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## Exportweltmeister: The Low Returns on Germany's Capital Exports

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# ABSTRACT

## EXPORTWELTMEISTER: THE LOW RETURNS ON GERMANY'S CAPITAL EXPORTS

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Germany is world champion in exporting capital ("Exportweltmeister"). No other country invests larger amounts of savings outside its borders. However, Germany plays in the third division when it comes to investment performance, as we show in this paper. We study the returns on German foreign investments from 1950 to 2017 and find that: (1) Germany's annual returns on foreign assets were 2 to 5 percentage points lower than those of comparable countries. Germany ranks last among the G7 countries, also in the last decade; (2) Domestic returns on German assets have outperformed foreign returns abroad by about 3 percentage points per year; (3) Germany's external wealth provides very little consumption insurance as foreign returns are highly correlated with domestic activity; (4) The capital exports do little to diversify demographic risks as Germany mainly invests in countries with similar demographics. Taken together, these facts raise substantial doubts whether German households, firms, and banks allocate their savings in a beneficial way.

Keywords: International Capital Flows, Foreign Assets, Foreign returns

JEL classification: F21, F30, F31, F36, G15

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# 1 Introduction

In a famous scene in Michael Lewis' "The Big Short", a senior executive at Deutsche Bank, Greg Lippmann, tours Wall Street in 2007 to short-sell securities containing US subprime mortgages. When asked who was still buying these toxic, high-risk papers, "he always just said: Düsseldorf" (Lewis 2010, p. 67). As a matter of fact, Düsseldorf-based IKB Bank was one of the first banks to fail in 2007. Its "Rhinebridge" investment vehicle was heavily invested in the US subprime mortgage market. IKB Bank subsequently had to be rescued by the German government. These and other anecdotes have tainted the reputation of German investors in global markets, as the notion of "stupid German money" indicates.

Is there economic truth in this caricature? Are German investment returns particularly low, and if so, why? From the point of view of German savers and economic policy-makers, this is a first order question. Germany today is the world's foremost exporter of savings. More than 300 billion Euros of German savings are sent abroad every year. Despite the heavy losses on American and other investments in the 2008 crisis, Germany has exported 2.7 trillion Euros in the past decade alone, equivalent to about 70% of GDP. These capital outflows came from German banks, firms, and households. Unlike in China or Japan, the public sector has played only a secondary role in the build-up of Germany's foreign asset stock, despite the Bundesbank's much-debated Target2 claims within the Eurosystem.[1]

To what extent are the massive capital exports paying off economically for Germany? The German public debate has generally interpreted the high current account surplus as a demonstration of the competitiveness of German industry, and not as an indication of insufficient domestic demand (see e.g. Schuknecht 2014, Fuest 2017, German Council of Economic Experts 2017, Sinn 2017). Various voices in the domestic debate view Germany's capital outflows favorably. Often-heard arguments include the potential for international risk sharing and as a hedge against adverse demographic trends, in line with the traditional textbook view.[2] An aging country like Germany, so the argument goes, can benefit from investing abroad and achieve better investment returns in younger, more dynamic economies abroad (see e.g. Deutsche Bank 2013). Storing wealth abroad will also help for risk sharing and consumption insurance, for example when German households are hit by a recession while other countries are not, resulting in stabilizing capital income transfers from abroad (see e.g. Bundesbank 2018).

[1] In 2018, Target2 claims accounted for about 10% of Germany's total external assets.

[2] See e.g. Taylor and Williamson (1994) and Obstfeld and Rogoff (1996).

Internationally, the country's large-scale capital exports have drawn more criticism. They are sometimes seen as a problem for recovery in the Euro area, and possibly as a driver of credit and asset-price bubbles abroad (see e.g. Bernanke 2015, den Haan, Ellison, Ilzetzki, McMahon and Reis 2016, European Commission 2016, IMF 2016, Krugman 2017). While this criticism used to be rejected by German economists and institutions (see e.g. Weidmann 2014, German Ministry of Finance 2017), the debate has recently shifted, with more voices questioning the size of Germany's current account surplus, which continues to exceed 7% of GDP per year (see e.g. Board of Academic Advisors 2019, Weidmann 2019). A key reason is that the economic consequences of low domestic investment have become difficult to overlook. In an ironic reference to IKB Bank's failed "Rhinebridge" investment vehicle, the deteriorating condition of actual bridges over the Rhine has become a symbol of crumbling infrastructure and growing domestic investment needs. In a situation where Germany's infrastructure needs an overhaul, financing investment in other countries has come under greater scrutiny.

This paper presents a comprehensive empirical assessment of Germany's investments abroad over the entire postwar period. We estimate investment returns and valuation changes across seven decades and compare Germany's returns abroad with those of 12 other advanced economies as well as the returns on domestic investment. We also assess the consumption insurance offered by foreign returns, and their role as a hedge for demographic risks. A central contribution is the international perspective, which is pursued throughout the paper.

Since all economies have access to the same investment opportunities abroad, it is informative to compare the returns on foreign assets of one country to those of another. We ask: How large are the returns on foreign investment of each nation in international capital markets, and how does Germany compare? In other words, we focus on returns on external assets, not on the difference between returns on assets and liabilities. For the purpose of assessing investment performance, this is the relevant question as the liability structure of countries is a function of the investment decisions of others. Moreover, the returns on liabilities can be distorted due to tax shifting and country-specific effects that make comparisons difficult.[3]

Our analysis brings several new insights that break rank with the consensus view in Ger-

[3]In Germany, the difference between asset returns and liability returns has turned positive in recent years, but not because German foreign investments performed better in terms of yields or valuation gains, but rather because the yield of foreigners investing in Germany went down, partly for idiosyncratic reasons (see Appendix A5).

many: First, we find that the returns on German foreign assets are considerably lower than those earned by other countries investing abroad. Since 1975, the average of Germany's yearly foreign returns was about 5 percentage points lower than that of the US and close to 3 percentage points lower than the average returns of other European countries. Germany fared particularly bad as an equity investor where investment returns under-performed by 4 percentage points annually.

Second, we find that Germany earns significantly lower foreign returns *within* each asset category, after controlling for risk. This suggests that Germany's weak financial performance abroad is not merely the result of a more conservative investment strategy that focuses on safer assets. The low German returns compared to other countries also cannot be explained by exchange rate effects (appreciation), nor by the recent build-up of Target2 balances. Instead, valuation losses are a big part of the explanation. The valuation of Germany's external asset portfolio has stagnated or decreased, while other countries witnessed considerable capital gains, on average. Germany's frequent investment losses are remarkable given that the world economy has witnessed a spectacular price boom across all major asset markets over the past 30 years (Jordà, Knoll, Kuvshinov, Schularick and Taylor 2019).

Third, German returns on foreign investment were considerably lower than the returns on domestic investment. This is an important insight for the policy debate on the merits of domestic vs. foreign investment. The difference was particularly pronounced in the last decade, when the average return on a domestic portfolio of German bonds, equity, and real estate was about 4 percentage points higher per year than the returns on Germany's foreign assets.[4] German capital exports surged in the past decade, but the better returns were to be had at home. Clearly, while it is possible that domestic returns were to some extent pushed up by capital exports, negative real interest rates on a wide range of assets provide some *prima facie* argument against a scarcity premium on domestic capital.

Fourth, we find little evidence that foreign returns have positive effects for consumption insurance. The return on Germany's external assets is highly correlated with German economic activity – even more so than domestic returns – and, thus, provides no hedge against domestic consumption shocks. Moreover, 70% of Germany's foreign assets are invested in other advanced economies that face similar demographic risks. In the past decade, less than 10% of capital flows went to younger, more dynamic economies outside

[4]Data on the domestic return is from Jordà et al. (2019). The return is computed as a weighted average of return on equity, housing, bonds and bills. Weights are stock market capitalization, housing wealth, and public debt (split half-half between bonds and bills).

Table 1: Comparing returns on foreign assets, 1975-2017

| | Rank | 1975-2017 | 1999-2017 | 2009-2017 |
|---|---|---|---|---|
| United States | 1 | 10.64 | 8.00 | 9.27 |
| United Kingdom | 2 | 10.22 | 5.68 | 4.09 |
| Canada | 3 | 9.19 | 4.93 | 8.98 |
| Sweden | 4 | 8.99 | 6.45 | 5.38 |
| Norway | 5 | 8.00 | 5.89 | 7.38 |
| Italy | 6 | 7.96 | 3.31 | 4.39 |
| Spain | 7 | 7.91 | 2.09 | 2.89 |
| France | 8 | 7.38 | 4.01 | 4.43 |
| Netherlands | 9 | 6.65 | 4.82 | 6.05 |
| Denmark | 10 | 5.32 | 5.32 | 6.98 |
| Portugal | 11 | 5.01 | 2.71 | 2.20 |
| Germany | 12 | 4.93 | 3.68 | 3.69 |
| Finland | 13 | 4.43 | 3.90 | 3.39 |

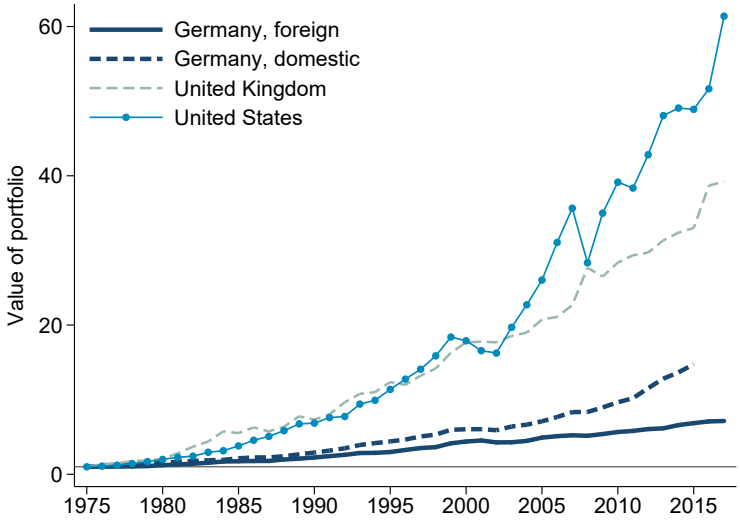
*Notes:* This table shows average, nominal returns on foreign assets for various time samples. Countries are ranked by their average return. We compare nominal returns in domestic currency to abstract from different national inflation dynamics. The ranking is similar with real returns (see Appendix A1). Data for Denmark and Portugal starts in 1999 and 1993, respectively. No data is available for Japan. For details see Section 2.

of Europe or North America, despite the fact that emerging markets now account for more than 50% of world GDP.

Table 1 summarizes the main findings of the paper. The table ranks countries by their average return on foreign investments, using all countries for which we have sufficiently detailed data (see Section 2 for details and methodology). Germany has the worst investment performance among the G7-countries. In the full country sample from 1975 to 2017, Germany ranks 12th, with only Finland performing worse. The picture looks similar if we consider the past decade (2009-2017), where Germany ranks on the 10th place. The same is true when we use real returns, deflating each country's foreign asset returns with domestic inflation rates (see Appendix Table A1, where Germany ranks 9th).

The cumulative effects of these bad investment returns are quantitatively large, as can be illustrated with a simple counterfactual exercise. In the decade since the 2008 financial crisis alone, Germany could have become about 2 to 3 trillion Euros richer had its returns in global markets corresponded to those earned by Norway or Canada, respectively. This implies a (hypothetical) wealth loss of 70 to 95% of German GDP (see Section 5 for details). On a per capita basis, this implies an amount of 28.000 to 37.300 Euros of foregone wealth

Figure 1: Cumulated nominal returns, 1975-2017




*Notes*: This graph shows cumulated total returns since 1975 for a portfolio with an initial value of 1. We focus on foreign nominal returns of the US, the UK and Germany, as well as the German domestic return (data until 2015 from Jordà et al. (2019)). Returns are cumulated over the years using the following formula: $\prod_{i=0}^{t}(1+r_i)$. For details see Section 2.

for each German citizen (compared to the performance of Norway and Canada). These numbers are only an illustrative thought experiment, but they highlight the economic magnitude of high vs. low returns on foreign investments.

The large cumulative effects are also evident in Figure 1, which compares the total return performance of German foreign investments, US and UK external assets, as well as a portfolio of domestic German assets (stocks, bonds and houses). Assume you invested 1 Euro in global capital markets in 1975 and that you reinvest any dividends or interest gains. As of 2017, you would own 40 to 60 times of that initial investment had you followed the investment strategy of the UK or the US. In comparison, the initial investment only increased by a factor of 7 using the returns on German foreign assets (before inflation). German domestic assets generated gains 14 times of the initial investment.

**Related literature:** The paper contributes to the existing literature in several ways. First, it compares the foreign investment returns of 13 nations in a systematic way. Much of the literature focuses on individual countries and typically compares the returns on assets abroad to those earned by foreigners on inward investments, i.e., on liabilities (for a survey see, e.g. Gourinchas and Rey 2014). A main motivation of that strand of research is to examine the size of the "exorbitant privilege", referring to the phenomenon that some

countries, such as the United States, can borrow at low yields from abroad and reinvest these into higher-yielding assets internationally (Lane and Milesi-Ferretti 2003, Meissner and Taylor 2006, Gourinchas and Rey 2007*a*, Curcuru, Dvorak and Warnock 2008, Curcuru, Dvorak and Warnock 2013). Here, we take a broader perspective and benchmark returns across countries, decompose these returns, and examine their determinants in a sample spanning multiple decades. This adds to a small literature that compares international returns (Lane and Milesi-Ferretti 2003, Lane and Milesi-Ferretti 2007*a*, Habib 2010). We apply a broad range of tests across countries that so far have only been employed to analyze return differentials of individual countries. In particular, based on newly gathered data and new estimates for our 13-country sample, we compute how returns are affected by valuation changes due to exchange rates, by asset composition, and by the geographical distribution of foreign investments.[5]

Second, this paper is the most comprehensive analysis of the returns of Germany's external assets, going as far back as the 1950s, and by applying a similar degree of rigor as influential studies conducted for the United States. Our basic methodological approach resembles that of the Bundesbank (2014, 2018) and we also get similar return estimates for comparable samples, spanning 2005-2017 (see Appendix A2 for a detailed comparison with these and other studies focusing on Germany). Our contribution is to put these numbers into perspective by benchmarking the investment performance to that of similar economies, by adding five decades of data, and by studying *why* German returns are so low, focusing, in particular, on exchange rate effects, Target2, asset composition, return volatility, and geography. The results reveal how badly German investments have done in international comparison, including in the past decade. Our study, thus, comes to different conclusions about the profitability of German investments than earlier works (Appendix A2). Furthermore, our findings on risk sharing and demographic hedging question two of the most common arguments in support of Germany's large capital outflows.

The structure of the paper is as follows. We first guide the reader through some technical but important preliminaries about data, balance of payment arithmetic and methodology used. The next section presents long run series for returns, yields, and valuation changes on German foreign investments. We then compare returns on German foreign assets to returns on the foreign assets of other countries and to domestic German assets. The last section looks at the performance of foreign assets as a hedge for domestic consumption and demographic risks.

[5]Bénétrix, Lane and Shambaugh (2015) also analyze a large set of countries but they mainly focus on valuation changes due to exchange rates and not on their effects on returns.

## 2 Data and definitions

This section gives an overview of the main data and definitions used. We start by describing the method for computing returns and the classification of investment types, then discuss the data for Germany, and move on to international data.

### 2.1 Return computation

We compute the aggregate domestic currency return as the sum of primary investment income, $II_t$, earned and valuation changes, $VC_t$, over the stock of assets at the beginning of year $t$:

$$\widetilde{r}_t^A = \frac{II_t^A + VC_t^A}{IIP_{t-1}^A} = \widetilde{i}_t^A + \widetilde{vc}_t^A, \tag{1}$$

where the superscript $A$ indicates the asset side of the economy, i.e. assets owned abroad, financial account outflows and primary income earned by German residents. This is the standard approach in the literature (see e.g. Habib 2010). We transform the three measures of returns to real values using consumer price inflation $\pi_t$:

$$i_t^j = \frac{1 + \widetilde{i}_t^j}{1 + \pi_t} - 1 \qquad \text{(real yield)} \tag{2}$$

$$vc_t^j = \frac{1 + \widetilde{vc}_t^j}{1 + \pi_t} - 1 \qquad \text{(real rate of capital gain)} \tag{3}$$

$$r_t^j = \frac{1 + \widetilde{i}_t^j + \widetilde{vc}_t^j}{1 + \pi_t} - 1 = i_t^j + vc_t^j + \frac{\pi_t}{1 + \pi_t} \qquad \text{(real return)}, \tag{4}$$

Following the residual approach, we compute valuation changes as all changes in the asset position not due to transaction in the financial account:

$$VC_t^A = IIP_t^A - IIP_{t-1}^A - FA_t^A = VX_t^A + VP_t^A + VOT_t^A. \tag{5}$$

These valuation changes can be further split into valuation changes due to the change in the exchange rate (for assets denominated in foreign currency), $VX_t$, changes due to price changes, $VP_t$, and other changes, $VOT_t$, which include write-offs and permanent losses but also residuals due to statistical discrepancies. The latter result mainly from changes in primary data sources and differences between the different time series used. In the literature on the exorbitant privilege of the US, much attention focused on the treatment of this other adjustments term which can be large in some cases (see e.g. Lane and Milesi-Ferretti 2009).

In the United States, the main reason for discrepancies are different revision policies for the IIP and the balance of payments, specifically revisions in asset data are more extensive than revisions in flow data (Curcuru et al. 2008). In Germany, this is not the case. The Bundesbank revises both stock and flow data up to the four previous years and adjusts both accounts in order to ensure consistency. Therefore, we include other adjustments fully in our valuation gains following authors such as Habib (2010) and Lane and Milesi-Ferretti (2007*a*). However, we also adjust for statistical problems which are not adjusted for in revisions, as discussed for example by the Bundesbank (2014) and Frey, Grosch and Lipponer (2014). A detailed explanation of our adjustments can be found in Section 2.3. Our procedure ensures that we include relevant permanent losses while, at the same time, not including changes due to purely statistical effects.

Starting in 2005, the Bundesbank provides a breakdown of the valuation gains into the three components (exchange rates, prices, other). Using this data, we show in Appendix A2.2 that different allocations of the residual term only have minor effects on the overall return. We take this as evidence that our residual approach with additional adjustments is appropriate for the study of long-run return developments in Germany.

### 2.2 Asset categories

Following standard practice, we will focus on four broad categories of foreign investments:

- **Foreign direct investment** (FDI) is any kind of foreign investment associated with control or significant influence over a foreign affiliate. This category also includes any additional investment associated with the foreign direct investment relationship, including reverse investment. Furthermore, real estate investments typically fall in the FDI category.

- **Portfolio investment** is further split into debt and equity investment, where debt investment refers to bonds of any kind and equity refers to any direct claims not classified as FDI. Furthermore, investment fund shares are usually combined with the equity part of portfolio investment. In our analysis, we will usually consider debt and equity separately.

- **Other investment** is a combination of various additional investment categories. It mainly covers financial loans, trade credit and advances, currency, and deposits. In addition, "other investment" includes some residual "other equity" as well as claims

from pension entitlements and insurances (the latter only since the recent reform of the BPM). For Euro Area countries, also Target2 balances are included, more precisely in the "currency and deposits" subcategory.

- **Reserves** refer to any assets held by the central bank for the purpose of monetary operations.

### 2.3 German data

To compute returns, we use data from three different balance of payments accounts published by the Bundesbank: the International Investment Position (IIP), the financial account, and data on primary income from the current account.

The IIP is available since 1949 on the Bundesbank website. The flow accounts data there starts in 1971. We combine this series with data for 1949-1970 using a Bundesbank report published in commemoration of the 50th anniversary of Deutsche Mark, which is made available electronically by Histat/GESIS (Bundesbank 1998). The stock data and the new flow data have been revised backwards to match the requirements of the sixth edition of the IMF's Balance of Payments Manual (BPM). The older flow data is still based on the previous edition of the BPM and it is denominated in Deutsche Mark (DM). Furthermore, there are important differences between the BPM5, which was introduced in 1993,[6] and the BMP6 introduced in 2009.

A main challenge in this context was to assure that we have consistent time series for each asset category over the seven decades we study, for which we adapt the old (pre-1971) BOP data to make it compatible to the newer data. The easiest part was to convert all old series into Euro using the fixed conversion rate (1.95583 $\frac{DM}{€}$). In addition, there were several changes in the BOP manuals and Bundesbank data series that relate to the classification of asset classes and their subcategories, which we deal with as follows.

First, we combine "loans" and "other investment" in the historical data into an aggregate category to make it consistent with the modern (BMP6) classification, which combines loans, currency, deposits and other investment activities under the label "other investment". The historical series, we created includes interest income from loans but not from "other investment", since these mainly constitutes government stakes in international or-

[6] The BPM5 was implemented by the Bundesbank in 1995 for the current account and in 1998 for the IIP. Using more detailed data the Bundesbank was able to reclassify the old data in line with the most recent manuals, which is very helpful for our purposes.

ganizations.[7]

Second, in the old data, financial account flows of the central bank were recorded in a separate account. The data from this central bank account is similar to that in today's category which is labeled "financial account" (we can compare the old and new series for a lengthy overlapping period, namely 1971-1997). Therefore, the data from the old Bundesbank account is relabeled as "financial account" data in the period before 1971 and then merged with the new series.

Third, in today's BOP data, portfolio debt investments are divided into long and short term bonds, while there is no such distinction in the old data, where this category is labeled as "fixed income assets".[8] Since these terms refer to the same asset class, the old and new series are merged and renamed "portfolio debt". This category captures both long and short term bonds in history and today.

Fourth, we face the problem that "reserve assets" are a distinct category in the IIP and the financial account, while reserves are combined with "other investments" in the primary income account.[9] As a result, we merge the two series so that returns can only be computed for the sum of "other investments and reserves".

Fifth, portfolio equity investment includes the subcategory "investment fund shares" but data availability and reliability of this series is limited historically. The subcategory was fully incorporated in the German IIP only in 1994, but the estimation of the liability position is noisy and imprecise until the year 2009 (Frey et al. 2014). Therefore, we only compute returns from investment fund shares from 2010 onward and exclude this series until 2009. Since "investment fund shares" make up no more than 6% of total IIP assets and less than 1% of IIP liabilities before 2009, this does not affect our results much.[10] We face similar problems for the category of FDI debt, meaning loans that are part of foreign direct investment flows. The IIP series on this subcategory only starts in 1997 while it was included in the other accounts earlier on. We therefore exclude the data on FDI loans prior to 1997 to ensure consistent return series.

[7] See annotation in table B6_07 in Bundesbank (1998).

[8] More specifically, in German the category in the new data is called "Schuldverschreibungen" whereas it used to be "festverzinsliche Wertpapiere".

[9] In the BPM6, countries are left the choice whether to show the income flows separately or combine them with "other investment". In the old manual countries could choose to include the income flows either in "other investment" or portfolio investment. The Bundesbank chose to combine the reserve asset income with other investment income, such that there is a consistent time series available.

[10] The aggregate return on foreign assets is barely affected. The return on equity is lower if we include investment fund shares since their return is lower than the return on equity. Between 1994 and 2009, the inclusion of investment fund shares lowers the return from 8.71% to 6.1%. Hence, if anything, ignoring this sub-category will result in an over-estimation of German returns (upward bias).

Sixth, the Bundesbank added "financial derivatives" to the IIP in 2010, as this category had become increasingly relevant. Financial derivatives are only recorded as balances in the financial account and not included in primary income, making it difficult to compute precise returns. Therefore, we subtract financial derivatives from aggregate quantities and do not consider them in our main returns calculations. However, we do show some stylized facts on the amount of outstanding derivatives in Section 3. More generally, whenever any further new category is added to the IIP, we subtract the increase due to this addition from the change in assets in the given year to avoid any unwarranted breaks in valuation gains.

Beyond the categorization of asset classes, we need to consider idiosyncratic breaks in the data series, changes in data availability, as well as mismatches between the three different accounts, as also discussed by Bundesbank (2014) and Frey et al. (2014).

First, the initial values in 1954 for IIP liability categories portfolio investment and debt instruments within portfolio investment are unrealistically low compared to values in the following period, resulting in double or triple digit returns in the following year. These values were excluded as outliers.

Second, the Bundesbank changed the valuation of its reserves and other external holdings after the introduction of the Euro in 1999. Before 1999, the reserves were valued using the "lower of cost or market" concept, while they are valued at market prices afterwards. According to Bundesbank (2012), this resulted in a €26.25 billion jump in the reported value of reserves and other assets held by the Bundesbank in 1999 (of these €25.42 billion are FX reserves and €0.83 billion are other assets). To correct for this one-time change, this increase is subtracted from the change in the relevant IIP asset categories in 1999.

Third, there are issues with regard to market vs. book valuations. For our purpose of computing investment returns it is crucial to value assets at market prices. This is particularly challenging for the valuation of FDI. For listed companies, FDI equity is valued at market prices by the Bundesbank since 2004, but not before. For non-listed companies, the Bundesbank uses the values reported in the parent company's balance sheet, as is standard practice in many countries and is also recommended in the BPM6 (Bundesbank 2008). Moreover, no market prices are used for other, smaller components of FDI assets, for example assets related to construction sites. Only real estate assets have always been valued at market prices (Bundesbank 2008). The lack of market values in some parts of the FDI data may lead to an underestimation of returns, which is particularly problematic if Germany uses a different valuation approach than other countries. We explore how our

results may be biased due to FDI valuation issues in Appendix A7, concluding that the effects are small.

Valuation issues are less relevant for the remaining asset categories. The Bundesbank has always reported portfolio investments at market prices.[11] The same is true for real estate, which is valued at market prices using price indices, also prior to 2004 according to Bundesbank (2008). For reserves, the Bundesbank provides market-based values since 1999, and before that it applied the lowest value accounting principle, assigning the minimum of market value and original (purchasing) costs. For loans, deposits, and currency valuation changes are secondary, except for exchange rate effects, which we take into account throughout our analysis.

Taken together, these adjustments allow us to compute consistent time series of returns using primary income, financial account flows, and asset stocks for the asset categories of foreign direct investment, portfolio debt investment, portfolio equity investment, and "other investments" (including reserves) starting in 1949.

Beyond data on German assets and liabilities, we use data on the German price level and GDP from the Macro History Database (MHD) (Jordà, Schularick and Taylor 2017). MHD data is only available until 2016, so we append data from German Federal Statistics Office (GDP) and Eurostat (Harmonized Index of Consumer Prices (HICP)) for 2017. For GDP we do this by using official data levels and applying the growth rates from the MHD data.

### 2.4 International data

In order to place German returns in a broader context, we compare them to other countries' returns on their foreign assets. We compute the returns of other countries as discussed above and thus require the same type of data. The main data sources are the IMF's balance of payments and international investment position statistics.

The time series generally start in 1970 but there are differences across countries. Data on assets is the most limited when drawing on national sources. Therefore, we add data on assets from the External Wealth of Nations database (EWN) of Lane and Milesi-Ferretti (2007*b*). We follow their recommendation regarding the starting year of when to use IMF data and when to use their estimates. This is mainly due to part of the older time series from the IMF still being book-value series. Lane and Milesi-Ferretti (2007*b*) on the other hand, provide estimates of market-value positions. Due to the relevance of valuation

[11] The valuation used to be done by using price indices (Bundesbank 2008). Since 2006 individual securities can be tracked and valued to provide an even better estimate of foreign assets.

changes for our returns we rely on their estimates. This allows us to compute returns for 12 additional countries. For five countries the return series start in 1971, for an additional five countries the series starts at the latest in 1976. Details on countries and time spans covered are listed in Table A3 in the appendix. To ensure comparability we also exclude data on financial derivatives from the other countries' returns. In addition, we also check the consistency of the data sources as we do for Germany and adjust accordingly. These country-specific data issues are also described in Table A3.

To compute real returns, we use data on inflation from the World Bank's Word Development Indicators. Furthermore, we also use nominal GDP data from the World Development Indicators database in the regression analyses.

One important influence on returns are valuation changes due to exchange rates. Unfortunately, exchange-rate specific valuation changes are only published scarcely by some countries and there is no readily available dataset across countries, especially not by asset class. Therefore, we estimate exchange rate driven valuation change for each investment category in our sample as discussed in more detail in Section 6.1. For this purpose we need data on the currency composition of assets, but such data is also not readily available. Instead, we follow the suggestions of Bénétrix et al. (2015)[12] to approximate the currency composition. For each assets category, we use different external sources. Table A4 in the appendix provides details on the data used for each country and asset type. We also discuss the data choices in the following.

For FDI assets, we use OECD data on bilateral FDI stocks which starts in 1985 for most countries and covers a large set of partner countries.[13] Following Bénétrix et al. (2015), we assume that FDI in a country is always denominated in the local currency.

To estimate the currency shares of portfolio investment, we rely on data from the IMF's Coordinated Portfolio Investment Survey (CPIS). The survey collects data on the cross-border holdings of portfolio equity and debt assets starting in 2001. The holdings are broken down by country pairing and by currency. The currency breakdown includes US Dollars, British Pound, Euro, Japanese Yen and Swiss Franc.[14]

[12]This is an update and extension of Lane and Shambaugh (2010) which describes the process in some more detail.

[13]Bénétrix et al. (2015) suggest using the UNCTAD database. However, we find for our sample the OECD database is more useful. The UNCTAD data only covers the years 2001-2012. Its advantage is that it covers a large set of reporting countries, and that it includes the ultimate counterparts instead of the immediate target of the investments. This is relevant especially for the investment of large multinational corporations. The former is not relevant to us since we focus only on advanced economies. The latter is unlikely to affect the currency composition in a major way.

[14]Not all countries provide a currency breakdown since 2001. In those cases, we use information from

"Other investment" mainly comprises of loans and deposits by banks. Therefore, Bénétrix et al. (2015) suggest using the Locational Banking Statistics (LBS) provided by the Bank for International Settlements (BIS). This data set covers bank lending by banks in US Dollars, British Pound, Euro, Japanese Yen and Swiss Franc. We use these currency shares as an estimate for the currency share of all other investment. Data is available from 1977 onward.[15]

Reserve assets also include a significant share of foreign currency assets. We, therefore, gathered balance sheet and annual report data of each of the national central banks. In some cases only approximate shares are reported (e.g. "more than 90%"). In these cases we resort to IMF data on reserve positions and apply the reported shares. Furthermore, we use IMF data on special drawing rights (SDRs) which are also subject to valuation changes. Details on coverage and sources by country are again displayed in Table A4 in the appendix.

To validate our approach on exchange-rate driven valuation changes, we make use of the fact that some countries have started to publish a breakdown of IIP valuation changes in recent years, albeit usually with limited time coverage. Among these countries are Germany, the Netherlands, Portugal, Spain, the United Kingdom, and the United States. Whenever official time series are available we use these and, otherwise, rely on our own estimates.[16] Furthermore we can show that our estimates are similar to the official time series Appendix A4, which gives some assurance that our approach is useful. In that appendix, we also compare our estimates to those of Bénétrix et al. (2015) although they do not show results by asset category. However, their aggregated series by country are comparable to our own aggregated ones.

As mentioned earlier, we also study the geographical distribution of assets, i.e., the countries where the assets are held. For this purpose we rely on the same data sources

the country breakdown to estimate currency shares. We adjust the country shares by the average ratio of country to currency shares when both are available since there is no one-for-one match between the two (especially for the US Dollar). Here, we again deviate from Bénétrix et al. (2015) who only use the country data available.

[15]Bénétrix et al. (2015) report that they have access to more detailed data directly from the BIS, potentially covering the gaps in the officially reported series. For some countries data availability is limited. A notable case are the United States for which the currency breakdown is only available from 2012 on with exception of one data point in 1998. We use this fact to linearly interpolate between 1998 and 2012 to increase data coverage. We check whether this biases the US data by comparing the resulting series on valuation changes to the valuation changes published by the Bureau of Economic Analysis (BEA) and find small deviations (see Appendix A4 for details).

[16]We do not include the UK data since their estimation procedure is less sophisticated and builds on less detailed data than ours, see the Appendix A4 for details on this.

as for the currency composition estimates. This is possible because the IMF's CPIS and the BIS's LBS databases both include data on the country composition as well. The FDI data refers to countries anyways. We discuss the approach in Section 3.2. In this case, too, data is not available for all years for all countries. Details can be found in Table A5 in the appendix.

Finally, we use data on exchange rates from the Bundesbank for Deutsche Mark (until 1998) and Euro (since 1999). All other required bilateral exchange rates are approximated using BIS data on US Dollar exchange rates.

# 3 Germany's capital exports since WW2

## 3.1 Evolution of Germany's current account and foreign assets

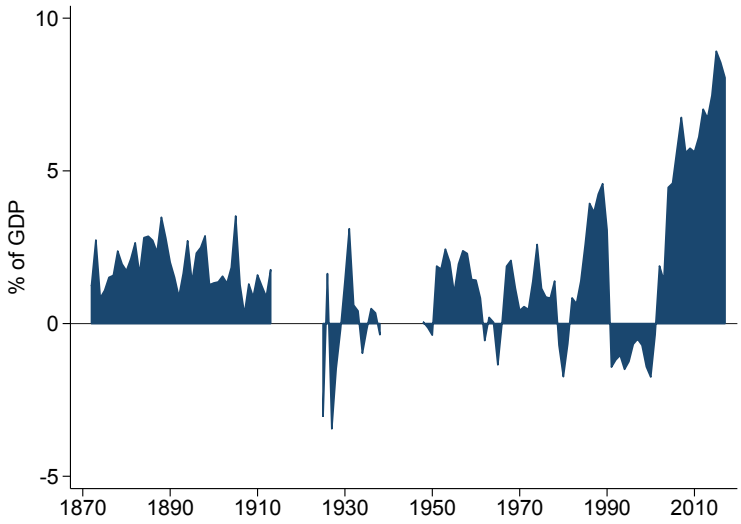
Germany has been running current account surpluses for a large part of her modern economic history. Notable exceptions are the first ten years after the late 1920s and 1930s and the reunification. Figure 2 shows that the last decade is characterized by exceptionally high surpluses, even by historical standards. The recent surpluses were about three times higher relative to GDP than in gold standard times and during the so-called economic miracle in the 1950s and 1960s.

As a result of consistently high capital exports, Germany ranks among the worlds top external creditors, both in absolute numbers and relative to GDP, as Figure 3 shows.

Furthermore, Figure 4 shows that Germany not only has a large net position but also a large gross position. Both the asset and liability positions rose strongly since the mid-1990s and now amount to 256% and 197% of GDP respectively. While they initially grew in tandem leaving the net position at relatively small levels, the gap has been increasing since the mid-2000s and especially in recent years. While the net position has been positive over the entire post-war period with few exceptions, it currently stands at above 50% of GDP. This reflects Germany's sustained past current account surpluses.

How does Germany's international investment position (IIP) compare to accumulated capital exports? In a simple framework, one can think of Germany's external asset portfolio as a savings account. Adding up all the payments that have flown into this account correspond to the historical book value of gross investments. The difference between historical costs and market value then reflects valuation gains on that portfolio. In other words, the larger the difference between the accumulated flow measure and the current market value of external investments, the higher the capital gains.

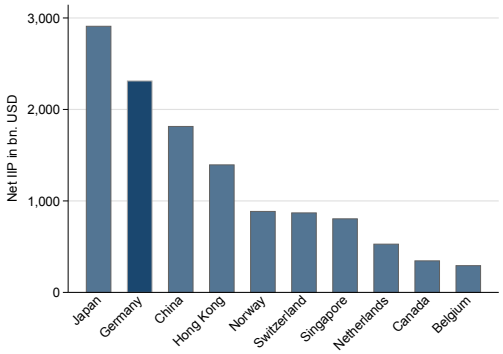
Figure 2: German current account balance in % of GDP, 1872–2017



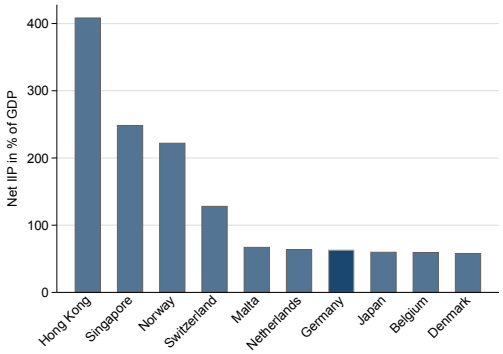

*Notes*: This figure shows Germany's long history of current account surpluses, which is interrupted only by few periods with deficits, in particular after Germany's reunification in 1990. The past two decades stand out, showing record surpluses both in absolute terms and as a share of GDP. No data is available for 1914–1924 and 1939–1947. Data from the Macro History Database (Jordà et al. 2017) and Bundesbank.

Figure 3: The world's largest net creditors, 2017

(a) Total net position (billion USD)



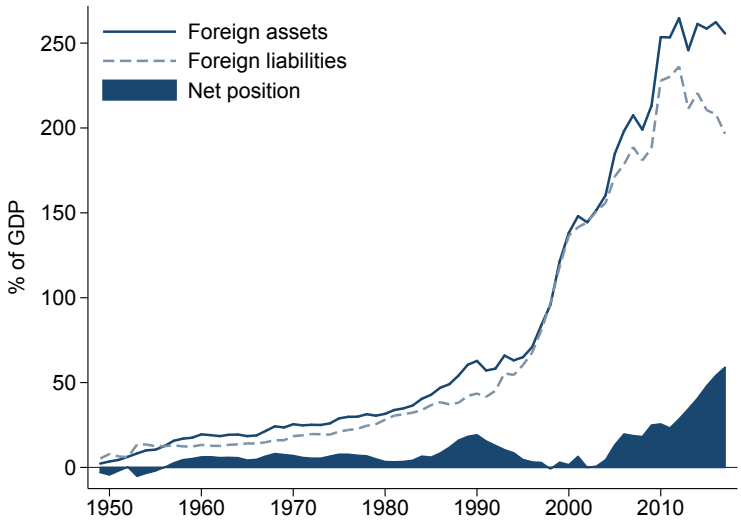

(b) Net position in % of GDP




*Notes:* The net position is the difference between foreign assets (assets held abroad) and foreign liabilities (domestic assets held by foreigners). In USD terms Germany's net position is only exceeded by Japan. The graph excludes small oil exporting countries with large net positions in % of GDP. Data on asset positions are from the Bundesbank and the IMF, data on GDP from the World Bank.

Figure 5 demonstrates that the value of Germany's (gross) foreign asset position very

Figure 4: Germany's international investment position, 1949–2017




*Notes:* The net position is the difference between foreign assets (assets held abroad) and foreign liabilities (domestic assets held by foreigners). The graph shows the significant build up of Germany's gross positions since the 1990s, of both assets and liabilities (financial globalization). The net position has grown most markedly over the last decade (large and sustained current account surpluses). Assets data from Bundesbank. GDP from the Macro History Database (Jordà et al. 2017) and the German Statistical Office.

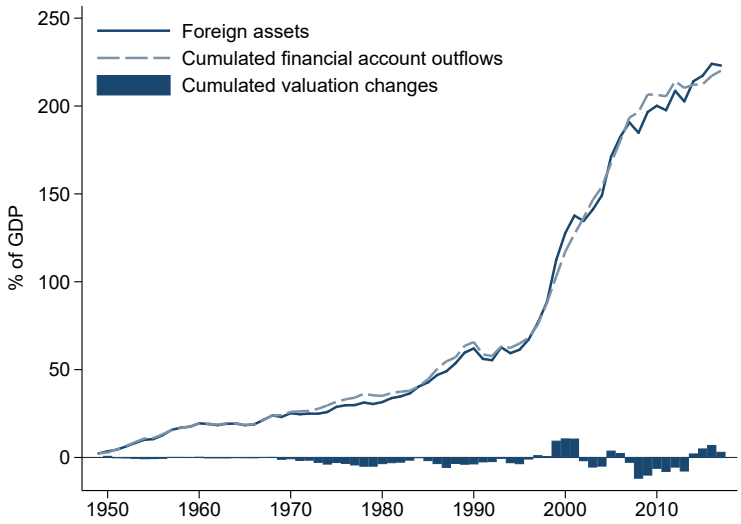
closely tracks the cumulated current accounts. This implies that the valuation gains, i.e., the wedge between historical flows and current market value, cannot have been large. In light of the multi-decade asset price boom that has characterized the world economy in the past decades this is clearly noteworthy (see Jordà et al. 2019).

### 3.2 Germany's external portfolio: asset types and geography

Also the composition of Germany's foreign assets changed notably over time. As mentioned earlier, the balance of payments data broadly distinguishes between five different asset categories: foreign direct investment (FDI), portfolio investment, other investment, reserves, and financial derivatives. For Germany, we have data on the first four categories since 1949, but data on financial derivatives only starts in 2010 since this is an investment type that only became relevant more recently. Therefore, we will show derivatives once here and exclude them from the remainder of the analysis. This will facilitate the interpretation of developments over time.

Panels (a) of Figure 6 show the changing composition regarding asset classes over

Figure 5: Germany's foreign assets and cumulated financial account outflows, 1949-2017




*Notes:* This graph shows that Germany's cumulated financial outflows (blue dotted line) closely track the stock of total foreign assets (blue line). This indicates small valuation gains or even losses on the gross asset position. More specifically, the difference between the two series equals cumulated valuation changes, which are negative with the exception of a few years (blue bars). Foreign assets and cumulated financial account flows are adjusted to remove statistical differences between the series, see Section 2.3 for details. Financial derivatives are excluded. Data from the Bundesbank.

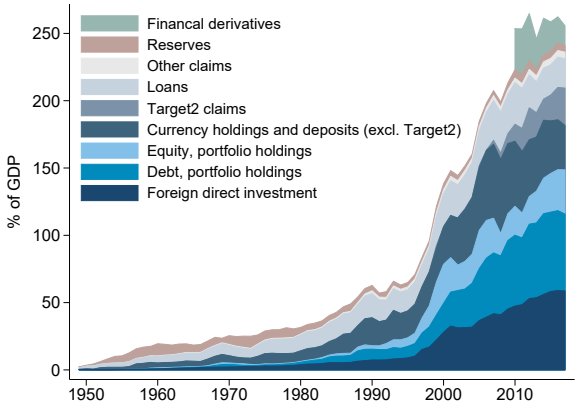
time. The rise in the overall level in assets was largely driven by increases in foreign direct investment and portfolio investment reflecting increasing international financial integration. Reserve assets on the other hand made up 20-30% of all assets until the 1970s and have become almost irrelevant today. Target2 balances have been increasing in recent years but only represent about 10% of all assets. As Target2 balances do not generate income, they could potentially bias our estimated downwards, and throughout the paper we will pay close attention that our findings are unaffected by this.

In addition to the composition by functional category, one can also decompose the foreign asset position by domestic sectors. Here, the balance of payments distinguishes between four broad sectors: banks, firms and households, the government, and the central bank. In more recent data, the non-bank private sector is further split into financial firms and non-financial firms plus households. Panel (b) of Figure 6 shows the changing composition by sector over time.[17] The panel shows that the increase in gross position

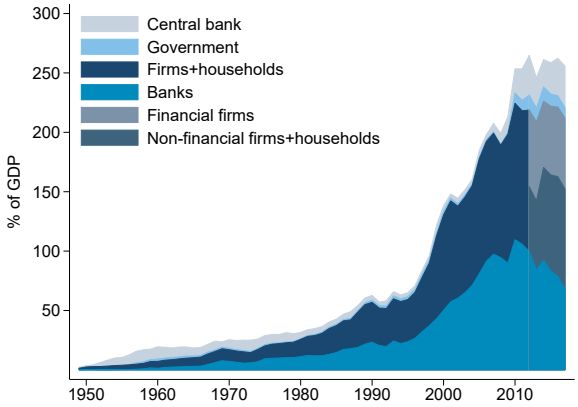
[17]From now on we exclude financial derivatives because they are only available since 2010 and their inclusion makes the interpretation of developments over time more complicated. The majority of financial

Figure 6: Composition of Germany's international investment position, 1949–2017

(a) Foreign assets by type




(b) Foreign assets by sector



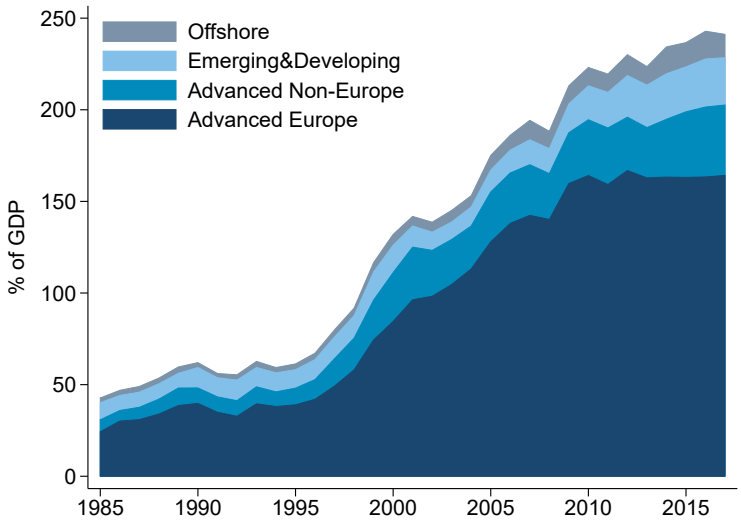

*Notes:* This graph shows the composition of Germany's foreign assets over time along two dimensions: by type of investment (a) and by sector (b). Asset data from the Bundesbank. The data split between firms and households is only available since 2012. GDP data from the Macro History Database (Jordà et al. 2017) and the German Statistical Office.

since the 1990s was mainly driven by banks increasing their exposure relative to GDP. However, since the financial crisis the banking sector reduced its exposure. This decline has been partially offset by non-financial firms.

It is equally interesting to consider the geographical distribution of assets. Unfortunately, no official data on the country of residence of the counter-parties are available. Therefore, we rely on additional data sources to estimate the geographical distribution of foreign investments for Germany and other countries, as discussed at the end of Section 2.4.

derivatives are held by banks.

Figure 7: Geographical distribution of aggregate IIP assets, 1985-2017




*Notes:* This graph shows that the majority of German foreign assets are invested in other advanced economies, especially in Europe. The geographical distribution is estimated from additional data sources, see Section 2.4. The figure excludes financial derivatives since no data on their geographical distribution available. Choice of offshore countries is based on Bundesbank list of offshore banking centers. GDP from the Macro History Database (Jordà et al. 2017) and the German Statistical Office.

Figure 7 shows the resulting decomposition into four regions since 1985.[18] The figure reveals that Germany mainly invests in other advanced economies, especially in fellow European countries. The introduction of the Euro in 1999 further increased the European exposure as even more investment went to other Euro Area countries. Today, almost 70% of all investments are in other advanced European economies, another 15% are in non-European advanced economies (mainly the US), and only the remaining 15% are invested in other countries worldwide, including offshore destination.

## 4 Returns on German foreign and domestic assets

We now turn to the analysis of the profitability of German foreign investments. This section presents descriptive statistics of Germany's foreign asset returns and shows that these are lower than returns on domestic investments.

[18]The external data sources do not allow for a meaningful estimation for the period before 1985.

### 4.1 Germany's foreign investment returns 1950-2017

Table 2 summarizes the German return, yield, and valuation changes since 1950. For the comparison with domestic investments it is more informative to focus on real returns (deflated by national CPI), but we also show nominal returns for the main tables and figures (to save space, some were shifted to Appendix A1).

Table 2: Returns on German foreign assets, 1950-2017

| | Panel (a): Real returns | | | Panel (b): Nominal returns | | |
|---|---|---|---|---|---|---|
| | 1950-17 | 1999-17 | 2009-17 | 1950-17 | 1999-17 | 2009-17 |
| Return, all assets | 1.58 | 2.24 | 2.53 | 3.94 | 3.68 | 3.69 |
| Yield, all assets | 1.75 | 1.99 | 1.76 | 4.18 | 3.45 | 2.92 |
| Valuation changes, all assets | -2.49 | -1.16 | -0.36 | -0.24 | 0.24 | 0.77 |
| Return, FDI | -0.18 | 3.78 | 4.85 | 2.38 | 5.27 | 6.05 |
| Return, equity portfolio hold. | 8.25 | 3.13 | 8.41 | 11.00 | 4.52 | 9.61 |
| Return, debt portfolio hold. | 5.66 | 3.18 | 3.40 | 8.39 | 4.65 | 4.57 |
| Return, other inv.+ reserves | 1.13 | 1.15 | 0.13 | 3.48 | 2.58 | 1.27 |

*Notes:* This table shows average real and nominal returns on German foreign assets. Returns are split by components and asset category. Returns estimated using Bundesbank data as discussed in Section 2.1. Real returns deflated using German consumer price index from Macro history Database and Eurostat.

The average real annual return between 1950 and 2017 was 1.59%. The yield was positive 1.75% while valuation changes were negative on average at -2.48%. Recall that the real return equals the sum of the real yield and real valuation changes plus some adjustment for inflation. Average real returns increased in the more recent periods to around 2% depending on the time horizon. This is mainly due to lower valuation losses, albeit they remain negative.

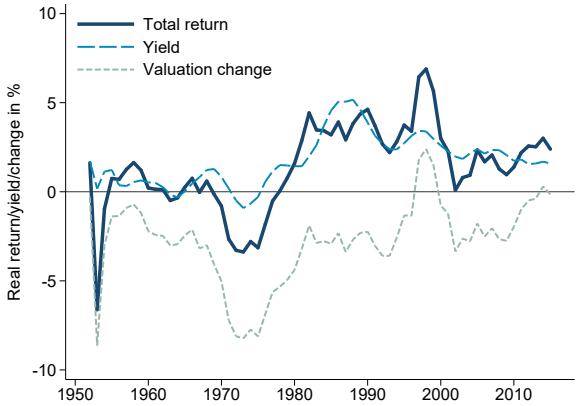
The lower part of Table 2 reveals large differences between the asset categories.[19] Over the full sample, portfolio equity investments saw the highest returns on average, followed by portfolio debt. FDI and other investment had much smaller real returns. However, since 1999 the relationships changed: equity returns fell and FDI increased so that now they are roughly similar.

To visualize developments over time, Figure 8 plots 5-year rolling averages of our measures of returns. Panel (a) shows the real return, yield, and valuation changes on total assets. Panel (b) plots the real returns by asset category. Several observations stand out.

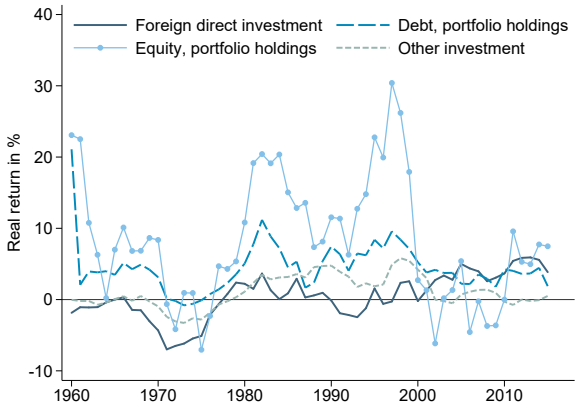
[19] As discussed in the data section, we need to combine other investment and reserves when computing returns since investment income data is not available separately for those two categories.

Figure 8: Real returns on German foreign assets, 5-year rolling means, 1950-2017

(a) Returns on all assets




(b) Returns by asset class




*Notes*: This graph shows real returns on German foreign assets as a rolling arithmetic mean computed over a 5-year windows and plotted at the third year of the window. Panel (a) shows returns on all assets and the decomposition into yield and valuation changes. Panel (b) shows total return series by asset category. Returns are estimated using Bundesbank data as discussed in Section 2.1. The series are deflated using the German consumer price index from the Macro History Database (Jordà et al. 2017) and Eurostat.

First, valuation changes are more volatile than yields and drive the volatility in returns (as should be expected). Average real valuation changes were almost always negative. The improvement in average returns on German foreign assets since the 1980s was driven mainly by a significant increase in the yield, i.e., the direct income earned on investments. Average real valuation changes, however, have remained in negative territory even over much of the

last decades, which is surprising as global asset markets have performed exceptionally well since the 1970s.

Second, the average return to IIP assets hides diversity across asset classes. The returns vary strongly across these asset categories, as shown in Panel (b) of Figure 8. Returns to foreign direct investment were low for many decades but increased in the 2000s. Portfolio investment, which includes investment in equity and debt securities, generated larger returns than the aggregate asset position in most periods. This is mainly due to high returns on foreign equity. Finally, the other category that, among others, includes bank loans saw returns comparable to the aggregate return.

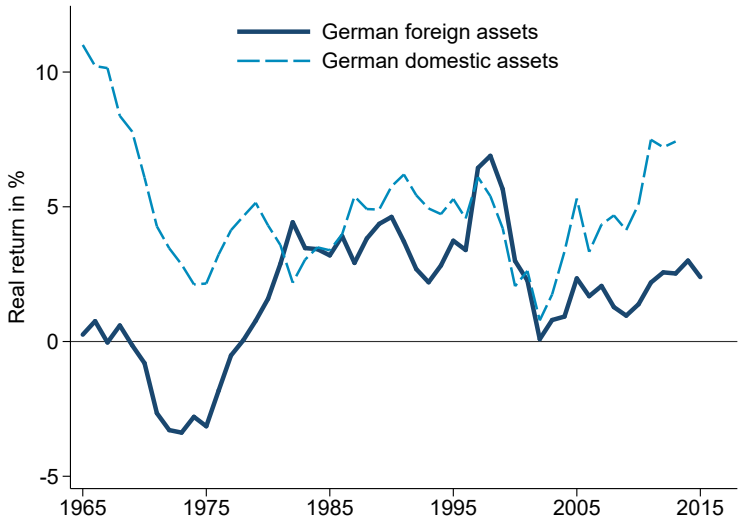
### 4.2 Comparison to domestic returns

How do Germany's external returns compare to returns on domestic capital? There are two main options to address this question. Many studies compare the return earned abroad to the return earned on domestic capital markets. Others compare it to the return earned on the other side of international balance sheet, i.e., on inward investments by foreigners. As explained above, the comparison with liability returns is not necessarily insightful regarding the quality of foreign investment. Foreign liabilities do not cover all investment opportunities available to German investors in their own country and the returns reported by foreigners can be downward biased due to tax shifting, especially in a high-tax country like Germany. For these reasons, we focus on the first option - the comparison of foreign returns with returns on the aggregate capital stock in Germany.

Despite our emphasis on domestic portfolio returns, we also compute the return on IIP liabilities in Appendix A5. In line with earlier studies, we find that the difference between asset and liability returns in Germany was negative for a long time but decreased in the past 20 years and recently turned positive. This trend is mainly driven by decreasing yields on FDI liabilities and debt liabilities. The latter is not surprising given the flight to safety compressing German bond returns after 2008. The former may be related to tax incentives leading to the increased leverage on inward FDI, resulting in relatively low reported yields (see Appendix A5 for a discussion).

The return on Germany capital stock (held both by foreigners and Germans) is taken from the data set of Jordà et al. (2019). We make use of the return to capital which is computed as the return to a portfolio consisting of equity, housing, bonds and, bills. To compute the return to capital, the authors compute returns for all asset categories

Figure 9: Foreign vs. domestic returns, real, 5-year rolling means, 1963-2017




*Notes*: This graph shows that the return on German foreign assets (dark blue line) is lower than the domestic return on German assets at home (dotted line) for most years. The series are rolling means computed over 5 year windows and shown at the third year. The return on German domestic assets is from Jordà et al. (2019) and available 1963-2015. Both series are deflated using the German CPI.

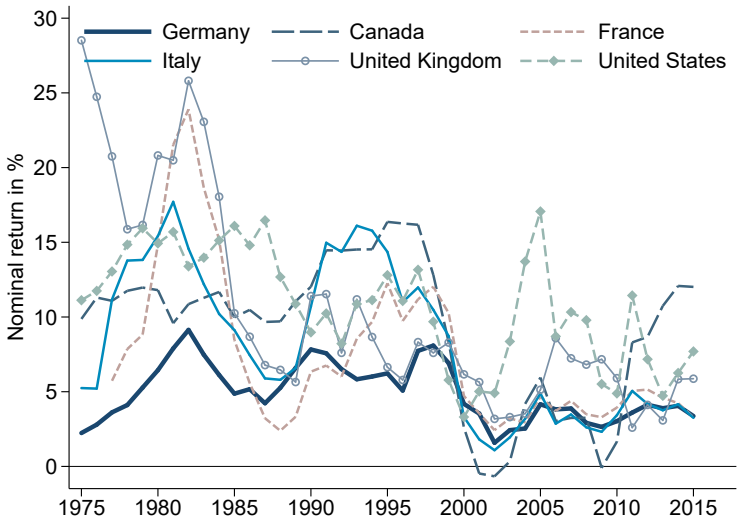
using various data sources. The returns also include both valuation changes as well as direct income flows. In the case of Germany since World War II, the authors use money market rate for the bills returns, the performance index for the Bund bond market return, the German stock market index for equity, and housing returns based on the rent-price approach. Then they aggregate individual returns to arrive at an aggregate return on capital using appropriate portfolio weights. These weights are stock market capitalization for equity returns, housing wealth for housing returns, and public debt split equally between bonds and bills. Unfortunately, the return to capital series starts only in 1963.

Figure 9 plots five-year rolling averages of the foreign and domestic returns. It reveals that domestic returns were significantly higher than the return earned abroad for the majority of the time observed. On average the difference was more than 3 percentage points. Only in the early 1980s and in the early 2000s until the financial crisis were the average returns roughly equal. Moreover, while the average domestic return computed by Jordà et al. (2019) rose significantly in the past decade, foreign returns did not increase.

## 5 International comparison: Germany vs. other countries

Our main focus is comparing German foreign returns to other countries' foreign returns. This is the most plausible comparison to gauge Germany's relative performance when investing abroad since all (advanced) economies in principle have access to the same investment opportunities. For this comparison, we computed returns for a group of 12 additional advanced economies from 1975 to 2017. We started by collecting data for each of the G7 counties, although we could not find detailed, long-run data on foreign assets and their returns for Japan. We then tried to add as many OECD countries as possible. The final selection is based on data availability in particular with regard to the level of disaggregation and the years covered, since we wanted a long time horizon. All returns are expressed in the country's respective domestic currency.

Figure 10: Nominal returns in comparison, 5-year rolling means, 1975-2017




*Notes*: This graph shows that Germany's returns on foreign assets (dark blue line) were almost always lower than the foreign returns of other G7 members (excluding Japan due to data availability). Rolling means computed over 5 year windows and plotted at the third year of the window. We compare nominal domestic currency returns to abstract from the effects of different inflation dynamics across the countries. The overall picture is similar when plotting real returns, as shown in Appendix A1. For more details see Section 2.

### 5.1 Descriptives

For now, we focus on the other G7 members for comparison to keep the graphs and tables simple (Japan is not included due to data availability). Later, we will include the additional advanced economies in the comparison group. Figure 10 shows that German returns abroad were consistently lower than those of other countries. Importantly, this does not apply only to the US with its "exorbitant privilege" in international finance, but also to Italy, France, Canada, and Britain.

Table 3 summarizes the key return statistics in comparison and over different time horizons. The table demonstrates that German returns were lower than the European average, and consistently lower than domestic returns.

Table 3: Comparing returns, nominal, various time horizons

| | 1975-2017 | 1999-17 | 2009-17 | 1980-89 | 1990-99 | 2000-09 | 2010-17 |
|---|---|---|---|---|---|---|---|
| Germany, foreign assets | 4.93 | 3.68 | 3.69 | 6.68 | 7.12 | 2.73 | 3.59 |
| Germany, domestic assets | 7.03 | 6.26 | 8.48 | 6.79 | 8.37 | 4.24 | 8.68 |
| Canada | 9.19 | 4.93 | 8.98 | 10.27 | 15.31 | 1.29 | 8.88 |
| France | 7.38 | 4.01 | 4.43 | 13.56 | 8.60 | 3.41 | 4.13 |
| Italy | 7.96 | 3.31 | 4.39 | 10.23 | 13.17 | 2.28 | 3.72 |
| United Kingdom | 10.22 | 5.68 | 4.09 | 16.30 | 7.96 | 5.21 | 5.14 |
| United States | 10.64 | 8.00 | 9.27 | 14.93 | 10.69 | 7.62 | 7.50 |
| Germany minus domestic | -1.96 | -2.38 | -4.33 | -0.11 | -1.25 | -1.51 | -4.59 |
| Germany minus US | -5.71 | -4.32 | -5.58 | -8.25 | -3.57 | -4.89 | -3.91 |
| Germany minus Europe[1] | -2.77 | -0.73 | -1.03 | -5.02 | -2.52 | -0.57 | -1.11 |

[1] Europe is an average of DK, ES, FI, FR, GB, IT, NL, NO, PT, SE.

*Notes:* This table shows that Germany's returns on foreign assets were lower than the return on domestic assets as well as the foreign returns of other G7 members (excluding Japan due to data availability). Foreign returns are computed as discussed in Section 2, while the domestic German return is from Jordà et al. (2019). We compare nominal domestic currency returns to abstract from the effects of different inflation dynamics across the countries.

### 5.2 Regression evidence

Is Germany's financial under-performance statistically significant in a broader country panel? In the next step, we test whether German returns are lower relative to a larger group of countries. As explained, the additional countries we consider are 12 comparable OECD economies, namely Canada, Denmark, Finland, France, Italy, the Netherlands, Norway, Portugal, Spain, Sweden, the UK, and the US. We regress the observed annual returns for Germany and these other advanced economies on standard control variables as well as a

"German dummy". We are mainly interested in the size and significance of the coefficient on the German dummy as it tells us whether German returns differ significantly compared to other countries. In the cross-country setting we again focus on nominal returns as we are interested in the direct returns that individual countries earn abroad, thus, abstracting from inflation dynamics across the countries. Using this data, we estimate the following model using pooled OLS:

$$\tilde{r}_{it} = \alpha + \beta D_{it} + \delta Z_{it} + \gamma_t + u_{it}, \tag{6}$$

where $D_{it}$ is a dummy variable which is 1 for Germany and 0 for the other countries, $Z_{it}$ are control variables and $\gamma_t$ are yearly time fixed effects. In line with the existing literature, we control for the size of the net foreign asset position as well as past financial account balances relative to GDP to capture re-balancing effects via returns in countries with large past and current external imbalances (as discussed by e.g. Gourinchas and Rey (2014)).

The results are shown in Table 4. Columns 1-4 present our core finding: German foreign investment returns are consistently about 2 percentage points lower than the returns of other countries. Moreover, while the exact under-performance fluctuates between 1 and 3 percentage points, the finding is robust across different periods. Another important finding is that the investment under-performance we measure is statistically significant.

Excluding the Target2 balances from the total pool of Germany's foreign assets does not alter our main finding. This is shown in Columns 5 and 6 of Table 4, which focus on the period after 1998 when the Euro (and, thus, the Target2 system) was introduced. The coefficients confirm that Germany's returns on foreign assets are about 1.5 to 2 percentage points lower than the returns of other countries.

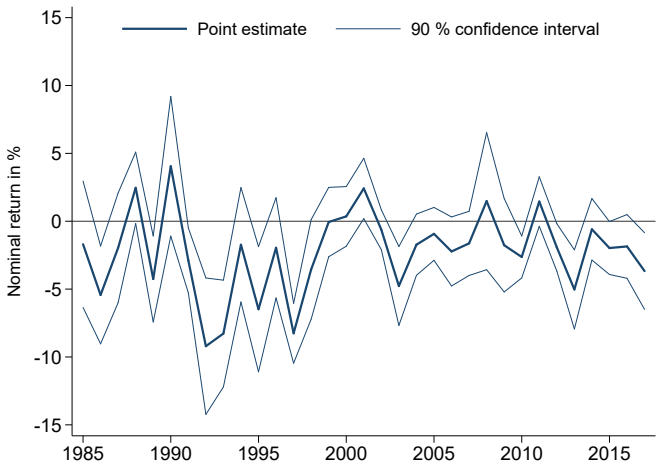
We next analyze how the Germany dummy evolved over time to see if the German under-performance is driven by particular episodes. To test this, we interact the German country dummy with year fixed effects to estimate a time-varying effect. The regression and control variables are the same as in the full specification above. The resulting coefficients are plotted in Figure 11. The chart shows that German under-performance has been relatively persistent over time. The first half of the 1990s saw particularly bad returns. Also the most recent decade shows significantly lower returns for Germany. Only the late 1980s and the early 2000s were periods in which Germany's returns were comparable to those of other countries. It is noteworthy that German returns never outperform other countries. The German dummy is not significantly positive in any year since 1985. Instead, periods of average performance are followed by spells of substantial under-performance.

Table 4: Determinants of returns on foreign assets (all assets), 1985-2017

| | Baseline (all assets) | | | | Excluding Target2 | |
|---|---|---|---|---|---|---|
| | (1) 1985-2017 | (2) 1985-1998 | (3) 1999-2017 | (4) 2009-2017 | (5) 1999-2017 | (6) 2009-2017 |
| Germany dummy | -2.28*** | -3.01** | -1.51** | -2.11** | -1.39** | -1.82** |
| | (0.63) | (1.51) | (0.59) | (0.81) | (0.59) | (0.82) |
| Constant | 4.20* | 4.46* | 14.02*** | 7.45*** | 14.04*** | 7.45*** |
| | (2.47) | (2.46) | (1.31) | (1.81) | (1.32) | (1.81) |
| Observations | 406 | 160 | 246 | 117 | 246 | 117 |
| Adjusted $R^2$ | 0.38 | 0.27 | 0.41 | 0.18 | 0.41 | 0.19 |
| No. countries | 13 | 12 | 13 | 13 | 13 | 13 |
| Year fixed effects | Yes | Yes | Yes | Yes | Yes | Yes |

*Notes:* This table shows that German returns on foreign assets are significantly lower than the foreign returns of other advanced economies. This is true across different samples (Columns 1-4) as well as when Target2 balances are excluded (Columns 5-6). The dependent variable is the nominal rate of return on total foreign assets by country and year. The regressions include control variables for net foreign assets and the financial account balance (coefficients not shown). Data for Denmark and Portugal starts in 1999 and 1993, respectively. No data for Japan available. Robust standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Figure 11: Germany fixed effect over time (country dummy)




*Notes:* This graph plots the coefficient for the Germany dummy in each year since 1985 (dark blue line) as well as its 90% confidence interval (light blue lines). The regression builds on Column 1 in Table 4 and controls for net foreign assets, the financial account balance and year effects. The main take away is that the under-performance of German foreign returns has been relatively persistent over time.

### 5.3 Aggregate financial consequences – a counterfactual exercise

In this section, we aim to quantify the cumulative financial loss (or foregone gains) caused by Germany's low returns on foreign assets. For this, we need to construct a counterfactual in which German returns would have been comparable to those of other countries.

We compute Germany's counterfactual investment income assuming that Germany achieved the rates of return by the other G7 members (we also include Norway, which achieved the highest returns over the past decade). We then compare these counterfactual values to the realized income earned and compute the aggregate cumulative loss or gain. To evaluate the economic size of the effects we deflate the losses using German CPI and also express the counterfactual numbers as percent of German GDP in 2017. More specifically, we compute the aggregate loss, $Loss_t$, in each year as

$$Loss_t = r_{t,DE}A_{t-1,DE} - r_{t,c}A_{t-1,DE} = (r_{t,DE} - r_{t,c})A_{t-1,DE},$$

where $r_{t,c}$ is the nominal return, $A_{t-1,DE}$ is the German asset position, and $c$ refers to the respective other country. The resulting losses are displayed in Table 5.

Table 5: Cumulated income losses due to low returns on German foreign assets

| | 1975-2017 | | 1999-2017 | | 2009-2017 | |
|---|---|---|---|---|---|---|
| | bn 2015 € | % of GDP | bn 2015 € | % of GDP | bn 2015 € | % of GDP |
| Canada | -3217.32 | -106.50 | -2396.73 | -70.80 | -3085.21 | -95.07 |
| France | -678.71 | -26.33 | -325.57 | -10.74 | -329.70 | -10.69 |
| Italy | -543.74 | -23.87 | 80.99 | 3.73 | -314.62 | -10.19 |
| Norway | -3177.16 | -104.58 | -2647.51 | -81.39 | -2330.59 | -70.82 |
| United Kingdom | -2183.30 | -77.85 | -1856.50 | -60.31 | -498.26 | -14.32 |
| United States | -4422.47 | -151.89 | -3853.83 | -125.54 | -2984.29 | -93.51 |

*Notes:* This table quantifies the foregone income on Germany's foreign assets due to Germany's comparatively low investment returns abroad. Losses are computed as the difference between total income earned (yield plus valuation changes) on German assets and hypothetical income earned had Germany achieved the same return as the comparison country. Nominal losses are deflated using the CPI index with 2015=100 and then added up over time. In Columns 2, 4, and 6 the counterfactual losses are shown as a share of nominal German GDP of 2017.

As can be seen, the amounts are substantial. Had Germany been as savvy an external investor as other countries, the country would be considerably richer today. The losses are

largest when using US returns as counterfactual but the numbers are also substantial when comparing to other countries. On example is the case of France. Had Germany achieved the same return on investment as France since the introduction of the Euro (1999), the country would be 300bn Euros richer today, according to these simple back-of-the-envelope calculations. By not achieving the returns that Italy achieved, Germany forgave wealth of about 300bn Euros in the decade since the financial crisis alone. More remarkably, since 2009, Germany would have gained an additional 2-3 trillion Euros of wealth (corresponding to 71% or 95% of its 2017 GDP) if its foreign investments had performed like those of Norway or Canada, respectively. In per capita terms, this amounts to 28.000 and 37.300 Euros of foregone income for each German citizen in less than 10 years, a substantial wealth loss compared to Norway and Canada, respectively.

# 6 Why are German returns low?

We have established that German returns on foreign investments are considerably lower than the returns of other countries. In this section, we aim to understand the causes. More precisely, we decompose the return differential using cross-country data as far back as possible (mostly starting in 1985, when detailed data on the composition of foreign assets become available for most economies, see Section 2).

In principle, the negative German return differential could be the result of a range of factors linked to asset allocation (asset class selection, geography, risk profile). It could also be driven by exchange rate effects, meaning that the "raw" returns achieved by German investors were systematically reduced by exchange rate appreciation. We will start by looking at the latter.

## 6.1 Exchange rate effects

To understand the role of exchange rates we need information on the valuation changes due to exchanges rates. The newest edition of the BPM requires countries to publish a decomposition of valuation changes into the three components exchange rates, prices and other changes. However, most countries either publish this breakdown only for recent years or have not started publishing it yet. As mentioned above, the Bundesbank reports time series by asset category starting in 2005. Therefore, we estimate the valuation changes due to exchange rates ourselves.

In order to do this, we modify the approach of Lane and Shambaugh (2010) and Bénétrix et al. (2015). These authors show that data on the currency composition of assets is

sufficient to estimate valuation changes due to exchange rate movements. To see this, first note that valuation changes due to exchange rates are the changes in the valuation of all foreign currency assets valued in the domestic currency neither due to transaction nor price or other changes:

$$VX_t^A = \sum_c \left( IIP_t^{A,c} E_t^c - IIP_{t-1}^{A,c} E_{t-1}^c - FA_t^{A,c} \bar{E}_t^c - (VP_t^{A,c} + VOT_t^{A,c}) \bar{E}_t^c \right), \qquad (7)$$

where the superscript $c$ indicates a variable which is expressed in a different currency than the German one. $E_t^c$ and $\bar{E}_t^c$ are the end of period and average exchange rates in year $t$ between the Euro or DM and currency $c$, respectively. Here, we follow the recommendation of the IMF's balance of payments manual and use average exchange rates to value transactions and valuation changes due to a lack of data on the timing of the two. Finally, note that the last part of the expression in equation (7) equals all changes in the value of the foreign currency assets not due to transactions when valued in the respective currency since there can be no valuation effects within the same currency, i.e.

$$VP_t^{A,c} + VOT_t^{A,c} = IIP_t^{A,c} - IIP_{t-1}^{A,c} - FA_t^{A,c}. \qquad (8)$$

Plugging this expression into equation (7) yields the following simple expression for $VX_t^A$ after some manipulation:

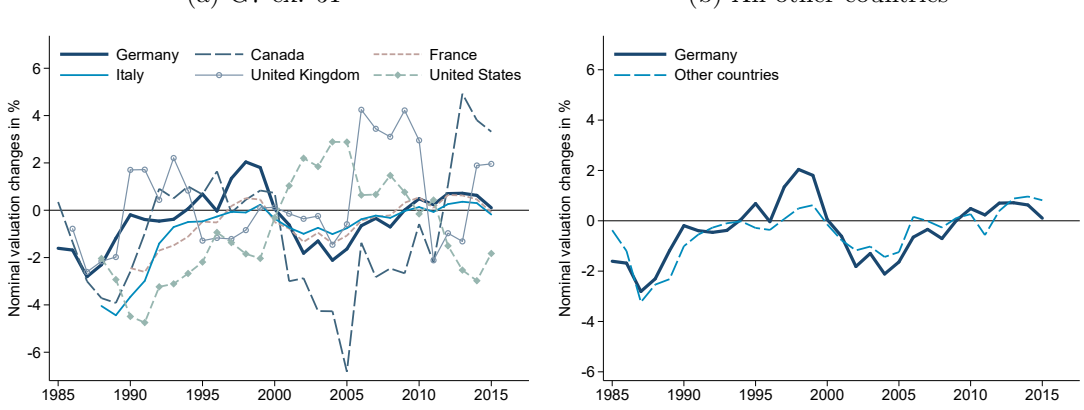
$$VX_t^A = \sum_c \left( IIP_t^{A,c} E_t^c - IIP_{t-1}^{A,c} E_{t-1}^c - (IIP_t^{A,c} - IIP_{t-1}^{A,c}) \bar{E}_t^c \right). \qquad (9)$$

Now we only need data on the currency composition of assets. As discussed in Section 2.4, this is not available directly from the countries. However, we are able to use other data sources to estimate currency shares. Details on this can be found in Section 2.4. Despite the several approximations involved in the estimation procedure, our estimates are very close to the ones published by the Bundesbank for Germany as well as those published by other countries' statistical institutions (see Appendix A4).

Figure 12 (a) shows that German valuation changes due to exchange rates did not differ significantly from that of other countries. All countries experience both gains and losses due to exchange rates.[20]

[20]The observation of negative fx valuation adjustments raises a more fundamental point about international adjustment. The intertemporal approach to the current account implies that valuation changes matter for the external solvency constraint and via this constraint may be a potential channel for external

Figure 12: Valuation changes due to exchange rates, 1985-2017, rolling 5 year means




*Notes*: Graphs show that Germany's valuation changes due to exchange rates are not significantly different from those of other countries. The lines represent rolling means computed over 5 year windows across countries and plotted at the third year of the window. Valuation changes computed using estimated currency shares from additional data sources, see Section 6.1. "Other countries" in Panel (b) refers to CA, DK, ES, FI, FR, GB, IT, NL, NO, PT, SE and US.

Before the introduction of the Euro, exchange rate effects tended to be relevant in Germany, with valuation effects being among the larger ones within the G7 group. In the period since then, German valuation changes due to exchange rates were rather average. We can also compare Germany to the average of all other 12 countries (as included in the regression in the previous section). Panel (b) of Figure 12 confirms that German valuation changes do not stand out relative to these other countries. In sum, exchange rate effects do not help explain the observed differences in returns between Germany and other countries.

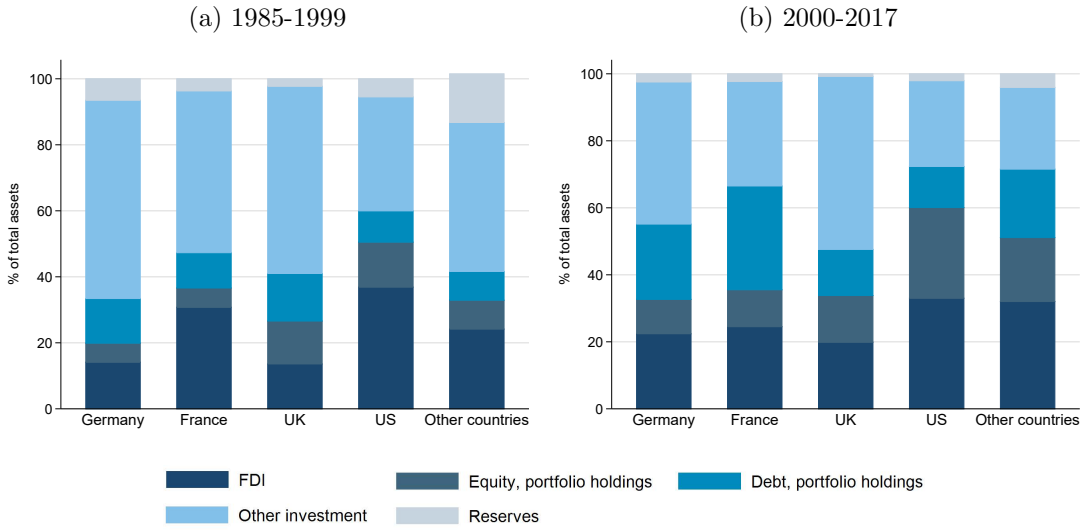
### 6.2 Portfolio allocation

Lower German returns could be a result of a more conservative investment strategy that favors less risky asset classes such as bonds over equities. Figure 13 shows that there are indeed notable differences in the composition of foreign assets between Germany and the other countries. We show the periods 1985-2000 and 2002-2017 separately to account for the large compositional changes in the 1990s as documented in Section 3.

The figure reveals that Germany's large share of other investment in the 1980s and 1990s was atypical compared to other countries. In addition, the shift towards more FDI and portfolio in recent decades was sizeable but other countries increased their investment in these positions even more. As a result, in the past two decades Germany invested

adjustment (Gourinchas and Rey 2007*b*, Gourinchas and Rey 2014).

Figure 13: Composition of IIP assets, 1985-2017




*Notes:* These graphs show that Germany holds a lower share of FDI and equity assets than other countries. This is true both in the earlier part of the sample (Panel a), and in recent years (Panel b). Data from Bundesbank, IMF and (Lane and Milesi-Ferretti 2007*b*). 'Other countries' includes CA, DK, ES, FI, IT, NL, NO, PT and SE.

significantly less in FDI and equities than the other countries. This provides an indication of the potential relevance of compositional differences. However, the detailed decomposition discussed in the next section reveals that differences within each asset category are even more relevant.

Other than the asset composition, the *geographical allocation* of foreign investments could affect performance. Unfortunately, no data is available on the returns by geographical location, so that we cannot include geography in our decomposition exercise. However, as explained, we can estimate which share of Germany's assets is located in which country (Section 2.4 and 3.2). This allows us to include geography controls in our regression analysis in Section 6.4. Moreover, we know that the large bulk of Germany's investments goes to other European high-income countries, while the share of investments in the rest of the world is small and shrinking. In international comparison, Germany stands out as a country with a particularly strong "home bias" in favor of European investments.

### 6.3 Decomposition: comparing exchange rate, asset class, and return effects

In this section, we decompose the return differential into its components, so as to analyze the effects of exchange rates and asset composition more systematically. The exercise starts in 1990 since we need information on the returns for all asset categories

separately. This is not available for most countries before the 1990s.

Our cross-country decomposition approach builds on and expands the exercise that Gourinchas and Rey (2007*a*) apply for the United States. Specifically, one can write the aggregate return to any portfolio $p$ as the weighted average of the returns of the different portfolio components $j$ using lagged weights:

$$r_t^p = \sum_{j=1}^{J} w_{j,t-1}^p r_{j,t}^p, \tag{10}$$

where $w_{j,t-1}^p$ is the weight of assets class $j$ in the portfolio $p$, $r_{j,t}^p$ is the return to the respective asset class and $J$ is the number of asset classes. Using equation (10) one can then rewrite the difference in aggregate returns of two portfolios $p$ and $q$ as

$$\begin{aligned} r_t^p - r_t^q &= \sum_{j=1}^{J} \frac{r_{t,j}^p + r_{t,j}^q}{2} (w_{t-1,j}^p - w_{t-1,j}^q) \\ &+ \sum_{j=1}^{J} \frac{w_{t-1,j}^p + w_{t-1,j}^q}{2} (r_{t,j}^p - r_{t,j}^q). \end{aligned} \tag{11}$$

The first term of equation (11) captures the difference in returns resulting from the different weights of each assets in the two portfolios and is labeled the *composition effect*. The differences between weights are weighted by the average return of the respective asset in both portfolios. The second term captures the effect of the return differential on the overall difference and is called the *return effect*.

Furthermore, we expand the exercise by subtracting aggregate valuation changes due to exchange rates from the returns before decomposing the difference. This allows us to parse out the *exchange rate effect*.

Table 6 shows the decomposition results, which focuses on the comparison between Germany and other G7 members.

The first column shows the difference between Germany's foreign returns vis-à-vis each comparison country, averaged for the full period 1990-2017. In line with our findings above, German returns are lower than those of the other G7 members, so that the sign is negative in each row.

The second column shows the contribution of valuation changes due to exchange rates. The positive values indicate that most countries' returns suffered more from exchange rate-driven valuation changes (appreciation effects) than did Germany. The only exception is

Table 6: Decomposition of return differences: Germany vs other countries, 1990-2017

| Comparison country | Difference in foreign returns (pp.) | Difference due to | | |
|---|---|---|---|---|
| | | exchange rates | composition (asset class) | returns within asset class |
| | (1) | (2) | (3) | (4) |
| Canada | -3.922 | 0.308 | -0.826 | -3.405 |
| France | -0.924 | 0.380 | 0.189 | -1.480 |
| Italy | -2.037 | 0.347 | -0.360 | -2.011 |
| UK | -1.628 | -0.802 | -0.199 | -0.627 |
| US | -4.136 | 0.433 | -1.257 | -3.312 |

*Notes:* Decomposition splits the difference between return on German foreign assets and other country's foreign assets into three parts: (1) difference in valuation changes due to exchange rates, (2) different composition of asset position in the four broad asset categories, and (3) difference in returns within each asset classes (details in Section 6.3). Returns estimated as discussed in Section 2.1. For countries we compare nominal returns to abstract from the effects of different inflation dynamics across the countries.

the United Kingdom, where exchange rate effects can help to explain about half of the return differential with Germany (-0.8 of -1.6 percentage points overall). Taken together, however, the numbers in Column 2 are small, so that exchange rate movements do not help much to explain the observed gap between German and other countries' returns.

The third column indicates that asset composition is also not a major driver of the observed return differentials of Germany vs. other countries. Only in the comparison with Canada and the US, asset composition plays a non-trivial role, accounting for up to 25% of the returns differences (-0.8 and -1.3 percentage points respectively, see Column 3).

The dominant part of the explanation are differences in returns *within each assets class*. This can be seen in Column 4 which shows large negative numbers. The pure and plain return effect explains more than three quarters of the differences in returns between Germany and other countries.

In sum, the main reason why German foreign investments produce lower returns is not the type of assets Germany holds (debt vs. equity vs. FDI) nor frequent exchange rate appreciations. Instead, Germany's foreign assets are less profitable within the same asset class and after controlling for exchange rate and composition effects. Understanding why this is the case is what we turn to now.

### 6.4 Returns within asset classes

In this section, we want to understand what is driving the modest investment performance on the level of individual asset classes. For this purpose, we compare German

returns to other countries' return for individual asset classes. We return to our regression model from equation (6), and include the geographical distribution of each country's assets as well as additional asset characteristics.

For each asset class $j$ – portfolio equity and debt, foreign direct investment and "other investment" – we estimate the following regression:

$$\tilde{r}_{it}^{j} = \alpha_j + \beta_{1j} D_{it} + \sum_r \beta_{rj} S_{it}^{A,j,r} + \beta_{2j} \sigma_{it}^{j} + \delta Z_{it} + \gamma_t + u_{ijt}, \tag{12}$$

where $S_{it}^{A,j,r}$ is the share of assets from region $r$ in total assets of category $j$ owned by country $i$ in year $t$. $Z_{it}$ are additional control variables and $\gamma_t$ are yearly time fixed effects. In addition to the net foreign asset position and the financial account balance, $Z_{it}$ now also includes the exchange rate effects estimated before as these are an important driver of returns. We also include a measure of risk, $\sigma_{it}^{j}$. Specifically, following standard practice, we use the standard deviation of the respective return series, computed over 3-year rolling windows and centered around $t$. In addition, we control for geography, using the same set of world regions as before.

Note that in this exercise we set the bar intentionally high. The foreign exchange exposure, geographic portfolio allocation, and risk are part of the investment decision of German savers or intermediaries. Investors can freely choose where and what to invest in. The regressions therefore test an even stricter version of the German returns puzzle. We ask, conditional on foreign exchange movements and other controls, did German investors receive worse returns *within* individual asset classes than other countries?

Tables 7 and 8 present the results in four columns. The regression in the first column only includes the controls from the baseline specification in Section 4. The next three columns control for exchange rate effects, geography, and risk, respectively.

We lack data on the geographic allocation of assets and on exchange rate valuation effects for the regressions on debt and equity, so that the sample is restricted to 2002-2017 in Table 7 (see also Section 2). For similar reasons, also the country sample varies across different panels.[21] In particular for the "Other investments" category, data on the geographical distribution is relatively scarce (also see Table A5). Therefore, the number of observations and countries changes with the inclusion of geographical composition.

The tables deliver a clear finding. Germany's returns are consistently lower across asset

[21] All results exclude Spain due to a lack of data on the geographical distribution by asset class. The results for debt and equity further exclude Norway due to a lack of data on geographic allocation for these assets. The results for "Other investments" exclude both Norway and Portugal for the same reason.

Table 7: Determinants of returns by asset class (equity and debt), 2002-2017

| | **Equity returns** | | | | **Debt returns** | | | |
|---|---|---|---|---|---|---|---|---|
| | (1) Baseline | (2) Val. FX | (3) Risk | (4) Geo. | (5) Baseline | (6) Val. FX | (7) Risk | (8) Geo. |
| Germany dummy | -4.10** | -4.13** | -4.72** | -2.99 | -0.68 | -0.84 | -0.44 | -0.91 |
| | (1.80) | (1.74) | (1.83) | (2.24) | (0.93) | (0.90) | (0.88) | (1.08) |
| Valuation ch. due to ex. rates, equity | | 1.04*** | 0.97*** | 0.92*** | | | | |
| | | (0.13) | (0.14) | (0.15) | | | | |
| 3-year rolling std. dev., equity | | | 0.38** | 0.38** | | | | |
| | | | (0.17) | (0.17) | | | | |
| Valuation ch. due to ex. rates, debt | | | | | | 1.02*** | 0.99*** | 1.03*** |
| | | | | | | (0.15) | (0.15) | (0.15) |
| 3-year rolling std. dev., debt | | | | | | | 0.23 | 0.11 |
| | | | | | | | (0.20) | (0.21) |
| Advanced Europe | | | | 0.11 | | | | -0.14** |
| | | | | (0.15) | | | | (0.07) |
| Advanced Non-Europe | | | | 0.16 | | | | -0.08 |
| | | | | (0.15) | | | | (0.08) |
| Emerging &Developing | | | | 0.19 | | | | -0.16** |
| | | | | (0.18) | | | | (0.07) |
| Constant | -20.70*** | -18.11*** | -25.06*** | -38.94** | 8.94*** | 10.06*** | 8.51*** | 21.55*** |
| | (1.90) | (1.77) | (4.16) | (17.24) | (2.99) | (2.23) | (2.03) | (6.99) |
| Observations | 175 | 175 | 164 | 164 | 175 | 175 | 164 | 164 |
| Adjusted $R^2$ | 0.76 | 0.82 | 0.84 | 0.84 | 0.09 | 0.39 | 0.41 | 0.45 |
| No. countries | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
| Year fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

*Notes:* Germany's returns on equity are significantly lower than other countries' returns even after controlling for exchange rate effects and risk. Debt returns are comparable, albeit the coefficients of the Germany dummy are negative as well. Sample restricted to 2002-2017 due to a lack of data on geographic allocation and exchange rate valuation effects by asset class (see Section 2). Spain and Norway dropped entirely due to a lack of data on the geographical distribution by asset class. Net foreign assets and financial account balance included in the regressions but not shown. Robust standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 8: Determinants of returns by asset class (FDI and "Other investments"), 1985-2017

| | **FDI returns** | | | | **Other investment returns** | | | |
|---|---|---|---|---|---|---|---|---|
| | (1) Baseline | (2) Val. FX | (3) Risk | (4) Geo. | (5) Baseline | (6) Val. FX | (7) Risk | (8) Geo. |
| Germany dummy | -3.32*** | -3.60*** | -3.22** | -2.90** | -1.28 | -1.42* | -1.78*** | -1.12 |
| | (1.26) | (1.27) | (1.30) | (1.36) | (1.02) | (0.75) | (0.67) | (0.81) |
| Valuation ch. due to ex. rates, FDI | | 0.38*** | 0.36*** | 0.37*** | | | | |
| | | (0.10) | (0.11) | (0.11) | | | | |
| 3-year rolling std. dev., FDI | | | 0.15 | 0.13 | | | | |
| | | | (0.20) | (0.21) | | | | |
| Valuation ch. due to ex. rates, other | | | | | | 1.00*** | 1.07*** | 1.09*** |
| | | | | | | (0.08) | (0.08) | (0.09) |
| 3-year rolling std. dev., other | | | | | | | -0.16 | -0.13 |
| | | | | | | | (0.11) | (0.14) |
| Advanced Europe | | | | -0.12 | | | | -0.09* |
| | | | | (0.15) | | | | (0.05) |
| Advanced Non-Europe | | | | -0.10 | | | | -0.07 |
| | | | | (0.18) | | | | (0.06) |
| Emerging &Developing | | | | -0.10 | | | | -0.10 |
| | | | | (0.15) | | | | (0.10) |
| Constant | 9.82 | 11.69** | 10.56** | 21.32 | 3.64 | 12.68*** | 12.75*** | 20.65*** |
| | (5.98) | (5.18) | (5.10) | (17.06) | (3.37) | (1.40) | (0.89) | (4.76) |
| Observations | 339 | 339 | 328 | 328 | 227 | 227 | 212 | 189 |
| Adjusted $R^2$ | 0.14 | 0.18 | 0.19 | 0.18 | 0.33 | 0.63 | 0.67 | 0.67 |
| No. countries | 12 | 12 | 12 | 12 | 10 | 10 | 10 | 10 |
| Year fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

*Notes:* Germany's returns on FDI are significantly lower than those of other countries even after controlling for exchange rate effects, risk and geographical allocation. Returns on other investments are lower but the effect is not always significant. Geographical distribution for the respective asset class. Net foreign assets and financial account balance included in the regressions but not shown. The results exclude Spain due to a lack of data on the geographical distribution by asset class. The results for "Other investments" further exclude Norway and Portugal for the same reason. Robust standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

classes. This means that returns are lower even if we zoom in to individual asset classes and control for risk characteristics. The effects are particularly pronounced for portfolio equity investment and FDI. Both stand out economically and statistically as markets in which German returns were substantially lower, even after accounting for the effects of other allocation choices (which can also be seen as part of investment performance). For debt and "other investments" the mean effect remains negative by a 100 basis points, but is not significant.

# 7 Benefits for consumption insurance and demographic risks

So far, we showed that German returns are systematically lower than other countries' returns even after controlling for various compositional aspects. One reason why Germans may accept these low returns is an insurance motive. If returns are countercyclical with respect to domestic consumption, they provide a hedge against volatility in consumption. Additionally, Germans may strategically invest in regions with better demographic prospects. These might not yield high returns yet but potentially will in the future. In this section, we briefly touch upon these two potential channels.

## 7.1 Consumption insurance – income smoothing from abroad?

There is large literature on the potential of international investment to reduce consumption risks. The basic idea is that foreign investments can help to buffer shocks to household consumption. Suppose Germany witnesses an economic downturn while foreign countries do not. In this situation, German households that have invested into foreign assets will benefit from their (high) capital income from abroad to counterbalance their (lower) domestic income. The foreign capital income will thus help households to smooth their consumption over time, making them better off. Thus far, however, the literature found only very limited effects of investment income flows on consumption smoothing (see e.g. Sørensen and Yosha 1998, Lane 2001).

Here, we test to what extent German foreign investments provide consumption insurance for German households. We again focus on total returns on the foreign assets, i.e., we combine yields and valuation changes. We base our empirical approach on the consumption capital-asset pricing model (CCAPM). The CCAPM assumes that the return of a risky asset is proportional to the consumption beta. Intuitively, this implies that assets which have high pay-offs in bad states of the world when consumption is low are more desirable.

This can be formalized as follows:

$$\mathbb{E}[R_{it}] - \gamma_0 = \gamma_1 \beta_{c,i}, \tag{13}$$

where $R_{it}$ is the return to a risky asset, $\gamma_0$ is the return to a portfolio not correlated with consumption growth (the zero consumption beta portfolio), $\gamma_1$ is the price of risk, and $\beta_{ci} = \text{cov}(R_{it}, c_t)/\text{var}(c_t)$ with $c_t$ as the growth rate of aggregate consumption per capita is the measure of risk (Breeden, Gibbons and Litzenberger 1989). When the CCAPM holds, the expected return to an asset or portfolio is linear in its consumption beta. Therefore, a lower return on German foreign assets could be justified in terms of the CCAMP by a low consumption beta.

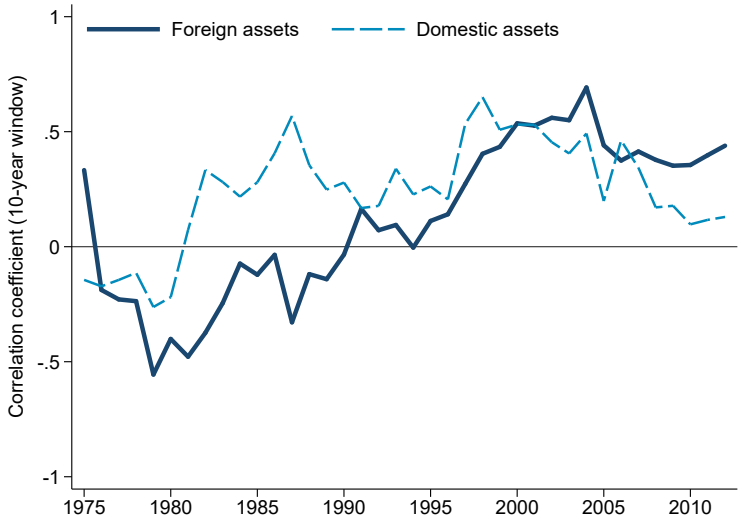
Table 9: Correlation of real consumption and real returns (lagged returns)

| | 1985-2017 | 1999-2017 | 2009-2017 |
|---|---|---|---|
| Germany, foreign assets | 0.294 | 0.494 | 0.413 |
| Germany, domestic assets | 0.268 | 0.319 | 0.134 |
| Canada | 0.099 | 0.353 | 0.579 |
| Finland | -0.152 | 0.400 | 0.837 |
| France | 0.127 | 0.397 | 0.420 |
| Italy | 0.072 | 0.528 | 0.563 |
| Netherlands | 0.319 | 0.255 | 0.667 |
| Norway | 0.133 | 0.089 | -0.274 |
| Spain | 0.053 | 0.381 | 0.675 |
| Sweden | -0.027 | 0.424 | 0.649 |
| United Kingdom | -0.126 | -0.213 | -0.516 |
| United States | 0.379 | 0.366 | 0.553 |

*Notes:* This table shows that Germany's real returns on foreign assets are positively correlated with real domestic consumption growth per capita (little evidence for consumption insurance). The correlation coefficient between returns and consumption is higher for foreign assets than for domestic German assets. The coefficient is also higher than those for most other countries. Income smoothing effects are largest for the United Kingdom and Sweden that show a negative correlation coefficient. The returns and consumption growth series are deflated using each countries consumer price index. Denmark and Portugal are omitted because data only starts in 1999 and 1993 respectively.

For this purpose, we compute the covariances between consumption growth and the investment returns discussed above. The CCAPM in equation (13) refers to spot consump-

Figure 14: Correlation of real consumption and real return, Germany, 10 year rolling windows, 1971-2017




*Notes:* The correlation between Germany's returns on foreign assets and real consumption growth is positive in most years, especially since the 1990s. In recent years the correlation is higher for foreign returns compared to domestic returns. Correlation coefficients plotted at the $5^{\text{th}}$ year of the window. Correlation coefficient computed for consumption growth and real returns, both deflated using the German consumer price index.

tion, yet empirically only period average consumption can be measured. In this study, we follow convention and choose the interpretation of consumption data as measuring consumption at the beginning of the period. In this case, consumption growth is computed by dividing next period consumption with current period consumption (Campbell 1999). Therefore, the correlation between consumption growth and returns is calculated using the return in period $t$ and consumption growth between period $t+1$ and $t$. Data on consumption growth is taken from the Macro History Database by Jordà et al. (2017) which includes data until 2016.[22]

Table 9 provides two crucial insights. First, the returns on German foreign assets are more strongly correlated with domestic consumption growth than a bundle of domestic German assets. In other words, they provide *less* consumption insurance than a domestic German portfolio and their low returns are not justified by the consumption insurance that the asset provides. Second, also in comparison with other countries, the correlation of the German portfolio with German consumption appears high. The key upshot is that

[22]The data for 2017 are from the World Development Indicators Database of the World Bank.

low German returns compared to other countries are not justified by their consumption insurance properties.

Moreover, if we take a closer look at the time path of the correlation between foreign asset returns and German domestic consumption, we find that the surge in German capital exports in recent years has gone hand in hand with a loss of consumption insurance (Figure 14). The correlation of foreign returns with domestic consumption growth has increased in recent years, not decreased. German foreign assets do not only have low pay-offs overall, they are also not helping to smooth consumption, and these trends have become worse in the past decade of record capital exports.

### 7.2 A hedge against demographic risks?

Germany faces increasing demographic risk from an aging population. Investing in countries with younger populations may help to hedge this risk and facilitate inter-temporal income smoothing. However, the data show that German assets are predominantly invested in other advanced countries with aging populations, especially into other European countries, and increasingly so.

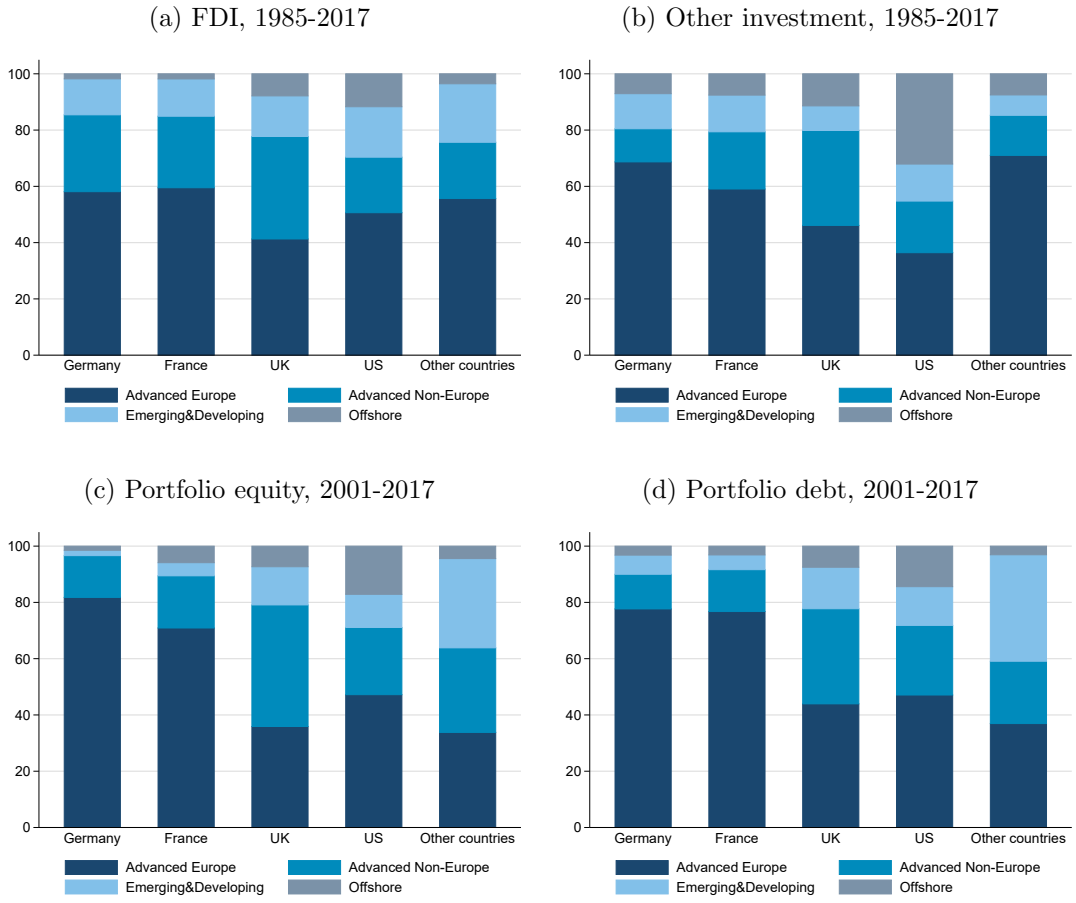
It is particularly remarkable that the share of German investments to younger and more dynamic developing countries and emerging markets has decreased rather than increased, from 25-30% in the 1980s to less than 10% in 2017. This drop has occurred despite the fact that developing countries such as China or India have seen record growth rates and that the emerging world now accounts for more than 50% of world GDP. In other words, the "home-bias" of German investments in favor of European investments has intensified and the potential for demographic risk hedging has decreased accordingly.

The preference for investing into aging economies is more pronounced in Germany than in other countries. This can be seen in Figure 15 which compares the geographical allocation of foreign assets. While Germany's preference for European investments is observable for all asset categories, the focus on the Euro area is especially strong for portfolio equity and debt (Panels (c) and (d)).[23] Specifically, the majority of Germany's equity assets are located in Northern Euro area countries, while the majority of debt securities are in Southern Euro area countries.

Another way to explore the relevance of demography is to plot world maps. Figure 16 shows the geographic distribution of Germany's foreign assets across the world between

[23]Please note that the underlying data for the geographical allocation of portfolio assets is only available since 2001.

Figure 15: Geographical distribution of foreign assets by category

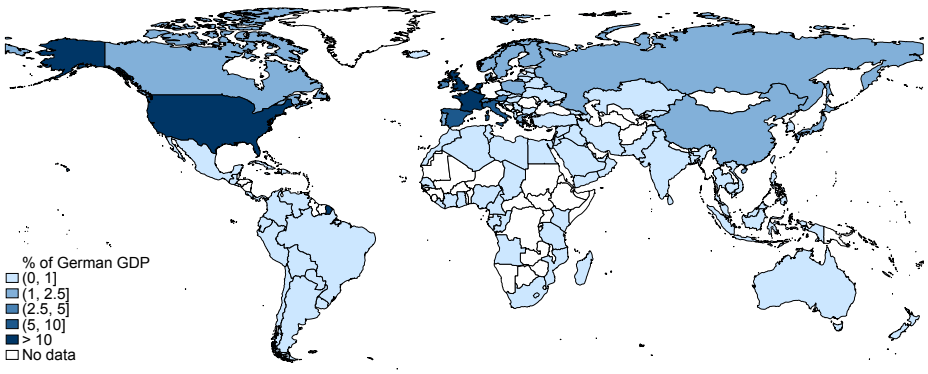



*Notes:* These graphs show that Germany's geographical allocation of foreign assets differs from that of other countries. Germany invests more in Advanced European countries and less in developing countries. Germany's bias towards European investments is especially large for portfolio holdings (Panels (c) and (d)). Offshore countries are classified following the Bundesbank's list of offshore banking centers.

1985 and 2017. It is estimated as discussed in Section 2. Assets are scaled by German GDP.

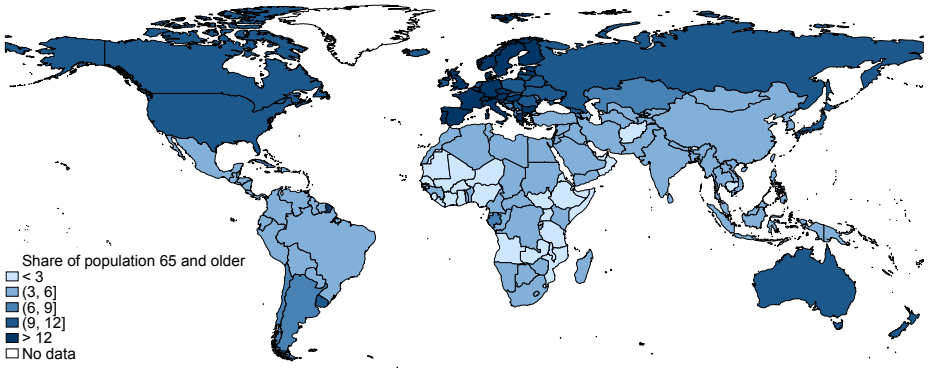
The map reveals once more that Germany's foreign investments flow predominantly to Europe and other advanced countries. These are also the countries with a population structure most similar to Germany. Figure 17 shows the average share of the people aged 65 and older in total population between 1985 and 2015 (old-age dependency ratio). It is clearly visible that the two maps overlap, as Germany has almost no investments in countries with a younger population structure. This illustrates that Germany's large stock of foreign assets does little for hedging against demographic risks.

Figure 16: Geographical distribution of German foreign assets, 1985-2017




*Notes:* This map shows the geographic distribution of German foreign assets. The stock is expressed in % of German GDP held in each country and averaged between 1985 and 2017.

Figure 17: Old age population (% above 64 years), average, 1985-2015




*Notes:* This map shows the share of each country's population aged 65 years and older, averaged between 1985 and 2015 (more recent data not available). Data from the UN Population Division.

# 8 Conclusion

Germany is world champion when it comes to exporting savings. In this paper, we studied the financial returns on German foreign investment. We find that the reputation of German household, firms, and banks of being bad foreign investors is mostly justified. German returns are substantially lower than those of other countries across asset classes. Moreover, foreign returns were consistently lower than domestic returns and the geographic distribution does not support the argument that the country's foreign investments hedge against demographic trends. The overwhelming share of German foreign investments is located in other industrial countries with similar demographic profiles.

We find that the under-performance of German foreign investment is particularly pronounced for equity and foreign direct investments. Importantly, the lower returns are not explained by a different risk profile of German investments. The correlation of foreign returns with domestic consumption is higher, not lower, than in other countries and higher than for domestic returns. In other words, foreign assets provide very little consumption insurance to German households. Overall, the low returns raise serious doubts with regard to the capacity of German households and the German financial sector to allocate Germany's substantial savings exports in a beneficial way.

## References


Bernanke, B. S. (2015), 'Germany's Trade Surplus is a Problem', Brookings online, 02.04.2015.

Bénétrix, A. S., Lane, P. R. and Shambaugh, J. C. (2015), 'International Currency Exposures, Valuation Effects and the Global Financial Crisis', *Journal of International Economics* 96, S98–S109.

Board of Academic Advisors (2019), 'Wirtschaftspolitische Probleme der deutschen Leistungsbilanz', Report for the German Ministry of Economic Affairs and Energy.

Breeden, D. T., Gibbons, M. R. and Litzenberger, R. H. (1989), 'Empirical Tests of the Consumption-Oriented CAPM', *The Journal of Finance* 44(2), 231–262.

Bundesbank (1998), *50 Jahre Deutsche Mark. Monetäre Statistiken von 1948 bis 1997 auf CD-ROM*, Verlag Vahlen und C.H. Beck.

Bundesbank (2008), 'Das deutsche Auslandsvermögen seit Beginn der Währungsunion: Entwicklung und Struktur', *Monatsbericht* Oktober, 15–33.

Bundesbank (2012), 'Zahlungsbilanzstatistik September 2012', *Statistisches Beiheft 3 zum Monatsbericht* September, 98–103.

Bundesbank (2014), 'Diskrepanz zwischen der Veränderung des Auslandsvermögens und des kumulierten Saldos der Kapitalbilanz: kein geeigneter Indikator für Vermögensverluste', *Monatsbericht* Mai, 52–54.

Bundesbank (2018), 'Die deutsche Auslandsposition: Höhe, Rentabilität und Risiken der grenzüberschreitenden Vermögenswerte', *Monatsbericht* Dezember, 47–68.

Campbell, J. Y. (1999), Asset Prices, Consumption, and the Business Cycle, *in* J. B. Taylor and M. Woodford, eds, 'Handbook of Macroeconomics', Vol. 1C, North Holland: Amsterdam, chapter 19, pp. 1231–1303.

Curcuru, S. E., Dvorak, T. and Warnock, F. E. (2008), 'Cross-border Return Differentials', *Quarterly Journal of Economics* 123(4), 1495–1530.

Curcuru, S. E., Dvorak, T. and Warnock, F. E. (2013), 'On Returns Differentials', *Journal of International Money and Finance* 36, 1–25.

den Haan, W., Ellison, M., Ilzetzki, E., McMahon, M. and Reis, R. (2016), 'The Danger of Germany's Current Account Surpluses: Results of the CFM and CEPR Survey', VoxEU, 27.10.2016.

Deutsche Bank (2013), 'Deutsche Leistungsbilanzüberschüsse – Kritik nicht stichhaltig', Deutsche Bank Research – Standpunkt.

European Commission (2016), 'Country Report Germany 2016'.

Frey, R., Grosch, U. and Lipponer, A. (2014), 'Fallstricke bei der Bestimmung von Vermögensverlusten deutscher Anleger im Ausland', *Wirtschaftdienst* 94(11), 806–812.

Fuest, C. (2017), 'The Politics of Germany's External Surplus', Project Syndicate, 17.07.2017.

German Council of Economic Experts (2017), 'Economic Forecast 2017 and 2018'.

German Ministry of Finance (2017), 'The German Current Account in the Context of US-German Trade', Position Paper with the Ministry of Economic Affairs, 10.05.2017.

Gourinchas, P.-O. and Rey, H. (2007*a*), From World Banker to World Venture Capitalist: U.S. External Adjustment and the Exorbitant Privilege, *in* R. H. Clarida, ed., 'G7 Current Account Imbalances: Sustainability and Adjustment', University of Chicago Press, chapter 1, pp. 11–66.

Gourinchas, P.-O. and Rey, H. (2007*b*), 'International Financial Adjustment', *Journal of Political Economy* 115(4), 665–703.

Gourinchas, P.-O. and Rey, H. (2014), External Adjustment, Global Imbalances, Valuation Effects, *in* G. Gopinath, E. Helpman and K. Rogoff, eds, 'Handbook of International Economics, Vol. 4', Elsevier, chapter 10, pp. 585–645.

Habib, M. M. (2010), 'Excess Returns on Net Foreign Assets – The Exorbitant Privilege from a Global Perspective', *ECB Working Paper* 1158.

IMF (2016), 'Germany: IMF Country Report No. 16/202'.

Jordà, O., Knoll, K., Kuvshinov, D., Schularick, M. and Taylor, A. M. (2019), 'The Rate of Return on Everything, 1870-2015', *Quarterly Journal of Economics* Forthcoming.

Jordà, O., Schularick, M. and Taylor, A. M. (2017), Macrofinancial History and the New Business Cycle Facts, *in* M. Eichenbaum and J. A. Parker, eds, 'NBER Macroeconomics Annual 2016', Vol. 31, University of Chicago Press, pp. 213–263.

Krugman, P. (2017), 'Germany's Real Sin', New York Times Opinion Pages, 27.05.2017.

Lane, P. R. (2001), 'Do International Investment Income Flows Smooth Income?', *Review of World Economics* 137(4), 714–736.

Lane, P. R. and Milesi-Ferretti, G. M. (2003), 'International Financial Integration', *IMF Staff Papers* 50(1), 82–113.

Lane, P. R. and Milesi-Ferretti, G. M. (2007*a*), A Global Perspective on External Positions, *in* R. H. Clarida, ed., 'G7 Current Account Imbalances: Sustainability and Adjustment', University of Chicago Press, chapter 2, pp. 67–102.

Lane, P. R. and Milesi-Ferretti, G. M. (2007*b*), 'The External Wealth of Nations Mark II: Revised and Extended Estimates of Foreign Assets and Liabilities, 1970-2004', *Journal of International Economics* 73, 223–250.

Lane, P. R. and Milesi-Ferretti, G. M. (2009), 'Where Did All the Borrowing Go? A Forensic Analysis of the U.S. External Position', *Journal of the Japanese and International Economies* 23(2), 177–199.

Lane, P. R. and Shambaugh, J. C. (2010), 'Financial Exchange Rates and International Currency Exposures', *American Economic Review* 100(1), 518–540.

Lewis, M. (2010), *The Big Short*, W. W. Norton & Company.

Meissner, C. M. and Taylor, A. M. (2006), 'Losing our Marbles in the New Century? The Great Rebalancing in Historical Perspective', *Conference Series; [Proceedings], Federal Reserve Bank of Boston* 51, 53–129.

Obstfeld, M. and Rogoff, K. (1996), *Foundations of International Macroeconomics*, The MIT Press.

Schuknecht, L. (2014), 'The Empire Strikes Back: Why Germany's Exports and Current Account Surpluses Benefit Other Countries', *International Economy* Fall, 50–72.

Sinn, H.-W. (2017), 'How to Reduce Germany's Surplus', Project Syndicate, 21.07.2017.

Sørensen, B. E. and Yosha, O. (1998), 'International Risk Sharing and European Monetary Unification', *Journal of International Economics* 45(2), 211–238.

Taylor, A. M. and Williamson, J. G. (1994), 'Capital Flows to the New World as an Intergenerational Transfer', *Journal of Political Economy* 102(2), 348–371.

Weidmann, J. (2014), 'External Imbalances in the Euro Area', Speech at the International Business Cycle Conference at the Kiel Institute for the World Economy, 17.03.2014.

Weidmann, J. (2019), 'Herausforderungen für das deutsche Wirtschaftsmodell ', Speech at the Sparkassentag (Meeting of German savings banks), 16.05.2019.

# Appendix

## Contents

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# A1 Additional tables and figures

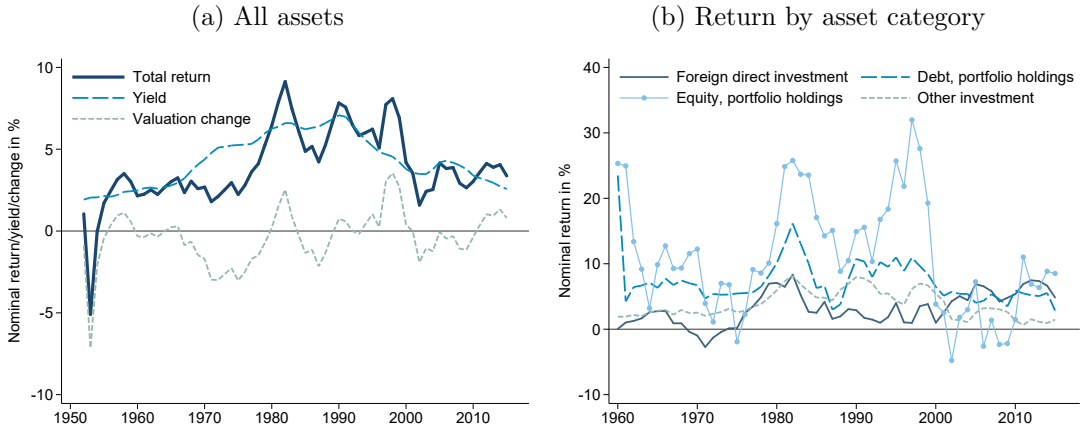
## A1.1 Nominal returns on German foreign assets and domestic assets

When analyzing German returns on foreign assets and comparing them to domestic assets in Section 4, we focused on real returns. Here, we also show nominal returns over time.

Figure A1 plots the nominal return, yield, and valuation changes (in Panel (a)) as well as returns by asset categories (in Panel (b)). Panel (a) confirms that Germany saw many years of valuation losses not just in real terms, as shown in the man text, but also in nominal terms. Panel (b) reveals that average nominal returns on FDI were positive but close to zero in contrast to the negative real returns before the 2000s. The other patterns in returns by category are similar for nominal and real returns.

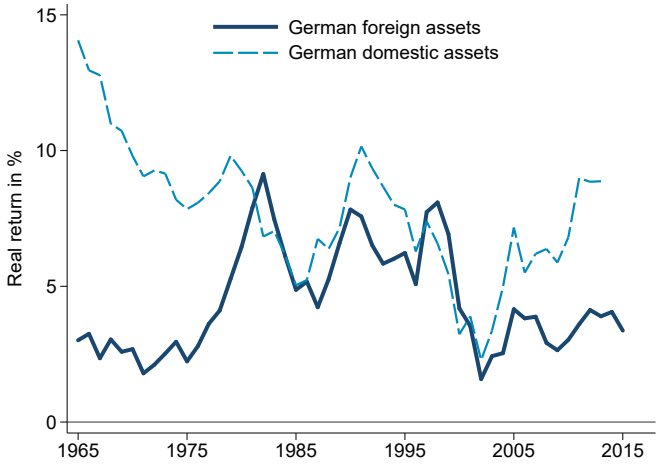
Figure A2 shows the comparison of the return on German foreign assets to the return on German domestic assets as measured by Jordà et al. (2019) for the nominal case. Compared to Figure 9 in the main text, the gap between nominal returns on foreign vs. domestic assets is larger than that with real returns in the 1960s and 1970s, mainly due to higher inflation. The overall picture, however, is similar for the real and nominal series.

Figure A1: Nominal returns on German foreign assets, 5-year rolling means, 1950-2017




*Notes*: Figure shows same results as Figure 8 for nominal returns. Also, in nominal terms Germany saw absolute losses in many periods. Rolling arithmetic averages computed over 5-year windows and plotted at the third year of the window. Returns estimated as discussed in Section 2.1.

Figure A2: Nominal returns in comparison, 5-year rolling means, 1975-2017




*Notes*: Figure shows the same comparison as Figure 9 for nominal returns. Given that both series are deflated using the same price index, the same results emerge. Rolling means computed over 5 year windows and plotted at the third year of the window. Return on foreign assets estimated as discussed in Section 2.1. Return on German domestic assets from Jordà et al. (2019).

### A1.2 Real returns on other countries' foreign assets

When comparing German returns to other countries' returns in Section 5, we focus on nominal returns to abstract from different inflation dynamics across countries. Our focus on nominal returns is motivated by the idea that we want to compare investment performance on the same global level playing field – before country-specific factors (such as inflation) are taken into account. Using nominal returns, Germany ranked $12^th$ among the 13 countries we consider. For completeness, we now also show results for real returns.

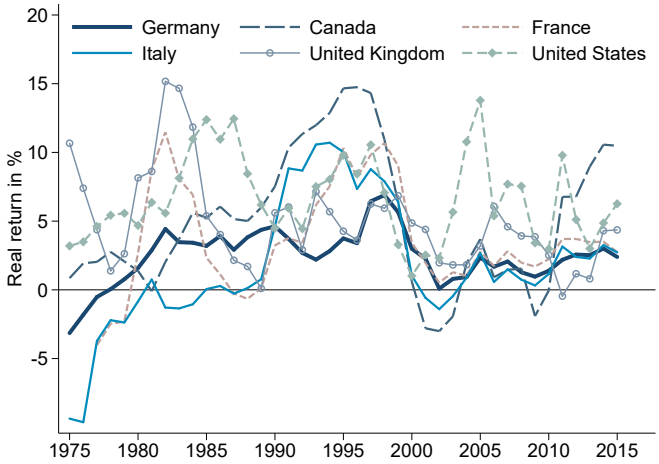
Table A1 shows that Germany ranks 9th when considering real returns. This is due to countries like Italy or Spain experiencing much higher rates of inflation especially in the earlier part of the sample. Therefore, in terms of their own price level, foreign returns for Italy and Spain appear lower than Germany's real returns abroad. Figure A3 confirms that Germany compares more favorably when looking at real returns, owing to the country's relatively low domestic inflation rates.

Table A1: Real returns on foreign assets, 1975-2017

| | Rank | 1975-2017 | 1999-2017 | 2009-2017 |
|---|---|---|---|---|
| United States | 1 | 6.61 | 5.75 | 7.74 |
| Canada | 2 | 5.21 | 3.01 | 7.40 |
| United Kingdom | 3 | 4.88 | 3.63 | 1.85 |
| Sweden | 4 | 4.63 | 5.22 | 4.60 |
| Netherlands | 5 | 3.77 | 2.95 | 4.55 |
| Norway | 6 | 3.57 | 3.73 | 5.24 |
| Denmark | 7 | 3.48 | 3.48 | 5.58 |
| France | 8 | 3.34 | 2.62 | 3.48 |
| Germany | 9 | 2.54 | 2.24 | 2.53 |
| Portugal | 10 | 2.44 | 0.69 | 1.17 |
| Italy | 11 | 1.88 | 1.50 | 3.18 |
| Spain | 12 | 1.29 | -0.07 | 1.82 |
| Finland | 13 | 0.31 | 2.36 | 2.19 |

*Notes:* This table shows the same results as Table 1 for real returns instead of nominal returns. Nominal domestic currency returns are deflated using each country's own consumer price inflation (from Macro History Database (Jordà et al. 2017) and World Bank.) Data for Denmark starts in 1999 and data for Portugal starts in 1993.

Figure A3: Real returns in comparison, 5-year rolling means, 1975-2017




*Notes*: This graph shows the same comparison as Figure 10 for real returns instead of nominal returns. Nominal domestic currency returns are deflated using each country's own consumer price inflation (from Macro History Database (Jordà et al. 2017) and World Bank.) Also in real terms German returns are low compared to the other G7 members (excluding Japan due to data availability). Rolling means computed over 5 year windows and plotted at the third year of the window. For more details see Section 2.

## A2 Comparison to earlier work on German foreign returns

### A2.1 Overview of the literature

Several earlier studies have computed returns on German foreign assets. In this appendix, we provide an overview of this work and compare the results to ours.

The overall take away is that all studies, including ours, use similair data sources and methodology. Moreover, all earlier papers use a more limited time sample compared to our study and no previous paper conducts decomposition exercises or international comparisons like we do. Most existing papers also focus on the return differential, i.e., the difference between the return on assets and liabilities.

Table A2: Results of other studies and comparison with our results

| Authors | Data | Other valuation changes included? | Return measures and sample used | Results | Our results with same sample |
|---|---|---|---|---|---|
| Lane and Milesi-Ferretti (2007*a*) | External Wealth of Nations for assets, BOP | Yes | Real return on assets, 1995-2000 | 5.4% | 6.1% |
| Habib (2010) | BOP and IIP before most recent revision in data | Yes | Real return differential, 1981-2007 | -1.07 | -1.04 |
| Bundesbank (2014), Frey et al. (2014)[1] | BOP and IIP before most recent revision in data | No | Nominal return on assets, 2005-2013 | 4.0% | 3.8% |
| Baldi and Bremer (2015) (DIW Berlin) | BOP and IIP before most recent revision in data | Yes | Nominal return differential, 1993-2012 | -1.5 | -0.5 |
| Bundesbank (2018) | BOP and IIP based on BPM6 | No | Nominal return on assets, 2008-2017 | 3.7% | 3.2% |
| Fiedler, Görg, Hornok, Jannsen, Kooths, Marchal, and Potjagailo (IfW Kiel) | BOP and IIP based on BPM6 | No | Nominal return on assets, 2005-2016 | 3.9% | 3.9% |

*Notes:* This table provides an overview of studies that have produced estimates of Germany's return on foreign assets. It describes the data and methodology used, and compares the other authors' results to our results. One reason for differing results is the treatment of "Other valuation changes" as discussed in the following Appendix A2.2.

[1] Frey et al. (2014) is a more extensive version of Bundesbank (2014).

Table A2 provides a concise summary of earlier estimates. For transparency, we compare the result of each study to our own using the exact same sample and variables used in the respective earlier study.

The table reveals that our results are very similar overall. There are two main reasons for any remaining discrepancies. The first is differences in the data, since we use the most updated and cleaned series provided by the Bundesbank. Papers published before 2015 use data based on the old balance of payments manual, meaning prior to the many revisions that came with the introduction of the new manual (BPM6). The second reason is the treatment of "other valuation changes". In particular the more recent studies (like Bundesbank 2018) exclude these changes, while we include them, since there is no strong argument not to do so and since we lack a data breakdown to exclude these changes before 2005. We discuss the impact of this choice in more detail in the following section and conclude that the inclusion or exclusion of "other valuation changes" does not affect the overall results much, especially not for our international comparisons.

### A2.2 Treatment of "other" valuation changes

As discussed in Section 2.1, one open issue in the computation of foreign returns regards the treatment of valuation changes due to "other changes", meaning residual valuation changes which can neither be attributed to exchange rate nor price movements. There are basically two options. First, one can simply exclude all residual valuation changes (see e.g. Bundesbank 2014, Frey et al. 2014, Bundesbank 2018). Second, one can include all or parts of these changes. Lane and Milesi-Ferretti (2009), for example, suggest to include "other valuation changes" for FDI but not for portfolio investment. For "other investments", in turn, they suggest adding it to the initial asset position.

Given that these options are pretty much arbitrary, and since the Bundesbank does not provide a data breakdown for the period before 2005, we include "other valuation changes" in our baseline results for Germany and other countries alike. However, we now check what impact this has on the overall results. Specifically, using Bundesbank data on the split of valuation changes after 2005, we can illustrate the effect of including, partly including, or excluding these other changes.

Panel (a) of Figure A4 shows that excluding valuation changes due to "other changes" for the period after 2005 does not make much of a difference, although the size of the change depends on the time period covered. In the pre-crisis years 2005-2007, for example, you get *lower* German returns if you exclude "other changes", while the returns are *higher*

Figure A4: Robustness of estimated nominal returns, 2005-2017

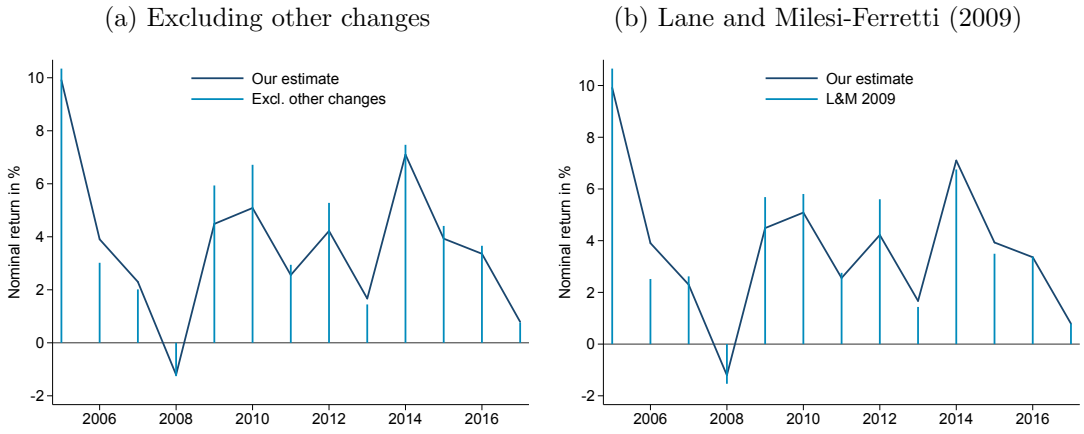
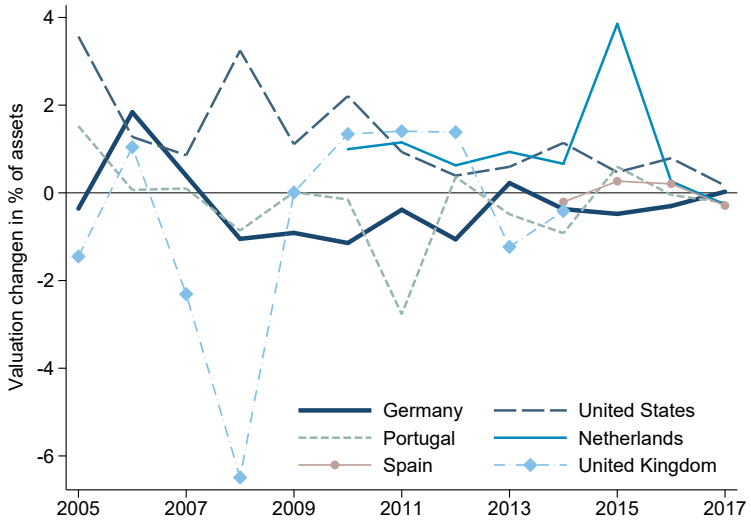



Figure A5: Valuation changes due to other adjustments, 2005-2017




*Notes:* This graph shows valuation changes due to "other changes" for Germany and other countries. Data retrieved from the statistical institutions responsible for the IIP (Bundesbank (DE), Bureau of Economic Analysis (US), Banco de Portugal (PT), Dutch Central Bank (NL), Banco de Espana (ES), Office of National Statistics (UK)). The UK estimate includes financial derivatives.

in the crisis years 2008-2010 without those changes. Panel (b) of Figure A4 follows the recommendation of Lane and Milesi-Ferretti (2009) of excluding "other changes" only for some asset categories. The take away is the same. In some years, the estimates are higher, while in others, they are lower. In aggregate, for all years for which there is comparison data

(2005-2017), Germany's nominal returns are 0.4 percentage points lower when excluding other valuation changes (4.1% with "other valuation change" vs. 3.7% without).

Does the choice make a difference for the international comparisons? To assess this, we retrieved data on "other valuation changes" for several countries and check how much their exclusion affects the results in comparison to Germany.

Figure A5 illustrates the impact of other valuation changes in percent of assets since 2005 for Germany, the US, the UK, the Netherlands and Spain. On average, German valuation changes were slightly below zero, at -0.28%. The averages for the US and the Netherlands are positive while the averages for the United Kingdom is negative. The Spanish average over the short time span available is roughly equal to zero. Thus, taken together, the discrepancy is not large enough to explain the observed differences between Germany and the other countries.

## A3 Data sources and classifications

This appendix lists the data sources used for (i) estimating returns across countries (Table A3), to compute (ii) valuation changes due to exchange rates (Table A4), as well as on (iii) the geographical distribution of assets (Table A5). The tables also provide information on data availability and country specific data issues.

Finally, Table A6 shows how our country groups are defined.

Table A3: Data sources for return computation of other countries

| Country | Coverage | IIP sources | Notes |
|---|---|---|---|
| Canada | 1970-2016 | EWN until 1989; IMF | |
| Denmark | 1999-2016 | IMF | Earlier data available but with gaps. |
| Finland | 1975-2016 | EWN until 1989; IMF | |
| France | 1975-2016 | EWN until 1993; IMF | PF not part of return before 1988 (no capital income data); capital income on PF debt in 1993 reported in Franc instead of Euro; jumps due to category changes in FDI in 1999 removed from change in assets. |
| Italy | 1972-2016 | EWN until 2003; IMF | FDI and PF not part of return before 1980 (no capital income data). |
| Netherlands | 1970-2016 | EWN until 1981; IMF | No PF assets data in EWN. No return in 2003 due to break in data. |
| Norway | 1975-2016 | EWN until 2006; IMF | PF not part of return before 1992 (no capital income data). |
| Portugal | 1993-2016 | EWN until 1995; IMF | Earlier data available but with gaps. |
| Spain | 1975-2016 | EWN until 2000; IMF | PF not part of return before 1990 (no capital income data). |
| Sweden | 1970-2016 | EWN until 1981; IMF | PF not part of return before 1997 (no capital income data). |
| United Kingdom | 1970-2016 | EWN until 1981; IMF | PF not part of return before 1984 (no capital income data). |
| United States | 1970-2016 | EWN until 1981; IMF | PF not part of return before 1986 (no capital income data). |

*Notes:* EWN = External Wealth of Nations database by Lane and Milesi-Ferretti (2007*b*)

Table A4: Data sources on the currency composition of assets

| Country | OECD FDI | CPIS (currency[1]) | LBS | Reserves |
|---|---|---|---|---|
| Canada | 1985-2017 | 2014-2017 | 1977-2017 | 1999-2017, Bank of Canada, USD |
| Denmark | 1991-2017 | 2001-2017 | 1977-2017 | 2005-2017, Danmarks Nationalbank |
| **Germany** | 1985-2017 | 2007-2017 | 1977-2017 | 1949-2017, Bundesbank, only USD until 1999 |
| Finland | 1992-2012, 2016-2017 | 2013-2017 | 1983-2017 | 2002-2017, Bank of Finland |
| France | 1987-2017 | 2001-2017 | 2007-2017 | 2001-2017, IMF, (based on Banque de France reports assume all in USD) |
| Italy | 1985-2017 | 2001-2017 | 2011-2017 | 2005-2017, Banca d'Italia |
| Netherlands | 1985-2017 | 2009-2017 | 2014-2017 | 1997-2017, Dutch central bank |
| Norway | 1988-2017 | only countries | 2014-2017 | 1997-2017, Norges Bank |
| Portugal | 1995-2017 | 2001-2017 | 2009-2017 | 2001-2017, Banco de Portugal (2011-2017 data, 2001-2010 assume 90% of reserves is in USD) |
| Spain | 2000-2017 | 2007-2017 | 2014-2017 | 1999-2017, Banco de Espana |
| Sweden | 1986-2017 | 2003-2014 | 1977-2017 | 1999-2017, Swedish Riksbank |
| United Kingdom | 1987-2017 | only countries | 1977-2017[2] | 1997-2017, Bank of England |
| United States | 1985-2017 | 2003-2017 | 1998-2017 | 1999-2017, except 2001, US Department of the Treasury (US International Reserve Position report) |

*Notes:* CPIS = Coordinated Portfolio Investment Survey LBS = Locational Banking Statistics.
[1] Country breakdown always available starting in 2001.[2] Data for 1982 is missing.

Table A5: Data sources on the geographical distribution of assets

| Country | OECD FDI | CPIS | LBS |
|---|---|---|---|
| Canada | 1985-2017 | 2001-2017 | 2007-2017 |
| Denmark | 1991,1994,1998,1999-2017 | 2001-2017 | 1977-2017 |
| **Germany** | 1985-2017 | 2001-2017 | 1977-2017 |
| Finland | 1992-2012, 2016-2017 | 2001-2017 | 1983-2017 |
| France | 1987-2017 | 2001-2017 | 1977-2017 |
| Italy | 1985-2017 | 2001-2017 | 2014-2017 |
| Netherlands | 1985-2017 | 2001-2017 | 1977-2017 |
| Norway | 1988-2017 | 2001-2017 | no data |
| Portugal | 1995-2017, 2006 missing | 2001-2017 | no data |
| Spain | 2003-2017 | 2001-2017 | 2014-2017 |
| Sweden | 1986-2017 | 2001-2017 | 1977-2017 |
| United Kingdom | 1987-2017 | 2001-2017 | 1977-2017, 1982 missing |
| United States | 1985-2017 | 2001-2017 | 1977-2017 |

*Notes:* CPIS = Coordinated Portfolio Investment Survey;
LBS = Locational Banking Statistics.

Table A6: Country groups used for geographical distribution

| Group | Countries | | | |
|---|---|---|---|---|
| Advanced Europe | Austria | Belgium | Cyprus | Czech Rep. |
| | Denmark | Estonia | Finland | France |
| | Germany | Greece | Iceland | Ireland |
| | Italy | Latvia | Lithuania | Luxembourg |
| | Malta | Netherlands | Norway | Portugal |
| | San Marino | Slovak Rep. | Slovenia | Spain |
| | Sweden | Switzerland | United Kingdom | |
| Advanced Non-Europe | Australia | Canada | Japan | New Zealand |
| | Rep. of Korea | Macao | Taiwan | United States |
| Offshore | Antigua and Barbuda | Bahrain | Barbados | Belize |
| | Dominica | Grenada | Hong Kong | Lebanon |
| | Liberia | Marshall Isl. | Mauritius | Panama |
| | Philippines | Samoa | Seychelles | Singapore |
| | St. Kitts and Nevis | St. Lucia | The Bahamas | Vanuatu |
| | St. Vincent and the Grenadines | | | |
| Emerging&Developing | Remaining countries | | | |

*Notes:* Choice of offshore countries based on Bundesbank list of offshore banking centers.

## A4 Estimation of valuation changes due to exchange rates

In this section, we compare our estimates of valuation changes due to exchange rate movements (as discussed in Section 2.1) using official data on this type of data for several countries. In addition we also compare our estimates to an alternative set of estimates that is based on the currency composition data provided for total assets (not asset categories) by Bénétrix et al. (2015). The comparisons focus on the period after 2002 when the CIPS portfolio data become available, so that all asset classes can be included. The main take away from this exercise is that the estimates are similar across sources.

### A4.1 Germany

Figure A6 shows the comparison of valuation changes due to exchange rates for all asset classes for Germany. As explained, our aggregate comparison starts in 2002 (Panel (a)). Panels ((b)-(f)) start in 2005, which is when Bundesbank estimates by asset class become available. Overall the results are very similar, except for the reserves category in 2008 and 2009. This result suggests that the publicly available data on the currency composition of reserves is not complete or that the Bundesbank uses non-public, detailed data the allows for much more precise estimate. In any case, reserves only make up a small part of total assets, so the effect of this mismatch is not large.

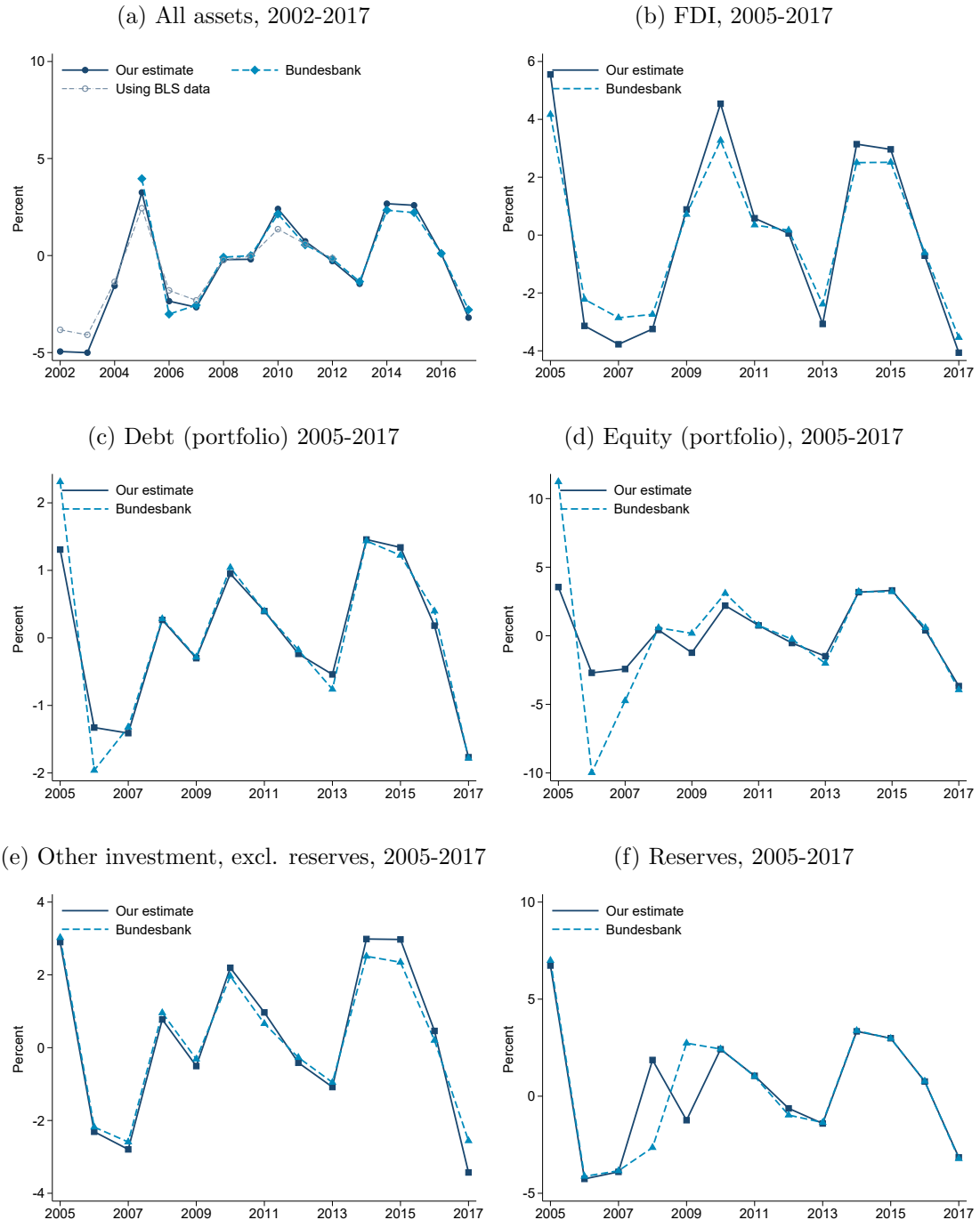
### A4.2 Netherlands

The Dutch Central Bank (DNB) publishes a breakdown of valuation changes starting in 2010. Panel (a) of Figure A7 shows that also for the Netherlands our approach delivers fairly similar estimates despite the lack of CPIS currency data before 2009 and the lack of any LBS data before 2014.

### A4.3 Portugal

The Banco de Portugal publishes a breakdown of valuation changes since 1999. Panel (b) of Figure A7 shows that our approach delivers fairly similar estimates despite the lack of any LBS data before 2009. However, in the first three years when no CPIS data is available the estimates differ substantially since our aggregate measure includes only FDI in this period.

Figure A6: Germany: valuation changes due to exchange rates, result comparison




*Notes*: This graph compares our estimates of valuation changes due to exchange rates to those published by the Bundesbank. We find few discrepancies. The estimates using the aggregate data on total assets from Bénétrix et al. (2015) are also fairly similair. BLS refers to Bénétrix et al. (2015).

### A4.4 Spain

The Spanish Banco de Espana (BdE) publishes time series starting only in 2014. For the four overlapping years our estimate is only slightly lower than the publishes series, see Panel (c) of Figure A7. The result using BLS data is quite similar.

### A4.5 United Kingdom

In an article titled "Analysis of the UK's international investment position: 2016"[24] the Office of National Statistics (ONS) published estimates of the valuation changes due to exchange rate effects for 2000 to 2014. The estimation is based only on US Dollar, Euro and Japanese Yen exchange rates, uses country shares to approximate currency shares and includes financial derivatives. Panel (d) of Figure A7 shows that this yields similar results as our more detailed approach as well as the estimates using BLS data.

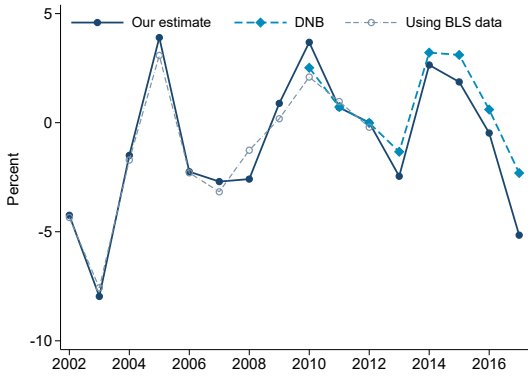
### A4.6 United States

For the US, the Bureau of Economic Analysis (BEA) publishes data on the valuation changes due to exchange rate movements since 2002. Panel (e) of Figure A7 shows that also the estimates for the US are very close to the published series. This is reassuring since we need to interpolate the US currency composition of other investment between 1998 and 2012.

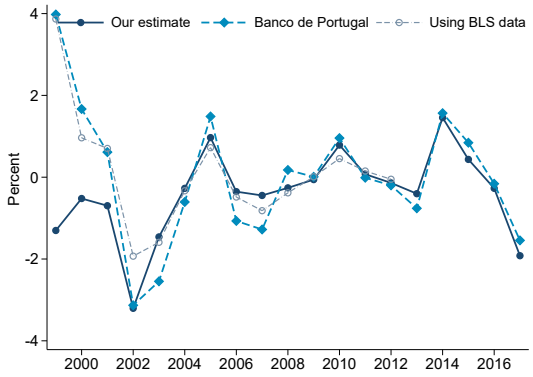
[24]The article is available on the ONS website: `https://www.ons.gov.uk/economy/nationalaccounts/balanceofpayments/articles/analysisoftheuksinternationalinvestmentposition/2016`.

Figure A7: Other countries: valuation changes due to exchange rates, result comparison

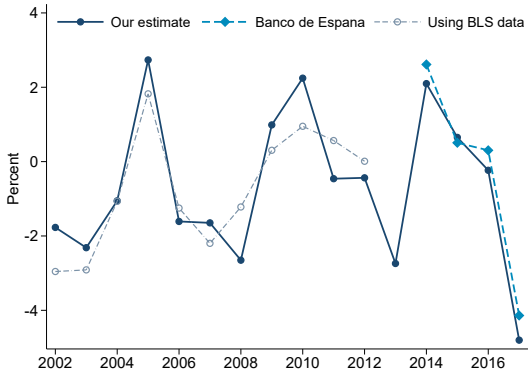
(a) Netherlands, all assets, 2002-2016



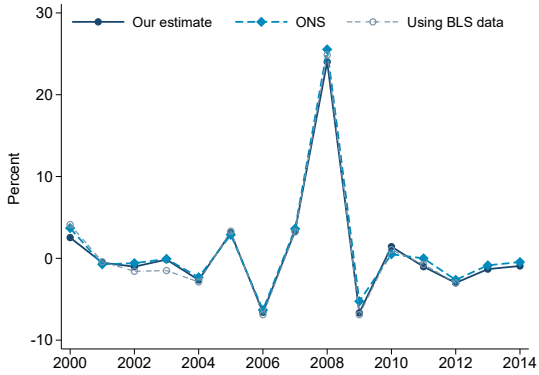

(b) Portugal, all assets, 1999-2017



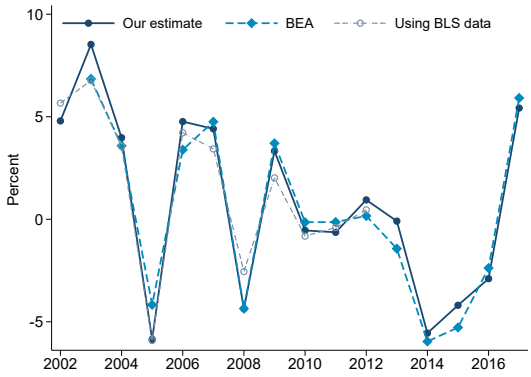

(c) Spain, all assets, 2002-2017




(d) United Kingdom, all assets, 2000-2014




(e) United States, all assets, 2002-2017



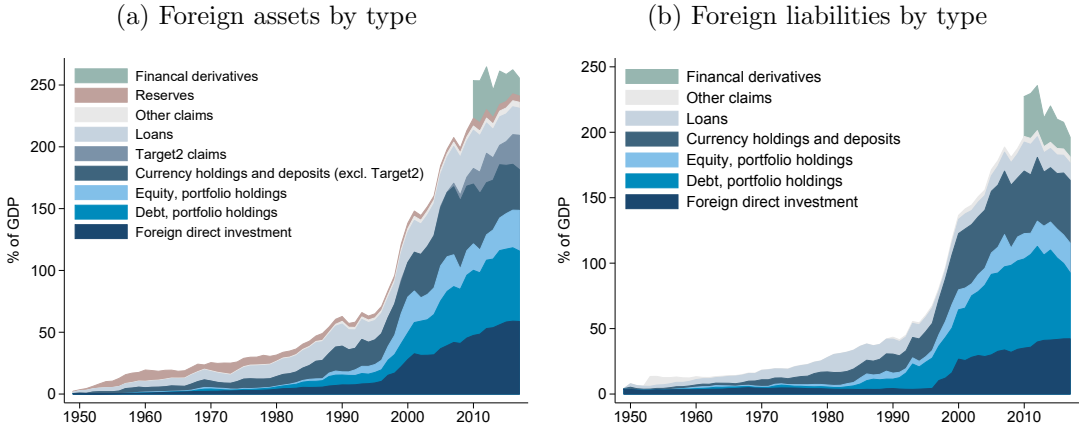

*Notes*: This graph compares our estimates of valuation changes due to exchange rates to the official estimates published by the respective central bank or related country authority. We conduct this comparison for all countries for which this data breakdown is made publicly available. Overall, we find few discrepancies. The estimates using data from Bénétrix et al. (2015) also produces similar results for aggregate assets. BLS refers to Bénétrix et al. (2015). DNB=Dutch Central Bank, ONS=Office of National Statistics, and BEA=Bureau of Economic Analysis.

## A5 Return differential between German assets and liabilities

To gauge the profitability of foreign investments, many earlier studies compare the returns on foreign assets to those earned by foreigners in the respective country (on foreign liabilities). While we prefer the comparison to other countries' returns and a broader measure of domestic returns, we also want to provided estimates of liability returns here. We will see that the difference between asset and liability return decreased in recent years, indeed it has turned positive over the past decade. This has led some commentators to argue that German investment performance abroad improved in recent years (Bundesbank 2014, Bundesbank 2018). Here we show that changes in the German differential is not the result of better foreign returns, but mainly driven by a reduction returns on liability FDI and liability portfolio debt. Both categories saw specific developments in the past decade which complicate the comparison further.

To set the stage, Figure A8 shows the composition of German foreign assets and liabilities. As can be seen, the asset composition of liabilities (Panel (b)) is rather similar to that of Germany's foreign assets (Panel (a)).

Figure A8: Composition of Germany's international investment position, foreign assets vs. liabilities, 1949–2017

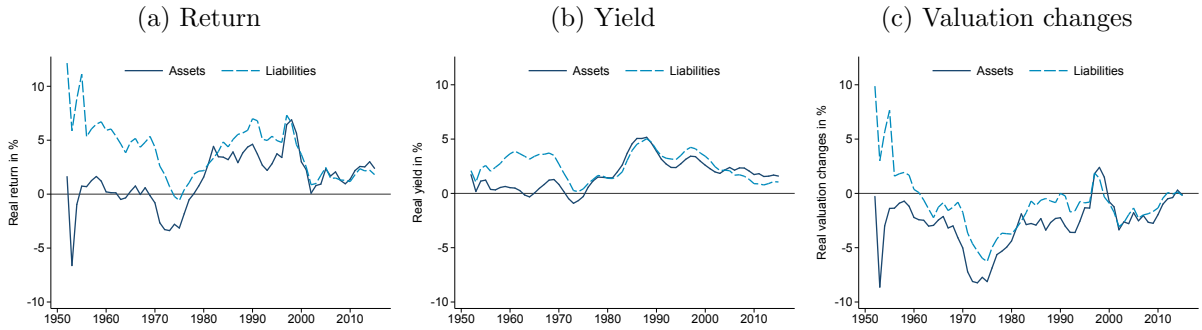



*Notes:* Data from Bundesbank. Detailed split of firms and households only available since 2012.

Panel (a) of Figure A9 compares the returns on Germany's assets abroad to those on foreign liabilities since the 1950s. As can be seen, the return on assets was lower throughout the entire post-WW2 period, and until the 2000s. The past few years are the first time in which the difference turns (slightly) positive, on average.

For a more detailed comparison, panels (b) and (c) of Figure A9 show breakdowns into yields vs. valuation changes. The graphs reveal that the most recent shift is driven by

Figure A9: Real return, yield and valuation changes on German foreign assets vs. liabilities, 1950-2017




*Notes*: Rolling means computed over 5 year windows and plotted at the third year of the window. Return on foreign assets and liabilities estimated as discussed in Section 2.1 and deflated using the consumer price index.

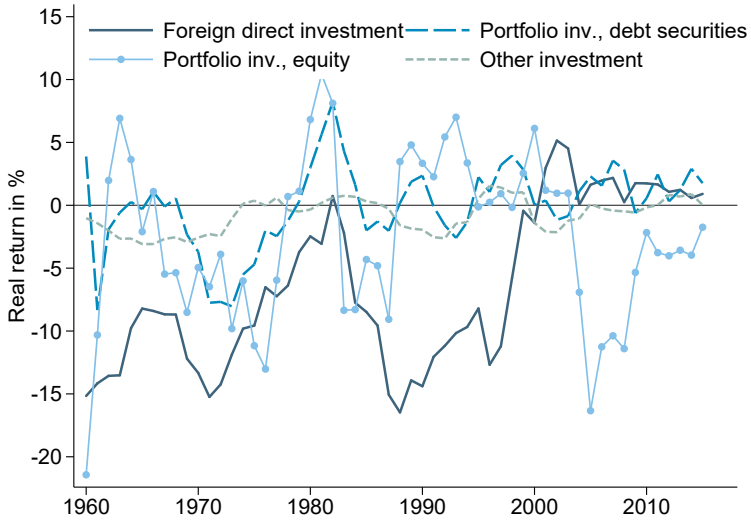
yields and not by valuation changes. Generally, there are only very few years in which the valuation changes on assets were larger than valuation changes on liabilities.

Finally Figure A10 displays a breakdown by asset class. To facilitate interpretation, we show the difference between asset and liability returns instead of both returns separately for each asset class. The figure shows that before the 2000s the return differential was especially negative for FDI, but this differential has improved notably over the past two decades, with German FDI abroad showing higher returns that foreign FDI in Germany. Also the relative performance of portfolio debt has shifted since the early 2000s, with German portfolio assets yielding higher returns compared to German debt securities held by foreigners. In contrast, the differential remains negative for equity investments, often strongly so.

To understand the drivers of these differences, we now perform the same decomposition exercise as we did for foreign returns across countries (Section 6.3). Table A7 shows that the differences within each asset class explain the overall difference, both historically and today. Figure A8 also illustrates the decomposition over time. It highlights that the difference due to composition did not decrease a lot since the 1970s while the within-asset class differences decreased substantially and turned positive since the 2000s. Finally, Table A11 shows the contribution of each type of assets, again differentiating by differences due to asset composition and differences due to returns within asset classes. The table shows that the negative values in the early sample are mainly driven by FDI and other investment. The recent switch to positive differences was largely driven by FDI and portfolio debt.

To summarize, we find that the recent decrease in the gap between returns on foreign

Figure A10: Differences between real returns on foreign assets and liabilities by asset class, 1960-2017




*Notes*: This figure shows differences between real returns (or yields or valuation changes) between German foreign assets and foreign liabilities. Rolling arithmetic means computed over 5 year windows and plotted at the third year of the window. Returns estimated as discussed in Section 2.1.

assets and foreign liabilities is mainly due to the relative changes in yields on FDI and debt portfolio holdings, especially because the return of foreigners investing in Germany went down. This finding is consistent with the observation that the outflows of debt and FDI investments from Germany (both gross and net) have increased notably over the past 20 years, possibly due to a search-for-yield effect.

At the same time, there are important idiosyncratic effects that complicate the comparison of FDI and debt returns on assets vs. liabilities. First, it is well-known that, during and after the global financial crisis and the Eurozone crisis, foreigners have purchased record amounts of German Bunds and other highly rated German debt securities, despite the fact that these had almost zero yields (Bundesbank 2017). This safe-haven effect improved the differential for debt securities. Second, inward FDI in Germany has become highly leveraged over the past two decades, mostly for tax shifting reasons. Today, many foreign companies load their German subsidiaries with debt to reduce the (high) effective tax rate on profits after interest. In comparison, German outward FDI is significantly less leveraged (Graf and Grimme 2017). This mismatch biases down the aggregate yields and returns reported by foreign-owned firms in Germany, even if the profitability of German firms has stayed the same (Ramb and Weichenrieder 2005). The increased within-firm

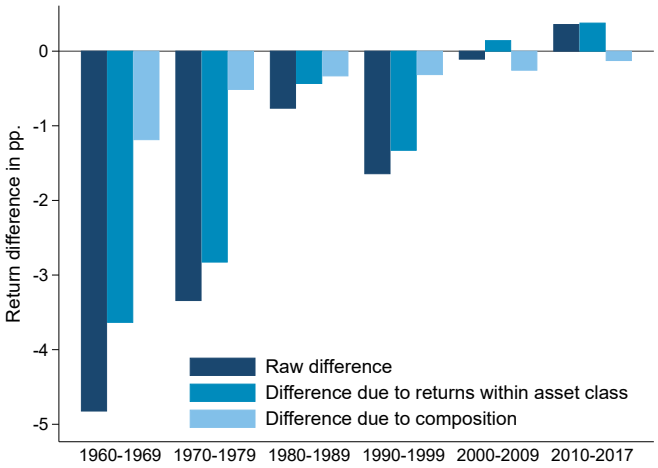
tax shifting activities makes it hard to interpret the recent increase in relative yields on German FDI as improved investment performance. More research is needed to examine these effects in detail, ideally using micro-data on FDI and portfolio debt flows.

Table A7: Decomposition of real return differential between foreign assets and liabilities, 1960-2017

| | | Difference due to | |
|---|---|---|---|
| | Difference in returns (pp.) | composition (asset class) | returns within asset class |
| 1960-2017 | -1.792 | -0.465 | -1.341 |
| 1985-2017 | -0.841 | -0.262 | -0.606 |
| 1999-2017 | 0.218 | -0.087 | 0.257 |
| 2009-2017 | 0.479 | -0.280 | 0.657 |
| 1960-1969 | -4.823 | -1.186 | -3.634 |
| 1970-1979 | -3.342 | -0.513 | -2.826 |
| 1980-1989 | -0.764 | -0.331 | -0.433 |
| 1990-1999 | -1.642 | -0.314 | -1.328 |
| 2000-2009 | -0.107 | -0.255 | 0.141 |
| 2010-2017 | 0.357 | -0.125 | 0.376 |

*Notes:* This decomposition splits the difference between returns on German foreign assets and German foreign liabilities into two parts: (1) asset class composition (using the same four broad asset categories used above), and (2) difference in returns within each asset classes. More details in Section 6.3.

Figure A11: Decomposition of real return differential between foreign assets vs. liabilities, 1960-2017




*Notes:* Decomposition splits difference between return on German foreign assets and German foreign liabilities into two parts: (1) different composition of asset position in the four broad asset categories, and (2) difference in returns within each asset classes (details in Section 6.3).

Table A8: Contributions of different assets to differential between foreign assets and domestic assets (IIP), 1960-2017

| | Total effect | FDI | Equity | Debt | Other inv. |
|---|---|---|---|---|---|
| *Panel (a): Differences due to composition* | | | | | |
| 1960-2017 | -0.465 | -0.108 | -0.194 | -0.307 | 0.144 |
| 1985-2017 | -0.262 | 0.156 | -0.169 | -0.475 | 0.225 |
| 1999-2017 | -0.087 | 0.088 | -0.002 | -0.303 | 0.129 |
| 2009-2017 | -0.280 | 0.130 | -0.108 | -0.307 | 0.005 |
| *Panel (b): Differences due to returns within class* | | | | | |
| 1960-2017 | -1.341 | -0.845 | -0.094 | 0.128 | -0.531 |
| 1985-2017 | -0.606 | -0.396 | -0.167 | 0.244 | -0.288 |
| 1999-2017 | 0.257 | 0.393 | -0.290 | 0.393 | -0.239 |
| 2009-2017 | 0.657 | 0.296 | -0.238 | 0.516 | 0.083 |

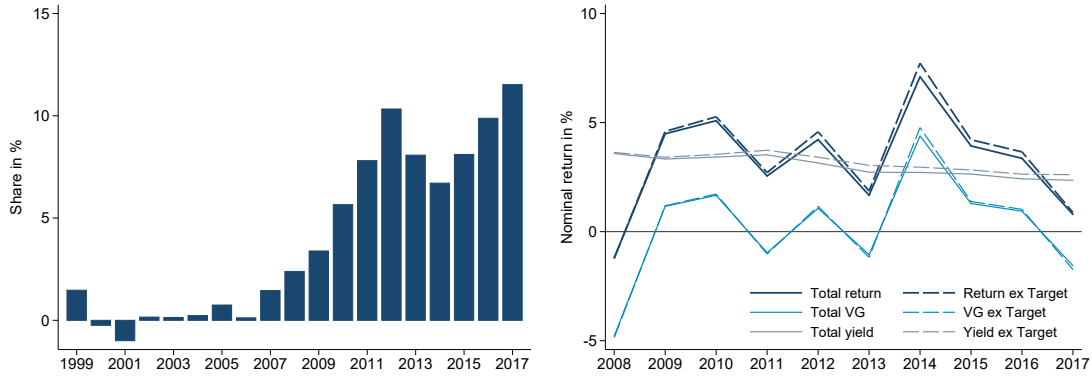
*Notes:* This table shows contributions of individual asset classes to each of the components of the return differential. Components are (1) different composition of asset position in the four broad asset categories, and (2) difference in returns within each asset classes (details on decomposition in Section 6.3).

## A6 Impact of Target2 balances on German foreign returns

Germany's Target2 balances have been growing fast since 2007. The crisis in the Euro area led to large inflows of deposits into Germany and, thus, to higher Target2 claims. In recent years, the extended asset purchases by the European Central Bank (ECB) are also believed to have contributed to the growth of Target2 balances. Many of the purchased securities are sold by banks outside of the Euro area, which tend to have their Target2 accounts registered with the German Bundesbank. If these investors sell their securities to the ECB, Target2 assets in Germany increase (see e.g. Bundesbank 2017).

Figure A12: Foreign asset returns and Target2 balances: Germany

(a) Share of Target2 in total assets, 1999-2017 (b) Impact of Target2 on returns, 2007-2017




*Notes:* Panel (a) shows the increasing share of Target2 balances in total foreign assets. Panel (b) shows that the effect of Target2 balances for aggregate returns is not very large.

Target2 balances are renumerated at a benchmark interest rate (the "main refinancing rate") that currently stands at zero. Target2 claims enter both German foreign assets as well as the financial account. Therefore, they do not affect valuation changes or yields. However, they do lower the returns (in absolute terms) by increasing the denominator.

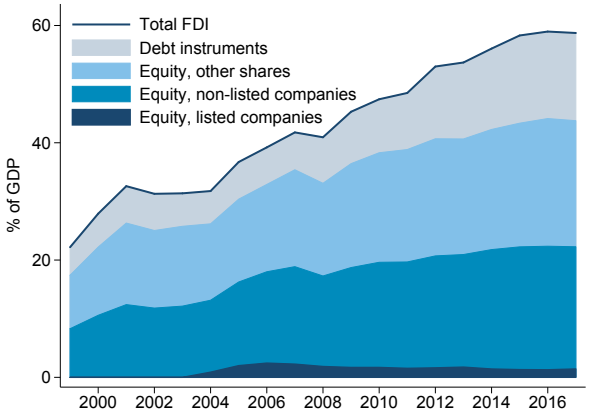
Figure A12 plots the share of Target2 balances in total assets. We all show total returns, yields and valuation changes including and excluding Target2 balances. The returns are plotted since 2008 because 2007 is the first year Target2 balances amounted to more than 1% of total assets. This share increased to 11.5% of total assets in 2017 with some fluctuations, see Panel (a) of Figure A12.

Taken together, including Target2 lowers the yearly nominal return on total German foreign assets by 0.23 percentage points, on average, since 2008. The return effect was largest in 2014, with -0.62 percentage points. In the remaining years it varied between -0.1 and -0.35 percentage points.

## A7 Book values for FDI assets

As discussed in Section 2.3, German FDI assets are recorded at book value before 2004, which could bias our results. This is mainly relevant for equity in listed companies because for equity in non-listed companies there is no direct estimate of market prices available anyways. Figure A13 shows that equity in listed companies only makes up a small part of German FDI assets. Instead the equity assets are roughly equally split between equity in non-listed companies and other equity which includes real estate. Since market prices are less relevant for the non-listed shares and are applied to real estate assets, the valuation at book values should not affect our results too much.

Figure A13: Detailed composition of FDI assets, 1999-2017




*Notes*: Composition of German FDI assets. Data from Bundesbank.

Nevertheless, we now check our results for sensitivity to these valuation effects for FDI. For this purpose we consider the counterfactual where there are only valuation changes due to exchange rates. Technically when assets are recorded at book value there can be no price adjustments, this means that if we record valuation changes other than those due to exchange rate movements these must be write-offs or due to mismeasurement. Now we can assume that all other changes observed are due to mismeasurement and set total valuation changes before 2005 to the estimated valuation changes due to exchange rates. To get a conservative estimate we do this only for Germany.

Table A9 shows the regression using the returns on FDI as dependent variable from Section 5. We compare results with the standard return measure to those with the adjusted return, measured as described above. While the difference between Germany and the other countries becomes smaller in absolute terms with the adjusted returns, it is still negative and significant. Thus our results hold up even if we exclude all valuation changes except for

those due to exchange rate movements. It should be noted that this analysis only adjusts the German returns. If other countries also report book values, their returns are likely to be underestimated as well.

Table A9: FDI returns with adjusted valuation changes

| | Standard return | | | | Adjusted return | | | |
|---|---|---|---|---|---|---|---|---|
| | (1) Baseline | (2) Val. FX | (3) Risk | (4) Geo. | (5) Baseline | (6) Val. FX | (7) Risk | (8) Geo. |
| Germany dummy | -3.32*** | -3.60*** | -3.22** | -2.90** | -2.42** | -2.70*** | -2.23** | -1.90* |
| | (1.26) | (1.27) | (1.30) | (1.36) | (1.02) | (1.01) | (1.06) | (1.12) |
| Valuation ch. due to ex. rates | | 0.38*** | 0.36*** | 0.37*** | | 0.39*** | 0.37*** | 0.38*** |
| | | (0.10) | (0.11) | (0.11) | | (0.10) | (0.11) | (0.11) |
| 3-year rolling std. dev., std. return | | | 0.15 | 0.13 | | | | |
| | | | (0.20) | (0.21) | | | | |
| 3-year rolling std. dev., adj. return | | | | | | | 0.14 | 0.12 |
| | | | | | | | (0.19) | (0.20) |
| Advanced Europe | | | | -0.12 | | | | -0.13 |
| | | | | (0.15) | | | | (0.15) |
| Advanced Non-Europe | | | | -0.10 | | | | -0.12 |
| | | | | (0.18) | | | | (0.18) |
| Emerging &Developing | | | | -0.10 | | | | -0.12 |
| | | | | (0.15) | | | | (0.14) |
| Constant | 9.82 | 11.69** | 10.56** | 21.32 | 9.96* | 11.87** | 10.93** | 23.42 |
| | (5.98) | (5.18) | (5.10) | (17.06) | (5.93) | (5.12) | (4.90) | (16.70) |
| Observations | 339 | 339 | 328 | 328 | 339 | 339 | 328 | 328 |
| Adjusted $R^2$ | 0.14 | 0.18 | 0.19 | 0.18 | 0.15 | 0.19 | 0.20 | 0.19 |
| No. countries | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 |
| Year fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

*Notes:* Columns 1-4 reproduce the results of Table 8 in Section 5. These are compared to the results using adjusted returns in Columns 5-8 (excluding any valuation changes not due to exchange rates). Robust standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Net foreign assets and financial account balance included in the regressions, but not shown.

## References cited in the appendix


Baldi, G., and Bremer, B. (2015), 'The Evolution of Germany's Net Foreign Asset Position', *DIW Economic Bulletin* 5(22/23), 303-309.

Bénétrix, A. S., Lane, P. R. and Shambaugh, J. C. (2015), 'International Currency Exposures, Valuation Effects and the Global Financial Crisis', *Journal of International Economics* 96, S98–S109.

Bundesbank (2014), 'Diskrepanz zwischen der Veränderung des Auslandsvermögens und des kumulierten Saldos der Kapitalbilanz: kein geeigneter Indikator für Vermögensverluste', *Monatsbericht* Mai, 52–54.

Bundesbank (2017), 'Die deutsche Zahlungsbilanz für das Jahr 2016', *Monatsbericht* März, 17-34.

Bundesbank (2018), 'Die deutsche Auslandsposition: Höhe, Rentabilität und Risiken der grenzüberschreitenden Vermögenswerte', *Monatsbericht* Dezember, 47–68.

Fiedler, S., Görg, H., Hornok, C., Jannsen, N., Kooths, S. , Marchal, L. and Potjagailo, G. (IfW Kiel) (2018), 'Zur wirtschaftlichen Bedeutung deutscher Direktinvestitionen im Ausland und deren Relevanz für den deutschen Leistungsbilanzsaldo', Report for the German Ministry of Finance.

Frey, R., Grosch, U. and Lipponer, A. (2014), 'Fallstricke bei der Bestimmung von Vermögensverlusten deutscher Anleger im Ausland', *Wirtschaftdienst* 94(11), 806–812.

Graf, C., and Grimme, C. (2017), 'Der Einluss der Vermögenseinkommen auf den deutschen Leistungsbilanzüberschuss', *ifo Schnelldienst* 22, 28-44.

Habib, M. M. (2010), 'Excess Returns on Net Foreign Assets – The Exorbitant Privilege from a Global Perspective', *ECB Working Paper* 1158.

Jordà, O., Knoll, K., Kuvshinov, D., Schularick, M. and Taylor, A. M. (2019), 'The Rate of Return on Everything, 1870-2015', *Quarterly Journal of Economics* Forthcoming.

Jordà, O., Schularick, M. and Taylor, A. M. (2017), Macro Financial History and the New Business Cycle Facts, *in* M. Eichenbaum and J. A. Parker, eds, 'NBER Macroeconomics Annual 2016', Vol. 31, University of Chicago Press, pp. 213–263.

Lane, P. R. and Milesi-Ferretti, G. M. (2007a), A Global Perspective on External Positions, *in* R. H. Clarida, ed., 'G7 Current Account Imbalances: Sustainability and Adjustment', University of Chicago Press, chapter 2, pp. 67–102.

Lane, P. R. and Milesi-Ferretti, G. M. (2007b), 'The External Wealth of Nations Mark II: Revised and Extended Estimates of Foreign Assets and Liabilities, 1970-2004', *Journal of International Economics* 73, 223–250.

Lane, P. R. and Milesi-Ferretti, G. M. (2009), 'Where Did All the Borrowing Go? A Forensic Analysis of the U.S. External Position', *Journal of the Japanese and International Economies* 23(2), 177–199.

Ramb, F. and Weichenrieder, A. J. (2005), 'Taxes and the Financial Structure of German Inward FDI', *Review of World Economics* 141(4), 670-692.