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2022

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The Consequences of the TCJA's International Provisions: A Conceptual Framework and Survey of the Evidence

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December 2022

Abstract:

The 2017 US tax legislation - widely referred to as the Tax Cut and Jobs Act (TCJA) - fundamentally transformed the US system of international taxation, introducing for instance a new tax on "Global Intangible Low-Taxed Income" (GILTI). This paper develops a simple conceptual framework that synthesizes and extends the theory of multinational corporations' (MNCs') responses to taxation. It also surveys the emerging empirical evidence on the consequences of the TCJA's international provisions. The conceptual framework focuses on the efficiency costs of ownership distortions in analyzing the impact of the GILTI tax and the prior repatriation tax on foreign acquisitions by US MNCs. The paper derives a set of sufficient conditions under which changes in US MNCs' foreign activity in response to the TCJA imply an unambiguous reduction in both US national welfare and global welfare. Drawing on the empirical literature on the impact of the TCJA, the paper documents five robust findings: the TCJA led to a general decline in US MNCs' foreign acquisitions, increased US MNCs' investment in routine foreign tangible assets, led (at most) to a decline in profit shifting to the extent expected from the TCJA's tax rate reduction (suggesting no impact of its international provisions per se), reduced the market value of US MNCs relative to domestic US firms, and had no detectable impact on domestic US investment and wages. The first two of these findings correspond closely to the model's sufficient conditions for an unambiguous decline in US and global welfare, while the other findings provide additional support for this conclusion. An illustrative calculation based on the magnitude of the first effect suggests that the TCJA nearly doubled the synergy losses associated with US taxation of US MNCs' foreign activity.

JEL Codes: H25; F23

Keywords: International taxation; Multinational firms; Tax Cut and Jobs Act (TCJA); Repatriation taxes; GILTI tax

Acknowledgments: I thank Jim Albertus, Nuno Garoupa, and Jim Hines for helpful conversations, Kim Clausing and Tim Dowd for valuable comments on an earlier draft, and Kelsey Nelson for research assistance. I acknowledge the financial support of the Lee and Brena Freeman Faculty Research Fund at the University of Chicago Law School. Any remaining errors or omissions are my own.

Electronic copy available at: https://ssrn.com/abstract=4305501

1) Introduction

The 2017 US tax legislation, generally referred to as the Tax Cut and Jobs Act (TCJA), fundamentally transformed the US system of international taxation. The prior worldwide system of taxing US multinational corporations (MNCs) imposed a tax at the time of repatriation (i.e., the payment of dividends from foreign affiliates to the US parent firm). The TCJA abolished the repatriation tax. However, it introduced a new minimum tax – known as the "Global Intangible Low-Taxed Income" (GILTI) tax - on the foreign income of US MNCs, along with several other new provisions.

This paper develops a theoretical framework to analyze the consequences of the prior international tax system and of the TCJA for US national welfare and global welfare. Building on past work on the international provisions of the TCJA (Dharmapala, 2018), the model unifies, synthesizes, and extends the literature on MNCs and repatriation taxes initiated by Hartman (1985) and further developed by, among others, Sinn (1991), Hines (1994), Weichenrieder (1996), De Waegenaere and Sansing (2008), Becker and Fuest (2010) and Albertus, Glover and Levine (2022). However, the basic framework in this literature is modified here in a number of important respects. First, it focuses on cross-border mergers and acquisitions rather than on "greenfields" investment. It is also extended to allow consideration of the efficiency costs of ownership distortions and the role of agency costs. In addition to synthesizing prior theoretical ideas, this paper derives a set of novel results that challenge important intuitions that have guided both policy and research in this area.

The model assumes a continuum of firms in a foreign country, each with a fixed value under domestic ownership. However, firms vary in the value they would generate under the ownership of a US MNC (which may be either higher or lower than the value under domestic ownership). At time 1, a US MNC can make take-it-or-leave-it (TIOLI) offers to domestic owners to acquire their firms. At time 2, the firms acquired at time 1 – which are now affiliates of the US parent - generate earnings. These earnings may be repatriated to the US parent or used to finance further acquisitions (in an extension to the basic setup, the earnings may also be invested in passive assets by the affiliates).

Under the pre-TCJA regime, the US imposes a tax upon the repatriation of earnings; importantly, this tax is deferred until the time of repatriation. The foreign country is assumed to impose a tax rate that is lower than that of the US, and this foreign tax rate is normalized to zero.

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Global welfare is maximized when the US MNC acquires a foreign firm (at either time 1 or 2) if and only if its value under US MNC ownership exceeds its value under domestic ownership. Under the TIOLI assumption, US national welfare (the surplus gained by the US MNC plus repatriation tax revenue, if any) is maximized under essentially these same conditions.

The general result for the pre-TCJA system is that a positive repatriation tax leads to the number of acquisitions by the US MNC being (weakly) smaller than is efficient. The nature of the equilibrium depends on whether there is a repatriation constraint (i.e., an exogenous requirement that time 2 earnings are paid as a dividend to the US parent, perhaps because the common stockholders of the US parent demand payout). In the presence of a repatriation constraint, the repatriation tax burden cannot be avoided, and the US MNC chooses to make (strictly) fewer acquisitions than are efficient. In the absence of a repatriation constraint, the US parent chooses to make a set of acquisitions at time 1 that is anticipated to generate (just) sufficient earnings at time 2 to acquire the remaining foreign firms for which acquisition is privately optimal. This outcome is closer to efficiency from a global and national perspective because the time-2 acquisitions serve as a shield against the repatriation tax. When affiliates can defer the repatriation tax indefinitely by holding passive assets, the number of acquisitions converges to (but never exceeds) the socially efficient level.

In some of the earlier literature and in policy discussions prior to the TCJA, it was often argued that the pre-TCJA regime gave rise to over-investment abroad due to the agency costs of free cash flow (generated by the "trapped" cash held within foreign affiliates to avoid the US repatriation tax) or to the anticipation of future reform. A novel result from our model is that over-investment does not occur in equilibrium, even when we introduce agency costs of this type. A rational, forward-looking US parent anticipates at time 1 that at time 2 managers of its local affiliates will wish to acquire too many local firms. Therefore, it limits its acquisitions at time 1 such that the cash generated at time 2 is only (just) sufficient to acquire the remaining firms for which acquisition is optimal (from the parent's perspective).

This result holds even when at time 1 the US parent underestimates the future repatriation tax (e.g., because it expects the repatriation tax to be abolished and this does not occur). In this case, there will be excessive acquisitions relative to the level that is privately optimal for the US MNC, but not relative to the socially efficient level (from the perspective of both global and US national welfare). On the other hand, when there are agency costs at the level of the US parent

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itself (or, equivalently, "hubris" – in the sense of the overestimation of the benefits of acquisitions – among managers of the parent), the number of acquisitions in the pre-TCJA system may be inefficiently large. However, this will be true of both domestic and foreign acquisitions, and a tax burdening only foreign acquisitions would be poorly tailored to address this problem.

Excessive pre-TCJA acquisitions may also occur in the model if they facilitate profit shifting into the foreign country. However (as discussed in Section 4 below), the central question in practical terms is whether US MNCs had differentially greater access to profit shifting opportunities relative to non-US MNCs in the pre-TCJA period. The evidence on effective tax rates (ETRs) from financial statement data suggests that this was not the case – US-based MNCs tended to have ETRs that were higher (or at least no lower) than those of non-US-based MNCs in the pre-TCJA period (e.g., Markle and Shackelford, 2012; Allen and Morse, 2019). Thus, it appears unlikely that US MNCs over-invested abroad prior to the TCJA due to profit shifting opportunities.

The 2017 tax reform replaced the repatriation tax with the GILTI tax – a minimum tax on foreign income that is due regardless of whether the foreign income is repatriated. Whenever the GILTI tax is strictly positive, the number of acquisitions by US MNCs is strictly smaller than is efficient. In addition, when there exist routine assets that generate low returns (and are always more valuable in the hands of domestic owners), these assets are never acquired by the US MNC under the old system; however, after the TCJA, value-destroying acquisitions of routine assets may occur due to a GILTI tax provision that allows a deduction for a 10% presumptive return on tangible foreign assets.

In general, however, the GILTI tax burden may be higher or lower than the burden of the former repatriation tax. Thus, the impact of the switch to the GILTI tax is ultimately an empirical question. The paper derives a set of sufficient conditions under which changes in US MNCs' foreign activity in response to the TCJA imply an unambiguous reduction in US national welfare and global welfare from the 2017 reform. These conditions involve a general decline in US cross-border acquisitions after the reform, accompanied by an increase in US investment in routine foreign tangible assets. Drawing on the emerging empirical literature on the impact of the TCJA, the paper argues that the available evidence is consistent with this set of sufficient conditions.

More generally, the empirical literature on the effects of the international provisions of the TCJA establishes five major findings that are quite robust across different studies, using a variety

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of datasets and empirical approaches. First, this literature finds a general decline in cross-border acquisitions by US MNCs after the TCJA. This finding appears to be robust across approaches that estimate the post-TCJA change in the likelihood that the acquirer in a global sample of cross-border acquisitions is a US MNC (Amberger and Robinson, 2021; Dunker, Overesch and Pflitsch, 2021) and those that use a sample of US firms to estimate the post-TCJA change in the likelihood that a firm announces a foreign acquisition (Atwood et al., 2020). The magnitude is substantial. Feld et al. (2016) estimate that the lower level of foreign acquisitions caused by the pre-TCJA repatriation tax led to a synergy loss of $537 million per year. The decline in foreign acquisitions estimated in Amberger and Robinson (2021) implies an increase of $498 million per year in this synergy loss. This suggests that the TCJA almost doubled the synergy losses associated with US taxation of US MNCs' foreign activity.

Second, the literature finds that an exception to this pattern of reduced US investment abroad post-TCJA is provided by the acquisition of routine tangible assets (and capital expenditures generating such assets). Atwood et al. (2020) interpret an increase in foreign acquisitions for a subset of their sample that is most likely to be subject to the GILTI tax as being induced by the GILTI tax provision that allows a deduction for a 10% presumptive return on tangible foreign assets. Along similar lines, Beyer at al. (2022) find an increase in foreign – but not domestic – capital expenditures among GILTI-affected firms. These two findings above correspond very closely to the set of sufficient conditions derived in the paper for an unambiguous reduction in both US national welfare and global welfare from the 2017 reform.

Third, the literature does not to date find unambiguous evidence of a reduction in profit shifting activity by US MNCs following the TCJA. Clausing (2020) and Garcia-Bernardo, Jansky and Zucman (2022) provide descriptive evidence on the location of US MNCs' reported profits before and after the TCJA. While the share of US MNCs' profits reported in tax havens appears stable, Garcia-Bernardo, Jansky and Zucman (2022) find a decline in the foreign share of US MNCs' profits. Even assuming that this is entirely due to a decline in profit shifting, the magnitude is smaller than would be expected from the TCJA's substantial corporate tax rate reduction (based on standard estimates in the literature of the semi-elasticity of reported profit with respect to tax rates, as surveyed for instance in Dharmapala (2014) and Beer, de Mooij and Liu (2020)). This suggests no incremental role for the TCJA's international provisions (such as the GILTI tax) in reducing profit shifting activity. Thus, the TCJA's international provisions appear to have reduced

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foreign acquisitions without reducing profit shifting (beyond what would be expected due to the tax rate reduction).

Fourth, the literature finds that the TCJA reduced the market value of US MNCs, relative to domestic US firms. Wagner, Zeckhauser, and Ziegler (2018) find substantial negative market reactions for US MNCs (relative to domestic US firms) during the legislative events in late 2017 that led to the enactment of the TCJA. In principle, this reaction may be due to a one-time tax on previously accumulated foreign cash holdings that formed part of the TCJA. However, Kalcheva et al. (2020) provide evidence that the negative reaction is not primarily attributable to the one-time tax, but rather to ongoing features of the TCJA regime such as the GILTI tax. Overall, these market reactions reinforce the conclusion from the first finding above that US MNCs face increased US tax burdens on foreign activity under the TCJA, relative to those under the pre-TCJA system.

Fifth, the literature has generally not found any detectable impact of the TCJA on investment or wages in the US (although there are some contrary findings on capital expenditures). While there was a surge in repatriations following the TCJA's abolition of the repatriation tax, the evidence suggests that these repatriations led to a large increase in share repurchases while having little discernible impact on domestic investment. This conclusion is quite unsurprising in the light of prior evidence from a 2005 repatriation tax holiday (e.g., Blouin and Krull, 2009; Dharmapala, Foley and Forbes, 2011)). In the context of cross-border activity, it is particularly noteworthy that there appears to have been no detectable increase in inbound FDI to the US (e.g. Matheson et al., 2022). In view of the very large reduction in the US statutory corporate tax rate under the TCJA, there appears to be a very large amount of "missing" inbound FDI, relative to what might be expected based on standard estimates of the responsiveness of FDI to tax rates. Importantly, the apparent absence of such effects suggests that there are no offsetting beneficial effects of the TCJA that might potentially outweigh the welfare loss from reduced foreign activity by US MNCs.

The paper proceeds as follows. Section 2 describes the pre-TCJA system of taxation of US MNCs' foreign income, and then describes the main international provisions of the TCJA. Section 3 develops the theoretical model. Section 4 discusses its implications in relation to the prior literature and policy debates on international taxation. Section 5 reviews the emerging empirical literature on the consequences of the TCJA's international provisions. Section 6 concludes.

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2) The Pre-TCJA International Tax System and the TCJA Reforms

2.1) The Pre-TCJA US International Tax System

Prior to the TCJA, the United States imposed a system of worldwide taxation on US-resident multinational corporations (MNCs) (for an introductory discussion, see e.g., Dharmapala, 2017). The income generated by foreign affiliates of US parents was subject to taxation by the US. However, this US tax was only imposed at the time the dividends were paid (or "repatriated") to the US parent. Consider a simple scenario in which a US parent owns a foreign affiliate, located in a foreign country B.[1] Suppose that the US tax rate is 35% (as was true prior to the TCJA) and that country B's tax rate is 20%. The foreign affiliate earns $100 of income, and pays $20 of tax to the government of B. There are no immediate US tax consequences. However, when the affiliate pays a dividend to its US parent, the latter has $100 of income under US tax law, with a foreign tax credit (FTC) for the tax paid to country B. Because of the FTC, taxes due at the time of repatriation are generally equal to the difference between the foreign tax paid and the tax that would be due if earnings were taxed at the US rate. In this example, an additional $15 would be due under the US repatriation tax when the earnings are repatriated.

In this example, the US is the "residence" country (where the MNC parent is based) and B is the "source" country (where the affiliate's business operations are located). The distinction between "residence" countries and "source" countries is fundamental to international tax law. The income generated by normal business operations in the source country is referred to as "active" business income, whereas income received from other sources unconnected to normal business operations (such as interest or dividend income from portfolio assets) is referred to as "passive" income. Residence countries (such as the US) with "worldwide" tax systems impose tax on the active foreign business income of resident MNCs (with a credit for taxes paid to the source country). Under a "territorial" (or "dividend exemption") system, the "active" foreign income derived by resident MNCs from foreign business operations is exempt from residence country taxation (and is taxed only by the source country). Both worldwide and territorial residence countries may, however, tax the passive foreign income earned by their resident MNCs. Under US tax law, a set of provisions known as the "Subpart F rules" impose immediate US taxation (without deferral) of passive income earned by foreign affiliates.

[1] This example follows Dharmapala (2017. p. 233).

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As the US repatriation tax was imposed only at the time of repatriation, US MNCs had the ability to defer US taxes on "active" foreign income. When there were no profitable active investments abroad, deferral could be achieved by accumulating passive assets in low-tax affiliates, despite the Subpart F provisions that impose immediate US taxation of passive foreign income. Suppose that a foreign affiliate of a US MNC earned $100 of active income, delayed repatriation, and invested in a portfolio of passive assets that earned a 10% annual return. Each year, it will be subject to immediate US tax at 35% on the $10 return (with a credit for any foreign tax paid). However, the US tax on the original $100 of active income would be deferred until the time of repatriation (e.g. Weichenrieder, 1996; see also the model in Section 3 below).

When repatriation could be deferred for a considerable period of time, the present value burden of the repatriation tax arguably became relatively small (e.g., Dharmapala, 2018). Nonetheless, a substantial body of evidence showed that the repatriation tax affected the global market for corporate control, with US MNCs being tax-disfavored acquirers of foreign firms, relative to those firms' domestic owners and to MNCs based in other (territorial) countries (e.g., Feld et al., 2016).

2.2) The TCJA's Reforms to International Taxation

The TCJA reduced the US corporate income tax rate from 35% to 21% and fundamentally transformed the US system of international taxation. In particular, the TCJA abolished the repatriation tax. However, taken in its entirety, the TCJA should not be viewed as a territorial reform (such as the reforms implemented by the UK and Japan in 2009). Rather, the TCJA introduced a new minimum tax – known as the "Global Intangible Low-Taxed Income" (GILTI) tax - on the foreign income of US MNCs, along with several other new provisions affecting MNCs. Dharmapala (2018) argues that under reasonable conditions, the burden of the new GILTI tax may well exceed that of the former repatriation for many and perhaps most US MNCs. Thus, the 2017 reform could arguably be said to have transformed an ostensibly worldwide but functionally territorial system into one that is ostensibly territorial but functionally worldwide.

The GILTI tax[2] involves first computing what is termed the "tested income" of a US parent. This is the pretax foreign income (denoted below by X) aggregated over all foreign affiliates, subject to certain exclusions and deductions. The deduction that is perhaps of most relevance is

[2] This formulation follows Dharmapala (2018), but some of the notation has been modified.

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for foreign taxes. Simplifying substantially, tested income can be defined as $(1-\tau_F)X$, where τ_F is the foreign tax rate. The GILTI provision grants the US MNC a presumptive return of α (which the TCJA set equal to 10%) on its tangible foreign assets, denoted by *R*. The value of R is determined by the affiliates' basis in depreciable physical assets, or "Qualified Business Asset Investment" (QBAI). GILTI is defined as the excess of tested income *X* over the presumptive 10% return on foreign tangible assets.[3] Thus:

$$GILTI = (1-\tau_F)X - \alpha R \quad (1)$$

GILTI tax liability is determined by applying the tax rate on GILTI (denoted by τ_G, set by the TCJA initially at a 10.5% rate, though it is scheduled to increase in the future) to GILTI (as defined in Equation (1)).[4] In addition, a partial FTC is allowed for any foreign taxes paid. This entails grossing up GILTI by these foreign taxes and using 80% of the foreign tax for the FTC. Thus, the GILTI tax liability, denoted T_{GILTI}, can be defined as:

$$T_{GILTI} = \tau_G\left((1-\tau_F)X - \alpha R + \frac{(1-\tau_F)X - \alpha R}{(1-\tau_F)}\tau_F\right) - 0.8\left(\frac{(1-\tau_F)X - \alpha R}{(1-\tau_F)}\tau_F\right) \quad (2)$$

for sufficiently low values of τ_F; otherwise, T_{GILTI} = 0.

While our discussion will focus primarily of the GILTI tax, the TCJA included a number of other significant international provisions. The "Foreign-Derived Intangible Income" (FDII) provision provides a reduced tax rate for US firms' export income. In particular, the component of income (above a presumptive rate of return on US tangible assets) derived from exports is taxed at 13.125% rather than the standard 21% rate. The "Base Erosion and Anti-Abuse Tax" (BEAT) is a new minimum tax regime introduced under the TCJA that disallows deductions for payments to foreign related parties in certain circumstances. The TCJA also imposed a one-time tax on foreign cash holdings (through a deemed repatriation mechanism); this is sometimes termed the "deemed repatriation tax." As a one-time tax associated with the transition to the TCJA system, it is not intended to have ongoing applicability.

[3] Net interest expense is added to GILTI, but it is assumed here that net interest expense is zero.
[4] The 10.5% rate represents a 50% deduction relative to the baseline 21% corporate tax rate. From 2026, the GILTI rate will increase to 13.125%.

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3) The Model

The model presented in this section is intended to synthesize and extend a substantial literature across public economics, finance and accounting on the impact of repatriation taxes on MNCs' behavior. It is based on the pioneering contribution of Hartman (1985), as further developed by, among others, Sinn (1991), Hines (1994), Weichenrieder (1996), De Waegenaere and Sansing (2008), Becker and Fuest (2010) and Albertus, Glover and Levine (2022). However, the basic framework in this literature is modified here in a number of important respects. First, it focuses on cross-border mergers and acquisitions rather than on "greenfields" investment. It is also extended to allow consideration of the efficiency costs of ownership distortions and the role of agency costs. All of these are issues of great relevance to MNC behavior, but have not generally been central to prior theoretical work.[5]

The economic theory of why some firms choose to become multinationals emphasizes the central importance of the advantages of the common ownership of assets across countries in inducing (some) firms to become multinational. In particular, the influential OLI (ownership, location, and internalization) framework that is associated with the "Reading School" of international business studies (e.g., Dunning, 1977) stresses the role of the ownership of assets in determining their productivity. A theory of how taxation affects MNCs' behavior should arguably take as its starting point a theory of why some firms choose to become multinationals (e.g., Desai and Hines, 2003); the framework developed here seeks to do so. Moreover, in addition to synthesizing prior theoretical ideas, this section derives a set of novel results that challenge important intuitions that have guided both policy and research in this area.

3.1) Basic Setup

Assume that there exists a continuum of firms in a foreign (non-US) country. Each firm has an exogenously fixed identical value D under ownership by domestic residents or entities. However, firms vary in their value V_{US} in the event of being acquired by a US-based MNC, with $V_{US} \in [0, \bar{V}_{US}]$ and $D \in (0, \bar{V}_{US})$. Thus, some firms are more valuable under US ownership while others are less valuable (reflecting variation in the effects of ownership on productivity discussed

[5] Becker and Fuest (2010) is a significant exception, as it analyzes acquisitions and allows for ownership effects on firm value. However, it does not address agency costs, and does not allow for a sequential series of acquisitions over time (as modeled below). Moreover, it does not, of course, model the TCJA reforms that were enacted subsequent to its publication.

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above). Without loss of generality, the mass of firms in the foreign country is normalized to 1. The country's tax rate τ_F is normalized to zero (without significant loss of generality, as long as τ_F is lower than the US corporate income tax rate). The density of firms over the range $[0, \bar{V}_{US}]$ of possible values *v* under US ownership is given by the pdf $f(v)$, with corresponding cdf $F(v)$. To derive simple illustrative closed-form solutions, we use the uniform pdf $f(v) = \frac{1}{\bar{V}_{US}}$ and corresponding cdf $F(v) = \frac{v}{\bar{V}_{US}}$. However, the main results are established below for quite general distributions (with very mild restrictions).

The model assumes a single US MNC that faces no financial constraints (i.e., it can make all of the acquisitions that it wishes to make and to which domestic owners accede). The timing – shown in Figure 1 – is as follows. At time 1, the US MNC can make take-it-or-leave-it (TIOLI) offers to domestic owners to acquire firms. As a domestically-owned firm always has a present value of *D* under its current ownership, this entails that the US MNC pays *D* to acquire a foreign firm. We assume that the US MNC always orders its offers starting with the most valuable firms (with value $\bar{V}_{US}$ under its ownership) and proceeding in descending order. Thus, time 1 acquisitions can be summarized by V_1, the threshold value of *v* above which the US MNC acquires firms; the US MNC hence acquires a fraction (1 - $F(V_1)$) of firms in the foreign country at time 1. While subsequent acquisitions by its affiliates at time 2 are possible (as described below), we assume that the US MNC undertakes all the acquisitions it wishes to make at time 1 (rather than waiting until time 2) when it is indifferent between acquisition at time 1 and time 2.

At time 2, firms that were acquired at time 1 (which are referred to as affiliates of the US MNC) generate intermediate cash flows of $Y(1 + r)$ per firm, where r is the discount rate and it is assumed that $Y \in (0, D]$. The affiliates may use these internal funds (and any other financing provided by or approved by the US parent) to make further acquisitions. The US affiliates are assumed to make TIOLI offers to domestic owners (as at time 1, starting with the most valuable firms and proceeding in descending order). The value of a firm under domestic ownership at time 2 is identical to that at time 1, apart from the accumulation of an additional *rD* of cash; thus, the cost of acquisition at time 2 is *D*(1 + *r*) per firm. The threshold value of *v* above which the US MNC's affiliates acquire remaining domestically-owned firms at time 2 is denoted by $V_2 \leq V_1$ (where $V_2 = V_1$ represents a scenario in which there are no additional time 2 acquisitions). In the

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basic model, any internal funds not used at time 2 for acquisitions are repatriated to the US parent (although the possibility of investing this cash in passive assets is introduced later).

At time 3, affiliates that were acquired at time 1 generate further earnings of $(V_{US} - Y)(1+r)^2$ (and zero thereafter).[6] Affiliates that were acquired at time 2 generate earnings of $V_{US}(1+r)^2$ at time 3 (and zero thereafter). There is no further possibility of making acquisitions at time 3 and subsequent periods. In periods after time 3, affiliates are assumed to remain in formal existence, but generate no further earnings. at time *n*, Affiliates are liquidated at some subsequent time *n*. Under these assumptions, note that the present value of cash flows evaluated at time 1 is identical for acquisitions made at time 1 and at time 2.[7] In particular, the net present value of an acquisition (regardless of whether it is made at time 1 or time 2) is $(V_{US} - D)$.

In the absence of a repatriation tax (and assuming that $\tau_F = 0$, as noted above), the surplus derived by the US MNC from its acquisitions can be characterized as:

$$W_{MNC}^{NT} = \int_{V_2}^{\overline{V}_{US}} (v - D) f(v) dv \tag{3}$$

Maximizing W_{MNC}^{NT} with respect to V_2 yields $V_2^{NT} = D$ (i.e., the US MNC makes all socially valuable acquisitions), with $V_2^{NT} = V_1$ (i.e., all these acquisitions are made at time 1, as there is no gain from delay until time 2). This outcome - which is illustrated in Figure 2 - serves as a convenient welfare benchmark as it also maximizes global welfare, which can be characterized as:

$$W_{Global} = \int_{V_2}^{\overline{V}_{US}} v f(v) dv + \int_{0}^{V_2} D f(v) dv \tag{4}$$

In addition, Equation (3) provides a natural characterization of US national welfare, even in the presence of a repatriation tax exists, if we assume that equal weight is placed on the US MNC's profits and on revenue from the repatriation tax. A choice of $V_2 = D$ then also maximizes US national welfare.

[6] Under the assumption made earlier that $Y \in (0, D]$, time 2 earnings are strictly positive. If $V_{US} < D$, then it is possible that time 3 earnings are strictly negative. Note, however, that this case is not of great relevance; all equilibria derived below involve $V_2 \geq D$.

[7] For a time 1 acquisition, the net present value at time 1 is:

$$-D + \frac{Y(1+r)}{1+r} + \frac{(V_{US} - Y)(1+r)^2}{(1+r)^2} = V_{US} - D$$

For a time 2 acquisition, the net present value at time 1 is:

$$-\frac{D(1+r)}{1+r} + \frac{V_{US}(1+r)^2}{(1+r)^2} = V_{US} - D$$

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3.2) The Pre-TCJA Repatriation Tax

3.2.1) Introducing the Repatriation Tax

We now introduce a repatriation tax $\tau > 0$, imposed upon dividends paid by foreign affiliates to the US parent (and paid at the time of repatriation). For instance, if an affiliate acquired at time 1 pays out all of its time 2 earnings $Y(1+r)$ as dividends to the parent, it would face a US tax of $\tau Y(1+r)$ at time 2. If it then repatriates all of its time 3 earnings $(V_{US}-Y)(1+r)^2$ at time 3, it would face a US tax of $\tau(V_{US}-Y)(1+r)^2$ at time 3. If time 2 earnings $Y(1+r)$ are used instead for acquisitions and are not repatriated, then no US tax is imposed. In general, income tax principles imply that the US parent is entitled to a tax-free return of capital upon liquidation, either because dividends are paid out of earnings and profits or because it has basis equal to the cost of acquisition. This implies a deduction worth τD (for a time 1 acquisition) at time *n*. To simplify the analysis (without fundamentally affecting any of the insights), we focus on the scenario in which the return of capital is anticipated to be far in the future. Then, the after-tax net present value of a firm converges to $(1-\tau)\ (V_{US}-D)$.[8] Nonetheless, it is worth emphasizing that the distortions to acquisitions created by the repatriation tax are due to the timing differences between the tax and the recovery of capital; a (consumption-type) cash flow tax that allowed the US parent to immediately deduct its acquisition cost would not distort acquisitions (e.g., Becker and Fuest, 2010).

We first consider the case where the US MNC faces a binding repatriation constraint – i.e., all earnings of affiliates must be immediately repatriated to the parent, perhaps to satisfy demands for payout from the common stockholders of the parent. Under these circumstances, the surplus derived by the US MNC from its acquisitions can be characterized as:

$$W_{MNC}^{RC} = \int_{V_2}^{\bar{V}_{US}} ((1-\tau)v - D) f(v) dv \tag{5}$$

For the uniform pdf $f(v) = \frac{1}{\bar{V}_{US}}$, maximizing this surplus entails setting $V_2^{RC} = V_1^{RC} = \frac{D}{1-\tau}$ (as illustrated in Figure 3). Thus, the repatriation tax leads to some socially valuable acquisitions being foregone.

[8] For instance, for a time 1 acquisition, the net present value at time 1 is:

$$\lim_{n\to\infty}\left[-D + \left(\frac{(1-\tau)Y(1+r)}{1+r} + \frac{(1-\tau)(V_{US}-Y)(1+r)^2}{(1+r)^2} + \frac{\tau D}{(1+r)^n}\right]\right. = (1-\tau)V_{US} - D$$

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3.2.2) Equilibrium with Commitment

Now, assume that the US MNC faces no repatriation constraint. It is thus free (as in Hartman's (1985) framework, though that does not model acquisitions) to either repatriate its affiliates' time 2 earnings or to use them for time 2 acquisitions. The advantage of the latter is that the reinvestment abroad of time 2 earnings allows the MNC to avoid the US repatriation tax. As argued by Hartman (1985), internal funds are thus a lower-cost source of finance because those funds would otherwise be subject to the repatriation tax. Hence, it is optimal for the MNC to stagger its acquisitions across time 1 and time 2, and to maximize the use of earnings from firms acquired at time 1 in making time 2 acquisitions. For the uniform distribution, the maximal use of internal funds for acquisitions made at time 2 occurs when the following constraint is binding:

$$\left(1 - \frac{V_1}{\bar{V}_{US}}\right) Y(1+r) = D(1+r)\left(\frac{V_1 - V_2}{\bar{V}_{US}}\right) \tag{6}$$

The LHS represents the earnings at time 2 of affiliates acquired at time 1. The RHS represents the cost of acquisitions made at time 2. Rearranging this constraint allows us to characterize the MNC's optimal choice of V_1 for a given value of its desired V_2:

$$V_1(V_2) = \frac{Y\bar{V}_{US} + DV_2}{Y + D} \tag{7}$$

For a given level of (ultimate) acquisitions desired by the MNC, this expression tells us how those acquisitions should be divided between time 1 and time 2.

We first consider the "commitment" scenario, in which the US parent not only chooses V_1 at time 1 but also commits to a particular choice of V_2 at time 1. Under these circumstances, the surplus derived by the US MNC from its acquisitions can be characterized as:

$$W_{MNC}^{C} = \int_{V_2}^{\bar{V}_{US}} ((1-\tau)v - D) f(v) dv + \int_{V_1(V_2)}^{\bar{V}_{US}} \tau Y f(v) dv \tag{8}$$

The second term reflects the idea that each time 2 acquisition using internal funds acts as a repatriation tax shield, eliminating the repatriation tax owed on the time 2 earnings of affiliates acquired at time 1 (when the constraint in Equation (6) is binding). This surplus is evaluated at time 1, so while time 2 earnings are $Y(1+r)$, this has present value Y at time 1. The constraint characterized in Equations (6) and (7) is implicitly incorporated into Equation (8) through the lower limit of integration in the second term.

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Maximizing the expression in Equation (8) with respect to V_2 (and therefore also determining V_1 via Equation (7)) for the uniform distribution yields the solution:

$$V_2^C = \frac{D}{1-\tau}\left(1 - \frac{\tau Y}{Y+D}\right) \tag{9}$$

V_1^C is given by substituting this value of V_2^C into Equation (7). This outcome is depicted in Figure 3. Note that the MNC's ability to avoid the repatriation tax mitigates – but does not eliminate – the distortion to acquisition decisions created by the repatriation tax (i.e., $V_2^C > D$). The intuition for why some distortion generally persists can be understood as follows. Consider the marginal acquisition; this occurs either at time 1 or time 2. If the former, that affiliate's earnings cannot be shielded from the repatriation tax by further time 2 acquisitions; thus, its earnings will be subject to the repatriation tax. If the latter, then that affiliate's earnings will occur at time 3, when no acquisitions are possible. More generally, this intuition holds whenever there is a final acquisition (the returns from which cannot be used for further reinvestment). In an infinite-horizon setting – where there is always some strictly positive probability of a subsequent acquisition - the distortion could potentially be eliminated; however, this would not affect the main conclusions below regarding the comparison of the pre-TCJA and TCJA systems.

3.2.3) Equilibrium with Partial Commitment

Now consider the case of "partial commitment" in which the parent chooses V_1 at time 1, while the affiliates that were acquired at time 1 independently choose V_2 at time 2. We impose some (realistic) restrictions on the financing possibilities open to the affiliates at time 2. In particular, as affiliates are typically wholly-owned by the parent, the affiliates cannot issue equity at time 2. They can potentially borrow, but we assume that the parent's guarantee is required for borrowing (and thus borrowing cannot be used to pursue objectives that differ from those of the parent). The parent's time 1 commitment is described as "partial" because it can commit at time 1 to providing no additional financing to affiliates at time 2; however, affiliates are assumed to have discretion over the use of internal funds at time 2. In determining how these funds are used, we initially assume that the affiliate managers share the parent's general objective (of maximizing the MNC's aggregate value, from a time 2 perspective); we consider below the case where there exist what we term "affiliate-level" agency costs.

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For a given choice of V_1 by the parent at time 1, denoted $\hat{V}_1$, the incremental surplus created by time 2 acquisitions by the US affiliates can be characterized as follows:

$$\int_{V_2}^{\hat{V}_1} (1+r)((1-\tau)v - D)f(v)dv + \int_{V_2}^{\hat{V}_1} \tau D(1+r)f(v)dv \tag{10}$$

The second term reflects the avoidance of the repatriation tax – for each additional firm acquired at time 2, repatriation taxes paid to the US fall by $\tau D(1+r)$. Equation (10) can be simplified to:

$$(1+r)(1-\tau)\int_{V_2}^{\hat{V}_1} (v-D)f(v)dv \tag{11}$$

Let $\hat{V}_{2A}$ be the US affiliates' desired choice of V_2 at time 2. Straightforwardly, $\hat{V}_{2A} = D$ from Equation (11); i.e., the affiliates would choose – if they were unconstrained – to make all socially valuable acquisitions. This reflects what might be termed an "opportunity cost of capital" effect (prominent in Hartman's (1985) pioneering model, and emphasized recently by Albertus, Glover and Levine (2022)): while the return from time 2 acquisitions is lowered by the repatriation tax on time 3 earnings, the repatriation tax also lowers the opportunity cost of internal funds by the same proportion (as the funds used for the acquisition would otherwise be subject to the repatriation tax). This insight is closely related more generally to the "new view" of dividend taxation (Auerbach, 1979).

While the affiliates wish to set $\hat{V}_{2A} = D$ at time 2, however, this is not (privately) optimal from the ex ante perspective of the US parent at time 1. Rather, the parent's preferred choice of V_2 is given by Equation (9). Even when affiliates make independent decisions about V_2, it is possible for the parent to ensure that its preferred V_2 is ultimately implemented by an appropriate choice of V_1. In particular, substituting the expression for V_2 in Equation (9) into Equation (7), the parent's optimal choice of V_1 in the "no commitment" setting, denoted V_1^{NC}, is:

$$V_1^{NC} = \frac{Y\bar{V}_{US} + D^2\left(\frac{(1-\tau)Y + D}{(1-\tau)(Y+D)}\right)}{Y+D} \tag{12}$$

In equilibrium, subject to the constraint characterized in Equation (6), the US affiliates ultimately choose at time 2 a value of V_2, denoted V_2^{NC}, that is identical to that chosen directly by the parent in the "commitment" scenario (i.e., $V_2^{NC} = V_2^C$, as defined in Equation (9)). Figure 4 illustrates these outcomes.

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3.2.4) Introducing Passive Investment

So far, we have assumed that the only choices available with respect to earnings generated at time 2 are to repatriate or to use the funds for acquisitions. This corresponds to the assumptions of the Hartman (1985) framework. Weichenrieder (1996) introduced another possible choice – for the foreign affiliate to invest the funds in passive assets. Essentially, the foreign affiliate uses the retained funds to purchase a portfolio of bonds and stocks in much the same way as would a retail investor. This generates passive returns that, for US MNCs, are subject to immediate US taxation under what are known as the Subpart F rules of US tax law (and more generally are often subject to taxation by the MNC's residence country when "controlled foreign corporation (CFC) rules apply). Thus, we assume that the returns to passive assets are immediately repatriated (as there is no deferral benefit to retaining them within the foreign affiliate).

Importantly, however, the US repatriation tax on the earnings from foreign affiliates' business operations (generated at time 2 and/or time 3) can be deferred until the time that the affiliate is liquidated at time *n*. As noted earlier, we focus on the case where $n \to \infty$. The burden of the repatriation tax becomes negligible in this scenario, and the present value of an acquired firm converges to V_{US}. This leads to socially efficient acquisition decisions that maximize global and US national welfare. This outcome resembles that shown in Figure 2 (where there is no repatriation tax). Of course, a deferral strategy of this type is only feasible for MNCs that face no repatriation constraint (of the sort characterized earlier in Section 3.2.1). In addition, there may be resource costs of tax planning and other frictions associated with the long-term retention of funds abroad. These would impose an implicit tax on foreign activity that would discourage foreign acquisitions ex ante (at time 1). However, this possibility does not affect the central results below about the comparison of the pre-TCJA and TCJA systems.

3.2.5) Introducing Agency Costs and the Anticipation of Tax Reform

In the literature (e.g., Dharmapala, 2017; Albertus, Glover and Levine, 2022), it is often claimed that the agency costs of free cash flow among foreign affiliates led under the pre-TCJA system to over-investment by US MNCs in foreign acquisitions. A similar claim is often made with respect to the anticipation of the possibility of tax reform (in particular, the abolition of the repatriation tax, or the recurrence of a temporary repatriation tax holiday such as that enacted under the American Job Creation Act of 2004). We consider here how each of these possibilities affects

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acquisition behavior within the framework developed above that emphasizes rational, forward-looking behavior by the US parent.

First, consider managerial agency costs at the affiliate level – i.e., a situation in which the objectives of the managers of foreign affiliates diverge from those of the US parent (this is of course only relevant in the "no commitment" scenario of Section 3.2.3 above). In particular, suppose that the managers of the US MNC's foreign affiliates derive private benefits of $M(1+r)$ at time 2 from each acquisition made at time 2. We maintain the assumption from Section 3.2.4 that the MNC faces no repatriation constraint and that investment in passive assets is possible (so that, in effect, $\tau = 0$).

For a given choice of V_1 by the parent at time 1, denoted $\hat{V}_1$, the incremental surplus created by time 2 acquisitions, from the perspective of the managers of US affiliates at time 2, can be characterized as follows:

$$\int_{V_2}^{\hat{V}_1} (1+r)(M+v-D)f(v)dv \tag{13}$$

Let $\hat{V}_{2AM}$ be the US affiliates' desired choice of V_2 at time 2 when managerial private benefits exist. Straightforwardly, $\hat{V}_{2AM} = D - M$ from Equation (13); i.e., the affiliates' managers would choose – if they were unconstrained – to make acquisitions that are value-destroying and therefore excessive from the perspective of global welfare, US national welfare, and the welfare of the US parent.

While the affiliate managers wish to set $\hat{V}_{2AM} = D - M$ at time 2, this is clearly not optimal from the ex ante perspective of the US parent at time 1. Rather, the parent's preferred choice is $V_2 = D$ (under the assumption that deferral via investment in passive assets eliminates the repatriation tax burden; more generally, the parent would wish to set V_2 higher than the affiliates' preferred level because *M* enters the affiliates' objective function but not that of the parent). As in Section 3.2.3, even when affiliates make independent decisions about V_2 it is possible for the parent to ensure that its preferred V_2 is ultimately implemented by an appropriate choice of V_1. In particular, substituting $V_2 = D$ into Equation (7), the parent's optimal choice of V_1 in the agency cost setting, denoted V_1^M, is:

$$V_1^M = \frac{Y\bar{V}_{US} + D^2}{Y + D} \tag{14}$$

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In equilibrium, subject to the constraint characterized in Equation (6), the affiliate managers ultimately choose at time 2 a value of $V_2 = D$, that is identical to the parents' preferred choice of V_2; Figure 5 illustrates this equilibrium. Thus, the literature on the agency costs of free cash flow makes a valuable point about the potential divergence of interests between parents and affiliate managers. In our framework with a rational, forward-looking parent, the anticipation of these agency costs plays an important role in shaping equilibrium behavior (in particular, absent agency costs, the parent would simply set $V_1 = D$, rather than $V_1 = V_1^M$ as defined in Equation (14)). Nonetheless, under the realistic assumption that affiliate managers do not have access to outside financing sources that are completely independent of the parent, excessive acquisitions do not occur in equilibrium.

As noted above, it is also claimed that – during the pre-TCJA era – the possibility of future reform caused over-investment in foreign activity. In some accounts, this mechanism reinforces the agency cost channel – i.e., US affiliates abroad accumulate cash in anticipation of future holidays or reform, creating free cash flow that affiliate managers squander on unprofitable acquisitions. Our framework casts some doubt on these claims as well. Consider a scenario in which the US parent expects reform (or a series of repatriation tax holidays) with probability 1 (a more natural assumption would be that expectations are rational or model-consistent – i.e., centered on the true probability – but we make an extreme assumption to illustrate the point more clearly). The parent's perceived τ is thus zero and it will wish to implement $V_2 = D$. In the "commitment" scenario, it can choose this directly. In the "partial commitment" scenario, as we have seen, it can choose V_1 appropriately to ensure that $V_2 = D$ is chosen by the affiliates at time 2. To the extent that the parent is excessively optimistic about the future repatriation tax, it is possible that the parent will experience ex post regret (i.e., choose a higher value of V_2 than turns out to be privately optimal). However, even this excessive optimism cannot lead to a *socially* excessive level of acquisitions, unless the parent believes that the US will introduce a negative repatriation tax (or some other subsidy for foreign acquisitions) in the future.

3.2.6) Summary

The various equilibrium outcomes discussed above are summarized in Proposition 1 below. Note that the closed-form expressions above were derived using a uniform pdf. Proposition 1, in

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contrast, holds for a general distribution of firms, subject only to the following mild restriction on the cdf:

Condition 1: There exists some $V^+ \in (D, \bar{V}_{US})$ such that:

$$F(V^+) = \frac{DF(D) + Y}{D + Y}$$

Let $\hat{V}_{2P}$ be the parent's preferred choice of V_2, and $\hat{V}_{2A}$ be the affiliates' preferred choice of V_2 at time 2. Let V_2^* be the equilibrium choice of V_2 at time 2. Then,

Proposition 1: If $\hat{V}_{2P} \geq D$ and Condition 1 holds, then $V_2^* \geq D$.

Proof: See Appendix

This proposition establishes that, under reasonable conditions, the pre-TCJA system leads to US MNCs' acquisitions of foreign targets being (weakly) too small (relative to the level that is optimal from the perspective of global welfare and US national welfare). In particular, this result holds whenever the parent's privately optimal level of acquisitions is (weakly) smaller than is socially optimal, and is subject to a mild restriction on the distribution of foreign firms. Importantly, Proposition 1 holds regardless of the value of $\hat{V}_{2A}$ and even in the presence of affiliate-level managerial agency costs and the possibility of future reforms or tax holidays.

3.3) The TCJA Regime

As described in Section 2, the TCJA abolished the repatriation tax and replaced it with the GILTI tax represented (in simplified form) in Equations (1) and (2). Under our normalization that $\tau_F = 0$, Equation (2) becomes:

$$T_G = \tau_G(X - \alpha R) \tag{15}$$

Recall that the GILTI tax is imposed regardless of whether foreign earnings are repatriated. Thus, there is no advantage to staggering acquisitions over time to use affiliates' internal funds. Hence, we assume that all acquisitions under the TCJA occur at time 1. These acquisition decisions are characterized by the threshold value of *v*, denoted by V^{TCJA}, above which the US MNC acquires foreign firms at time 1.

To elucidate the role of the GILTI tax's allowance for a presumptive return at rate α (currently set at 10%) on tangible assets, we introduce a new class of "routine" tangible assets into the model. Specifically, assume that there exists in the foreign country a continuum of routine tangible assets, each with value $\bar{R}$ under domestic ownership and value $R_{US} \in [0, \bar{R}]$ under the

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ownership of the US MNC. The distribution of possible values x of R_{US} is given by the pdf $g(x)$ and the corresponding cdf $G(x)$. To derive illustrative expressions below, we use the uniform distribution $g(x) = \frac{1}{\bar{R}}$; however, Proposition 2 below holds for a general pdf.

Under these assumptions, acquisitions of routine tangible assets by the US MNC are never value-increasing and generally value-destroying. Prior to the TCJA, there is no incentive for the US MNC to acquire any of these assets – doing so would require paying $\bar{R}$ to the domestic owner (using the same TIOLI assumption as in the prior analysis) but would generate at most $\bar{R}$ and generally less in value. Thus, the threshold value of R_{US}, denoted R^P, above which the MNC acquires these assets under the pre-TCJA system is $R^P = \bar{R}$ (i.e., no routine tangible assets are acquired).

Under the TCJA, on the other hand, the allowance for a presumptive return on tangible assets creates an incentive to make value-destroying acquisitions of tangible assets. We assume that routine tangible assets generate a return at rate r (so that the return is $r\bar{R}$ under domestic ownership and rR_{US} under US MNC ownership). Under the TCJA, if the US MNC acquires a routine tangible asset with return rR_{US} for one period, it will receive an after-tax return of $(1-\tau_G)rR_{US}$ and also receive a deduction against its GILTI tax liability of $\alpha\tau_G\bar{R}$ (based on the asset's basis, which reflects the cost of acquisition $\bar{R}$ rather than the asset's lower value under US ownership). Because time 1 acquisitions of firms are assumed in our setup to generate income only (at most) at times 2 and 3, the US MNC will not wish to retain any routine tangible assets beyond that period. In particular, the routine asset can profitably be sold back to a domestic owner when there is no longer any GILTI to shelter. Thus, the net cost of acquiring routine tangible assets can be understood in one of two (equivalent) ways – as, in effect, the US MNC renting the asset from its domestic owner (albeit with formal US ownership for GILTI tax purposes), or as the purchase and resale described above. In either case, the foregone return to the domestic owner for which it must be compensated is $r\bar{R}$ and thus the net cost of acquisition for the US MNC (under the TIOLI assumption) is $r\bar{R}$.[9]

[9] The US MNC may potentially hold the routine asset for more than one period if GILTI tax liabilities arise in multiple periods. However, the one-period holding duration assumed here is simpler and does not affect the results, as all calculations are in terms of present values at time 1 (and under the assumption stated below that GILTI tax liability is not completely eliminated by the allowance for presumptive returns from routine assets).

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Denoting by V_1 and R_1 the US MNC's choices of acquisitions of foreign firms and foreign routine tangible assets, respectively, at time 1, the MNC's surplus can be expressed as:

$$W_{MNC}^{TCJA} = \int_{V_1}^{\bar{V}_{US}} ((1-\tau_G)v - D)f(v)dv + \int_{R_1}^{\bar{R}} ((1-\tau_G)rx + \alpha\tau_G\bar{R} - r\bar{R})g(x)dx \quad (16)$$

Investment in routine tangible assets is only worthwhile for the US MNC as long as its GILTI tax liability is not exhausted. Thus, its optimal choices of by V_1 and R_1 are made subject to the constraint that:

$$\int_{R_1}^{\bar{R}} ((1-\tau_G)rx + \alpha\tau_G\bar{R} - r\bar{R})g(x)dx \leq \int_{V_1}^{\bar{V}_{US}} \tau_G v f(v)dv \quad (17)$$

Assuming that the constraint in Equation (17) is not binding, interior solutions can be found for the optimal values of V_1 and R_1 (denoted V^{TCJA} and R^{TCJA}, respectively) and these choices are separable. For the case of uniforms pdfs $f(v)$ and $g(x)$ the MNC's choices can be characterized as follows:

$$V^{TCJA} = \frac{D}{1-\tau_G} \quad (18)$$

$$R^{TCJA} = \min\left[\frac{(r-\alpha\tau_G)}{r(1-\tau_G)}\bar{R}, \bar{R}\right] \quad (19)$$

When $\alpha > r$ (as is likely to be the case given that α = 10%), $R^{TCJA} < \bar{R}$ (i.e., the US MNC makes some value-destroying investments in tangible assets). Under the assumptions above, this necessarily entails an inefficiency.

However, it is not clear whether V^{TCJA} is closer to or further away from the efficient outcome of *D* in relation to the outcome under the repatriation tax. That is, in general, the GILTI tax burden may be higher or lower than the burden of the former repatriation tax. Thus, the impact of the switch to the GILTI tax is ultimately an empirical question. It is, however, possible to derive a set of sufficient conditions under which US MNCs' responses to the TCJA imply an unambiguous reduction in US national welfare and global welfare from the 2017 reform. These conditions involve a general decline in US cross-border acquisitions after the reform, accompanied by an increase in US investment in routine foreign tangible assets. These conditions are summarized in Proposition 2, which can be established for quite general distributions (with the mild restrictions noted below).

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Denote the threshold value of V_2 under the pre-TCJA system (characterized for various scenarios in Section 3.2) by V^P (where $V^P \geq D$ by Proposition 1), and note that US national welfare (denoted W_{US}^P) under that system can be characterized as:

$$W_{US}^P = \int_{V^P}^{\bar{V}_{US}} (v - D) f(v) dv \tag{20}$$

while US national welfare (denoted W_{US}^{TCJA}) after the TCJA can be characterized as:

$$W_{US}^{TCJA} = \int_{V^{TCJA}}^{\bar{V}_{US}} (v - D) f(v) dv - \int_{R^{TCJA}}^{\bar{R}} r(\bar{R} - x) g(x) dx \tag{21}$$

Global welfare under the two systems (denoted W_{Global}^P and W_{Global}^{TCJA}) can be defined analogously, using Equation (4).

Proposition 2: Suppose that $\hat{V}_{2P} \geq D$, that Condition 1 holds, that $V^{TCJA} > V^P$, and that $f(v) > 0$ for some $v \in (V^P, V^{TCJA})$. Then, $W_{US}^{TCJA} < W_{US}^P$ and $W_{Global}^{TCJA} < W_{Global}^P$.

Proof: See Appendix.

That is, observing a decline in US acquisitions of foreign firms following the TCJA is sufficient to establish that the TCJA's international provisions reduced US national (and global) welfare. This effect – illustrated in Figure 6 – is reinforced if there is also an increase in investment in routine tangible assets by US MNCs following the TCJA. Drawing on the emerging empirical literature on the impact of the TCJA, we argue in Section 5 below that the available evidence is consistent with this set of sufficient conditions.

4) Discussion

4.1) The Extensive and Intensive Margins of MNC Activity

The conceptual framework developed here is intended to unify and synthesize a substantial literature on the effects of the repatriation tax of the behavior of MNCs. It also seeks to extend this literature in a number of directions, for instance emphasizing acquisitions rather than capital expenditures (thereby taking account of behavior on the extensive margin), allowing for the impact of owners' identities on firm value, and expanding its scope to model central aspects of the current TCJA system enacted in 2017. The framework here also helps to resolve an important tension within the analysis of international taxation, especially of the consequences of the repatriation tax. Much of the discussion of repatriation taxes prior to the TCJA was premised on the idea that they

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reduce the foreign activity of resident MNCs. However, there was also a strand of research (of which Albertus, Glover and Levine (2022) is a leading example) that argued that repatriation taxes induced excessive foreign activity; this was typically attributed to the opportunity cost of capital being low when cash was "trapped" abroad, to managerial agency costs at the affiliate level, and to the anticipation of possible future reforms that would abolish the repatriation tax.

Clearly, these views of the repatriation tax are in some tension with each other.[10] Moreover, the model above makes clear that these different views have important implications for how we evaluate the welfare consequences of the TCJA. In the former view, the repatriation tax causes foreign activity to be inefficiently low, and any further reduction in foreign activity after the TCJA would unambiguously cause further welfare losses. In the latter view, foreign activity was excessively large prior to the TCJA, and so a TCJA-induced reduction in foreign activity could potentially (though not necessarily) be welfare-enhancing.

The model above goes well beyond highlighting the importance of this question; it provides a unifying framework that encompasses the insights of each of these perspectives and reconciles their apparent contradictions. The "opportunity cost of capital" effect and the effect of affiliate-level agency costs are indeed operative, as shown in Section 3.2 above. Models such as that of Albertus, Glover and Levine (2022) thus capture a valuable set of insights. However, within the context of a sequential game in which a rational, forward-looking US parent moves first, these effects will be anticipated. Under some mild restrictions, and with realistic assumptions about the financing sources available to affiliates, Proposition 1 establishes a strong theoretical presumption that the repatriation tax induced excessively low levels of foreign activity. Expressed differently, over-investment (at least relative to the privately optimal level) holds on the intensive margin – i.e., for a given level of initial investment by the US parent. However, this initial level of investment is ultimately itself a choice; the possibility of over-investment is eliminated or mitigated when the extensive margin choice – i.e., whether and how much the US parent invests initially – is made optimally.

This is not to say that over-investment abroad by US MNCs was impossible in the pre-TCJA period (indeed, some such scenarios are discussed below). However, the model makes it clear that the commonly cited reasons do not imply over-investment in equilibrium from a social perspective. Evidence from the abolition of repatriation taxes in the UK and Japan in 2009

[10] Even so, Dharmapala (2017) reviews both these types of arguments (p. 241 and p. 244) without reconciling them.

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reinforces this theoretical point. For instance, Feld et al. (2016) show that acquisitions by Japanese-based and UK-based MNCs rose after the reforms (by about 32% and 4%, respectively); their simulation of the abolition of the repatriation tax by the US suggests that this would increase foreign acquisitions by US MNCs by 11% (p. 18). Moreover, Liu (2020) finds that UK MNCs' investment abroad grew after the 2009 reform that abolished the UK's repatriation tax.[11]

There are some significant caveats to Proposition 1. For instance, it is possible that its premise that $\hat{V}_{2P} \geq D$ may not hold (i.e., that the parent's privately optimal level of acquisitions may be strictly larger than is socially optimal). When there are agency costs at the level of the US parent (i.e., between the shareholders of the parent firm and the managers or other insiders of the parent firm) the number of acquisitions may be inefficiently large if the parent's insiders derive private benefits from acquisitions. Equivalently, managerial "hubris" – in the sense of the overestimation of the benefits of acquisitions – among managers of the parent would lead to similar outcomes. However, this will be true of both domestic and foreign acquisitions. In principle, if sufficient information were available, a Pigovian tax on acquisitions may then be optimal. However, a tax burdening only foreign acquisitions (such as the pre-TCJA repatriation tax or the TCJA's GILTI tax) would be poorly tailored to address this problem.

4.2) The Role of Profit Shifting

Socially excessive acquisitions may also be desired by the parent if they facilitate profit shifting into the foreign country (from the US or from other higher-tax jurisdictions). For example, suppose that each foreign acquisition allows profits of $\pi > 0$ from other jurisdictions to be shifted to the foreign country. Then, when passive investment is available and the repatriation imposes no burden, $\hat{V}_{2P} = D - \pi < D$. It is not at all clear that profit shifting requires substantial acquisitions of "real" firms (rather than, for instance, the creation of legal entities – without much economic substance - in tax haven jurisdictions).[12] Nonetheless, in principle, profit shifting opportunities could result in socially excessive acquisitions in the framework developed above.

[11] However there are some contrary results in the literature that are arguably anomalous from the perspective of our framework. Arena and Kutner (2015) find that UK and Japanese MNCs reduced foreign capital expenditures after the territorial reforms in 2009. Egger et al. (2015) report a decrease in capital investment by UK MNCs' foreign affiliates after the reform. It is not clear how to reconcile these results with that of Liu (2020). Note, however, that studies of acquisitions (e.g., Feld et al., 2016) – rather than studies of capital expenditures - are more directly relevant to our discussion here.

[12] See Dharmapala (2014) and Beer, de Mooij and Liu (2020) for a review and discussion of profit shifting.

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However, what is likely to be most important to ownership distortions in the real world is competition for assets among MNCs resident in different countries, rather than competition between US MNCs and (generally smaller) domestic-only firms. Hence, whether US MNCs over-invest abroad depends crucially on whether they have *differential* access to profit shifting opportunities, relative to non-US MNCs. When profit shifting opportunities are identical across MNCs, the effect on their bids for a given asset will be symmetrical (i.e., all MNCs will be willing to bid more when their effective tax rate is lower). Ownership patterns will then be unaffected by profit shifting opportunities.

Profit shifting is, in many circumstances, constrained by source country rules such as restrictions on the deductibility of interest paid to other affiliates of the same MNC (which limits "earnings stripping" through lending by low-tax affiliates to high-tax affiliates). Such source country rules typically apply equally to MNCs regardless of their residence and thus are unlikely to enable differential tax avoidance by US MNCs. On the other hand, residence countries may impose controlled foreign corporation (CFC) rules (which enable the residence country to directly tax passive income earned in low-tax jurisdictions) of varying strength.[13] In principle, it is possible that US CFC rules are weaker in practice than those of other residence countries, enabling US MNCs to engage in more profit shifting than non-US MNCs prior to the TCJA.[14]

However, the evidence on effective tax rates (ETRs) from financial statement data seems inconsistent with such a claim. Markle and Shackelford (2012) show that in the pre-TCJA period US-based MNCs tended to have ETRs that were generally higher (or at least no lower) than those of non-US-based MNCs (see also Allen and Morse (2019)). This is difficult to reconcile with US MNCs having greater access to profit shifting opportunities (at least on balance, taking account of both the repatriation tax and the strength of CFC rules).[15] Thus, it seems unlikely that US MNCs over-invested abroad prior to the TCJA due to profit shifting opportunities. This evidence reinforces the basic point made in Section 3 that the pre-TCJA system led (at least weakly) to excessively low foreign activity by US MNCs.

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13 See Dharmapala (2019) for a discussion and analysis of earnings stripping and CFC rules across different countries.
14 Such an argument might, for instance, emphasize the role of the "check-the-box" (CTB) regulations introduced in 1996 that are thought to have facilitated profit shifting by US MNCs from high-tax to low-tax foreign jurisdictions (e.g., Desai and Dharmapala, 2009).
15 A strand of the tax law literature (Fleming, Peroni, and Shay, 2009) argues that the pre-TCJA system – due to favorable cost allocation rules and the ability to deduct foreign losses against US income - led to tax outcomes for US MNCs that were more favorable than they would have faced under a territorial system. While this is possible in principle, the evidence cited here also appears to contradict this claim.

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4.3) Other Issues and Caveats

Despite these caveats, the intuition underlying Proposition 1 is quite general. This is the case even though there are clearly many highly stylized features of the model developed above. For instance, the intermediate cash flows $Y(1 + r)$ at time 2 are assumed to be deterministic. More realistically, they could be assumed to be stochastic with expected value of $Y(1 + r)$. A risk-neutral parent would care only about the expected value and thus still generally want $\hat{V}_{2P} \geq D$. Proposition 1 would then hold in expected terms (note that risk neutrality seems a reasonable assumption for parents that are widely-held by diversified shareholders). When there are in addition affiliate-level agency costs, it is possible that some affiliates (with high realizations of $Y(1 + r)$) will engage in excessive acquisitions, while others (with low realizations of $Y(1 + r)$) will make too few acquisitions in relation to the global/national optimum. It will still be the case, though, that when averaged over a large number of US MNCs across many countries, US MNCs' acquisitions will in expectation be no higher than the social optimum.

Heterogeneity among US MNCs in their industry or product line (that is not modeled here) may result in targets being scarce (abundant) for those US MNCs that experience high (low) realizations (implying that acquisitions may be excessively high ex post). While this scenario would result in ex post acquisitions being potentially far from the expected number, ex ante the opposite scenario (in which acquisitions are excessively low ex post) is also possible; in expectation, absent some systematic bias, there is no reason that US acquisitions will not be weakly lower than optimal. Thus, a stochastic $Y(1 + r)$ does not imply a general phenomenon of excessive acquisitions by US MNCs prior to the TCJA.[16]

The framework developed above also sheds new light on the interpretation of some widely-discussed phenomena in the behavior of MNCs. For instance, Hanlon, Lester and Verdi (2015) and Edwards, Kravet and Wilson (2016) find evidence that foreign acquisitions by US MNCs with large ("trapped") foreign cash holdings generate less positive market reactions than other acquisitions. This is usually interpreted as evidence of agency costs leading to value-destroying acquisitions in the presence of the repatriation tax. Note, however, that the same evidence can be interpreted very differently in the light of our model. In all equilibria in which acquisitions occur

[16] A somewhat related point is that in a setting of imperfect competition, US MNCs may acquire foreign targets to gain market share even when the target is worth less under US ownership. This is possible, but in a more general setting where MNCs resident in different countries compete over targets, similar behavior by non-US MNCs is also possible. Thus, there is no reason to expect that on balance this motivation will lead to excessive US acquisitions.

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at time 2, acquisitions made at time 2 create lower (albeit positive) surplus and therefore would be expected to generate lower (less positive or – if the baseline for the typical acquisition is a negative reaction - more negative) stock market reactions than time 1 acquisitions. Nonetheless, in these equilibria, time 2 acquisitions are efficient and value-creating; they are simply less so than time 1 acquisitions because the US MNC makes offers to the most valuable acquisitions earlier and to the less valuable acquisitions later.[17]

More generally, our framework casts some doubt on the very notion of "trapped" cash. Ultimately, the US parent chooses whether to acquire foreign affiliates (i.e., makes an extensive margin choice) and how, if at all, to stagger acquisitions over time (in effect, delegating further acquisitions to the original affiliates). The repatriation tax existed for about a century prior to its abolition in 2017, and so is unlikely to have represented a surprise to US MNCs. Thus, it would have been readily anticipated that cash flows generated by affiliates would become "trapped" (i.e., that affiliates would face a lower opportunity cost of capital due to the repatriation tax) and that agency costs of free cash flow would arise. Thus, US parent firms are not hapless victims of the repatriation tax or of agency costs, but rational and forward-looking agents that choose how much cash will be "trapped" in the future (at least in terms of expected value). Rather than viewing the accumulation of large amounts of foreign cash as an exogenous event that generates agency costs, one might view this accumulation as a conscious choice that tends to be made precisely when agency and incentive-alignment problems have been solved or mitigated.[18]

Finally, a potential caveat to Proposition 2 (with respect to US national welfare) is that we have assumed that the US places equal weight on the MNC's after-tax profits and on revenue from the repatriation and GILTI taxes. In principle, it is possible that if tax revenue is socially very valuable, then the welfare loss from lower foreign activity following the TCJA may be offset by the social value of the increased revenue from the GILTI tax. Note, however, that the projected

[17] Feld et al. (2016) also question the interpretation of the results in Hanlon, Lester and Verdi (2015), pointing out that the results are also "consistent with a generally impeding effect of repatriation taxes on foreign acquisitions which is moderated by the current state of foreign capital stock in the set of all U.S. firms. In fact, if there was no threat of ending up in a position with locked-out cash, it is not clear how an impeding effect of repatriation taxes on foreign investment would come about" (pp. 18-19).

[18] Olson (2021) provides some evidence that may be broadly consistent with this perspective. He finds that following the 2017 reform, US MNCs with lower inferred agency costs (based on the presence of institutional investors with the incentive and ability to monitor) were less likely to repatriate foreign cash and repurchase shares. This suggests that, while agency costs are important, firms strategically anticipate and respond to them in ways that mitigate their effects.

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revenue from the GILTI tax is very modest in relation to aggregate tax collections, making such a scenario seem unlikely.[19]

Moreover, it is possible to articulate a contrary intuition along the following lines. Consider a scenario in which a strictly positive capital income tax is socially optimal, as in some models developed within the "New Dynamic Public Finance" literature (e.g., Golosov, Tsyvinsky and Werning, 2006). This typically entails a general capital income tax on individuals' returns from savings (including dividends and capital gains from all firms, US MNCs, non-US MNCs and domestic-only firms alike). Suppose that there exists in addition a tax on firms' foreign income that reduces foreign activity. To be sure, in this world there would (and should) be some distortion to firms' activities – both domestic and foreign – at the social planner's optimum because the normal return to capital is taxed. Even so, we can imagine a welfare gain from eliminating the additional distortion to foreign activity from the special tax and increasing the general capital income tax rate correspondingly. Of course, this is at a rather high level of abstraction, but it is arguable that the repatriation and GILTI taxes are best conceptualized along these lines.

5) A Survey of the Evidence

About five years have elapsed since the enactment of the 2017 reforms. This has proven to be sufficient time for the relevant data to become available and for researchers to produce a substantial body of work analyzing the impact of the reforms on various important outcomes. While much of this emerging literature is not yet published, it is an opportune time to take stock of the findings so far, in view of the ongoing multilateral OECD/G-20-led reform process that is related in many ways to the 2017 US reforms. Moreover, the COVID-19 pandemic created radically different conditions from 2020 onwards, implying that 2018 and 2019 are likely to prove to be the only available years over which the effects of the 2017 reforms can be analyzed without significant confounding factors being operative. Research on the effects of the reform will undoubtedly continue to be produced, but it is unlikely that additional useful data will emerge in the future.

[19] The Joint Committee on Taxation (JCT) forecast a modest revenue impact of the TCJA's international provisions, raising $32 billion per year over 10-year horizon (see: https://www.jct.gov/publications/2017/jcx-67-17/). In contrast, the TCJA in its entirety was estimated to create a $1.5 trillion revenue loss over a 10-year horizon. It is highly unlikely that policymakers who believed revenue to be socially very valuable at the margin would enact a reform that would, overall, generate such a large revenue loss.

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The survey below on the empirical literature on the effects of the international provisions of the TCJA focuses on a set of five major findings that are quite robust across different studies, using a variety of datasets and empirical approaches. This robustness allays concerns associated with the relatively limited span of useful data, and with respect to the possibility that future research may overturn these findings. Of these findings, the first two that are described below correspond very closely to the set of sufficient conditions derived in Proposition 2 for an unambiguous reduction in both US national welfare and global welfare from the 2017 reform. The other findings reinforce the central narrative regarding the costs of the 2017 reforms, and provide a broader perspective on the effects of the TCJA on cross-border economic activity.

5.1) The Impact on Cross-Border Acquisitions by US MNCs

Prior to the TCJA, a robust literature examined the effects of taxation on cross-border acquisitions, with a particular focus on the effects of the repatriation tax imposed by the US and by certain other countries, including the UK and Japan until 2009 (e.g., Huizinga and Voget, 2009; Voget, 2011; Feld et al., 2016). Since the TCJA, this literature has been extended to shed light on the impact of the TCJA on cross-border acquisitions by US MNCs.

Amberger and Robinson (2021) use data on cross-border acquisitions over the 2011-2019 period (spanning the TCJA) from the Zephyr database provided by the Bureau van Dijk. Their dataset consists of 3266 target firms located in 46 different countries. The basic empirical approach is a linear probability model that regresses an indicator for the acquirer being US-based on an indicator for the post-TCJA period (2018-2019), along with various target firm characteristics and target country and target industry fixed effects. In essence, this approach tests whether, conditional on a firm being acquired, it is more or less likely that the acquirer is US-based (rather than non-US-based) following the TCJA. Their main result is that targets of cross-border acquisitions are less likely to be acquired by US MNCs following the TCJA. The authors interpret this finding as being potentially value-enhancing in a presumed setting where there was excessive foreign investment prior to the TCJA (as in Albertus, Glover, and Levine (2022)). However, in the light of the model in Section 3 with rational, forward-looking US parent firms (and in particular Proposition 2), this result may be better interpreted as indicating that the TCJA was welfare-decreasing.

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A secondary result in Amberger and Robinson (2021) - that US acquirers with little foreign presence prior to the TCJA increased their acquisitions – may appear contrary to this interpretation. However, it can perhaps be explained in terms of an increase in after-tax cash flows due to the TCJA's corporate tax rate reduction (especially for firms that are financially constrained), rather than to the TCJA's international provisions lowering the US tax burden on foreign activity.

Atwood et al. (2020) use data over 2010-2019 on the universe of US firms (both MNCs and non-MNCs) from Compustat. This is merged this with acquisitions data from the Securities Data Company (SDC) database provide by Refinitiv. In particular, they focus on whether a US firm in a particular year made an acquisition announcement that appears in the SDC data. Their empirical approach uses a probit model of the probability that a US firm announces a foreign acquisition in a given year.[20] The variable of interest is an interaction between an indicator for being an MNC and an indicator for the post-TCJA period, with controls for time-varying acquirer characteristics. The paper also constructs a measure of the extent to which US MNCs in the sample were subject to repatriation tax prior to the TCJA; this is inferred using data on foreign effective tax rates and other variables. In the analysis, MNCs are divided into those that faced higher and lower repatriation tax burdens pre-TCJA.

The main result of relevance for our purposes is that the overall impact of the TCJA on the probability of a US firm making a foreign acquisition was negative, across different categories of firms facing different repatriation tax burdens prior to the TCJA (see in particular Table 6, Panel A, Column 2). This decline is particularly marked for firms that were inferred to face no significant repatriation taxes prior to the TCJA. The effect is mitigated for firms that faced higher repatriation taxes prior to the TCJA. This pattern of findings implies a general decline in US acquisitions after the TCJA, with the weaker finding for firms with higher repatriation taxes being broadly consistent with the framework in Section 3. In particular, the more burdensome the repatriation tax, the less a US parent would invest ex ante, implying a smaller decrease post-TCJA.

Dunker, Overesch and Pflitsch (2021) also use data over 2010-2019 from the SDC database provide by Refinitiv. They collect a sample of 8,598 cross-border acquisitions (excluding those with US targets), of which 873 have US-based acquirers. They conduct an analysis of US acquirers' share of the global sample of cross-border acquisitions. Specifically, they estimate a logit model of an indicator for an acquirer being a US MNC (rather than a non-US MNC) on a

[20] The paper also analyzes domestic acquisitions, but these are less relevant for our purposes.

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post-TCJA indicator and a variety of deal and target characteristics and industry fixed effects. Their point estimates (see Table 5) show that the overall probability of a cross-border acquirer being US-based fell after the TCJA, although the decline is not statistically significant. However, under the circumstances where we might expect the TCJA reforms to matter most – i.e., where the target is located in a country with a corporate tax rate below the sample median and where the US MNC is inferred (based on its worldwide foreign effective tax rate and on proxies for excess returns) to be likely to be subject to the GILTI provision – there is a statistically significant decline in the probability of a cross-border acquirer being US-based.[21]

The results in Dunker, Overesch and Pflitsch (2021) are thus basically consistent with those of the other papers. They also find a weaker result – that is not generally statistically significant – that acquisitions by US MNCs not inferred to be subject to the GILTI tax increased. Arguably, such an effect – if it indeed exists - would be consistent with the UK and Japanese evidence following their 2009 territorial reforms that did not include a GILTI-like provision (e.g. Feld et al., 2016). It may also suggest the impact of a hypothetical US territorial reform that more closely mirrored the UK and Japanese reforms.[22]

The general finding of a decline in US MNCs' cross-border acquisitions after the TCJA, especially of targets in lower-tax jurisdictions (i.e., those with below-median tax rates) appears to robust across a variety of approaches. These include analyses that estimate the post-TCJA change in the likelihood that the acquirer in a global sample of cross-border acquisitions is a US MNC (Amberger and Robinson, 2021; Dunker, Overesch and Pflitsch, 2021) and those that use a sample of US firms to estimate the post-TCJA change in the likelihood that a firm announces a foreign acquisition (Atwood et al., 2020). Importantly, these findings – based on a difference-in-difference approach with a clearly defined control group – suggest that raw descriptive statistics about the number of US outbound acquisitions in 2018 or the volume of US outbound FDI may be

[21] Pflitsch (2022) analyzes market reactions to the announcement of cross-border acquisitions with US acquirers before and after the TCJA. He finds that announcements returns are lower post-TCJA. This finding is not straightforward to interpret within the conceptual framework developed here, nor is it easy to reconcile with the consensus result in the literature that US acquisitions fell after the TCJA. However, it appears to rest on an unconventional interpretation of market reactions – as embodying the degree of dissatisfaction of investors with managerial policies – rather than as reflecting changes in fundamental market value.

[22] Spencer (2022) constructs a heterogenous firm model in which firms endogenously decide whether to export or undertake FDI, and analyzes the impact of the abolition of the US repatriation tax on simulations of domestic US outcomes such as the incentives for firm entry and growth. However, the model completely ignores the GILTI tax and its impact. Thus, its results can, at best, be interpreted as shedding light on the consequences of a hypothetical US "pure" territorial reform that resembles the UK and Japanese reforms.

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misleading. For instance, Carroll, Mackie, and Pizzola document a substantial increase in the volume of cross-border acquisitions by US firms in 2018, though they caution that this should not necessarily be attributed to the TCJA.[23] Spencer (2022) reports aggregate Bureau of Economic Analysis (BEA) data suggesting an increase in US outbound FDI in 2018. Such raw numbers may, however, lead us astray in the absence of a control group, fixed effects, and control variables.

The magnitude of the decline in foreign acquisitions can most readily be interpreted in the light of the prior work of Feld et al. (2016) and the estimates from the linear probability model of Amberger and Robinson (2021, Table 2). Feld et al. (2016) use data from the Zephyr database provided by the Bureau van Dijk on all cross-border acquisitions among firms in OECD countries over 2004-2013 (with 341,719 observations). They apply a mixed logit approach to analyze the impact of repatriation taxes, using the variation generated by reforms in the UK, Japan, and New Zealand that abolished these countries' repatriation taxes. In their (pre-TCJA) data, the baseline probability of a cross-border acquirer being a US MNC is 0.3438. Based on their regression results, they estimate that the abolition of the US repatriation tax would increase this probability by 11% to 0.3816. This corresponds to an increase of $12.7 billion per year in deal value. Using simulations of the synergy value associated with acquisitions (see Feld et al. (2016, pp. 11-12)), they find that this increase corresponds to a synergy gain of $537 million per year. In other words, according to this analysis, the US repatriation tax led to synergy losses of $537 million per year.

Amberger and Robinson (2021, Table 2) report post-TCJA declines in the probability of a cross-border acquirer being a US MNC of between 0.035 and 0.06, depending on the specification. Using the strongest specification (column 5, with country-by-industry fixed effects), the estimated decline is 0.035. This corresponds to a decline in the probability of a cross-border acquirer being a US MNC from the pre-TCJA Feld et al. (2016) baseline of 0.3438 to 0.3088 (a decline of 10.2%, i.e., a reduction in deal value of $11.8 billion per year). Assuming the same ratio of synergy losses to deal value as in Feld et al. (2016), the TCJA generates an additional $498 million per year in synergy losses (i.e., a 93% increase in annual synergy losses from $537 million pre-TCJA to $1.035 billion after the TCJA). As illustrated in Figure 6, the estimates in the literature thus suggest that the TCJA nearly doubled the synergy losses associated with US taxation of US MNCs' foreign activity.

[23] See: https://www.bloomberglaw.com/product/tax/document/XDD5OEO0000000?bna_news_filter=daily-tax-report&jcsearch=BNA%252000000169da66de1eaff9ffe66b250000#jcite

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5.2) The Impact on Investment in Routine Foreign Tangible Assets by US MNCs

An exception to the pattern of reduced US investment abroad post-TCJA is provided by the acquisition of routine tangible assets (and capital expenditures generating such assets). Atwood et al. (2020) find an overall decrease in the probability of US firms making foreign acquisitions after the TCJA (as described above); however, they also find an increase in foreign acquisitions for a subset of US firms with high inferred repatriation tax burdens. This latter effect is stronger for firms with GILTI inclusions. Moreover, targets' return on tangible assets is lower for acquisitions by US MNCs with GILTI inclusions. Thus, Atwood et al (2020) interpret this increase in foreign acquisitions for a subset of their sample that is most likely to be subject to the GILTI tax as being induced by the GILTI tax provision that allows a deduction for a 10% presumptive return on tangible foreign assets. That is, increased investment in routine foreign tangible assets appears (as implied in the model in Section 3) to be motivated by the desire to shield income from the GILTI tax.

Along similar lines, Beyer at al. (2022) find an increase in foreign – but not domestic – capital expenditures among firms more likely to be subject to the GILTI tax. They use Compustat data on US MNCs, combined with hand-collected data on foreign and domestic net property, plant, and equipment (PPE) for fiscal years ending during the 2015-2018 period (the latter data allows for the computation of changes in net foreign PPE over a period spanning the TCJA). The paper takes the view that investment in foreign PPE is typically financed internally using foreign cash holdings. Thus, the empirical approach involves regressing foreign capital expenditures on a post-TCJA indicator and an interaction between the post-TCJA indicator and foreign cash holdings (and various control variables).

Beyer et al. (2022) find that US MNCs that are likely to be subject to the GILTI provision and that have larger foreign cash holdings increase foreign capital expenditures but do not increase domestic (US) capital expenditures. They interpret this result as indicating a response (presumably unintended by policymakers) to the GILTI tax provision that allows a deduction for a 10% presumptive return on tangible foreign assets. This, too, is consistent with the model in Section 3.3 and the discussion in Dharmapala (2018). Within the framework in Section 3 (and in particular with reference to Proposition 2), an increase in investment in routine foreign tangible assets would be expected to reinforce the decline in US national welfare and global welfare due to the decline in US MNCs' acquisitions of (non-routine) foreign firms.

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5.3) The Impact on Profit Shifting Activity by US MNCs

The literature to date has not found unambiguous evidence of a reduction in profit shifting activity by US MNCs following the TCJA. Garcia-Bernardo, Jansky and Zucman (2022) combine a variety of data sources, including firms' financial statement data from Compustat, country-by-country tax reports, and aggregate BEA data. They describe the resulting locational patterns of US MNCs' reported profits before and after the TCJA, concluding that the share of US MNCs' income reported in tax haven jurisdictions remained relatively stable over time, notwithstanding the enactment of the TCJA (Clausing (2020) also finds a relatively stable share in havens). However, Garcia-Bernardo, Jansky and Zucman (2022) find a decline of about 3 to 5 percentage points in the foreign share of US MNCs' profits; the baseline foreign share of US MNCs' profits before the TCJA varies across their data sources, but is generally around 40%. Garcia-Bernardo, Jansky and Zucman (2022) concede that this descriptive evidence does not constitute causal evidence of an effect of the TCJA. Due to other contemporaneous changes, they note (p. 15) that "the observed decline in the foreign income share of US companies should probably be seen as an upper bound for the effect of the Tax Cuts and Jobs Act."

Even assuming that the reduction in the foreign share is entirely due to a decline in profit shifting, however, the magnitude is smaller than would be expected from the TCJA's substantial corporate tax rate reduction (from 35% to 21%). Standard estimates in the profit shifting literature suggest a semi-elasticity of reported profit with respect to the tax rate differential across countries of 0.8 (see in particular the survey by Dharmapala (2014)). This entails that a 14 percentage point decrease in the tax rate difference between the US parent and its foreign affiliate (due to a tax cut in the US from 35% to 21%) would increase profits reported in the US by about 11% (e.g., from $100,000 to $111,000). A more recent meta-regression analysis (Beer, de Mooij and Liu, 2020) finds a somewhat larger semi-elasticity of 1 (implying an increase in profits reported in the US of 14%). To place the post-TCJA increase in US reported profits in context, assume that a US MNC reported 60% of its profits in the US before the TCJA. Then, a 3 to 5 percentage point increase in US reported profits implies an increase of 5% to 8%, considerably below the expected 11% increase due to the tax rate cut (and even further below this when using the higher semi-elasticity in Beer, de Mooij and Liu (2020)).[24]

[24] These semi-elasticities are derived from a log-linear specification (see Dharmapala (2014)). Dowd, Landefeld and Moore (2017) use a quadratic specification and argue that the log-linear approach tends to underestimate

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Thus, even the upper bound on the decline in profit shifting post-TCJA can be attributed entirely to the TCJA's tax rate reduction. This leaves little role for the international provisions proper (such as the GILTI tax) to play any role in reducing profit shifting. This point is important in understanding the consequences of the TCJA's international provisions. In particular, it casts doubt on the possibility that the TCJA's international provisions proper – such as the transition from the repatriation tax to the GILTI regime - may have generated revenue gains or other benefits from reduced profit shifting that might offset the welfare loss from reduced foreign activity by US MNCs. Of course, this conclusion is provisional in the sense that changes in profit shifting may be delayed due to lags in adjusting tax planning structures and strategies. Note, though, that a decline in profit shifting for US MNCs that is not matched by similar declines for non-US MNCs would potentially exacerbate ownership distortions and synergy losses. A multilateral approach to implementing a minimum tax on MNCs (as in the Pillar Two proposal, in contrast to the unilateral approach of the TCJA) may, however, mitigate this effect.

5.4) The Impact on the Market Value of US MNCs

If the GILTI tax imposes a greater burden on US MNCs than did the prior repatriation tax (as suggested by Dharmapala (2018) in certain circumstances, and consistent with the decline in US MNCs' foreign activity found in the empirical literature), then we might expect that it would lead to a decline in the market value of US MNCs. There is indeed considerable evidence that the TCJA reduced the value of US MNCs relative to US domestic firms. However, there are a number of potential confounding factors. For instance, the TCJA included other international tax provisions, such as a one-time tax on previously accumulated foreign cash holdings, that may also have reduced the value of US MNCs. On the other hand, the reduction in the corporate tax rate (on US MNCs' US operations) may have offset the decline in overall value due to the changes in international tax provisions.

Wagner, Zeckhauser, and Ziegler (2018) study stock market reactions to events associated with the legislative events in late 2017 that led to the enactment of the TCJA. They find substantial

(overestimate) responsiveness when the initial tax rate is high (low). Thus, it is possible that standard semi-elasticities entail too large a response for a tax rate reduction from 35%. However, using the estimate in Dowd, Landefeld and Moore (2017, p. 11) that "under the quadratic specification, a change in the tax rate from . . . 30% to 29% results in a 0.7% increase in profits" would imply an increase of nearly 10% in US reported profits, which is also substantially larger than what is observed.

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negative market reactions for US MNCs (relative to domestic US firms) during these events. As they note: "The House vote began a slide for multinationals relative to domestically focused companies. This may seem surprising, as the shift to territorial taxation should, ceteris paribus, help multinationals. However, this ceteris lost its paribus . . . from the House vote until passage, stock of internationally oriented companies were major relative losers." (p. 593).

In principle, this reaction may be due to the one-time tax on previously accumulated foreign cash holdings that formed part of the TCJA (and that is not expected to be an ongoing policy that would affect the future behavior of US MNCs). However, Kalcheva et al. (2020) provide evidence that the negative reaction is not primarily attributable to the one-time tax, but rather to ongoing features of the TCJA regime such as the GILTI tax. Their analysis finds (like that of Wagner, Zeckhauser, and Ziegler (2018)) that there was an overall decline in the relative value of US MNCs. In addition, they test whether MNCs' negative abnormal returns on days of TCJA-related legislative events are related to firms' unrepatriated earnings held abroad as cash (and subject to the one-time tax on unrepatriated earnings). Regressing the abnormal returns on measures of unrepatriated earnings (and other relevant variables), they find that MNCs continue to have negative abnormal returns. That is, the one-time tax on foreign cash holdings does not seem to explain the negative impact of the TCJA on the market value of US MNCs. Overall, these market reactions reinforce the conclusion from the findings described in Section 5.1 that US MNCs face increased US tax burdens on foreign activity under the TCJA, relative to those under the pre-TCJA system.

Evidence supportive of these event study results comes from financial statement measures of effective tax rates. Using Compustat data over 1995-2019, Dyreng et al. (2020) find substantial decreases in US firms' effective tax rates – as computed using financial statement data – after the TCJA. These decreases, however, are much larger for US domestic firms relative to US MNCs. Moreover, the reductions for US MNCs are due to decreases in the tax burden on their domestic (US) operations, not to a reduced US tax burden on their foreign income. These findings complement the evidence on market reactions.

In principle, the efficiency implications of a decline in the value of MNCs relative to domestic-only firms may be ambiguous, in particular if MNCs were tax-favored prior to the TCJA. However, Dyreng et al. (2020, Figure 2) show that the pre-TCJA ETRs for US domestic-only firms were very similar to (and by some measures even lower than) the ETRs for US MNCs. Thus, the

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decline in the value of MNCs relative to domestic-only firms can perhaps be best understood as reflecting the creation or aggravation of an inefficiency rather than the correction of a prior distortion.

5.5) The Impact on Investment and Wages

Prior to the enactment of the TCJA, proponents claimed that it would greatly increase investment in the US (by US and non-US firms) and increase the wages of US workers. The effects of the TCJA on investment and wages (and various other outcomes) are documented in Gale and Haldeman (2021) using aggregate data for 2018-2019. While there was a surge in repatriations following the TCJA's abolition of the repatriation tax, the evidence suggests that these repatriations led to a large increase in share repurchases while having little discernible impact on domestic investment. This conclusion is quite unsurprising in the light of prior evidence from the repatriation tax holiday included in the American Job Creation Act of 2004 (e.g. Blouin and Krull, 2009; Dharmapala, Foley and Forbes, 2011)).

Overall investment grew after the TCJA, but Gale and Haldeman (2021) argue that this growth can be entirely accounted for by pre-existing trends in aggregate demand, oil prices, and other economic conditions. There are some contrary findings in the literature, however. Crawford and Markarian (2022) compare the capital expenditures of US and Canadian firms after the TCJA, finding an increase for the former relative to the latter. Note that even if US firms' domestic capital expenditures increased, this may be due to the effect of the TCJA's tax rate reduction (for instance, via an easing of financial constraints), rather than to its international provisions per se. Gale and Haldeman (2021) also argue that there is no evidence that the TCJA had any impact on the wages of US workers.

In the context of cross-border activity, it is particularly noteworthy that there appears to have been no detectable increase in inbound FDI to the US (e.g., Matheson et al., 2022). In view of the very large reduction in the US statutory corporate tax rate under the TCJA, there appears to be a very large amount of "missing" inbound FDI, relative to what might be expected based on standard estimates of the responsiveness of FDI to tax rates. The meta-study by de Mooij and Ederveen (2008, Table 3, p. 694) reports a semi-elasticity of FDI of -2.4 with respect to the statutory tax rate. This implies that a 14 percentage point reduction in the statutory tax rate (from

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35% to 21%) would yield about a one third increase in inbound FDI into the US. Yet, the actual response appears to have been essentially zero.

Explaining this puzzle of "missing" inbound FDI presents a challenge for future research (although there are several potential explanations that have been canvassed – see e.g., Matheson et al. (2022)). For our purposes, these facts are primarily relevant in that they suggest that there are no offsetting beneficial effects of the TCJA that might potentially outweigh the welfare loss from reduced foreign activity by US MNCs. Of course, even if domestic US investment and wages had risen, this would not necessarily imply a welfare gain – investment may be inefficiently high, while wage increases may reflect rent-sharing by firms with market power.

6) Conclusion

The 2017 US tax reform (the TCJA) fundamentally transformed the US system of international taxation. Even though a considerable body of empirical evidence has emerged analyzing the impact of the international provisions of the TCJA, the welfare consequences of these provisions remain unclear. This paper develops a simple conceptual framework that synthesizes and extends the theory of multinational corporations' (MNCs') responses to taxation. The conceptual framework focuses on the efficiency costs of ownership distortions in analyzing the impact of the GILTI tax and the prior repatriation tax on foreign acquisitions by US MNCs. It enables straightforward comparisons of the welfare effects of the two regimes. In particular, the paper derives a set of sufficient conditions under which changes in US MNCs' foreign activity in response to the TCJA imply an unambiguous reduction in both US national welfare and global welfare.

The paper also surveys the emerging empirical evidence on the consequences of the TCJA's international provisions, in the light of this conceptual framework. Drawing on this empirical literature, the paper documents five robust findings: the TCJA led to a general decline in US MNCs' foreign acquisitions, increased US MNCs' investment in routine foreign tangible assets, led (at most) to a decline in profit shifting to the extent expected from the TCJA's tax rate reduction (suggesting no impact of its international provisions per se), reduced the market value of US MNCs relative to domestic US firms, and had no detectable impact on domestic US investment and wages. The first two of these findings correspond closely to the model's sufficient conditions for an unambiguous decline in US and global welfare, while the other findings reinforce

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this conclusion in various ways. An illustrative calculation based on the magnitude of the post-TCJA decline in US MNCs' foreign acquisitions suggests that the TCJA nearly doubled the synergy losses associated with US taxation of US MNCs' foreign activity.

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Figure 1: Timing

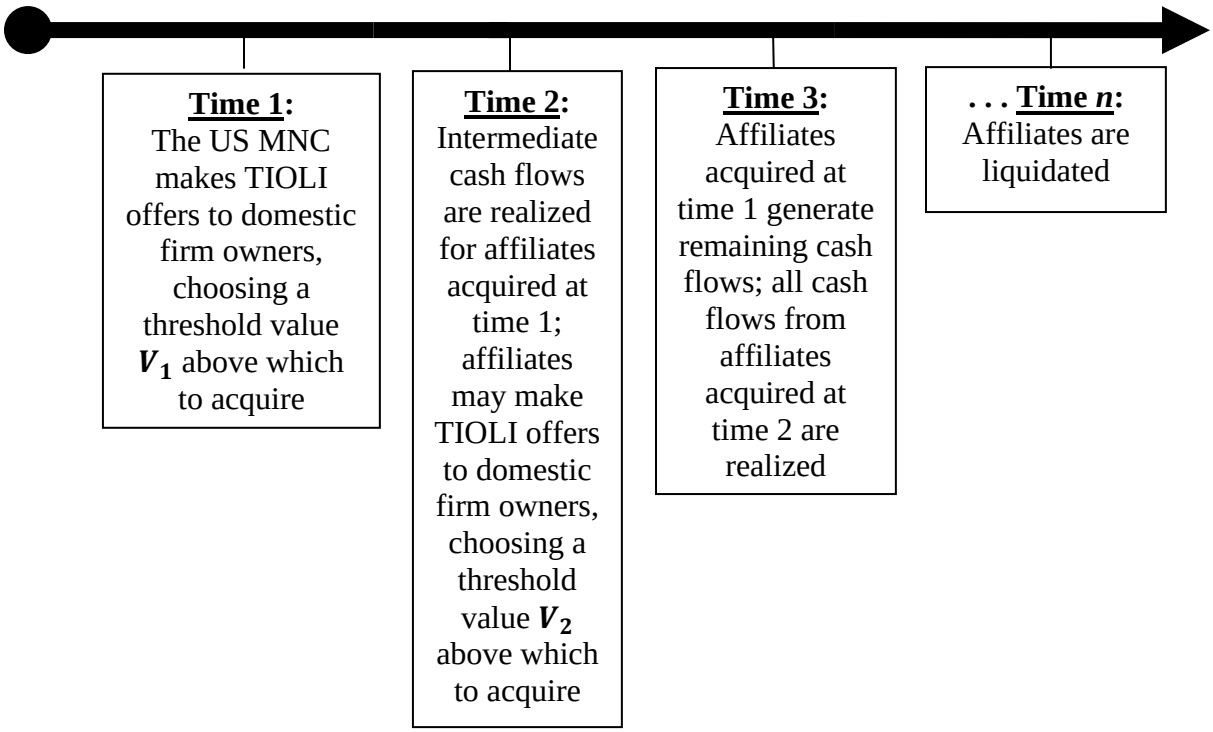

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Figure 2:

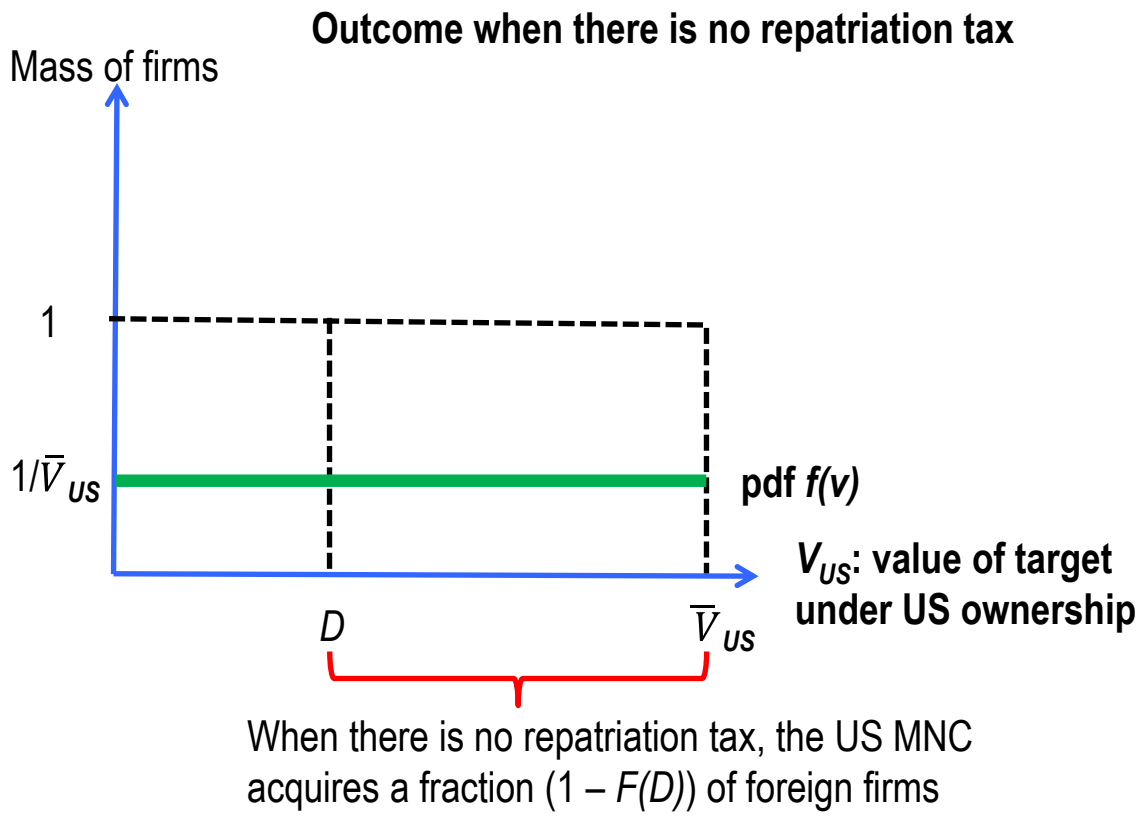

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Figure 3:

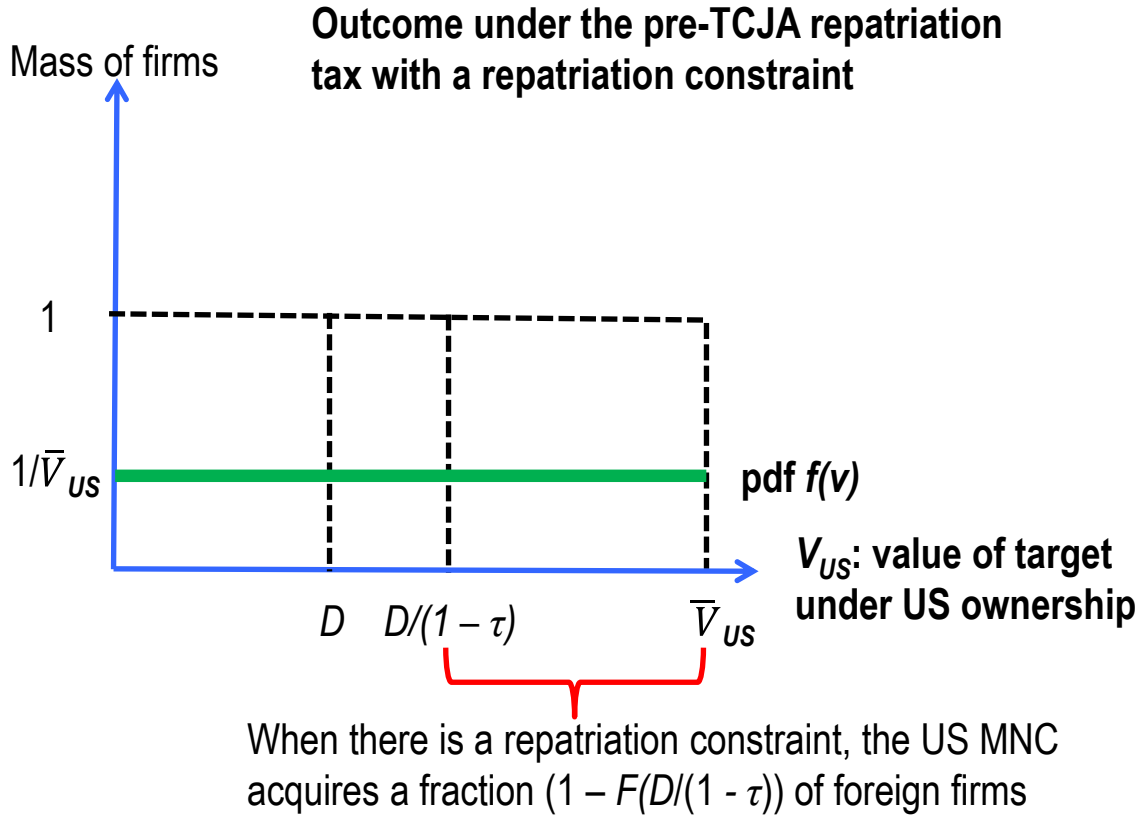

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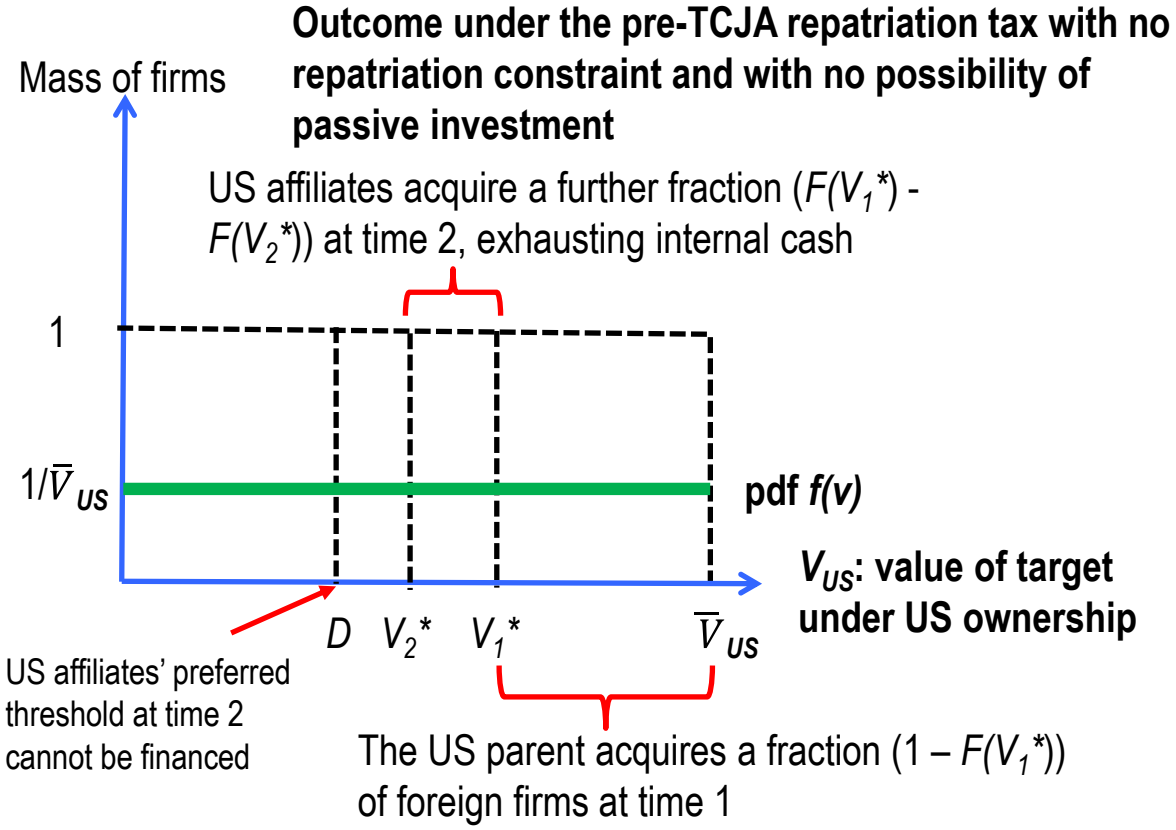
Figure 4:



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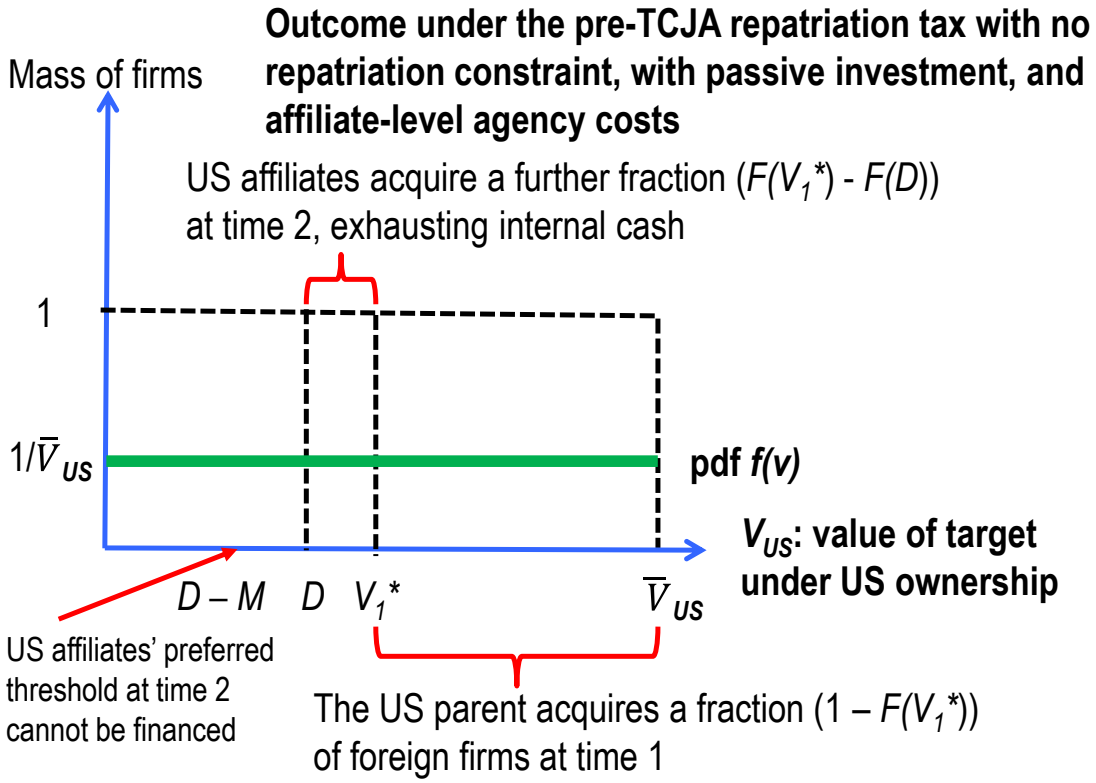

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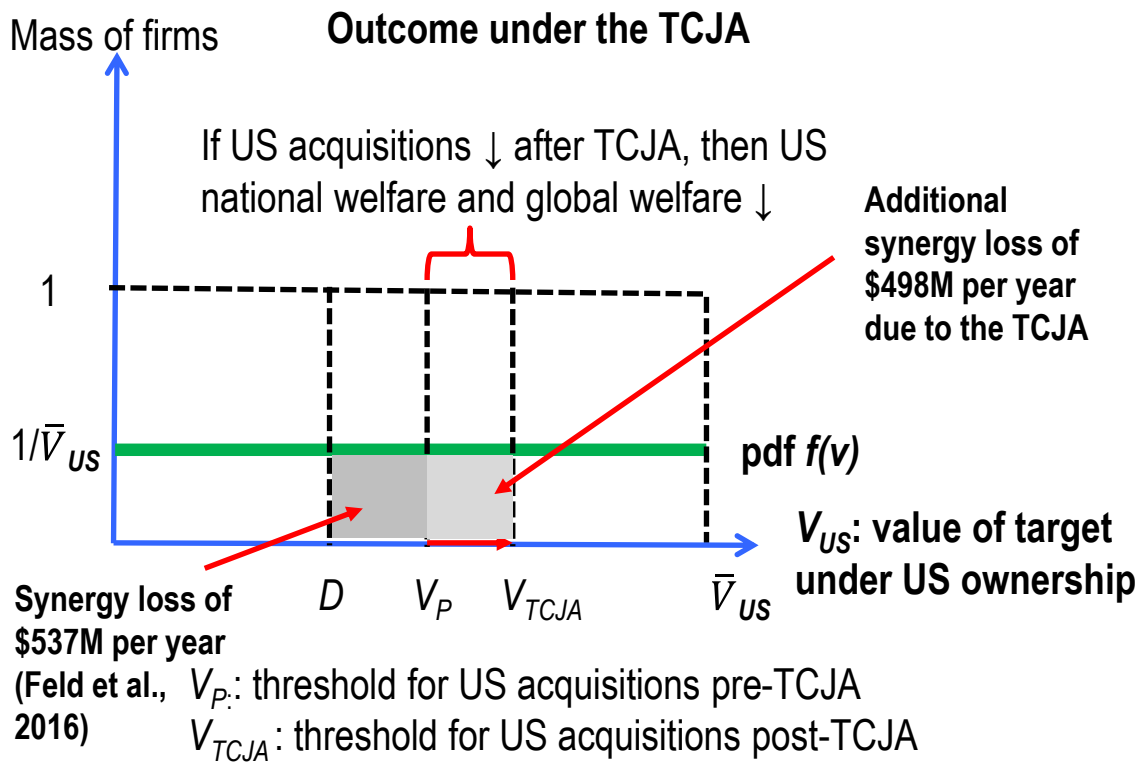
Figure 6:



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Appendix: Proofs of Propositions

Proof of Proposition 1: Rearranging the expression in Condition 1 implies:

$$(1 - F(V^+))Y(1 + r) = D(1 + r)(F(V^+) - F(D)) \quad \text{(A1)}$$

The LHS represents the earnings at time 2 of affiliates acquired at time 1. The RHS represents the cost of acquisitions made at time 2. Equation (A1) is essentially a generalization of Equation (6) for a general cdf.

Suppose that $\hat{V}_{2P} \geq D$ and $\hat{V}_{2A} \geq D$. Then, $V_2^* \geq D$ follows directly, regardless whether the parent or the affiliates choose V_2.

Suppose that $\hat{V}_{2P} \geq D$ and $\hat{V}_{2A} < D$. Then, Equation (A1) implies that the parent can implement $V_2^* = D$ by setting $V_1 = V^+$ (noting that the constraint in Equation (A1) is satisfied for $V_1 = V^+$ when Condition 1 holds, and that setting $V_1 = V^+$ ensures that only acquisitions up to $V_2 = D$ can be financed by the affiliates at time 2). Thus, $V_2^* = D$.

Therefore, under the assumptions stated in Proposition 1, $V_2^* \geq D$.

Proof of Proposition 2: From Equation (20), it is possible to express W_{US}^P as:

$$W_{US}^P = \int_{V^P}^{V^{TCJA}} (v - D)f(v)dv + \int_{V^{TCJA}}^{\bar{V}_{US}} (v - D)f(v)dv \quad \text{(A2)}$$

$V^P \geq D > 0$ by Proposition 1, $V^{TCJA} > V^P > 0$ by assumption, $(v - D) \geq 0$ and $(v - D)f(v) > 0$ for some *v* by the assumption stated in Proposition 2. Thus, the first term is > 0. It follows that:

$$W_{US}^P > \int_{V^{TCJA}}^{\bar{V}_{US}} (v - D)f(v)dv \quad \text{(A3)}$$

Moreover, from Equation (19) and because $r(\bar{R} - x)g(x) \geq 0$:

$$\int_{R^{TCJA}}^{\bar{R}} r(\bar{R} - x)g(x)dx \geq 0 \quad \text{(A4)}$$

Thus, from Equation (21):

$$W_{US}^P > \int_{V^{TCJA}}^{\bar{V}_{US}} (v - D)f(v)dv \geq W_{US}^{TCJA} \quad \text{(A5)}$$

Thus, $W_{US}^P > W_{US}^{TCJA}$.

Analogous arguments can be used to establish that $W_{Global}^{TCJA} < W_{Global}^P$.

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