Winners and Losers of Profit Shifting: A Macroeconomic Perspective

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Abstract

Despite assertions by governments and cooperative organizations about the detrimental effects of profit shifting on global economies, there is minimal research on how tax-motivated profit shifting impacts countries' economies. We fill this gap in the literature by developing a country-year measure of aggregate profit shifting and use it to examine the effects of tax-motivated profit shifting on countries' future real GDP and employment growth. Our findings suggest that countries *to which* profits are shifted experience a significant increase in future real GDP growth, primarily driven by greater investment in productive assets. This increase in future real GDP growth does not vary across paper or real profit shifting. We also find evidence of increase in future employment growth in countries *to which* profits are shifted but only in cases of real profit shifting. We do not find evidence that countries *from which* profits are shifted experience decreased future real GDP growth; however, we find some evidence of lower future employment growth. Taken together, our findings indicate that profit shifting creates winners, and, to a limited extent, losers. Our paper contributes a novel empirical proxy and new country-level findings to the literatures on profit shifting and the economic effects of firms' tax planning.

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1. Introduction

Multinational enterprises (MNEs) engage in strategic tax planning to relocate profits from high-tax to low-tax jurisdictions within the MNE's consolidated group. Such profit shifting is presumed to reduce aggregate taxes paid on the MNE's profits and to result in one or more countries collecting less tax revenue. To limit such revenue losses, individual countries and cooperative organizations have tried to curtail opportunities and incentives to engage in profit shifting (Dharmapala [2019]). These efforts include initiatives geared towards diminishing the perceived opacity that facilitates profit shifting (e.g., country-by-country reporting) and policies designed to reduce the benefits derived from profit shifting (e.g., minimum taxes).

Profit shifting has also been the subject of extensive academic research. Micro-level studies have examined its determinants and consequences and macro-level research has focused on understanding how it influences international trade dynamics. What remains unexamined is the impact of profit shifting on the future macroeconomic growth of individual countries and whether such effects vary across source and destination countries. Understanding the relationship between profit shifting and future macroeconomic growth is important because there is a longstanding assumption that the economies of countries *from which* profits are shifted are harmed by the shifting while countries *to which* profits are shifted benefit from it. This assumption is often backed by estimates of country-level tax revenue loss or firm-level estimates of the magnitude of profit shifting. For instance, the Organisation for Economic Co-operation and Development (OECD) estimates that profit shifting leads to an annual tax revenue loss of USD 100-240 billion for countries, equivalent to four to ten percent of global corporate tax revenue. Blouin and Robinson

[2020] estimate that the U.S. alone loses USD 10-20 billion in revenue each year to the profit shifting of its multinationals.[1]

Profit shifting may impact the future macroeconomic growth of individual countries *to which* profits are shifted if the shifted income becomes part of their tax base and allows their governments to invest domestically (Shevlin, Shivakumar, and Urcan [2019] or if MNEs invest the shifted profits in productive assets and employees in the country. Conversely, countries *from which* profits are shifted may experience reduced future macroeconomic growth if the shifting results in loss of tax revenue and/or reduction in investment by MNEs.

There are also reasons to expect that profit shifting may not affect future macroeconomic growth. First, it is possible for reported profits and investable dollars not to be collocated. To the extent that profits are being shifted without affecting the location of cash or assets, shifting may have no effect on where investments are made. Second, it is possible for the effects to go in opposite directions and offset. For example, if MNEs are able to increase their amount of investable cash through shifting and able to invest it in highly productive countries, the macroeconomic growth it generates could compensate for any loss resulting from reduced tax revenue.

To examine the relation between profit shifting and future macroeconomic growth empirically, we require a country-year measure of profit shifting. To the best of our knowledge, no such measure exists, so we create one by adapting a commonly used firm-level measure to the country level. Using unconsolidated data of the affiliates of all MNEs covered by *Orbis*, we

[1] Clausing [2016] estimates an annual tax revenue loss for the U.S. of USD 77-111 billion. However, Blouin and Robinson [2020] show that the double counting of income in the U.S. Bureau of Economic Analysis (BEA) data causes those estimates to be overstated. Relatedly, Tørsløv, Wier, and Zucman [2023] find that approximately 0.8 percent of U.S. GDP was shifted out of the U.S. in 2015, while Beer, de Mooij, and Liu [2020] estimate this number to be 0.4 percent.

calculate the tax incentive to shift profit for each affiliate using De Simone, Klassen, and Seidman's [2017] adaption of the measure, *C*, developed by Huizinga and Laeven [2008]. We then compute an asset-weighted average of the incentives of all affiliates in the country-year and use that as our proxy for aggregate profit shifting of the country-year.

Following the research design of Shevlin, Shivakumar, and Urcan [2019], we examine whether profit shifting affects future real GDP growth and future employment growth by regressing each on our aggregate profit shifting measure. We split the sample of country-years based on the aggregate incentive to shift profit in or out and estimate the model separately on each subsample. We find that countries *to which* profit is shifted experience greater future real GDP growth and find limited evidence that countries *from which* profit is shifted experience reduced employment growth. Importantly, these findings are incremental to the effect of aggregate corporate tax avoidance on future macroeconomic growth, as studied by Shevlin, Shivakumar, and Urcan [2019].

Next, we examine whether the effects are different in large and small countries by splitting the sample of country-years at the median of real GDP. These tests are motivated by the assumption that smaller economies are more likely to have their economic growth materially impacted by profit shifting because they are less diversified and robust than larger economies. Consistent with this assumption, we find evidence suggesting that the relation between profit shifting and future employment growth is concentrated among smaller economies.

We also examine whether the effect of profit shifting on future macroeconomic growth varies between real and paper profit shifting. Real profit shifting involves actual changes in the location of economic activities, such as production, investment, and employment, motivated by tax considerations. On the other hand, paper profit shifting refers to the shifting of profits across

jurisdictions without any corresponding movement of real economic activity. Using OECD's Country-by-Country Reporting (CbCR) Statistics, we develop a country-level Return on Assets (ROA) metric to distinguish between the two forms of profit shifting. Our findings reveal that countries *to which* profits are shifted experience greater future real GDP growth regardless of the type of shifting, while higher future employment growth is only linked to real profit shifting. However, we do not find evidence that the effects of profit shifting on future real GDP or employment growth differ between real and paper profit shifting in countries *from which* profits are shifted.

Finally, we explore the channels through which aggregate profit shifting affects future GDP growth. We find that countries *to which* profits are shifted experience significantly greater future investment growth, providing further evidence to support our assertion that, on average, the profit shifting we capture is not simply paper shifting and is used for future investment within the country. We find some marginal evidence that countries *to which* profits are shifted experience greater corporate tax revenue, suggesting that increased government investment using this revenue may also contribute to the increase in future real GDP growth.

We conduct several tests to demonstrate the robustness of our results. First, we obtain the aggregate effective tax rate (ETR) data from Shevlin, Shivakumar, and Urcan [2019] to replace our construction of their measure. Although this significantly decreases our sample size, all inferences remain the same. Second, we develop an alternate measure of aggregate profit shifting using domestic firms to generate an expectation for the level of MNE profit reported in the country-year. All inferences remain unchanged when we use this alternate measure. Third, we include country fixed effects in our main regression model to address the potential of correlated omitted variables and all inferences remain the same. Last, given the significant impact of large MNEs on

the Irish macro-economy (e.g., "Leprechaun economics", see Halpin [2016]), we drop Ireland and confirm that Ireland alone does not drive our results.

Our paper contributes to the literature on profit shifting and the macroeconomic effects of corporate taxes. First, we add to the ongoing debate on the "winners" and "losers" of profit shifting. There has been a longstanding assumption that economies in high-tax countries bear the brunt of profit shifting, whereas low-tax countries reap the rewards through increased corporate profits and corresponding tax revenue. Our study directly examines this assumption. Our findings indicate that countries receiving shifted profits experience advantages such as greater future GDP growth and, at times, greater employment growth. Interestingly, the countries from which these profits are shifted do not appear to exhibit lesser future real GDP growth; however, we find some evidence of lesser future employment growth. These findings imply that profit shifting may have winners, but no clear losers from a future macroeconomic growth perspective.

Second, we introduce a novel proxy for the profit shifting incentive at the country-year level which can be used in future academic research to study other macro-level effects of profit shifting. The measure is constructed using the affiliate-level data in the *Orbis* database, which has been used extensively in studies of profit shifting at the micro level. Our innovation is aggregating and weighting the affiliate-level estimates of shifting incentive to derive a measure of each country's overall incentive each year. A profit shifting measure aggregated at the country-year level is less affected by missing data than a measure at the firm level.[2] However, we acknowledge that aggregation may also obscure both firm-specific behaviors and heterogeneity within industries.

[2] Orbis data have been shown to be more incomplete in low-tax countries and tax havens than in other countries (Tørsløv, Wier, and Zucman [2023]). While this will result in mismeasurement of shifting incentive for affiliates that have commonly controlled affiliates in those low-tax countries, there is no reason to expect for that mismeasurement to be systematically different in the countries in our sample.

Finally, we directly examine macroeconomic effects of profit shifting. To our knowledge, ours is the first study to investigate how profit shifting affects future macroeconomic growth. In a related paper, Shevlin, Shivakumar, and Urcan [2019] document that country-level ETRs are negatively associated with future macroeconomic growth. Their results suggest that when corporations pay less than the statutory tax rate (i.e., engage in greater tax avoidance), the headquarter countries experience greater future economic growth, on average. While profit shifting is a form of tax avoidance, Shevlin, Shivakumar, and Urcan's [2019] measure captures general tax avoidance and only captures profit shifting to the extent that profit shifting directly alters the firm's ETRs in its headquarter country. Moreover, in additional analysis, Shevlin, Shivakumar, and Urcan [2019] establish that their results are robust to the exclusion of MNEs, and thus, are not driven by profit shifting.

We take a different approach and examine the direct effects of shifting tax bases across countries, regardless of the effect on ETRs. Our findings indicate that while countries receiving shifted profits experience greater future GDP growth, the countries from which these profits are shifted do not appear to exhibit lesser future real GDP growth. We therefore extend the work of Shevlin, Shivakumar, and Urcan [2019] by exploring the effects of the redistribution of corporate profits and the broader economic consequences across multiple nations. The findings of our study offer new insights into the economic effects of profit shifting in a globalized economy and challenge the long-standing assumptions that profit shifting harms the countries from which profits are shifted. These findings should be of particular interest to regulators and policymakers, especially the OECD as it continues work on its Base Erosion and Profit Shifting (BEPS) framework.

2. Prior Literature

2.1 Profit shifting

Profit shifting is the strategic practice of relocating profits earned in one jurisdiction to another jurisdiction. Though an MNE may shift profits for several reasons, tax incentives have been identified as a primary driver, and tax-motivated profit shifting has been shown to significantly lower the consolidated ETRs of MNEs (Huizinga and Laeven [2008]). For example, suppose an MNE headquartered in a country with a 35% tax rate has pre-tax income of $10 million and shifts $2 million of profit to a country with a 0% tax rate. In that case, the company will pay $0.7 million less in tax and its ETR will be 28%.[3]

The widespread use of profit shifting by MNEs to minimize their global tax burden has garnered significant attention from policymakers, media, activists, and practitioners, and a large stream of literature has examined the determinants and consequences of profit shifting at the firm level. Some of the key findings in this literature are that profit shifting can lead to tax savings (Klassen, Lang, and Wolfson [1993]), increased shareholder value and increased firm-level productivity (Maffini and Mokkas [2011]). Several studies also examine the effects of profit shifting on investment and find that firm-level investments are sensitive to the tax rate differential between investee and investor countries (Desai, Foley, and Hines Jr. [2006]; Overesch [2009]; Becker and Riedel [2012]).

A more nascent stream of literature examines profit shifting from a macro perspective. Most of these studies focus on the impact of profit shifting on international trade, which has been proxied using foreign direct investment (FDI), balance of payment, and transfer pricing. The

[3] $2.8 million of tax/$10 million of income = 28% ETR. This simple example assumes that the firm is headquartered in a country with a territorial tax system that exempts foreign income from domestic tax. Most countries have a territorial tax system in place.

evidence provided by these studies is mixed. In one of the earliest papers in this stream, Clausing [2003] examines the effects of tax-motivated transfer pricing on U.S. intrafirm trade and finds that U.S. intrafirm export prices are lower and import prices are higher for countries with low tax rates. In a follow-up paper, Clausing [2006] examines the effects of international taxation on U.S. international trade flows and finds that international tax planning affects the location decisions of MNEs and the prices and quantities of their intrafirm trade transactions. Other studies, however, fail to find evidence that tax incentives affect intrafirm trade prices (Pulina and Zanaj [2022]; Deng and Laux [2021]). In a more recent paper, Depaul, Murphy, and Vernon [2024] examine the effects of countries being named on the European Commission's list of "non-cooperative tax havens" on country-level tourism and FDI. They find a small reduction in tourism and a general increase in FDI flowing to listed countries from EU countries.

Looking beyond intrafirm trade prices and to investment, several studies have also tried to estimate the scale of profit shifting. Janský and Palanský [2019] document that a higher share of investments from tax havens is associated with a lower reported rate of return on inward FDI and infer that the reduced return is caused by profit shifting.

While these prior studies offer valuable perspectives on the impact of profit shifting on international trade and investment, they do not provide estimates of its effects on individual countries' future macroeconomic growth outcomes.[4] We begin to fill this gap by examining the effect of profit shifting on countries' future real GDP growth and employment growth. By doing so, we aim to provide a more comprehensive understanding of how profit shifting affects domestic

[4] FDI measures cross-border capital flows, providing insights into the level of international economic integration and a country's appeal to foreign investors. Existing studies investigating the relationship between profit shifting and FDI offer valuable evidence on how profit shifting influences a country's investment climate, particularly in attracting or deterring foreign investments. These studies tend to focus narrowly on capital mobility and the direct consequences of tax incentives or regulatory environments on investment behavior.

economic productivity, labor markets, and long-term economic stability. This distinction is critical because GDP and employment growth capture wider economic dynamics that FDI alone cannot fully explain.

2.2 Corporate tax and macroeconomic outcomes

Prior evidence on the general effects of corporate taxes on future macroeconomic growth has been mixed (Huang and Frentx [2014]). For example, Stefan Fölster and Magnus Henrekson (2001) do not find a evidence of relationship between country level tax rates and macroeconomic growth. Angelopoulos, Economides, and Kammas [2007] on the other hand find that average tax rates at the country level are negatively correlated with growth. Dabla-Norris & Lima (2023) examines the macroeconomic impact of tax changes, distinguishing between tax rate and tax base changes. Their findings suggest that tax base changes during fiscal consolidation have a smaller effect on output and employment compared to tax rate changes. In recent paper, Kawano, Olson, Slemrod and Hsieh (2023) review the literature that estimates the effects of tax policy on economic growth and find that the existing papers do not support the claim that tax rate changes have a significant impact on national income.

Shevlin, Shivakumar, and Urcan [2019] posit that the mixed evidence is due to the use of the statutory tax rate – which, they argue, fails to capture firms' tax avoidance activities and tax incentives such as credits – to proxy for corporate taxes. Using a country-year aggregate ETR measure, Shevlin, Shivakumar, and Urcan [2019] find that lower aggregate ETRs are associated with greater future macroeconomic growth. They posit that lower aggregate ETRs provide firms with greater tax savings, which firms then invest locally, contributing positively to future GDP growth and employment growth. When aggregate ETRs are greater, funds are redirected from firms to governments, which are not used efficiently in investment due to governments' various

social and political objectives. As discussed below, whether this finding would hold specifically for profits shifted in or out of countries remains an empirical question.

3. Hypothesis Development

There are three primary channels through which corporate profits can impact macroeconomic outcomes. First, MNEs can invest the shifted profits in productive assets and employees within the domestic economy, further contributing to future macroeconomic growth. De Simone, Klassen, and Seidman [2022] evaluate whether profit shifting affects local investment and find that firms with higher levels of profit shifting do not exhibit the typical responsiveness to local investment incentives. This suggests that firms invest the shifted profits in local economies even if it does not maximize their after-tax return on investment. Consequently, the profits shifted out of a country may take away from the investments that MNEs would otherwise make in that country, leading to a further decrease in future macroeconomic growth.

For example, consider the scenario where an MNE shifts profits from a high-tax affiliate to a low-tax affiliate. If the MNE then channels the shifted profits into investments in productive factors such as capital infrastructure or labor force development within the low-tax jurisdiction, this could spur future macroeconomic growth in that low-tax country. In contrast, the high-tax country loses corporate profits that might have otherwise been invested in its economy, which may lead to a decrease in future macroeconomic growth in the high-tax country.

Second, profit shifting contributes to corporate tax revenue. Countries to which profits are shifted receive greater tax revenue, which their governments can use in domestic investments. These investments may lead to future macroeconomic growth (Shevlin, Shivakumar, and Urcan [2019]). Correspondingly, countries from which profits are shifted may experience a loss in tax

revenue, limiting government investment and potentially contributing to decreased future macroeconomic growth.

Lastly, profit shifting can also influence personal consumption, which, per the U.S. BEA, makes up 71% of GDP.[5] As discussed above, MNEs can invest the shifted profits in employees within the domestic economy, which leads to greater employment rates and wages and increased personal consumption. Similarly, countries from which profits are shifted may experience lower personal consumption, leading to decreased future macroeconomic growth.

Alternatively, profit shifting may not be related to a country's future macroeconomic growth as the shifted profits may not be material to the country's economy. Blouin and Robinson [2020] show that the magnitude of profit shifting by U.S. MNEs may be significantly overstated due to the double counting of income in the BEA data commonly used to generate estimates. Dyreng, Hills, and Markle [2021] use financial statement data to estimate the profits shifted out of the U.S. by U.S. MNEs and develop magnitude estimations similar to those of Blouin and Robinson [2020], adding credence to the assertion that many existing profit shifting estimates are overstated. If this is the case, we may see no relation between profit shifting and future macroeconomic growth.

To summarize, the effect of profit shifting on future macroeconomic growth likely depends on various factors, including the interplay between tax optimization strategies, how the MNEs and governments choose to invest the shifted profits and corresponding tax revenue, respectively, and the magnitude of the shifted profits. We state our main hypothesis in the null form as follows:

Hypothesis 1: *Profit shifting is not associated with future macroeconomic growth*.

[5] https://www.bea.gov/system/files/papers/P2004-6.pdf

4. Measure of Aggregate Profit Shifting

4.1 Sample selection for the aggregate profit shifting measure

Existing studies have shown that aggregating firm-level data in financial statements can provide incremental information about macroeconomic outcomes (e.g., Shivakumar [2007]; Shevlin, Shivakumar, and Urcan [2019]). We, therefore, use unconsolidated financial statement data at the affiliate level to develop our measure of aggregate profit shifting.

We start by collecting the population of unconsolidated affiliate-level financial statement data from 2011 to 2018 from *Orbis*. We begin in 2011 due to *Orbis* data limitations and end in 2018 to avoid capturing the macroeconomic impacts of the COVID-19 pandemic, which would be included in the calculation of 2019's future macroeconomic growth variable. We restrict the sample to affiliates of MNEs, defined as a parent with at least one affiliate located in a country other than the parents headquarter-country. We require each affiliate-year observation to have non-missing NACE industry code, pre-tax income, tangible fixed assets, and total assets. Following prior research, we aggregate all financial statement variables within each parent-country-year to create the observations used to calculate the tax incentive variable. Finally, we drop any observation that does not have at least one "sibling" observation (controlled by the same parent) because the tax incentive variable requires at least two countries in which profits can be recorded.

4.2 Measure of aggregate profit shifting incentive

Each country hosts a set of entities, and each of those entities has incentives and opportunities to shift profit into or out of the country based on its interrelationships with all of the entities within its corporate group. The intuition behind our measure of country-year profit shifting incentive is that it will be determined by the composition of entities within a country. If the country is dominated by entities with the incentive to shift profit out of (in to) the country, the country-

level incentive will be to shift profit out (in). If the country contains a mix of entities with in- and out-shifting incentives, the country-level incentive will be closer to zero. Our first step, then, is to calculate the tax incentive variable for each parent-country-year. We then calculate the country-year measure by taking weighted averages within the country-year.

To calculate the parent-country-year tax variable, we follow Huizinga and Laeven [2008] and De Simone, Klassen, and Seidman [2017] and estimate *C* as follows:

$$C_{i,t} = \frac{\sum_{n \neq i} K_n(\tau_i - \tau_n)}{\sum_n K_n} \quad (1)$$

C is a measure of affiliate *i*'s tax incentive to shift profit in year *t. C* is calculated as the capital-weighted tax rate differential between affiliate *i* and all other affiliates of the MNE in year *t*, where *K* is affiliate *i*'s capital and τ is the statutory tax rate of the country in which the affiliate is domiciled.[6] All data are in U.S. dollars, and all variables are defined in Appendix A.

In the spirit of Shevlin, Shivakumar, and Urcan [2019], we calculate our country-year aggregate profit shifting measure, $AggProfitShifting_{c,t}$, as a weighted average of the *C*s of all affiliates in country *c* in year *t*.[7] Example calculations are provided in Appendix B. $AggProfitShifting_{c,t}$ shares important properties with *C*: negative (positive) values indicate incentive to shift profit in to (out of) a country, and the incentive is increasing in magnitude. As such, countries with negative (positive) measures of $AggProfitShifting_{c,t}$ are interpreted as countries to which (from which) profit is shifted in the year.[8]

[6] For ease of exposition, we refer to the unit of observation as an "affiliate". It is actually a parent-country-year and all variables are aggregates of commonly-controlled unconsolidated affiliates.

[7] Alternative country-year measures of shifting incentives are the statutory tax rate and an aggregate ETR (Shevlin, Shivakumar, and Urcan [2019]). Neither measure is as shifting-specific as ours. The statutory tax rate is independent of the mix of entities within the country and the aggregate ETR reflects all tax avoidance, not specifically profit shifting.

[8] Our use of the aggregate of the incentives of the entities within a country as our measure of the country's profit shifting relies on an implicit assumption that the entities responded to the incentives by shifting profits. A vast

4.3 Country-level estimates

Descriptive statistics for the country-level aggregate profit shifting measure for all countries in our sample are shown in Table 2 Panel A. We find that countries such as Bermuda, Ireland, Luxembourg, and Switzerland have some of the smallest estimates, representing high levels of inbound profit shifting. On the other hand, our estimates for countries like the United States, France, Germany, and India are high, suggesting profit is being shifted out of these countries. Therefore, the profit shifting estimates are generally consistent with our expectations based on prior empirical results and anecdotes, thus providing comfort with our measure.

We also provide visualizations of $AggProfitShifting_{c,t}$ for select countries. Figure 1 shows the time trends for $AggProfitShifting_{c,t}$ in countries with the highest levels of inbound profit shifting. In contrast, Figure 2 illustrates the time trends for countries with the highest levels of outbound profit shifting.

Figure 1 shows that the incentives to shift profits into Switzerland, Luxembourg, and Ireland remain high during our sample period. However, there is a decrease in these incentives post-2016 for both Switzerland and Ireland, but not for Luxembourg. In Figure 2, we note that the incentives to shift profit out of Germany, France, and the U.S. remain high before 2016. Similar to Figure 1, we see lower incentives to shift profit out of France and the U.S. starting in 2016. The decrease in incentives to shift profit out of high-tax countries and into low-tax countries after 2016 can be attributed to the introduction of the OECD's base erosion and profit shifting framework, which is associated with lower levels of profit shifting (Adams [2025]), and specifically, country-by-country reporting, which is associated with the movement of real activities across countries to better match where profit is reported (De Simone and Olbert [2021]). The decrease in incentives

literature at the micro level supports this assumption. To avoid requiring this assumption, one would need an entity-year-level measure of shifted profits and we are unaware of a reliable measure that is calculable using our data.

to shift profit out of the U.S. is more drastic compared to other countries, which can be explained by the Tax Cuts and Jobs Act passed on December 20, 2017, which changed the U.S. corporate tax rate to a flat 21% from 35%.

To further validate our measure, we plot the time trends in $AggProfitShifting_{c,t}$ for countries that have experienced changes in STRs. Figure 3 provides the time trends for Japan and India as these two countries have experienced a decrease and an increase in STRs in the sample period, respectively. Japan experienced a 10% decrease in its STR from 39.54% in 2011 to 29.74% in 2018. As the STR decreased in Japan, the incentives to shift profit out of Japan also trended downward, approaching zero by the end of the sample period. In contrast, the incentives to shift profit out of India did not follow the same trend as the STR. Between 2012 and 2014, when the STR in India increased from 43.4% to 47.43%, the incentives to shift profit out of India significantly declined. Although there was an increase in incentives to shift profit out of India between 2014 and 2015, the STR remained relatively stable.

Figure 3 indicates that while STRs are an important factor in the incentives to shift profit into or out of a country, they do not capture all aspects of profit shifting.[9] Since our measure of aggregate profit shifting considers not only the STR of the country where an affiliate operates, but also the STRs of all other affiliates in the multinational group, it provides additional information beyond what is conveyed by STRs alone. Further, when making profit shifting decisions, MNEs consider STRs in conjunction with other factors such as labor market availability and skill (e.g., MacCarthy and Atthirawong [2003]).

[9] Table 3 shows that the correlation coefficient between $AggProfitShifting_{c,t}$ and τ, the STR, is 0.810. In untabulated analysis, we run our main regression model outlined in equation (2) with and without $AggProfitShifting_{c,t}$, and find that the inclusion of $AggProfitShifting_{c,t}$ increases the model's R^2 by 0.82 percentage points when future GDP growth is the dependent variable. Thus, our measure of aggregate profiting shifting is incremental to the STR and increases the model's explanatory power.

We further explore whether the incentives to shift profit into or out of a country change over time. In Table 2 Panel A, we calculate the percentage of years that $AggProfitShifting_{c,t}$ is either negative (In %) or positive (Out %) in the sample period. We find that $AggProfitShifting_{c,t}$ is either negative or positive for all years during our sample period for most countries (86%) in our sample. This indicates that the incentives to shift profit remain fairly constant over the sample period. In other words, the sign on $AggProfitShifting_{c,t}$ does not fluctuate over the sample period for a given country, suggesting stability in country-level aggregate profit-shifting estimates.

Notably, our measure of aggregate profit shifting is not designed to measure the magnitude of profit shifting – it is intended to capture the *relative* aggregate incentive to shift profits into or out of a country. Thus, the estimates in Table 2 Panel A should be interpreted relative to other countries rather than each country independently.

5. Macroeconomic Effects of Profit Shifting

5.1 Sample and research design

To examine the effects of profit shifting on the future macroeconomic growth of a country, we estimate the following OLS model:

$$\begin{aligned} Growth_{c,t+1} = {} & \gamma_0 + \gamma_1 AggProfitShifting_{c,t} + \gamma_2 AggETR_{c,t} \\ & + \gamma_3 RealGDPGrowth_{c,t} + \gamma_4 \tau_{c,t} + \gamma_5 lnPopulation_{c,t} \\ & + YearFE + \varepsilon_{c,t} \end{aligned} \qquad (2)$$

The dependent variable, *Growth*, is alternatively $RealGDPGrowth_{c,t+1}$ or $EmploymentGrowth_{c,t+1}$. We follow Shevlin, Shivakumar, and Urcan [2019] and define $RealGDPGrowth_{c,t+1}$ as the real GDP of the country in year *t+1* minus the real GDP of the country in year *t*, scaled by the real GDP of the country in year *t*. Real GDP is measured at constant 2017 prices. $EmploymentGrowth_{c,t+1}$ is defined as the total number of employed individuals in country

c in year *t+1* minus the total number of employed individuals in country *c* in year *t*, scaled by the total number of employed individuals in country *c* in year *t*.

The coefficient on $AggProfitShifting_{c,t}$, γ_1, is our coefficient of interest. A negative (positive) estimate of γ_1 is consistent with greater inbound profit shifting being positively (negatively) associated with future macroeconomic growth, or with greater outbound profit shifting being negatively (positively) associated with future macroeconomic growth.

It is important to note that though profit shifting can directly impact GDP through increased corporate profits, it does not necessarily affect *future* GDP *growth*, as this depends on the nature of the shifted profits (e.g., paper shifting) and how the shifted profits are used.[10] We therefore do not expect there to be a direct relation between $AggProfitShifting_{c,t}$ and our dependent variable.

We control for Shevlin, Shivakumar, and Urcan's [2019] measure of country-level aggregate effective tax rate ($AggETR_{c,t}$), given its relation with future macroeconomic growth and our interest in the effect that aggregate profit shifting has on future macroeconomic growth beyond that of tax avoidance in firms' headquarter-countries. Shevlin, Shivakumar, and Urcan [2019] use publicly listed entities in 63 countries to compute $AggETR_{c,t}$, which captures the tax avoidance activities of the entities that are located in a given country (host entities). Though profit shifting may be one of the tax avoidance strategies used by MNEs, Shevlin, Shivakumar, and Urcan's [2019] sample includes both domestic entities and MNEs. Moreover, in additional analysis, Shevlin, Shivakumar, and Urcan [2019] establish that their results are not driven by profit shifting as the results are robust to the exclusion of MNEs.

[10] There are two main approaches to calculating GDP: the expenditure method and the income method. The expenditure method, which is the more commonly used method, calculates GDP as the sum of consumption, investment, government spending, and net exports. Under the income method, GDP is calculated as the sum of corporate profits, interest and investment income, and self-employment, wages, and labor income. As shifted profits impact corporate profits, profit shifting directly impacts GDP.

Our aggregate profit shifting measure differs from the $AggETR_{c,t}$ measure used by Shevlin, Shivakumar, and Urcan [2019] on several dimensions. First, we include all entities with operations in a country, regardless of whether they are listed there. For example, in Germany, we include entities listed in Germany as well as affiliates of foreign entities with operations in Germany. Second, while the $AggETR_{c,t}$ measure used in Shevlin, Shivakumar, and Urcan [2019] may capture some of the effects of profits shifting, it is limited to profits shifted into or out of Germany by German-listed entities and only to the extent that the shifted profits influence the ETRs of these entities in Germany. Our measure on the other hand captures profits shifted into or out of Germany by all entities, even if those profits do not directly affect the tax base on which German companies are taxed. Our measure therefore allows us to examine the macroeconomic effects of profit shifting more directly.

Consistent with Shevlin, Shivakumar, and Urcan [2019], we also control for lagged growth ($RealGDPGrowth_{c,t}$) to account for potential mean reversion in macroeconomic growth and the relation between employment growth and GDP growth, the statutory tax rate of the country ($\tau_{c,t}$), and the population of the country ($lnPopulation_{c,t}$) which reflects a country's growth potential. Year fixed effects are included, and standard errors are clustered at the country level. Country fixed effects are not included due to collinearity with the variables of interest and the control variables. In a robustness test tabulated and described below, we include country fixed effects and all inferences remain unchanged. Macroeconomic variables are obtained from the Penn World Tables. All data are in U.S. dollars, and all variables are defined in Appendix A.

We include in our sample all country-years for which we can estimate the aggregate profit shifting measure.[11] As detailed in Table 1, our sample consists of 465 country-year observations, representing 72 countries from 2011 to 2018.

5.2 Descriptive statistics

Our descriptive statistics, reported in Table 2 Panel B, are largely consistent with those of Shevlin, Shivakumar, and Urcan [2019]. In general, our sample has lesser on-average future real GDP growth (mean 0.029, median 0.027) compared to that of Shevlin, Shivakumar, and Urcan [2019] (mean 0.033, median 0.034). However, our sample has greater on-average future employment growth (mean 0.007, median 0.006) than the sample in Shevlin, Shivakumar, and Urcan [2019] (mean 0.002, median 0.002).

One notable difference in descriptive statistics is that of $AggETR_{c,t}$, which is, on average, larger (mean 0.361, median 0.273) than the sample in Shevlin, Shivakumar, and Urcan [2019] (mean 0.219, median 0.220). This difference is likely driven by limitations in the *Orbis* data that require us to use GAAP ETR instead of cash ETR, as cash taxes paid is unavailable. In a robustness test tabulated and described below, we obtain the aggregate ETR data from Shevlin, Shivakumar, and Urcan [2019] to replace our construction of their measure. Although this significantly decreases our sample size, all inferences remain the same.

Pearson correlation coefficients are reported in Table 3, with correlations statistically significant at the five percent level denoted in bold. Correlations are generally low except for the correlation between $AggProfitShifting_{c,t}$ and $\tau_{c,t}$ (coefficient 0.810), which is reasonable given that STRs are a significant driver of profit shifting, but not the sole driver. The correlation coefficient

[11] Due to *Orbis* data limitations, specifically Orbis' reliance on the public financial statements of privately-held firms, there are insufficient affiliate-year observations to estimate the aggregate profit shifting measure for countries such as Canada and China.

between $AggProfitShifting_{c,t}$ and $AggETR_{c,t}$ is only 0.176, suggesting that, as expected, $AggProfitShifting_{c,t}$ and $AggETR_{c,t}$ do not capture the same underlying construct.[12]

The correlations between $AggProfitShifting_{c,t}$ and $RealGDPGrowth_{c,t}$ and $AggProfitShifting_{c,t}$ and $EmploymentGrowth_{c,t}$ are -0.157 and -0.173, respectively. These coefficients provide univariate evidence that suggests that greater inbound (outbound) profit shifting is associated with greater (lesser) future macroeconomic growth. However, we do not make formal conclusions until we consider multivariate evidence.

5.3 Main results – future real GDP growth

Table 4 Panel A reports the results of estimating equation 2 with $RealGDPGrowth_{c,t+1}$ as the outcome variable of interest. The coefficient of interest is that on $AggProfitShifting_{c,t}$. In columns 1 and 2 (3 and 4), we estimate equation 2 without (with) year fixed effects. In columns 1 and 3 (2 and 4), we estimate equation 2 without (with) $AggETR_{c,t}$, to determine whether the relation between $AggProfitShifting_{c,t}$ and $Growth_{c,t}$ is incremental to that of $AggETR_{c,t}$ and $Growth_{c,t}$.

In Panel A, the coefficient estimates on $AggProfitShifting_{c,t}$ are negative and statistically significant at the ten percent level across all specifications (coefficients range from -0.064 to -0.075). As negative values of $AggProfitShifting_{c,t}$ represent greater inbound profit shifting, this result is consistent with both potential explanations – countries with greater inbound profit shifting exhibit significantly greater future real GDP growth, and countries with greater outbound profit shifting exhibit significantly lesser future real GDP growth. Thus, we do not make formal conclusions until we explore this result in further detail in cross-sectional analyses.

[12] The correlation coefficient between $AggProfitShifting_{c,t}$ and $AggETR_{c,t}$ from Shevlin, Shivakumar, and Urcan [2019] is 0.516.

The coefficient estimates on $AggETR_{c,t}$ are negative, consistent with the findings of Shevlin, Shivakumar, and Urcan [2019]; however, they are not statistically significant at conventional levels.[13] We note that this may be a result of using GAAP ETRs instead of cash ETRs, so we reserve our conclusions about the relation between $AggETR_{c,t}$ and $Growth_{c,t}$ in the presence of $AggProfitShifting_{c,t}$ until we use the aggregate ETR data from Shevlin, Shivakumar, and Urcan [2019] in a robustness test below.

We also note that including year fixed effects does not significantly impact the magnitude of the coefficient estimates on $AggProfitShifting_{c,t}$ or the standard errors.

5.4 Main results – future employment growth

Table 4 Panel B reports the results of estimating equation 2 with $EmploymentGrowth_{c,t+1}$ as the outcome variable of interest. Similar to Panel A, we estimate equation 2 without (with) year fixed effects in columns 1 and 2 (3 and 4), and we estimate equation 2 without (with) $AggETR_{c,t}$ in columns 1 and 3 (2 and 4).

The coefficient estimates on $AggProfitShifting_{c,t}$ are not statistically significant in all columns, suggesting that there is no on-average effect of $AggProfitShifting_{c,t}$ on future employment growth, and further cross-sectional analyses are warranted.

5.5 Cross-sectional analyses

Inbound vs Outbound Profit Shifting

Next, we explore whether our main results vary between inbound profit shifting and outbound profit shifting. We create an indicator variable, $Inbound_{c,t}$, which equals one when *AggProfitShifting* is negative for the country-year; and zero otherwise. As such, $Inbound_{c,t}$ takes

[13] When we run equation 2 with $AggETR_{c,t}$ and without $AggProfitShifting_{c,t}$, the coefficient on $AggETR_{c,t}$ is negative and statistically significant as per the findings of Shevlin, Shivakumar, and Urcan [2019].

on the value one (zero) for county-years for which the aggregate incentive is for profits to be shifted in (out).

Table 5 reports the results from estimating Equation 2 after bifurcating the sample by $Inbound_{c,t}$, with Panel A (B) reporting the results with $RealGDPGrowth_{c,t+1}$ ($EmploymentGrowth_{c,t+1}$) as the outcome variable of interest. In Panel A, the coefficient estimates on $AggProfitShifting_{c,t}$ are negative and statistically significant in all columns (coefficient estimates range from -0.098 to -0.106) in the $Inbound_{c,t}$=1 sample. When $Inboun_{c,t}d$=0, we find the coefficient estimates on *AggProfitShifting* are insignificant in all columns. These results suggest that countries *to which* profits are shifted exhibit greater future real GDP growth, whereas countries *from which* profits are shifted do not appear to exhibit lesser future real GDP growth.

In Panel B of Table 5 – where the outcome variable is $EmploymentGrowth_{c,t+1}$ – the coefficient estimates on $AggProfitShifting_{c,t}$ are negative and insignificant when $Inbound_{c,t}$ is equal to 1. In the second group ($Inbound_{c,t}$=0), the coefficient estimates on $AggProfitShifting_{c,t}$ are positive and significant in columns 1 and 2 (0.071, t-statistic of 1.872 in column 1; 0.070, t-statistic of 1.886 in column 2) and positive and marginally significant in columns 3 and 4 (0.056, t-statistic of 1.364 in column 3; 0.055, t-statistic of 1.369 in column 4) when year fixed effects are included. Altogether, the results in Table 5 do not show evidence of a change in employment growth in countries *to which* profits are shifted but provide some evidence to suggest that countries *from which* profits are shifted experience less future employment growth.

Size of the Economy

Next, we consider whether the relation between aggregate profit shifting, and future macroeconomic growth varies between large, developed countries and smaller, less developed ones. On the one hand, larger economies might benefit less from having profits shifted in because

these countries typically have more diversified economies, and the inflow of shifted profits likely represents a smaller proportion of their total economic activity. In contrast, smaller economies could gain more from inbound profit shifting as the shifted profits can significantly boost their economy. On the other hand, larger countries may have relatively larger labor markets compared to smaller countries, which could lead to a greater increase in future employment growth resulting from the inflow of shifted profits.

Similarly, large countries from which profits are shifted may be better equipped to mitigate the adverse effects of outbound profit shifting than smaller countries. Smaller countries often rely more heavily on a narrower set of economic activities and revenue sources, so when profits are shifted out, the relative impact on their economy is greater. However, large economies often host multinational corporations with extensive operations, making the scale of profit available to be shifted out substantial and leaving them more vulnerable to outbound profit shifting. Considering these competing arguments, we do not make any prediction on how the relation between profit shifting and future macroeconomic growth will vary with country size.

To examine the effect of the size of the economy empirically, we create an indicator variable, $LargeEconomy_{c,t}$, which equals 1 (0) when *RealGDP* of country *c* in year *t* is greater than or equal to (less than) the median value of *RealGDP* for all country-year observations. Since inbound and outbound profit shifting countries can vary in size, we create separate variables for these two groups. We then modify Equation 2 to interact $LargeEconomy_{c,t}$ with $AggProfitShifting_{c,t}$.[14] Table 6 reports these results, with Panel A (B) reporting the results with $RealGDPGrowth_{c,t+1}$ ($EmploymentGrowth_{c,t+1}$) as the outcome variable of interest. For brevity, we

[14] All inferences remain unchanged when we use a fully interactive model.

report the results from the variation of Equation 2 that includes $AggETR_{c,t}$ and year fixed effects. Columns 1 (2) report the results for inbound (outbound) profit shifting countries.

In Panel A column 1, the coefficient on $AggProfitShifting_{c,t}$ is negative and marginally significant (-0.083, t-statistic of -1.577) for inbound profit shifting countries, consistent with our results in Table 5 Panel A. However, the coefficient on the interaction of $AggProfitShifting_{c,t}$ and $LargeEconomy_{c,t}$ is not statistically significant (-0.038, t-statistic of -0.755). In column 2, the main effect of $AggProfitShifting_{c,t}$ continues to be insignificant, consistent with Table 5 Panel A, and the coefficient on $AggProfitShifting_{c,t} \times LargeEconomy_{c,t}$ is also insignificant (-0.091, t-statistic of -0.569). Thus, we do not find any evidence that the effects of aggregate profit shifting on $RealGDPGrowth_{c,t+1}$ varies with the size of the country's economy.

In Panel B column 1, the coefficient on $AggProfitShifting_{c,t}$ is negative and marginally significant (-0.087, t-statistic of -1.327), whereas the coefficient on the interaction of $AggProfitShifting_{c,t}$ and $LargeEconomy_{c,t}$ is positive and marginally significant (0.087, t-statistic of 1.398). These results provide some evidence to suggest that aggregate profit shifting contributes to higher $EmploymentGrowth_{c,t+1}$ in smaller inbound profit shifting economies, where the inbound profits presumably make up a larger portion of the economy.

In column 2, the coefficient on $AggProfitShifting_{c,t}$ is positive and marginally significant (0.081, t-statistic of 1.223), whereas the coefficient on the interaction of $AggProfitShifting_{c,t}$ and $LargeEconomy_{c,t}$ is insignificant. Thus, we do not find any evidence that the effects of aggregate profit shifting on $EmploymentGrowth_{c,t+1}$ varies with the size of the country for outbound profit shifting countries.

These findings suggest that in countries *to which* profits are shifted, the impact on future real GDP growth does not vary with the size of the economy. However, the effect on future

employment growth is concentrated in smaller economies, suggesting that inbound profit shifting does not affect all countries equally. We continue to find limited evidence of reduced future growth in countries *from which* profits are shifted, with no variation based on the size of the economy. This finding suggests that our main results are not driven by the fact that, on average, countries *from which* profits are shifted are larger than the countries *to which* these profits are shifted. Instead, our results indicate that outbound profit shifting does not hinder future real GDP or employment growth, reinforcing the idea that profit shifting does not necessarily create "losers".

Real vs Paper Proft Shifting

In our next set of empirical tests, we examine whether the effect of profit shifting on future macroeconomic growth varies between real and paper profit shifting. Real profit shifting can have a positive effect on future macroeconomic growth through increased future economic activity in recipient countries, such as infrastructure, research, or employment-generating activities. Conversely, countries from which these profits are shifted may experience lower future macroeconomic growth due to a reduction in these economic activities.

The effect of paper profit shifting on future macroeconomic growth is less clear. On the one hand, paper profit shifting may not affect future macroeconomic growth as it does not necessarily influence the location of real economic activities. On the other hand, paper profit shifting can lead to higher tax revenues in the countries to which profits are shifted and lower tax revenues in the countries from which profits are shifted. These changes in government revenues can impact public investment and economic growth.

To distinguish between real and paper profit shifting, we make use of the aggregate CbCR Statistics published by the OECD.[15] This dataset provides anonymized and aggregated CbCR data with more granular information than is available in other data sources and contains information on MNE employees, related and unrelated party revenues, profits and taxes paid (OECD [2024]). This dataset has been used in existing research to examine the effects of CbCR on aggregate investment patterns (Joshi, Markle, and Robinson [2025]).

We use this dataset to calculate a country-level ROA variable by scaling pre-tax income by total tangible assets at the country-year level.[16] Next, we identify countries where the reported profits are disproportionate to activity levels. For countries *to which* profits are shifted ($Inbound_{c,t} = 1$), we interpret relatively higher (lower) ROA values as indicative of paper (real) profit shifting. A relatively higher ROA suggests increased levels of reported profits with no corresponding increase in assets, which is characteristic of paper profit shifting. Conversely, a relatively lower ROA suggests increased levels of reported profits alongside increased assets, aligning more closely with real profit shifting. In the inbound income shifting sample, we define $\underline{Paper}_c$ as equal to 1 if the country's ROA is greater than the median ROA across all countries, and 0 if it is lower.

For countries *from which* profits are shifted ($Inbound_{c,t} = 0$), we interpret relatively lower (higher) ROA values as indicative of paper (real) profit shifting as a lower ROA suggests that profits are shifted out to another jurisdiction without a reduction in the asset base in the home

[15] This data can be accessed at https://stats.oecd.org/Index.aspx?DataSetCode=CBCR_TABLEI

[16] The OECD has published aggregate CbCR statistics for the years 2016 to 2020. As our sample period ends in 2020, we calculate the average ROA for each country based on data from 2016 to 2018 and use this value for the country across all years. We acknowledge that this approach assumes the level of activity and profitability in a country has remained stable over our sample period, which may not hold true for all countries.

country. In this sample, we define $\underline{Paper}_c$ as equal to 1 if the country's ROA is lower than the median ROA across all countries, and 0 if it is greater.

Table 7 reports the results of estimating Equation 2 by bifurcating on $\underline{Paper}_c$, with Panel A (B) reporting the results with $RealGDPGrowth_{c,t+1}$ ($EmploymentGrowth_{c,t+1}$) as the outcome variable of interest. For brevity, we report the results from the variation of Equation 2 that includes $AggETR_{c,t}$ and year fixed effects. Columns 1 and 2 (3 and 4) report the results for inbound (outbound) profit shifting countries.

As shown in Panel A columns 1 and 2, we continue to find statistically significant evidence of a positive relation between higher amounts of aggregate profit shifting and greater future real GDP growth for inbound profit shifting countries (one-tailed), but this does not appear to differ based on whether the profit shifting is real or paper. In columns 3 and 4, we continue to fail to find evidence of a relation between aggregate profit shifting and future real GDP growth for outbound profit shifting countries, for both real and paper profit shifting.

As shown in Panel B columns 1 and 2, we find that the positive relation between higher amounts of aggregate profit shifting and greater future employment growth for inbound countries is concentrated among real profit shifting instead of paper. This result is consistent with an increase in employees among countries to which profits are shifted. Columns 3 and 4 show that we fail to find evidence of a relation between aggregate profit shifting and future employment growth for outbound profit shifting countries, for both real and paper profit shifting. These results add credibility to our assertion that, on average, the countries losing profits do not necessarily become "losers."

5.6 Channels Through Which Profit Shifting Affects Future GDP Growth

Our results suggest that profit shifting leads to greater future real GDP growth in countries to which profits are shifted. In this section, we explore the channels through which profit shifting affects future GDP growth in these countries. [17] We focus on two primary channels discussed in Section 3: investment growth and corporate tax revenue. We do not test the third channel discussed, personal consumption, as we do not find robust evidence of increased future employment growth, which is a significant driver of personal consumption.

Investment Growth

MNEs can invest their shifted profits in productive assets and employees within the domestic economy, contributing to future macroeconomic growth in that country. To explore whether profit shifting is associated with an increase in future investment growth in productive assets, we re-estimate Equation 2 by replacing the dependent variable with $InvestmentGrowth_{c,t+1,}$ which equals the investment in a country's capital stock in year *t+1* minus the investment in a country's capital stock in year *t*, scaled by the investment in a country's capital stock in year *t.*

Table 8 column 1 reports the results of estimating Equation 2 with $InvestmentGrowth_{c,t+1}$ as the outcome variable in the inbound profit shifting sample. The coefficient on $AggProfitShifting_{c,t}$ is negative and statistically significant at the one percent level (-0.285, t-statistic of -3.306), suggesting that inbound profit shifting is associated with future investment growth in productive assets. Overall, our results are consistent with inbound shifted profits being

[17] In untabulated results, we estimate Table 8 for our outbound income shifting sample and do not find any evidence of decrease in investment or government revenues in these countries.

invested in productive assets in the domestic economy, contributing to the increase in future GDP growth found in Tables 4-6.

Corporate Tax Revenue

Countries to which profits are shifted may also collect greater tax revenue that governments can use for domestic investments, potentially generating future macroeconomic growth. To explore whether greater tax revenues are associated with inbound profit shifting, we re-estimate Equation 2 by replacing the dependent variable with $CorpTaxRevenue_{c,t}$. $CorpTaxRevenue_{c,t}$ equals the natural logarithm of total corporate tax revenue collected by the tax administration of country c in year *t* scaled by $RealGDP_{c,t}$. Unlike our measures of macroeconomic growth, we do not use the growth in corporate tax revenue because we expect that the effect of profit shifting on corporate tax revenue should be observed within the same year. This is due to the nature of tax instalment collection and reporting processes, which typically capture changes in tax liabilities on an annual basis. We also modify Equation 2 to include known determinants of corporate tax revenue that we could obtain for our global sample of countries. These variables include a country's public debt ($PublicDebt_{c,t}$), trade openness ($TradeOpenness_{c,t}$), and the corruption perception index score ($CPI_{c,t}$) (Andrejovská and Glova [2025]).

Table 8 column 2 reports the results of estimating Equation 2 with $CorpTaxRevenue_{c,t}$ as the outcome variable in the inbound profit shifting sample. The coefficient on $AggProfitShifting_{c,t}$ is negative and marginally significant (-5.712, *t*-statistic of -1.667), providing some evidence to suggest that greater levels of inbound profit shifting is associated with greater corporate tax revenue collected by tax administrations. Thus, increased government investment through increased corporate tax revenue may be a secondary channel in which profit shifting contributes to increased future GDP growth.

5.7 Robustness Tests

Shevlin, Shivakumar, and Urcan's [2019] Aggregate ETR Measure

As discussed above, our construction of Shevlin, Shivakumar, and Urcan's [2019] $AggETR_{c,t}$ measure uses firms' GAAP ETRs instead of cash ETRs due to *Orbis* data limitations. Thus, our prior analyses cannot demonstrate that the documented relation between $AggProfitShifting_{c,t}$ and $Growth_{c,t}$ is incremental to that of $AggETR_{c,t}$ and $Growth_{c,t}$ when $AggETR_{c,t}$ is constructed using cash ETRs. To address this, we obtain Shevlin, Shivakumar, and Urcan's [2019] $AggETR_{c,t}$ data to replace our construction of their measure in Equation 2. In Table 9, we recreate our main Table 5 regression results using the $AggETR_{c,t}$ data, which we label as $AggETR_SSU_{c,t}$. For brevity, we use the variation of Equation 2 that includes year fixed effects.

In Panel A (B) we report the results with $RealGDPGrowth_{c,t+1}$ ($EmploymentGrowth_{c,t+1}$) as the outcome variable of interest, where column 1 (2) contains the result for the inbound (outbound) profit shifting countries. As shown in Panel A column 1, the coefficient on $AggProfitShifting_{c,t}$ continues to be negative and statistically significant (one-tailed, -0.120, t-statistic of –1.661) in the presence of $AggETR_SSU_{c,t}$. The coefficient on $AggProfitShifting_{c,t}$ in Panel A column 2 also continues to be not statistically significant. Thus, our results suggest that aggregate inbound profit shifting is associated with greater future real GDP growth, and this association is incremental to that of aggregate corporate taxes using cash ETRs.

When we consider future employment growth, we continue to an insignificant coefficient on $AggProfitShifting_{c,t}$ in column 1 and a positive and statistically significant coefficient in column 2 on $AggProfitShifting_{c,t}$ (0.165, t-statistic of 2.170) in the presence of $AggETR_SSU_{c,t}$. These analyses are consistent with Table 5; we fail to find evidence of an overall association between aggregate profit shifting and future employment growth for inbound profit shifting countries, and

some evidence of an association between aggregate profit shifting and lesser future employment growth for outbound profit shifting countries, which is incremental to that of aggregate corporate taxes using cash ETRs. We note that the coefficients on the control variables are consistent with that of Table 5 as well.[18]

Alternative Measure of Aggregate Profit Shifting

Our primary measure of aggregate profit shifting is based on *C*, which captures the tax incentive to shift income (Huizinga and Laeven [2008]). Although there is a significant literature which finds that economic actors respond to and act in accordance with incentives, we acknowledge that this measure does not capture actual shifted profits, as this is not visible. To demonstrate robustness of our results, we develop an alternative measure of aggregate profit shifting using the actual reported profits at the consolidated parent level and unconsolidated affiliate level data for all domestic firms in *Orbis*. We then use the domestic firms to generate an expectation for the level of profit reported in the country-year, and then interpret deviations from that expectation by multinationals as shifted profit.

We start with the population of unconsolidated financial statement data for corporate entities from 2012 to 2018. We require each corporate entity-year observation to have a non-missing NACE2 industry code, earnings before interest and tax (EBIT), and total assets, and to have compensation expense greater than zero. We then divide the sample into domestic and multinational corporate entities.

[18] We do not use $AggETR_SSU_{c,t}$ in our primary analysis as it results in a significant sample size reduction and a resulting loss in power such that we would not be able to conduct our other cross-sectional analyses.

Next, in untabulated analyses, we compare the descriptive statistics of consolidated total assets, fixed assets, compensation expense, and number of employees of domestic to multinational entities in each country-industry-year. As expected, multinational entities are significantly larger and have more employees than domestic entities. Since very small domestic entities are likely not comparable to multinational entities, we drop all domestic entities with consolidated fixed assets less than the 25th percentile of multinational entities' fixed assets in that country-industry-year. We further employ entropy balancing (Hainmueller [2012]), a form of pseudo-matching, on entities' profit, fixed assets, and compensation expense when running the Cobb-Douglas production function regression discussed below, to ensure greater comparability between our domestic and multinational samples.

After the elimination of domestic entities with consolidated fixed assets less than the 25th percentile of multinationals' fixed assets in that country-industry-year, we are left with some country-industry-years that have insufficient observations to reliably estimate the Cobb-Douglas production function coefficients discussed below. Given how critical the Cobb-Douglas production function coefficients are to creating our aggregate profit shifting measure, we drop all corporate entities located in countries where there are fewer than 25 observations in a country-industry-year. Unfortunately, this limits our sample size significantly; however, this ensures more reliable estimates.

Next, we estimate a modified version of the Cobb-Douglas production function (e.g., Hines and Rice [1994]) on the affiliates of the domestic firms in the balanced sample to generate estimates of the coefficients on the capital and labor inputs for each country-industry-year:

$$lnEBIT_{i,t} = \beta_0 + \beta_1 lnTangibles_{i,t} + \beta_2 lnLabor_{i,t} + \varepsilon_{M,t} \quad (3)$$

In Equation 3, the dependent variable, *lnEBIT*, is the natural logarithm of the domestic entity *i*'s unconsolidated earnings before interest and tax in year *t*. *lnTangibles* equals the natural logarithm of domestic entity *i*'s unconsolidated fixed assets in year *t*, and *lnLabor* equals the natural logarithm of domestic entity *i*'s unconsolidated compensation expense in year *t*. Standard errors are clustered at the consolidated entity level. Equation 3 is estimated separately for each country-industry-year to ensure the reliability of the Cobb-Douglas production function coefficients.[19] Thus, we do not include industry-level productivity, economic shocks, or other variables often in a Cobb-Douglas production function.

Equation 3 yields estimates of the coefficients on the capital and labor inputs for each country-industry-year using domestic entities that do not shift profit. In other words, the coefficients estimate profitability in a country-industry-year without any potential impact of profit shifting. Coefficient values differ significantly across industries, as expected. With some exceptions, coefficient values are generally consistent across countries within an industry.

We then apply these coefficients to multinationals' inputs in the same country-industry-year and add the constant value. This generates an estimate of *lnEBIT* that the affiliate of a multinational would report each year in the absence of profit shifting. We then calculate the difference between predicted *lnEBIT* and actual *lnEBIT*. The result is an estimate which can be interpreted as the natural log of the ratio of predicted EBIT to actual EBIT, where a negative (positive) amount is consistent with inbound (outbound) profit shifting.[20]

Finally, we create our aggregate profit shifting measure – an asset-weighted average of the predicted profit shifting of all multinationals in the country-year. One challenge in creating this

[19] In untabulated analysis, we modify equation 1 for the financial institutions industry to include inputs specific to the industry, such as customer deposits (e.g., Joshi et al. [2020]). Our ultimate aggregate profit shifting measure remains unchanged.

[20] $\ln(x) - \ln(y) = \ln(x/y)$

measure is the conversion of the *lnEBIT* amounts to EBIT dollars. Our estimation process leads to predicted EBIT values with a much tighter distribution than actual EBIT values, which becomes particularly apparent when calculating *e* to the power of *lnEBIT*. To address these extreme values and to prevent the outliers from driving our profit shifting measure, we scale the EBIT dollar difference by unconsolidated total assets and create an asset-weighted average of this scaled difference of all multinationals in the country-year.

We use this alternative measure of aggregate profit shifting to test whether our main results found in Table 5 hold.[21] Table 10 reports these results, with Panel A (B) reporting the results with $RealGDPGrowth_{c,t+1}$ ($EmploymentGrowth_{c,t+1}$) as the outcome variable of interest. For brevity, we report the results from the variation of Equation 2 that includes *AggETR* and year fixed effects. Columns 1 (2) report the results for inbound (outbound) profit shifting countries.

Consistent with Table 5 Panel A, we find that the coefficient on the alternative measure of *AggProfitShifting* is negative and statistically significant at the five percent level in Table 10 Panel A column 1 (-0.164, *t*-statistic of -2.237) and insignificant in column 2. This evidence further corroborates our previous finding that increased inbound profit shifting is associated with greater future real GDP growth but outbound profit shifting does not appear to be associated with lesser future real GDP growth, on average.

Consistent with Table 5 Panel B, we find that the coefficients on the alternative measure of *AggProfitShifting* are insignificant in both Table 10 Panel B columns 1 and 2. Thus, we continue to fail to find evidence that aggregate profit shifting is associated with future employment growth in inbound profit shifting countries, on average, and find some evidence of lesser future

[21] This alternate measure of *AggProfitShifting* provides similar estimates to our primary measure. For example, the correlation between the two measures for France is 0.596, for Slovakia is 0.457, and for Slovenia is 0.436.

employment growth in outbound profit shifting countries. We note that the coefficients on the control variables are consistent with that of Table 5, with some exceptions. The availability of data to reliably measure the Cobb-Douglas production function coefficients has led to a smaller sample size, which may cause differences in some control variable coefficients.

Country Fixed Effects

To address potential correlated omitted variable bias, we recreate our main Table 5 regression results with country fixed effects. Again, for brevity, we use the variation of Equation 2 that also includes year fixed effects. Table 11 reports these results, with Panel A (B) reporting the results with $RealGDPGrowth_{c,t+1}$ ($EmploymentGrowth_{c,t+1}$) as the outcome variable of interest. Columns 1 (2) report the results for inbound (outbound) profit shifting countries.

Consistent with Table 5 Panel A, we find that the coefficient on $AggProfitShifting_{c,t}$ is negative and statistically significant in Table 11 Panel A column 1 (one-tailed, -0.072, *t*-statistic of –1.561) and insignificant in column 2. This evidence further corroborates our previous finding that increased inbound profit shifting is associated with greater future real GDP growth but outbound profit shifting does not appear to be associated with lesser future real GDP growth, on average.

Consistent with Table 5 Panel B, we find that the coefficients on $AggProfitShifting_{c,t}$ are insignificant in both Table 11 Panel B columns 1 and 2. Thus, we continue to fail to find evidence that aggregate profit shifting is associated with future employment growth in inbound profit shifting countries, on average, and find some evidence of lesser future employment growth in outbound profit shifting countries.

Exclusion of Ireland

Last, given the significant impact of large MNEs on the Irish macro-economy (e.g., "Leprechaun economics", see Halpin [2016]), we want to ensure our results are not driven by Ireland alone. In untabulated analysis, we recreate our main Table 5 regression results without Ireland. Consistent with Table 5 Panel A, the coefficient on $AggProfitShifting_{c,t}$ is negative and statistically significant, however, unsurprisingly, the magnitude and statistical significance has decreased (one-tailed, -0.086, t-statistic of –1.429). Consistent with Table 5 Panel B, the coefficient on $AggProfitShifting_{c,t}$ remains insignificant. Therefore, our main results are robust to the exclusion of Ireland.

6. Conclusion

We examine the impact of profit shifting on the future macroeconomic growth of individual countries and whether such effects vary across source and destination countries. We start by developing an aggregate measure of profit shifting by adapting a commonly used firm-level measure to the country level. Following the research design of Shevlin, Shivakumar, and Urcan [2019], we examine whether profit shifting affects future real GDP growth and future employment growth by regressing each on our aggregate profit shifting measure.

We find that countries to which profits are shifted experience a significant increase in future real GDP growth, which appears to result from increased investment in productive assets in the recipient countries. We also find some evidence that these recipient countries also see an increase in future employment growth, thus suggesting that some shifted profits are invested in labor; however, this result is concentrated amongst smaller economies. Importantly, we fail to find evidence that countries from which profits are shifted experience decreased future real GDP growth, and we find only some evidence of decreased future employment growth. Our analysis further distinguishes between real and paper profit shifting, revealing that both types contribute to

GDP growth in recipient countries, whereas employment growth is primarily associated with real profit shifting.

Our findings challenge the prevailing assumption that profit shifting primarily harms high-tax countries while benefiting low-tax jurisdictions. Instead, we provide evidence that while profit shifting create winners in the countries to which these profits are shifted, it does not necessarily create "losers" in the countries from which these profits are shifted.

These findings have significant implications for policymakers, particularly in the context of international tax reforms such as the OECD's BEPS framework and the Global Minimum tax. While efforts to curb profit shifting often focus on mitigating tax revenue losses, our study suggests that the broader economic effects of profit shifting warrant further consideration. Rather than viewing profit shifting as a zero-sum game, policymakers should assess how tax strategies influence overall economic growth and employment dynamics in source and destination countries. By developing a novel country-year measure of profit shifting, we also offer a tool for future research on macroeconomic consequences of profit shifting. Future studies can build upon our methodology to further explore how profit shifting interacts with investment, corporate tax policies, and long-term economic development.

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Appendix A – Variable Definitions

Variable	Definition	Source
$AggETR_{c,t}$	Asset-weighted average of each affiliate's effective tax rate in country *c* at time *t*, as per Shevlin, Shivakumar, and Urcan [2019].	Orbis, self-constructed
$AggProfitShifting_{c,t}$	Asset-weighted average of each affiliate's *C* variable in country *c* at time *t*, as detailed in Section 4.2.	Orbis, self-constructed
$CorpTaxRevenue_{c,t}$	Natural logarithm of total corporate tax revenue collected by the tax administration in country *c* at time *t* scaled by the real GDP of country *c* at time *t*.	International Monetary Fund
$CPI_{c,t}$	Corruption Perception Index score of country *c* at time *t*, scaled by 100 and reverse-coded.	Transparency International
$EmploymentGrowth_{c,t+1}$	Number of employed individuals in country *c* at time *t+1* minus the number of employed individuals in country *c* at time *t*, scaled by the number of employed individuals in country *c* at time *t*.	Penn World Tables
$Inbound_{c,t}$	Indicator which equals one where *AggProfitShifting* is less than zero for country *c* at time *t*; zero otherwise.	self-constructed
$InvestmentGrowth_{c,t}$	Investment in the capital stock of country *c* at time *t+1* minus investment in the capital stock of country *c* at time *t*, scaled by investment in the capital stock of country *c* at time *t*.	Penn World Tables
$K_{i,t}$	Tangible fixed assets of affiliate *i* at time *t* (TFAS variable).	Orbis
$LargeEconomy_{c,t}$	Indicator which equals one where the real GDP of country *c* at time *t* is the greater than or equal to the median value of real GDP for all country-years; zero otherwise. Constructed separately for the *Inbound*=1 and *Inbound*=0 groups.	Penn World Tables; self-constructed
$lnPopulation_{c,t}$	Natural logarithm of the population of country *c* at time *t*.	Penn World Tables
$PublicDebt_{c,t}$	Gross government debt of country *c* at time *t*, scaled by real GDP at time *t*.	International Monetary Fund
$Paper_{c,t}$	Constructed separately for the *Inbound*=1 and *Inbound*=0 groups. In the *Inbound*=1 group, indicator which equals one 1 if the country's ROA is greater than the median value of ROA across all countries, and 0 if it is lower. In the *Inbound*=0 group, indicator which equals one 1 if the country's ROA is lower than the median value ROA across all countries, and 0 if it is greater.	

	ROA in both samples as the return on assets and is calculated as the sum of pre-tax income reported by all MNEs in country *i* in years 2016 to 2018 scaled by the sum of total tangible assets reported by all MNEs in country *i* in years 2016 to 2018.	
$RealGDPGrowth_{c,t+1}$	Real GDP of country *c* at time *t+1* minus real GDP at time *t*, scaled by real GDP at time *t*.	Penn World Tables
$\tau_{c,t}$	Statutory tax rate of country *c* at time *t*.	Tax Foundation
$TradeOpenness_{c,t}$	Natural logarithm of the net trade of country *c* at time *t*, scaled by real GDP at time *t*.	World Bank

Appendix B – Calculation of Aggregate Profit Shifting Incentive Measure

This example has a sample of 4 countries (A, B, C, and D), each of which hosts both headquarters and affiliates of MNEs. Tax rates of 40%, 30%, 20%, and 10% are arbitrarily assigned to the respective countries. Asset values from 0 to 100 are randomly assigned to each affiliate.

Parent		Affiliate					
Country	*Parent*	*Country*	*Affiliate*	*Tax rate*	*Assets*	*C*	
A	A1	A	A1_A	40%	60	0.10	*
A	A1	C	A1_C	20%	14	(0.10)	**
A	A1	D	A1_D	10%	25	(0.20)	
A	A2	B	A2_B	30%	14	0.17	
A	A2	D	A2_D	10%	96	(0.17)	
B	B1	A	B1_A	40%	52		#
B	B2	A	B2_A	40%	40	0.14	
B	B2	C	B2_C	20%	85	(0.14)	
B	B3	B	B3_B	30%	46	0.09	
B	B3	D	B3_D	10%	35	(0.09)	
C	C1	C	C1_C	20%	11	0.05	
C	C1	B	C1_B	30%	8	0.15	
C	C1	D	C1_D	10%	34	(0.05)	
D	D1	D	D1_D	10%	16	(0.23)	
D	D1	A	D1_A	40%	51	0.23	
D	D2	D	D2_D	10%	68	(0.11)	
D	D2	B	D2_B	30%	83	0.11	
D	D3	D	D3_D	10%	20	(0.08)	
D	D3	C	D3_C	20%	83	0.08	

* $C_{A1_A} = \frac{14*(40\%-20\%)+25*(40\%-10\%)}{60+14+25} = 0.10$

** $C_{A1_C} = \frac{60*(20\%-40\%)+25*(20\%-10\%)}{60+14+25} = -0.10$

C_{B1_A} cannot be calculated because there are no data for other commonly controlled affiliates. The assets of B1_A are not included in the denominator of APS_A.

Country	Tax rate	AggProfShifting	
A	40%	0.15	^
B	30%	0.11	
C	20%	0.05	
D	10%	(0.13)	^^

^ $APS_A = \frac{60*0.10+40*0.14+51*0.23}{60+40+51} = 0.15$

^^ $APS_D = \frac{25*-0.20+96*-0.17+35*-0.09+34*-0.05+16*-0.23+68*-0.11+20*-0.08}{25+96+35+34+16+68+20} = -0.13$

Figure 1: Values of *AggProfitShifting*$_{c,t}$ for Top Countries *to which* Profits are Shifted

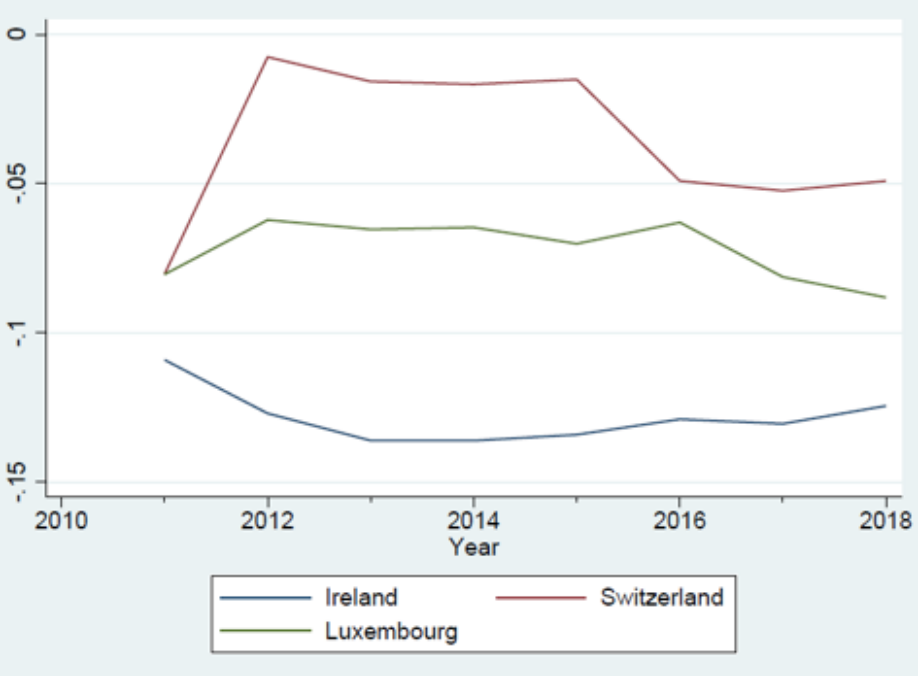


Figure 2: Values of *AggProfitShifting*$_{c,t}$ for Top Countries *from which* Profits are Shifted

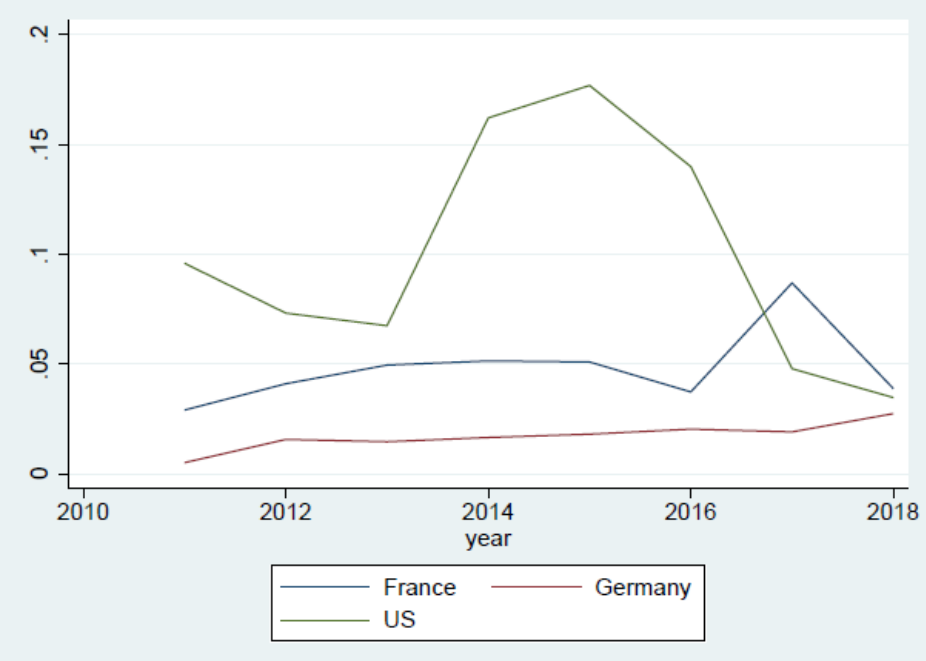
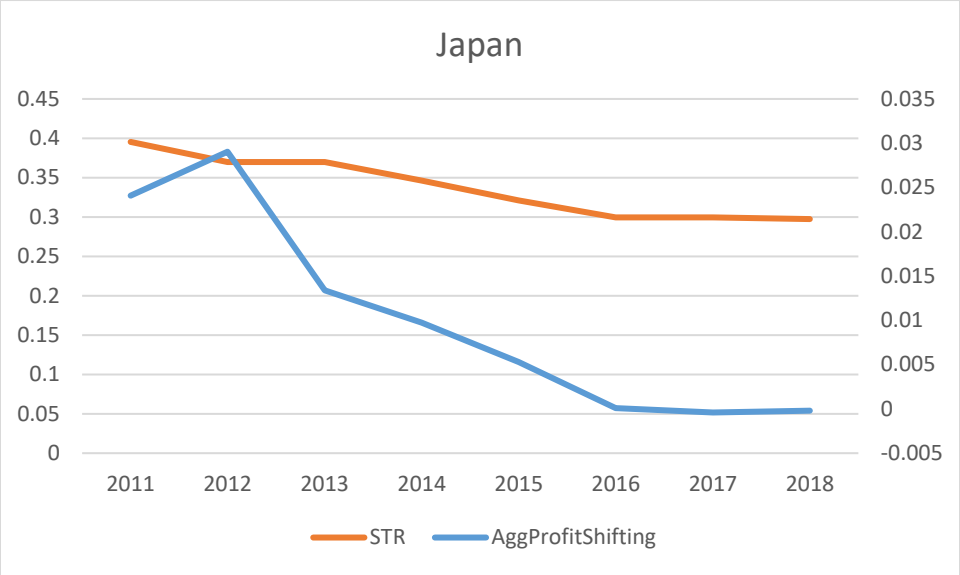


Figure 3: Values of AggProfitShifting$_{c,t}$ in Countries with Significant STR Changes



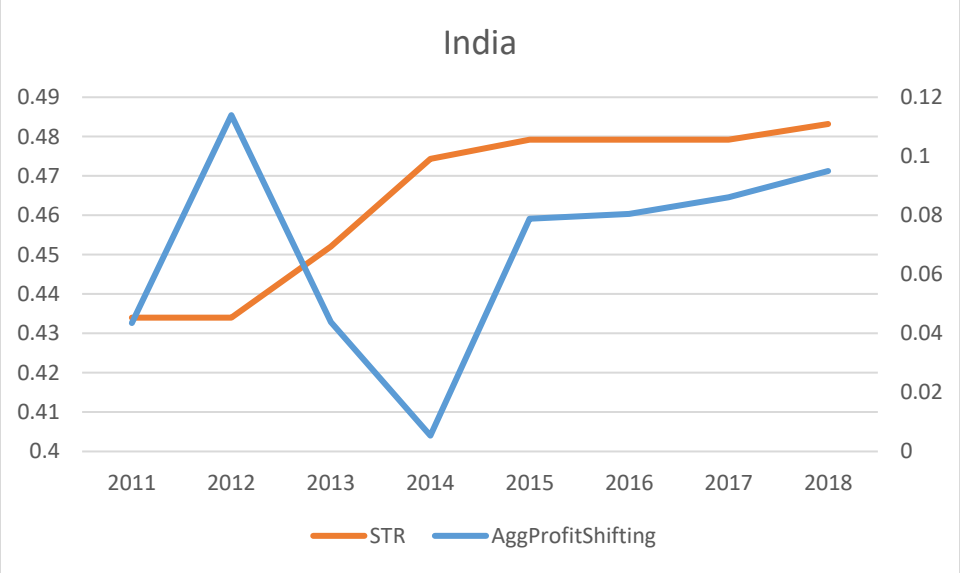


Table 1: Sample Selection and Composition

Panel A. Sample Selection

Population of all unconsolidated affiliate-years of MNEs covered by *Orbis* with non-missing NACE, pre-tax income, tangible fixed assets, and total assets from 2011-2018	1,531,680
Collapsed into country-year observations	469
Less: country-years for which no *AggETR* variable could be computed (Montenegro 2011, Saint Lucia 2011, Saint Lucia 2012, Gabon 2016)	(4)
Sample of country-year observations for the main tests	465

Panel B. Observations by Year

Year	Observations
2011	51
2012	59
2013	62
2014	60
2015	61
2016	55
2017	58
2018	59
Total	465

Panel C. Observations by Country

Country	Obs	Country	Obs	Country	Obs	Country	Obs
Albania	2	Egypt	2	Montenegro	7	Slovenia	8
Algeria	7	Estonia	7	Morocco	8	South Africa	8
Argentina	5	Finland	8	Netherlands	8	South Korea	8
Australia	8	France	8	New Zealand	8	Spain	8
Austria	8	Georgia	1	North Macedonia	7	Sri Lanka	8
Belgium	8	Germany	8	Norway	8	Sweden	8
Bermuda	4	Guyana	4	Pakistan	8	Switzerland	8
Bosnia	8	Hong Kong	6	Panama	5	Taiwan	8
Botswana	2	Hungary	8	Paraguay	1	Tanzania	4
Brazil	8	Iceland	6	Peru	1	Thailand	6
Bulgaria	8	India	8	Poland	8	Tunisia	4
Chile	5	Ireland	8	Portugal	8	Turkey	8
Colombia	3	Italy	8	Romania	8	Ukraine	8
Cote d'Ivoire	8	Japan	8	Russia	8	United Arab Emirates	3
Croatia	8	Latvia	8	Senegal	7	United Kingdom	8
Czech Republic	8	Luxembourg	8	Serbia	8	United States	7
Denmark	6	Malaysia	3	Singapore	4	Uruguay	3
Ecuador	5	Malta	8	Slovakia	8	Zimbabwe	2
Total							465

Notes: This table provides sample selection in Panel A, and sample composition by year in Panel B and by country in Panel C.

Table 2: Descriptive Statistics

Panel A. Descriptive Statistics for Aggregate Profit Shifting by Country

Country	median	min	max	In %	Out %
Albania	-0.011	-0.021	0.000	1.000	0.000
Algeria	-0.040	-0.073	-0.016	1.000	0.000
Argentina	0.049	0.034	0.063	0.000	1.000
Australia	0.004	0.002	0.006	0.000	1.000
Austria	0.001	-0.004	0.008	0.625	0.375
Belgium	0.025	0.002	0.042	0.000	1.000
Bermuda	-0.144	-0.274	-0.015	1.000	0.000
Bosnia	-0.080	-0.109	-0.066	1.000	0.000
Botswana	0.032	0.031	0.034	0.000	1.000
Brazil	0.032	0.004	0.087	0.000	1.000
Bulgaria	-0.088	-0.103	-0.040	1.000	0.000
Chile	-0.106	-0.134	-0.067	1.000	0.000
Colombia	0.009	0.000	0.025	0.000	1.000
Cote d'Ivoire	-0.054	-0.072	-0.031	1.000	0.000
Croatia	-0.030	-0.052	-0.022	1.000	0.000
Czech Republic	-0.036	-0.039	-0.030	1.000	0.000
Denmark	-0.010	-0.045	0.031	0.667	0.333
Ecuador	-0.060	-0.150	-0.029	1.000	0.000
Egypt	-0.025	-0.030	-0.020	1.000	0.000
Estonia	-0.023	-0.032	-0.017	1.000	0.000
Finland	-0.024	-0.039	-0.009	1.000	0.000
France	0.048	0.029	0.087	0.000	1.000
Georgia	-0.022	-0.022	-0.022	1.000	0.000
Germany	0.017	0.005	0.027	0.000	1.000
Guyana	0.068	0.050	0.083	0.000	1.000
Hong Kong	-0.063	-0.134	-0.021	1.000	0.000
Hungary	-0.063	-0.118	-0.008	1.000	0.000
Iceland	-0.012	-0.015	-0.008	1.000	0.000
India	0.068	0.005	0.114	0.000	1.000
Ireland	-0.128	-0.136	-0.109	1.000	0.000
Italy	0.010	0.000	0.020	0.000	1.000
Japan	0.010	-0.000	0.029	0.250	0.750
Latvia	-0.054	-0.087	-0.018	1.000	0.000
Luxembourg	-0.072	-0.088	-0.062	1.000	0.000
Malaysia	-0.052	-0.088	-0.029	1.000	0.000
Malta	0.054	0.003	0.106	0.000	1.000
Montenegro	-0.109	-0.142	-0.094	1.000	0.000
Morocco	0.012	-0.003	0.030	0.125	0.875
Netherlands	-0.021	-0.032	-0.010	1.000	0.000
New Zealand	-0.009	-0.017	0.003	0.750	0.250
North Macedonia	-0.085	-0.102	-0.062	1.000	0.000

Norway	-0.007	-0.021	0.004	0.750	0.250
Pakistan	0.000	-0.011	0.015	0.375	0.625
Panama	-0.047	-0.055	-0.030	1.000	0.000
Paraguay	-0.063	-0.063	-0.063	1.000	0.000
Peru	-0.008	-0.008	-0.008	1.000	0.000
Poland	-0.065	-0.074	-0.056	1.000	0.000
Portugal	0.011	0.002	0.024	0.000	1.000
Romania	-0.081	-0.093	-0.038	1.000	0.000
Russia	-0.022	-0.105	-0.002	1.000	0.000
Senegal	-0.026	-0.109	0.009	0.857	0.143
Serbia	-0.079	-0.129	-0.064	1.000	0.000
Singapore	-0.043	-0.061	-0.026	1.000	0.000
Slovakia	-0.026	-0.041	-0.017	1.000	0.000
Slovenia	-0.036	-0.048	-0.023	1.000	0.000
South Africa	0.052	0.000	0.068	0.000	1.000
South Korea	-0.008	-0.028	-0.001	1.000	0.000
Spain	-0.002	-0.018	0.008	0.375	0.625
Sri Lanka	-0.045	-0.068	-0.022	1.000	0.000
Sweden	-0.023	-0.039	-0.006	1.000	0.000
Switzerland	-0.036	-0.080	-0.008	1.000	0.000
Taiwan	-0.005	-0.015	-0.002	1.000	0.000
Tanzania	0.020	0.012	0.026	0.000	1.000
Thailand	-0.075	-0.097	-0.032	1.000	0.000
Tunisia	-0.000	-0.000	0.000	0.750	0.000
Turkey	-0.045	-0.057	-0.008	1.000	0.000
Ukraine	-0.015	-0.019	-0.010	1.000	0.000
United Arab Emirates	-0.268	-0.271	-0.263	1.000	0.000
United Kingdom	-0.060	-0.097	-0.007	1.000	0.000
United States	0.107	0.035	0.177	0.000	1.000
Uruguay	-0.008	-0.021	-0.001	1.000	0.000
Zimbabwe	-0.065	-0.067	-0.063	1.000	0.000

Panel B. All Variables

	mean	sd	p25	p50	p75
RealGDPGrowth	0.029	0.028	0.015	0.027	0.041
EmpGrowth	0.007	0.017	-0.000	0.006	0.015
AggProfitShifting	-0.025	0.055	-0.054	-0.019	0.004
AggETR	0.361	0.570	0.215	0.273	0.343
τ	0.236	0.082	0.190	0.240	0.295
lnPopulation	2.634	1.729	1.649	2.568	3.849

Notes: This table contains descriptive statistics for the aggregate profit shifting measure in Panel A, and for all variables to estimate our main macroeconomic growth models in Panel B. Variables are defined in Appendix A.

Table 3: Correlation Matrix

	(1)	(2)	(3)	(4)	(5)	(6)
(1) RealGDPGrowth	1					
(2) EmploymentGrowth	**0.291**	1				
(3) AggProfitShifting	**-0.157**	**-0.173**	1			
(4) AggETR	-0.041	-0.071	**0.176**	1		
(5) τ	-0.034	**-0.248**	**0.810**	**0.188**	1	
(6) lnPopulation	-0.055	**-0.273**	**0.373**	**0.141**	**0.557**	1

Notes: This table provides Pearson correlations for variables to estimate our main macroeconomic growth models. Values that are in bold are statistically significant at the five percent level or higher (two-tailed). Variables are defined in Appendix A.

Table 4: Future Macroeconomic Growth

Panel A. Future Real GDP Growth

$RealGDPGrowth_{c,t+1}$	Hypothesis	(1)	(2)	(3)	(4)
$AggProfitShifting_{c,t}$	H1	-0.064*	-0.064*	-0.075*	-0.075*
		(-1.689)	(-1.681)	(-1.957)	(-1.958)
$AggETR_{c,t}$			-0.002		-0.003
			(-0.781)		(-1.325)
$RealGDPGrowth_{c,t}$		0.492***	0.490***	0.507***	0.503***
		(6.110)	(6.031)	(6.162)	(6.073)
$\tau_{c,t}$		0.037	0.038	0.045	0.048*
		(1.345)	(1.407)	(1.664)	(1.771)
$lnPopulation_{c,t}$		-0.001	-0.001	-0.001	-0.001
		(-1.033)	(-1.015)	(-1.095)	(-1.064)
Year FE		N	N	Y	Y
Observations		465	465	465	465
Adjusted R-squared		0.386	0.386	0.439	0.439

Panel B. Future Employment Growth

$EmploymentGrowth_{c,t+1}$	Hypothesis	(1)	(2)	(3)	(4)
$AggProfitShifting_{c,t}$	H1	0.003	0.003	-0.003	-0.003
		(0.101)	(0.111)	(-0.106)	(-0.104)
$AggETR_{c,t}$			-0.002		-0.002
			(-0.607)		(-0.842)
$RealGDPGrowth_{c,t}$		0.243***	0.241***	0.247***	0.245***
		(5.730)	(5.750)	(5.988)	(6.018)
$\tau_{c,t}$		0.011	0.012	0.016	0.018
		(0.478)	(0.516)	(0.684)	(0.740)
$lnPopulation_{c,t}$		-0.002***	-0.002***	-0.002***	-0.002***
		(-3.018)	(-2.980)	(-3.095)	(-3.048)
Year FE		N	N	Y	Y
Observations		465	465	465	465
Adjusted R-squared		0.182	0.181	0.203	0.202

Notes: This table provides regression results for the effect of aggregate profit shifting on future macroeconomic growth, where the dependent variable is *RealGDPGrowth* in Panel A and *EmploymentGrowth* in Panel B. The regressions are estimated using OLS regression. Standard errors have been adjusted for clustering at the country level and the related t-statistics are reported in parentheses. *, **, and *** indicate two-tailed statistical significance at the ten, five, and one percent levels, respectively. Variables are defined in Appendix A.

Table 5: Cross-Sectional Analysis Based on Inbound vs Outbound Profit Shifting

Panel A. Future Real GDP Growth

	$Inbound_{c,t} = 1$				$Inbound_{c,t} = 0$			
$RealGDPGrowth_{c,t+1}$	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$AggProfitShifting_{c,t}$	-0.099**	-0.098**	-0.105**	-0.106**	0.033	0.031	-0.001	0.000
	(-2.045)	(-2.033)	(-2.141)	(-2.138)	(0.800)	(0.721)	(-0.013)	(0.003)
$AggETR_{c,t}$		-0.003		-0.004*		0.002		-0.001
		(-1.376)		(-1.781)		(0.537)		(-0.310)
$RealGDPGrowth_{c,t}$	0.402***	0.400***	0.414***	0.410***	0.722***	0.726***	0.749***	0.747***
	(4.472)	(4.450)	(4.545)	(4.475)	(9.097)	(8.788)	(9.730)	(9.444)
$\tau_{c,t}$	0.038	0.041	0.046	0.050	0.041	0.040	0.045	0.045
	(1.129)	(1.190)	(1.354)	(1.452)	(1.107)	(1.095)	(1.396)	(1.386)
$lnPopulation_{c,t}$	-0.000	-0.000	-0.000	-0.000	-0.001	-0.002*	-0.002*	-0.002*
	(-0.355)	(-0.372)	(-0.326)	(-0.349)	(-1.599)	(-1.753)	(-1.768)	(-1.754)
Year FE	N	N	Y	Y	N	N	Y	Y
Observations	325	325	325	325	140	140	140	140
Adjusted R-squared	0.325	0.324	0.361	0.361	0.577	0.574	0.647	0.644

Panel B. Future Employment Growth

	$Inbound_{c,t} = 1$				$Inbound_{c,t} = 0$			
$EmploymentGrowth_{c,t+1}$	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$AggProfitShifting_{c,t}$	-0.033	-0.032	-0.035	-0.035	0.071*	0.070*	0.056	0.055
	(-0.977)	(-0.954)	(-1.011)	(-1.013)	(1.872)	(1.886)	(1.364)	(1.369)
$AggETR_{c,t}$		-0.004		-0.005		0.002		0.003
		(-1.331)		(-1.346)		(0.514)		(0.672)
$RealGDPGrowth_{c,t}$	0.233***	0.230***	0.240***	0.236***	0.276***	0.281***	0.266***	0.269***
	(4.258)	(4.269)	(4.508)	(4.514)	(4.278)	(4.434)	(4.197)	(4.281)
$\tau_{c,t}$	0.037	0.041	0.038	0.044	-0.065*	-0.066*	-0.052	-0.052
	(1.195)	(1.356)	(1.251)	(1.443)	(-1.723)	(-1.765)	(-1.278)	(-1.308)
$lnPopulation_{c,t}$	-0.003***	-0.003***	-0.003***	-0.003***	-0.001	-0.001	-0.001	-0.001
	(-2.815)	(-2.777)	(-2.778)	(-2.733)	(-0.909)	(-0.932)	(-1.099)	(-1.150)
Year FE	N	N	Y	Y	N	N	Y	Y
Observations	325	325	325	325	140	140	140	140
Adjusted R-squared	0.165	0.166	0.171	0.173	0.284	0.281	0.350	0.349

Notes: This table provides regression results for the effect of aggregate profit shifting on future macroeconomic growth, where the dependent variable is *RealGDPGrowth* in Panel A and *EmploymentGrowth* in Panel B. Columns (1) to (4) [(5) to (8)] report the results for countries in the inbound [outbound] profit shifting sample . The regressions are estimated using OLS regression. Standard errors have been adjusted for clustering at the country level and the related t-statistics are reported in parentheses. *, **, and *** indicate two-tailed statistical significance at the ten, five, and one percent levels, respectively. Variables are defined in Appendix A.

Table 6: Cross-Sectional Analysis Based on Size of Economy

Panel A. Future Real GDP Growth

$RealGDPGrowth_{c,t+1}$	$Inbound_{c,t}$ = 1 (1)	$Inbound_{c,t}$ = 0 (2)
$AggProfitShifting_{c,t}$	-0.083	0.037
	(-1.577)	(0.292)
$AggProfitShifting_{c,t} \times LargeEconomy_{c,t}$	-0.038	-0.091
	(-0.755)	(-0.569)
$AggETR_{c,t}$	-0.003	-0.001
	(-1.338)	(-0.268)
$RealGDPGrowth_{c,t}$	0.397***	0.691***
	(4.501)	(8.083)
$\tau_{c,t}$	0.043	0.084
	(1.335)	(1.677)
$lnPopulation_{c,t}$	0.001	0.000
	(1.094)	(0.211)
$LargeEconomy_{c,t}$	-0.008*	-0.010**
	(-1.876)	(-2.264)
Year FE	Y	Y
Observations	325	140
Adjusted R-squared	0.370	0.671

Panel B. Future Employment Growth

$EmploymentGrowth_{c,t+1}$	$Inbound_{c,t}$ = 1 (1)	$Inbound_{c,t}$ = 0 (2)
$AggProfitShifting_{c,t}$	-0.087	0.081
	(-1.327)	(1.223)
$AggProfitShifting_{c,t} \times LargeEconomy_{c,t}$	0.087	-0.039
	(1.398)	(-0.478)
$AggETR_{c,t}$	-0.004	0.003
	(-1.275)	(0.654)
$RealGDPGrowth_{c,t}$	0.244***	0.270***
	(4.698)	(4.057)
$\tau_{c,t}$	0.046	-0.052
	(1.522)	(-1.194)
$lnPopulation_{c,t}$	-0.002	-0.001
	(-1.577)	(-0.901)
$LargeEconomy_{c,t}$	0.001	0.001
	(0.242)	(0.310)
Year FE	Y	Y
Observations	325	140
Adjusted R-squared	0.182	0.340

Notes: This table provides regression results for the effect of aggregate profit shifting on future macroeconomic growth, where the dependent variable is *RealGDPGrowth* in Panel A and *EmploymentGrowth* in Panel B. Columns 1 (2) report the results for countries in the inbound (outbound) profit shifting sample. The regressions are estimated using OLS regression. Standard errors have been adjusted for clustering at the country level and the related t-statistics are reported in parentheses. *, **, and *** indicate two-tailed statistical significance at the ten, five, and one percent levels, respectively. Variables are defined in Appendix A.

Table 7: Cross-Sectional Analysis Based on Real vs Paper Profit Shifting

Panel A. Future Real GDP Growth

	$Inbound_{c,t} = 1$		$Inbound_{c,t} = 0$	
	(1)	(2)	(3)	(4)
$RealGDPGrowth_{c,t+1}$	Real	Paper	Real	Paper
$AggProfitShifting_{c,t}$	-0.165	-0.076	0.071	-0.032
	(-1.600)	(-1.347)	(0.671)	(-0.305)
$AggETR_{c,t}$	-0.005*	-0.004	0.003	-0.011
	(-1.761)	(-0.947)	(0.963)	(-1.310)
$RealGDPGrowth_{c,t}$	0.451***	0.337**	0.704***	0.621**
	(9.132)	(2.577)	(8.424)	(2.628)
$\tau_{c,t}$	0.090	0.009	0.040	-0.014
	(1.663)	(0.216)	(1.148)	(-0.375)
$lnPopulation_{c,t}$	0.000	0.000	-0.001*	-0.000
	(0.282)	(0.113)	(-1.838)	(-0.084)
Year FE	Y	Y	Y	Y
Observations	152	173	55	85
Adjusted R-squared	0.489	0.237	0.737	0.476

Panel B. Future Employment Growth

	$Inbound_{c,t} = 1$		$Inbound_{c,t} = 0$	
	(1)	(2)	(3)	(4)
$EmploymentGrowth_{c,t+1}$	Real	Paper	Real	Paper
$AggProfitShifting_{c,t}$	-0.140*	-0.008	-0.059	0.041
	(-1.986)	(-0.235)	(-0.754)	(1.084)
$AggETR_{c,t}$	-0.005	-0.004	0.014**	-0.007
	(-1.139)	(-0.798)	(2.598)	(-1.689)
$RealGDPGrowth_{c,t}$	0.254***	0.200***	0.270**	0.227*
	(3.543)	(4.074)	(2.862)	(2.035)
$\tau_{c,t}$	0.083	0.030	-0.016	-0.024
	(1.649)	(0.864)	(-0.308)	(-0.677)
$lnPopulation_{c,t}$	-0.005***	-0.001	-0.003**	-0.000
	(-2.989)	(-0.763)	(-2.651)	(-0.482)
Year FE	Y	Y	Y	Y
Observations	152	173	55	85
Adjusted R-squared	0.270	0.083	0.456	0.289

Notes: This table provides regression results for the effect of aggregate profit shifting on future macroeconomic growth, where the dependent variable is *RealGDPGrowth* in Panel A and *EmploymentGrowth* in Panel B. Columns 1 and 2 (3 and 4) report the results for countries in the inbound (outbound) profit shifting sample, where columns 1 and 3 (2 and 4) report the results for real (paper) profit shifting. The regressions are estimated using OLS regression. Standard errors have been adjusted for clustering at the country level and the related t-statistics are reported in parentheses. *, **, and *** indicate two-tailed statistical significance at the ten, five, and one percent levels, respectively. Variables are defined in Appendix A.

Table 8: Channels Through Which Profit Shifting Affects Future Real GDP Growth

Channel	(1) $InvestmentGrowth_{c,t+1}$	(2) $CorpTaxRevenue_{c,t}$
$AggProfitShifting_{c,t}$	-0.285***	-5.712
	(-3.306)	(-1.667)
$AggETR_{c,t}$	-0.009*	0.156
	(-1.747)	(1.407)
$RealGDPGrowth_{c,t}$	-0.000*	
	(-1.956)	
$RealGDPGrowth_{c,t-1}$		0.000
		(1.390)
$\tau_{c,t}$	0.171*	9.869***
	(1.996)	(3.141)
$lnPopulation_{c,t}$	0.003	0.852***
	(0.865)	(6.175)
PublicDebt		-0.001
		(-0.295)
lnTradeOpenness		0.628**
		(2.453)
CPI		-4.056***
		(-6.549)
Year FE	Y	Y
Observations	325	164
Adjusted R-squared	0.150	0.876

Notes: This table provides regression results for the channel in which aggregate profit shifting effects future real GDP growth, where the dependent variable is *Investment Growth* in column 1 and *CorpTaxRevenue* in column 2. The regressions are estimated using OLS regression. Standard errors have been adjusted for clustering at the country level and the related t-statistics are reported in parentheses. *, **, and *** indicate two-tailed statistical significance at the ten, five, and one percent levels, respectively. Variables are defined in Appendix A.

Table 9: Cross-Sectional Analysis Based on Inbound vs Outbound Profit Shifting Using Shevlin, Shivakumar, and Urcan's [2019] *AggETR* Measure

Panel A. Future Real GDP Growth

	$Inbound_{c,t} = 1$	$Inbound_{c,t} = 0$
$RealGDPGrowth_{c,t+1}$	(1)	(2)
$AggProfitShifting_{c,t}$	-0.120	-0.069
	(-1.661)	(-0.785)
$AggETR_SSU_{c,t}$	-0.085**	-0.037
	(-2.197)	(-0.615)
$RealGDPGrowth_{c,t}$	0.536***	0.601***
	(7.072)	(3.175)
$\tau_{c,t}$	0.084	0.104*
	(1.376)	(2.060)
$lnPopulation_{c,t}$	0.001	0.000
	(0.356)	(0.066)
Year FE	Y	Y
Observations	107	65
Adjusted R-squared	0.508	0.498

Panel B. Future Employment Growth

	$Inbound_{c,t} = 1$	$Inbound_{c,t} = 0$
$EmploymentGrowth_{c,t+1}$	(1)	(2)
$AggProfitShifting_{c,t}$	0.077	0.165**
	(1.237)	(2.170)
$AggETR_SSU_{c,t}$	-0.017	-0.036
	(-0.229)	(-1.722)
$RealGDPGrowth_{c,t}$	0.449***	0.317***
	(3.450)	(3.412)
$\tau_{c,t}$	-0.053	-0.078
	(-0.651)	(-1.592)
$lnPopulation_{c,t}$	-0.004*	-0.001
	(-1.799)	(-0.894)
Year FE	Y	Y
Observations	107	65
Adjusted R-squared	0.215	0.351

Notes: This table provides regression results for the effect of aggregate profit shifting on future macroeconomic growth, where the dependent variable is *RealGDPGrowth* in Panel A and *EmploymentGrowth* in Panel B, and the regressions are run on the sample for country-years for which Shevlin et al.'s [2019] *AggETR* measure is available. Column (1) [(2)] reports the results for countries in the inbound [outbound] profit shifting sample . The regressions are estimated using OLS regression. Standard errors have been adjusted for clustering at the country level and the related t-statistics are reported in parentheses. *, **, and *** indicate two-tailed statistical significance at the ten, five, and one percent levels, respectively. Variables are defined in Appendix A.

Table 10: Cross-Sectional Analysis Based on Inbound vs Outbound Profit Shifting Using Alternative Measure of Aggregate Profit Shifting

Panel A. Future Real GDP Growth

	$Inbound_{c,t} = 1$	$Inbound_{c,t} = 0$
$RealGDPGrowth_{c,t+1}$	(1)	(2)
$AggProfitShifting_{c,t}$	-0.164**	-0.031
	(-2.237)	(-0.325)
$AggETR_{c,t}$	0.002	-0.006***
	(1.166)	(-4.271)
$RealGDPGrowth_{c,t}$	0.131	0.580***
	(1.186)	(11.183)
$\tau_{c,t}$	-0.161*	-0.006
	(-1.800)	(-0.317)
$lnPopulation_{c,t}$	0.001	-0.002*
	(0.814)	(-2.438)
Year FE	Y	Y
Observations	99	45
Adjusted R-squared	0.544	0.805

Panel B. Future Employment Growth

	$Inbound_{c,t} = 1$	$Inbound_{c,t} = 0$
$EmploymentGrowth_{c,t+1}$	(1)	(2)
$AggProfitShifting_{c,t}$	-0.023	-0.080
	(-1.109)	(-0.750)
$AggETR_{c,t}$	0.000	0.003
	(0.246)	(1.309)
$RealGDPGrowth_{c,t}$	0.136***	0.685***
	(6.080)	(11.214)
$\tau_{c,t}$	0.008	-0.014
	(0.340)	(-1.171)
$lnPopulation_{c,t}$	-0.002	-0.001*
	(-1.101)	(-2.443)
Year FE	Y	Y
Observations	99	45
Adjusted R-squared	0.290	0.700

Notes: This table provides regression results for the effect of aggregate profit shifting on future macroeconomic growth, where the dependent variable is *RealGDPGrowth* in Panel A and *EmploymentGrowth* in Panel B and the independent variable of interest is the alternative measure of aggregate profit shifting. Column (1) [(2)] reports the results for countries in the inbound [outbound] profit shifting sample . The regressions are estimated using OLS regression. Standard errors have been adjusted for clustering at the country level and the related t-statistics are reported in parentheses. *, **, and *** indicate two-tailed statistical significance at the ten, five, and one percent levels, respectively. Variables are defined in Appendix A.

Table 11: Cross-Sectional Analysis Based on Inbound vs Outbound Profit Shifting Using Country Fixed Effects

Panel A. Future Real GDP Growth

	$Inbound_{c,t} = 1$	$Inbound_{c,t} = 0$
$RealGDPGrowth_{c,t+1}$	(1)	(2)
$AggProfitShifting_{c,t}$	-0.072	-0.026
	(-1.561)	(-0.294)
$AggETR_{c,t}$	-0.002	-0.005
	(-0.677)	(-1.110)
$RealGDPGrowth_{c,t}$	0.159*	0.327*
	(1.816)	(2.043)
Year FE	Y	Y
Country FE	Y	Y
Observations	325	140
Adjusted R-squared	0.491	0.728

Panel B. Future Employment Growth

	$Inbound_{c,t} = 1$	$Inbound_{c,t} = 0$
$EmploymentGrowth_{c,t+1}$	(1)	(2)
$AggProfitShifting_{c,t}$	0.011	-0.015
	(0.363)	(-0.249)
$AggETR_{c,t}$	-0.007	0.005
	(-1.426)	(0.783)
$RealGDPGrowth_{c,t}$	0.200***	0.250
	(3.788)	(1.610)
Year FE	Y	Y
Country FE	Y	Y
Observations	325	140
Adjusted R-squared	0.321	0.396

Notes: This table provides regression results for the effect of aggregate profit shifting on future macroeconomic growth, where the dependent variable is *RealGDPGrowth* in Panel A and *EmploymentGrowth* in Panel B, and the regressions included country fixed effects. Column (1) [(2)] reports the results for countries in the inbound [outbound] profit shifting sample . The regressions are estimated using OLS regression. Standard errors have been adjusted for clustering at the country level and the related t-statistics are reported in parentheses. *, **, and *** indicate two-tailed statistical significance at the ten, five, and one percent levels, respectively. Variables are defined in Appendix A.