An anatomy of the external sector*

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Abstract

We show new empirical evidence on the micro-level drivers of the external sector using a unique and comprehensive firm-level dataset spanning Switzerland's current account, international investment position, capital flows, and valuation changes. We document three new sets of facts. First, we find strong interdependencies across external sector outcomes at the firm level, with a small number of firms accounting for the majority of cross-border linkages in all major external sector outcomes. Second, firms playing a large role in the external sector exhibit distinct characteristics such as larger employment, more complex firm structures, and foreign ownership. Third, larger firms differ from smaller ones in terms of the composition of their external sector linkages, country exposure, and currency exposure.

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1 Introduction

Much of the conventional analysis of the external sector relies on macro-level data and the implicit assumption that aggregate outcomes can be attributed to the behavior of a single, stylized agent (Chinn and Prasad, 2003; Obstfeld and Rogoff, 2005; Forbes and Warnock, 2021). Yet, external sector statistics reflect the aggregation of heterogeneous agents and conceal a well-documented skewness towards global firms (Bernard et al., 2018). Comprehensive micro-level data on the external sector remain scarce, thus preventing an in-depth assessment of how the macro focus of the external sector analyses aligns with the empirical realities of the data.

This paper addresses this gap in the literature by constructing a unique micro-level dataset of the external sector and documenting new empirical evidence on its micro-level foundations. We provide the first comprehensive and consistent account of the main macroeconomic aggregates of the external sector—that is, current account (CA) transactions, capital flows, cross-border stocks, and valuation changes—at the firm level. Using this dataset, we show strong interdependencies across external sector outcomes at the micro level and a high degree of granularity in all aspects of the external sector. In addition, we find that firms differ markedly in their characteristics and their choices along the firm size distribution. Our results underline the limitations of the single, stylized agent assumption in capturing the key features of the aggregate data and underscore the importance of a granular perspective to improve our understanding of the characteristics and dynamics of the external sector.

Our main contribution is to introduce a novel dataset, which offers the first comprehensive firm-level account of the external sector. We combine administrative and survey data underlying Switzerland's official statistics on balance of payments and international investment position. We complement these official data sources with micro-level estimates to comprehensively account for financial and non-financial corporations' external linkages. We fully consolidate data and estimates within enterprise groups using group structure data from Dun & Bradstreet such that the various data sources can be aggregated into comparable micro-level outcomes.[1] The resulting firm-level dataset is the first to provide a consistent and comprehensive micro-level account of the current account, international investment position, capital flows and valuation changes. It spans over 10'000 firms from 2016 to 2024 and provides a detailed breakdown by components across outcomes, partner countries, and currencies of denomination.

The richness of the dataset allows us to dissect the external sector and study open questions from the international macro-finance literature from a micro lens. While the literature has established the importance of large firms for aggregate fluctuations in GDP

[1] An enterprise group encompasses all entities in Switzerland that are controlled by the same ultimate controlling entity. For simplicity, we refer to enterprise groups as firms.

and goods trade (Gabaix, 2011; di Giovanni et al., 2014) and, more recently, current account (Koomen and Wicht, 2026), the role of firm heterogeneity in shaping the broader external sector remains less understood. In particular, existing research has not systematically examined whether large multinationals contribute disproportionately to aggregate capital flows, international investment positions, and valuation changes (Lane and Milesi-Ferretti, 2018; Lane and Shambaugh, 2010). Moreover, limited evidence exists whether firm characteristics beyond size, such as ownership and economic activity, are important determinants of aggregate outcomes and fluctuations in the external sector (Guvenen et al., 2022). Finally, previous studies have examined aggregate exchange rate exposure and the role of currency denomination in trade and finance (Gopinath et al., 2010; Benetrix et al., 2020), little is known about how firm-level characteristics shape aggregate geographical diversification and the currency composition of the real and financial sides of the external sector. In particular, whether aggregate valuation losses are broadly distributed across firms, or concentrated among a smaller number of firms has not been explored.

Guided by these gaps in the literature, we uncover three sets of new empirical regularities. The first set of empirical facts focuses on the micro-level foundations of the external sector. We show statistically significant relationships between firm-level CA balances and financial account (FA) balances. In addition, valuation changes are a systematic and economically significant driver of external wealth dynamics at the firm-level. Importantly, the external sector is granular—that is, largely driven by a small number of firms. Half of real and financial linkages are thus explained by the top 50 firms.[2] Granularity also shapes net outcomes: top firms drive Switzerland's persistent CA surplus, stagnating net international investment position, volatile net capital flows, and sizeable net valuation losses. We show that top firms tend to drive both real and financial sides of the external sector. In other words, firms with large CA transactions tend to exhibit large cross-border stocks, large capital flows, and large valuation changes.

Given the high degree of granularity, our second set of empirical regularities establishes that the specific characteristics of large firms drive macro aggregates. We find that top firms in the external sector have larger employment and more complex group structures. Top firms are also more likely to be foreign-owned, typically by final investors in the US or European financial centers, such as Luxembourg. Finally, we find that firms in manufacturing sectors shape both real and financial sides of the external sector.

Our third set of empirical regularities shows that firms differ starkly in their choices—that is, in their operational choices or business models—along the firm size distribution. We find that top firms rely less in cross-border goods trade, but have relatively more

[2]We calculate total real linkages, that is, CA receipts plus expenses, per firm and rank them based on total linkages. Thus, top firms are those with the lowest ranks or the largest real linkages. We do the same for financial linkages (cross-border stocks).

transactions in merchanting, services trade, and investment income. We further find strong forces of gravity in both real and financial linkages, with larger firms being exposed to more, and more distant, countries. Firms further tend to match country exposures both in real and financial flows. Finally, top firms are less exposed to the Swiss franc both in real and financial transactions, but rely more on the US dollar. Given the structurally appreciating Swiss franc, the currency composition of cross-border stocks implies systematically larger valuation losses for larger firms.

Given the high degree of granularity and stark differences across firms, official statistics reflect the behavior and characteristics of a small number of dominant firms, and not an average firm. As a result, aggregate measures—such as CA balances, or net foreign asset positions—mask the underlying distribution of risks and exposures across firms. Consequently, a micro-level perspective is essential to better understand the drivers of external sector developments, assess vulnerabilities vis-à-vis trading partners and currencies, and design effective policy responses to shocks and distortions.

Related literature: This paper relates to a growing literature exploiting micro-level data underlying Switzerland's external sector. Specifically, this paper mainly builds on Koomen and Wicht (2026), who offer the first firm-level account of the CA balance and test the granular hypothesis of Gabaix (2011) for the CA. This paper extends their approach in two critical aspects. First, we broaden the analysis significantly by moving beyond the CA and covering the financial side of the external sector comprehensively. Second, we link all data sources and build consolidated group-level external linkages, such that a firm can be tracked within the CA but also across external sector outcomes in a consistent way. This consolidation allows for a robust firm-level analysis. In addition, this paper relates to Fischer and Yeşin (2026), who study the effect of the Brexit vote on Swiss capital flows using one survey also exploited in this paper. Finally, Wicht (2026) leverages the dataset introduced in this paper to build consolidated industry-level CA flows and study CA composition and dynamics through the lens of industries.

Looking beyond papers relying on Swiss data, this paper builds on a vast literature studying firm-level heterogeneity and its implication for aggregate outcomes. By providing a comprehensive account of firms' external linkages, we bridge several strands of the literature with micro-level evidence on the drivers of international trade (e.g., Eaton et al., 2011; Bernard et al., 2018), multinational production (e.g., Antràs et al., 2026), and capital flows (e.g., Coppola et al., 2021). Adding to this overview, we provide a comprehensive literature review throughout the paper.

The paper is organized as follows. Section 2 describes the data and panel characteristics. Section 3 details the micro-level foundations of the external sector. Section 4 provides a characterization of the firms underlying the external sector and Section 5 analyzes the business models of the firms. Section 6 concludes.

2 Data

2.1 Scope and definitions

We build a comprehensive dataset of the external sector for Switzerland, covering four key economic concepts: the current account (CA); the international investment position (IIP); capital flows (CF), also known as the financial account; and valuation changes (VC) on the IIP. Formally, the panel's unit of observation is:

$$X^d_{ispct}, \tag{1}$$

where $X \in \{CA, IIP, CF, VC\}$ denotes each of the four outcome variables, i indexes the firm, s the subcomponent (or type) of the linkage, p the partner country, c the currency of denomination, t the time period, and d the direction of the linkage, that is, receipts or expenses in the CA, assets or liabilities in the IIP, outflows or inflows in CF, and gains or losses in VC. Importantly, we focus on financial and non-financial corporations. Consequently, the public sector, that is, the government and the central bank, as well as households are excluded from our dataset.

These concepts are an integral part of the broader system of the national accounts and follow a consistent set of accounting principles aligned with national accounts (IMF, 2009). Following international guidelines, the CA first records receipts and expenses generated through business activities with a counterparty abroad, such as goods and services trade but also earned income. The CA balance is equivalent to the gap between disposable income and expenditure (also referred to as the savings-investment gap). Second, the IIP encompasses foreign assets and liabilities, recording the economy's financial balance sheet with counterparties abroad. The net IIP, therefore, is the current value of the country's net claims on nonresidents. Third, CF exhibit financial flows between residents and non-residents, i.e., the economy's net acquisition and disposal of financial assets and liabilities. And fourth, VC comprise of holding gains and losses on IIP that result, for example, from exchange rate movements.

Importantly, these four concepts are related to each other through two macro identities. First, the balance of payments identity imposes the following relationship:

$$CA^n_t = CF^n_t, \tag{2}$$

where CA^n_t is the CA balance and CF^n_t are net capital flows (equivalently, the FA balance)

at time t.[3] Second, the stock–flow reconciliation identity imposes:

$$\Delta NIIP_t = CF_t^n + VC_t^n, \tag{3}$$

where $\Delta NIIP_t$ is the change in the net international investment position from $t-1$ to t, CF_t^n are net capital flows in t, and VC_t^n are net valuation changes in t. In other words, (3) is a law of motion and states that financial assets and liabilities gain or lose value and appear or disappear as a result of transactions, other volume changes, or revaluation.

The four indicator are key indicators in policy analysis (IMF, 2009). First, the CA is at the center of the global imbalances discussion and remains the key measure to assess countries' exchange rate and macroeconomic policies (Chinn and Ito, 2024; IMF, 2025). Second, contrasting with the CA, the NIIP is the relevant mass to assess external sustainability and financial vulnerabilities (Cubeddu et al., 2023). Third, the magnitude and the volatility of CF are monitored by policymakers as they may result in funding tensions or asset bubbles (Forbes and Warnock, 2021; BIS, 2021). And fourth, VC are increasingly under scrutiny as they are considered an important channel for external rebalancing (Gourinchas and Rey, 2014).

The rest of this section details the construction of the panel. In doing so, we broadly follow the guidelines of compilers. Given the extensive data work, this section only introduces the main features of the panel and leaves the details to Appendix A, which we indicate in footnotes.

2.2 Micro-level data sources

The main inputs to the panel are four micro-level data sources, which are all used in the compilation of Switzerland's official external sector statistics.[4] First, we use the administrative customs data from the Swiss Federal Office for Border and Customs Security (FOCBS), which serves as the main basis for goods trade in the CA. Second, we use the CA surveys compiled by the SNB. These surveys provide data on aspects of goods trade not captured by the customs data (e.g., merchanting), as well as services trade and secondary income, and are thus key inputs for the CA. Third, we use the SNB cross-border capital linkages surveys, which gather data on cross-border stocks, capital flows, and associated investment income of resident corporations. Fourth, we use two of the SNB banking statistics surveys, which complement the cross-border linkages surveys by

[3] We abstract from capital transfers (also referred to as the capital account), which are negligible over the sample period, at -0.1% of GDP on average. We further abstract from errors and omissions, which cannot be decomposed at the firm-level and thus cannot yield additional insights.

[4] A peculiarity of the Swiss external statistics is that it includes Liechtenstein. This paper refers to Swiss data, but linkages between Switzerland and Liechtenstein are considered domestic, whereas linkages of Liechtenstein with the rest of the world except Switzerland are counted as Swiss linkages. The same convention is also used in Swiss banking statistics.

providing data on the cross-border stocks of resident banks.[5]

All four datasets are mutually exclusive and cover different aspects of the external sector. They are, however, quite different in nature. A first key distinction is the coverage. On the one hand, the customs data is administrative, covering the universe of goods imports and exports passing through Swiss customs. On the other hand, the SNB surveys aim to provide a good coverage of Switzerland's linkages with the rest of the world. They are by definition not representative of such linkages, but geared towards large agents. A second key distinctive feature is the level of observation, that is, the definition of a reporting entity within each data source. For example, the customs data contains entity-level trade flows, while reporting companies in the cross-border linkages surveys are mother companies resident in Switzerland, which submit data on behalf of all entities under their control in Switzerland. Thus, although all micro-level data sources contain a standard Swiss company identification number (UID), linking the data with these identifiers would not yield sensible micro-level data.

To link datasets in an economically coherent manner, we build enterprise groups, defined as the composite of all entities resident in Switzerland controlled by the same ultimate controlling institutional unit (UCI). We thus aggregate the external linkages of all entities controlled by the same ultimate owner.[6] To do so, we rely on commercial data from Dun & Bradstreet, which provide information on group structures, including country of ownership, as well as activity (NOGA code), employment, and location (zip code).[7] Our sample covers all reporting entities in SNB surveys and the largest importers and exporters in the customs data (around 8500 entities per year).

Our micro-level dataset builds on Koomen and Wicht (2026), who first leveraged the customs data, the SNB CA surveys, and the quarterly capital linkages survey to offer a comprehensive view of the CA. We expand on the dataset used in their paper in two aspects. First, we combine *all* micro-level data sources underlying the external linkages of financial and non-financial corporations resident in Switzerland, which include the yearly capital linkages surveys and two banking statistics surveys. Second, we consolidate the data into enterprise groups such that we are able to track firms within the CA but also across the external sector. Our approach considerably improves on Koomen and Wicht (2026) by broadening the scope of the data and introducing a consistent firm identifier. It also comes at a cost as we lose the quarterly frequency of the data, reduce the available time sample, and excludes the lower tail of the customs data, for which we do not have group-level information.

[5]Each data source is described in more details in Appendix A.1.

[6]Using enterprise groups as unit of observations is standard in FATS statistics and consistent with the enterprise group statistics published by the SFSO. For more information on UCIs, see Eurostat's homepage. See also the SFSO's homepage.

[7]The features of the Dun & Bradstreet data are detailed in Appendix A.1.2.

2.3 Micro-level estimates

The micro-level data are extensive but not exhaustive in providing a comprehensive account of the external sector. Importantly, three key aspects of corporations' international linkages—(i) labour income payments, (ii) portfolio equity, and (iii) portfolio debt—are not covered by the micro-level data sources. In addition, capital flows in given subcomponents and valuation changes are not readily available at the micro-level. To ensure a comprehensive view of the corporate external sector, we propose micro-level estimates for these missing pieces.

2.3.1 Labour income

Labour income captures cross-border payments arising from employment. Swiss residents working abroad generate labour income receipts, while foreign residents working in Switzerland generate expenses. Labour income is a significant driver of the CA balance, generating a persistent deficit of about CHF 27 bn annually over the sample period, but is not readily available at the micro-level. While we can ignore receipts within our framework (attributed to Swiss households), expenses are potentially paid by firms of our sample. Thus, we propose a two-step strategy to estimate firm-level payments to non-resident workers.

In the first step, similar to Wicht (2026), we estimate labour income expenses by canton and economic activity. To do so, we construct the median wage of a cross-border worker by canton and economic activity using data of the SFSO Swiss Earnings Structure Survey. Combining our estimated wage and the number of cross-border workers, published by the SFSO Cross-border Commuter Statistics, we then construct aggregate labour income expenses by activity and canton. To account for the Covid-19 pandemic and its effect on the labour market, we deduct excess furlough payments published by the SECO from the estimated total wage payments. In the second step, we introduce micro-level heterogeneity. Using Dun & Bradstreet data on the location of companies, their economic activity, and their employment, we calculate a firm's share in total employment within a sector and canton and assign the corresponding share of labour income expenses.[8] For simplicity, we assume labour income expenses are paid in Swiss francs and do not estimate to which partner country labour expenses are paid, thus leaving the partner country as unallocated.

2.3.2 Portfolio equity

Portfolio equity is an important contributor to the Swiss external sector: it accounts for about 16% of total assets and 26% of total liabilities between 2016 and 2024. Again, data

[8] Appendix A.2 details the estimation of labour income expenses.

on portfolio equity are not available at the micro-level. To fill in this gap, we propose an estimation strategy of firm-level portfolio equity. We focus on liabilities and disregard assets, which are attributed to households and thus beyond the scope of our focus on corporations.

We estimate portfolio holdings by non-residents of publicly-traded Swiss firms using LSEG data. Formally, portfolio equity ($s = pieq$) liabilities ($d = L$) of firm i are estimated as

$$IIP^{L}_{i,pieq,pct} = \frac{x_{ipt}}{\sum_p x_{ipt}} \times p_{it} \times X_{it}, \tag{4}$$

where x_{ipt} denote the number of stocks of publicly listed Swiss company i held by major investors in country p in year t, p_{it} is the close price of said stocks, and X_{it} are the total number of shares outstanding. We assume that liabilities are denominated in Swiss francs ($c = CHF$). We further assume that the cross-country distribution of holdings across major investors is representative of all investors. Estimates are made for the 219 companies listed on the Swiss stock exchange between 2016 and 2024.

We use estimated PI equity liabilities to calculate associated expenses, capital flows, and valuation changes. Micro-level expenses from PI equity are calculated with a simple proportionality assumption. If firm i accounts for 10% of total PI equity liabilities, then we allocate 10% of total PI equity expenses to firm i. PI equity transactions and valuation changes follow the more general approach described in the following section.

2.3.3 Portfolio debt

Similarly to PI equity, PI debt is not available at the micro-level. PI debt is a lesser driver of the external sector: about 12.3% of total assets and 3.3% of total liabilities over the sample period. For completeness, we still propose an estimation strategy. Again, we focus on liabilities and disregard assets, which are attributed to households and thus beyond the scope of our focus on corporations.

We estimate portfolio debt issued by resident firms held by non-residents. To do so, we combine on LSEG data on debt issuance and maturity in Switzerland and SNB aggregate data. Formally, portfolio debt ($s = pide$) liabilities ($d = L$) issued by firm i in currency c held by non-residents at time t are estimated as

$$IIP^{L}_{i,pide,pct} = x_{ict} * w^{*}_{t}, \tag{5}$$

where x_{ict} is the amount of outstanding debt in currency c by firm i at time t and w^{*}_{t} is the share in total liabilities held by non-residents, calculated as the ratio of cross-border PI debt to total PI debt issued by the private sector. We do not estimate the partner country breakdown, thus leaving the partner country as unallocated. Estimates are made

publicly-listed Swiss companies and for the non-publicly listed companies among the top 100 companies with the largest cross-border stocks.

As a final step, we use estimated PI debt liabilities to calculate associated expenses, capital flows, and valuation changes. Similarly to PI equity, we calculate micro-level PI expenses from PI debt with a simple proportionality assumption. PI debt transactions and valuation changes also follow the more general approach described in the following section.

2.3.4 Capital flows and valuation changes

While firm-level capital flows are provided by SNB statistics if underlying stocks come from the capital linkages surveys, they are not available if underlying stocks come from the banking statistics survey or result from our estimation of portfolio stocks. To fill in this gap, we propose the following estimation strategy.

Conceptually, capital flows (CF) of firm i vis-à-vis partner country p in currency c are estimated as:

$$CF^{d}_{ispct} = \Big(\frac{IIP^{d}_{ispct}}{p_{it}\varepsilon_{ct}} - \frac{IIP^{d}_{ispct-1}}{p_{it-1}\varepsilon_{ct-1}}\Big)\bar{p}_{it}\bar{\varepsilon}_{ct}, \tag{6}$$

where IIP^{d}_{ispct} are the firm's stocks (assets or liabilities) at time t, p_{it} is the end-of-period t price of firm i's stocks, ε_{ct} is the end-of period t nominal exchange rate with currency c, $\bar{p}$ and $\bar{\varepsilon}$ are the period average price and exchange rate.

In practice, the implementation of equation (6) depends on the type of stocks. In the case of portfolio equity, we use the firm-level share's closing price in period t and $t-1$ as the relevant prices from LSEG data, as introduced in Section 2.3.2. If the underlying stocks are portfolio debt, we use bond indices from Barclays as the relevant prices. Finally, if the underlying stocks are bank holdings, prices are irrelevant and we only consider exchange rate valuations. Note that if stocks are denominated in Swiss franc, as we assume for portfolio equity liabilities, then there is no exchange rate to be applied.

Finally, we construct valuation changes as official statistics rely only on aggregates to estimate valuation changes, not micro-level data. In our framework, valuation changes are simply the residual between changes in stocks and the transactions. Formally, we calculate micro-level valuation changes as:

$$VC^{d}_{ispct} = (IIP^{d}_{ispct} - IIP^{d}_{ispct-1}) - CF^{d}_{ispct}, \tag{7}$$

where stocks and capital flows are either available in the micro-level data or estimated.[9]

2.4 Panel characteristics

We combine the micro-level data and our estimates to form the final panel, which offers a comprehensive account of external linkages of corporations resident in Switzerland. We harmonize all data sources along the following dimensions. First, we construct subcomponents within each outcome variable following SNB internal guidelines. As shown in Table 1, we consider the main components (e.g., goods trade, direct investment stocks) as well as key subcomponents (e.g., merchanting, direct investment equity).[10] Second, we adopt the lowest frequency among data sources and restrict the sample to the yearly frequency, in which all data sources are available. The panel covers nine years of data spanning 2016 to 2024. Third, we harmonize the country breakdown. We can fully track 63 major countries in all data sources, which cover about 91% of world GDP, and group all other countries into a constructed rest of the world.[11] Fourth, we consolidate the currency breakdown and consider three currencies—the Swiss franc, the US dollar, and the Euro—as well as a composite for all other currencies.

[9]Valuation changes may include unattributed "other changes" beyond exchange rate and price revaluations. If capital flows are surveyed, then one can construct exchange rate and price valuation changes, while the resulting residual is attributed to other changes. We conduct such an exercise in Section 5.3. However, if both capital flows and valuation changes are unknown, then the contribution of "other changes" cannot be properly attributed to capital flows or valuation changes. This imprecision in the estimates is also true for official statistics.

[10]We settle on this breakdown as a good trade-off between simplicity and ability to deliver key insights for the scope of this paper. Note, however, that a finer level of disaggregation across subcomponents is possible. The definition of each subcomponent and its relevance given Swiss specificities is detailed in Appendix A.3. Table A2 further details the data source underlying each subcomponent.

[11]Table A5 in Appendix A details the country breakdown.

Table 1: Panel subcomponents

Outcome variable	Component	Subcomponent
CA	Goods	"Business cycle" trade
		Precious metals
		Trade supplements
		Merchanting
	Services	Financial services
		Business services
		Other services
	Primary income	Labour
		Direct investment
		Portfolio investment
		Other investment
	Secondary income	
CF / IIP / VC	Direct investment	Equity
		Debt
	Portfolio investment	Equity
		Debt
	Other investment	

Note: This table reports the subcomponent breakdown of each variable $X \in \{CA, CF, IIP, VC\}$. Appendix A.3 details the construction of each subcomponent from the micro-level data sources and estimates.

Table 2 provides details on the underlying data source of the panel, availability of breakdowns and coverage of official statistics across external sector indicators and by accounting entry. First, with the exception of valuation changes, the vast majority of the panel is based on micro-level data. Starting with the CA, 100% of receipts and 93.8% of expenses are based on micro-level data. Turning to the financial side, micro-level data explains 100% of total assets and 66% of total liabilities, and 77.8% of capital outflows and 59% of capital inflows. Note that we sum up over the absolute value of micro-level capital flows to construct sensible shares. Finally, valuation changes are fully based on our estimates.

Second, the country breakdown is widely available. The lowest coverage in terms of partner country occurs for valuation losses, at 94.9% on the liability side. In addition, the availability of the currency breakdown is perfect with the exception of the CA. A currency breakdown is available for 47.2% of receipts and 50.1% of expenses. The customs data identifies the currency of denominatoin of exports and imports, allowing for a currency breakdowns, whereas the SNB CA surveys and the capital linkages surveys do not offer a currency breakdown for other CA flows.

Finally, we show the coverage of official statistics by the panel. While we do not report coverage for the FA and valuation changes since negative numbers complicate the interpretation, we find that the panel explains about 84.3% of CA receipts, 83.7% of

CA expenses, 52.2% of foreign assets, and 87.0% of liabilities. Coverage is not complete for two main reasons. First, our focus on corporations excludes important aspects of the external sector, in which the public sector or households play a key role. In particular, we exclude the SNB, whose reserves account for 16% of cross-border assets and 116% of the NIIP. Second, the enterprise group structure data from Dun & Bradstreet is only available for reporting entities in SNB surveys and for the largest exporters and importers in the customs data (about 8500 entities per year). We thus exclude smaller firms in the customs data, who account for about 9.3% and 3.3% of imports and exports, respectively.[12]

Table 2: Panel characteristics

BOP/IIP	Direction	Micro-level data	Breakdown availability		Official data coverage		
			Country	Currency	Official	Panel	Ratio, %
CA	Receipts	100.0	99.8	47.2	6673	5628	84.3
	Expenses	93.8	99.2	50.1	6255	5237	83.7
IIP	Assets	100.0	99.9	100.0	46893	24472	52.2
	Liabilities	66.0	95.4	100.0	39954	34740	87.0
CF	Outflows	77.8	99.8	100.0	71	-102	
	Inflows	59.0	98.4	100.0	-401	-501	
VC	Asset changes	0.0	100.0	100.0	830	-546	
	Liability changes	0.0	94.9	100.0	769	-15	

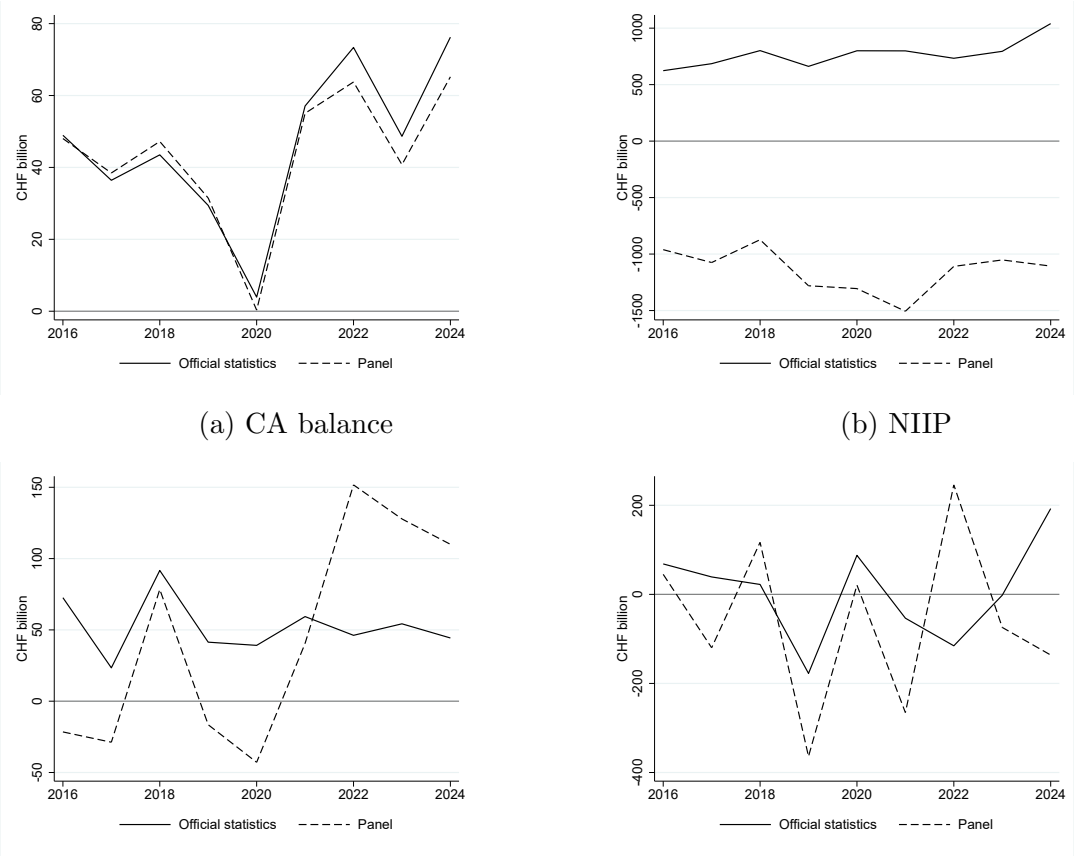
Note: This table summarizes the main characteristics in terms of micro-level data coverage, breakdown coverage, and coverage of aggregate official statistics.

As a complement to Table 2, Figure 1 shows the coverage of net outcomes (CA balance, net CF, net IIP, and net VC), which are more often the focus of researchers and policy makers. First, the panel underestimates slightly the CA surplus compared to the official figure but replicates closely its movements. Second, we consider the NIIP. The panel produces a significant negative NIIP, whereas the actual NIIP in Switzerland is largely positive. Again, this discrepancy is explained by the exclusion of the public sector and households: reserve assets of the SNB and portfolio equity assets attributed to households are major drivers of a positive NIIP. Despite failing to replicate the level, the panel generates a broadly stagnant NIIP, which is in line with the official figure. Finally, both net CF and net VC in the panel broadly replicate the level of official measures, although they are more volatile.

As a last step, Table 3 presents summary statistics of the four external sector outcomes, X_{iscpt}. Starting with the CA, the panel contains about 5.8 million observations covering 13'000 firms with an average CA transaction of CHF 1.9 million. The dispersion across transactions is significant, with a minimum at -24.1 billion and a maximum at 21.2 billion. Note that CA transactions can be negative as, following statistical standards, (i) the panel includes trade subtractions, e.g., returns or CIF adjustment, which are recorded as negative entries, and (ii) merchanting flows are included in net terms, that is, as the

[12]Table A3 decomposes the coverage of official statistics by the panel across CA and IIP components.

Figure 1: Net coverage



(a) CA balance

(b) NIIP

(c) Net capital flows

(d) Net valuation changes

Notes: This figure shows the coverage of official statistics by the micro-level panel. Figure (a) shows the CA balance, (b) net IIP, (c) net capital flows, and (d) net valuation changes. Derivatives and the capital account are excluded.

difference between sales and purchases. Turning to the financial side of the external sector, the panel contains about one million observations covering about 1400 firms. The number of firms is thus significantly lower in the IIP, CF, and VC, than in the CA, simply because they rely purely on survey data, whereas the CA relies on administrative data which cover a substantially larger number of companies. The average stock value is CHF 63.6 million and the maximum amounts to CHF 139 billion. The average CF (VC) is CHF -0.6 (-0.6) million, with a significant dispersion between a minimum at CHF -59 (-35) billion and a maximum at CHF 51 (43) billion.

Table 3: Summary statistics of panel

Indicator	N. obs	N. firms	Mean	St. Dev	Min	Max
Current account	5,796,432	13,056	1.9	85.8	-24,134	21,175
International investment position	935,478	1,424	63.6	1001.3	0	139,314
Capital flows	1,012,983	1,422	-0.6	370.6	-58,945	51,477
Valuation changes	880,104	1,426	-0.6	271.4	-34,579	43,010

This table shows summary statistics for the unit of observation X^d_{iscpt}, for each outcome $X \in \{CA, IIP, CF, VC\}$ across firms i, subcomponent s, partner country n, currency c, time t and direction of the external linkage d. Minimum and maximum values are shown as an average of the top five minimum and maximum values to account for confidentiality requirements. The unit is CHF million.

3 Micro-level foundations of the external sector

3.1 Revisiting macro identities

Existing firm-level research on international economic activity has examined individual components of the external sector extensively, particularly goods and services trade (Eaton et al., 2011; Ariu et al., 2019), or the relationship between trade and foreign direct investment (Helpman et al., 2004). While these studies provide important insights into firms' international activities, they offer a less comprehensive picture of how real and financial transactions are interconnected at the firm level. In particular, the relationship between firms' current account transactions and their financial account flows remains unexplored.

As a starting point, we revisit the two macro identities described in Section 2.1 exploiting the micro-level dataset. Formally, we relate micro-level data on CA balance, FA balance, change in NIIP, and valuation changes. To attenuate the skewness of the distribution given the presence of negative values in net outcomes, we transform the outcomes as inverse sine transformation.[13]

Results are shown in Table 4. Column (1) shows that a 1% increase in the CA balance is associated with a 0.25% increase in the FA balance.[14] Thus, while we do find a positive relationship between micro-level CA and FA balance, the relationship is far from perfect. In addition, the explanatory power is very low.

While the BOP identity has to hold at the country level, our results show that it does not need to hold at the firm level. This result is of course not surprising. Firms

[13]The inverse sine transformation, $asinh(x) = ln(x + \sqrt{(x^2 + 1)})$, has similar properties to a log transformation but can handle zero and negative values.

[14]This is an approximation of the marginal effect as the inverse sine transformation requires the dependent and independent variables to be transformed back into their original units for a correct interpretation. We find only small discrepancies between the estimated effects and the marginal effects after transformation. While recognizing the small potential mismeasurement in the coefficients, we focus on estimated coefficients for simplicity. For large values of the variables, the estimated coefficient based on transformed variables is shown to be equivalent to the semi-elasticity based on untransformed variables (Bellemare and Wichman, 2020).

may choose not to invest their net CA receipts abroad. Instead, they can distribute their cross-border profits to their investors or invest only domestically. That is, unlike at the country level, there is no accounting identity linking the firm's CA balance, e.g., from goods exports, to its net foreign investment, i.e., as direct investment flows.[15]

Next, Columns (2)-(4) in Table 4 relate the change in NIIP to the CA balance, FA balance, and VC, respectively. First, Column (2) shows that there is a positive and statistically significant relationship between the CA balance and change in the NIIP at the firm level. The relationship, however, is economically weak. A 1% increase in the CA balance is associated with a 0.11% increase in the NIIP at the firm level. Similarly, Column (3) relates the change in NIIP to the FA balance at firm level. A 1% increase in the FA account balance is associated with a 0.66% increase in the NIIP. Again, the relationship is not one-to-one, but economically stronger than the one for the CA balance. Last, Column (4) shows that a 1% increase in the valuation changes is associated with a 0.52% increase in the NIIP. This finding underlines the importance of valuation changes for the evolution of the NIIP at the firm level, and, in general, for external rebalancing. In sum, we provide evidence that the stock-flow reconciliation identity holds at the firm level, with both the FA balance and valuation changes being equally important determinants of the external wealth of firms.

Importantly, our findings have policy implications. First, firms' cross-border investment decisions are driven by further factors in addition to their cross-border income, such as their characteristics as well as macro developments both in Switzerland and in their counter-party countries. Second, valuation changes play an important role in the evolution of the NIIP at the firm level. While Gourinchas and Rey (2014) show the growing role of valuation changes in external adjustment of countries, we demonstrate that valuation changes are an important driver of the NIIP even at firm level. This finding indicates the vast extent of external exposures present on firms' balance sheets.

3.2 Investigating granular origins

In the presence of a fat-tailed firm size distribution, the importance of large firms in shaping aggregate fluctuations has been widely recognised in the macroeconomics literature. Following the early work of Gabaix (2011), idiosyncratic shocks to large firms have been shown to drive a series of aggregate outcomes, such as GDP (Acemoglu et al., 2012; Carvalho and Gabaix, 2013; Carvalho and Grassi, 2019), international trade (di Giovanni et al., 2014; Gaubert and Itskhoki, 2021), inflation (Alvarez-Blaser et al. 2025), or the

[15] At the country level, when all cross-border receipts and expenses of the residents are aggregated, the CA balance equals the FA balance, because we are dividing the world into two entities, home and rest of the world. A similar reasoning holds for countries' bilateral flows. Countries' bilateral CA balances are a poor indicator of their bilateral FA balances (Milesi-Ferretti, 2025), but when aggregated across all partner countries, CA balances match FA balances, because the world as a whole has no external counterpart.

Table 4: Revisiting macro identities

	(1) FA, net	(2) Δ NIIP	(3) Δ NIIP	(4) Δ NIIP
CA balance	0.247***	0.108***		
	(0.017)	(0.015)		
FA balance			0.657***	
			(0.013)	
VC, net				0.517***
				(0.017)
Sector FE	Yes	Yes	Yes	Yes
Ownership country FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	9728	9728	9728	9728
Adjusted R^2	0.06	0.01	0.38	0.19

Notes: The dependent variable is the firm-level FA balance in Column (1) and the firm-level change in NIIP in Columns (2) through (4). Dependent and independent variables are expressed under an inverse sine transformation. Sector, ownership, and year FE are included. Standard errors clustered at the firm level are reported in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

CA (Koomen and Wicht, 2026).

Building on that literature, we test the extent of granularity in the external sector, exploiting the comprehensiveness of the dataset and consistent definition of firms across real and financial flows. The size of firm i is defined as its total cross-border linkages across countries, currencies, and direction of the linkage within each year for each aspect of the external sector. Firms are then ranked based on their size, with the lowest rank assigned to the firm with the largest external linkages. To smooth out the impact of outliers, we take an average of the ranks over years.

Figure 2a shows the firm-level distribution of CA transactions, IIP stocks, capital flows, and valuation changes. Over the four variables of interest, we find that the distribution is highly skewed. The top 5 five firms accounts for 18.5% of CA transactions, 19.4% of stocks, 19.7% of capital flows, and 15.8% of valuation changes. The top 50 firms further account for 54.5% of CA transactions, 58.2% of stocks, 58.5% of capital flows and 59.8% of valuation changes, while the top 500 firms account for 85.3% of CA transactions, 96.6% of stocks, 96.3% of capital flows and 97.4% of valuation changes. There is thus substantial concentration of external sector linkages among the largest firms.

The prevalence of large firms in gross terms largely translate to net outcomes. Starting with the CA, Figure 2b shows a stark concentration of CA surplus among the largest firms: the top five firms explain a CA surplus of CHF 38 bn, or about 82.6% of the average CA surplus over the sample period. Overall, there is a clear tendency for larger firms to run

surpluses, which peak at about CHF 65.5 bn among the top 1000 firms. After reaching that point, cumulated CA balances declines steadily, implying that the majority of firms in our sample run CA deficits.

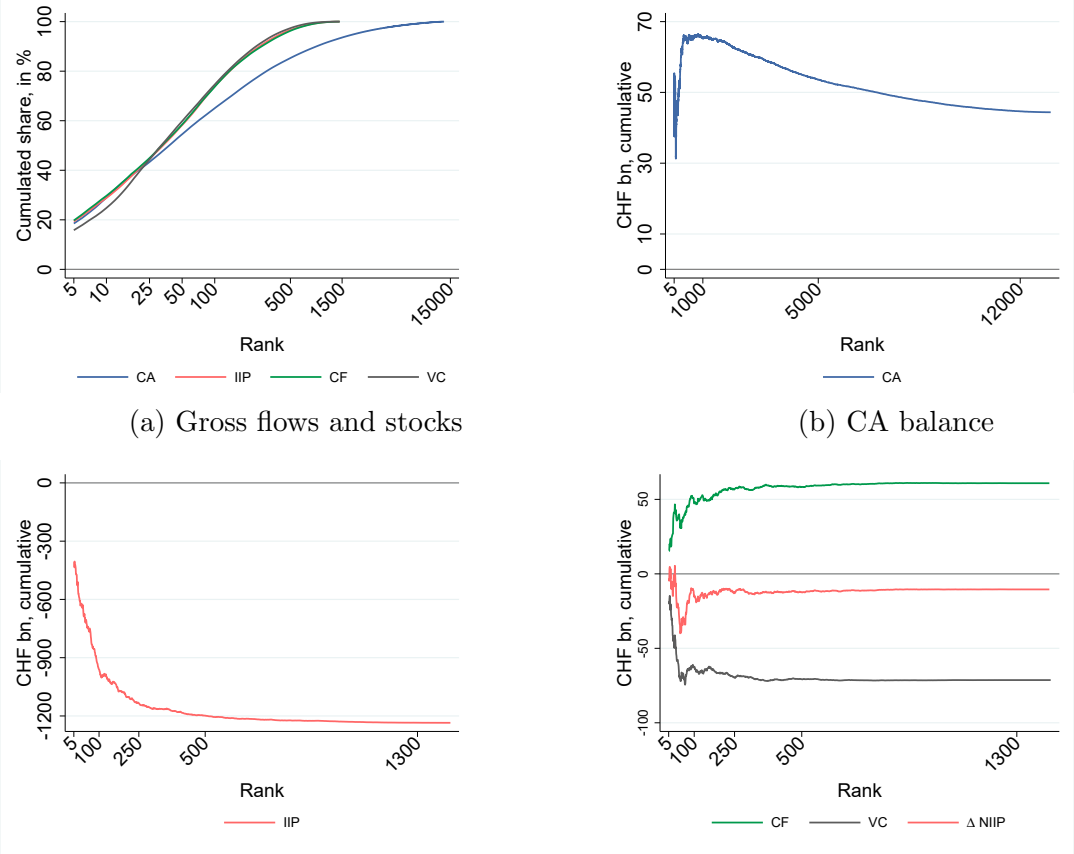
Turning to the financial side of the external sector, Figure 2c plots the average NIIP over the sample period across ranks. Similarly to the CA, concentration is high. The top 5 firms account for about 37.0% of the NIIP generated by corporations in our sample, while the top 100 accounts for 77.8%. Over the entire distribution, cumulated net outcomes decrease smoothly over the firm size distribution, suggesting that the net debtor position is common among financial corporations. Such a high degree of concentration thus allows for shocks to large firms to impact the dynamics of a country's external balance. Indeed, Figure 2d shows the stock-flow reconciliation of the cumulated change in NIIP over the sample period across the size distribution, distinguishing between capital flows and valuation changes. The largest firms account for the majority of observed changes. Indeed, the top 100 accounts for 77.6% of total cumulated capital flows, 87.9% of cumulated valuation changes, and 147.8% of changes in stocks observed in our sample. We see strong offsetting patterns within ranks between capital flows and valuation changes, suggesting that the aggregate acquisition-accumulation gap has granular origins. In addition, there is heterogeneity along the size distribution in how firms contribute to the stock-flow developments. The majority of the dynamics takes place among the 250 largest firms. At the firm level, net capital flows can turn negative, and valuation changes can oscillate between net gains or losses.

Figure 2a and Figure 2b thus confirm the findings of Koomen and Wicht (2026), who first documented the substantial skewness in CA gross and net flows using a related but unconsolidated firm-level dataset of Switzerland's CA. Building on their first contribution, we show that this skewness extends more broadly to the external sector, both stocks and flows. We further document the connection between large firms across external sector outcomes, which we turn to next.

While all aspects of the external sector are granular, the top percentile companies are not necessarily the same across all four outcomes. Figure 3 illustrates this point by simply plotting the rank of a firm in the CA against its rank in the IIP. For readability, we focus on the top 1500 firms in both the CA and IIP. Clearly, the rank of a company in the CA is correlated with the percentile in the IIP such that companies highly relevant for the real side of the balance of payments also matter on the financial side.[16] Estimating a simple fitted line to the chart reveals a statistically significant relationship with a slope of 0.45. Nevertheless, the correlation is far from perfect. Some firms thus specialize on one side of the balance of payments. For example, large domestic intermediaries supplying foreign consumption goods to Swiss consumers may have limited cross-border integration beyond goods trade and the CA. Similarly, pass-through capital in Switzerland is common, which

[16]Figure B1 in the Appendix shows the rank correlation for the entire sample.

Figure 2: Granularity across the external sector



(a) Gross flows and stocks

(b) CA balance

(c) NIIP

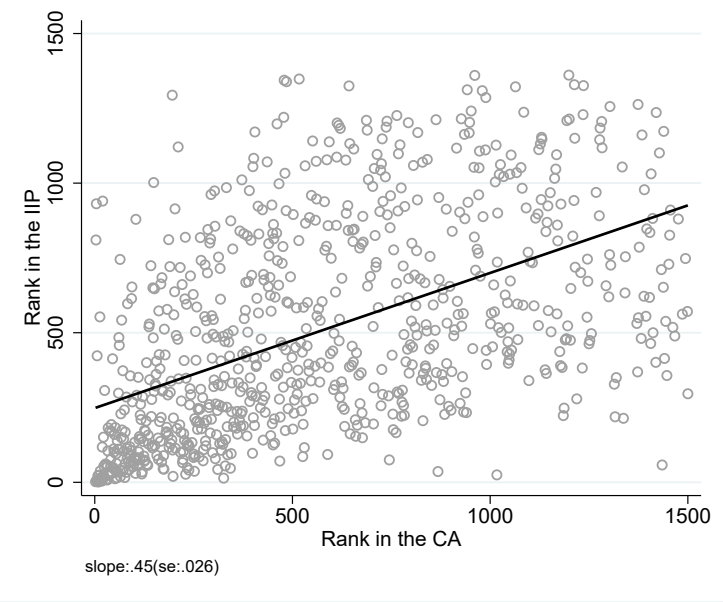
(d) Stock–flow reconciliation

Notes: Figure (a) reports the cumulated shares in CA flows (receipts plus expenses), IIP (assets plus liabilities), CF, and VC across ranks. We consider CF and VC as absolute values. Figure (b) shows the cumulated CA balances across ranks. Figure (c) shows the cumulated net IIP across ranks. Figure (d) shows the stock–flow reconciliation across ranks. All sub-panels are based on the average over the sample period.

has a sizable impact on cross-border stocks, but little implications for the real economy.

Our results echo with the literature studying the intersection between international trade and multinational production (Helpman et al., 2004; Ramondo and Rodríguez-Clare, 2013; Tintelnot, 2017; Antràs et al., 2026). In a robustness check shown in Table B2 of Appendix B, we show that similar patterns can be found between CA flows excluding goods trade and cross-border stocks excluding FDI. We find strong positive correlations between the ranks of firms based on less studied aspects of the external sector, such as merchanting flows or services trade on the real side or other investment stocks on the financial side of the external sector.

Figure 3: Rank correlation between CA and IIP



Notes: This chart shows the correlation of ranks in the CA and IIP, focusing on the largest 1500 companies.

4 Characterization of firms

Having established that aggregate external sector outcomes are driven by a small number of firms, this section examines which firm level characteristics explain their contributions to these outcomes.

The literature on multinationals highlights the importance of foreign ownership and corporate structures for international capital flows and, in turn, for the international transmission of economic and financial shocks (Biermann and Huber, 2024). Further studies document how the ownership structures of multinationals shape production networks (Alfaro and Charlton, 2009), while the geographical organization of multinationals complicates the measurement and interpretation of aggregate external statistics (Avdjiev et al., 2018; Guvenen et al., 2022). However, less is known about how firm characteristics, including size, ownership structure, and economic activity, shape the composition and concentration of the external sector. We address this gap by examining how firm-level employment, corporate group complexity, ownership nationality, and economic activity relate to firms' contributions to aggregate outcomes. The new insights allow us to identify the characteristics of firms that account for a disproportionate share of the economy's external sector.

Formally, we explore firm-level characteristics along the firm size distribution. The firm size distribution is defined as normalized firm ranks, both in the CA and IIP as defined in the previous section, from 0 to 100. Lower percentiles are associated with higher ranks, i.e., firms with smaller external linkages.

4.1 Proxy for firm size: employment and complexity

As the first characteristic of firms along the size distribution, we investigate the relationship between our baseline measure for firm size based on external linkages and two other proxies for firm size: firm-level employment and the number of entities within a firm. Starting with the CA, Column (1) of Table 5 shows that a 1 percentage point increase in the percentile of the size distribution is associated with a 8.5% increase in firm-level employment. This relationship is statistically significant and robust to the inclusion of sector and ownership country fixed effects. We further find a statistically significant and positive relationship between the percentile of the size distribution and the complexity of firms, measured by the number of entities per firm. As shown in Column (2), a 1 percentage point increase in the percentile of the size distribution is associated with a 27.4% increase in the number of entities within firms.

Similar patterns hold when considering the size distribution in the IIP. A 1 percentage point increase in the size distribution is associated with a 5.9% increase in employment and with a 18.9% increase in the number of entities per firm as shown in Column (3) and (4), respectively. While the effects remain statistically significant, the magnitude of the coefficients is slightly below than those found based on the CA. This is not surprising given that the firm-level dataset for the IIP is purely derived from survey data, thus focusing on the largest firms, while the firm-level dataset for the CA contains administrative data, which also covers smaller firms.

We thus establish that large firms in terms of their external real and financial linkages are also larger in terms of employment and complexity. These results echo a well-established literature showing that larger, more productive firms become active in international markets as exporters (Melitz, 2003; Bernard et al., 2007; Chaney, 2008), are both exporters and importers (Antràs et al., 2017; Bernard et al., 2018) and further engage in multinational production through foreign direct investment (Yeaple, 2009; Antràs et al., 2026). Importantly, while the rest of this paper relies on the firm size distribution as determined by external linkages, our results suggest a statistically significant link to other, tangible measures of firm size.

Table 5: Employment and firm structure

	CA		IIP	
	(1)	(2)	(3)	(4)
Employment (logged)	8.5***		5.9***	
	(0.15)		(0.52)	
N. entities (logged)		27.4***		18.9***
		(0.59)		(1.48)
Observations	11250	13056	1325	1424
Adjusted R^2	0.36	0.25	0.16	0.16
Sector FE	Yes	Yes	Yes	Yes
Ownership country FE	Yes	Yes	Yes	Yes

Notes: The dependent variable is the firm-level percentile within the firm-size distribution. Standard errors clustered at the firm level are reported in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

4.2 Ownership

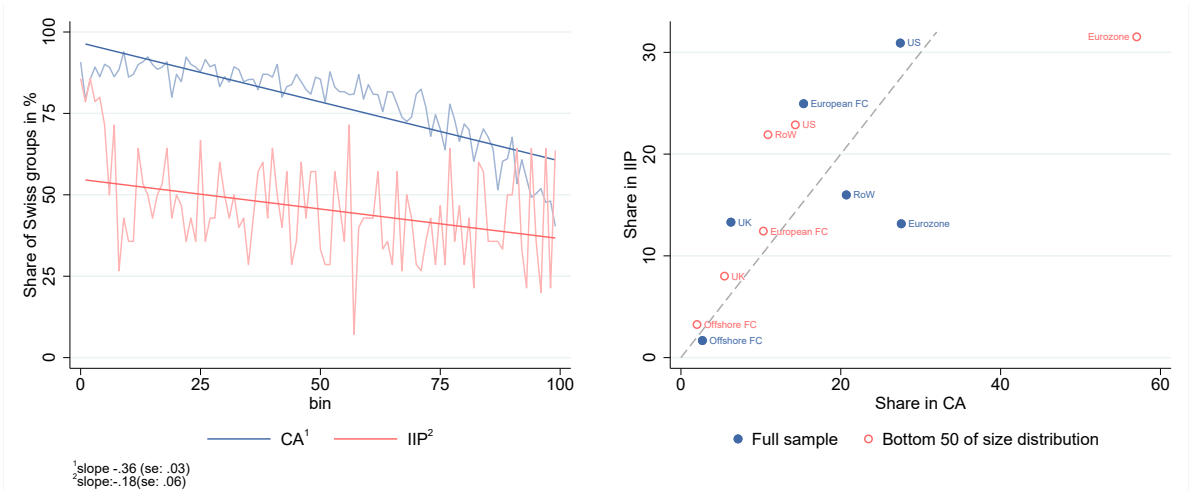
As the second characteristic of firms along the size distribution, we turn to ownership. Figure 4a shows the share of Swiss firms across the size distribution. Both in the CA and the IIP, the share of Swiss firms declines along the size distribution. By simply fitting a linear trend, we find a statistically significant negative relationship between the size distribution and the share of Swiss-owned firms. Namely, the share of Swiss-owned firms declines by 0.36 percentage points with each percentile in the CA and by 0.18 percentage points in the IIP. Overall, Swiss-owned firms tend to be smaller than foreign-owned ones. Focusing first on the CA, 87% of firms are Swiss below the median. Above the median, this share declines rapidly, dropping to below 51% above the 90th percentile. In the IIP, the pattern is less striking, but still present: 51% of firms are Swiss below the median. Above the median, this share declines, dropping to below 47% above the 90th percentile. Foreign-owned firms play a major role in the highest percentiles of the size distribution. Given the high degree of granularity in the external sector, we find that only 51.4% of total CA flows and 54.2% of total IIP flows are explained by Swiss-owned firms.

Focusing on the foreign ownership, Figure 4b reports the share of the CA and the IIP by country of (foreign) ownership. The blue circles report shares for the entire sample. US-owned firms play the largest role, explaining approximately 13.4% of CA flows and 14.2% of IIP stocks. Then, firms of European financial centers—defined as Ireland, Luxembourg, and the Netherlands—come second, explaining approximately 6.9% of CA flows and 10.5% of IIP stocks. Unsurprisingly, there is a strong correlation between the contributions of certain ownership countries to the CA and to the IIP. As shown in Figure 3, firms important for the real external sector are also relevant for the financial side. Importantly, however, we see that compared to the CA, the IIP is tilted towards firms

owned by the US and by European financial centers, reflecting the key role these countries play in financial flows. In contrast, firms owned by Euro zone countries (excluding financial centers) play a larger role for the CA.

These aggregate patterns, however, are not representative across the size distribution. As contrast, the red circles show the share of the external sector by ownership country focusing only on the bottom 50 percentile of the size distribution. Based on this cut of the data, firms of the Euro zone become the largest contributions to the external sector, accounting for 57.0% of the CA and 31.5% of the IIP. Both the US and European financial centers become less relevant. Ownership by these countries is thus concentrated in larger firms.

Figure 4: Ownership over the size distribution



(a) Domestic ownership

(b) Foreign ownership

Notes: Figure (a) reports the share of Swiss-owned firms across the size distribution in the CA and in the IIP. The lines represented fitted linear trends. Figure (b) reports the share of selected ownership countries in the CA and IIP based on the entire sample (blue circles) and based on the bottom 50 percentiles of the size distribution (red circles). European financial centers (FC) include Ireland, Luxembourg, and the Netherlands. The Euro zone does not include European FCs.

Figure 4 illustrates the substantial contribution of foreign-owned firms in the Swiss external sector. Importantly, this is not a Swiss-specific phenomenon. The importance of foreign-owned firms in shaping external sector outcomes has been shown for a number of economies (Barry and Bradley, 1997; Kneller and Pisu, 2004; Criscuolo and Martin, 2009), including the US (e.g., Alfaro and Alviarez, 2025). This phenomenon is driven by firms' global operations straddling national borders. Firms spread their economic activities—including production, financing, and supply chain management—across multiple countries and coordinate them through an extensive network of foreign affiliates. As a result, residency-based external statistics reflect not only domestic economic conditions but are also driven by international corporate strategies and global economic conditions. Our results underline the major share of external sector linkages driven by non-domestic

companies. As described in Avdjiev et al. (2018), external sector statistics should then be carefully interpreted as the established accounting and measurement framework has important limitations in highly globalized economies.[17]

4.3 Economic activity

As the third characteristic of firms along the size distribution, we consider economic activities.[18] Figure 5 shows the breakdown of the CA and the IIP by economic activities. Similarly to Figure 4, blue circles show shares in total external linkages for the entire distribution. Unsurprisingly, given the results of the two previous sections, there is a clear positive correlation between sectoral contributions to the CA and to the IIP. Thus, sectors that matter for the CA also matter for the IIP. Nuances, however, emerge: manufacturing sectors tend to dominate the CA: wholesale and retail firms play the largest role, with a 21.0% share, thus surpassing the pharmaceutical and chemicals industry, one of Switzerland's key export sectors. They play a smaller role in the IIP, with a 19.0% share. In contrast, the finance sector tends to dominate the IIP, with a 38.5% share. In the CA, this sector only accounts for 18.7% of flows.

This snapshot is once again driven by large firms. To contrast with the aggregate picture, the red circles in Figure 5 show sectoral shares in total external linkages focusing on the bottom 50 percentiles of the size distribution. Based on the reduced sample, the importance of the trade sector and the finance sector on each side of the IIP is exacerbated. The trade sector accounts for almost half of CA flows, but less than 20% of the IIP. The finance sector accounts for about a third of cross-border stocks, but less than 5% of CA flows. Taken together, this simple figure shows that manufacturing sectors tend to contribute to a similar extent to the CA and to the IIP, while the trade industry and the finance industry stand out as they dominate the real and financial side, respectively, especially among smaller firms.

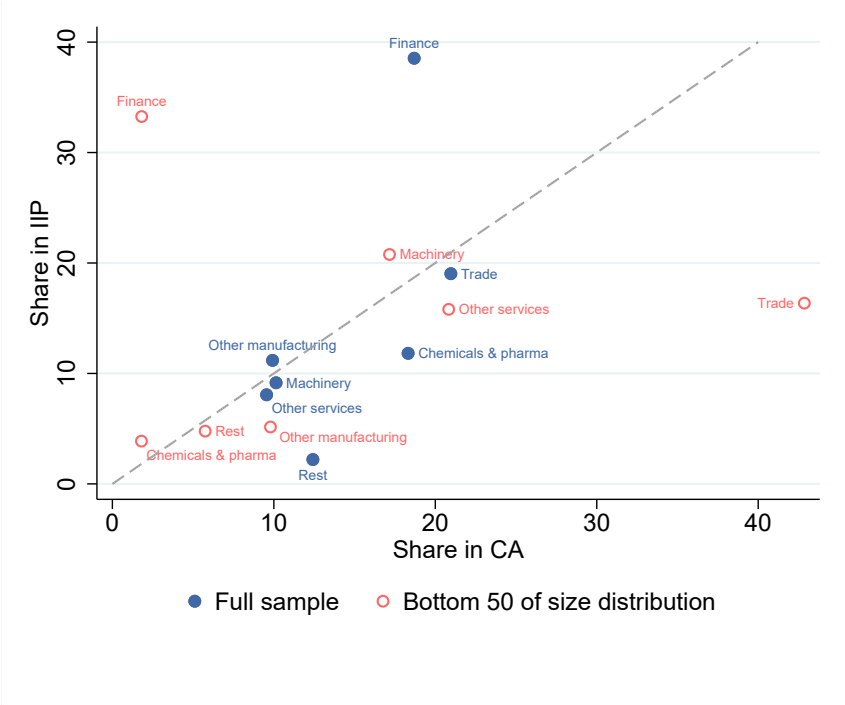
Our findings are consistent with a literature spanning several fields. First, we confirm the key role of intermediaries for real external sector linkages. Intermediaries shape international trade in goods by facilitating access to international markets for smaller, less productive firms and/or serving less accessible markets (Ahn et al., 2011; Bernard

[17] An emerging literature attempts to uncover true economic linkages using granular data. For example, Coppola et al. (2021) and Beck et al. (2024) show that residency-based statistics do not reflect true geographic linkages. Similarly, Tabova and Warnock (2026) show that the standard distinction between "domestic vs foreign investors" does not map well into economically meaningful differences in investment behavior.

[18] Assigning an unique economic activity to a firm is not straightforward as entities within the firm may be active in different types of activities. We assume that the firm inherits the activity of the entity within that firm that generates the most employment in Switzerland. See Wicht (2026) for a thorough discussion.

et al., 2015; Bernard et al., 2019).[19] Second, we document that the finance industry encompassing banks and non-bank financial intermediaries—whether small or large—are determining Switzerland's IIP, consistent with the findings of the literature (BIS, 2021; Avdjiev et al., 2022; Avdjiev et al., 2026).[20] The finance industry not only shapes the level of the IIP in Switzerland and other countries, but also determines the dynamics of international capital flows (Miranda-Agrippino and Rey, 2020), exchange rates (Gabaix and Maggiori, 2015; Bippus et al., 2026), and the propagation of shocks with repercussions for the real economy (Buch and Goldberg, 2024).

Figure 5: Sectoral distribution



Notes: This figure reports the share of selected sectors in CA flows (receipts plus expenses) and IIP (assets plus liabilities) based on the entire sample of firms (blue circles) and based on the bottom 50 percentiles of the size distribution (red circles). MEM stands for machinery, electronic equipment and metals. Trade stands for wholesale and retail trade.

[19]The Swiss case is likely to go beyond the common understanding of the role of intermediaries as Switzerland is home of a large commodity trading industry. Large multinationals resident in Switzerland purchase goods abroad and sell those goods abroad without the goods ever crossing the Swiss border. These types of flows are recorded as merchanting flows under goods trade in the CA. These multinationals are typically classified as intermediaries in wholesale trade. See Krell and Yeşin (2023) for a discussion.

[20]IIPs are shaped not only by financial intermediaries, but also by jurisdictional intermediation. Switzerland, like other financial centers, acts as a conduit country such that some capital 'passes through' a company without generating employment or real investment in the domestic economy (Swiss National Bank, 2017). This type of capital is referred to as 'pass-through capital' (Damgaard et al., 2024).

5 Business models of firms

The disproportionate role of larger, more complex, and foreign owned firms in the external sector as shown in the previous section raises the question of how their business models differ from those of other firms. More formally, this section examines heterogeneity in firms' international activities, geographic linkages, and currency exposures. Existing research shows that large firms engage in a broader range of international activities, combining goods trade with cross-border services transactions (Haller et al., 2014; Ariu, 2016; Breinlich and Criscuolo, 2011). These activities are closely interconnected (Wicht, 2026), reflecting firms' international production networks and market presence (Ariu et al., 2019). However, existing studies focus on goods and services trade, leaving open how other current account components, particularly primary and secondary income, relate to firms' trading activities. Moreover, little is known about whether different types of external transactions are concentrated among the same firms and in the same foreign markets, and how these patterns vary with firm characteristics. We address these gaps by examining the current account at the firm level in its entirety, including their geographic distribution, and assessing how firm heterogeneity shapes aggregate external balances.

Beyond their real activities, firms have cross-border financial positions whose currency composition determines their exposure to exchange rate movements. Previous studies have examined aggregate exchange rate exposure and the role of currency denomination in international trade and finance (Gopinath et al., 2010; Benetrix et al., 2020). However, less is known about how firms' real and financial linkages differ in their geographic and currency composition, or how these patterns vary with firm characteristics. In particular, it remains unclear whether firms' foreign currency assets and liabilities offset one another or generate substantial net exposures, and whether the resulting valuation gains and losses are concentrated among a few large firms. Making use of the currency breakdown in our firm-level dataset, we examine how heterogeneous firm level exposures contribute to aggregate external positions and valuation changes.

Below we consider (i) the composition of external linkages, (ii) country exposures, and (iii) currency exposures. Again, for simplicity, we focus on the size distribution within the CA and within the IIP.

5.1 Composition of external linkages

As the first dimension of firm-level choices, we consider the composition of external linkages. To do so, we calculate the firm-level shares of specific components in total linkages and relate these shares to the size distribution, conditional on sector, ownership, and year fixed effects. Table 6 shows the results.

Panel A first reports the results for the CA, splitting flows between cross-border

goods trade, merchanting, services, and income flows.[21] On the receipts side, cross-border goods trade plays a lesser role for larger firms: a 1 percentage point (pp) increase in the percentile of the size distribution is associated with a 0.25 pp decrease in the share of cross-border goods trade in total receipts. Instead, merchanting trade, services trade, and income flows play a large role of a source of receipts for larger firms (+0.03, +0.11 and +0.11 pp share increase associated with a 1 pp increase in the size distribution, respectively). On the expenses side, goods trade similarly plays a lesser role in lower percentiles of the size distribution (-0.15 pp share change associated with a 1 pp increase in the size distribution), while services trade accounts for a larger share for expenses (+0.12 pp share change associated with a 1 percentage point increase in the size distribution). One may question whether the results are driven by the sample selection as our panel contains more firms that are exclusively present in the customs data. Table B1 in the Appendix shows that the results are largely robust to excluding firms only present in the customs data.

The results give important insights into the complex cross-border activities of larger firms, echoing conceptual or empirical work using aggregate data (Avdjiev et al., 2018; Di Nino et al., 2020). In the context of the global imbalances discussion, which is increasingly biased towards goods trade imbalances, our results highlight that goods trade play a lesser role for the largest firms, which drive most of the external sector. Any rebalancing, warranted or not, is unlikely to occur throughout a single component. Accordingly, the impact of any policy targeting a single component is unlikely to have a proportional impact on the CA given spillovers to other components of the CA. Focusing a specific component thus has clear limitations given that it may only be a partial view of a firm's cross-border activities. A related paper based on economic activities establishes strong offsetting patterns in component-level balances at the sector level (Wicht, 2026).

Panel B of Table 6 turns to the IIP, splitting stocks between DI equity, PI equity, and debt instruments. On the asset side, a 1 pp increase in the percentile of the size distribution is associated with a 0.37 pp share increase of DI equity and a 0.36 pp share decrease of debt positions, respectively, in their total foreign assets. On the liability side, however, a 1 pp increase in the percentile of the size distribution is associated with a 0.16 pp share decrease of DI equity and an 0.11 pp share increase of PI equity positions, respectively, in their total liabilities.

The results in Panel B give important insights to the cross-border balance sheets of firms. First, large firms rely more on having ownership stakes in foreign enterprises with voting power and control and rely less on debt instruments in their external assets. While DI equity is a long-term investment and acts as a shock absorber because its return always

[21] We thus split cross-border goods trade that cross the Swiss border from global production (merchanting). We consolidate labour income, investment income, and secondary income, into the income component.

depends on the performance of the other firm, debt instruments are fixed-term contractual claims with predetermined interest payment scheme, thus shifting risk to the borrower as payments are decoupled from the performance of the borrowing firm. Overall, large firms can be viewed as "large" and long-term investors abroad, as withdrawing equity investment tends to be difficult while debt positions can easily be adjusted or withdrawn. Second, large firms can fund their activities by issuing securities in the stock market and rely less on DI equity investors from abroad. As a result, large firms are likely to manage their operations, risks and exposures rather independently and can generate a steady cross-border income stream. This conjecture is also consistent with Panel A of the same table.

Our findings in Panel B are consistent with the literature on firm's capital structure and financing choices. Helpman et al. (2004) show that only the most productive and largest firms have DI, while others serve foreign markets via exports or remain domestic. Similarly, Gozzi et al. (2010) and Erel et al. (2020) show that financing choices are highly non-uniform across firms, with firm characteristics, including size, playing a decisive role. While these papers focus either on DI or on security issuance, they all show that cross-border financing is heavily concentrated among large firms. Importantly, though, the latter two papers show that firms often issue bonds in international markets which would not necessarily be captured in our dataset if it is done via a foreign affiliate.

Table 6: External linkages composition across the firm size distribution

Panel A: CA	Receipts				Expenses		
	(1) Goods	(2) Merchanting	(3) Services	(4) Income	(5) Goods	(6) Services	(7) Income
Percentile	-0.25***	0.03***	0.11***	0.11***	-0.15***	0.12***	0.02***
	(0.010)	(0.003)	(0.007)	(0.006)	(0.011)	(0.007)	(0.009)
Observations	81980	81980	81980	81980	90422	90422	90422
Adjusted R^2	0.52	0.18	0.47	0.35	0.37	0.33	0.31

Panel B: IIP	Assets			Liabilities		
	(1) DI equity	(2) PI equity	(3) Debt	(4) DI equity	(5) PI equity	(6) Debt
Percentile	0.37***	-0.01*	-0.36***	-0.16***	0.11***	0.05
	(0.032)	(0.007)	(0.032)	(0.032)	(0.034)	(0.034)
Observations	8928	8928	8928	9894	9894	9894
Adjusted R^2	0.41	0.13	0.41	0.46	0.36	0.36

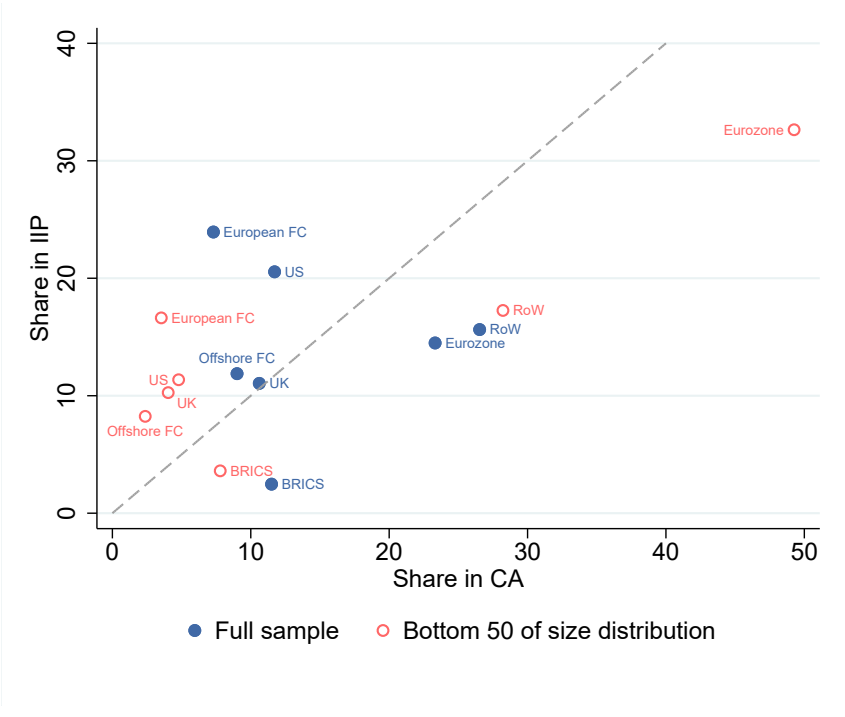
Notes: The dependent variable is the share of subcomponent s in firm i's transactions or positions for accounting entry d at time t, $X^d_{ist}/(\sum_s X^d_{ist})$, where $X^d_{ist} = \sum_{pc} X^d_{ispct}$. The regression includes sector (4-digit level), ownership, and year fixed effects. Merchanting does not show under expenses as such flows are netted in official statistics. Standard errors clustered at the firm level are reported in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

5.2 Country exposure

As the second dimension of firm-level choices, we consider country exposures across firms. Country breakdowns are readily available on an aggregate basis. Thus, aggregate bilateral exposures between countries are generally well understood and widely discussed by policymakers. We thus focus on contrasting these aggregates patterns with a snapshot of country exposures by smaller firms.

Blue circles in Figure 6 show shares in total external linkages for selected countries or groups of countries based on our entire sample.[22] We contrast these shares by focusing on the bottom 50 percentiles of the size distribution, shown as red circles. Among smaller firms, the Eurozone becomes the largest partner both in terms of CA flows and cross-border stocks, with shares at 49.3% and 32.6%, respectively. The US, European financial centers and offshore financial centers lose in relevance, with declines in shares of 17.3% and 20.1%, respectively, compared to aggregate figures. Smaller firms thus have less exposure to financial hubs, suggesting more direct cross-border relationships rather than intermediated, and to far-away trading partners, consistent with the well-document gravity of cross-border relationships (Anderson and van Wincoop, 2003).

Figure 6: Partner countries over the size distribution



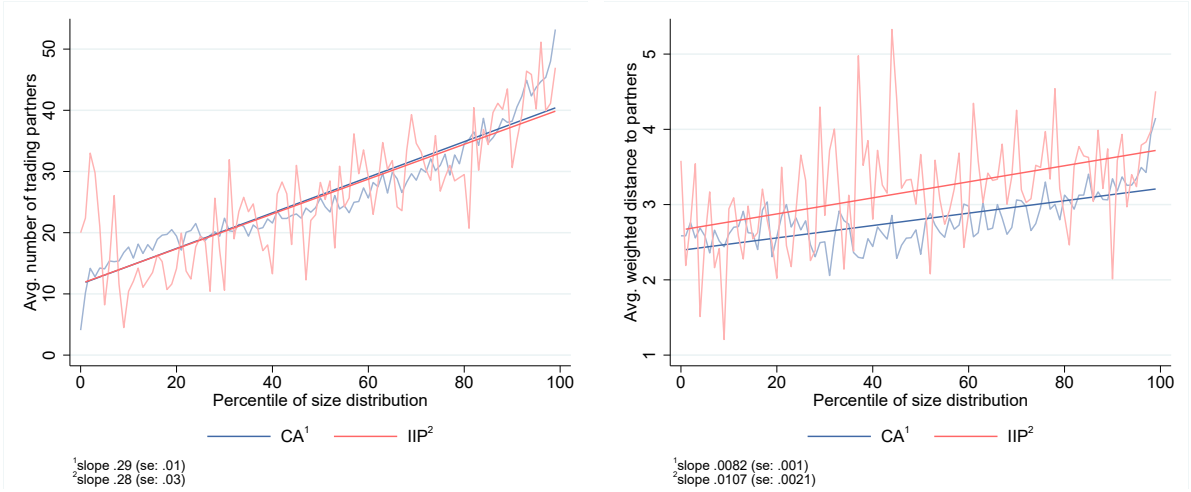
Notes: This figure reports the share of selected partner countries in the CA and IIP based on the entire sample (blue circles) and based on the bottom 50 percentiles of the size distribution (red circles). European financial centers (FC) include Ireland, Luxembourg, and the Netherlands. The Euro zone does not include European financial centers.

[22] To produce interpretable results, we consider gross sales and purchases in merchanting for this exercise as the conventional netted values can muddle results across partner countries.

To further investigate the forces of gravity, Figure 7a reports the number of partner countries with which an average firm within a percentile of the firm size distribution has an external linkage, both in the CA and in the IIP. On both the real and financial side of the external sector, a clear positive correlation emerges, suggesting that larger firms are connected with more countries than smaller ones. Fitting a simple linear regression line reveals very similar patterns in both the CA and the IIP, with a statistically significant slope of 0.29 and 0.3, respectively. Next, Figure 7b reports the average distance to countries with which a firm has an external linkage across the firm size distribution. On average, external linkages are more distant in the IIP than in the CA. Both in the CA and IIP, the average distance to countries with which firms maintain an external linkage increases over the firm size distribution. Fitting a simple linear regression shows statistically significant relationships.

These results echo a large body of evidence in the international trade literature (e.g., Eaton et al., 2011) and multinational production literature (e.g., Tintelnot, 2017). Our results, however, suggest that gravity extends beyond these well-documented aspects of cross-border relationships. Indeed, Table B3 in the Appendix shows that the relationship is robust to excluding cross-border goods trade in the CA and FDI in the IIP.

Figure 7: Gravity over the size distribution



(a) Number of partner countries

(b) Average distance to partner country

Notes: Figure (a) reports the number of partner countries across the size distribution in the CA and in the IIP. Figure (b) reports the average distance to trading partners per firm across the size distribution in the CA and the IIP. The lines in each figure represent fitted linear trends.

Given the symmetry of results shown in Figure 7, we investigate the overlap of country exposures across real and financial exposures. Namely, we relate firm-level real exposures to a country, defined as the share of a country in a firm's total CA linkages, to financial exposure to that country, measured as the share of that country in a firm's total IIP linkages. Results are shown in Table 7. Overall, we find strong correlations between real

and financial country exposure to a country. As shown in Column (1), a 1 percentage point (pp) increase in the country's share in CA flows is associated with a 0.55 pp increase in the that country's share in the IIP. The results are robust to the inclusion of firm, year, and country fixed effects.

We test the robustness of this results under several other assumptions. Namely, we exclude cross-border goods trade from the CA and FDI from the IIP to test whether the relationship holds beyond them given the well-established complementarity between them (Antràs et al., 2026), and further exclude investment income flows, which mechanically could be related to cross-border stocks. Columns (2) through (6) shows that the positive and statistically significant relationships holds despite restrictions in subcomponents of the CA and IIP. Coefficients tend to be lower, however, at about 0.3. The explanatory power declines also at about 25%. Overall, our results suggest strong interdependencies between real and financial exposures to partner countries. In the context of increasing geoeconomic fragmentation, there may strong spillovers between real and financial cross-border linkages.[23]

Table 7: Real and financial country exposures

	Country share in IIP			Country share in IIP, excl. FDI		
	(1)	(2)	(3)	(4)	(5)	(6)
Country share in CA	0.55***			0.31***		
	(0.01)			(0.02)		
–"–, excl. goods		0.62***			0.31***	
		(0.01)			(0.02)	
–"–, excl. goods and inv. inc.			0.34***			0.28***
			(0.02)			(0.02)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	215573	198155	132509	171929	155620	109889
Adjusted R^2	0.41	0.56	0.23	0.27	0.29	0.24

Notes: The dependent variable is the share of country p in firm i's cross-border positions at time t, $IIP_{ipt}/(\sum_p IIP_{ipt})$, where $IIP_{ipt} = \sum_{sc,d} IIP^d_{ispct}$. Independent variables follow a similar construction for the CA. Column (1) through (3) consider entire IIP. Columns (4) through (6) excludes FDI from the IIP. Similarly, we consider full CA flows, as well as CA flows excluding cross-border goods trade, and investment income (inv. inc.) flows from the construction of independent variables. Regressions include firm, year, and country fixed effects. Standard errors clustered at the firm level are reported in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

[23]Further analysis, not yet included to this draft, shows that those patterns hold irrespective of ownership.

5.3 Currency choice

As the third dimension of firm-level choices, we consider the currency composition of external linkages. To do so, we calculate the firm-level shares of different currencies in total linkages and relate them to the size distribution, conditional on sector, ownership, and year fixed effects. Table 8 shows the results.

First, we consider CA flows. Unfortunately, a currency breakdown is only available for cross-border goods trade. We caution that our results may not extend to entire CA flows. Nevertheless, Panel A of Table 8 shows systematic differences in currency use across the size distribution. A 1 pp increase in the percentile of the size distribution is associated with a 0.09 pp share decline of CHF-denominated receipts. In contrast, the USD (other currency) share in receipts increases by 0.04 pp (0.03 pp). On the expenses side, a 1 pp increase in the percentile of the size distribution is associated with a 0.04 pp share increase in CHF-denominated expenses and a 0.01 pp share increase in USD denominated expenses. In contrast, the share in EUR-denominated expenses decreases by 0.06 pp. These results echo a large literature on the implications of invoicing currency for trade dynamics, exchange rate pass-thorough, and external adjustment (Gopinath et al., 2010; Amiti et al., 2014), including contributions using the Swiss customs data (e.g., Bonadio et al., 2020).

Panel B of Table 8 turns to the IIP. On the asset side, a 1 pp increase in the percentile of the size distribution is associated with a 0.07 pp share decline of CHF-denominated and a 0.43 pp share decline of EUR-denominated positions in total assets, respectively. In contrast, shares in USD-denominated and other-currency-denominated positions are higher by 0.20 pp and 0.27 pp, respectively. On the liability side, a 1 pp increase in the percentile of the size distribution is associated with a marked 0.44 pp share decline of CHF-denominated positions. In contrast, shares in USD-denominated, EUR-denominated, and other-currency-denominated positions in total liabilities increase by 0.28 pp, 0.08 pp, and 0.08 pp, respectively. This finding is striking as it illustrates that large firms are significantly different from small firms in their currency exposures. In particular, large firms denominate a smaller fraction of their assets and liabilities in domestic currency (CHF), instead have a larger fraction of their assets and liabilities in the globally dominant currency (USD). Consequently, they are significantly more exposed to currency risk on their balance sheet.[24]

To examine a possible currency mismatch on firms' external positions, we depict the net currency exposure along the firm size distribution in Figure 8a. The net CHF position is calculated as CHF-denominated assets minus CHF-denominated liabilities. All other foreign currency positions are combined together. The figure clearly illustrates that large

[24]Ongoing work further investigates the role of ownership in these patterns. Preliminary results, not yet included to this version of the paper, suggest that the results hold for subsamples based on ownerships (Swiss, US, Euro area, and other.) although estimates are less precisely estimated.

Table 8: Currency composition across the firm size distribution

Panel A: CA	Receipts				Expenses			
	(1) CHF	(2) USD	(3) EUR	(4) Other	(5) CHF	(6) USD	(7) EUR	(8) Other
Percentile	-0.09***	0.04***	0.02	0.03***	0.04***	0.01***	-0.06***	0.01***
	(0.017)	(0.007)	(0.015)	(0.003)	(0.008)	(0.005)	(0.009)	(0.002)
Observations	823279	823279	823279	823279	1256206	1256206	1256206	1256206
Adjusted R^2	0.12	0.18	0.20	0.07	0.13	0.26	0.24	0.17

Panel B: IIP	Assets				Liabilities			
	(1) CHF	(2) USD	(3) EUR	(4) Other	(5) CHF	(6) USD	(7) EUR	(8) Other
Percentile	-0.07**	0.20***	-0.43***	0.27***	-0.44***	0.28***	0.08***	0.08***
	(0.032)	(0.021)	(0.034)	(0.017)	(0.043)	(0.021)	(0.024)	(0.009)
Observations	196355	196355	196355	196355	174001	174001	174001	174001
Adjusted R^2	0.18	0.36	0.43	0.37	0.34	0.39	0.31	0.21

Notes: The dependent variable is the share of currency c in firm i's at time t transactions or positions vis-à-vis partner country c for accounting entry d, $X^d_{ipct}/(\sum_c X^d_{icpt})$, where $X^d_{ipct} = \sum_s X^d_{ispct}$. The regression includes sector (4-digit level), ownership, year and partner country fixed effects. Standard errors clustered at the firm level are reported in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

firms have a sizable net asset position denominated in foreign currencies, while they have substantial net liabilities in Swiss franc. As such large firms are heavily exposed to valuation losses due to the currency composition of their external balance sheets and the trend appreciation of the CHF in the long run. Firms in the top percentile hold a net asset position in foreign currencies of about CHF 400 billion, while they have a net liability position in CHF of almost CHF 1 trillion.

Next, we calculate cumulated valuation changes in the IIP due to exchange rate changes for each firm i over time t, following equation (8).

$$VC(\varepsilon)^d_{iscpt} = IIP^d_{iscpt-1}\Big(\frac{\varepsilon_{ct}}{\varepsilon_{ct-1}} - 1\Big) + CF^d_{iscpt}\Big(\frac{\varepsilon_{ct}}{\bar{\varepsilon}_{ct}} - 1\Big), \tag{8}$$

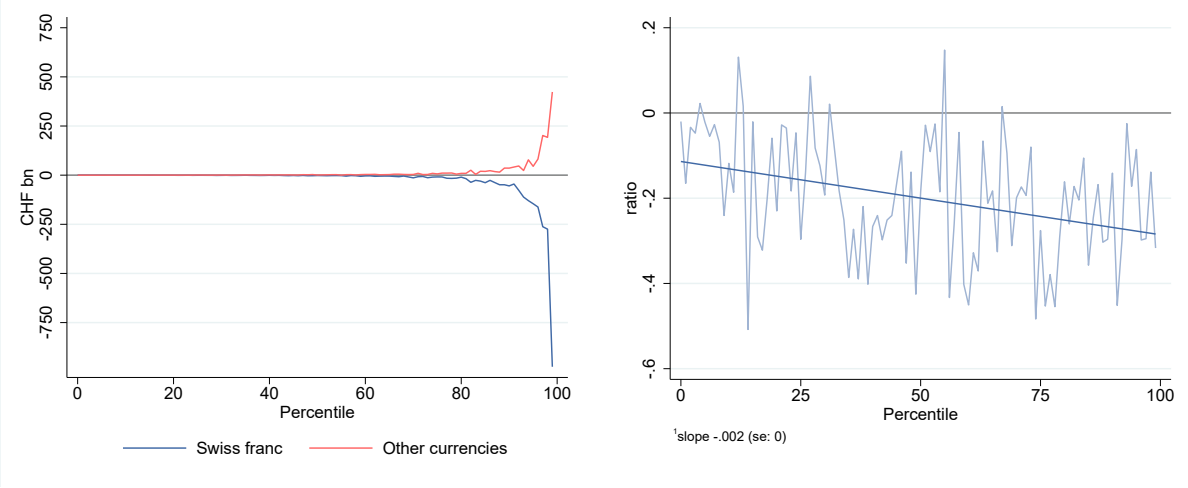
where s denotes subcomponent, c denotes currency, and d denotes direction of the IIP. In addition, ε_{ct} stands for the exchange rate of currency c at time t, CF stands for capital flows during t, and $\bar{\varepsilon}_{ct}$ stands for the average exchange rate during t.

Figure 8b shows the cumulated valuation changes between 2017 and 2024 for the whole IIP along the firm size distribution. As expected, large firms have been subject to larger valuation losses, given their substantial net liabilities in the structurally appreciating CHF as depicted in Panel B of Table 8 and Figure 8a.

The stark concentration of valuation changes among large firms is remarkable. Given the substantial aggregate currency exposures as documented in (Benetrix et al., 2020) and

the importance of valuation changes in external adjustment (Gourinchas and Rey, 2014), we show that valuation losses are in fact not an economy-wide phenomenon. Instead, the largest firms are the most exposed to foreign currencies and incur substantial revaluation on their balance sheet when exchange rates move.

Figure 8: Net currency exposure and valuation losses



(a) Net exposure by currency

(b) Valuation changes

Notes: Figure (a) shows the NIIP over percentile between the domestic currency and foreign currencies. Figure (b) shows the ratio of exchange change valuation changes, cumulated between 2017 and 2024, over average stocks across percentiles of the size distribution. If the currency is not identified (currencies other than CHF, USD, and EUR), then we assume that the stock is denominated in the currency of the country where the stock is invested in or owed to.

6 Conclusion

We combine administrative data, survey data, and micro-level estimates to construct a comprehensive and consistent firm-level dataset covering the four macroeconomic aggregates of the external sector, namely the current account, the international investment position, capital flows, and valuation changes. This dataset allows to document three sets of new empirical facts. First, we find strong interdependencies in external sector outcomes at the firm level. Importantly, granularity is pervasive: a few large firms drive gross and net outcomes in all aspects of the external sector. Second, external sector aggregates are driven by large firms with specific characteristics. In particular, larger firms are larger in terms of employment, have more complex firm structures and tend to be foreign-owned. In addition, the distribution of economic activities is not constant over the firm size distribution. Third, we show that firm along the firm size distribution make different choices in terms of the composition of external sector linkages, country exposures, and currency exposure.

These new empirical facts have important implications for our understanding of the external sector. With the marked expansion of international real and financial linkages over recent decades (Yi, 2003; Hummels and Klenow, 2005; Lane and Milesi-Ferretti, 2018), policy focus has shifted on external sector developments (IMF, 2026). While micro-level data and empirical evidence are widely available for small pockets of the external sector, they are not sufficient to understand the full external sector which encompasses a much wider set of activities and financial linkages (Wicht, 2026). Our results highlight the strong interpendencies in the external sector and show that a micro-level perspective is essential to better understand the drivers of external sector developments, assess vulnerabilities vis-à-vis trading partners and currencies, and design effective policy responses to shocks and distortions.

To the best of our knowledge, this is the first dataset covering a country's external sector in such granularity and comprehensiveness and the first attempt at documenting the granularity and heterogeneity behind the real and financial aggregates in a consistent setup. More broadly, this dataset offers opportunities for a wide range for further research such as hedging behavior of firms in trade and foreign investment, geoeconomic fragmentation, or the impact of monetary policy on the external sector.

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A Data appendix

A.1 Micro-level sources

A.1.1 BOP/IIP micro-level data

We rely on four sources of micro-level BOP/IIP data:

- **Customs data:** The Federal Office for Customs and Border Security (FOCBS) provides the administrative dataset covering all goods imports and exports of Swiss firms that pass through Swiss borders. The data is available at a daily frequency and includes a full country breakdown, currency breakdown (CHF, EUR, USD, other European currencies, other non-European currencies), and goods breakdown at the HS 8-digit tariff level. We distinguish between the business cycle total (total 1) and the general total (total 2). Total 2 comprises all foreign trade passing through customs, while total 1 excludes trade in precious metals, precious stones and gems, works of art and antiques. The customs data is available with a firm identifier (UID) starting in 2016.

- **CA surveys:** The SNB CA surveys, also known as CAx surveys, cover cross-border trade in goods (excluding foreign trade as recorded by the Swiss Customs), services, aspects of investment income not captured by the INV surveys and unilateral transfers, including capital transfers. There are four surveys: CAQG for companies from all sectors, CABQ for banks, CAIQ for insurance companies, and CATQ for transport companies. Surveys are partial, covering legal entities and companies whose transaction value exceeds CHF 100,000. They include a country breakdown for the majority of surveyed items, but no currency breakdown. Note that these surveys are no longer implemented as they were replaced by the CAS survey in 2023.

- **Cross-border capital linkages surveys:** The SNB cross-border linkages surveys, also known as the INV surveys, comprise three surveys: INQ, INA, and INP. The INQ survey captures quarterly cross-border assets and liabilities (e.g., short-term and long-term debt, equity securities, claims and liabilities vis-à-vis third parties or related companies), derivatives, and investment income. The INA is an annual version of the INQ. The INP survey captures cross-border participation, thus is particularly relevant for direct investment equity. All three surveys are partial, covering legal entities and companies where the transaction value exceeds CHF 1 million per reporting item, or where the foreign assets or liabilities at the time of the survey exceed CHF 10 million per reporting item. All reporting entities are required to fill in the INP survey, but submit either the INA or the INQ survey. The INV surveys include a currency and country breakdown for most items. If not

part of the survey, transactions relative to stocks surveyed by INV are estimated at the reporting entity level by SNB statistics. We take them as given.

- **Banking statistics surveys:** We use two banking statistics surveys. First, we use the MONA_B survey, one of the SNB's comprehensive monthly balance sheet surveys. The survey is partial, focusing on bank offices whose balance sheet total and fiduciary business combined exceed CHF 500 million. This survey provides a breakdown of stocks by residual maturity, by currency, and by customer residence (in Switzerland or abroad). For our purposes, we only consider the cross-border aspect of the balance sheet data. Second, we use the quarterly locational banking statistics survey (EURO2). This quarterly survey is compiled by the SNB and is the basis for the BIS locational banking statistics. It is partial, covering bank offices whose aggregated total of assets and fiduciary assets vis-à-vis other countries or whose aggregated total of liabilities and fiduciary liabilities vis-à-vis other countries exceeds CHF 1 billion. We use parts of the EURO2 on loans and liquid assets, deposits, and debt securities held. Importantly, EURO2 provides a full country breakdown of stocks. As done in official statistics, we use EURO2 to create a country breakdown of MONA_B data. If banks are covered in both surveys, we create a bank-specific country breakdown. If banks are only covered by MONA_B, we use the average country breakdown across all EURO2 banks.

A.1.2 Dun & Bradstreet data

The Dun & Bradstreet data allows us to link the multiple micro-level data sources and build consolidated micro-level BOP/IIP data. As shown in Table A1, the sample from Dun & Bradstreet comprises 13'090 distinct firms between 2016 and 2024, out of which about 10'258 are ultimately Swiss-owned. firms cover 51'763 entities. On average, a firm is constituted of 1.2 entities. The median firm is constituted by one entity, while the largest firms include 42 entities.

The D&B data further provides entity-level characteristics on employment, sector of activity (six-digit NOGA code) and location (zip code). We construct firm-level characteristics with the following procedures. firm-level employment is simply the sum of all employees across entities. firm-level activity is the NOGA code generating the most employment across entities. Similarly, we assign a main location to the firm based on the zip code generating the most employment across entities. We are able to construct firm-level employment for 86.1% of firms. The average firm employs 128 workers. The distribution of workers per firm is skewed, with 16 workers for the median firm and 70'878 workers for the largest firm. Similarly, a sector of activity can be constructed for 93% of firms. Figure A1a shows the top twenty sectors, defined as two-digit NOGA codes, plus composites of other sectors. In contrast, we are able to assign a location for all firms in

Table A1: Summary statistics of Dun & Bradstreet data

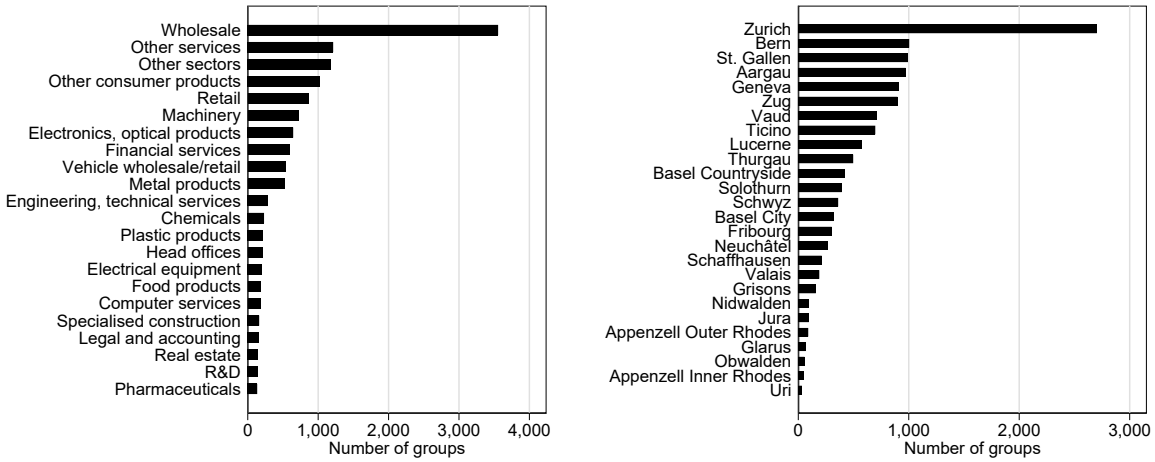
Ownership structure					
N. firms	N. Swiss firms	Entities per firm			
		N. entities	Mean	Median	Max
13,090	10258	15,763	1.2	1	42

firm-level metadata					
Employment				NOGA code	Location
Coverage (%)	Mean	Median	Max	Coverage (%)	Coverage (%)
86.1	128	16	70,878	93	100

Note: This table summarizes the main characteristics of the Dun & Bradstreet data, both in terms of ownership structure and metadata.

the sample. Figure A1b reports the distribution of firms across cantons. Zurich has the largest count of firms.

Figure A1: Firm-level characteristics



(a) Activity

(b) Location

Notes: Figure (a) shows the number of firms per sector, defined as two-digit NOGA codes. We report the twenty largest sectors and firm the rest in composites (other manufacturing, other services, and other sectors). Figure (b) reports the number of firms per canton.

A.2 Details of the labour income estimation

As described in the main text, we use estimations if micro-level data on specific BOP/IIP components is not readily available or does not exist at the micro-level.

First, we estimate the median yearly salary[25] w at time t of a cross-border worker (CB) by sector s and canton c as:

$$w_{sct}^{CB} = \frac{w_{sct}}{w_{st}} \times w_{st}^{CB}, \tag{9}$$

where w_{sct} is the median wage in sector s and canton c, w_{st} is the median wage in sector s in Switzerland, and w_{st}^{CB} is the median wage of a cross-border worker in sector s. Wage data come from the SFSO Swiss Earnings Structure Survey and provide a breakdown across industries (close to a two-digit NOGA code level). The datasets are available for 2016, 2018, 2020, and 2022. We use a simple linear interpolation to fill in missing years. In case the median wage is not available, we use the median wage of all workers, adjusting for the average deviation in wages between cross-border and Swiss employees.

Next, we estimate yearly labour income (li) by economic activity s and canton c. Formally, we calculate it as:

$$li_{sct} = w_{sct}^{CB} \times N_{sct}^{CB} - EF_{sct}^{CB}, \tag{10}$$

where w_{sct}^{CB} comes from equation (9). The number of cross-border workers in sector s, canton c, and year t, N_{sct}^{CB} comes from the SFSO Cross-Border Commuter Statistics, which provide quarterly information on the number of foreign cross-border commuters working in Switzerland and their main characteristics. Finally, EF_{sct}^{CB} is an estimate of excess furlough payments to cross-border workers to account for the Covid-19 pandemic:

$$EF_{sct}^{CB} = EF_{sct} \times \frac{w_{sct}^{CB} N_{sct}^{CB}}{w_{sct} N_{sct}}. \tag{11}$$

and

$$EF_{sct} = F_{sct} - \bar{F}_{sct<2020} \tag{12}$$

where $\bar{F}_{sct<2020}$ is the average furlough contribution prior to 2020. Furlough contributions F_{sct} are published by the SECO.

Finally, we estimate labour income expenses of firm i in canton c within sector s estimates as:

$$li_{isct} = \frac{N_{isct}}{N_{sct}} \times li_{sct}. \tag{13}$$

A.3 Consolidation of BOP / IIP components

We closely follow SNB internal guidelines to construct BOP/IIP components using the micro-level data and estimations. In doing so, we adhere to official statistics. Table A2 gives an overview of the BOP/IIP components and their underlying data sources. If we

[25]Because mean salary is not available in the data source. We, therefore, will be underestimating labor income.

depart from official statistics, details on any assumptions are provided here. This section draws significantly from publicly available SNB documentation. Table A2 summarizes the data sources underlying each BOP/IIP component.

A.3.1 Current account

The CA is split in four main components : goods, services, primary income, and secondary income. We give here details on each subcomponent.

- **Goods - cross-border goods trade:** Cross-border goods trade corresponds to total 1, which encompasses all foreign trade passing through Swiss customs with the exception of precious metals, precious stones and gems, works of art and antiques. Importantly, non-monetary gold trade, which accounts for a major share of nominal trade, is excluded. Total 1 is preferred by economists to study Swiss trade as trade in non-monetary gold is volatile and largely irrelevant for Switzerland's business cycle.

- **Goods - precious metals:** Precious metals contribute to the difference between total 2 and total 1. It encompasses tariffs (HS 8-digit level) for precious metals, precious stones and gems, works of art and antiques. Trade in non-monetary gold is the key driver of this subcomponent. It is important to isolate trade in precious metals from other types of cross-border goods trade in a specific subcomponent given the distorting impact of gold trade on Swiss external sector indicators (Wicht, 2025).

- **Goods - trade supplements:** Supplements to foreign trade comprise additions and subtractions to trade. Within our panel, additions come from the CAx surveys and comprise goods acquired in ports. Additions include a country breakdown, but no currency breakdown. Subtractions are constructed using the customs data. They include returns, re-exports and re-imports without change of ownership after processing, and CIF/FOB adjustment on imports. As for general cross-border trade, a country and currency breakdown is available. Following statistical conventions, subtractions are deducted from trade and are thus recorded as negative values.

- **Goods - merchanting:** Merchanting is defined as the purchases of goods outside of Switzerland and the sale of those goods outside of Switzerland, without transformation of those goods and without the goods crossing the Swiss border. It is thus part of goods trade. In official statistics, merchanting receipts are defined as net merchanting – that is, the difference between sales and purchases – while merchanting expenses do not exist as a statistical concept. Merchanting is available with a country breakdown, but no currency breakdown.

- **Services - finance and insurance:** Financial services cover services provided by banks and other financial institutions (e.g., commissions for financial intermediation, brokerage fees). Insurance services cover the service aspect of the premium business of private insurance companies and auxiliary insurance services (e.g., commission for insurance brokerage). These services come with a country breakdown, but no currency breakdown.

- **Services - business services:** We group, under business services, several types of services that are likely to be included in the global value chain of large MNEs. These include research and development services, licence fees (charges for the use of intellectual property rights), manufacturing services, and other business services (e.g., consulting). The CAx surveys are the main source of data for those services. A country breakdown is available, but no currency breakdown. A part of the manufacturing services are estimated based on the customs data, specifically as an estimate derived from processing traffic. We follow internal guidelines to construct firm-level estimates. For this subset of business services, a country and a currency breakdown are available.

- **Services - other services:** Other services encompass all other types of services available from the CAx surveys, that is, transport services (e.g., passenger, freight over air, rail, road and other modes of transport), telecommunication, computer and information services (e.g., hardware and software related services, broadcast of sound, images, or data) and personal, cultural, and recreational services. These services come with a country breakdown, but no currency breakdown.

- **Primary income - investment income:** Three categories of investment income are used in CA statistics: direct investment income covers dividends and retained earnings on equity and interest associated with debt, portfolio investment income covers income on equity stocks and debt securities, and other investment income covers income on intrabank loans. The cross-border linkages surveys are the main source for investment income, but are complemented with some information from the CAx surveys.

- **Secondary income:** secondary income includes unilateral transfers between residents and non-residents, such as insurance claims payments and premium income associated with the insurance sector.

A.3.2 Capital flows / IIP / Valuation changes

Capital flows, stocks and changes on stocks are split into three main components: direct investment, portfolio investment, and other investment.

- **Direct investment**: Direct investment comprises investments that grant at least 10% of voting stock of a company to an investor. Direct investment thus typically reflects intrafirm investments, excluding those of banks and finance companies. We distinguish between equity participations and debt.
  - **Equity:** The INV surveys are the unique source of data for direct investment equity. Direct investment equity stocks are available with a country breakdown, but no currency breakdown. We assume that direct investment equity liabilities are denominated in Swiss francs, while assets are denominated in the currency of the counterparty country. To simplify, we do not distinguish between equity transactions and retained earnings but include both to capital flows. In transactions, we again assume that retained earnings outflows are denominated in Swiss francs, and that inflows are denominated in the currency of the counterparty country.
  - **Debt:** The INV surveys are also the source of data for direct investment debt and offer both a currency and country breakdown.
- **Portfolio investment:** Portfolio investment comprises investments that grant less than 10% of voting stock of a company to an investor. We distinguish between equity participations and debt.
  - **Equity:** Switzerland does not have security-by-security data. Therefore, PI equity liabilities (as well as expenses and valuation changes) of the firms in our sample are estimated using aggregate data on banks' custody accounts and firm-level data from LSEG (see Section 2.3).
  - **Debt:** PI debt comes from INV surveys and is available with a country and currency breakdown. PI debt claims further comes from the EURO2 banking statistics survey, which reports banks' trading books. We further complement firm-level debt data from INV surveys, with micro-level data of INV surveys on equity holdings not in bank's custody accounts and redomiciliations.
- **Other investment:** Other investment includes all investment not allocated to direct investment, portfolio investment, or reserve assets. Typically, intrafirm lending and borrowing by banks and finance companies is included in this components because this lending does not have the character of a direct investment.

Table A2: Data sources

Component	Source
Current account	
Goods	
Cross-border goods trade	FOCBS customs data
Precious metals	FOCBS customs data
Trade supplements	FOCBS customs data, SNB CA surveys
Merchanting	SNB CA surveys
Services	
Finance and insurance	SNB CA surveys
Business services	FOCBS customs data, SNB CA surveys
Other services	SNB CA surveys
Primary income	
Labour income	SFSO, SECO, Dun & Bradstreet
Direct investment	SNB INV surveys
Portfolio investment	SNB CA surveys, SNB INV surveys, LSEG
Other investment	SNB CA surveys, SNB INV surveys
Secondary income	SNB CA surveys
Financial account / IIP / valuation changes	
Direct investment	
DI equity	SNB INV surveys
DI debt	SNB INV surveys
Portfolio investment	
PI debt	SNB INV surveys, SNB BSTA surveys, BIS exchange rate data, Barclays bond indices data
PI equity	SNB INV surveys, LSEG
Other investment	SNB INV surveys, SNB BSTA surveys, BIS exchange rate data

Note: This tables details the breakdown of BOP/IIP aggregates and the underlying data sources for the construction of micro-level data.

A.3.3 Final dataset

Table A3 summarizes the coverage of the panel (micro-level data plus estimations) by components of the CA and the IIP. Importantly, the panel excludes the capital account and derivatives for simplicity. We also abstract from errors and omissions, as they carry little economic importance.

Coverage is high but not perfect for three main reasons. First, we exclude the public sector. This is particularly visible in the low coverage for reserve assets and insurance business. Second, we exclude activities of Swiss households or done on behalf of Swiss households. Thus, we exclude their portfolio equity and debt assets, as well as labour income receipts. Third, the Dun & Bradstreet data, which allow us to link the micro-level data, only covers the largest agents in cross-border goods trade. We exclude thus imports and exports generated by smaller agents. Finally, small discrepancies are entirely possible due to data vintages and the involved data work.

Table A4 details the underlying data source for each subcomponent as well as the availability of the country and currency breakdown.

Table A5 reports the final country breakdown.

Table A3: Coverage breakdown

Current account		
Goods	93.3	89.3
Cross-border goods trade	94.6	90.9
Precious metals	91.9	95.6
Additions	58.0	7.8
Subtractions	84.1	91.0
Merchanting	88.6	
Services	80.4	84.4
Finance and insurance	78.2	68.3
Business services	97.3	98.6
Other services	61.9	64.5
Primary income	72.2	82.3
Labour income	0.0	14.1
Direct investment	97.7	98.4
Portfolio investment	3.5	98.8
Other investment	98.7	68.9
Reserve assets	0.0	
Secondary income	68.1	60.1
IIP		
Direct investment	96.4	95.1
DI equity	99.4	97.9
DI debt	89.9	89.5
Portfolio investment	8.5	97.1
PI debt	16.9	26.9
PI equity	1.8	106.6
Other investment	81.1	70.4
Reserves	0.0	
Derivatives	0.0	0.0

Notes: This table reports the breakdown of coverage across subcomponents of the CA and of the IIP.

Table A4: Estimation methods, and breakdowns

Component	Data source	Breakdown availability	
		Country	Currency
Current account			
Goods			
Cross-border goods trade	Micro	✓	✓
Precious metals	Micro	✓	✓
Trade supplements	Micro	✓	Partial
Merchanting	Micro	✓	×
Services			
Finance and insurance	Micro	✓	×
Business services	Micro	✓	Partial
Other services	Micro	✓	×
Primary income			
Labour income	Estimation	×	✓
Direct investment	Micro	✓	×
Portfolio investment	Mix	✓	Partial
Other investment	Micro	✓	×
Secondary income	Micro	✓	×
Financial account			
Direct investment			
DI equity	Micro	✓	✓
DI debt	Micro	✓	✓
Portfolio investment			
PI debt	Micro	✓	✓
PI equity	Mix	✓	✓
Other investment	Micro	✓	✓
IIP			
Direct investment			
DI equity	Micro	✓	✓
DI debt	Micro	✓	✓
Portfolio investment			
PI debt	Micro	✓	✓
PI equity	Mix	✓	✓
Other investment	Micro	✓	✓
Valuation changes			
Direct investment			
DI equity	Estimation	✓	✓
DI debt	Estimation	✓	✓
Portfolio investment			
PI debt	Estimation	✓	✓
PI equity	Estimation	✓	✓
Other investment	Estimation	✓	✓

Notes: Data source indicates whether the component relies on micro-level data (micro), on estimations, or both (mix). Breakdown availability indicates whether the component comes with a full (✓), partial, or no country / currency breakdown (×).

Table A5: Country breakdown

Single countries
Argentina, Australia, Austria, Belgium, Brazil, Bulgaria, Canada, Chile, China, Croatia, Cyprus, Czech Republic, Denmark, Egypt, Estonia, Finland, France, Germany, Greece, Greenland, Hong Kong, Hungary, Iceland, India, Indonesia, Iran, Ireland, Israel, Italy, Japan, Korea, Latvia, Lithuania, Luxembourg, Malaysia, Malta, Mexico, Morocco, Namibia, Netherlands, New Zealand, Nigeria, Norway, Philippines, Poland, Portugal, Romania, Russia, Singapore, Slovakia, Slovenia, South Africa, Spain, Sweden, Taiwan, Thailand, Turkey, UK, US, Uruguay, Venezuela
Offshore financial centers aggregate
Anguilla, Bahamas, Barbados, Bermuda, British Virgin Islands, Cayman Islands, Curacao, Guernsey, Hong Kong, Isle of Man, Jersey, Mauritius, Marshall Islands, Macau, Montserrat, Singapore.
Others
International organizations, Rest of the world (all countries not listed above).

Notes: This table reports the country breakdown.

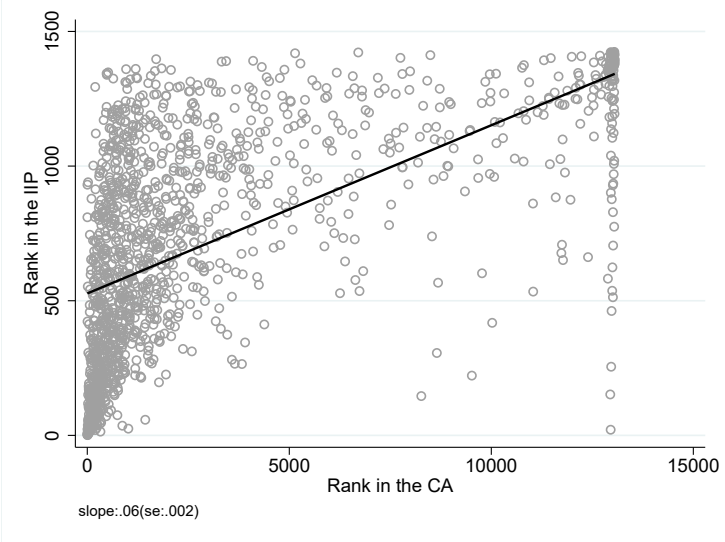
B Results appendix

Table B1: Robustness–Composition

	Receipts				Expenses		
	(1) Goods	(2) Merchanting	(3) Services	(4) Income	(5) Goods	(6) Services	(7) Income
Percentile	-0.19***	0.07***	-0.01	0.13***	-0.23***	0.19***	0.04
	(0.038)	(0.016)	(0.039)	(0.034)	(0.037)	(0.033)	(0.038)
Observations	12494	12494	12494	12494	13372	13372	13372
Adjusted R^2	0.47	0.43	0.59	0.40	0.32	0.42	0.38

Notes: The dependent variable is the share of subcomponent s in firm i's at time t transactions or positions, $X_{ist}/(\sum_s X_{ist})$, where $X_{ist} = \sum_{pc} X_{ispct}$. The regression includes sector (4-digit level), ownership, and year fixed effects. All firms are included, including those only present in the administrative customs data. Standard errors clustered at the firm level are reported in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Figure B1: Full rank correlation between CA and IIP



Notes: This chart shows the correlation of ranks in the CA and IIP for all firms in the sample.

Table B2: Spearman Rank Correlations

	CA			IIP	
	(1) Full	(2) Excl. goods	(3) Excl. goods & inv. inc.	(4) Full	(5) Excl. FDI
CA	1.000				
–"–, excl. goods	0.891***	1.000			
–"–, excl. goods and inv. inc.	0.780***	0.765***	1.000		
IIP	0.714***	0.819***	0.526***	1.000	
–"–, excl. FDI	0.456***	0.567***	0.394***	0.769***	1.000

Notes: The table reports pairwise Spearman rank correlations between firm-level ranks across different balance of payments aggregates. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table B3: Robustness: gravity

Panel A: Extensive margin	CA			IIP	
	(1) Full	(2) No goods	(3) No goods/income	(4) Full	(5) No FDI
Percentile	26.431***	24.095***	24.238***	24.106***	17.878***
	(0.363)	(0.960)	(1.132)	(1.555)	(1.797)
Observations	102540	19380	14719	10267	7085
R^2	0.474	0.447	0.512	0.620	0.690

Panel B: Intensive margin	CA			IIP	
	(1) Full	(2) No goods	(3) No goods/income	(4) Full	(5) No FDI
Percentile	0.780***	0.797***	0.900***	0.782***	1.136***
	(0.067)	(0.170)	(0.191)	(0.204)	(0.215)
Observations	102540	19380	14719	10267	7085
R^2	0.213	0.190	0.214	0.331	0.309

Notes: Dependent variables are the following. Panel A: number of partner countries; Panel B: average weighted distance to partner countries (1000km). The regressor is the percentile of the size distribution. Columns (2) and (4) exclude goods trade and FDI, respectively. Column (3) excludes goods trade and investment income. Includes year, sector, and ownership fixed effects. Clustered standard errors at firm level are reported in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$