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Retained earnings, foreign portfolio ownership, and the German current account: A firm-level approach

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Abstract

In some countries, a sizable fraction of savings is derived from corporate savings. Although larger, traded corporations are often co-owned by foreign portfolio investors, current international accounting standards allocate all corporate savings to the host country. This paper suggests a framework to correct for this misleading attribution and applies this concept to Germany. For the years 2012 to 2020, our corrections retrospectively reduce German savings and consequently the German current account surplus by, on average, €11.5bn annually. This amounts to lowering Germany's average official current account surplus (€226.6bn) across these years by approximately five percent.

Keywords: current account; balance of payments; corporate savings; retained earnings, foreign portfolio investment; Germany

JEL classification: F32, E21

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1 Introduction

High current account surpluses by several countries have triggered an intense political and academic debate over the past years. For example, some argue that Germany's surpluses have depressed economic activity in other countries.[1] In the EU, the prevention and eventual correction of "excessive" current account balances are part of the Macroeconomic Imbalances Procedure (European Union, 2011).

Against this background, it is of crucial importance to correctly measure a country's current account balance. This is not a trivial issue, because many balance of payments entries are based on estimates rather than observations, which may result in substantial measurement errors (see Braml and Felbermayr, 2019). Moreover, reported current account balances depend on how specific transactions enter the balance of payments statistics, according to the Sixth Revision of the International Monetary Fund's Balance of Payments Manual (IMF, 2013) – known as BPM6. The definitions utilized in BPM6, however, may not always be appropriate for the question at issue.

Because of accounting identities, a current account surplus – which reflects a surplus of domestic savings over domestic investment – must go along with net capital exports.[2] For this reason, high domestic savings are often blamed as a source of international imbalances. At the same time, the literature has recognized that a growing fraction of national savings takes the form of corporate savings (Chen et al., 2017), which have been identified as an important driver of Germany's current account surpluses in recent years (Deutsche Bundesbank, 2017; Felbermayr et al., 2017; Hoffmann et al., 2021).

When accounting for corporate savings in the balance of payments, an important distinction is made between retained earnings of companies that are affiliates of foreign direct investors and other companies whose equity is — partly or totally — held by foreign portfolio investors. In the first case, a single foreign investor holds at least 10% of the affiliate's equity, establishing a "direct investment relationship" (IMF 2013, p. 101), and the retained earnings of the affiliate are attributed to the country of the direct investor in proportion to the investor's ownership share.[3] In the second case, which

[1] For a discussion, see Braml et al. (2018).
[2] Differences between the balances of the current account and the financial account may be due to the capital account balance and statistical discrepancies.
[3] In the case of Germany, a majority of foreign affiliates are wholly owned. See Mintz and Weichenrieder (2010).

includes all other companies, the retained earnings are treated as domestic savings. This classification occurs despite the fact that a large fraction of these corporations also may be held by foreign investors via smaller levels of participation that do not satisfy the criterion for a "foreign direct investment (FDI)" and thus instead represent foreign portfolio investments (FPI).

In the current account, this asymmetry is reflected by the fact that reinvested earnings of domestic companies held by foreign direct investors are treated as debit entries in a country's primary income account (IMF 2013, p.188). Conversely, reinvested earnings of domestic companies held by foreign portfolio investors do not affect primary income and the current account.

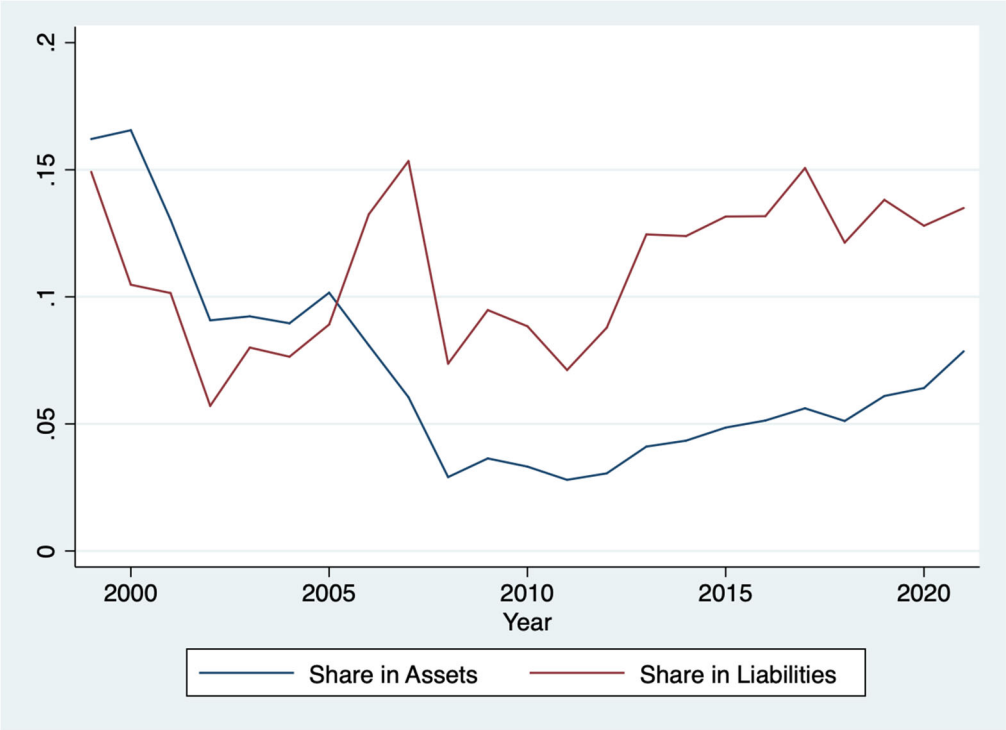
This heterogeneous practice may be justified by the differences in management control. In the case of FDI, the decision to reinvest profits is made by the (foreign) parent company, whereas it is made by the (domestic) firm management in the case of FPI (IMF 2013, p. 189). Nevertheless, ignoring reinvested earnings outside direct investment relationships may bias the assessment of countries' current account balances.[4] In the case of Germany, the magnitudes involved may be substantial. According to the IMF's Balance of Payments Statistics, the average balance on "dividends on equity excluding investment fund shares" in Germany's primary income account amounted to -10.8 billion USD annually between 2005 and 2020 or -4.2 percent of Germany's current account balance.[5] If, for the sake of illustration, each euro of dividend distributed to foreign portfolio investors were accompanied by another euro of retained profits to be attributed to these foreign investors (reflecting a 50% profit distribution), this would result in an ex-post downward correction of Germany's net primary income (and current account) by roughly 11 billion USD per year.

The main objective of this paper is to investigate whether adjusting retained earnings for foreign portfolio ownership – i.e. performing a *retained-earnings correction* – would perceptibly change the size of the German current account. As Figure 1 illustrates, it is a stylized fact that a large part of Germany's gross foreign capital *imports* are equity investments, whereas a relatively small share of Germany's gross

[4] This view is expressed, e.g., by Deutsche Bundesbank (2017, p. 21).
[5] Note that the "…income on investment fund shares includes both dividends and reinvested earnings." (IMF 2013, p. 205). Hence, the problem that reinvested earnings are attributed to the host country instead of the owner's country does not occur in the case of investment shares.

foreign capital *exports* takes this form. Adjusting the reported balance of payments figures by accounting for foreign portfolio ownership can therefore be expected to lower Germany's national savings and potentially result in a decrease of the country's reported current account surplus. The question is: by how much?

Figure 1: Equities as a Share of Germany's Cross-border Assets and Liabilities



Note: The blue line represents the share of equities in Germany's foreign assets; the red line illustrates the share of German liabilities in the form of equity. Source: Deutsche Bundesbank.

Researchers both at policy institutions and in academia have been aware of the potential measurement bias resulting from the asymmetric treatment of retained earnings for countries' current accounts, and have developed various solution approaches to compute the retained earnings correction (Adler et al., 2019; IMF 2018; Fischer et al., 2019).[6] The biggest challenge in assessing the magnitude of this correction comes from the difficulties in accurately identifying ownership positions at the firm level, and in combining this information with firm-level information on profits and retained

[6] In fact, in its recent *External Stability Reports*, the IMF explicitly corrects the observed current account balances of some countries to account for the "measurement bias" stemming, inter alia, from the treatment of retained earnings on portfolio equity investments (see, e.g., IMF, 2022a, 2022b:34-35 as well as Allen et al., 2023:51-53).

earnings. Due to a lack of precise data, most existing studies base their estimates on *average* (country-specific) retained-earnings ratios and combine this information with balance-of-payments figures on capital-income flows.

In this paper, we derive the retained earnings-correction for Germany, adopting a much more granular approach than existing studies when it comes to assessing retained earnings that can be assigned to foreign owners of German companies (i.e. resulting from *inbound* investment). More specifically, we use detailed information on firm-specific ownership structures, earnings, and dividends instead of relying on aggregate data. Combining this approach with a (slightly refined) version of the existing literature's strategy when it comes to assessing the magnitude of retained earnings abroad that can be assigned to owners residing in Germany (i.e. resulting from *outbound* investment), we demonstrate that the retained earnings correction for the years 2012 to 2020 is not trivial: on average, it amounts to -11.5 billion EUR. This is approximately five percent of Germany's average yearly current account surplus (€226.6 billion EUR) across these years.

We believe that our focus on firm-level data results in more reliable estimates of the potential bias associated with measuring capital income flows than the "macro" approach adopted by the existing literature. At the same time, we demonstrate that – for the German case – using the macro approach does not substantially alter our results on the inbound side. This is an important finding, since it suggests that statistical authorities that do not have access to the granular data we use can rely on the approximations that have been suggested by existing studies.

The rest of the paper is structured as follows: the next section discusses various approaches to computing the retained-earnings correction. It starts by presenting an ideal approach that could be implemented if precise firm-level data on profits, retained earnings and ownership shares were available for both inbound and outbound portfolio investments. It then reviews the approximations used by the existing literature and eventually presents our own approach. Section 3 describes our data collection for the German inbound side of portfolio investments, while Section 4 deals with the outbound side. Section 5 presents our quantitative results, followed by a sensitivity analysis in Section 6. Section 7 summarizes our findings and offers some conclusions.

2 Computing the Retained Earnings Correction

In what follows, we denote ownership shares by *s*, dividends by *d*, and retention rates – i.e. the ratio of retained earnings over dividends – by λ. The value of net-income flows on portfolio equity investment that would have to be added to the current account balance of Germany (DEU) if retained earnings were assigned to their ultimate owners – i.e., the *retained earnings correction* $RE_{DEU,t}$ – can be written as follows:

$$RE_{DEU,t} = \sum_{c \neq DEU} \sum_{f \in F_c} s^{DEU}_{c,f,t} \cdot d_{c,f,t} \cdot \lambda_{c,f,t} - \sum_{f \in F_{DEU}} \left(1 - s^{DEU}_{DEU,f,t}\right) \cdot d_{DEU,f,t} \cdot \lambda_{DEU,f,t} \qquad (1)$$

The first term in equation (1) represents the correction that is performed on incoming dividend flows resulting from *outbound* portfolio investments: For a given firm *f* located in country *c*, dividends of period *t* ($d_{c,f,t}$) are multiplied by the ownership share of German investors $s^{DEU}_{c,f,t}$ in that firm, as well as the firm-specific *retention rate* $\lambda_{c,f,t}$, i.e. the ratio of retained earnings over dividends. Firm-level retained earnings accruing to German owners are then summed over all firms located in a given country *c* (i.e. $f \in F_c$) and over all countries *c* (except for Germany).

The second term in equation (1) reflects the correction performed on outgoing dividend flows resulting from *inbound* investments. To calculate retained earnings accruing to foreign owners at the firm level, one multiplies the dividends of the German firm f in period *t* ($d_{DEU,f,t}$) by the firm-specific retention rate ($\lambda_{DEU,f,t}$) and the firm-specific share of equity held by owners outside Germany $\left(1 - s^{DEU}_{DEU,f,t}\right)$. This product is then summed up over all firms in Germany (i.e. $f \in F_{DEU}$).

The above expression illustrates the challenges in terms of data requirements faced by researchers who aim at computing the exact value of $RE_{DEU,t}$ (or any other country): since both ownership stakes, dividends, and retention rates are likely to differ across countries and firms, one would need this information for the entire set of firms and countries. Especially when it comes to the first part of (1), this is utopian. Confronted with this problem, existing studies use various approximations.

Fischer et al. (2019) compute the retained earnings correction for a large number of countries by combining information on aggregate income flows with information on *average* ownership shares and retention rates. Translated into our notation, applying the approach of Fischer et al. (2019) to the case of Germany reads as follows:

$$RE_{DEU,t}^{Fischer\ et\ al.} = \sum_{c \neq DEU} \bar{\sigma}_{c,t}^{DEU} \cdot d_{c,t}^{ROW} \cdot \bar{\lambda}_{c,t} - d_{DEU,t}^{ROW} \cdot \bar{\lambda}_{DEU,t} \quad (4)$$

To compute the retained earnings correction for the outbound side, the share of Germany in foreign firm ownership (averaged over all firms), $\bar{\sigma}_{c,t}^{DEU} = \bar{s}_{c,t}^{DEU} / \sum_{j \neq c} \bar{s}_{c,t}^{j}$, is multiplied by total dividend outflows from country *c* to the rest of the world ($d_{c,t}^{ROW}$) and the average retention rate observed in country *c* in period *t* ($\bar{\lambda}_{c,t}$). To compute the correction on *inbound* investments, total dividend outflows from Germany to the rest of the world ($d_{DEU,t}^{ROW}$) are multiplied by the average retention rate observed for Germany ($\bar{\lambda}_{DEU,t}$). The accuracy of this approximation depends on how precisely the product of average ownership shares, average retention rates and aggregate dividend flows reflect the sum of firm-specific retained ownership shares and retained earnings.

To compute their version of the retained earnings correction, Adler et al. (2019) offer three alternatives, which also rely on a set of approximations. Translated into our notation, applying the *flow approach* of Adler et al. (2019) to the case of Germany reads as follows:

$$RE_{DEU,t}^{Adler\ et\ al.,flow} = d_{ROW,t}^{DEU} \cdot \bar{\lambda}_{ROW,t} - d_{DEU,t}^{ROW} \cdot \bar{\lambda}_{DEU,t} \quad (5)$$

In (5), $d_{ROW,t}^{DEU}$ are total dividend flows received by Germany from the rest of the world (ROW), while $\bar{\lambda}_{ROW,t}$ is the average retention rate observed in these countries. As in Fischer et al. (2019), the correction on the inbound side is computed by multiplying outgoing dividend flows by the average German retention rate. While data on $d_{ROW,t}^{DEU}$ and $d_{DEU,t}^{ROW}$ are readily available in the balance of payments, the computation of

retention rates is based on observed dividend yields and price-earnings ratios (see Adler et al., 2019:15).[7]

While we are facing similar data constraints as the studies mentioned above when applying the retained earnings-correction to *outbound* investments, we have access to firm-specific data that allow us to be much more precise for *inbound* investments. More specifically, we combine information on German firms' dividends and retention rates with information on firm-specific ownership shares, and we can eventually compute the approximative reinvested earnings correction as follows:

$$RE_{DEU,t}^{approx} = \sum_{c \neq DEU} d_{c,t}^{DEU} \cdot \overline{\lambda}_{c,t} - \sum_{f \in F_{DEU}} \left(1 - s_{DEU,f,t}^{DEU}\right) \cdot d_{DEU,f,t} \cdot \lambda_{DEU,f,t}, \quad (6)$$

Where $d_{c,t}^{DEU} = \sum_{f \in F_c} s_{c,f,t}^{DEU} \cdot d_{c,f,t}$ denotes total dividend flows from country *c* to Germany.

Note that the first part of (6) differs from the approach by Fischer et al. (2019) since, instead of using balance of payments data on *total* dividend outflows from country *c* and determining the share of Germany by considering ownership stakes, we have access to bilateral dividend flows (from country *c* to Germany). In the following sections, we will describe how we apply our approach to German inbound and outbound investment, respectively, and we will eventually combine both sides to compute $RE_{DEU,t}^{approx}$.

3 German Inbound Portfolio Investment

The analysis of the German inbound side of portfolio investments concentrates on *listed firms*. This approach reflects the expectation that small-scale foreign portfolio participation in non-listed firms comes with a disproportionate governance cost. Consequently, investments in non-listed firms usually imply a 10 percent or greater ownership share and are therefore classified as FDI rather than FPI. As discussed in the

[7] In addition to the flow approach sketched above, Adler et al. (2019) also present a *stock approach*, which is based on applying observed dividend yields and price-earnings ratios to the *stock* of countries' external portfolio assets and liabilities, and a *hybrid approach*, which combines the two perspectives. For its most recent vintage of the External Balance Analysis (EBA), the IMF applies a further approach that combines aggregate corporate savings with information on foreign ownership in domestic firms (Allen et al., 2023).

introduction, FDI firms are not our interest because, for these firms, corporate savings are already allocated to the country of the investor. The omission occurs with FPI firms, which is where we place our focus.

For German traded companies, we collected financial information available in professional data bases. Data on retained earnings and dividends, which allow computing $d_{DEU,f,t} \cdot \lambda_{DEU,f,t}$, were taken from *Orbis*. As Orbis lacks information on dividend payments for financial firms, this information was completed drawing on *Bloomberg* data for dividends and earnings of financial firms. For our calculations, we made use of the after-tax-profits of German firms and deducted the dividends as flagged for distribution in the previous year's balance sheet. Table 1 displays the aggregate retained earnings (i.e., corporate savings) that result over the period 2012-2020 and the number of firms behind our measure of retained earnings. On average, across years, our data covers 327 German corporations. While this is not the entire universe of German traded firms, non-negative savings as well as negative savings are concentrated on a small population of larger firms, as illustrated by Figures 2a and 2b.

The accounting data on firms' dividends and retained earnings are then matched with information on firm ownership, which we need to compute $\left(1 - s_{DEU,f,t}^{DEU}\right)$. Columns (4) and (5) of Table 1 indicate the number of firms, for which such a match could be achieved, and their retained earnings. Finally, the last column illustrates retained earnings of German non-financial corporations from the national accounts framework. Retained earnings recorded in our micro data sets cover, on average, about 48 percent of corporate savings reported in the national accounts. While this seems to be a rather small share, note that the firms that are relevant for us – i.e. those who are partly owned by foreign portfolio investors – represent only a part of German firms.[8]

[8] The year 2020 is an outlier. Since we concentrate on public limited companies in our analysis, they do not seem to be representative during the Covid-19 pandemic for the overall German corporate savings development. One potential reason is that foreign profits of German multinational firms dropped significantly and large corporations do not adjust their dividends correspondingly. After all, this effect suggests that the impact of retained earnings on the current account tends to be underestimated in our setting.

Table 1. Retained Corporate Earnings of German Traded Firms (2012-2020)

Year	Number of Firms	Retained Earnings (bn euro)	Number of Matched Firms	Retained Earnings of Matched Firms (bn euro)	Retained Earnings according to National Accounts (bn euro)
2012	292	47.4	253	46.3	63.6
2013	306	33.1	277	32.3	80.1
2014	311	30.8	286	33.5	61.9
2015	319	20.9	300	24.9	85.6
2016	324	30.8	308	31.0	91.8
2017	332	69.5	322	69.4	85.5
2018	347	51.0	339	51.0	69.4
2019	354	40.6	340	39.2	91.9
2020	360	10.3	344	5.4	103.7

Note: Based on firms' accounting information from Orbis and Bloomberg. "Matched firms" are firms for which data on retained earnings could be matched with ownership data via the SHS-Base plus data base. Retained earnings by matched firms in 2014-2016 is lower than in the initial sample due to unmatched firms whose dividend payments exceeded after-tax profits.

Information on the prevalence of foreign ownership is derived from the Deutsche Bundesbank's *Securities Holdings Statistics (SHS-Base plus)* data base. Starting in December 2005, the Securities Holdings Statistics (formerly, Securities Deposits Statistics) have been including micro data on securities holdings. Financial institutions domiciled in Germany report securities which are deposited by domestic or foreign customers. Furthermore, domestic banks provide information about their own holdings, irrespective of where the securities are held.[9]

[9] An alternative, professional data base with foreign ownership information is provided by *Refinitiv Eikon*. While this data base seems to be behind several journalistic contributions on the foreign ownership of large German corporations, its coverage is concentrated on institutional investors (banks, funds, etc.). In May 2021, Eikon, on average, allowed the identification of 56% of the ownership in the 30 largest German public firms (DAX members). A possible way to close the gap could be to assume that the unidentified owners have the same proportion of foreign investors as the identified owners. However, since identified owners tend to be institutional owners, while unidentified owners are likely to be dominated by private investors, this approach is questionable and not pursued in the present study. Further studies on foreign ownership are sometimes conducted by banks and accounting firms on an ad hoc basis, but with limited year and firm coverage.

Figure 2a. Non-negative Corporate Savings Distribution

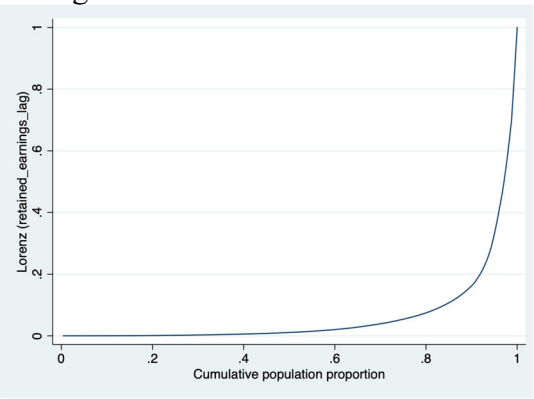
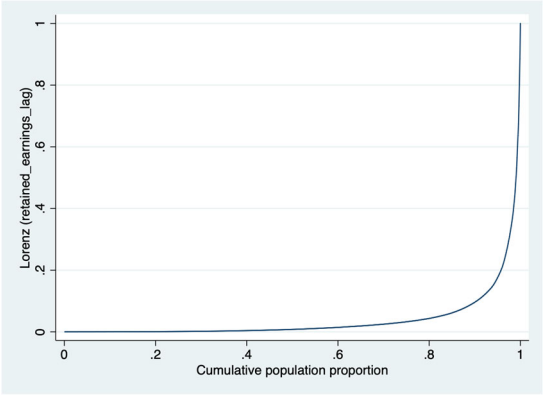
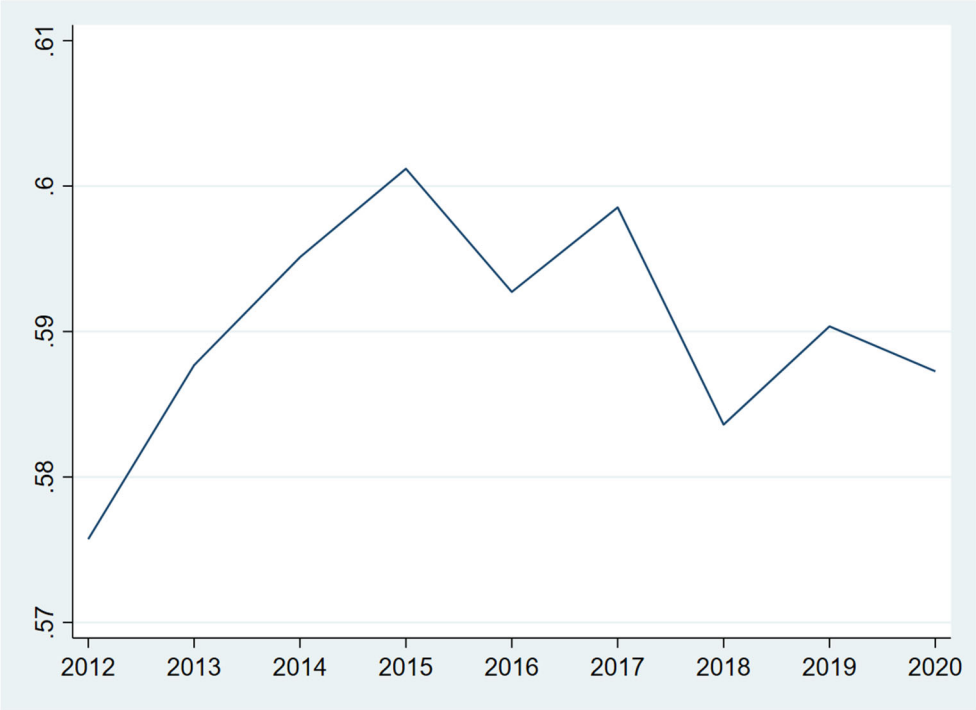


Figure 2b. Negative Corporate Savings Distribution



Note: Lorenz curves for non-negative and negative observations of retained earnings in 2016.

Figure 3: The Share of Foreign Ownership in German Traded Stocks (2012-2020)



Note: The ownership shares are based on the SHS-Base plus data base for individual companies.

Figure 3 depicts the (weighted) average share of foreign ownership between 2012 and 2020 for the sample of matched firms.[10] It hovers around 59% with a relatively narrow bandwidth.

[10] Note that the ratio depicted in Figure 3 could theoretically cover also ownership via "direct investment relationships". However, most direct investment equity is administered by parent firms themselves rather than German banks. The stocks listed in the SHS-Base plus database are therefore mostly reflecting portfolio investments.

4 German Outbound Portfolio Investment

As mentioned above, the calculation of foreign retained earnings that should be attributed to Germany is less straightforward. There is no unifying and comprehensive source for German portfolio ownership in individual foreign firms. As a consequence, we have to use the approximation described by equation (6), combining total dividend flows from country *c* to Germany ($d_{c,t}^{DEU}$) with information on the average retention rate prevailing in that country ($\overline{\lambda}_{c,t}$). Data on bilateral dividend flows can be inferred from German current account data available within the Deutsche Bundesbank. To compute the retention rate for firm *f* in country *c*, we consider the change of book equity that does not come from new shareholder equity in the respective firm. Adding this figure over all firms in country *c* at time *t* and dividing by total profits, we arrive at a proxy for $\overline{\lambda}_{c,t}$.

As on the inbound side, one remaining issue results from timing mismatches: corporations' end-of-year balance sheets report net-of-tax earnings in year t and equity pledged for dividend payments. These dividend payments will then take place in the *next* year, and only in that next year they can show up in the current account as German primary income. We therefore relate total retained earnings in period *t* to the published value of dividends as flagged in the *preceding* year.

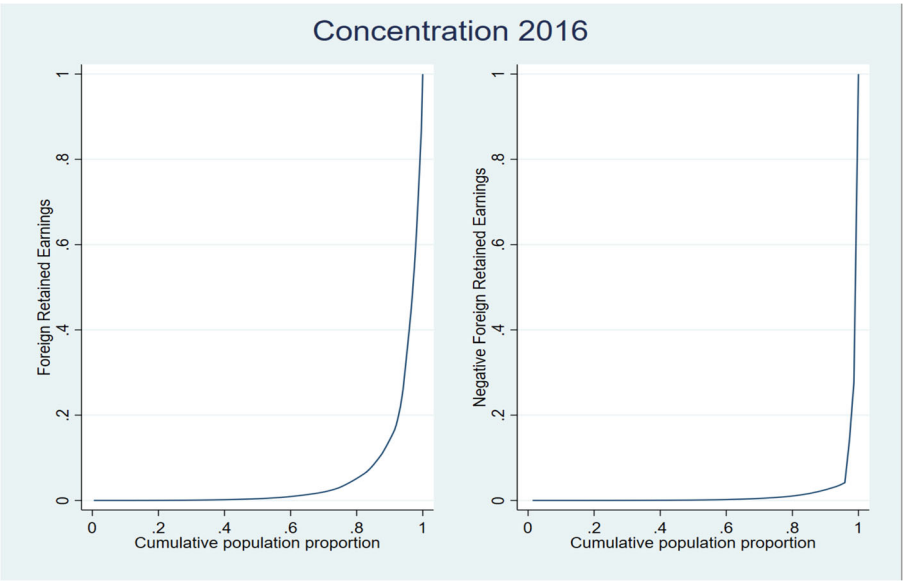
As mentioned above, using average country-specific *average* retention rates to approximate corporate savings attributable to German investors comes with caveats. If, for example, German investors, for some reason, invested mainly in firms with low retention rates (i.e., high payout ratios), our proxy would be biased upward. If, inversely, German investors were disproportionally engaged in firms that do not pay dividends but, e.g., use share repurchases instead, then our measure would underestimate the true retained earnings attributable to Germany.

For the empirical implementation, the information on foreign firms' dividends and net-of-tax profits is drawn from the *Refinitiv Eikon database*. From this database, we extracted information on all available traded corporations headquartered in a set of foreign jurisdictions. Our coverage of foreign jurisdictions is constructed to make sure that, in every year from 2012 through 2020, more than 95 percent of the foreign dividends received by German portfolio investors are captured. This leads to a total of

38 jurisdictions.[11] Based on the unweighted average across years (2012-2020) and 38 jurisdictions, the average retention rate is calculated as 1.06. Interestingly, the corresponding figure for Germany is very close, amounting to 1.07. Therefore, differences between the inbound and outbound sides of the retained-earnings correction should not depend on a different retention propensity of German firms compared to foreign ones, but should be attributable to different amounts of foreign equity investments.

For each country-year cell, we multiply the retention rate ($\overline{\lambda}_{c,t}$) by the amount of total dividends from the respective country ($d_{c,t}^{DEU}$), as reported in German current account statistics.[12] As on the inbound side, the retained earnings and losses of firms across our 38 jurisdictions are heavily concentrated on large firms. Figure 4 illustrates the concentration (separately for increases and reductions in retained earnings) for the year 2016.

Figure 4: The Concentration of Foreign Retained Earnings (Outbound Side)



Note: Foreign retained earnings (corporate savings) are calculated from Refinitiv Eikon without weighting for German ownership.

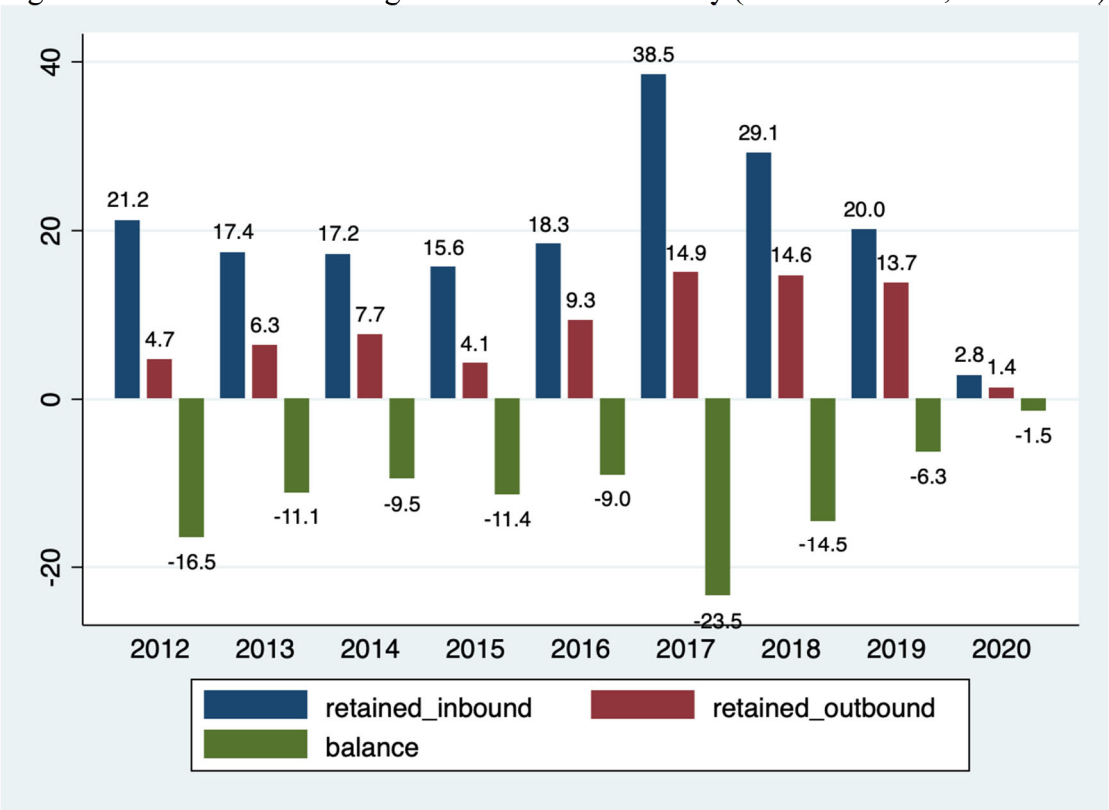
[11] The list of included countries is provided in Table A.1 in the appendix.

[12] Fortunately, in the German current account statistics portfolio dividends received by domestic investors are separately available on a pre-tax basis. Foreign withholding taxes on the dividends are booked as a separate item. Note that if data (in other jurisdictions) were available after foreign withholding taxes only, these after-tax dividends needed to be grossed-up to arrive at pre-tax dividends. This grossing-up would be required since dividends in the corporate accounts are reported before withholding tax.

5 Combining Results on German Inbound and Outbound Portfolio Investments

This section reports results that were derived by combining the two approaches for the inbound and outbound side of German portfolio investment described above. For each year, the blue (red) bars in Figure 5 reflect the corrections on the inbound (outbound) side in absolute value, while the green bars reflect the total retained earnings correction to the German current account balance. All figures are in billions of euros. We find that a downward correction of the German current account surplus applies throughout, with a maximum of -23.5bn EUR in the year 2017. In 2020, probably due to the Covid-19 crisis, profits and consequently corporate savings were meager; therefore, corrections were small. On average across years, we calculate an annual correction of -11.5bn EUR.

Figure 5: The Retained Earnings Correction for Germany (billions of EUR, 2012-2020)

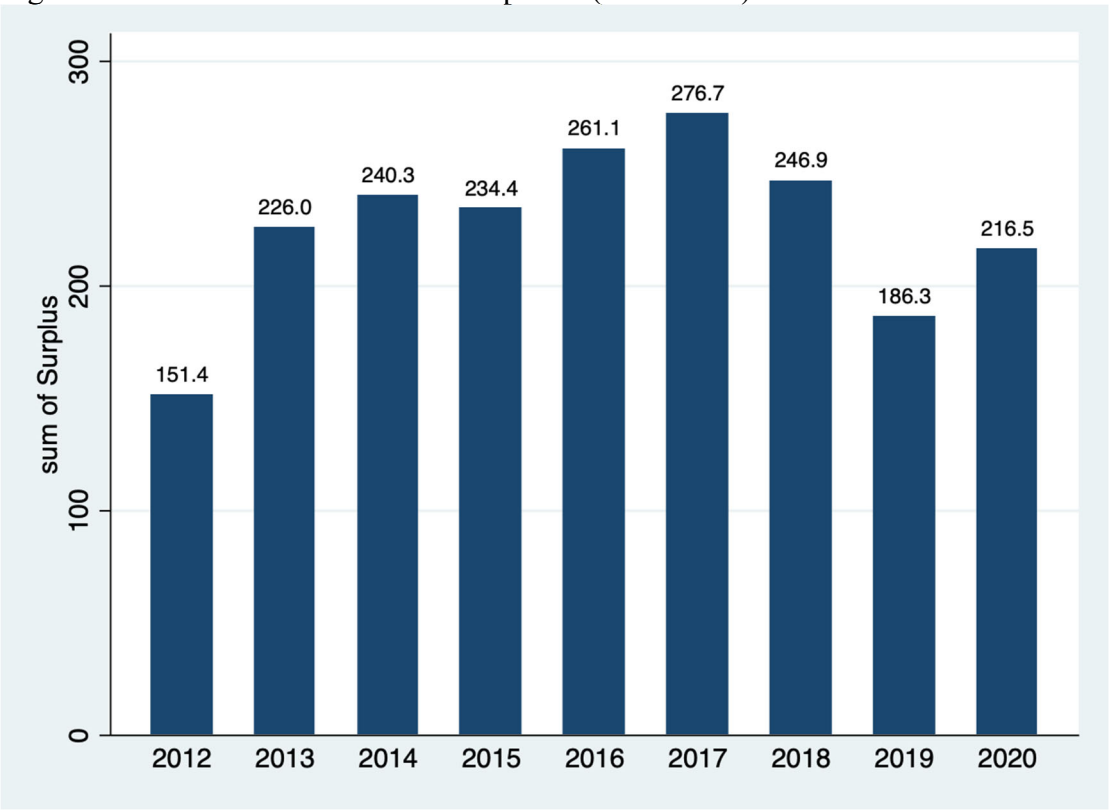


Note: The bars "retained_inbound" (blue) measure German corporate savings that should be attributed to foreign portfolio investors; "retained_outbound" (red) reflects foreign corporate savings that should be attributed to German portfolio investors; "balance" denotes the difference between these values, i.e., "retained_outbound" minus "retained_inbound".

The blue and red bars show the components on which the net figures — as depicted by the green bars — are based. In all years, the corporate savings that occurred in Germany, but should have been assigned to foreigner investors (blue bars), were higher than the corporate savings that occurred outside of Germany but should have been assigned to German investors (red bars). This corresponds to the fact that the share of foreign stocks in Germany's total foreign assets is lower than the share of German stocks owned by foreign investors in Germany's total foreign liabilities.

The average correction of -11.5bn EUR amounts to approximately five percent of the average yearly current account surplus in these years (226.6bn EUR). See Figure 6 for a year-by-year plot of recent German current account surpluses. Relative to German GDP, the retained earnings correction amounts to -0.37 percent, on average.

Figure 6: German Current Account Surpluses (2012-2020)



Note: German current account surplus in billions of EUR. Source: Deutsche Bundesbank.

6 Sensitivity Analysis

As outlined in Section 2, our retained earnings correction on the inbound portfolio investment side differs from previous contributions by using firm-level data on retained

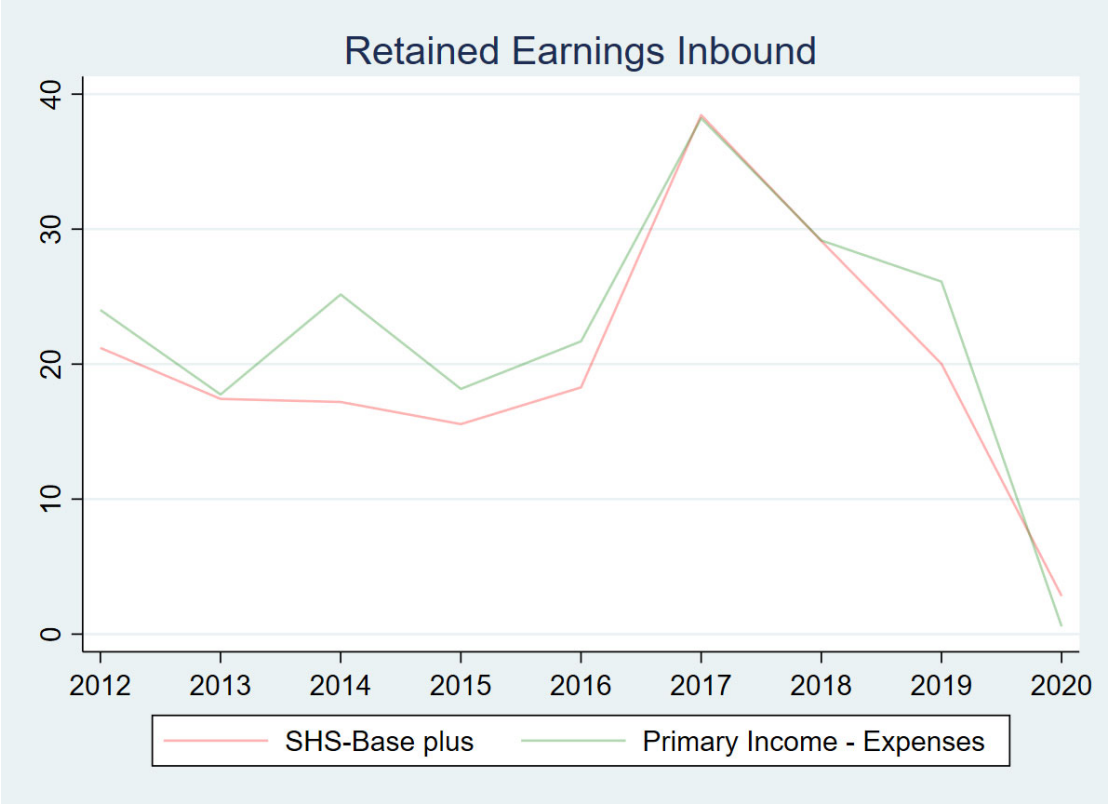
earnings and ownership shares instead of country-wide averages. By how much would we have gone wrong if we had used the "macro" approach for the inbound portfolio investment side as well? To find out, we followed Fischer et al. (2019) and Adler et al. (2019), combining information on the average retention rate in Germany with information on dividend outflows from Germany.

In Figure 7, the red line represents retained earnings on inbound portfolio investments based on the "micro" (firm-level) approach used so far, while the green line uses the "macro" approach. As the graph illustrates, the two alternative approaches lead to comparable results in absolute numbers, which are the ones relevant for correcting current account figures. This said, the *relative* magnitudes may differ more pronouncedly. In 2014, the year of the greatest absolute difference, the micro-based figure (17.2bn EUR) is 32 percent below the macro-based figure (25.2bn EUR).

Note that this exercise, while being important in its own right, also allows an assessment of the accuracy of the "macro" approaches used by other contributions on this issue (Adler et al., 2019; IMF, 2018; Fischer et al., 2019). If our findings for the German example can be transferred to other countries, it suggests that the macro approach – with its substantially lower information requirements – yields reasonably reliable results.

This, of course, leaves us with the question why the retained earnings correction we compute for Germany – roughly -0.37 percent of GDP, on average – is more substantial than the results provided by Fischer et al. (2019:255) or Adler et al. (2019:20), with both studies suggesting that the German correction is negligible. We argue that this discrepancy is due to the different time spans covered: Fischer et al. (2019) consider the years 2001 to 2015 when German corporate savings were just about to take off, Adler et al. (2019) consider the years 2012 to 2016. Moreover, the approach to compute retention rates applied by Adler et al. (2019) is based on average dividend yields and price-earnings ratios, while we are using balance sheet data.

Figure 7. German Retained Earnings Attributed to Foreign Investors: Comparing Micro and Macro Approaches (Billions of Euro)



Note: The green line (macro approach) displays the retained earnings of German companies attributable to foreign portfolio investors using a year-specific retention rate applied to *all* dividends flowing to foreign portfolio investors. The red line (micro approach) displays company specific information of retained earnings combined with company-specific ownership information from the SHS-Base plus.

7 Conclusions

Balance of payments accounting is often associated with difficult measurement problems. This paper singles out the problem of correctly attributing corporate savings that have become increasingly important over time (Chen et al. 2017). When foreign investors have small minority stakes in domestic firms (below 10% of total equity), current practice stipulates that corporate savings are completely credited to the economy where the firm is located. This practice is misleading, from an economic point of view, because these savings should be attributed to foreign owners. The implications can be particularly important for a country as Germany, with its asymmetric international structure of foreign assets and liabilities.

While previous studies computed the necessary retained earnings-correction by using information on aggregate dividend income flows as well as average ownership shares and retention rates (i.e. the ratio of retained earnings over dividends), we leverage data on firm-level ownership shares available at the Deutsche Bundesbank's SHS-Base plus data base, which allow us to be much more precise, in particular with respect to foreign portfolio investments in Germany.

Our findings are in line with expectations: for the years 2012-2020, a corrected allocation of the ownership of corporate savings would reduce German savings, net primary income and the current account by an average of 11.5bn EUR per year, i.e. €103.5bn EUR, cumulatively. In relative terms, across the years 2012 to 2020, this reduces the official German current account surpluses by approximately 5 percent. A correction of corporate savings not only affects the current account balance, but it also affects German gross national income (GNI) by the same absolute numbers, as additional primary income is allocated to foreigner investors. In relative terms, this adjustment, on average, reduces yearly German GNI by 0.36 percent.[13]

While these findings are based on a "micro" approach, which uses firm-level data on ownership shares and retained earnings, we compare them to the "macro" approach, which relies on country-specific averages. Interestingly, our calculations for Germany show closely comparable results for the two concepts. This insight is important to assess the accuracy of studies that quantify measurement biases in the current account for a larger number of countries, but must rely on aggregate country-level data due to the lack of precise ownership information at the firm level.

We believe that our findings and proposed concepts can stimulate the discussion to further develop the guidelines for international accounting practices. Although the application of our concepts may render the computation of current account balances somewhat more complex, the procedure should not necessarily trigger further processing delays. After all, information on retained earnings of corporations is already needed under the BPM6 guidelines, if only for foreign affiliates of multinational corporations.

[13] Average German GNI across 2012-2020 was 3211.23bn Euros (destatis.de).

8 Data Appendix

For the micro approach, the imputation of retained earnings on the inbound side was constructed as follows. Net-of tax profits (*net income*) and dividends were taken from Orbis and from Bloomberg for financial firms, as Orbis lacks dividends for financial firms. Corporate savings were then defined as net-of-tax profits minus dividends paid in the respective year. Within Deutsche Bundesbank, for each firm, the fraction of dividends paid to foreign owners was identified by matching the Orbis-Bloomberg data with the confidential data base SHS-Base plus. The relevant fractions of dividends, as flagged in the previous year, were then used to attribute the retained earnings of the relevant year to foreign portfolio owners aggregated across all traded firms available.

On the outbound side of German investment, we rely on data from *Refinitiv Eikon*. From this database, we take the net-of-tax profit (*Income available to common Shareholders including extraordinary profits*) and deduct dividends (*Gross dividends*) as paid in this year for each traded firm. The respective values are aggregated on the country-year level and divided by the country-year level of dividends paid to yield a measure of $\overline{\lambda}_{c,t}$, the retention rate for country *c* in year *t*, which relates retained earnings to dividends paid. The calculation of retained earnings that are attributable to German portfolio investors then multiplies the relevant country-year value of $\overline{\lambda}_{c,t}$ with the total amount of dividends received by German portfolio investors according to German current account data, as available at the Deutsche Bundesbank. To align the timing of dividends received by foreign investors with the flagged dividends in the balance sheet we use the lagged values of dividends reported in *Refinitiv Eikon*, i.e., dividend payments announced in the accounts for 2019 are deemed paid in 2020.

While our paper only encompasses the years 2012-2020, Table A.1 below also shows average values for 2010 through 2021. The simple average of $\overline{\lambda}_{c,t}$ across all years and countries equals 1.29. For the years 2012-2020, used in the main text, we calculated an unweighted average of 1.06 when excluding Germany and a value of 1.07 for Germany. The data on the outbound side include 38 jurisdictions, which represent the most important destination countries based on portfolio dividends received by German investors. The country set has been constructed to ensure that, in each year, the

38 jurisdictions cover at least 95% of portfolio dividends received by German portfolio investors. The value for Germany is added in Table A.1 for illustration.

Table A.1: Retention Rates (Country Averages 2010-2021)

Country	$\bar{\lambda}$	Nr. of Corporations
AUS	0.3	849
AUT	1.2	40
BEL	1.3	82
BRA	0.9	204
BGR	-2.0	33
CAN	0.8	1201
CHE	1.1	169
CHN	2.4	3276
COL	1.3	25
CYM	-0.2	32
DNK	1.8	78
ESP	0.6	62
FIN	0.2	77
FRA	0.7	349
GBR	0.5	938
GER	1.2	351
GRC	-4.3	74
HKG	1.6	1077
HUN	1.6	10
IDN	-8.5	265
IND	2.1	1460
IRE	1.0	60
ITA	0.1	107
JPN	2.0	2975
KOR	4.4	1517
LUX	1.4	28
MEX	1.3	112
NLD	1.5	59
NOR	0.2	99
PHL	1.9	118
POL	0.9	205
RUS	2.7	80
SAU	1.1	86
SGP	0.8	327
SWE	1.1	239
TWN	0.7	1412
UKR	20.4	20
USA	1.6	3891
VNM	3.3	124
ZAF	0.6	129
Average (2010-2021)	1.29	

Note: Values in the column $\bar{\lambda}$ denote the country averages of the retention rate across years.

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