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How Does Profit Shifting Affect the Balance of Payments?

by Shafik Hebous, Alexander Klemm, and Yuou Wu

I N T E R N A T I O N A L M O N E T A R Y F U N D

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Fiscal Affairs Department

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Prepared by Shafik Hebous, Alexander Klemm, and Yuou Wu¹

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Abstract

Profit shifting by multinational enterprises—through manipulation of transfer prices of related-party trade, intragroup lending, or the location of intangibles—affects international flows, raising the question of its impact on the current account and external balances. This paper approaches this question theoretically and empirically. In theory, profit shifting distorts the components of the current account and bilateral current account balances but leaves a country's aggregate net balance unaffected. There is, however, a real effect on current account balances, because taxes are paid to different jurisdictions. Moreover—in practice—the measured current account could change, because not all transactions are equally easy to track. Our panel empirical results broadly confirm that the current account balance tends to be, on average, unaffected by profit shifting, but taking heterogeneity into account we find that both the real tax effect and mismeasurement strengthen income balances—and thus the current account—in investment hubs.

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I. INTRODUCTION

Accurate balance of payments (BoP) data are essential for macroeconomic analysis. The fundamental strategies used by multinational enterprises to minimize tax payments by shifting profits to jurisdictions with lower tax rates involve actions that directly affect international flows: Manipulation of transfer prices of cross-border intragroup trade affects import and export data; corporate debt and financing structures affect international flows of interest; and, the location of intangible assets, such as patents, affects international flows of royalties and license fees. Although such strategies affect components of the BoP, they do not involve real changes to the location of production or employment. With recent empirical evidence pointing to large amounts of shifted profits from high-tax to low-tax jurisdictions, it becomes critical to ask how the BoP is affected by profit shifting practices by multinationals, and whether the potential effect is quantitatively large.

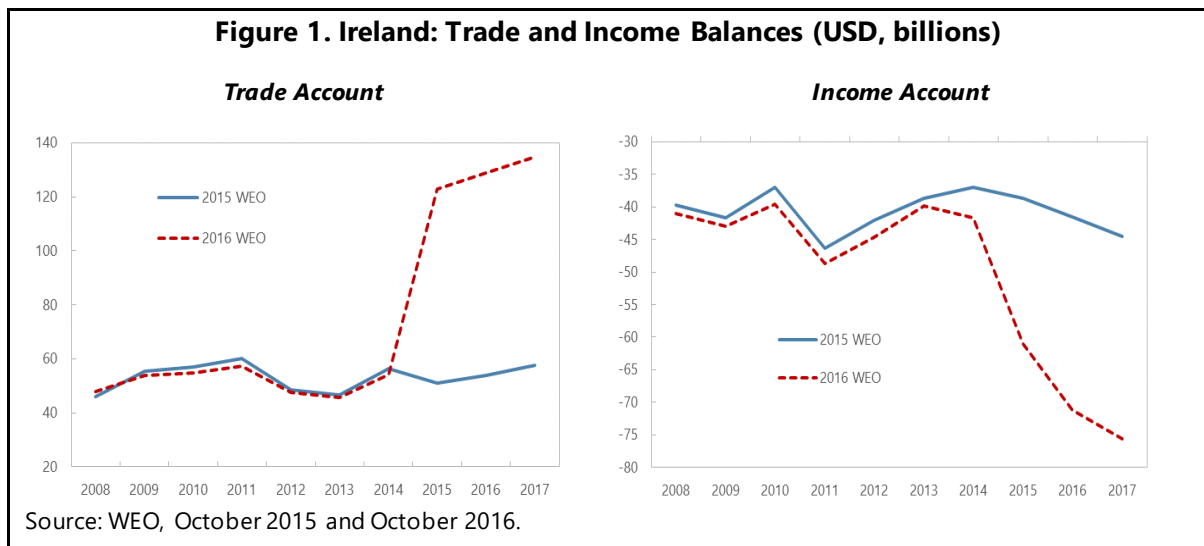
This paper provides a comprehensive analysis of how tax-motivated transactions and arrangements by multinational enterprises can affect the BoP, thereby bridging the two fields of international economics and public finance. This topic has already attracted considerable attention by academics and policymakers. For example, in 2015, Ireland revised up GDP growth from 7.8 to 26.3 percent as a result of some transactions involving multinational enterprises. While the exact nature of this GDP revision is not the topic of this paper,² a less discussed aspect is that the trade and income balances of the BoP were also revised in the process. Figure 1 visualizes a fundamental theme that emerges from the analysis of this paper: There are two offsetting effects on the current account, with a strengthening trade and weakening income account limiting the impact on the net current account. Other related examples include Switzerland's recent revision to address data gaps in connection to retained earnings that led to a sharp decrease in the primary income balance (SNB 2020).

An ample empirical literature suggests that multinationals are indeed likely to engage in profit shifting. A meta study by Beer, de Mooij, and Liu (2020) finds that on average a country loses 1.5 percent of its corporate tax base for each percentage point increase in the corporate income tax rate.³ Various papers also report estimates of aggregate losses. Results range from a relatively low losses of 2 percent of the global tax base (Beer et al., 2020), over 8 percent (Tørsløv, Wier and Zucman, 2018) to 23 percent (Cobham and Janský, 2018). Crivelli, De Mooij, and Keen (2016) calculate results separately for OECD members, where the long-run revenue loss is just below 1 percent of GDP and for other countries, where it totals 1.3 percent of GDP. Clearly there is

² For a discussion see Central Bank of Ireland (2016), Avdjiev et al. (2018), and Lane (2017).

³ See also surveys of the literature by Dhammika (2014), Dharmapala (2019), Egger et al. (2010), and Weichenrieder (2009).

uncertainty about precise figures, but this wealth of research certainly suggests the presence of profit shifting.⁴



Three main messages emerge from our analysis. First, double entry accounting under the BoP insulates the aggregate current account *balance* from distortion by profit shifting practices, but the sub-accounts (i.e., the trade, income, and bilateral current account balances) are distorted. The important strategies are discussed in this paper. To illustrate the fundamental idea, consider the case of mispricing related-party cross-border trade—an important mode of profit shifting. A multinational headquartered in a high tax country has an incentive to underprice its related-party exports and overprice its related-party imports (to lower reported profits by increasing costs and decreasing income), which result in an understated trade balance. However, the weakening trade balance (resulting from a successful transfer mispricing) is offset by an improved income balance—as the profits that have been shifted to the affiliate in the lower-tax jurisdiction will either return to the high-tax country in the form of dividends or be counted as reinvested earnings. Hence, either way, the current balance is not distorted by tax motivated arrangements of multinationals, but its components are. Moreover, whenever the trade balance is distorted this affects GDP and hence the ratio of the current account to GDP.

Second, although the current account is undistorted by profit shifting in theory, in practice measurement errors in statistics can be sizable. This can be particularly relevant for the income balance due to the challenges in accurately recording retained earnings of multinational affiliates abroad. In contrast, export and import data—at least on goods—are relatively easy to collect and tend to be of higher quality, which make the trade balance more likely to reflect transfer prices.

⁴ Empirical work suggests that all channels are important, especially transfer price manipulation. Heckemeyer and Overesch (2017) compare different channels empirically and find that nonfinancial methods (such as transfer price manipulation) explain about two thirds of total profit shifting. There is also empirical evidence that suggests that multinationals in some cases use different channels of profit shifting as substitutes (Saunders-Scott, 2016; Nicolay, Nusser, and Pfeiffer, 2017).

Hence, to the extent that the offsetting effect on the income balance is harder to detect—i.e., leaving no trace in the reporting economy's data—there will be a resulting gap in the current account. In this sense, statistical errors affect the measured, rather than true, current account balance.

Third, tax avoidance strategies do not *distort* the current account balance, but they do have a real effect on it, because taxes are paid to another country. Not all of the additional profits in low-tax jurisdictions come back through the income account, if some of them are collected as taxes by the country gaining tax base. Quantifying this effect is extremely difficult because it is manifestly tied to the net amount of shifted profits in each country, which is by definition unobservable.

Building on the literature, we provide the first empirical analysis of the above three predictions. Our regression results suggest that a 10-percentage point higher corporate income tax rate is, on average, associated with a reduction in the trade balance by 1 percent of GNI. For the average country, this effect is roughly offset by an increase of the same magnitude in the net income balance. However, if we split the sample into a group of likely tax base gainers and the rest of the countries, we find that the effect on the income balance only offsets about 4 percentage points of the improvement in their trade balances. This indicates a nonlinearity, such that in countries that are likely to gain significant tax base from profit shifting, the trade account effect dominates, and the current account strengthens by about 6 percent of GNI, on average.

Moreover, we decompose the positive effect on the current account in the group of tax base gainers into a real tax effect and a potential measurement error. Based on country-by-country estimates of profit shifting by Tørsløv, Wier, and Zucman (2018), the genuine tax effect on the current account averages 2.1 percent of GNI in the group of tax base gainers—i.e., by taxing the profits that are ultimately owned by non-residents, the net income balance in these countries improves. Based on our estimates, we compute the measurement error as the gap between the trade balance and the income balance that cannot be explained by the real tax effect. We find that the measurement error in the net income balance of tax base gainers is about 3.9 percent of GNI, on average.

This paper is related to small but growing literature considering the impact of tax on external balances. Carloni et al. (2019) focus on the trade account in the United States and estimate that the 2017 tax reform improves the US trade balance by about 9 percent through tax-motivated related-party trade. Avdjiev et al. (2018) considers actual relocation (“offshoring”), the location of headquarters (“redomiciliation”), and the transfer of IP assets. The latter is related to our topic, given that such transfers almost invariably involve transfer pricing issues with tax implications that we discuss in detail in our paper. They find that offshoring and relocation of IP do not affect current accounts but do change the trade and income accounts. Redomiciliation, however, does affect current accounts, because all unrepatriated earnings are allocated to a different country of corporate residence. Braml and Felbermayr (2019) investigate the impact of VAT on current accounts and argue that VAT fraud is behind much of the EU's measured trade surplus with itself.

Adler, Garcia-Macia and Krogstrup (2019) look more generally at distortions of capital account, mainly focusing on inflation and retained earnings of portfolio investment which they find to explain a nontrivial share of current account imbalances. In a somewhat related study, Guvenen et al. (2019) examine how outbound profit shifting from US multinationals affects measured aggregate productivity in the United States, and find magnitudes ranging from 0.09 to 0.24 percent.

This paper is structured as follows. Section II discusses the theoretical effect of the various profit-shifting channels on the external accounts. Section III turns to the question of how these different effects are accounted for statistically, and whether differences in data availability for different components of the balance of payments may prevent offsetting flows to be detected. Section IV then turns to data and presents an empirical analysis of the balance of payments in relation to tax rates. Section V concludes.

II. THEORY

Economic accounts and the international tax system both predominantly operate using the single legal entity principle (for instance, the institutional unit concept for economic accounts, and the single enterprise concept for international tax). This means that related legal (e.g., incorporated, registered or otherwise “resident”) entities located in a jurisdiction different from its parent entity are recognized separately, which implies that stocks and flows within multinational enterprises are separately recognized through those legal entities. Thus, there is a need to allocate profits and other flows and stocks to entities within individual countries to be able to determine the tax and prepare national external accounts statistics.

A. Transfer Price Manipulation

In most countries, multinationals are obliged to use the arm’s length principle for any transactions between related parties, that is, they should charge the same price as if dealing with unrelated counterparts. For many goods and services, however, determining such prices precisely is difficult, for example, because goods and services traded among multinationals are often unique and/or intangible, so that comparable market prices are not available. Multinationals therefore have some leeway in setting these prices and have an incentive to choose those that leave most of the profits in countries with lowest tax rates. The precise extent of such leeway depends on the strictness of transfer pricing rules as well as the degree of enforcement by tax administrations.⁵

To illustrate the theoretical neutrality of transfer price manipulation with respect to the current account, we consider various possible transactions of a multinational. We consider a simple multinational with one headquarters (HQ) located in a high-tax country and two affiliates, one in

⁵ For evidence on transfer mispricing see, for example, Davies et al. (2018) and Hebous and Johannesen (2015). On tax enforcement, see Tørsløv et al. (2020).

high-tax (HT) and one in low-tax (LT) country. For purely illustrative purposes tax payments are ignored for now but will be introduced shortly. Even in such a simple multinational with just three locations, there are many possible trade and profit flows, the most relevant examples of which are summarized in Table 1 and illustrated in Figure 2.

The first example considers transfer price manipulation to shift profits from the headquarters to the low-tax affiliate. If the production structure is such that the headquarters imports, then import prices would be exaggerated. If headquarters instead exports, the prices would be underreported. Both would occur if trade flows in both directions. Either way, the trade account strengthens in the low-tax country and weakens in the country of the headquarters. Turning to the income balance, there is an offsetting effect: the low-tax affiliate earns a higher profit, but because it is owned by headquarters, this is a credit on the income balance of headquarters' country. This is most obvious if this profit is returned as a dividend, but it would also be recorded as a credit if kept in the low-tax affiliate, in that case as re-invested foreign earnings.⁶ Ultimately, in both countries the current account is unaffected, but the composition between the trade and income balances changes.

While the first example covered a direct relationship between headquarters and an affiliate, the second example considers profit shifting between affiliates. In this case, the tax-optimizing strategy is to shift profits from the high to the low-tax affiliate. On the trade account, this has the same impact as before, with the trade account of the low-tax country strengthening and the one of the high-tax country weakening accordingly. Changes in the income balance, however, do not occur bilaterally between the affiliates, but in relation to headquarters. As the additional profit in the low-tax affiliate belongs to headquarters, this is a credit for the income balance of the headquarters' country. In aggregate, however, the income balance of the headquarters' country does not change, because there is an offsetting reduction in profits from the operations of the high-tax affiliate. In sum, again current accounts are unaffected. However, in the countries of the two affiliates, the composition between the trade and income balances is changed and this is also reflected in bilateral current account balances. In the headquarters' country all aggregate balances remain the same, but there is a compositional change in bilateral balances with the two affiliates' countries.

The third example simply shows that the same reasoning continues to apply even if affiliates are owned indirectly rather than from headquarters. Specifically, headquarters owns a high-tax affiliate, which in turn owns a low-tax affiliate, and profit shifting again occurs between affiliates. Trade account flows are then the same as above, but recording the income becomes a bit more complicated, although the ultimate outcome—except for some bilateral balances—is exactly the same as in the previous example. One could make the examples above more complicated with

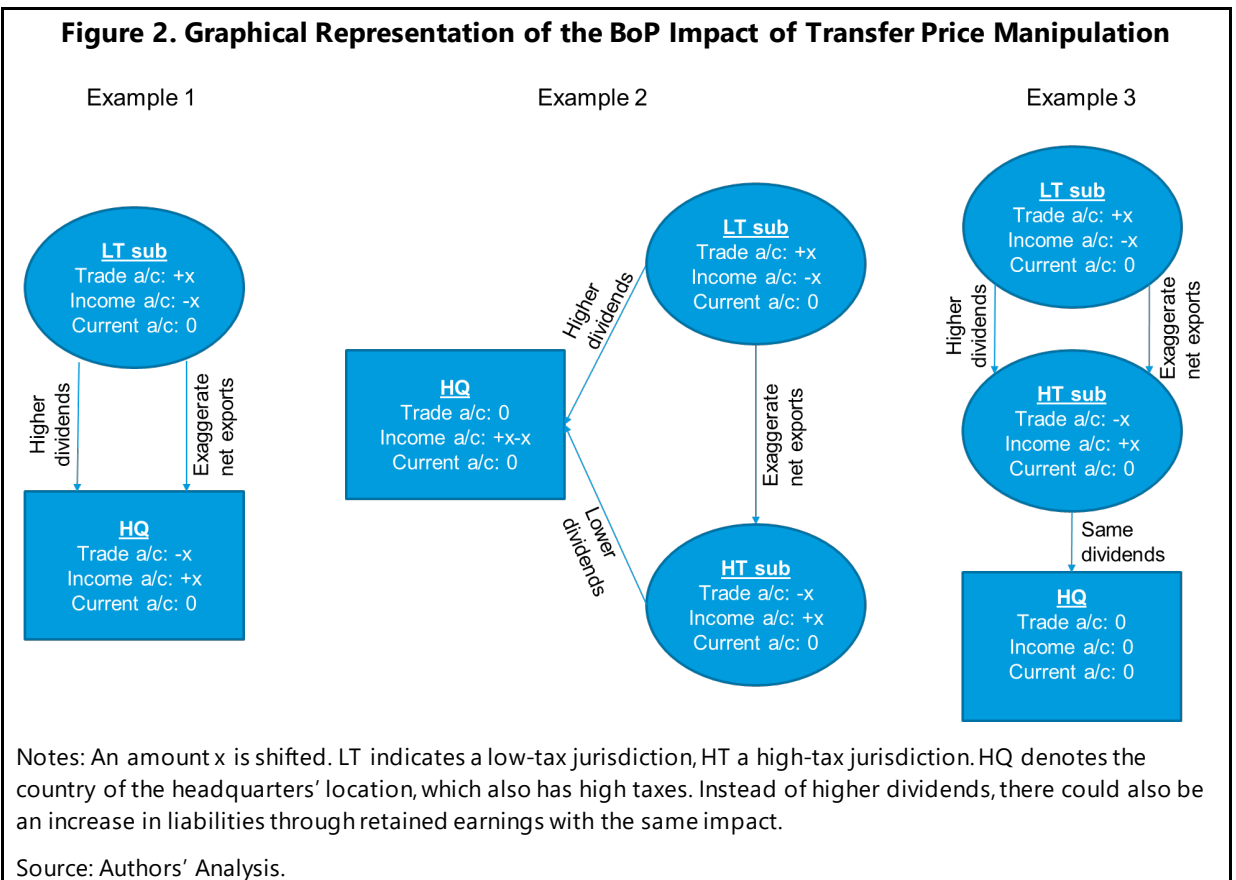
⁶ The IMF (2013) Balance of Payment and International Investment Position Manual lists under the direct investment heading of the income account "income on equity and investment fund shares," which is made up of "dividends and withdrawals from income of quasi-corporations" and "reinvested earnings."

more affiliates and various ownership structures among them, but this would not change the theoretical reasoning. It would, however, create challenges for statistical offices to correctly monitor all flows and liabilities (Section III).

Table 1. The Balance of Payments Impact of Profit Shifting, Ignoring Tax Payments

Country	Trade Account			Income Account			Current account
	Bilateral		Aggregate	Bilateral		Aggregate	
	LT-HQ	HT-HQ		LT-HT	LT-HQ		
<i>Example 1: Profit shift through transfer prices from HQ to LT.</i>							
LT	+x		+x	-x		-x	0
HQ	-x		-x	+x		+x	0
<i>Example 2: Profit shift through transfer prices from HT to LT, both owned by HQ.</i>							
LT			+x	-x		-x	0
HT			-x		+x	+x	0
HQ				+x	-x	0	0
<i>Example 3: Profit shift through transfer prices from HT to LT, LT owned by HT, HT owned by HQ.</i>							
LT			+x			-x	0
HT			-x		+x-x	+x	0
HQ					0	0	0

Notes: An amount x is shifted. LT indicates a low-tax jurisdiction, HT a high-tax jurisdiction, both of which contain a subsidiary. HQ denotes the country of the headquarters' location, which also has high taxes.
Source: Authors' Analysis.



An important extension to the analysis above is the inclusion of the tax, which changes results (Table 2). When profit is shifted to another country, it will also be taxed in that other country (unless it is a zero-tax country).⁷ While the net profit is still recognized in the income balance, the tax that is paid to the country benefiting from shifting, permanently remains in that country. In the first example, this means that the income balance of the headquarters' country strengthens only by the net profit in the affiliate country. As this is insufficient to make up for the full decline in the trade balance, the current account now weakens by the tax paid to the foreign government.⁸ In the second and third example, however, the income balance of the headquarters' country improves by any tax saving achieved, because it means lower aggregate debits to foreign governments. The affiliate countries each see their income balance change in line with the tax loss or gain.

Table 2. The Full Balance of Payments Impact of Profit Shifting

Country	Trade Account			Income Account			Current account
	Bilateral		Aggregate	Bilateral		Aggregate	
	LT-HQ	HT-HQ		LT-HT	LT-HQ		
<i>Example 1: Profit shift through transfer prices from HQ to LT.</i>							
LT	+x		+x	-x(1-tLT)		-x(1-tLT)	+xtLT
HQ	-x		-x	+x(1-tLT)		+x(1-tLT)	-xtLT
<i>Example 2: Profit shift through transfer prices from HT to LT, both owned by HQ.</i>							
LT			+x	+x		-x(1-tLT)	+xtLT
HT			-x	-x	+x(1-tHT)	+x(1-tHT)	-xtHT
HQ				+x(1-tLT)	-x(1-tHT)	x(tHT-tLT)	x(tHT-tLT)
<i>Example 3: Profit shift through transfer prices from HT to LT, LT owned by HT, HT owned by HQ.</i>							
LT			+x	+x		-x(1-tLT)	+xtLT
HT			-x	-x	+x(1-tHT)-	x(1-tLT)	-xtHT
HQ					x(tHT-tLT)	x(tHT-tLT)	x(tHT-tLT)

Notes: LT indicates a low-tax jurisdiction, HT a high-tax jurisdiction, both of which contain a subsidiary. HQ denotes the country of the headquarters' location, which also has high taxes.

Source: Authors' Analysis.

Summing up, transfer price manipulation can affect bilateral, but not aggregate current account balances, except indirectly through changes in tax liabilities. Typically, high-tax countries can expect to see their current accounts weaken, except when they hold headquarters of multinationals that shift profits between other countries not involving the headquarters, in which case current account strengthens by the aggregate tax saving. It is important to note that this is not a statistical flaw: it reflects a real transfer of tax payments to different treasuries. Apart from these effects through tax payments, profit shifting only affects the composition but not aggregate balance of current accounts.

⁷ Apart from being taxed, profit could also be reduced by other costs of profit shifting, which would have the same impact as the tax.

⁸ This is, of course, just the first-round effect. In general equilibrium, a country receiving such tax flows could spend them on imports and thereby undo the effect on the balance of payments.

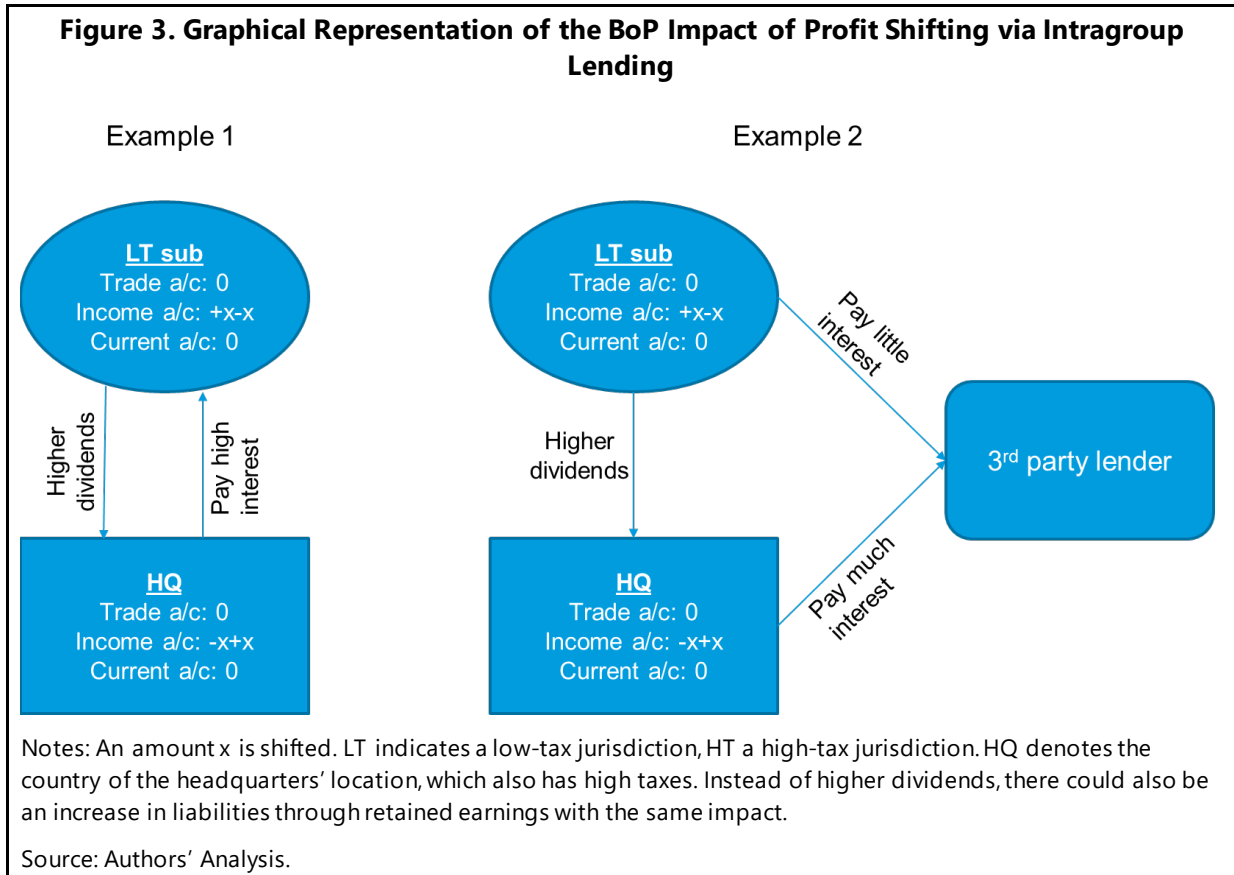
B. International Debt Shifting

Because interest is a deductible expense, multinationals can use intercompany debt to shift profits. Even if using third-party debt, they can affect the global distribution of profits by taking out most of their debt in high-tax jurisdictions. Finally, in case of intercompany debt, multinationals can amplify the effect by using excessive interest rates, although this aspect arguably falls under transfer price manipulation, if the interest rate is considered a price. Debt shifting has obviously no impact on the trade balance, but credits and debits occur on the income account.⁹

Consider first the case of a related-party loan (Figure 3, Example 1), where a headquarters in a high tax country borrows from an affiliated company in a low tax jurisdiction. Either by choosing a high interest rate or by lending a large amount, this could shift a significant part of the profit to the low-tax jurisdiction. The interest payment from the high- to the low-tax affiliate is a negative item on the income balance of the high tax country. At the same time, the received interest income by the affiliate in the low tax jurisdiction increases foreign profit of the affiliate in the high tax country (as unrepatriated retained foreign earnings or paid out dividends) generating a positive effect on the income balance of the high tax country. This positive foreign income effect offsets the negative effect of the interest payments in the high-tax country leaving the net income balance unaffected. As before, the company taking out the loan in the high-tax country does not need to be the headquarters: if it is also a subsidiary, then the structure would resemble Example 2 of Figure 2, but still current accounts are unaffected. Finally, as with the transfer price manipulation example, any tax paid in the low-tax jurisdiction on the shifted profit would lead to a real weakening of the income balance (and hence current account) in the high-tax country.

Consider, second, the case of third-party borrowing (Figure 3, Example 2) that could originate in another country. Here the profit shifting occurs, despite borrowing taking place at market conditions, simply by strategically bundling the debt in the high tax country and addressing any financing needs in the low tax country through equity. In this case bilateral current accounts are affected, and notably the high-tax country will see its current account strengthen, because the low-tax affiliate borrows little and hence earns greater foreign profits (which, as before, are distributed as dividends or counted as reinvested foreign earnings). The overall current account of the headquarters' country, however, does not change, as the higher foreign profits are offset by the increased interest payments to the third-party lender. In the country of the lender, the current account strengthens vis-à-vis the high tax country, but weakens vis-à-vis the low-tax country, remaining unaffected in aggregate. As in the other examples, any tax that is paid on shifted profits has a real impact on income and current accounts.

⁹ For evidence on international debt shifting see, for example, Feld et al. (2013) and Fuest et al. (2011).



C. Location of Intangible Assets

Locating legal ownership of patents, trademarks, or similar know-how assets in low-tax jurisdictions is another tax-minimizing strategy, as these assets receive royalties from affiliates. For instance, if ownership of a brand name is located in a low-tax jurisdiction, and the affiliates in other high-tax countries pay royalties for the use of such brand name, this shifts profits. The flows of royalties are recorded as imports and exports of services in the BoP (and thus they are covered under the discussion on transfer mispricing), but the location of the stock itself entails a price for that asset which could deviate from the arm's length price. Note that royalties are important on continuous basis, but such transfers of IP assets are less frequent (i.e., the asset is moved once but it would typically receive royalties for multiple periods).¹⁰

IP assets, such as patents and copyrights, have become increasingly important in the business model of multinationals, with activities such as research and development (R&D) and branding gaining higher shares in production value in recent years. The location of IP assets is important because affiliates pay royalties for the rights of using the IP asset, and these royalties will be taxed in the country where the IP asset is legally located.

¹⁰ For evidence on tax-motivated location of IP assets, see, e.g., Alstadsæter et al. (2018).

Once an intangible is located in a country, it will be compensated by royalties or license fees. The issue is thus essentially the same as the transfer price example explained above in section A (or the inter-company loan of section B, except that royalties and license fees are considered trade in services and enter through the trade rather than income account). The shifted profit boosts the trade account of the low-tax country but weakens its income account. No new issues arise, and as before, there will be real effects if tax is paid on shifted profits.

Additional issues may, however, arise in the original transaction that shifts an intangible asset. Under the latest (sixth edition) BoP manual (IMF 2013, paragraph 10.147), the recording of the outright sales of patents, copyrights, and industrial processes and designs are included under trade in R&D services and therefore directly affect the trade account (with an offsetting transaction in the capital account). Transactions in non-produced non-financial assets, such as brand names or trademarks, however, continue to be included in the capital account. As they enter on both the credit and debit side of the capital account, they do not affect the capital account balance, and hence also not the current account.

Typically, such transaction will occur at a price that is low relative to future royalty or fee flows. A typical example entails shifting an intangible asset from the location of its development (say a high-tax country) to a low-tax country at a stage just before patenting. This transfer is difficult to price because the prospect income from the asset is private information to the firm without a clear comparable price in the world market.¹¹ As the BoP records flows, future revaluation of the intangible asset do not directly affect the capital account (but will be recorded as valuation effects in the international investment position).

D. Treaty Shopping

A bilateral tax treaty allocates the taxing rights between two countries. Treaties can involve low cross-border withholding taxes on capital income—such as dividends, interest, royalties and management fees. Multinationals can set up an intermediate holding companies or special purpose entities in a jurisdiction with a treaty network with low withholding taxes—through which they funnel investment into a third country—although countries increasingly deny treaty benefits to such artificial structures. Nevertheless, in some countries, ‘transit’ flows remain very large.¹²

Treaty shopping affects the current account by the amount of the cross-border withholding tax. This is an example of the real tax effect on the current account. To illustrate how treaty shopping practices, affect the current account, consider a simple example involving two countries: an

¹¹ In a somewhat related study, McGrattan and Prescott (2010) estimate how mis-valuation of intangible assets contributes to mismeasurement of returns to investments of US subsidiaries of foreign multinationals.

¹² For evidence on treaty shopping by multinationals see, for example, Mintz and Weichenrieder (2010).

affiliate in a low-tax country (LT) distributes \$1 of dividends to a high-tax country (HQ). Consider two cases:

- a. If country *LT* imposes no cross-border withholding tax, then the entire amount of dividends will be distributed.
- b. If country *LT* imposes a cross-border withholding tax rate (t) on dividends, then a dividend outflow of \$1 would reduce the income balance by only $\$1 - t$.¹³ The implication is that the tax reduces the liability toward nonresidents exactly by the amount of the tax. As before with the corporate income tax, this withholding tax means that the net income balance will not offset tax-driven changes in the trade balance.

Building on this example, consider a treaty shopping structure. Let *LT* distribute dividends through a conduit company in an intermediate country to benefit from a zero withholding tax in its treaties with both *LT* and *HQ* countries (or more generally a country that imposes no taxes on dividends—neither on inbound nor on outbound payments). From the point of view of country *HQ* and of the low-tax country, this is equivalent to the absence of withholding, and hence income and trade balance effects of profit shifting offset each other. For the intermediate country there are no effects on the current account balance, just an inflow with an offsetting outflow. If withholding taxes are very low but nonzero, then the high and low-tax countries are in a situation between the extremes of full and no withholding taxes, and the flow-through country improves its income balance by the amount of tax collected.

III. DATA COLLECTION AND MEASUREMENT

A. Data Collection

Trade account data are generally based on reliable sources. According to the balance of payment compilation guide (IMF, 2014), trade in goods is usually based primarily on administrative records from the International Merchandise Trade Statistics (IMTS), which covers goods entering or leaving a country. While these data need to be adjusted (for example, crossing a border is not necessarily the time of change in ownership), they should generally provide a fairly robust starting point for estimating the declared values of trade in goods. Trade in services is often based on data from an International Transactions Reporting System (ITRS), which draws on data submitted by financial institutions, but those data are not available or sufficiently complete in all countries. Survey may be used to complement both reporting systems and are sometimes the main source for trade in services.

Income account data are much more likely to be survey based. Regarding dividend income, the ITRS is often used, but it may not provide full information on counterparts, making it difficult to

¹³ Specifically, the income gross of withholding taxes is reported in the primary income account and taxes are recorded in the secondary income account.

distinguish the type (portfolio or direct investment), and moreover, it likely only reports the immediate counterpart country, not the ultimate source or recipient. Data on reinvested earnings are often collected through surveys, so that the data quality depends strongly on coverage and the quality of the information provided by participating businesses. In countries with strict foreign exchange or foreign investment approval systems, these can serve as another data source, but in many other countries they are missing.

Given the difference in data availability, it is possible that profit shifting affects the measured, but not the true, current account. In case of transfer price manipulation, the trade account would likely reflect it, given that it is measured from administrative data, and firms would presumably report the same value to customs as for determining their incomes. The offsetting income account transaction, however, could be missed, especially if the change is in reinvested earnings rather than dividends.¹⁴ In case of debt shifting, any change in interest payments is likely to be detected, but again, any offsetting change in retained earnings could be missed. If indeed, offsetting flows in the income account are missed, the result would be that the measured current account balance changes as a result of either profit-shifting method.

B. GDP Ratios

The typical presentation of current account balances as a share of GDP creates a further sensitivity to profit shifting. As GDP is the sum of domestic consumption, investment, government spending and net exports, any change in the trade account affects GDP through the latter item. The offsetting change in the income account, however, is ignored in GDP statistics, because foreign income does not enter GDP. Hence, GDP is affected, even before taking account of the real tax effects. With those, there is potentially an indirect impact that occurs if changes in tax revenues affect government spending.

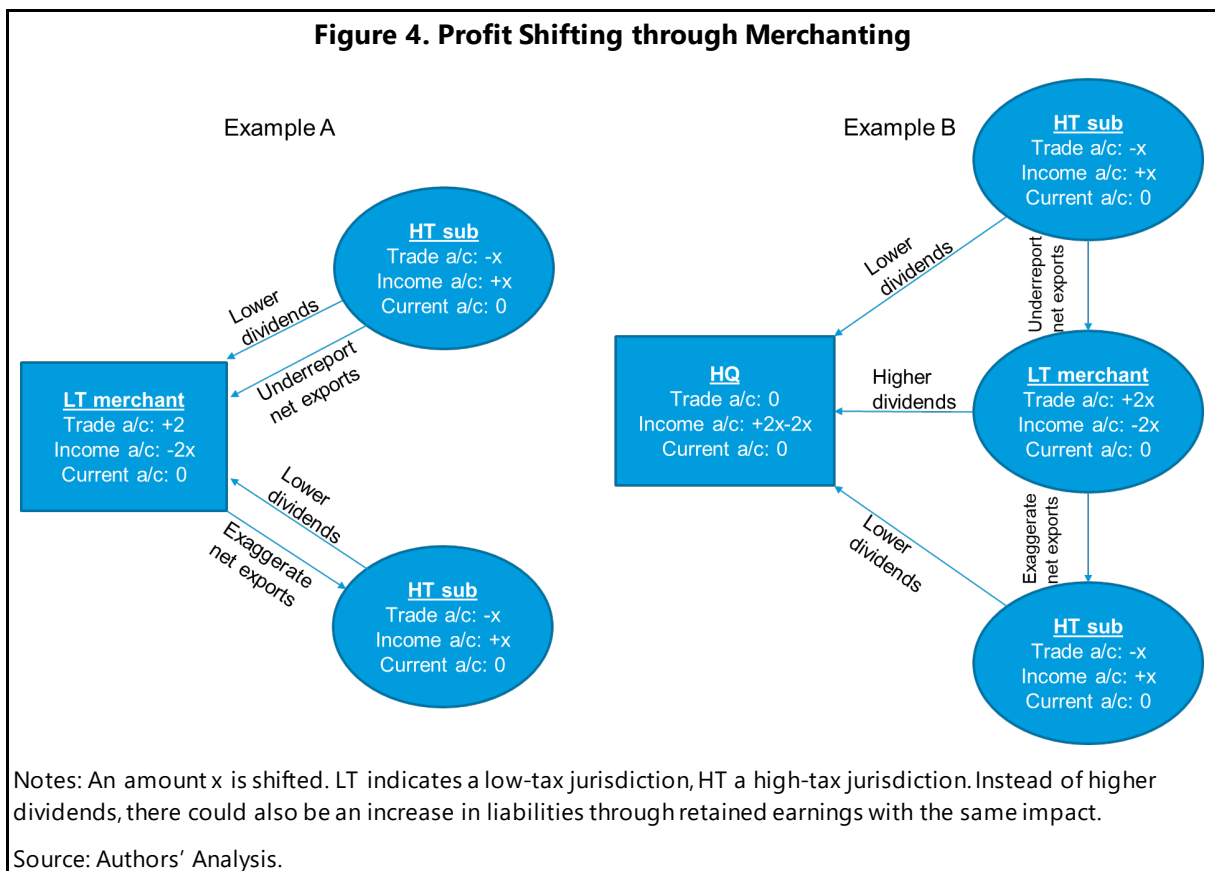
C. Merchanting

Merchanting—that is buying and selling of goods without processing them—is a service. When a resident company undertakes it abroad, that is buying from and selling to a nonresident, it is an export service. Recent research has shown that merchanting is an important factor explaining current account balances in some countries. For example, Beusch et al. (2017) find a disproportionate relationship between the current account and merchanting, indicating underreporting of merchanting. This finding has important implications, for example, if goods are purchased and sold abroad, the home country's exchange rate will have no direct impact on such activity.

While merchanting could also be part of a profit-shifting strategy, it would not add a new angle to the above analysis. If a merchant buys and sells from third parties, there is no scope for profit

¹⁴ Some of the difference may cancel out over time if retained earnings are ultimately paid out, but this can take a very long time.

shifting, and any profit earned from merchandising is genuine. If the transactions take place among related parties, there is scope for profit shifting. Notably, profit shifting through transfer price manipulation is now possible even between two affiliates located in high-tax jurisdictions, providing the merchandising affiliate is located in a jurisdiction that offers favorable tax treatment, at least for merchandising. Figure 4 illustrates two examples, one where the merchant is located in the corporate headquarters (Example A), and one where they are elsewhere (Example B). Example A is simply a combination of two transactions of the type discussed above as Example 1 in Figure 2. Example B is slightly more complicated in that bilateral current accounts are affected by the transactions: both high-tax affiliates experience a weaker trade account vis-à-vis the merchant country, but given their strong income account relative to the headquarters' country, aggregate current accounts remain unaffected (similar to Example 2 in Figure 2).



D. Portfolio Investment

As retained earnings that are related to portfolio investment are not counted in the income account. Fischer et al. (2019) show that retained earnings related to portfolio investment are sizeable in some cases, especially in financial centers with a range from 1.2 to 7.8 percent of GDP. They also illustrate that ignoring such retained earnings changes the dynamics of the income account, especially during times of crises. For the topic of our paper, the crucial point is whether any of those retained earnings are the result of profit shifting. Theoretically, this is not the case,

because portfolio investors cannot shift profits. Indeed, profit shifting only makes sense among affiliates of a jointly controlled multinational. In practice, however, it is possible that some direct investment is classified as portfolio investment due to errors (e.g., missing data on the controlling stockholders) and this would create a link between profit shifting and the reported national current account.

IV. EMPIRICAL ANALYSIS

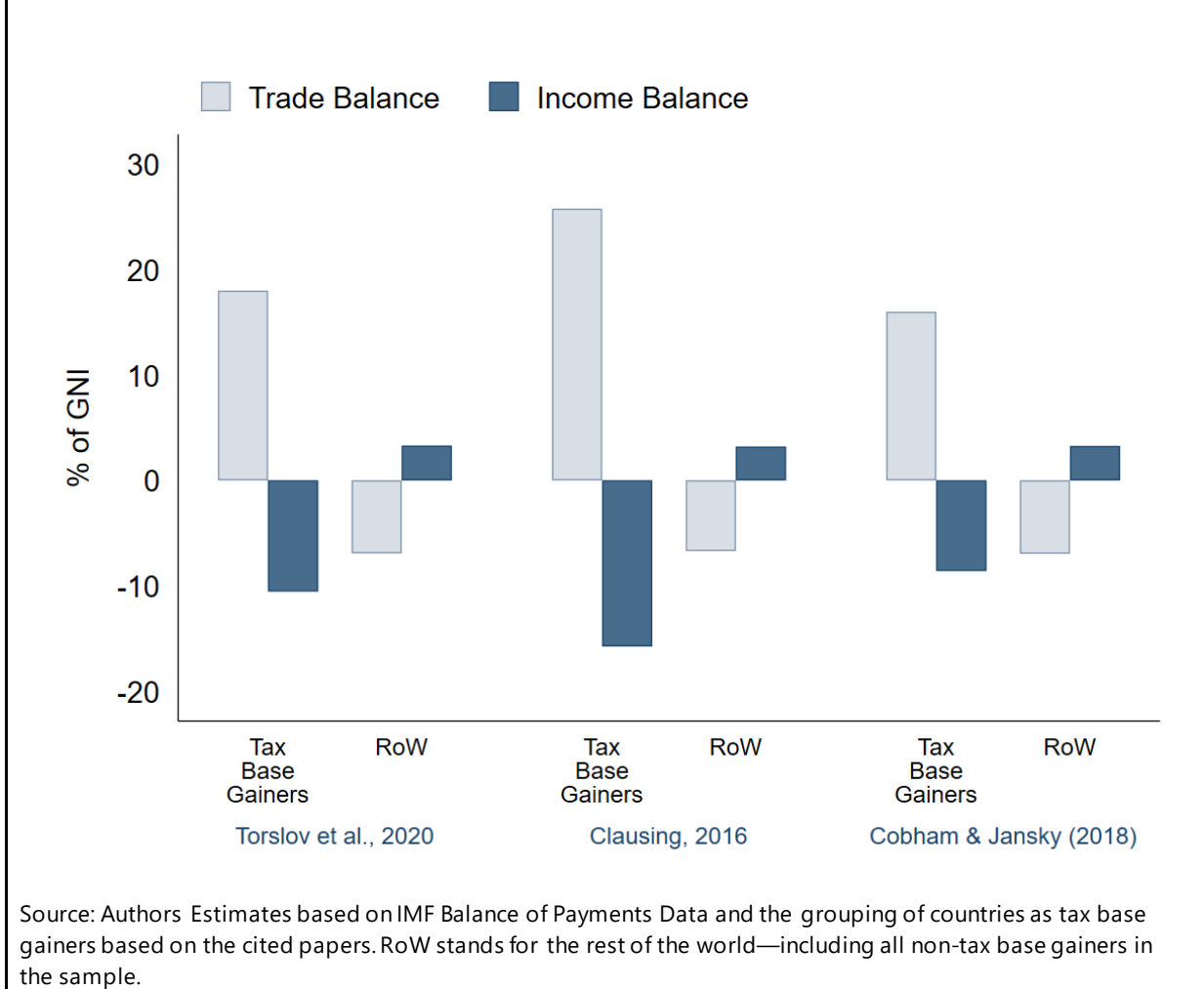
A. Graphical Evidence

The theoretical discussion above yields a number of testable hypotheses. Countries that experience inward profit shifting as a result of transfer price manipulation should have stronger trade balances and weaker income balances. Profit shifting through debt does not affect the trade balance or the net income balance. Current accounts should not differ, irrespective of the attractiveness of a country for profit shifting—except for any real tax effect that strengthens the income balance of beneficiaries of inward profit shifting. Moreover, measurement errors are more likely to occur in the income balance providing another reason why tax motivated changes to the trade balance may not be fully offset by the income balance in practice.

Thus, taken together, we expect that trade balances are stronger and income balances weaker in countries that potentially benefit from profit shifting (tax base gainers or investment hubs) than in the rest of the world as a result of transfer price manipulation. The current account is also likely stronger, driven by the real tax effect and any measurement problems that lead to missing liabilities in the income account.

A simple comparison of countries that are particularly likely to benefit from profit shifting (tax base gainers) to others confirms that they tend to have stronger trade and weaker income balances. As shown in Figure 5, this graphical evidence holds for various sets of countries that tend to be tax base gainers, identified using definitions from papers in the profit-shifting literature. While the absolute value of trade account balances for these country groups differ across definitions, it is consistently the case that trade balances are stronger and income balances weaker in the countries likely to benefit from profit shifting than in the rest of the world. Also, while Figure 5 shows the average over the years 2010-2018, the same pattern emerges for just the last year, the average over the last five years or the average since 1990. This provides prima facie evidence for the expected patterns.

Figure 5. Trade and Income Account Balances in Countries Likely to Gain Tax Base, Average 2010-2018



B. Regression Analysis

Profit Shifting and the Current Account

Specifications

While the above graphical evidence is informative, in this section we complement it by a regression analysis to control for other potential determinants of external balances. We base our benchmark specification on established existing literature and extend it to test for a potential tax effect. The literature has identified common determinants of the medium-term level of the current account including the terms of trade, demographic factors, financial deepening, and the stage of development (see, e.g., Chinn and Prasad, 2003; Chinn and Ito, 2007).

In addition to the standard determinants, our test requires a measure of profit shifting. Direct measures are rare, and even the few published estimates (e.g., Tørsløv et al., 2018) are available only for a single year. The alternative transparent simple candidate is to use the corporate

income tax rate, which is established in the literature as the driving force behind most profit shifting. In a panel specification, the use of a year dummy effectively transforms this into a measure of the tax rate relative to the world average. It is important to note that we express the external balance in terms of GNI rather than GDP, because we would not want to detect a relationship that is driven by the impact of profit shifting on GDP. Specifically, our benchmark specification is:

$$\left(\frac{B}{GNI}\right)_{it} = \beta\tau_{it} + \gamma'x_{it} + c_i + \lambda_t + \varepsilon_{it}, \quad (1)$$

where: B is one of the external balances, τ is the statutory corporate income tax rate, x is a vector of control variables, c_i denotes a set of country fixed effects, λ_t denotes year fixed effects, and ε is an error term. The subscripts i and t indicate country and year, respectively. We also estimate a version of Equation 3 using a dummy variable distinguishing between base gainers and losers as in Figure 3 instead of the tax rate—in which case the country fixed effects are left out to allow identification of the dummy variable.

Moreover, we extend the analysis by implement the group-fixed effect (GFE) estimator developed by Bonhomme and Manresa (2015). Instead of having country- and year-fixed effects as in Equation 3, we include “group-period” fixed effects allowing for clustered time patterns of unobserved heterogeneity within groups of countries without restricting the country group membership. Allowing time-varying group-specific patterns of heterogeneity strengthens the identification as it allows the effect of a global shock to external balances to differ across groups of countries. For example, a global commodity price shock will be captured by a year-fixed effect if the effect is common to all countries in the year. In contrast, the GFE allows such a global price shock to have different effects on different groups of countries by interacting the group variable with time periods. Specifically, we estimate:

$$\left(\frac{B}{GNI}\right)_{it} = \beta\tau_{it} + \gamma'x_{it} + c_i + \eta_{gt} + \varepsilon_{it}, \quad (4)$$

where η_{gt} is the set of group-period fixed effects added in addition to country effects. We set the number of groups to 2 (i.e., $g \in 1, 2$).¹⁵

Our data is a panel of 81 countries from 1990-2018. The data sources are the IMF Balance of Payments Statistics, World Economic Outlook, and updated data from Chinn and Ito (2006).

Based on the theoretical reasoning presented in the previous sections, we expect the following qualitative results (Table 3):

¹⁵ See Bonhomme and Manresa (2015) for a full discussion of this estimator, the optimal group assignment, and the algorithm for the computation.

- For the current account, β is expected to be insignificantly different from zero. As noted, there could be some real impact of profit shifting on the current account, but its sign is not obvious: For example, in a high tax country hosting important corporate headquarters, there could be losses (Example 1) or gains (Examples 2 and 3). In any case, the impact is expected to be small.
- For the trade account, β is expected to have a negative sign if transfer price manipulation takes place or be insignificantly different from zero if there is only debt shifting.
- For the income account, β is expected to have a positive sign and be of the same order of magnitude as in case of the trade account if transfer price manipulation takes place. It is still expected to be zero for debt shifting.
- For a further breakdown of the income account, β on net interest receipts should have a negative sign if debt shifting takes place. Conversely, β on net equity income should have a positive sign, irrespective of whether profit shifting occurs through debt or equity

Table 3. Expected Signs of the Profit Shifting Effects

	Transfer price manipulation	Debt shifting
Current account	$\beta = 0$	$\beta = 0$
Trade account	$\beta < 0$	$\beta = 0$
Income account	$\beta > 0$	$\beta = 0$
Net equity income	$\beta > 0$	$\beta > 0$
Net interest income	$\beta = 0$	$\beta < 0$

Source: Authors' Analysis

Results

Table 4 presents results from estimating Equation 3. As expected, the statutory corporate rate does not affect the current account balance (column 1). However, higher tax rates are associated with lower trade balances (column 2) and higher income balances (column 3). The magnitude of the effects in columns 2 and 3 roughly offset each other, implying that a 10-percentage point higher tax rate weakens the trade balance to GNI-ratio by about 1 percentage point and improves the income balance by the same magnitude, on average.

Various robustness checks were implemented. Given that the terms of trade are likely to be endogenous if transfer price manipulation takes place, we repeated all regressions without this variable, which did not change results. While the year effects already imply that the tax rate is relative to global averages, regressions were also repeated using the distance of the own tax rate to the average of the rest of the world, which likewise yielded the same results. Considering a breakdown of the income account, using net equity and interest income as dependent variables, we obtained insignificant results.

The last three columns in Table 4 present results from estimating Equation 4 including the group-year fixed effects, country fixed effects, and all controls. The findings are somewhat similar to those in the first three columns but indicate that the effect of the corporate income tax rate on the income balance is not fully offsetting that on the trade balance leading to a higher effect on the current account. This is consistent with the existence of a real tax effect and wrong attribution of retained earnings to residents instead of foreign direct investors. To explore this further, below we allow for a heterogeneous response between likely tax base gainers and other countries.

Table 4. Regression Results – Statutory Corporate Income Tax Rate and Current Account

	(1) Current Account	(2) Trade Balance	(3) Income Balance	(4) Current Account	(5) Trade Balance	(6) Income Balance
Corporate tax rate	0.006 (0.034)	-0.103*** (0.037)	0.109*** (0.026)	0.048 (0.042)	-0.065 (0.043)	0.114*** (0.036)
Terms of trade	0.041*** (0.013)	0.050*** (0.014)	-0.009 (0.006)	0.039*** (0.011)	0.078*** (0.013)	-0.039*** (0.010)
Fiscal balance/GNI	0.372*** (0.061)	0.330*** (0.063)	0.042 (0.031)	0.479*** (0.079)	0.341*** (0.072)	0.138*** (0.045)
Output gap	0.048 (0.041)	-0.015 (0.032)	0.063*** (0.021)	-0.241* (0.127)	-0.037 (0.127)	-0.204*** (0.061)
Population growth	-0.979*** (0.356)	-1.585*** (0.581)	0.606* (0.312)	-1.646*** (0.595)	-2.202*** (0.729)	0.556 (0.438)
Lag NFA/GNI	0.005 (0.019)	-0.020 (0.017)	0.025 (0.016)	0.010 (0.022)	-0.019 (0.018)	0.028 (0.020)
KA openness index	0.906 (0.742)	0.292 (0.949)	0.614 (0.628)	0.964 (1.038)	0.858 (1.198)	0.106 (0.897)
Income ratio	2.024 (1.609)	1.584 (1.892)	0.440 (1.190)	5.568*** (1.905)	5.112*** (1.964)	0.457 (1.687)
Ln GNI per capita	-4.412*** (0.607)	-4.255*** (0.798)	-0.158 (0.504)	-7.313*** (1.379)	-11.640*** (1.396)	4.326*** (0.895)
Constant	30.538*** (5.055)	34.342*** (6.855)	-3.804 (4.425)	68.999*** (11.737)	110.377*** (12.255)	-41.379*** (7.805)
Observations	1,535	1,535	1,535	911	911	911
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Nested	Nested	Nested
Group-Year FE	No	No	No	Yes	Yes	Yes
R ²	0.668	0.799	0.845	0.735	0.833	0.836

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Dependent variables are expressed as ratios to GNI.

While the statutory corporate income tax rate is the rate that matters most for profit shifting, it is still an imperfect measure of a country's attractiveness as a location for mobile profits. The reason is that the statutory rate does not take into account preferential tax treatments applied to specific incomes (for example reduced tax rates on income from IP assets or in special economic zones) or for specific taxpayers (for example through advance pricing agreements). Therefore, we

re-estimate Equation (3) using dummy variables separating likely base gainers from other countries, using country groupings from the literature. This is thus akin to the analysis in Figure 5 but controlling for other determinants of the current account balance.

Table 5. Regression Results – Tax Base Gainers

Dependent variable	(1) Current Account	(2) Trade Balance	(3) Income Balance	(4) Current Account	(5) Trade Balance	(6) Income Balance	(7) Current Account	(8) Trade Balance	(9) Income Balance
Tørsløv group	4.807*** (0.834)	7.109*** (1.172)	-2.302*** (0.858)						
Clausing group				7.292*** (0.831)	10.38*** (1.225)	-3.092*** (1.036)			
Cobham group							5.950*** (0.571)	10.39*** (0.761)	-4.443*** (0.606)
Terms of trade	-0.00491 (0.0104)	0.00636 (0.0104)	-0.0113 (0.00915)	-0.00594 (0.0104)	0.00500 (0.0104)	-0.0109 (0.00913)	0.00204 (0.0108)	0.0179* (0.0105)	-0.0159* (0.00890)
Fiscal balance/GNI	0.408*** (0.0583)	0.435*** (0.0803)	-0.0267 (0.0462)	0.409*** (0.0578)	0.435*** (0.0783)	-0.0262 (0.0457)	0.335*** (0.0584)	0.312*** (0.0782)	0.0228 (0.0465)
Output gap	0.0715 (0.0535)	-0.0148 (0.0569)	0.0863*** (0.0250)	0.0724 (0.0535)	-0.0141 (0.0569)	0.0865** (0.0247)	0.0677 (0.0524)	-0.0186 (0.0553)	0.0863** (0.0258)
Population growth	0.142 (0.202)	0.897*** (0.260)	-0.755*** (0.176)	0.0999 (0.197)	0.845*** (0.260)	-0.745*** (0.178)	0.251 (0.194)	1.047*** (0.254)	-0.796*** (0.179)
Lag NFA/GNI	0.058*** (0.0117)	0.0590*** (0.0132)	-0.00118 (0.00740)	0.057*** (0.00998)	0.059*** (0.0112)	-0.00242 (0.00656)	0.068*** (0.00948)	0.0697*** (0.0105)	-0.00165 (0.00619)
KA openness index	0.0412 (0.540)	-2.256*** (0.731)	2.297*** (0.516)	0.103 (0.540)	-2.145*** (0.734)	2.248*** (0.514)	0.0810 (0.541)	-2.301*** (0.719)	2.382*** (0.508)
Income ratio	4.910*** (0.812)	-4.078*** (1.008)	8.987*** (0.633)	4.103*** (0.825)	-5.153*** (1.063)	9.256*** (0.661)	1.963** (0.872)	-9.582*** (1.049)	11.55*** (0.722)
Ln GNI per capita	-0.156 (0.258)	4.762*** (0.365)	-4.918*** (0.247)	-0.0266 (0.259)	4.943*** (0.373)	-4.969*** (0.250)	0.555** (0.261)	6.018*** (0.364)	-5.463*** (0.261)
Constant	-1.725 (2.319)	-43.47*** (3.331)	41.74*** (2.317)	-2.517 (2.314)	-44.64*** (3.373)	42.12*** (2.326)	-8.509*** (2.366)	-55.12*** (3.338)	46.61*** (2.432)
Observations	1,588	1,588	1,588	1,588	1,588	1,588	1,588	1,588	1,588
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R ²	0.307	0.363	0.285	0.327	0.380	0.288	0.332	0.406	0.309

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Dependent variables are expressed as ratios to GNI.

Table 6. Regression Results – Tax Base Gainers, Breakdown of Income Balance

Dependent variable	(1) Net Equity Income	(2) Net Interest Income	(3) Net Equity Income	(4) Net Interest Income	(5) Net Equity Income	(6) Net Interest Income
Tørsløv group	-14.263*** (2.725)	1.095*** (0.162)				
Clausing group			3.122 (2.004)	0.996*** (0.207)		
Cobham group					-0.716 (0.803)	0.382*** (0.131)
Terms of trade	-0.004 (0.007)	0.004*** (0.001)	-0.009 (0.008)	0.004*** (0.001)	-0.008 (0.008)	0.004*** (0.001)
Fiscal balance/GNI	-0.166*** (0.058)	-0.007 (0.011)	-0.063 (0.067)	-0.007 (0.011)	-0.075 (0.066)	-0.013 (0.010)
Output gap	0.095** (0.045)	0.025* (0.013)	0.113** (0.053)	0.021 (0.013)	0.112** (0.052)	0.020 (0.013)
Population growth	-1.232*** (0.333)	-0.030 (0.032)	-1.412*** (0.396)	-0.013 (0.032)	-1.422*** (0.394)	-0.009 (0.032)
Lag NFA/GNI	-0.174*** (0.041)	-0.002 (0.002)	-0.245*** (0.054)	0.001 (0.002)	-0.238*** (0.052)	0.003* (0.002)
KA openness index	-3.181*** (0.790)	0.019 (0.132)	-4.141*** (0.996)	0.093 (0.134)	-4.093*** (0.996)	0.089 (0.135)
Income ratio	14.635*** (2.072)	0.662** (0.282)	8.950*** (1.324)	0.657** (0.298)	10.563*** (1.408)	0.770** (0.301)
Ln GNI per capita	-2.840*** (0.478)	-0.228*** (0.085)	-2.268*** (0.403)	-0.208** (0.087)	-2.522*** (0.418)	-0.209** (0.088)
Constant	17.375*** (3.564)	1.059* (0.589)	17.058*** (3.605)	0.812 (0.597)	18.363*** (3.559)	0.712 (0.612)
Observations	1,477	1,232	1,477	1,232	1,477	1,232
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
R ²	0.354	0.086	0.286	0.071	0.284	0.053

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Dependent variables are expressed as ratios to GNI.

Table 5 displays results from using dummy variables instead of the corporate income tax rate in analyzing the impact on the current, trade, and income accounts. In contrast to Table 4, the results indicate that the net effect on the current account is not zero because the income balance only partly offsets the stronger trade balance in the group of base gainers. This pattern arises for all three different groupings according to Tørsløv et al. (2020), Cobham and Janský (2019), and Clausing (2016), with the net positive effect on the current account ranging from 4.8 to 7.2 percent of GNI. Thus, this finding suggests that there is a non-linearity in the effect of profit shifting on the current account balances in the sense that the effect is concentrated in major hubs with large amounts of profits for nonresidents. Table 6 considers the further breakdown of the income balance. Unlike in Table 4, with the dummy variables, the expected results are found: the group of likely tax base gainers has significantly higher net interest income, and for one of the groupings also significantly weaker net equity income (it is insignificant for the other two groupings).

As discussed above, the finding that the effect on the income balance falls short of counteracting the trade balance is driven by two effects: a real tax effect and a potential measurement error. In an attempt to quantify both effects, we decompose the net positive effect of profit shifting on the current account as follows as:

$$\Delta CA = \text{real tax effect} + \text{measurement error} \quad (2)$$

From the regressions in Table 65, on average the current account of tax base gaining countries is boosted by about 6 percentage points of GNI (using the average of the estimated coefficients in columns 1, 4, and 6).¹⁶ This is approximately equal to the missing negative effect on the new income balance (as a ratio to GNI) of about 6 percentage points. We compute the real tax effect based on the estimates of revenue gain/loss in Tørsløv et al. (2018). On average, the real tax effect in the group of tax base gainers is 2.1 percent of GNI—which we calculated by dividing the US\$ revenue estimates in Tørsløv et al. (2018) by GNI. We attribute the rest of the effect ΔCA to a measurement error, which is about 3.9 percent of GNI. Thus, in the group of tax base gainers, our analysis suggests that, approximately:

$$\frac{\Delta CA}{6\% \text{ of GNI}} = \frac{\text{real tax effect}}{2.1\% \text{ of GNI}} + \frac{\text{measurement error}}{3.9\% \text{ of GNI}} \quad (3)$$

Finally, note to the extent that the current account is overestimated, this would also be reflected in estimated savings, given the identity between the current account and savings minus investment.¹⁷

V. CONCLUSION

The overview in this paper suggests that theoretically profit shifting will not lead to a distortion in aggregate current account balances, but it will affect their components. This is because of offsetting adjustments in the external balances correspond to any profit shifting techniques. The offsetting entries are in the trade and income balances if profit shifting takes place through transfer price manipulation, and in the debit and credit sides of the income balance in the case of profit shifting through cross-border intragroup lending. However, our analysis clearly indicates that bilateral balance between two countries can be significantly affected. Moreover, even though the current account itself is unaffected, its ratio to GDP is affected by tax motivated arrangements (as net exports enter GDP while payments to nonresidents are not deducted).

However, while there is no distortion to current accounts, there is still a real effect: if the country receiving profits taxes them, those taxes are then retained and do not repatriate through the income account. Moreover, as measurement errors are more likely in the income than trade

¹⁶ Which is roughly the average of the difference (in absolute value) between the dummy effects on the trade and income balance (between columns 2 and 4; between columns 6 and 7; and between columns 8 and 9).

¹⁷ Explaining observed high corporate saving is currently an active research agenda (e.g., Chen et al. 2017).

balance, the theoretical offset may not occur in the data, so that profit shifting may after all distort the measured, though not true, current account.

Our empirical estimates support the theoretical discussion. On average, profit shifting appears to affect trade and income balances symmetrically, with no significant impact on current account balances. The exception are those countries that are likely to attract significant profits, where the current account to GNI ratio is raised by 6 percentage points. The results suggest that about one third of this is due to the real tax effect and two thirds due to measurement errors.

These findings have various important policy implications. First and foremost, in countries where significant tax-related external flows are expected, a macroeconomist would be well advised to focus on the aggregate current account balance and be careful in interpreting its components as well as bilateral current accounts. Moreover, even the aggregate figure should be treated with caution when there are doubts about the possibility of accurately monitoring all items on the income account and notably reinvested foreign earnings.

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