Macroeconomic Effects of Profit Shifting

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Abstract

This study examines the macroeconomic effects of tax-motivated profit shifting. Despite the assertions by governments and cooperative organizations about the detrimental effects of profit shifting on global economies and the increasing regulatory efforts to counteract them, there is a noticeable lack of research on how tax-motivated profit shifting impacts countries' economies. We address 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. We also find some evidence of an increase in future employment growth, particularly concentrated among the "Big 8" tax havens. Importantly, we fail to find evidence that countries *from which* profits are shifted experience decreased future real GDP growth. 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, which should interest academics and policymakers seeking to understand and regulate multinationals' tax planning.

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1. Introduction

Tax-motivated profit shifting refers to the strategic tax planning adopted by multinational enterprises (MNEs) to relocate profits from high-tax to low-tax jurisdictions within the MNE's consolidated group. Because such profit shifting reduces aggregate taxes paid on the MNE's profits, individual countries and cooperative organizations have introduced various policy frameworks designed to curtail opportunities and incentives to engage in profit shifting (Dharmapala [2019]). These frameworks encompass initiatives geared towards diminishing the perceived opacity facilitating profit shifting, such as country-by-country reporting, and measures aimed at reducing the benefits derived from profit shifting, such as a global minimum tax.

The widespread use of profit shifting has also spurred extensive research. While micro-level studies have examined the determinants and consequences of profit shifting, macro-level research has focused on understanding how profit shifting influences international trade dynamics. These studies offer valuable insights into the ramifications of profit shifting, yet a critical aspect that remains to be fully understood is the potential impact of profit shifting on the future macroeconomic growth of individual countries, and whether such effects vary across countries serving as the source or the destination of the shifted profit. Understanding the relationship between profit shifting and future macroeconomic growth is important, as it addresses a longstanding assumption that the economies of countries *from which* profits are shifted face adverse consequences while countries *to which* profits are shifted stand to benefit.

This assumption is often backed by country-level estimations of 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. Clausing [2016] estimates an annual tax revenue loss of USD 77-111 billion for the US alone, while Blouin and Robinson [2020] assert that USD 10-20 billion is a more accurate figure due to the double counting of income in the US Bureau of Economic Analysis (BEA) data. Relatedly, Torslov, Wier, and Zucman [2023] find that approximately 0.8 percent of US GDP was shifted out of the US in 2015, while Beer, De Mooij, and Liu [2019] estimate this number to be 0.4 percent.

Though measuring the true extent of profit shifting is challenging, there are several reasons why profit shifting may impact the future macroeconomic growth of individual countries. On the one hand, countries *to which* profits are shifted stand to gain increased tax revenue, allowing their governments to invest domestically, potentially fostering future macroeconomic growth (Shevlin, Shivakumar, and Urcan [2019]). Moreover, MNEs can utilize the shifted profits within a country to invest in productive assets and employees, further contributing to future macroeconomic growth.

On the other hand, as anecdotes from the OECD suggest, countries *from which* profits are shifted may experience a significant loss in tax revenue, constraining government investments and potentially leading to a decline in future macroeconomic growth. Furthermore, the profits shifted outbound may take away from the investments that MNEs would otherwise make in the country, leading to a further decrease in future macroeconomic growth. Alternatively, recent evidence from Blouin and Robinson [2020] questioning the validity of the BEA data would suggest that the true magnitude of profit shifting may not be substantial enough to impact future macroeconomic growth.

To examine the relation between profit shifting and future macroeconomic growth, we require a country-year measure of profit shifting. To the best of our knowledge, no such measure

exists, so we adapt existing firm-level measures to generate this measure. Using unconsolidated affiliate-level data for all MNEs covered by *Orbis*, we calculate the tax incentive to shift profit for each affiliate (i.e., the Huizinga and Laeven [2008] and De Simone, Klassen, and Seidman [2017] *C* variable). In the spirit of Shevlin, Shivakumar, and Urcan [2019], we then compute an asset-weighted average of each affiliate's *C* in the country-year, which we use as our proxy for aggregate profit shifting.

Following the research design of Shevlin, Shivakumar, and Urcan [2019], we examine whether profit shifting affects future real GDP growth and employment growth by regressing each on our aggregate profit shifting measure. We find that future real GDP growth is greater in countries to which profits are shifted. This result is consistent with shifted profits representing significant capital investment for the recipient countries. We also find some evidence that recipient countries experience greater employment growth, although this result is concentrated amongst the "Big 8" tax havens. This suggests that profit shifting may also result in investment in recipient countries' labor markets, for low-tax countries with sufficiently large labor markets. However, contrary to the concept of "winners" and "losers" of profit shifting, we fail to find evidence indicating that countries from which profits are shifted experience decreased future real GDP growth.

Our paper contributes to the literature on profit shifting by examining the effects of MNEs' aggregate profit shifting on the future macroeconomic growth of individual countries. To the best of our knowledge, ours is the first study to directly examine the relation between profit shifting and future macroeconomic growth. In addition to empirical findings, we introduce a novel proxy for profit shifting at the country-year level. Academic researchers can use our measure to study other macro-level effects of profit shifting.

We also contribute to the literature examining the macroeconomic information contained in accounting numbers. Previous studies in this field have revealed that accounting information contains information about future GDP growth, labor market outcomes, inflation and other monetary policies (Shivakumar [2007], Shevlin, Shivakumar, and Urcan [2019], Hann, Li, and Ogneva [2021], Abdalla and Carabias [2022], Tang [2023]).

Finally, 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 sheds light on and tests 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. This implies that profit shifting may create a "winner," but the overall impact on the countries losing profits is not necessarily negative from a macroeconomic growth perspective.

2. Prior Literature

2.1 Profit shifting

Profit shifting is the strategic practice of relocating profits earned in one jurisdiction to another jurisdiction. Though a firm 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 effective tax rates (ETRs) of MNEs (Huizinga and Laeven [2008]). For example, suppose a firm 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%.[1]

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 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 US intrafirm trade and finds that US 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 US 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

[1] $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.

and Laux [2021]). Looking beyond intrafirm trade prices, 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. We begin to fill this gap by examining the effect of profit shifting on countries' future real GDP growth and employment growth.

2.2 Corporate tax and macroeconomic outcomes

Prior evidence on the general effects of corporate taxes on future macroeconomic growth has been mixed (e.g., Angelopoulos, Economides, and Kammas [2007]; Huang and Frentz [2014]). 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 planning activities and tax incentives such as credits – to proxy for corporate taxes. Using a country-year aggregate ETR, 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 as 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

Profit shifting can impact macroeconomic outcomes through three primary mechanisms. Firstly, corporate profits positively contribute to GDP. All else being equal, a country from (to)

which profits are shifted would experience a decrease (increase) in GDP. As we are interested in capturing the effects of how shifted profits are used instead of the effects of the shifted profits themselves, we do not use GDP as our outcome variable of interest. Instead, we use future GDP growth to avoid capturing the mechanical relation between corporate profits and GDP.

Secondly, 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 greater 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, MNEs can utilize the shifted profits within a country to invest 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 the 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.

Alternatively, profit shifting may not be related to a country's future macroeconomic growth as the shifted profits may not be material. Blouin and Robinson [2020] show that the magnitude of profit shifting by US 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 US by US MNEs and develop magnitudes 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 would 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*.

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 require each affiliate-year observation to have non-missing NACE industry code, pre-tax income, tangible fixed assets, and total assets. We then restrict the sample to affiliates of MNEs, as domestic-only firms do not engage in international profit shifting. We define an MNE as an entity with at least one affiliate located in a country other than the MNE's headquarter country. After dropping lone affiliates, we use the remaining affiliate-year observations to calculate our measure of aggregate profit shifting.

4.2 Research design for the aggregate profit shifting measure

To create our measure of aggregate profit shifting, we begin with the Huizinga and Laeven [2008] and De Simone, Klassen, and Seidman [2017] *C* variable 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. All data are in US dollars, and all variables are defined in Appendix A.

In the spirit of Shevlin, Shivakumar, and Urcan [2019], we calculate our aggregate profit shifting measure, *AggProfitShifting*, as an asset-weighted average of each affiliate's *C* in country *c* in year *t*. This approach is superior to simply using the statutory tax rate of each country because the *C* variable explicitly considers the statutory tax rates of the countries in affiliate *i*'s shifting opportunity set. Further, while Shevlin, Shivakumar, and Urcan's [2019] aggregate effective tax rate measure would capture the effects of profit shifting on the MNE's consolidated effective tax

rate, it captures many more factors, such as tax planning unrelated to profit shifting, and is thus not suitable for testing our hypothesis.

4.3 Country-level estimates

Country-level aggregate profit shifting estimates for all countries in our sample are shown in Table 2 Panel A. The profit shifting estimates are generally consistent with our expectations based on prior empirical results and anecdotes. For example, we find that countries like 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.

Further, Table 3 shows that the correlation coefficient between *AggProfitShifting* and τ, the statutory tax rate, is 0.810. This correlation is reasonable given that statutory tax rates are a significant driver of profit shifting, but it is considered in conjunction with other factors such as labor market availability and skill (e.g., MacCarthy and Atthirawong [2003]). The correlation coefficient between *AggProfitShifting* and *AggETR* is only 0.176, suggesting that, as expected, *AggProfitShifting* and *AggETR* do not capture the same underlying construct.

It is pertinent to note that 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:

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

The dependent variable, $Growth$, is alternatively $RealGDPGrowth$ or $EmploymentGrowth$. We follow Shevlin, Shivakumar, and Urcan [2019] and define $RealGDPGrowth$ ($EmploymentGrowth$) as the real GDP of (proportion of the population employed in) the country in year *t+1* minus the real GDP of (proportion of the population employed in) the country in year *t*, scaled by the real GDP of (proportion of the population employed in) the country in year *t*. Real GDP is measured at constant 2017 prices.

The coefficient on $AggProfitShifting$, 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.

We control for Shevlin, Shivakumar, and Urcan's [2019] measure of country-level aggregate effective tax rate (*AggETR*), 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 corporate tax in general. 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 (τ), and the population of the country ($lnPopulation$) 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 very high multicollinearity with the variables of interest and the control variables. Macroeconomic variables are obtained from the Penn World Tables. All data are in US 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. 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 0.06) 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*, 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 compute ETR using total tax expense, as current tax expense is unavailable.

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* and τ, as previously mentioned (coefficient 0.810). We check for potential multicollinearity issues by obtaining the variance inflation factors for all

regressions. All factors for all regressions are less than ten, suggesting multicollinearity is not a significant issue.

The correlations between *AggProfitShifting* and *RealGDPGrowth* and *AggProfitShifting* and *EmploymentGrowth* 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 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 $AggProfitShifting$. 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*, to determine whether the relation between *AggProfitShifting* and *Growth* is incremental to that of *AggETR* and *Growth*.

In Table 4, the coefficient estimate on $AggProfitShifting$ is negative and statistically significant at the ten percent level across all specifications (coefficients range from -0.064 to -0.075). 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.

The coefficient estimates on *AggETR* in columns 2 and 4 are negative, consistent with the findings of Shevlin, Shivakumar, and Urcan [2019], however, they are not statistically significant

at conventional levels.[2] Interestingly, the inclusion of *AggETR* as a control does not change the magnitude of the coefficient on *AggProfitShifting* or the standard errors. Thus, controlling for *AggProfitShifting*, we fail to find evidence of an incremental impact of *AggETR* on future real GDP growth. However, controlling for *AggETR*, we do find evidence of an incremental impact of *AggProfitShifting* on future real GDP growth.

We also note that including year fixed effects does not significantly impact the magnitude of the coefficient estimates on *AggProfitShifting* or the standard errors.

5.4 Main results – future employment growth

Table 5 reports the results of estimating equation 2 with $EmploymentGrowth_{c,t+1}$ as the outcome variable of interest. Similar to Table 4, 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* in columns 1 and 3 (2 and 4).

The estimates of the coefficient on $AggProfitShifting$ are positive and marginally significant in columns 1 and 2 (coefficient 0.044) and insignificant in columns 3 and 4 when year fixed effects are included (coefficient 0.036). Altogether, this suggests that there appears to be no on-average effect of *AggProfitShifting* on future employment growth, and further cross-sectional analyses are warranted.

Consistent with the results in Table 4, neither the magnitude of the coefficient on *AggProfitShifting* nor the standard errors significantly change when *AggETR* is included in the model. Thus, controlling for *AggProfitShifting*, we also fail to find evidence of an incremental impact of *AggETR* on future employment growth.

[2] When we run equation 2 with *AggETR* and without *AggProfitShifting*, the coefficient on *AggETR* is negative and statistically significant as per the findings of Shevlin, Shivakumar, and Urcan [2019].

5.5 Cross-sectional analyses

Next, we explore whether our main results are driven by inbound profit shifting in low-tax countries or outbound profit shifting in high-tax countries. We create an indicator variable, *Inbound,* which equals one where *AggProfitShifting* is less than zero for the country-year; and zero otherwise. We then interact *Inbound* with *AggProfitShifting* and report the results in Table 6 Panel A. Columns 1 and 2 (3 and 4) report the results with $RealGDPGrowth_{c,t+1}$ ($EmploymentGrowth_{c,t+1}$) as the outcome variable of interest.

In both columns 1 and 2, we find that the coefficients on *AggProfitShifting* are not statistically significant. However, the coefficient on the interaction of *AggProfitShifting* with *Inbound* is negative and statistically significant at the five percent level in column 1 (coefficient -0.144), albeit the standard error drops to just above the ten percent significance level when year fixed effects are included in column 2 (coefficient -0.118). 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 columns 3 and 4, we find that the coefficients on *AggProfitShifting* are positive and statistically significant at the five and ten percent levels, respectively (coefficient 0.084, coefficient 0.073). In contrast, the coefficients on the interaction of *AggProfitShifting* with *Inbound* are negative but not statistically significant at conventional levels. Unlike the results with future real GDP growth as the outcome variable of interest, we find some evidence to suggest that countries from which profits are shifted experience lesser future employment growth.

Lastly, we consider that not all tax haven countries are the same. The "Big 8" tax havens (Hong Kong, Ireland, Lebanon, Liberia, Panama, Puerto Rico, Singapore, and Switzerland) are relatively large countries with robust economies beyond that of shifted profits. Notably, these

countries have relatively large labor markets compared to other tax havens. Thus, we would expect these countries to experience a greater increase in future employment growth resulting from inbound shifted profits. To test this assertion, we create an indicator, *Big8*, which equals one where the country is considered a "Big 8" tax haven; and zero otherwise. We interact *Big8* with *AggProfitShifting* and report the results in Table 6 Panel B. Consistent with our assertion, we find that the coefficient estimate on the interaction of *AggProfitShifting* and *Big8* is negative and statistically significant at the ten percent level in both columns (coefficient -0.008, coefficient -0.007). This result implies that for low-tax countries with sufficient labor markets, greater inbound profit shifting is associated with greater future employment growth.

6. Conclusion

Our study extends the literature examining the consequences of profit shifting by examining whether the aggregate profit shifting of MNEs affects future GDP growth and employment growth. We find that countries to which profits are shifted experience a significant increase in future real GDP growth, suggesting that shifted profits are invested in productive factors 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 the "Big 8" tax havens. Importantly, we fail to find evidence that countries from which profits are shifted experience decreased future real GDP growth. Together, our results shed light on and challenge the common assumption that profit shifting negatively impacts the economies of high-tax countries.

These results are derived using a novel empirical proxy for profit shifting at the country-year level. Our measure and our findings should be of interest to academics and policymakers seeking to analyze and understand the effects of the international tax planning of MNEs more fully.

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Appendix A: Variable Definitions

Variable	Definition	Source
AggETR	asset-weighted average of each affiliate's effective tax rate in the country-year, as per Shevlin, Shivakumar, and Urcan [2019]	Orbis, self-constructed
AggProfitShifting	asset-weighted average of each affiliate's *C* variable in the country-year, as detailed in Section 4.2	Orbis, self-constructed
Big8	indicator which equals one where the country is considered a "Big 8" tax haven; zero otherwise	self-constructed
EmploymentGrowth	proportion of the population employed in the country at time *t+1* minus the proportion of the population employed in the country at time *t*, scaled by the proportion of the population employed in the country at time *t*	Penn World Tables
Inbound	indicator which equals one where *AggProfitShifting* is less than zero for the country-year; zero otherwise	self-constructed
K	tangible fixed assets	Orbis
lnPopulation	natural logarithm of the country's population	Penn World Tables
RealGDPGrowth	real GDP of the country at time *t+1* minus real GDP at time *t*, scaled by real GDP at time *t*	Penn World Tables
τ	statutory tax rate of the country	Tax Foundation

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. Median Aggregate Profit Shifting by Country

Country	median	Country	median	Country	median	Country	median
Albania	-0.011	Egypt	-0.025	Montenegro	-0.106	Slovenia	-0.039
Algeria	-0.044	Estonia	-0.022	Morocco	0.008	South Africa	0.058
Argentina	0.049	Finland	-0.025	Netherlands	-0.021	South Korea	-0.004
Australia	0.004	France	0.045	New Zealand	-0.011	Spain	0.002
Austria	-0.001	Georgia	-0.022	North Macedonia	-0.090	Sri Lanka	-0.048
Belgium	0.029	Germany	0.017	Norway	-0.006	Sweden	-0.024
Bermuda	-0.144	Guyana	0.070	Pakistan	0.001	Switzerland	-0.033
Bosnia	-0.080	Hong Kong	-0.034	Panama	-0.050	Taiwan	-0.004
Botswana	0.032	Hungary	-0.051	Paraguay	-0.063	Tanzania	0.020
Brazil	0.029	Iceland	-0.013	Peru	-0.008	Thailand	-0.083
Bulgaria	-0.093	India	0.080	Poland	-0.066	Tunisia	-0.000
Chile	-0.124	Ireland	-0.130	Portugal	0.011	Turkey	-0.054
Colombia	0.000	Italy	0.012	Romania	-0.086	Ukraine	-0.014
Cote d'Ivoire	-0.053	Japan	0.008	Russia	-0.011	United Arab Emirates	-0.270
Croatia	-0.026	Latvia	-0.058	Senegal	-0.023	United Kingdom	-0.078
Czech Republic	-0.037	Luxembourg	-0.068	Serbia	-0.070	United States	0.096
Denmark	-0.020	Malaysia	-0.040	Singapore	-0.043	Uruguay	-0.002
Ecuador	-0.038	Malta	0.056	Slovakia	-0.022	Zimbabwe	-0.065

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 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
R-squared		0.392	0.392	0.452	0.454
Adjusted R-squared		0.386	0.386	0.439	0.439

Notes: This table provides regression results for the effect of aggregate profit shifting on macroeconomic growth, where the dependent variable is *RealGDPGrowth.* 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: Future Employment Growth

$EmploymentGrowth_{c,t+1}$	Hypothesis	(1)	(2)	(3)	(4)
$AggProfitShifting_{c,t}$	H1	0.044*	0.044*	0.036	0.036
		(1.884)	(1.896)	(1.600)	(1.598)
$AggETR_{c,t}$			-0.002		-0.003
			(-0.759)		(-0.968)
$RealGDPGrowth_{c,t}$		0.141***	0.139***	0.140***	0.137***
		(3.540)	(3.509)	(3.648)	(3.614)
$\tau_{c,t}$		-0.055**	-0.054**	-0.049**	-0.047**
		(-2.477)	(-2.419)	(-2.235)	(-2.137)
$lnPopulation_{c,t}$		-0.002**	-0.002**	-0.002**	-0.002**
		(-2.458)	(-2.428)	(-2.543)	(-2.515)
Year FE		N	N	Y	Y
Observations		465	465	465	465
R-squared		0.145	0.146	0.177	0.179
Adjusted R-squared		0.137	0.137	0.157	0.157

Notes: This table provides regression results for the effect of aggregate profit shifting on macroeconomic growth, where the dependent variable is *EmploymentGrowth*. 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

Panel A. Inbound versus Outbound Countries

$Growth_{c,t+1}$	(1) *RealGDP*	(2) *RealGDP*	(3) *Employment*	(4) *Employment*
$AggProfitShifting_{c,t}$	0.057	0.025	0.084**	0.073*
	(0.936)	(0.419)	(2.306)	(1.911)
$AggProfitShifting_{c,t} \times Inbound_c$	-0.144**	-0.118	-0.061	-0.058
	(-2.014)	(-1.649)	(-1.420)	(-1.285)
$AggETR_{c,t}$	-0.002	-0.003	-0.002	-0.003
	(-0.888)	(-1.446)	(-0.731)	(-0.935)
$RealGDPGrowth_{c,t}$	0.479***	0.493***	0.139***	0.137***
	(5.895)	(5.909)	(3.483)	(3.578)
$\tau_{c,t}$	0.043	0.052*	-0.065***	-0.058**
	(1.442)	(1.789)	(-2.801)	(-2.589)
$lnPopulation_{c,t}$	-0.001	-0.001	-0.002**	-0.002***
	(-1.121)	(-1.158)	(-2.641)	(-2.742)
$Inbound_c$	0.004	0.003	-0.003	-0.003
	(1.150)	(1.106)	(-1.192)	(-1.212)
Year FE	N	Y	N	Y
Observations	465	465	465	465
R-squared	0.401	0.459	0.156	0.188
Adjusted R-squared	0.391	0.443	0.143	0.163

Panel B. Big 8 Tax Havens

$Growth_{c,t+1}$	(1) *RealGDP*	(2) *RealGDP*	(3) *Employment*	(4) *Employment*
$AggProfitShifting_{c,t}$	-0.071*	-0.071*	0.046*	0.039
	(-1.968)	(-1.968)	(1.927)	(1.631)
$AggProfitShifting_{c,t} \times Big8_c$	-0.037	-0.037	-0.061*	-0.057*
	(-0.687)	(-0.687)	(-1.937)	(-1.732)
$AggETR_{c,t}$	-0.003	-0.003	-0.002	-0.003
	(-1.321)	(-1.321)	(-0.753)	(-0.962)
$RealGDPGrowth_{c,t}$	0.501***	0.501***	0.142***	0.141***
	(5.651)	(5.651)	(3.419)	(3.501)
$\tau_{c,t}$	0.047*	0.047*	-0.056**	-0.049**
	(1.746)	(1.746)	(-2.551)	(-2.267)
$lnPopulation_{c,t}$	-0.001	-0.001	-0.002**	-0.002**
	(-1.055)	(-1.055)	(-2.485)	(-2.564)
$Big8_c$	-0.002	-0.002	-0.008**	-0.007**
	(-0.467)	(-0.467)	(-2.442)	(-2.001)
Year FE	N	Y	N	Y
Observations	465	465	465	465
R-squared	0.454	0.454	0.151	0.183
Adjusted R-squared	0.437	0.437	0.138	0.158

Notes: This table provides regression results for the effect of aggregate profit shifting on macroeconomic growth, where the dependent variable is *RealGDPGrowth* in columns 1 and 2 and *EmploymentGrowth* in columns 3 and 4. Panel A (B) considers a cross-sectional split on inbound versus outbound income shifting (Big 8 tax havens). 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.