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How expected inflation distorts the current account and the valuation effect☆

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ABSTRACT

We show that the current account balance (CA) is systematically distorted by an *inflation effect*, which arises because income on debt is recorded as nominal interest in the currency of denomination. Since nominal interest includes compensations for expected inflation, increases in the latter must impact the CA. Guided by the relevant international accounting rules, we impute the *inflation effect* for 50 economies between 1991 and 2017. When adjusting for the *inflation effect*, the absolute value of yearly CAs drops by 0.13% of GDP on average. Over the full period, the reduction is a sizable 22.85% of initial GDP for the average country (26.4% for the U.S.). As the flip side of the CA distortions, the *inflation effect* contributes systematically to the well-known *valuation effect* of net foreign assets. For the average country, the *inflation effect* accounts for a twelfth of the valuation effect, for the U.S., it accounts for well over a half.

1. Introduction

Ideally, the current account should measure the change in an economy's net real claims on foreigners. In practice, however, [it is] measured in nominal terms... Obstfeld and Rogoff 1996, p. 18

The two principal components of a country's current account balance (CA) are net exports and net income on foreign investment. The CA indicates how much countries save abroad (when it is positive) or indebt themselves vis-à-vis foreigners (when negative) and is used to identify global imbalances or 'unfair currency practices' in policy circles.[1] Academic work on the CA and global imbalances abounds.[2]

This paper shows how expected inflation – a genuinely nominal variable – systematically distorts the CA. The first part of our paper shows that this distortion, which we call the *inflation effect*, arises because international accounting rules require the CA to record nominal interest income instead of real income (whence our initial quote). The second part shows that the

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[1] See, for example, Lane and Milesi-Ferretti (2007b). Policy makers use the CA as a measure of 'external competitiveness' (e.g., IMF (2017)) and to define 'unfair currency practices' (see the U.S. Trade Facilitation and Trade Enforcement Act of 2015 and the Trade Act of 1974 – Congress (2016)).

[2] See Gourinchas and Rey (2014) for a comprehensive literature review. For recent contributions, see Kehoe et al. (2018) and Ikeda and Phan (2019).

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inflation effect is large, that it systematically distorts the CA and thus contributes the well-known *valuation effect*, defined as the difference between the CA and the change in net international investment positions.

The first part of the paper draws on the IMF's Balance of Payments and International Investment Position Manual (BPM; IMF 2009) to discuss and formalize the relevant international accounting rules. According to these accounting rules, interest on investment in debt instruments is recorded nominally in the currency of denomination and therefore includes compensation for expected inflation. E.g., the compensation for foreign debt investments is larger for higher foreign inflation, even after converting it to the domestic currency in which the CA is recorded.

The mechanism of the *inflation effect* is quickly exemplified through a hypothetical world economy of two countries that trade riskless bonds. The first country has an inflation rate of zero and the second of 100%. Under perfect foresight, the bonds of both countries yield identical real returns (normalized to zero), but local nominal rates of return differ by 100 percentage points. The inflation differential requires the currency of the second country to depreciate by the factor 2. In that world, the first country collects returns to its foreign investments of 100% when expressed in foreign currency and of 50% when converted to domestic currency (100% times the factor of depreciation). These returns appear as receivables in the first country's CA.[3] At the same time, the country's own nominal returns are zero, making both its net international investment income and its CA positive. The negative CA of the second country provides a mirror image of this situation. For comparison, in an alternative world with zero inflation throughout, both CAs would be zero. In slightly richer settings with positive inflation in both countries, inflation in both currency areas distorts the income of foreign assets (*receivables*) as well as the income of foreign liabilities (*payables*). We coin the term *inflation effect* for the obvious difference between the net foreign income in a positive-inflation world and net foreign income in a zero-inflation world. The *inflation effect* distorts recorded income on cross-border investments and thus the CA

The flip side of the *inflation effect* for the CA is a compensating change in the intensively studied valuation effect, defined as the difference between the change in a country's net international investment position (NIIP) and its CA.[4] In our example above of positive inflation, the first country suffers real valuation losses on the principle of its foreign investment when expressed in domestic currency, since the exchange-rate change cuts the value of the principle in half. By shifting value from the principle to investment income, the *inflation effect* systematically affects the CA and the valuation effect simultaneously, decreasing the one at the expense of the other.

It may appear disconcerting *per se* that inflation systematically impacts the CA. Whether or not these distortions are of practical relevance, however, is an empirical question. Our paper therefore assesses how the *inflation effect* distorts international investment income, as recorded in the CA, in a set of 50 countries for the years 1991 to 2017.[5] To do this, we proceed in three steps. First, we show that the key mechanics that drive the *inflation effect* surface in Balance of Payment (BOP) data: expected foreign inflation correlates systematically with the BOP-measured rate of returns, defined as recorded income over gross initial investment positions. In accordance with the accounting rules, the correlation is strong for debt instruments but weak for non-debt assets.

Second, we adjust the CAs for the countries in our sample by inferring what their CAs would look like under zero inflation.[6] The absolute value of the adjustments is economically important. They reduce the absolute value of the yearly CA by a moderate 0.13% of GDP (from 3.95% to 3.82%) on average. Over the whole period, however, the adjustments are large and reduce the absolute size of the cumulative CA by about one-seventh for the average country (from 156.47% to 133.62%).[7]

Third, we show that the *inflation effect* systematically inflates the valuation effect. While our yearly adjustments of the valuation effects reduce their absolute value marginally from 6.62% to 6.59% of GDP, the contributions are large at longer horizons: over the full period, adjusting for the *inflation effect* reduces the magnitude of the valuation effect from 86.47 % of initial GDP to 79.16% – a twelfth of its absolute value.

The adjustments for the U.S. are particularly pronounced: while the CA deficit falls from 2.84% to 2.31% of GDP for the average year, the cumulative CA decreases by 26.4% of initial GDP, from 120.74% to 94.34% over the whole period. Accordingly, the cumulative valuation effect decreases from 45.21% of initial GDP to 18.81%, or by well over one-half. The case of the U.S. also illustrates that the importance of the *inflation effect* increased in recent years, because the decline in expected inflation was overcompensated by an increase of cross-border holdings of debt instruments.

This paper connects to several literatures. Closest to our paper are Fischer et al. (2019) and Adler et al. (2019), who show that even when CAs are flawlessly reported, international accounting principles generate systematic distortions.[8]

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[3] Real valuation losses on the principle guarantee that real returns are zero.

[4] Changes in net foreign assets unexplained by the CA are valuation changes by definition – see Gourinchas and Rey (2014). Of course, the *inflation effect* leaves the NIIP unchanged. In the words of Lane and Shambaugh (2010), "if all foreign assets were single-period foreign-currency bonds and all foreign liabilities were single-period domestic-currency bonds, uncovered interest rate parity would mean that all predictable movements in exchange rates would be exactly offset by shifts in net investment income."

[5] Time and country coverage are imposed by data restrictions.

[6] We thus approach the ideal measurement of the CAs, mentioned by Obstfeld and Rogoff (1996) in our initial quote.

[7] The fact that the absolute value of yearly CAs changes little due to this adjustment does not contradict the observation that the absolute value of the cumulative CA changes a lot. This is quickly exemplified: imagine a country that has a recorded CA of −10 in each year of a given decade, such that the average absolute value of the CA is 100. If the adjustment changes the CA to +10 every second year, the absolute value of yearly adjustments is unchanged, but the cumulative CA drops to zero.

[8] As with the effects shown in these two papers, the *inflation effect* is independent of the often large *errors and omissions* that necessarily arise in reality under imperfect statistical reporting.

Fischer et al. (2019) emphasize that the particular treatment of the retained earnings of portfolio investments implies a systematic distortion of recorded CAs, primarily those of financial centers. Adler et al. (2019) lay out a general framework of external accounts to reflect a wider range of measurement problems and estimate the various CA adjustments.[9] In line with these papers, our study focuses on systematic problems that arise due to prevailing accounting rules. We also connect to the literature that highlights the measurement problems of cross-border investment and interest payments. Previous work has explored various sources of such problems, such as unmeasured fractions of foreign assets (Hausmann and Sturzenegger, 2007), imperfect reporting procedures (e.g., Curcuru et al. 2008; Dias et al. 2014; and Linsi and Mügge 2019), and unreported assets due to tax avoidance (Zucman 2013 and Coppola et al. 2020). Despite this specific part of the literature dealing with the errors in recorded international investment positions, we nonetheless rely on the officially recorded statistics when computing the adjusted current account and valuation effects.[10]

By documenting the systematic effect of expected inflation on the CA, our paper also connects to the literature on global imbalances.[11] In search of the drivers of the CA, the early paradigm of intertemporal trade is proven to have little explanatory power (e.g., Nason and Rogers 2006; Chinn and Prasad 2003; Gruber and Kamin 2007; and Chinn and Ito 2008) and recent theoretical work has focused on determinants like financial openness, government budget balances, and precautionary savings (Caballero et al. 2008; and Mendoza et al. 2009; Alfaro et al. 2008), as well as economic stability and fiscal policy (Lane and Perotti 1998 and Fogli and Perri 2006). The nature of a country's CA, in turn, has different implications for the sustainability of CA deficits, the stability of the global financial system, and the risk of disorderly adjustments of global imbalances. For example, Curcuru et al. (2008) revise previous measures of the 'exorbitant privilege' and observe that their "finding of a relatively small returns differential between U.S. claims and liabilities means that one stabilizing aspect of the current international economic system is weaker than previously believed." Our paper, by contrast, shows that expected inflation produces part of the global imbalances and that, in particular, part of the U.S. CA deficit is an artifact of the large, negative U.S. net foreign position of debt instruments. It thus suggests that global imbalances are less pronounced than usually perceived and that the international economic system may indeed be stronger than generally perceived. At the same time, our findings support the views expressed in Borio and Disyatat (2011) and Lane and Milesi-Ferretti (2009), who advocate a more holistic approach to global imbalances than one that focuses narrowly on CAs. Borio and Disyatat (2011) suggest using of stocks measures (gross foreign assets positions) instead of CAs to identify the risks of global imbalances.[12] Lane and Milesi-Ferretti (2009) document that "price and exchange rate valuation gains arising from asset price developments and the U.S. dollar depreciation are still key to understanding the stability of the U.S. external position," thus suggesting that the CA alone allows only a partial assessment of global imbalances. We add to this literature by highlighting how a mechanical but novel accounting effect determines the CA. In doing so, we provide additional arguments for a mindful use of the CA as a measure of global imbalances, suggesting (together with Borio and Disyatat, 2011) that stock-based measures may constitute a more reliable metric.

An important part of the literature on global imbalances has focused on the valuation effect and its determinants (e.g., Lane and Milesi-Ferretti 2007b and Gourinchas and Rey 2014 and the references therein).[13] Our paper connects to these studies by highlighting the systematic effect of expected inflation on the valuation effect. Our contribution differs from earlier work not by describing novel characteristics of external rebalancing (as done in Lane and Shambaugh 2010 and Bénétrix et al. 2015) but instead by exposing a pure accounting distortion. Our paper also relates to prominent studies by Gourinchas and Rey (2007) and Devereux and Sutherland (2010), which emphasize the distinction between expected and unexpected returns to foreign assets. Gourinchas and Rey (2007) show that part of external adjustments of cyclical fluctuations materialize through differential rates of returns on foreign assets, which are, in turn, partly driven by expected exchange-rate changes. While Gourinchas and Rey (2007) focus on unanticipated fluctuations around long-term trends, our *inflation effect* rests on the deterministic component of inflation and materializes in a deterministic setup. Devereux and Sutherland (2010) use a real open macro model with incomplete markets and highlight the distinction between predictable and unpredictable valuation changes. In their framework, expected gains must equalize across countries at first order, ex-

[9] In their empirical assessments, the authors confirm that the distorting effects of inflation can be large. Our paper goes beyond (Adler et al., 2019) by tightly linking our methodology to the BPM accounting rules and by appropriately relying on expected (rather than realized) inflation in the quantitative assessment and by assessing the systematic link between inflation and the valuation effect.

[10] Since adjustments are computed through the product of expected inflation with (the debt component of) gross foreign assets and liabilities, mismeasurement of the latter must result in an imperfect adjustment term. We also point out, however, that there is an important distinction between implied errors for the adjusted CA and implied errors for the adjusted valuation effect itself. The former is relatively moderate even if errors of reported debt securities are large. For example, if reported debt securities fluctuated around the true values of, say, 100% of GDP by plus and minus 50 percentage points, these fluctuations would result in a proportional erroneous adjustment of 50% of GDP times the foreign expected inflation rate (say 50%*0.02 = 1% of GDP if foreign inflation is 2%). In the same scenario, the valuation effect would deviate by 100% of GDP on a yearly basis in addition (since the value of debt assets itself fluctuates from 150% to 50% of GDP). Our adjusted CA is thus less prone to be affected by errors in the measurement of the gross international investment position than the adjusted valuation effect. In sum, lacking an obvious and viable alternative, we opt for the pragmatic solution and rely on official, readily available data.

[11] The literature typically understands global imbalances as the sum of CA deficits and surpluses. For work related to the Great Financial Crisis, see, e.g., Bernanke 2005; Roubini and Setser 2005 and Laibson and Mollerstrom 2010).

[12] This point has already been discussed in Milesi-Ferretti and Razin (1996). See also Sauré (2017) and the references therein.

[13] Amid the growth of gross foreign asset positions, Lane and Milesi-Ferretti (2007b) were among the first to observe that "[d]ifferences between changes in net foreign assets and the current account balance are quite persistent in many countries." Gourinchas and Rey (2014) observe that "the current account represents an increasingly imperfect measure of the change in a country's net foreign asset position."

pected valuation gains must hence be small (of higher order).[14] Our *inflation effect* conceptually differs from these effects, as it merely changes the split of otherwise deterministic returns into recorded income and valuation effect, leaving real returns unaffected.

The remainder of the paper is structured as follows. Section 2 gives an overview of the international accounting principles, which induce a link between expected inflation and the CA. Section 3 formalizes the basic argument, thus laying the ground for our empirical and counterfactual exercises reported in Section 4. Section 5 concludes.

2. International accounting principles

This section summarizes the international accounting rules relevant for income on foreign investment, drawing on the IMF's Balance of Payments and International Investment Position Manual (IMF 2009) or BPM. This manual is the central reference for international balance-of-payments reporting, including those for the CA.

The *inflation effect* on the recorded CA, on which the current paper focuses, arises due to the specific accounting rules for interest-bearing instruments, so-called *Debt Instruments*.[15,16] These *Debt Instruments* largely consist of deposits, loans, and debt securities, all of which generate *Interest*.[17] This *Interest* is an important component of the CA and it is computed according to the BPM as follows.

Components of accruing interest. The CA records *Interest* accruing on *Debt Instruments*, which consists of two components, actual interest payments and valuation gains. This *Interest* "is recorded as accruing continuously over time to the creditor on the amount outstanding" (BPM 11.49). For example, zero-coupon bonds generate positive interest each year before maturity. A particularly simple accounting rule applies to the important class of traded debt instruments, the interest on which "is determined using the original yield-to-maturity" (BPM 11.52).

Such interest is calculated in nominal value, which requires a specification of the reference currency. The BPM specifies the use of currencies as follows.

Currency of denomination. Generally, *Interest* on *Debt Instruments* is defined in nominal terms in the currency in which the underlying financial contract is specified. Specifically, interest on the subcategory "[d]omestic-currency-denominated fixed-rate instruments […] is the difference between the sum of all debtors' payments and the funds the creditor makes available to the debtor." Interest on the next subcategory of "foreign currency fixed rate instruments" is defined in parallel, while "foreign currency is used as the currency of denomination." For those debt instruments, "[i]nterest expressed in foreign currency is to be converted into the domestic currency at the mid-point market exchange rate for the periods in which the interest accrues." For interest on the remaining subcategory of index-linked instruments, the BPM specifies that these "… debt instruments with both the amount to be paid at maturity and periodic payments linked to a foreign currency are classified and treated as though they are denominated in that foreign currency" (see BPM 11.50). For any of these *Debt Instruments* issued or linked to foreign currency, the nominal returns are "converted into the [reporting country's] currency at the mid-point market exchange rate for the periods in which the interest accrues" (BPM 11.50). In sum, whenever foreign *Debt Instruments* are denominated in a foreign currency, their interest is typically computed in that foreign currency and subsequently converted into local currency.

Apart from *Debt Instruments*, other classes of financial instruments contribute to cross-border investment, generating additional types of investment income. For completeness and comparison, we also review the accounting rules for income in other investment classes. The BPM distinguishes between two other broad classes of financial instruments: *Equity and Investment Fund Shares* and *Other Financial Assets and Liabilities*. The first of these two classes generates specific types of returns: *Equity* generates *Dividends, Reinvested Earnings* or *Distributed Income of Quasi-Corporations*, while *Investment Fund Shares* generate *Dividends* and *Reinvested Earnings*. The only income-generating asset in the remaining class of financial instruments, *Other Financial Assets and Liabilities* is *Monetary Gold*, which we will neglect in this analysis.[18]

Other income. Apart from *Interest*, the BOP Manual defines three types of investment income (BPM 11.8): *Dividends* and *Reinvested Earnings*, which differ somewhat in their accounting rules.

Regarding the date of recording, *Dividends* are recorded at the time the shares go ex-dividend (BPM 11.31) and can arise from either Direct Investment (DI) or Portfolio Investment (PI) (BPM 11.32). Reinvested earnings are recorded in the period in which they accrue (BPM 11.43) and are excluded from income on PI, but included in income on DI.[19]

The BPM gives little indication regarding the role of exchange rates and currencies for the calculation procedures of these types of income. The manual explicitly excludes "any realized or unrealized holding gains or losses… [which] may arise from valuation changes, including exchange-rate-related gains and losses… " (BPM 11.44) and thus precludes a direct impact of exchange rates on retained earnings through these valuation effects. Otherwise, it does not specify the role of currencies or

[14] At first glance, our empirical results provide a nominal counterpart to that statement, as the components of the CA predicted by expected inflation constitute a small part of valuation changes.

[15] Throughout this section, these expressions in italics are technical terms as defined in the BPM.

[16] According to the BPM, "[d]ebt instruments are those instruments that require the payment of principal and/or interest at some point(s) in the future" – see BPM 5.31.

[17] In rare cases, *Debt Instruments* also generate *Other investment income.*

[18] Returns to this asset class are obviously unaffected by this paper's argument.

[19] For more information on reinvested earnings, see Fischer et al. (2019).

the exchange rate in the accounting rules, leaving open whether the procedures applied by the relevant national authorities involve currencies and whether exchange rates may affect the current account.

In sum, the BPMs accounting rules give rise to the following general rule. Income on foreign investment in Debt Instruments is computed in nominal terms in the currency of denomination (or issuing currency) and subsequently converted into the currency of the reporting country. This rule of thumb does not apply to the other financial asset classes such as *Equity and Investment Fund Shares*.

The next sections assess the implications of the aforementioned accounting rules for debt instruments.

3. Inflation effects and the CA

This section shows that the international accounting rules described above can systematically distort a country's CA. The distortions arise because higher inflation implies higher nominal income on *Debt Instruments*. An increase in foreign (domestic) inflation thus yields an increase in interest on foreign assets (liabilities) and consequently affects the net foreign investment income that enters the CA.

To formalize the argument, consider two countries, indexed by i and j, each issuing debt in the form of bonds denominated in the respective local currency. These bonds are issued in $t = 1$, are traded internationally, pay fixed nominal interest, and mature in $t = 2$. Inflation rates between period 1 and 2 in the two countries, denoted by π_i and π_j, are perfectly anticipated but differ generally across countries.[20]

Frictionless international capital markets ensure that real riskless rates of return, ρ, equalize across countries such that the Fisher equation

$$1 + r_i = (1 + \rho)(1 + \pi_i) \tag{1}$$

dictates that inflation adds to nominal bond yields for each country i.

We now compute net interest on country i's foreign assets in $t = 2$ as recorded in country i's CA according to BPM accounting rules. As discussed in Section 2, the calculation of asset income is a two-step process. First, the nominal value of interest on foreign (country j's) assets is recorded in foreign currency and then, second, is converted into local currency. Currency conversion of nominal interest on foreign liabilities is obsolete (if liabilities are issued in local currency). Net foreign investment income – which is equal to the CA in our example – thus equals interest on foreign assets minus interest on foreign liabilities, both expressed in local (country i's) currency.

Bond purchases made in period $t = 1$ yield interest in period $t = 2$. We denote $p_{j,t}$ as the bond price issued by country j in period t and I_j as the bond's interest payments, all denominated in country j's currency. The nominal interest rate in country j's currency is then

$$1 + r_j = (p_{j,2} + I_j)/p_{j,1} = \left[(I_j + p_{j,2} - p_{j,1})/p_{j,1}\right] + 1. \tag{2}$$

This expression of the rate of return to foreign assets corresponds to the two components in the accounting rules of the previous section: the term in the square brackets reflects nominal returns, consisting of interest payments (e.g., for fixed income instruments) and bond-price changes (e.g., for zero-coupon bonds). Together, both components constitute income, denoted in the issuing country's (country j's) currency.

Notice also that in this deterministic setting, real returns equalize across countries:

$$(1 + r_i)\left(1 + \Delta_{ij}\right) = 1 + r_j \tag{3}$$

where $1 + \Delta_{ij}$ is the factor of exchange-rate appreciation between period $t = 1$ and $t = 2$, and $\Delta_{ij} > 0$ indicates an appreciation of country i's currency. Together, both of the equations above yield the gross rate of return in country i

$$1 + r_i = \frac{(I_j + p_{j,2} - p_{j,1})/p_{j,1}}{1 + \Delta_{ij}} + \frac{1}{1 + \Delta_{ij}}. \tag{4}$$

On the left hand side, r_i stands for the nominal interest rate country i pays on its liabilities (its *payables*). On the right hand side, the first fraction reflects country i's income on foreign assets (its *receivables*). It is the nominal rate of return on country i's assets in the foreign currency, converted into local currency.

We next observe that the exchange-rate change is

$$1 + \Delta_{ij} = \left(1 + \pi_j\right)/(1 + \pi_i). \tag{5}$$

so that Eqs. (2), (4) and (5), combined with the Fisher Eq. (1) yields

$$1 + r_i = \left[(1 + \rho)(1 + \pi_i) - \frac{1 + \pi_i}{1 + \pi_j}\right] + \frac{1 + \pi_i}{1 + \pi_j}. \tag{6}$$

Just as for Eq. (4), the term in square brackets corresponds to country i's income on foreign assets and corresponds to its *receivable* as reported in its CA. The last term on the right hand side reflects the valuation effect on the principal, induced

[20] In the two-period setup, there is no risk of confusion and we drop time indices.

by the expected exchange-rate movements, as described in, e.g., Lane and Milesi-Ferretti (2007b). This second effect does not affect country i's CA.

We now turn from the rate of returns to the value of interest income. Denoting country i's gross bilateral foreign assets into country j with IIP^A_{ij} (A for assets) and the corresponding investment income with I^A_{ij}, we express country i's income on bilateral foreign assets computed according to the BPM accounting rules and expressed in its national currency as

$$I^A_{ij} = IIP^A_{ij} \cdot \left[(1+\rho)(1+\pi_i) - \frac{1+\pi_i}{1+\pi_j}\right]. \tag{7}$$

Interest payments on a country's bilateral foreign liabilities (the *payables*), expressed in local currency, are simply

$$I^L_{ij} = IIP^L_{ij} \cdot r_i = IIP^L_i \cdot [(1+\rho)(1+\pi_i) - 1], \tag{8}$$

where IIP^L_{ij} stands for country i's bilateral foreign liabilities.

For later use, we state the following first-order approximations of (7) and (8) for small rates of real returns and inflation,

$$I^A_{ij} \approx IIP^A_{ij}\left[\rho + \pi_j\right] \tag{9}$$

$$I^L_{ij} \approx IIP^L_{ij}[\rho + \pi_i], \tag{10}$$

which underscores our statement in the introduction that up to a mild simplification (the first-order approximation), the CA records nominal interest income instead of real interest income. Country i's bilateral net international investment income is then:

$$NII_{ij} = IIP^A_{ij} \cdot \left[(1+\rho)(1+\pi_i) - \frac{1+\pi_i}{1+\pi_j}\right] - IIP^L_{ij} \cdot [(1+\rho)(1+\pi_i) - 1] \tag{11}$$

or, in its approximated version,

$$NII_{ij} = IIP^A_{ij} \cdot \left[\rho + \pi_j\right] - IIP^L_{ij} \cdot [\rho + \pi_i]. \tag{12}$$

Eq. (11) and its linearized version (12) capture the mechanics of the *inflation effect*, through which expected inflation impacts the CA. These mechanics decompose into three parts. First, positive foreign inflation increases the receivable income on foreign assets and thus tends to overstate the net investment income and therefore also the CA. Second, positive domestic inflation increases the payable income on foreign liabilities and thus tends to understate the net investment income and therefore, again, also the CA. Third, both effects are leveraged by the magnitude of gross foreign assets and liabilities: the first (second) effect is larger in absolute value, the larger the underlying foreign assets (liabilities). In particular, a commensurate increase in foreign and domestic inflation increases the CA if the corresponding NIIP is positive and decreases the CA if the NIIP is negative. These three factors combine to our *inflation effect* for the CA.

As pointed out in our discussion of Eqs. (2) and (6), the distorting *inflation effect* on the CA has an offsetting counterpart that affects the valuation effect. The next section's empirical assessment below will highlight both the mechanics of the *inflation effect* and its empirical relation to the valuation effect.

In this section, we have shown that inflation may shift value between a country's start-of-period foreign assets and liabilities, on the one hand, and its CA, on the other. Before turning to our quantitative assessment, we make two important observations. First, in deriving Eq. (12) we have treated local bonds as denominated in local currency and foreign bonds as denominated in foreign currency. While these assumptions are convenient for laying down the general mechanics, the inflation rates in Eq. (12) must correspond to the respective currency of denomination, as explained in Section 2. Accordingly, we will use the inflation rates of the currency of denomination in the quantitative assessment below.[21] Second, we reiterate that this *inflation effect* relies on the anticipated component of inflation, since, in the presence of uncertainty, the crucial no-arbitrage condition (3) must hold in expectations. We will return to the distinction between the expected and unexpected components of inflation in our discussion in Section 4.3.3.

4. Quantitative assessment

This section shows that in a set of 50 countries, defined by data availability, the *inflation effect* on the CA is economically significant. We start by defining the key variables that we will use to assess the *inflation effect* in the data. To do this, we perform two basic consistency checks of our data: First, we show that for the countries in our sample, expected inflation correlates systematically with nominal yields, as implied by the Fisher equation. Second, expected inflation also correlates with the yields implied by the returns recorded in the BOP. Together, both observations suggest that the mechanics of our central argument are operating in the data.

[21] We have used inflation rates by geographic breakdown in an earlier version of this paper, obtaining very similar results.

In a next step, we compute an adjusted CA for each country, defined as the CA that would be reported if inflation were zero throughout. These adjustments of the CAs are large, especially over the longer horizons: for the average country, they explain about a seventh of the cumulated CAs in absolute value and a twelfth of the gap between the cumulated CA and the change in Net International Investment Position.[22]

4.1. Data, definitions, and consistency checks

The purpose of this section is to define our main variables in the data and to show that the relation (7) implied by BPM accounting rules holds in standard BOP data. In other words, domestic and foreign expected inflation impact the rate of return, as implied by standard macroeconomic aggregates. We stress that our econometric ambitions are modest: we do not establish causality but simply show that the data are broadly consistent with Eq. (7).

We use three main data sources: Bénétrix et al. (2020) provide international investment positions, simultaneously disaggregated by debt instruments and other assets and by the five currencies USD, EUR, JPY, GBP, CNY, and a residual class. This breakdown by currency and asset class is particularly important, since, first, expected inflation rates are specific to currencies and, second, the accounting rules in Section 2 specify the calculation of interest for *Debt Instruments* by currency.[23] Our second data source is International Financial Statistics (IFS) from the IMF, which provides income on a country's foreign assets and liabilities. The third source is Datastream, which provides expected inflation. Combining these data, the sample consists of 50 countries and spans the period from 1991 to 2017.[24] Other data sources are from standard sources, and we refer the reader to Appendix A for a detailed description.

We now turn to the two consistency checks.

4.1.1. Yields and inflation

It is well known that empirical evidence for the Fisher Eq. (1), the central element of the relationship between expected inflation and the CA, is mixed. For example, Mishkin (1992) observes that at the six- to twelve-month horizon, "interest rates ha[ve] no ability to predict future inflation in the United States in periods of low trend inflation.[25]

To verify that the Fisher effect is indeed present in the data used for our empirical assessment, we regress country-specific government bond yields at the 1-year and 5-year horizons on either expected inflation or realized inflation. Specifically, we take the logarithm of the Fisher equation and test the empirical model

$$\ln(1+r_{i,t}) = \beta \ln(1+\pi_{i,t}) + \gamma \phi_{i,t} + \delta_t + \varepsilon_{i,t}, \tag{13}$$

where $r_{i,t}$ is country i's government bond yield at the two maturities and $\pi_{i,t}$ is (expected) CPI inflation. We control for sovereign credit score $\phi_{i,t}$ (defined as average across major rating agencies) and add time fixed effects δ_t, which absorb the (constant) real rate of return.[26]

Table 1 reports the results. Columns I to III correspond to specifications where $\pi_{i,t}$ is expected inflation. For comparison, Columns IV to VI correspond to specifications where $\pi_{i,t}$ is realized inflation. In each of these sets, the three columns correspond to, respectively, OLS, random effects, and fixed effects estimations.[27] Robust standard errors are clustered at the country level in all cases. The upper (lower) panel of the table shows results for one-year (five-year) government bond yields.

Our interest is in the coefficient on expected inflation. All point estimates are positive and significant at the 1% level and reasonably close to unity, consistent with the positive link between inflation and nominal interest rates. Clearly, we do not claim our estimates imply causality. Yet, the conditional correlation is strong and consistent with an operating Fisher effect. Also, bond yields exhibit stronger co-movements with expected inflation (Columns I to III) than with realized inflation (Columns IV to VI), possibly because the surprise component of inflation induces an attenuation bias.[28]

With these observations, we turn to the rate of return implied by measured international investment income.

4.1.2. Returns to foreign investment and inflation

To test whether Eq. (7) reflects recorded income, we define country i's BOP-measured rate of return on foreign assets over the corresponding start-of-period foreign assets as $R_{ij,t} = I^A_{ij,t}/IIP^A_{ij,t-1}$ such that Eq. (7) becomes, adding time indices,

$$R_{ij,t} = (1+\rho_t)(1+\pi_{i,t}) - \frac{1+\pi_{i,t}}{1+\pi_{j,t}}. \tag{14}$$

[22] We relegate potential distinctions between inflation and expected inflation in our theoretical setup to the discussion in Section 4.3.3.

[23] See also Maggiori et al. (2020). We also conduct an analysis based on a geographical breakdown of the assets in an earlier version of this paper. While results can change substantially for individual countries, the overall direction of the results is qualitatively similar.

[24] We exclude observations with expected inflation above 15% or below -15%.

[25] See also the survey by Cooray (2003) and the discussion in Johnson (2006).

[26] We report details on data sources in Appendix A.

[27] In all specifications, the Hausman specification test indicates that the FE specification is preferable over the RE specification.

[28] At one year to maturity, the correlation between bond yields and expected inflation (realized inflation) in our pooled data is 0.701 (0.614), where the number for the periods 1991–2005 and 2005–2015 are 0.733 and 0.656 (0.610 and 0.658). Computing correlations for each country separately, the minimum is 0.201 (0.292), the maximum is 0.942 (0.902), the mean is 0.611 (0.545), and the median is 0.606 (0.569). At the 5-year horizon, the corresponding numbers are 0.693 (0.580), 0.744, and 0.618 (0.604 and 0.569), with a minimum of 0.732 (-0.765), a maximum of 0.936 (0.915), a mean of 0.533 (0.433) and a median of 0.599 (0.507) for the country-specific correlations.

Table 1
Government bond yields and inflation.

Indep. Var.:	Expected Inflation			Inflation		
	(I)	(II)	(III)	(IV)	(V)	(VI)
	OLS	RE	FE	OLS	RE	FE
Dep. Var.: Yield						
1 year maturity						
Inflation	0.936***	0.691***	0.600***	0.682***	0.438***	0.378***
	[0.148]	[0.165]	[0.196]	[0.137]	[0.115]	[0.121]
Average Credit Score	-0.002***	-0.003***	-0.003***	-0.003***	-0.003***	-0.003***
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
Observations	483	483	483	482	482	482
R2	0.812	0.804	0.837	0.781	0.770	0.832
5 year maturity						
Inflation	0.816***	0.563***	0.503***	0.575***	0.331***	0.286***
	[0.166]	[0.145]	[0.167]	[0.142]	[0.095]	[0.096]
Average Credit Score	-0.004***	-0.004***	-0.005***	-0.004***	-0.004***	-0.004***
	[0.000]	[0.001]	[0.001]	[0.000]	[0.001]	[0.001]
Observations	483	483	483	482	482	482
R2	0.834	0.822	0.865	0.801	0.786	0.858

Note: $^{***}p < .01$, $^{**}p < .05$, $^{*}\ p < .10$. Standard errors are shown in brackets and are clustered at the country level. The dependent variable is gross, logged yields. The sample is comprised of twenty-one countries for which 1- and 5-year government bond yield data was available in Datastream and spans the period from 1991 to 2015. It excludes inflation and expected inflation rates above or below 15% and observations for Greece during the height of the Euro Crisis (i.e from 2010 to 2012). See Appendix A for variable definitions as well as further data and sample description.

where i indexes the reporting country, j the denomination currency, and t the year. Since ρ and π are small, we will estimate the first order approximation of (14),

$$R_{ij,t} = \rho_t + \pi_{j,t}. \tag{15}$$

Ideally, our empirical test of (14) would exploit the variation of the BOP-measured $R_{ij,t}$ for each dyad ij. However, BOP data only record country i's investment income aggregated over all foreign countries, without a breakdown by geography or denomination currency.[29] We therefore interpret the index j in our model above simply as the rest of the world (ROW), such that $R_{ij,t}$ in Eq. (14) is the rate of return of country i in year t, that is, its income on foreign assets over its start-of-period stocks of foreign assets

$$R_{i,t} = \frac{\sum_j I_{ij,t}}{\sum_j IIP_{ij,t-1}}, \tag{16}$$

where the index j is dropped. The sums in the numerator and the one in the denominator of (16) are readily available from recorded CAs and IIPs, allowing us to take (16) as the observable BOP-measured rate of return to be used in our empirical tests.[30]

We stress that our theory suggests that (14) holds for *Debt Instruments* but not for other types of assets. Therefore, to test Eq. (14), we define the rate of return $R_{i,t}$ separately for *Debt Instruments*, labeled $R^D_{i,t}$, and for all other assets, which we simply label *Non-Debt*, $R^E_{i,t}$.

[29] There is a disaggregation over asset classes, which we will exploit in turn.

[30] The BOP-implied rate of return is affected by an issue that arises because the IIP and interest income are converted to USD using different exchange rates. Specifically, the IIP is, like all positions, "converted at the rate prevailing on the balance sheet date" (BPM 3.104), i.e., at end-of-period nominal exchange rates, while interest income is converted "at the mid-point market exchange rate for the periods in which the interest accrues," as cited in Section 2. When the differences of mid-point and end-of-period exchange rates are unexpected and random, they merely add noise to the rate of return, leaving our exercise noisy but unbiased. In the case of large differentials of expected inflation, however, these differences may grow systematic and non-negligible. We argue that the latter case is not relevant for our sample, because the differential of expected local and ROW inflation is small: on average, its absolute value is 0.6% and exceeds 10% for three observations only (all for Russia). A related issue concerns the question of whether positions are reported at market value or at face value, which the BPM does not answer with a simple rule. Thus, "positions of financial assets and liabilities should, in general, be valued as if they were acquired in market transactions on the balance sheet reporting date" (BPM 3.84) but the BPM defines important exceptions for "[l]oan positions [which] are recorded at nominal value" (BPM 3.86). In practice, however, different countries apply different procedures – see IMF (2003) for the case of FDI – and even for the important case of the U.S., treatment differs by asset class: short-term debt, long-term debt, and FDI debt are valued in distinct ways, since "[m]arket values are the basis for [...] long-term marketable debt securities; book values are the basis for direct investment; and face values are the basis for most other types of assets, especially short-term instruments and nonmarketable forms of indebtedness." (BEA, 1990, p. 21). We cannot adjust for these differences within the scope of this paper but concede that the resulting adjustments can be influenced by national accounting procedures and that their accuracy may thus differ across countries. We would like to thank Philip Lane for pointing out these conceptual issues.

Having defined BOP-measured rates of returns for country *i*'s investments, we need to define the corresponding expected inflation for the rest of the world. We do so by taking the weighted average of the rest of the world's expected inflation rates:

$$\bar{\pi}^A_{i,t} = \sum_j \omega^A_{ij,t-1}\pi_{j,t}, \tag{17}$$

where the weights $\omega^A_{ij,t-1}$ correspond to the start-of-period (or lagged end-of-period) positions of foreign assets. Specifically, $\omega^A_{ij,t-1}$ correspond to country *i*'s foreign assets in *Debt Instruments* denominated in currency *j*, expressed as a share of total foreign assets in *Debt Instruments*.[31] Through the country-specific weights in (16), $\bar{\pi}^A_{i,t}$ differs across investor countries *i* and thus requires an index *i*.[32] The superscript *A* indicates that the weights correspond to foreign assets, but we define the corresponding

$$\bar{\pi}^L_{i,t} = \sum_j \omega^L_{ij,t-1}\pi_{j,t}, \tag{18}$$

with weights $\omega^L_{ij,t-1}$ reflecting the currency composition of foreign liabilities in parallel to those of the assets in (17). In our consistency check below, we also use ROW-inflation computed through weights according to *Non-Debt* assets and liabilities (but we suppress an additional index).

With these definitions, we test the log-linearized version of (14), simply replacing π_j with $\bar{\pi}_i$:

$$\ln(R^{X,A}_{i,t}) = \alpha + \beta_1 \ln(1+\bar{\pi}^A_{i,t}) + \beta_2 \ln(1+\pi_{i,t}) + \gamma\, contr_{i,t} + \varepsilon_{i,t}, \tag{19}$$

where *i* and *t* index countries and years, respectively. $\pi_{i,t}$ is country *i*'s (expected) inflation rate, as in Eq. (14). The superscript $X = D, N$ indicates that we measure the BOP-measured rates of return to *Debt* and to *Non-Debt* instruments. According to Eqs. (14) and (15) we expect the coefficient on $\pi_{j,t}$ to be one and the coefficient on $\pi_{i,t}$ to be close to zero.

When estimating Eq. (19), we control for real riskless rate of return, as suggested by Eqs. (14) and (15), which we proxy by the one-year interest rate on U.S. Treasury bills minus U.S. expected inflation.[33] In addition, we control for the following variables: rest-of-the-world sovereign credit scores, real GDP growth, and growth of the stock market, which are all weighted averages, defined in parallel to Eq. (17).

Table 2 reports the regression results. In Columns I to III, the regressor *ROW inflation* is defined according to Eq. (17) and computed based on is expected inflation. In Columns IV to VI, it refers to realized inflation. In each of the sets, the three columns correspond to OLS, random effects, and fixed effects estimations, respectively.[34] Robust standard errors are clustered at the country level.

The top panel of Table 2 reports results for returns on *Debt Instruments* ($R^D_{i,t}$) as the dependent variable.[35] The coefficient of interest is the one on the rate of return on expected rest-of-world inflation (*ROW inflation*), which is predicted in (15) to be one. In all three specifications (Columns I to III), the estimates are close to 0.8 and significantly different from zero. Also, they are only different from unity at marginal levels of significance in Columns II and III. Similarly, coefficients on the real returns are positive and significant. However, they fall short of the predicted magnitude of one. Both variables that appear in the linearized Eq. (15) thus have the predicted sign and, while somewhat reduced in magnitude, are in line with our assumptions and theory.[36]

The coefficient on the control variable $\pi_{i,t}$ is positive, small in magnitude, and insignificant in all three regressions. Both observations are as predicted in (14). In particular, own inflation does not seem to have a first-order impact on the BOP-measured rate of return.[37] Finally, none of the three other control variables – rest-of-the-world sovereign credit scores, real GDP growth and stock market growth – is significant.

Columns IV to VI show that the estimated coefficients on ROW *realized* inflation are positive and significant in all three specifications, but the coefficient drops by more than half relative to the correct specification in Columns I to III. This finding, too, is consistent with model (15). In particular, it supports the view that surprise components of inflation do not contribute

[31] These data are reported in Bénétrix et al. (2020).

[32] We restrict expected inflation and inflation to stay within the bounds of ±15% and returns on foreign investment to stay between ±10%. We also exclude the years when countries adopted the euro for euro area countries.

[33] We aim to control for the real riskless rate of return, as it appears in Eqs. (6) to (12). We acknowledge that, in the presence of exchange-rate and inflation risk, the definition of the riskless rate of return is generally country-specific and thus not straightforward to define. Alternatively, country-specific real interest rates could be used but are not readily available. Any definition would need to strip the yields from potential country-specific default risk. Moreover, a conversion from nominal to real rates through expected inflation would imply that expected inflation enters the right-hand side of the regression once with a positive and once with a negative sign. In that case, measurement error in expected inflation could spuriously induce a positive coefficient of interest (the one on expected inflation). Overall, the U.S. bond yields thus appear as the natural choice of proxy for the riskless rate of return.

[34] In all specifications, the Hausman specification test indicates that the FE specification is preferable to the RE specification.

[35] For these asset types, the definition of the expected rest-of-world inflation rate in Eq. (17) corresponds closely to the BOP-measured rate of return in Eq. (16).

[36] The reduced magnitude may stem from an attenuation bias resulting from a mismeasurement of the expected inflation, or of ROW weights in the case of ROW inflation.

[37] It is easy to check that Eq. (14) predicts a positive second-order impact of $\pi_{i,t}$.

Table 2
Returns and inflation.

Indep. Var. (ROW Weighted Average):	Expected Inflation			Inflation		
	(I)	(II)	(III)	(IV)	(V)	(VI)
	OLS	RE	FE	OLS	RE	FE
Dep. Var.: Returns on Foreign Assets						
Debt						
ROW inflation	0.795***	0.794***	0.798***	0.318***	0.288***	0.283***
	(0.103)	(0.113)	(0.118)	(0.0358)	(0.0427)	(0.0456)
Own inflation	0.00403	0.0382	0.0498	0.0162	0.0443	0.0510
	(0.0213)	(0.0318)	(0.0401)	(0.0203)	(0.0277)	(0.0330)
Real Returns	0.585***	0.561***	0.555***	0.580***	0.555***	0.549***
	(0.0368)	(0.0387)	(0.0407)	(0.0392)	(0.0405)	(0.0419)
ROW Credit Score	-0.00316	-0.00255	-0.00232	0.00268	0.00298	0.00315
	(0.00260)	(0.00232)	(0.00227)	(0.00189)	(0.00199)	(0.00204)
ROW Eq. Ind. Growth	-0.00190	-0.00354	-0.00389	0.00205	0.000267	-0.000117
	(0.00319)	(0.00280)	(0.00280)	(0.00387)	(0.00359)	(0.00358)
ROW RGDP Growth	-0.0384	-0.0115	-0.00490	-0.105***	-0.0855**	-0.0810**
	(0.0315)	(0.0283)	(0.0283)	(0.0383)	(0.0364)	(0.0365)
Observations	820	820	820	868	868	868
R-squared	0.597	0.646	0.647	0.565	0.611	0.611
Non-Debt						
ROW inflation	-0.102	-0.0966	-0.0982	0.142	0.162**	0.167**
	(0.170)	(0.144)	(0.147)	(0.0997)	(0.0739)	(0.0755)
Own inflation	-0.185***	-0.167***	-0.171**	-0.171***	-0.128**	-0.126*
	(0.0623)	(0.0635)	(0.0747)	(0.0581)	(0.0561)	(0.0635)
Real Returns	-0.0200	-0.0465	-0.0465	-0.0147	-0.0428	-0.0445
	(0.0686)	(0.0624)	(0.0633)	(0.0730)	(0.0640)	(0.0649)
ROW Credit Score	0.00874	0.00953**	0.00957**	0.00551	0.00468	0.00438
	(0.00694)	(0.00394)	(0.00390)	(0.00624)	(0.00322)	(0.00316)
ROW Eq. Ind. Growth	0.0449***	0.0400***	0.0394***	0.0486***	0.0465***	0.0462***
	(0.00957)	(0.00798)	(0.00823)	(0.0107)	(0.00889)	(0.00920)
ROW RGDP Growth	-0.219**	-0.152**	-0.147**	-0.239*	-0.188**	-0.182**
	(0.0979)	(0.0634)	(0.0654)	(0.120)	(0.0758)	(0.0787)
Observations	780	780	780	809	809	809
R-squared (within)	0.106	0.096	0.096	0.093	0.093	0.093

Note: $^{***}p < .01$, $^{**}p < .05$, $^{*}\ p < .10$. Standard errors are shown in brackets and are clustered at the country level. Returns are gross and logged. The sample comprises 44 countries (45 countries in the debt regression with actual inflation) and spans the period from 1991 to 2017. Excluded from the sample are inflation and expected inflation rates above 15% and below -15%, as well as foreign investment returns above 10% and below -10%. It additionally excludes "Euro-adoption" years for Euro-Area countries. See Appendix Appendix A for variable definitions as well as further sample description.

to the effects outlined in the previous section, but instead blur the positive relation between expected inflation and nominal interest payments, thus introducing attenuation bias that reduces the magnitude of the estimated coefficient.[38]

Finally, the bottom panel of Table 2 reports estimations using rates of return on *Non-Debt* instruments. As discussed in Section 2, the positive effect of expected ROW inflation cannot be expected to materialize in this asset category. Accordingly, the coefficients on expected ROW inflation reported in the bottom panel are close to zero and insignificant for expected ROW inflation (Columns I - III). As expected, there is no clear connection between foreign expected inflation, on the one hand, and the rate of return on foreign investment in equities and other non-debt instruments, on the other. The case is slightly different for ROW realized inflation, which is positive and significant in Columns V and VI, yet also relatively small in magnitude.[39]

Overall, our estimations are intuitively appealing and support our assumptions and simple linear model (15). Most importantly for our current exercise, they suggest that inflation rates strongly impact the BOP-measured rate of return of foreign investment. Just as implied by the BPM6 accounting rules discussed in Section 2, expected foreign (rest-of-world) inflation correlates with measured returns nearly one-to-one within the asset category *Debt Instruments*. This association becomes weaker or non-existent for BOP-measured rates of return of other asset types or if expected inflation is replaced with realized inflation.

[38] These results also highlight the fact that correcting income on foreign debt instruments through realized inflation (Adler et al. 2019 proxy expected inflation by past realized inflation) will likely result in an imprecisely inferred *inflation effect*.

[39] The coefficient may pick up the part of the positive association between growth and inflation, which is not measured through stock market growth, the coefficient of which is significant and positive.

4.2. Adjusting for expected inflation

This section documents the magnitude of the *inflation effects* in three steps. First, motivated by our insights from Section 3, Section 4.2.1 defines an adjusted CA that would be recorded in a counterfactual world with no inflation. Second, given the adjusted CAs for our set of countries, Section 4.3 then assesses the magnitude of the *inflation effect*. Third, Section 4.3.2 shows that the *inflation effect* contributes systematically to the valuation effect. Additionally, we illustrate and discuss the properties of the adjusted cumulative CA and its relationship with the changes in the NIIP for eight selected economies.

4.2.1. Adjusting the current account

To gauge the effect of expected inflation on the CA, we define the adjusted CA of country i as the CA that would be recorded for that country in a world of zero inflation. Motivated by our discussion in Section 2, we adjust the CA for the *inflation effect* of foreign assets in the financial instrument *Debt Instruments*. We restate the approximation in Eq. (9), adding superscripts to indicate *Debt Instruments*

$$I_{ij}^{A,D} = IIP_{ij}^{A,D}\left[\rho + \pi_j\right],$$

where i indexes the reporting country and j the denomination currency. In a world with zero inflation, this term would simply be $IIP_{ij}^{A,D}\rho$ so that our adjusted CA would subtract the amount $IIP_{ij,t}^{A,D}\pi_{j,t}$ from the CA as recorded. Summing over adjustments of all foreign currencies and introducing time indices, the total adjustment on the asset side is

$$\Delta_{i,t}^{A} = \sum_{j} IIP_{ij,t}^{A,D}\pi_{j,t} = IIP_{i,t-1}^{A,D}\bar{\pi}_{i,t}^{A}, \tag{20}$$

where $IIP_{i,t-1}^{A,D}$ stands for country i's aggregate foreign assets of *Debt Instruments* at the start of year t (i.e., lagged) and $\bar{\pi}_{c,t}^{A}$ is defined in Eq. (17). Just as inflation affects receivable interest income on foreign assets, domestic inflation affects payable interest income on foreign liabilities, as well. Parallel to the former effect captured in Eq. (20), the latter effect is driven by the currency-specific inflation rates multiplied by the corresponding debt liabilities:

$$\Delta_{i,t}^{L} = \sum_{j} IIP_{ij,t}^{L,D}\pi_{j,t} = IIP_{i,t-1}^{L,D}\bar{\pi}_{i,t}^{L}, \tag{21}$$

where we used the term $\bar{\pi}_{i,t}^{L}$ as defined in Eq. (10).[40] Since this term adds to the payable income, it affects the CA of country i with the sign that is opposite to that of Eq. (20). In sum, country i's adjusted CA is readily defined as the officially recorded CA minus the *inflation effect* of income on foreign assets in Eq. (20) plus the *inflation effect* of income on foreign liabilities in Eq. (21)

$$\widetilde{CA}_{i,t} = CA_{i,t} - \Delta_{i,t}^{A} + \Delta_{i,t}^{L}. \tag{22}$$

Eq. (22) defines how we adjust the CA for expected inflation and illustrates the principal effects of expected inflation. First, the adjusted CA decreases in foreign expected inflation ($\bar{\pi}_{i,t}$) and increases in domestic expected inflation ($\pi_{i,t}$). We observe, however, that the differential between foreign and domestic inflation is not the only determinant of the sign of the adjustment because inflation rates interact with the magnitude of foreign assets ($IIP_{i,t}^{A,D}$) and liabilities ($IIP_{i,t}^{L,D}$). In fact, an equal increase in foreign and domestic inflation induces a downward adjustment whenever the net position of *Debt Instruments* $NIIP^{D} = IIP^{A,D} - IIP^{L,D}$ is positive and an upward adjustment whenever $NIIP^{D}$ is negative.

The *inflation effect*, that is, the object $\Delta_{i,t}^{A} - \Delta_{i,t}^{L}$ can thus arise through two possibly antagonistic forces: first, because of a differential between domestic and foreign inflation ($\pi_{i,t} - \bar{\pi}_{i,t}$) and second, for a given level of (non-zero) expected inflation in all countries, because of an unbalanced net position in *Debt Instruments* ($NIIP^{D} \neq 0$).

4.2.2. Adjusting the valuation effect

While a country's CA indicates its net savings abroad, the match between the changes in NIIP is not perfect. The difference between the CA and changes in NIIP is defined as the valuation effect of foreign assets and liabilities, the increasing importance of which is well recognized in the recent literature.[41] Formally, the valuation effect for country i and the period between t_0 and t_1 is

$$VAL_{i,t_0,t_1} = \Delta NIIP_{i,t_0,t_1} - \sum_{\tau=t_0+1}^{t_1} CA_{i,\tau}, \tag{23}$$

where $\Delta NIIP_{c,t_0,t_1} = NIIP_{c,t_1} - NIIP_{c,t_0}$. Since the *inflation effect* defined above impacts the CA, it must impact the valuation effect as well, because the measurement of international investment positions *NIIP* remains unaltered. It is indeed easy to

[40] Clearly, in the special case where all liabilities are issued in domestic currency, the term $\bar{\pi}_{i,t}^{L}$ equals $\pi_{i,t}$.

[41] For example, the U.S.'s persistently negative CA has not resulted in a commensurate decrease in its NIIP – see, e.g., Bénétrix et al. (2015) or Gourinchas and Rey (2014) and the references therein.

determine the role of the *inflation effect* for the valuation effect by cumulating *NIIP* changes and the adjusted CA, $\widetilde{CA}$. As in Eq. (23), our adjustment is

$$\widetilde{VAL}_{i,t_0,t_1} = \Delta NIIP_{i,t_0,t_1} - \sum_{\tau=t_0+1}^{t_1} \widetilde{CA}_{i,\tau}. \tag{24}$$

By definition, $\widetilde{VAL}$ equals the standard valuation effect minus the (accumulated) *inflation effect*. By comparing Eqs. (23) and (24) over different time horizons, we will assess whether the *inflation effect* contributes systematically to the valuation effect.[42]

4.3. Results of adjustment

Having defined the *inflation effect* for assets $\Delta^A_{i,t}$ (through Eq. (20)) and for liabilities $\Delta^L_{i,t}$ (through Eq. (21)), we show that the adjustments of the CA and the valuation effect through Eqs. (22) and (24) are important in the sense that they are large and, in addition, systematic, that is, they do not merely add to the errors and omissions in the BOP. To that aim, we operationalize the computation of the adjustments (20) and (21) as follows. In our sample of 50 countries, we compute $\Delta^A_{i,t}$ and $\Delta^L_{i,t}$ based on the assets and liabilities debt positions $IIP^D_{i,t}$ and based on $\bar{\pi}_{i,t}$ as defined in Eq. (17), where the weights ω_{ij} are defined through the currency decomposition of debt instruments.[43] As in Section 4.1, we use the currencies USD, EUR, JPY, GBP, CNY and the respective CPI inflation rates. For the positions in all other currencies (ROW) we use the GDP-weighted average inflation rates. This adjustment seems to be a natural and conservative practical implementation of our adjustment.[44]

With these definitions, we observe that over all countries and years, the absolute value of our baseline adjustments (i.e., $|\Delta^A_{i,t} - \Delta^L_{i,t}|$) is a sizable 0.23% of GDP on average, with a maximum of 29.8% for Russia in 1994 (and a minimum of virtually 0% for Chile in 2006). The average is quite large, especially when compared to the average CA, the absolute value of which stands at 3.95% of GDP.

4.3.1. The current account – recorded and adjusted

To assess the role of the *inflation effect* for the CA, we compare the absolute values of the recorded $CA_{i,t}$, and the adjusted CA, $\widetilde{CA}_{i,t}$, as defined in Eq. (22). We point out that the direction of the adjustment is not clear *a priori*: the *inflation effect* adds a component to the CA that may systematically increase or decrease its absolute magnitude.

Table 3 summarizes these values. Within our sample, the absolute value of the recorded $CA_{i,t}$ is on average 3.95% of GDP, with a maximum of 27.13% (Singapore in 2007) and a minimum of 0.00% (Norway in 1998). When adjusting for the *inflation effect*, the average absolute value drops somewhat, to 3.82 % of GDP (maximum of 32.03% Russia in 1994; minimum 0.00 Indonesia in 1993). Over the long run, the differences become more pronounced. Cumulating the recorded CA over the whole period between 1991 and 2017, the absolute value is 156.47% of initial GDP for the average country, while the corresponding number for the cumulated adjusted CA is 133.62% of initial GDP. This reduction amounts to about one-seventh $((156.47 - 133.62)/156.47 \approx 1/7)$.[45]

We have observed that the adjustment tends to reduce the absolute size of the CA for the average country. This implies that the global imbalances, measured as the sum of absolute values of all countries' CAs, tend to shrink when correcting for the *inflation effect*. This fact is illustrated in Fig. 1, which plots the sum of all CA surpluses and all CA deficits (expressed as a share of aggregate GDP) for our sample over the period from 1991 to 2017.[46] The red bars indicate the recorded CAs and the orange bars the adjusted CAs, so that the total length of the colored bars indicate the magnitude of the respective global imbalances. Both CA surpluses and deficits tend to decline in magnitude due to the adjustment, and so do global imbalances overall in most years: the recorded (adjusted) global imbalances stand at 3.27% (2.93%) of initial GDP, peak at 4.91% (4.32%) in 2006, and drop back to 2.92% (2.24%) in 2017. In the average year, they are reduced by the adjustment from 3.52 to 2.97 or by about one-sixth. Also, the contraction of global imbalances in the wake of the Global Financial Crisis was more pronounced when measured through the adjusted CAs: from their peak in 2006 to the trough in 2013, the recorded global imbalances contracted by 44%, while the adjusted global imbalances contracted by 49% during the same period.

[42] It may be suitable to address the recurring concern about whether our adjustments of the CA for the *inflation effects* require a simultaneous adjustment of the NIIP and changes therein. The answer is negative. The sum of the *inflation effect* and its impact on the valuation effect is zero by definition. This observation also highlights the distinction of our contribution to earlier work that focused on measurement errors of various balance-of-payment items, e.g., Curcuru et al. (2008), Hausmann and Sturzenegger (2005), or Zucman (2013). In contrast to these studies, our work concerns the recording of accruing value in distinct accounting categories, not potential mistakes in data collection.

[43] As discussed in footnote[30], the question of whether positions are reported in market, book, or face value may influence our adjustment. In particular, the higher the reported debt positions (e.g., the face value of sovereign debt is larger than its market value in the presence of high default risk), the higher our gross adjustments on foreign assets and liabilities.

[44] We mean "conservative in the sense that the bulk of debt from emerging market economies, which is not issued in the major currencies, is likely to be issued in domestic currencies and is thus subject to higher inflation, which would imply larger adjustments.

[45] As explained in Footnote 7 in the introduction, there is no logical discrepancy between the small yearly adjustments and the large adjustments over longer horizons because changes refer to absolute values.

[46] The sample is unbalanced, since data for Austria, Belgium, Greece, Ireland, Japan, and New Zealand start in 2005, 2002, 2000, 2005, 1996, and 2000, respectively.

Table 3
Recorded and adjusted current accounts – absolute values.

	Year-on-Year						Cumulative in 2017	
	$\lvert CA\rvert$			$\lvert\widetilde{CA}\rvert$			$\lvert\sum CA\rvert$	$\lvert\sum \widetilde{CA}\rvert$
Country	Mean	Min	Max	Mean	Min	Max		
Argentina	2.89	0.34	8.97	3.13	0.32	12.95	39.06	29.65
Australia	4.33	2.11	7.52	3.13	0.57	5.87	183.76	130.81
Austria	2.48	1.36	4.49	2.92	1.32	4.93	33.08	38.29
Belgium	1.68	0.08	4.52	1.62	0.06	4.65	18.40	5.41
Brazil	2.13	0.00	4.24	2.35	0.25	3.89	72.66	52.20
Canada	2.25	0.13	3.87	2.01	0.10	3.40	48.82	16.26
Chile	2.55	0.13	5.18	2.47	0.10	4.86	80.52	72.81
China	3.21	0.22	9.95	2.81	0.75	9.12	445.73	368.25
Colombia	2.96	0.67	6.34	2.91	0.36	6.27	122.80	114.53
Czech Republic	2.82	0.22	6.16	2.96	0.24	6.29	80.62	85.22
Denmark	3.71	0.53	8.88	4.13	0.71	8.60	140.45	152.49
Egypt	2.80	0.06	9.01	2.62	0.31	8.16	36.16	7.03
Finland	3.76	0.72	9.37	3.53	0.20	9.67	75.71	80.45
France	0.98	0.01	3.40	0.75	0.04	3.04	6.71	11.86
Germany	3.90	0.37	8.59	4.06	0.14	8.37	115.63	118.20
Greece	5.27	0.12	14.49	4.60	0.01	12.88	201.11	169.92
Guatemala	3.92	0.19	6.76	3.97	0.21	7.14	163.89	162.05
Hong Kong	6.93	1.39	15.01	3.47	0.09	7.79	198.35	56.06
Hungary	5.08	0.26	10.62	5.14	1.27	8.70	121.01	73.76
India	1.53	0.11	5.00	1.18	0.06	4.59	101.04	67.17
Indonesia	2.45	0.02	4.84	2.54	0.00	7.35	11.20	27.68
Ireland	2.88	1.01	5.56	13.05	8.58	17.88	13.90	181.62
Israel	2.57	0.28	5.40	2.20	0.31	4.75	61.03	48.69
Italy	1.58	0.16	3.32	1.46	0.01	3.12	0.26	13.52
Japan	2.76	0.75	4.68	1.96	0.46	3.32	64.35	41.62
Malaysia	8.65	1.98	16.85	8.51	1.94	16.90	458.78	435.32
Mexico	2.16	0.36	6.73	1.65	0.14	5.55	79.80	53.86
Morocco	2.98	0.08	9.74	3.03	0.03	9.65	117.55	115.78
Netherlands	5.58	1.74	10.84	5.78	1.17	11.93	227.99	234.13
New Zealand	3.71	0.78	7.72	1.86	0.07	5.20	82.81	38.48
Norway	9.06	0.00	16.17	9.25	0.27	16.03	395.99	394.29
Pakistan	3.35	0.11	9.21	2.92	0.03	8.68	120.64	94.41
Peru	3.72	0.03	8.67	3.23	0.45	7.70	156.87	133.70
Philippines	3.03	0.08	6.08	2.61	0.14	6.34	41.42	66.39
Poland	3.46	0.02	7.35	3.05	0.08	7.03	149.27	114.47
Portugal	5.27	0.11	11.92	5.21	0.13	10.59	187.15	160.29
Russia	5.58	0.03	17.45	8.04	0.07	32.03	177.17	205.64
Singapore	17.17	6.95	27.13	12.51	4.09	21.03	1291.60	933.01
South Africa	2.44	0.02	5.80	2.34	0.17	5.59	94.04	74.02
South Korea	2.96	0.18	10.73	2.80	0.14	10.92	178.25	157.56
Spain	3.44	0.06	9.48	3.29	0.28	8.22	100.82	73.32
Sri Lanka	3.80	0.37	9.54	2.95	0.24	8.47	216.93	163.17
Sweden	4.45	0.33	8.21	5.40	0.82	9.60	159.24	199.10
Switzerland	8.80	2.37	14.70	6.82	0.08	13.18	301.43	28.00
Thailand	5.39	0.32	12.49	5.03	0.38	13.71	125.28	106.64
Tunisia	4.79	0.93	10.25	4.34	0.10	10.12	265.09	240.05
Turkey	3.16	0.17	8.93	3.11	0.63	8.16	172.03	112.02
United Kingdom	2.56	0.09	5.27	2.03	0.09	5.01	100.92	80.23
United States	2.84	0.05	5.92	2.31	0.30	5.11	120.74	94.34
Uruguay	1.79	0.02	5.69	1.90	0.19	5.80	65.57	47.03
All Countries	3.95	0.00	27.13	3.82	0.00	32.03	156.47	133.62

Note: Yearly CAs in percent of real GDP. Cumulative CAs over the period 1991–2017 (except for Austria, Belgium, Greece, Ireland, Japan and New Zealand, whose initial observed period are in 2005, 2002, 2000, 2005, 1996, and 2000, respectively) are in real terms and measured in percent of initial real GDP. The numbers in the row "All Countries" correspond to the respective statistic given at the top of the column. In the final three columns, the cross-country mean is reported. ROW Inflation is calculated as the average expected inflation in the first quarter with real GDP shares in ROW GDP as weights. ROW GDP contains all countries excluding the five major currency issuers as well as the country under study.

Finally, Fig. 1 also plots the CAs as recorded (solid lines) and adjusted (dashed lines) for the two large contributors, the U.S. (yellow line) and China (grey line). While Chinas CA surplus is barely reduced due to our adjustment (from 0.26 to 0.22% of world GDP in the average year), the U.S.'s CA deficit shrinks substantially, from an average of 1.13% of world GDP to 0.89% when adjusted. In 2017, it has been reduced by half and stands at 0.27% instead of 0.54%. We will discuss the reasons for this strong correction in the following section in connection with the valuation effect.

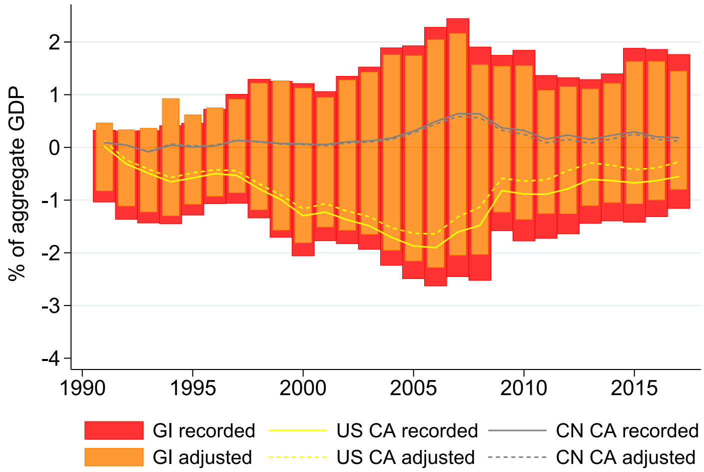

Fig. 1. Global Imbalances – Recorded and Adjusted
Note: The adjusted CAs are computed according to Eq. (22). The sample contains 50 countries; data for some countries begin after 1990. See Appendix Table A1 for details. Data Sources: Bénétrix et al. (2020), Datastream, IMF, WB, own calculations.

The U.S. CA proves to be subject to pronounced adjustments. Fig. 2 therefore plots the two components driving the adjustment for the U.S. – expected inflation and gross debt positions (as expressed in Eqs. (20) and (21)) – along with the CA adjustment itself. The figure illustrates how the growing importance of the *inflation effect* comes about. The top panel shows that the expected inflation for the currency baskets of U.S. debt assets (17) and debt liabilities (18) trended down over the entire period. This trend by itself would imply that distortions from expected inflation were reduced over time. The reduction in the *inflation effect*, however, was countered by the rapid increase in gross debt asset positions, shown in the middle panel. Since the *inflation effect* is proportional to the product of expected inflation and gross debt positions, the rapid growth of the latter overcompensated the decrease of the former, leading to an overall rise in the *inflation effect*, as plotted in the bottom panel.

The middle panel of Fig. 2 also documents a marked decrease in the U.S.'s net foreign asset position of debt. Without this widening of net liabilities, the *inflation effect* would have been small because expected inflation on assets from Eq. (20) and liabilities from Eq. (21) were essentially the same, such that their effects cancel out if assets and liabilities balance. Indeed, as the differential of *expected inflation* is zero (owing to the fact that much of the U.S.'s debt liabilities are denominated in USD) the *inflation effect* is non-zero only if net positions are unbalanced. As soon as gross liabilities exceed gross assets, the overall *inflation effect* turns negative.

In the case of the U.S., the overall negative effect adds to the CA deficit, such that adjusting for the effect leads to an upward correction of the CA (see Fig. 1). Over the past decades, the U.S. has become, in the words of Gourinchas and Rey (2007), the world's 'venture capitalist,' supplying safe assets (*Debt Instruments*) to the rest of the world in return for risky assets (*Equity*). These developments not only generate a risk premium that adds to the U.S. CA (as analyzed in Gourinchas and Rey (2007)); they simultaneously imply that the *inflation effect* has increasingly distorted the U.S. CA downward, making its CA deficit appear larger than it actually would in the absence of (expected) inflation.

4.3.2. The valuation effect – recorded and adjusted

Since the *inflation effect* distorts the recorded CA, it must also affect the differential between the CA and changes in the NIIP, that is, the valuation effect. Here again, the direction of the adjustment is not clear *a priori*: the *inflation effect* may systematically increase or dampen the valuation effect for any given country. Given the prominence of the valuation effect in the recent literature (highlighted prominently in Gourinchas and Rey 2014), we investigate whether or not the *inflation effect* systematically contributes to the valuation effect. We will investigate yearly adjustments, but also accumulate the CA and the adjusted CA over time. Cumulation over the full horizon will reveal whether the *inflation effect* only generates noise that averages out over time or whether it systematically dampens or magnifies a country's valuation effect.

We begin with a description of the adjustments for a subset of eight countries in our sample: the G7 countries plus Ireland.[47] Fig. 3 reports the cumulative CA as recorded and the cumulated adjusted CA, as defined in (23) and (24), together with the changes in NIIP.[48] The top left panel shows the change in the U.S. NIIP (blue line), the U.S. cumulated CA as recorded (solid orange line) and the U.S. cumulated CA as adjusted (dashed orange line) for the period 1990–2017. Accordingly, the cumulated valuation effect is the difference between the yellow and the blue solid line. We refer to the difference between the blue and the dashed yellow line as the *adjusted cumulated valuation effect*. The three variables are expressed

[47] Ireland takes a prominent role in the current policy debate because of its current account surplus; see Treasury 2019, pp. 67.

[48] Due to data availability, the plot starts in 2006 for Ireland. See also Table A1 in the appendix.

Table 4
Recorded and adjusted valuation changes.

	Year-on-Year						Cumulative in 2017	
	$\|VAL\|$			$\|\widetilde{VAL}\|$			$\|\sum VAL\|$	$\|\sum \widetilde{VAL}\|$
Country	Mean	Min	Max	Mean	Min	Max		
Argentina	4.35	0.01	31.23	4.39	0.15	30.75	56.02	46.61
Australia	6.91	0.37	22.70	6.60	0.07	24.06	102.68	49.73
Austria	2.38	0.48	5.07	2.42	0.73	5.51	10.50	15.70
Belgium	5.43	0.00	19.45	5.33	0.04	20.45	8.43	32.24
Brazil	5.70	0.09	20.67	5.84	0.08	20.68	32.41	11.94
Canada	6.00	0.01	20.60	5.66	0.34	19.85	131.08	98.52
Chile	3.44	0.00	11.26	3.46	0.08	11.26	44.89	37.18
China	2.38	0.02	9.79	2.17	0.04	9.66	272.15	194.67
Colombia	2.43	0.05	8.78	2.42	0.04	8.22	37.74	29.47
Czech Republic	4.15	0.49	9.16	4.13	0.58	9.07	15.98	20.58
Denmark	4.22	0.24	12.57	4.29	0.21	13.05	10.21	22.25
Egypt	4.07	0.29	22.78	4.31	0.21	23.97	98.04	127.17
Finland	13.98	0.20	94.91	14.12	0.51	94.94	45.20	49.94
France	3.54	0.29	17.59	3.56	0.19	17.22	33.32	38.47
Germany	2.95	0.16	9.41	2.98	0.26	9.53	52.18	54.75
Greece	9.73	0.00	43.58	9.86	0.28	41.97	33.24	2.05
Guatemala	3.22	0.04	13.38	3.23	0.03	13.21	126.69	124.85
Hong Kong	28.71	1.24	56.89	31.35	0.12	61.75	474.96	617.25
Hungary	7.03	0.36	22.54	6.59	0.65	24.78	71.75	24.50
India	2.81	0.23	10.96	2.79	0.23	10.99	29.67	63.54
Indonesia	9.27	0.07	86.21	9.50	0.21	89.27	44.59	83.47
Ireland	21.40	3.18	79.57	18.95	2.18	64.58	214.11	46.39
Israel	5.01	0.79	18.44	4.94	0.04	18.48	87.22	99.55
Italy	2.95	0.09	7.75	3.01	0.16	8.13	2.34	11.44
Japan	3.38	0.04	13.08	3.51	0.20	12.72	8.20	14.53
Malaysia	7.74	0.37	22.90	7.52	0.43	21.93	443.05	419.59
Mexico	4.64	0.53	14.65	4.47	0.12	16.47	24.63	1.32
Morocco	2.51	0.01	8.84	2.44	0.03	8.61	17.52	19.29
Netherlands	7.58	0.20	28.67	7.47	0.17	28.05	157.88	164.01
New Zealand	8.17	0.06	19.07	7.68	0.32	21.62	74.51	30.18
Norway	10.19	0.57	32.90	10.16	0.51	32.86	39.48	41.18
Pakistan	2.77	0.27	8.59	2.66	0.00	7.94	63.59	37.36
Peru	4.14	0.10	17.23	3.88	0.03	15.75	100.92	77.76
Philippines	4.33	0.00	12.81	4.17	0.14	14.33	32.07	57.04
Poland	6.37	0.02	20.76	5.76	0.15	16.00	26.54	8.26
Portugal	7.05	0.06	20.61	6.91	0.29	22.61	31.84	4.98
Russia	8.81	0.14	19.96	9.69	1.04	27.43	150.09	178.56
Singapore	20.75	0.66	87.85	21.28	0.47	80.02	178.44	180.14
South Africa	6.10	0.08	28.54	6.05	0.01	28.41	118.59	98.57
South Korea	4.07	0.09	16.11	3.98	0.10	16.30	112.58	91.89
Spain	5.34	0.16	16.64	5.45	0.12	16.27	41.13	68.63
Sri Lanka	3.71	0.04	9.95	3.56	0.06	8.75	49.34	4.43
Sweden	5.74	0.63	17.19	6.20	0.26	18.62	119.37	159.23
Switzerland	11.81	1.11	27.23	11.10	0.08	24.33	188.77	115.34
Thailand	6.85	0.38	26.55	6.74	0.12	27.77	125.32	106.68
Tunisia	6.15	0.06	15.12	6.27	0.37	15.82	18.73	43.78
Turkey	5.58	0.24	24.78	5.92	0.40	23.85	13.33	46.67
United Kingdom	6.47	0.05	20.31	6.35	0.28	20.23	83.74	63.05
United States	4.43	0.14	14.25	4.40	0.52	15.37	45.21	18.81
Uruguay	4.31	0.55	21.42	4.03	0.04	21.47	23.08	4.53
All Countries	6.62	0.00	94.91	6.59	0.00	94.94	86.47	79.16

Note: Yearly valuation changes in percent of real GDP. Cumulative valuation changes over the period 1991–2017 (except for Austria, Belgium, Greece, Ireland, and New Zealand, whose initial observed period are in 2005, 2002, 2000, 2005, and 2000, respectively) are in real terms and measured in percent of initial real GDP. The numbers in the row “All Countries” correspond to the respective statistic given at the top of the column. In the final three columns, the cross-country mean is reported. ROW Inflation is calculated as the average expected inflation in the first quarter with real GDP shares in ROW GDP as weights. ROW GDP contains all countries excluding the five major currency issuers as well as the country under study.

as a share of initial (year 1990) GDP. Just as documented in Gourinchas and Rey (2014), all three lines move together in the 1990s, but the cumulated valuation effect widens after 2000 and amounts to roughly 45.21% of initial GDP in 2017 ($-120.74 - (-75.53)$%). By contrast, the adjusted cumulated valuation effect is moderate and stands only at about 18.81%-points in 2017 – a decrease of well over half ($(45.21 - 18.81)/45.21 \approx 0.58$). For the U.S., a large part of the cumulated valuation effect is thus accounted for by the *inflation effect*.

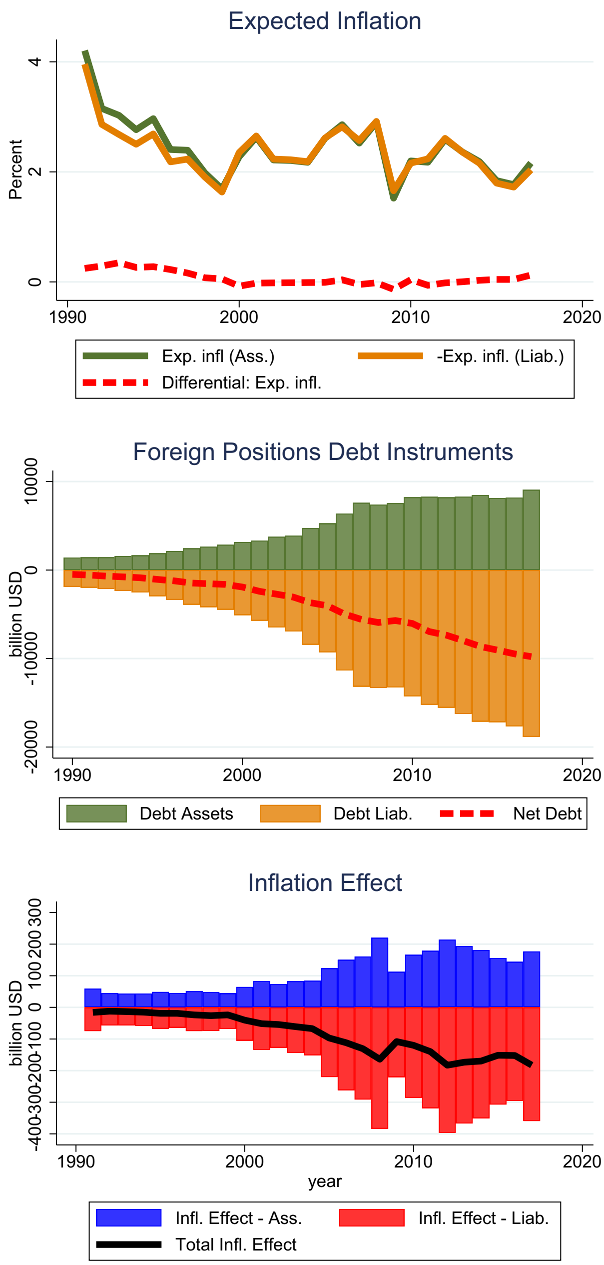

Fig. 2. Elements of the Inflation Effect for the U.S.
Note: The adjusted CAs are computed according to Eq. (22). The sample contains 50 countries; data for some countries begin after 1990. See Appendix Table A1 for details. Data Sources: Bénétrix et al. (2020), Datastream, IMF, WB, own calculations.

As discussed in connection with Fig. 2, the *inflation effect* is driven by two factors: differences in foreign and domestic inflation and large, unbalanced gross foreign positions in *Debt Instruments* and, in the case of the U.S., the upward adjustment is fully driven by the latter component. The large negative NIIP in the asset class *Debt Instruments* (see Gourinchas and Rey, 2014), implies that adjustments in U.S. liabilities are larger than adjustments in U.S. assets, making the adjusted CA less negative and thereby causing a decrease in the valuation effect.

A similar logic applies to the other countries that show an upward adjustment in the cumulative CA: in recent years, Canada, France, Italy, and the U.K. have had higher inflation abroad than at home, but their net liability positions in *Debt Instruments* are large enough that the adjustment for the *inflation effect* is positive overall.[49] In contrast, Ireland and Japan

[49] For Canada and the U.K., the negative gap between the change in NIIP and the cumulative CA in 2017 shrinks from 131.08% to 98.52% of initial GDP and from 83.74% to 63.03%, respectively. For Germany, France and Italy, the positive gap increases, respectively from 52.18% to 54.75%, from 33.32% to 38.47% and from 2.34% to 11.44%.

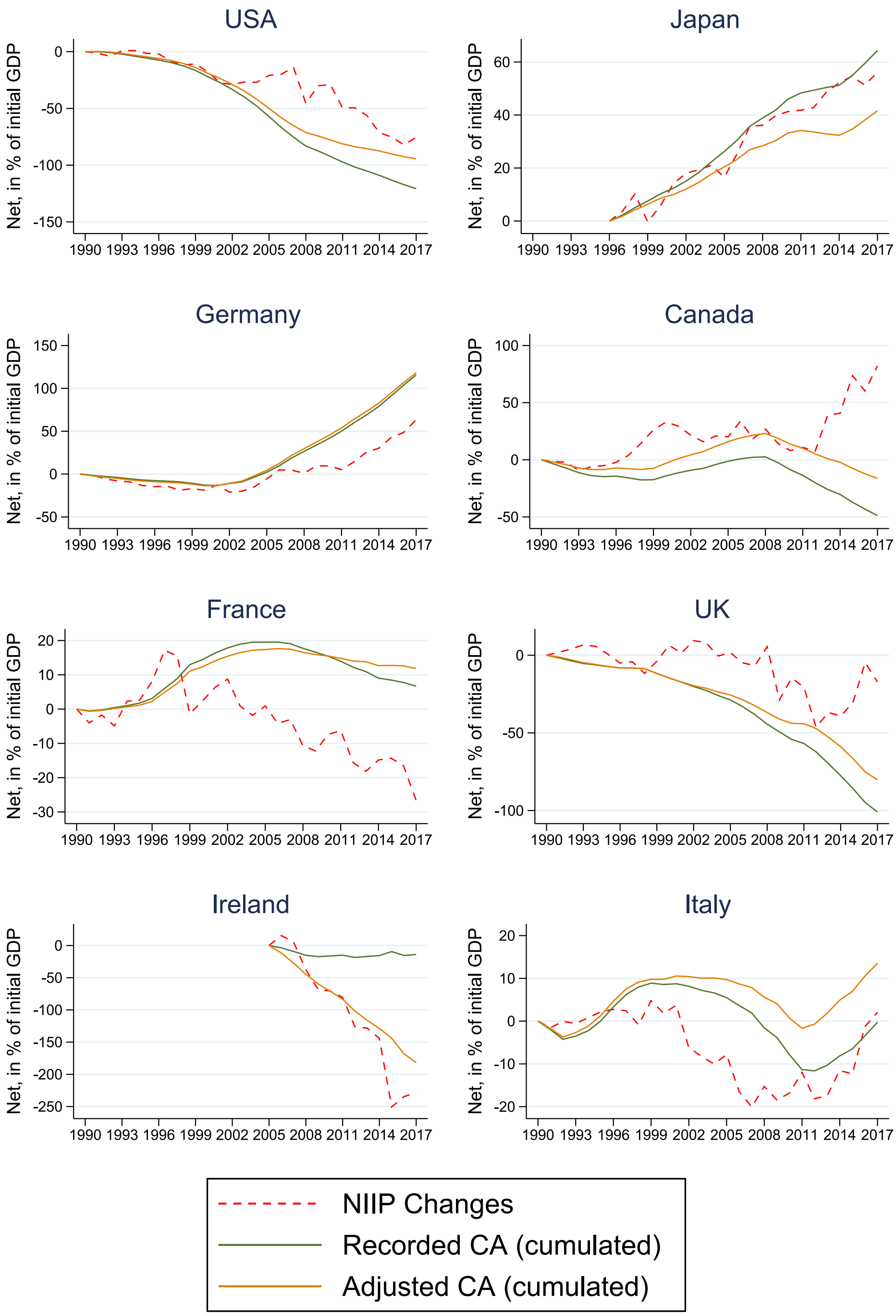

Fig. 3. Cumulated Current Account and Net International Investment Position - Recorded and Adjusted
Note: The adjusted CAs are computed according to Eq. (22). All variables are real (deflated by the GDP deflator) and expressed in terms of initial GDP. Data Sources: Bénétrix et al. (2020), Datastream, IMF, WB, own calculations.

show a systematic downward adjustment. The reasons are mixed: for Japan, the adjustment is driven by higher inflation abroad than at home and a large positive net *Debt* position. Ireland has a mixed inflation differential over the sample period and a positive net debt position throughout. In years in which inflation is higher at home, the surplus in assets overcompensates this effect, generating a downward adjustment throughout.[50]

[50] The *inflation effect* plays an important role in Ireland's valuation losses, which have a prominent place in the investigation of Lane et al. (2011). We do not overemphasize these findings, however, since the Irish BOP is plagued with uncertainties, especially when it comes to FDI positions. See IMF (2003) and Lane et al. (2011).

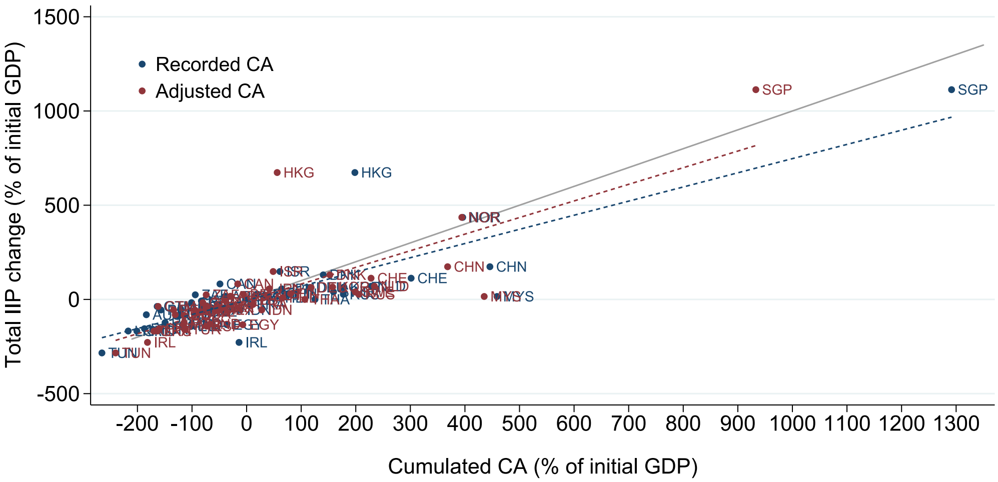

Fig. 4. Cumulated Current Accounts and Net International Investment Position Changes - CA Adjustment Based on Debt Positions
Note: Adjusted CA is computed using Eq. (22) based on debt positions. All variables are real, that is, expressed in 2000 USD, and in terms of initial GDP. Data Sources: Bénétrix et al. (2020), Datastream, IMF, WB, own calculations.

The examples of the U.S., Ireland, Canada, and the U.K. show that the *inflation effect* can increase the gap between the change in NIIP and cumulative CAs in the long run, such that adjusting for it reduces the valuation effect. At the same time, France and Japan show that the adjustment may increase it. The *inflation effect* may thus contribute systematically to the valuation effect in either direction. We next assess the extent to which there is a systematic reduction or amplification of the valuation effect in our full set of countries.

Specifically, we investigate whether the valuation effect *VAL* defined in Eq. (23) falls or rises in magnitude when adjusted for the *inflation effect* ($\widetilde{VAL}$ from Eq. (24)). We will compare both measures over both the short (year-to-year) and the long term (1991 - 2017). Table 4 provides a summary of (the absolute value of) these variables. The average yearly valuation effect as recorded is 6.62% of GDP in absolute value. On a yearly basis, the impact of the *inflation effect* on the average valuation effect seems to be minimal. However, the picture is different when looking at longer horizons: over the full period, the *inflation effect* reduces the cumulative valuation effect by 7.31% of initial GDP (from 86.47% to 79.16%) for the average country, or almost a twelfth. Just like a slow trend under strong noise, the *inflation effect* surfaces over longer horizons. When part of the noise washes out, a substantial share of what the literature identifies as a valuation effect of NIIP actually turns out to be our *inflation effect*.

Fig. 4 visualizes how adjustments of the *inflation effect* generally bring the cumulated CA closer to changes in NIIP in our full sample.[51] In the figure, the blue dots correspond to a country's cumulated CAs as officially recorded in their national balance of payments statistics. The red dots, instead, correspond to the adjusted CAs. Deviations from the 45-degree line (solid line) reflect from valuation effects. The figure includes the fitted lines for the officially recorded and the adjusted CA, showing that the cumulated adjusted CA is closer to the 45-degree line than its recorded counterpart.[52] The estimates corresponding to the plot are based on the model

$$\Delta_{1991,2017}\ niip_c = \alpha + \beta \sum_{\tau=1991}^{2017} ca_{c,\tau} + \gamma \Delta_{1991,2017} e_{c,usd} + \varepsilon_c, \tag{25}$$

where $\Delta_{1991,2017}$ indicates changes between the initial period and 2017, *niip* and *ca* are the *NIIP* and the *CA* normalized by country *c*'s 2000 GDP and $e_{c,usd}$.[53] The results are reported in Columns I and II of Table 5 and corroborate the message emerging from Fig. 4. The estimate of β is positive and significant (0.752) in the specification with the recorded cumulative CA (Column I), yet the p-value in the last row clearly rejects the hypothesis that that the slope is one. The coefficients in the specifications with the cumulative *adjusted CA* (Column II) increase to 0.881 and the hypothesis that the slope differs from one cannot be rejected.[54] As documented in Table 4 above, our adjustment of the CA seems more strongly linked to the valuation effects when looking at longer horizons. Nevertheless, we also estimate the relation (25) of year-to-year changes. The corresponding results, reported in Columns III and IV of Table 5, are qualitatively similar to those in the first three columns but less pronounced. Again, the coefficient on the cumulative CA as recorded (Column III) is 0.725 and thus

[51] Due to data availability, the change is computed over a shorter time period for some countries. See Table A1 in the Appendix.

[52] plots the Figure B1 in the Appendix plots the sample, excluding the outliers Singapore and Hong Kong. In this sample, the effect of the adjustments for the fitted line is less pronounced.

[53] The time period differs in some countries due to data availability. See Appendix Table A1 for details.

[54] Applying a simple z-score test, we find that the coefficients are significantly different from each other at the 10% level.

Table 5
The current account and the net international investment position - cross country analysis.

Dep. Var.:	Total NIIP Change		Year-to-Year NIIP Change	
	(I)	(II)	(III)	(IV)
Recorded Current Account	0.752***		0.725***	
(in percent of initial/current GDP)	[0.092]		[0.101]	
Adjusted Current Account		0.881***		0.775***
(All Debt)		[0.167]		[0.120]
Constant	-3.651	-5.800	0.028	-0.040
	[15.114]	[16.792]	[0.370]	[0.403]
Observations	50	50	1274	1274
R2	0.726	0.647	0.120	0.118
Coeff. test p-value	0.009	0.481	0.009	0.066

Note: $^{***}p < .01$, $^{**}p < .05$, $^{*}\ p < .10$. Standard errors are shown in brackets and are clustered at the country level. "Total NIIP Change" indicates change in a country's net international investment position from a reference year (usually 1990) to 2017, expressed in 2000 USD and in terms of initial (reference) GDP. "Year-to-Year NIIP Change" indicates a country's year-to-year change in its net international investment position, in percent of GDP. The recorded and adjusted current accounts are cumulated over the relevant period for each column (i.e reference period to 2017 in columns I and II, and for the current period for columns III and IV). See Appendix A for variable definitions as well as further data and sample description. The coefficient test p-values refer to an F-test with the null hypothesis of the respective coefficient on the CA variable being equal to 1.

smaller than the corresponding coefficient on the cumulative adjusted CA (Columns IV), 0.775, and the hypothesis that the latter is different from one is rejected only with marginal significance.[55]

Overall, our adjustments tend to compress the valuation effect, that is, the differences between the CA and the change in NIIP. A large part of the valuation effect thus actually appears to be an *inflation effect*.

4.3.3. Expected vs. surprise components of inflation

When calculating the *inflation effect* based on Eq. (22), we have relied on expected inflation, thus discarding the unexpected component of inflation. This choice is dictated by our theoretical foundation. Specifically, the assumption of uncovered interest parity, Eq. (3), reflects only the expected component of inflation.[56] While exchange-rate changes clearly induce valuation gains and losses on foreign investment and thus impact real returns, only the expected component is compensated for by promised returns on debt instruments.

To make the distinction between expected and unexpected components of inflation explicit, consider a two-period, n-country world with an uncertain exchange rate but deterministic returns to assets otherwise. Riskless nominal returns to country k's bonds, expressed in local currency, are defined just as in Eq. (2)

$$1 + r_k = \left[(I_k + p_{k,2} - p_{k,1})/p_{k,1}\right] + 1.$$

The uncovered interest parity requires

$$1 + r_i = \frac{r_j}{1 + \Delta^e_{ij}} + \frac{1}{1 + \Delta^e_{ij}}, \tag{26}$$

where superscript e indicates the expected component of inflation under the information set of period 1. As above, Δ stands for the exchange-rate change. Realized exchange-rate changes are

$$1 + \Delta_{ij} = 1 + \Delta^e_{ij} + \Delta^s_{ij},$$

where superscript s indicates the surprise component. Consider now an investor in i who invests in a riskless bond of country j. The nominal return in the currency of country j is fully known but the exchange-rate changes have a risky component. We label the realized return from this investment, expressed in country i's currency, as r_{ij}. It satisfies

$$1 + r_{ij} = \left[\tfrac{r_j}{1+\Delta_{ij}}\right] + \left[\tfrac{1}{1+\Delta_{ij}}\right] \approx \left[r_j\right] + \left[1 - \left(\Delta^e_{ij} + \Delta^s_{ij}\right)\right] = \left[r_i + \Delta^e_{ij}\right] + \left[1 - \left(\Delta^e_{ij} + \Delta^s_{ij}\right)\right].$$

Taking expectations, this equation obviously simplifies to $E(r_{ij}) = r_i$, since the surprise component of the exchange-rate change is zero. As discussed in connection with Eqs. (2) and (6), however, the term in the first square brackets reflects

[55] The coefficient on the adjusted CA is marginally significantly different from one at the 10% level and is not statistically different from the recorded CA coefficient using a simple z-score test. Table C1 reports the results for parallel regressions that exclude Singapore and Hong Kong. As suggested by Fig. B1, the differences between the coefficients reported and adjusted shrinks for this sample.

[56] If we explicitly added an uncertain component of inflation in our framework, Eq. (3) would hold in expectation and consequently π in (2) would stand for expected inflation.

precisely the BOP-measured rate of return, which thus corresponds to Eq. (14):

$$R_{ij}^{BOP} = r_i + \Delta_{ij}^e,$$

while the term in the second square brackets reflects the valuation change due to exchange-rate changes, which now decomposes into an expected component and an unexpected one.

Relating this last equation to the Fisher equation $1 + r_i = (1 + \rho)(1 + \pi_i^e)$ in its linearized form

$$r_k \approx \rho + \pi_k^e$$

and replacing the expected component of inflation with expected inflation differential

$$1 + \Delta_{ij}^e = \frac{1 + \pi_j^e}{1 + \pi_i^e} \approx 1 + \pi_j^e - \pi_i^e$$

yields for the BOP-recorded rate of return

$$R_{ij}^{BOP} = r_i + \Delta_{ij}^e = \rho + \pi_i^e + \pi_j^e - \pi_i^e = \rho + \pi_j^e.$$

Adding time indices, this shows that $\pi_{j,t}$ in Eqs. (14) and (15) specifically refers to the expected component of inflation.

While recent work has acknowledged the importance of exchange-rate changes for the valuation effect (e.g., Lane and Milesi-Ferretti, 2007a; Gourinchas and Rey, 2007; Lane and Shambaugh, 2010; Bénétrix et al., 2015), our paper highlights the distinct importance of its expected component. Our approach echoes the distinction between anticipated and unanticipated real returns to foreign investment, as pursued in Devereux and Sutherland (2010). These authors build a general equilibrium model of portfolio choice to decompose both components and report that expected valuation gains must be small under reasonable parameter values. Contrary to Devereux and Sutherland (2010), our paper highlights the role of expected inflation from a mere accounting perspective, showing that expected inflation leaves the real returns to foreign investment unchanged but distorts the CA at the expense the valuation effect.

Regarding the magnitude of the *inflation effect*, part of our findings are in line with Lane and Shambaugh (2010). Describing the core functioning of our *inflation effect*, Lane and Shambaugh (2010) state that exchange-rate changes are possibly “simply offsetting expected returns and the total financial impact on NFA [...] is not materially affected”. Summarizing their analysis of year-to-year returns, they conclude, however, that “this is not the empirically relevant scenario.”[57] We concur with this assessment in the sense that NIIP remains unaffected by the *inflation effect* and that its yearly contributions to the CA and the valuation effect are small. However, we also document that these small yearly effects are systematic and accumulate to economically significant values over longer horizons. The impact of expected inflation for the cumulated CA and valuation effects is large, in particular for the prominent example of the U.S., which has seen its large CA deficit substantially and systematically reduced in recent years.

5. Conclusion

This paper shows that inflation can systematically affect the current account balance (CA). It starts by summarizing the relevant accounting rules laid out in the IMF’s Balance of Payments Manual. Its main contribution is to highlight, theoretically and empirically, the positive link between the rate of expected inflation, nominal interest rates and the recorded return to debt investment. This *inflation effect* for the CA can be large, especially for countries with inflation that substantially differs from that of its typical investment destination or countries with large net foreign positions in debt instruments. Our empirical part shows that the corresponding adjustments to the CA are about 0.24% of GDP for the average country and year. Accordingly, the CA, measured in absolute values and cumulated over the whole period, is reduced by one-seventh for the average country (from 156.47% of initial GDP to 133.62%). In addition, global imbalances (the sum over the absolute values of all countries’ CAs) are less pronounced than previously thought and are adjusted from 3.53% of aggregate GDP to 2.96% in the average year. In 2017, the adjustment is as large as two-fifths. The adjustments of the CA have a flip side, affecting the well-known valuation effect on net international investment positions. When adjusting the cumulated valuation effect for the period 1991 to 2017 for the *inflation effect*, it shrinks by 7.7% of GDP, or a twelfth, for the average country. For the U.S., it drops by well over half, from 45.21% to 18.81% of initial GDP. Part of the valuation effect thus appears to be, in reality, an *inflation effect*. These findings shed new light on the sustainability of the U.S. CA deficit and suggest, more broadly, that the use of the CA as an indicator of global imbalances and as a policy tool may be problematic. The CA may deserve a more careful interpretation.

[57] At the same time, the authors state “currency-induced valuation shocks [...] can be substantial, are not quickly reversed, and explain a significant fraction of aggregate valuation shocks.”

Appendix A. Data

For our CA adjustments, we draw on three main data sources (i) Bénétrix et al. (2020) provides data on international investment positions, disaggregated by currency (USD, EUR, JPY, GBP, CNY, the domestic currency and a residual basket), separately for *Debt Instruments* and other assets, (ii) the IMF's Balance of Payment Statistics (BOPS) for information on the recorded CA, and (iii) Datastream for expected inflation. GDP data to normalize CA values come from the World Bank. The data from Bénétrix et al. (2020) constitute the backbone of our final sample and simultaneously impose the most severe data restriction, covering 50 countries for the period 1990 - 2017. See Table A1 for detailed information about data coverage by country.

For our regression results presented in Table 2, we additionally use data on investment income from BOPS and (realized) CPI inflation data from the World Bank. For further control variables, we use data from the IMF's International Financial Statistics (IFS) to compute real GDP growth and equity index growth. Data on credit ratings comes from Datastream. Market yields on U.S. treasury securities from FRED (St. Louis Fed) is used to calculate the real rate of return. This section provides more detail on data use and treatment in the present paper.

Returns on investment

We define country *i*'s nominal yearly rate of return on foreign assets as total yearly receipts on foreign assets over initial foreign asset positions in USD, as given in Eq. (16). To compute this ratio, we use the IMF's BOPS database, which records annual income on foreign assets and liabilities in the current account in the asset class *Debt Instruments* and divide those by lagged end-of-period stocks of cross-border investment (assets and liabilities) in the International Investment Position (IIP) from Bénétrix et al. (2020).

Expected and realized inflation

Expected inflation, as defined in Eqs. (17) and (18), is calculated using data from the World Economic Survey (WES), available on Datastream. It is defined as a Q1 average expert forecast of CPI inflation for the current year. To construct ROW expected inflation for each country, we apply the yearly currency weights of each country's IIP for the currencies classified in Bénétrix et al. (2020). For the residual currency basket (i.e. those that do not issue one of the major currencies), we take averages using real GDP weights of the remaining countries. We thus compute $\bar{\pi}_{it}^{A}$ for assets and $\bar{\pi}_{it}^{L}$ for liabilities, both for debt and for non-debt positions separately. For realized inflation, we use CPI inflation data from the World Bank and apply the same aggregation method as for expected inflation.

Yields.

Datastream provides our monthly series of constant maturity yields for government bonds for 20 OECD countries and South Africa, available since September 1990.[58] We use the 1- and 5-years to maturity yields (extracted from a 3^{rd} degree polynomial yield curve). Since the rest of our analysis is based on annual data, we compute yearly averages (when data for the full year is available). This results in a series of yearly average yields spanning the period from 1991 to 2015.[59]

Control variables

We construct **real returns** as follows. From FRED, we download monthly data on market yields on U.S. Treasury securities at 1-year constant maturity, quoted on investment basis. We take the January value of each year and subtract U.S. Q1 expected inflation.

Provided by the IFS, we have **real GDP growth**, and **equity indices**.[60] The average **credit score** variable represents the average annual credit rating given to a country by leading credit rating agencies (with a range between 0 and 20, where an AAA rating = 20). We normalize ratings to values between 0 and 1. Ratings come from Datastream and are provided by Oxford Economics.[61] Where applicable, the ROW averages of these variables are computed similarly to the inflation and expected inflation ROW averages.

CA Adjustments

We take recorded CA values from the BOPS. The adjustment terms given by Eqs. (20) and (21) are computed using expected ROW inflation, which is constructed as described above. International investment positions are from Bénétrix et al. (2020). For the tables and graphs presenting our results, we normalize recorded and adjusted CA as well as Net IIP using real GDP from the World Bank.

[58] The full country list comprises Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, Netherlands, New Zealand, Portugal, Spain, Sweden, Switzerland, South Africa, United Kingdom, USA.

[59] Data for Belgium, Greece and South Africa starts in 2001. Data for Portugal and Finland starts in 1995 and 1996 respectively.

[60] Depending on availability, one of the following equity index variables is used: LONSH_EOP_IX or FPE_IX.

[61] Data for New Zealand is directly computed from the historical ratings series available on the New Zealand debt management office website: https://www.nzdmo.govt.nz/about-us/credit-ratings.

Table A1
Data sources and coverage.

Country	Bénétrixet al. (2020)	CA/Inv. Inc.(IMF BOPS)	Exp. Infla-tion(Datastream)	GDP(World Bank)	CPI(World Bank)	Real GDP Growth(IMF IFS)	Equity Index Growth(IMF IFS)	Credit Rat-ings(Datastream)	Treasury Sec. Yields(FRED)
Argentina	1990-2017	1990-2018	1991-2017	1989-2018	2018-2019	1951-2015	1991-2016	1980-2016	-
Australia	1990-2017	1990-2018	1991-2017	1989-2018	1989-2019	1960-2015	1958-2016	1980-2016	-
Austria	1990-2017	2005-2018	1991-2017	1989-2018	1989-2019	1965-2016	1950-2016	1980-2016	-
Belgium	1990-2017	2002-2018	1991-2017	1989-2018	1989-2019	1954-2016	1950-2016	1980-2016	-
Brazil	1990-2017	1990-2018	1991-2017	1989-2018	1989-2019	1964-2011	1991-2016	1980-2016	-
Canada	1990-2017	1990-2018	1991-2017	1989-2018	1989-2019	1950-2016	1956-2016	1980-2016	-
Chile	1990-2017	1990-2018	1991-2017	1989-2018	1989-2019	1961-2016	1990-2016	1980-2016	-
China	1990-2017	1990-2018	1991-2017	1989-2018	1989-2019	1979-2012	1990-2016	1980-2016	-
Colombia	1990-2017	1990-2018	1991-2017	1989-2018	1989-2019	1969-2010	1952-2016	2005-2016	-
Czech Republic	1993-2017	1993-2018	1991-2017	1990-2018	1992-2019	1991-2016	1998-2016	1992-2016	-
Denmark	1990-2017	1990-2018	1991-2017	1989-2018	1989-2019	1967-2016	1995-2016	1980-2016	-
Egypt	1990-2017	1990-2018	1991-2007, 2010-2017	1989-2018	1989-2018	1983-2015	-	1987-2016	-
Finland	1990-2017	1990-2018	1991-2017	1989-2018	1989-2019	1961-2016	1950-2016	1980–2016	-
France	1990-2017	1990-2018	1991-2017	1989-2018	1989-2019	1951-2016	1950-2016	1980-2016	-
Germany	1990-2017	1990-2018	1991-2017	1989-2018	1989-2019	1961-2016	1970-2016	1980-2016	-
Greece	1990-2017	1990-97, 99-2018	1991-2017	1989-2018	1989-2019	1950-2016	1993-2016	1980-2016	-
Guatemala	1990-2017	1990-2018	-	1989-2018	1989-2019	1952-2015	-	2005-2016	-
Hong Kong	1990-2017	1998-2018	1991-2017	1989-2018	1989-2019	1962-2016	1990-2016	1980-2016	-
Hungary	1990-2017	1990-2018	1991-2017	1991-2018	1989-2019	1971-2015	2000-2016	1990-2016	-
India	1990-2017	1990-2018	1991-2017	1989-2018	1989-2019	1951-2016	1950-2016	1980-2016	-
Indonesia	1990-2017	1990-2018	1991-2016	1989-2018	1989-2019	1959-2016	1995-2016	1980-2016	-
Ireland	1990-2017	2005-2018	1991-2017	1989-2018	1989-2019	1950-2016	1950-2016	1980-2016	-
Israel	1990-2017	1990-2018	1992-2017	1989-2018	1989-2019	1969-2016	1950-2016	2005-2016	-
Italy	1990-2017	1990-2018	1991-2017	1989-2018	1989-2019	1971-2016	1950-2016	1980-2016	-
Japan	1990-2017	1996-2018	1991-2017	1989-2018	1989-2019	1956-2016	1950-2016	1980-2016	-
Malaysia	1990-2017	1990-2018	1991-2017	1989-2018	1989-2019	1971-2016	1980-2016	1980-2016	-
Mexico	1990-2017	1990-2018	1991-2017	1989-2018	1989-2019	1950-2016	1978-2016	1980-2016	-
Morocco	1990-2017	1990-2018	1992-95, 1998-2006, 2009-17	1989-2018	1989-2019	1965-2014	2000-2016	2005-2016	-

(*continued on next page*)

Table A1 (*continued*)

Country	Bénétrixet al. (2020)	CA/Inv. Inc.(IMF BOPS)	Exp. Infla-tion(Datastream)	GDP(World Bank)	CPI(World Bank)	Real GDP Growth(IMF IFS)	Equity Index Growth(IMF IFS)	Credit Rat-ings(Datastream)	Treasury Sec. Yields(FRED)
Netherlands	1990-2017	1990-2018	1991-2017	1989-2018	1989-2019	1957-2016	1950-2016	1980-2016	-
New Zealand	1990-2017	2000-2018	1991-2017	1989-2018	1989-2019	1955-2015	1960-2016	1980-2016	-
Norway	1990-2017	1990-2018	1991-2017	1989-2018	1989-2019	1967-2016	1950-2016	1980-2016	-
Pakistan	1990-2017	1990-2018	1991-2017	1989-2018	1989-2019	1954-2016	1960-2016	2005-2016	-
Peru	1990-2017	1990-2018	2000-2017	1989-2018	1989-2019	1951-2015	1988-2016	2005-2016	-
Philippines	1990-2017	1990-2018	1991-2017	1989-2018	1989-2019	1959-2016	1952-2016	1980-2016	-
Poland	1990-2017	1990-2018	1991-2017	1990-2018	1989-2019	1981–2014	1993-2016	1988-2016	-
Portugal	1990-2017	1990-2018	1991-2017	1989-2018	1989-2019	1979-2016	1988-2016	1980-2016	-
Russia	1993-2017	1994-2018	1991, 1993–2017	1989-2018	1993-2019	1996-2014	1998-2016	1989-2016	-
Singapore	1990-2017	1990-2018	1991-2006, 2008-16	1989-2018	1989-2019	1961-2016	1985-2016	1980-2016	-
South Africa	1990-2017	1990-2018	1991-2017	1989-2018	1989-2019	1951-2016	1960-2016	1980-2016	-
South Korea	1990-2017	1990-2018	-	1989-2018	1989-2019	1954-2016	1972-2016	1980-2016	-
Spain	1990–2017	1990-2018	1991-2017	1989-2018	1989-2019	1955-2016	1961-2016	1980-2016	-
Sri Lanka	1990-2017	1990-2018	1992-97, 1999–2017	1989–2018	1989-2019	1966-2014	2001-2015	2005-2016	-
Sweden	1990-2017	1990-2018	1991-2017	1989-2018	1989-2019	1951-2016	1950-2016	1980-2016	-
Switzerland	1990-2017	1990-2018	1991-2017	1989-2018	1989-2019	1950-2015	1989-2016	1980-2016	-
Thailand	1990-2017	1990-2018	1991-2017	1989-2018	1989-2019	1951-2016	1997-2016	1980-2016	-
Tunisia	1990–2017	1990-2018	1991-2017	1989-2018	1989-2019	1962-2014	-	2005-2016	-
Turkey	1990-2017	1990-2018	1991-2017	1989-2018	1989-2019	1968-2015	1986-2016	1980-2016	-
United Kingdom	1990-2017	1990-2018	1991-2017	1989-2018	1989-2019	1950-2016	1950-57, 1963–2016	1980-2016	-
United States	1990-2017	1990-2018	1991-2017	1989-2018	1989-2019	1950-2016	1950-2016	1980-2016	1978-2020
Uruguay	1990-2017	1990-2018	1991-2017	1989-2018	1989-2019	1956–2015	-	2005-2016	-

Appendix B. Additional Figures

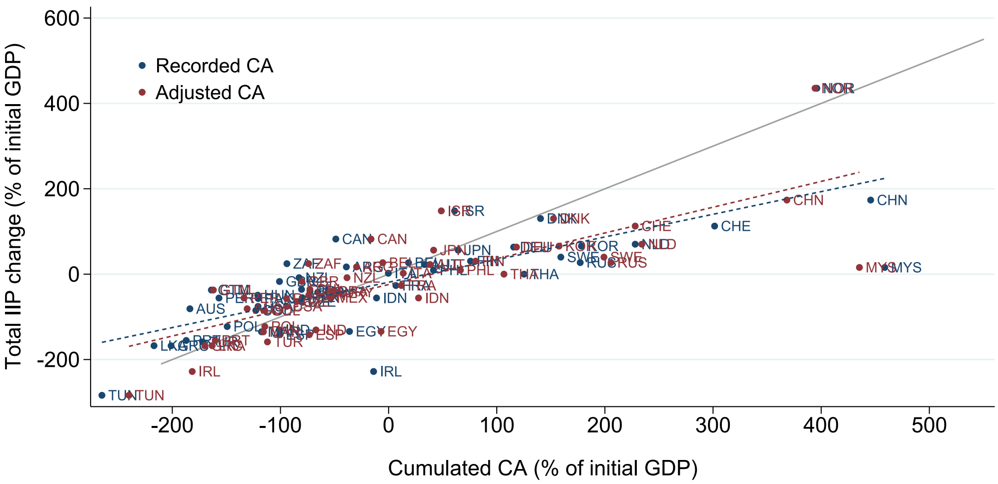

Fig. B1. Cumulated Current Accounts and Net International Investment Position Changes - CA Adjustment excl. Hong Kong and Singapore
Note: The adjusted CA is computed using Eq. (22), based on debt instruments. All variables are real, i.e. expressed in 2000 USD, and in terms of initial GDP. Data Sources: Bénétrix et al. (2020), Datastream, IMF, WB, own calculations.

Appendix C. Additional Tables

Table C1
The current account and the net international investment position - cross country analysis - excl. Hong Kong and Singapore.

Dep. Var.:	Total NIIP Change		Year-to-Year NIIP Change	
	(I)	(II)	(III)	(IV)
Recorded Current Account	0.531***		0.548***	
(in percent of initial/current GDP)	[0.112]		[0.052]	
Adjusted Current Account		0.604***		0.624***
(All Debt)		[0.127]		[0.072]
Constant	−18.979	−24.149**	−0.375	−0.517**
	[11.410]	[10.291]	[0.264]	[0.227]
Observations	48	48	1228	1228
R2	0.583	0.625	0.079	0.102
Coeff. test p-value	0.000	0.003	0.000	0.000

Note: ***$p < .01$, **$p < .05$, * $p < .10$. Full sample excluding Hong Kong and Singapore. Standard errors are shown in brackets and are clustered at the country level. “Total NIIP Change” indicates change in a country’s net international investment position from a reference year (usually 1990) to 2017, expressed in 2000 USD and in terms of initial (reference) GDP. “Year-to-Year NIIP Change” indicates a country’s year-to-year change in its net international investment position, in percent of GDP. The recorded and adjusted current accounts are cumulated over the relevant period for each column (i.e reference period to 2017 in columns I and II, and for the current period for columns III and IV). See Appendix A for variable definitions as well as further data and sample description. The coefficient test p-values refer to an F-test with the null hypothesis of the respective coefficient on the CA variable being equal to 1.

Supplementary material

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.euroecorev.2021.103721.

References

Adler, G., Garcia-Macia, D., Krogstrup, S., 2019. The measurement of external accounts. IMF Working Paper 19/132.
Alfaro, L., Kalemli-Ozcan, S., Volosovych, V., 2008. Why doesn't capital flow from rich to poor countries? An empirical investigation. Rev. Econ. Stat. 90 (2), 347–368.
BEA, 1990. The Balance of Payments of the United States – Concepts, Data Sources, and Estimating Procedures. Department of Commerce, Bureau of Economic Analysis.
Bénétrix, A. S., Gautam, D., Juvenal, L., Schmitz, M., 2020. Cross-border currency exposures: new evidence based on an enhanced and updated dataset. ECB Working Paper No. 2417.
Bénétrix, A.S., Lane, P.R., Shambaugh, J.C., 2015. International currency exposures, valuation effects and the global financial crisis. J. Int. Econ. 96, S98–S109.
Bernanke, B., 2005. The global saving glut and the u.s. current account deficit. Paper presented at Sandrigdge Lecture, Virginia Association of Economists. 10 March, Richmond, VA.
Borio, C. E., Disyatat, P., 2011. Global imbalances and the financial crisis: link or no link?BIS WP 346.
Caballero, R.J., Farhi, E., Gourinchas, P.O., 2008. Financial crash, commodity prices, and global imbalances. In: Brookings Papers on Economic Activity Fall, pp. 1–55.
Chinn, M.D., Ito, H., 2008. Global current account imbalances: American fiscal policy versus east asian savings. Rev. Int. Econ. 16 (3), 479–498.
Chinn, M.D., Prasad, E.S., 2003. Medium-term determinants of current accounts in industrial and developing countries: an empirical exploration. J. Int. Econ. 59 (1), 47–76.
Congress, U.S., 2016. Trade facilitation and trade enforcement act of 2015. Public Law 114–125.
Cooray, A., 2003. The Fisher effect: a survey. Singap. Econ. Rev. 48 (02), 135–150.
Coppola, A., Maggiori, M., Neiman, B., Schreger, J., 2020. Redrawing the map of global capital flows: the role of cross-border financing and tax havens.
Curcuru, S.E., Dvorak, T., Warnock, F.E., 2008. Cross-border returns differentials. Q. J. Econ. 123 (4), 1495–1530.
Devereux, M.B., Sutherland, A., 2010. Valuation effects and the dynamics of net external assets. J. Int. Econ. 80 (1), 129–143.
Dias, D.A., Richmond, C., Wright, M.L.J., 2014. The stock of external sovereign debt: can we take the data at face value? J. Int. Econ. 94 (1), 1–17.
Fischer, A.M., Groeger, H., Sauré, P., Yeşin, P., 2019. Current account adjustment and retained earnings. J. Int. Money Financ. 94, 246–259.
Fogli, A., Perri, F., 2006. The great moderation and the U.S. external imbalance. Monet. Econ. Stud. 24, 209–225.
Gourinchas, P.-O., Rey, H., 2007. From world banker to world venture capitalist: U.S. External adjustment and the exorbitant privilege. In: G7 Current Account Imbalances: Sustainability and Adjustment. University of Chicago Press, pp. 11–66.
Gourinchas, P.-O., Rey, H., 2014. External adjustment, global imbalances, valuation effects. In: Gopinath, G., Helpman, E., Rogoff, K. (Eds.), Handbook of International Economics, Vol. 4. Elsevier, pp. 585–645. Chapter 10
Gruber, J.W., Kamin, S.B., 2007. Explaining the global pattern of current account imbalances. J. Int. Money Financ. 26 (4), 500–522.
Hausmann, R., Sturzenegger, F., 2005. U.S. and Global Imbalances: Can Dark Matter Prevent a Big Bang? Working Paper 124, Center for International Development, Harvard University.
Hausmann, R., Sturzenegger, F., 2007. The missing dark matter in the wealth of nations and its implications for global imbalances. Econ. Policy 22 (51), 470–518.
Ikeda, D., Phan, T., 2019. Asset bubbles and global imbalances. Am. Econ. J. Macroecon. 11 (3), 209–251.
IMF, 2003. Foreign Direct Investment Statistics. How Countries Measure FDI. International Monetary Fund.
IMF, 2009. Balance of Payments and International Investment Positions Manual. International Monetary Fund.
IMF, 2017. 2017 External Sector Report. Technical Report. IMF Policy Paper July.
Johnson, P.A., 2006. Is it really the Fisher effect? Appl. Econ. Lett. 13 (4), 201–203.
Kehoe, T.J., Ruhl, K.J., Steinberg, J.B., 2018. Global imbalances and structural change in the United States. J. Polit. Econ. 126 (2), 761–796.
Laibson, D., Mollerstrom, J., 2010. Capital flows, consumption booms and asset bubbles: a behavioural alternative to the savings glut hypothesis. Econ. J. 544, 354–374.
Lane, P.R., Milesi-Ferretti, G.M., 2007a. The external wealth of nations mark II: revised and extended estimates of foreign assets and liabilities, 1970–2004. J. Int. Econ. 73 (2), 223–250.
Lane, P.R., Milesi-Ferretti, G.M., 2007b. The external wealth of nations: measures of foreign assets and liabilities for industrial and developing countries. J. Int. Econ. 55 (2), 263–294.
Lane, P.R., Milesi-Ferretti, G.M., 2009. Where did all the borrowing go? A forensic analysis of the US external position. J. Jpn. Int. Econ. 23 (2), 177–199.
Lane, P.R., Perotti, R., 1998. The trade balance and fiscal policy in the OECD. Eur. Econ. Rev. 42 (3), 887–895.
Lane, P.R., Shambaugh, J.C., 2010. Financial exchange rates and international currency exposures. Am. Econ. Rev. 100 (1), 518–540.
Lane, P.R., et al., 2011. The Dynamics of Ireland's Net External Position. IIIS.
Linsi, L., Mügge, D.K., 2019. Globalization and the growing defects of international economic statistics. Rev. Int. Polit. Econ. 26 (3), 361–383.
Maggiori, M., Neiman, B., Schreger, J., 2020. International currencies and capital allocation. J. Polit. Econ. 128 (6), 2019–2066.
Mendoza, E.G., Quadrini, V., Rios-Rull, J.V., 2009. Financial integration, financial development, and global imbalances. J. Polit. Econ. 117 (3), 371–416.
Milesi-Ferretti, G.M., Razin, A., 1996. Current Account Sustainability, 81. Princeton Study in International Finance.
Mishkin, F.S., 1992. Is the Fisher effect for real? A reexamination of the relationship between inflation and interest rates. J. Monet. Econ. 30 (2), 195–215.
Nason, J.M., Rogers, J.H., 2006. The present-value model of the current account has been rejected: round up the usual suspects. J. Int. Econ. 68 (1), 159–187.
Obstfeld, M., Rogoff, K., 1996. Foundations of International Macroeconomics. MIT Press, Cambridge, MA.
Roubini, N., Setser, B., 2005. Will the Bretton woods 2 regime unravel soon? the risk of a hard landing in 2005–2006. Unpublished Manuscript, New York University and Oxford University.
Sauré, P., 2017. Time-intensive R&D and unbalanced trade. Eur. Econ. Rev. 91, 229–244.
Treasury, 2019. Macroeconomic and Foreign Exchange Policies of Major Trading Partners of the United States. Technical Report. U.S. Department of the Treasury Office of International Affairs.
Zucman, G., 2013. The missing wealth of nations: are Europe and the US net debtors or net creditors? Q. J. Econ. 128 (3), 1321–1364.