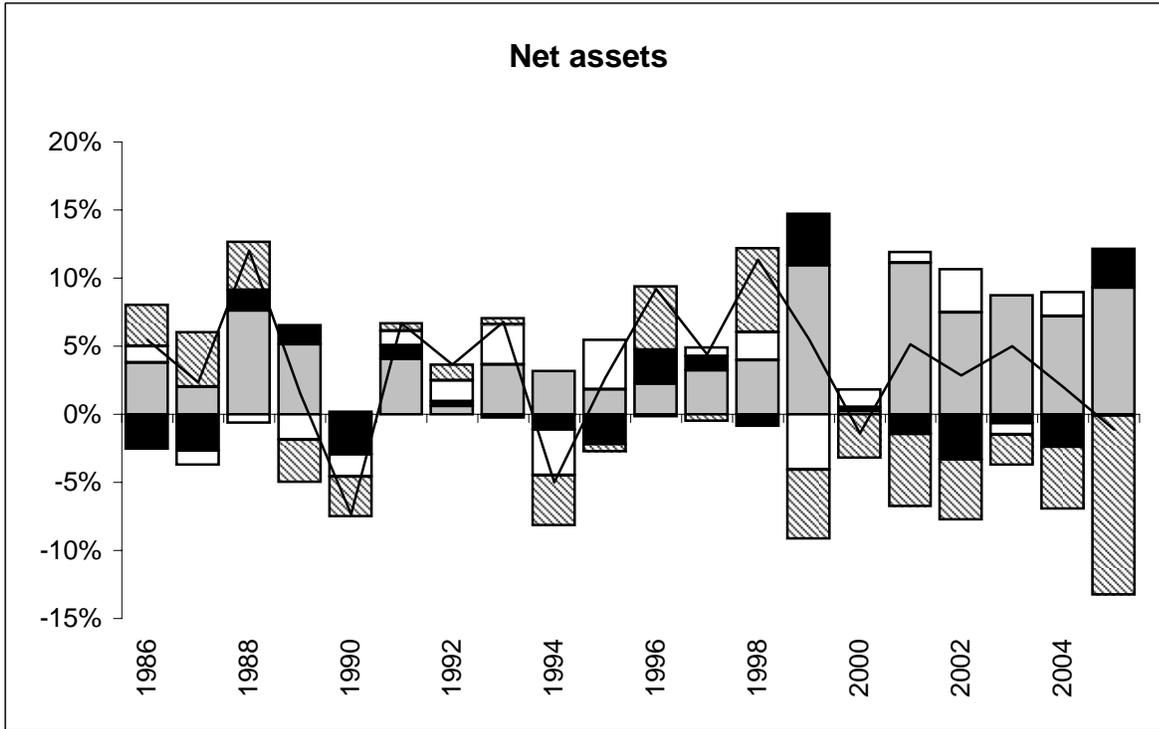
**Figure A.5: Dynamics of portfolio equity**  
Percent of GDP



Change in position    
  Financial flows    
  Exchange rate val.

Asset price val.    
  Other val.

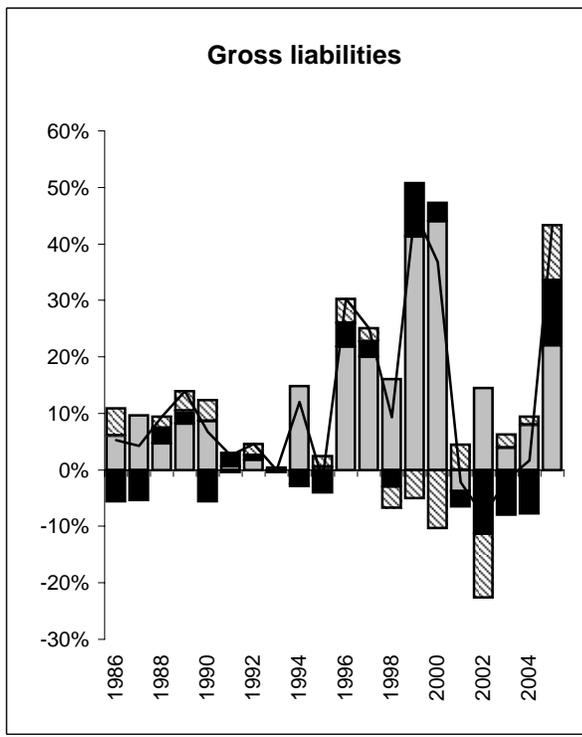
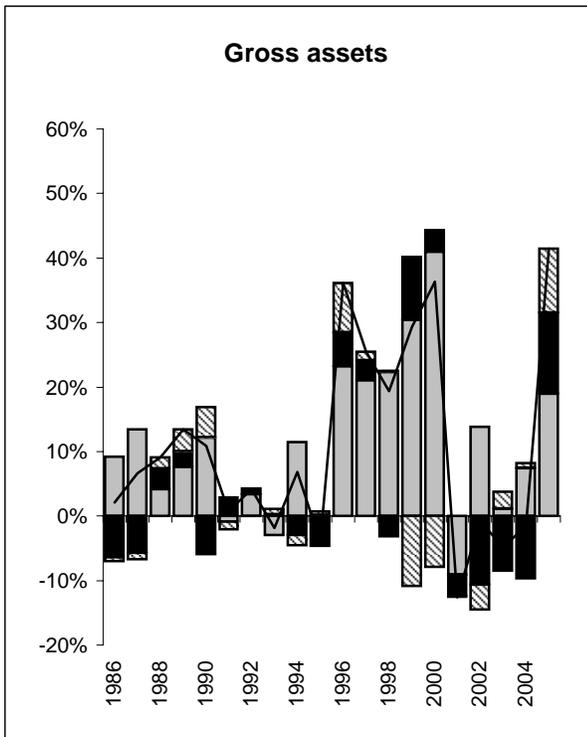
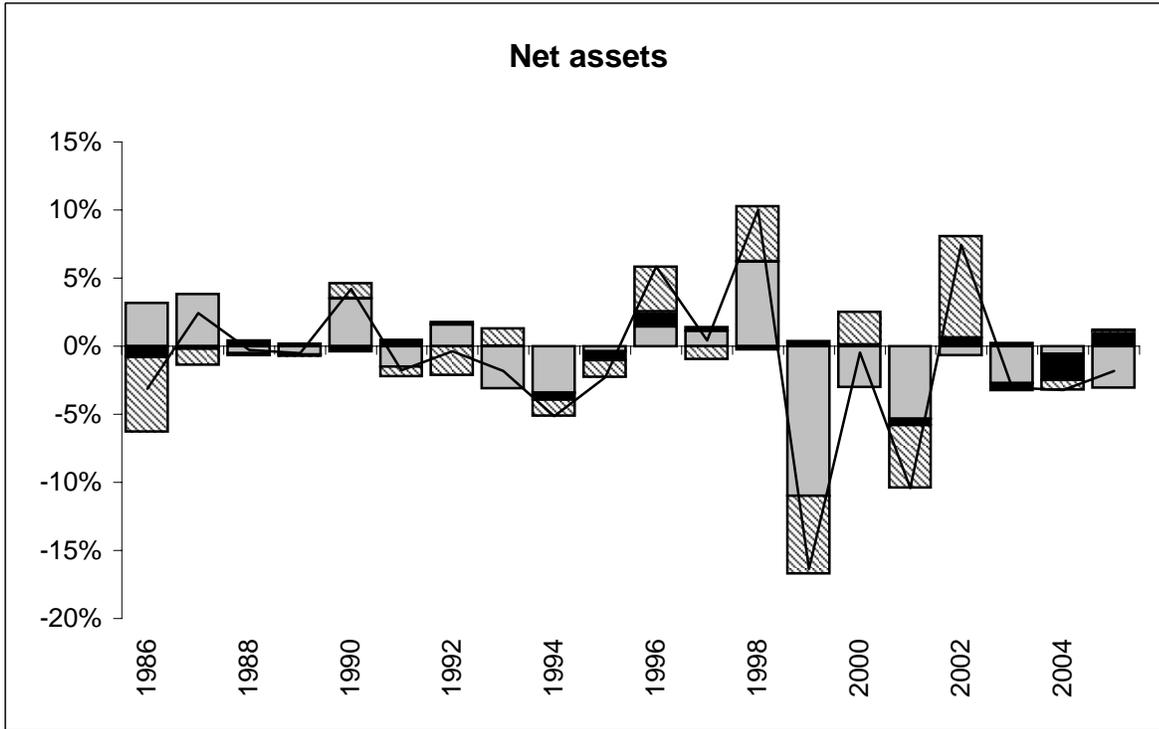
**Figure A.6: Dynamics of portfolio debt**  
Percent of GDP



Change in position    
  Financial flows    
  Exchange rate val.

Asset price val.    
  Other val.

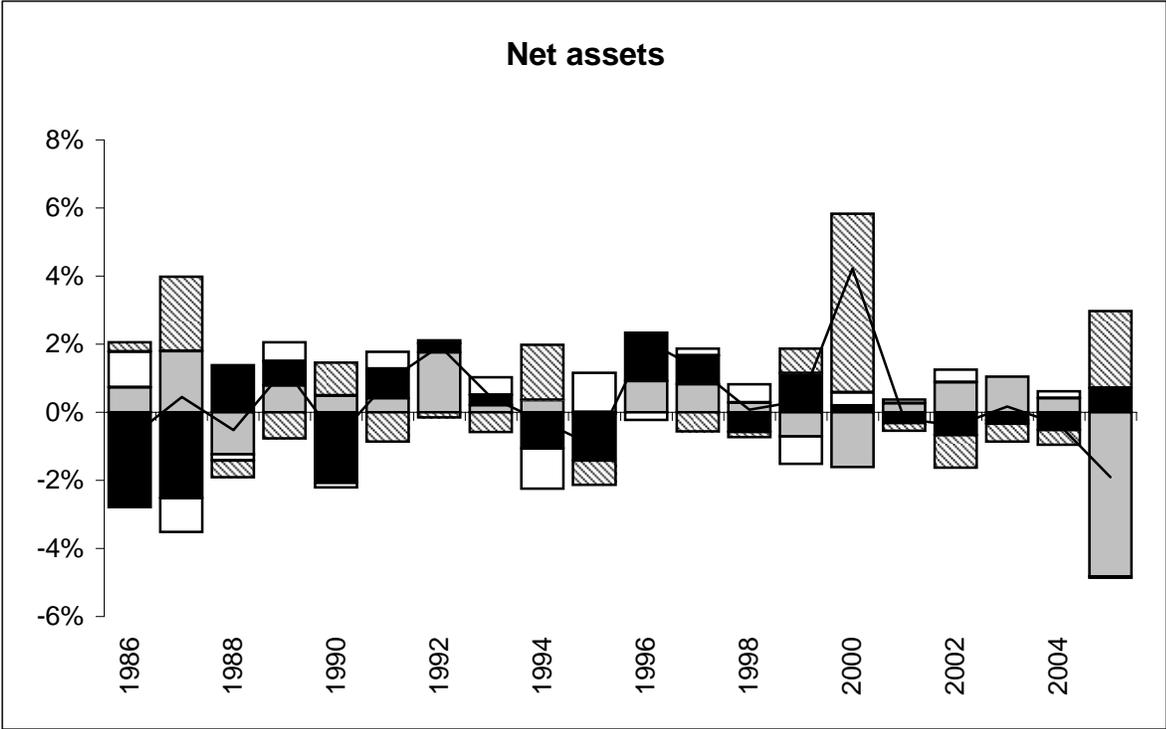
**Figure A.7: Dynamics of other positions**  
Percent of GDP



Change in position    
  Financial flows    
  Exchange rate val.

Asset price val.    
  Other val.

**Figure A.8: Dynamics of reserves**  
Percent of GDP



— Change in position      ■ Financial flows      ■ Exchange rate val.  
 □ Asset price val.      ▨ Other val.