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Technical Note on Estimating the Overall Effect of Corporate Tax Reforms

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Introduction

Corporate taxation remains a contentious issue among policymakers. Some assert that corporate taxes potentially discourage investment and should, therefore, be minimized. Conversely, other policymakers contend that the negative impacts on growth are frequently overstated. The latter group highlights the significance of corporate taxes in revenue generation and their role in maintaining the progressivity of the tax system in an unequal economy.

The recent debate about corporate taxes initially unfolded in 2017, preceding the approval of the Tax Cuts and Jobs Act (TCJA), and it is now reigniting. President Biden's budget proposal to partially reverse the permanent corporate tax cut implemented by the TCJA has been followed by recent reports indicating that GOP legislators and some economic advisors from former President Trump are contemplating further corporate tax reductions. Due to the need for revenue, many commentators anticipate that in 2025, with the expiration of the TCJA's temporary income tax provisions, the corporate tax discussion will be reopened.

In this context, several recent papers have been circulated examining the economic impacts of the TCJA. One paper has received special attention due to the comprehensiveness of its analysis and the quality of its data, and it has contributed to shaping the terms of the debate: Chodorow-Reich et al. (2023). At a high level, the paper finds that the TCJA boosted investment and had a positive effect on wages. In particular, the paper argues that both the cut in the statutory tax rate and the increase in investment subsidies that came with the TCJA were effective at stimulating corporate investment.

This paper has been leveraged by those who oppose any increase in corporate taxes, as evidenced by a recent oped by Kevin Brady and Douglas Holtz-Eakin, among several others. Unfortunately, many of these references selectively highlight certain results, typically those related to the investment result, while disregarding or minimizing the important caveat that the dynamic revenue effect was small despite the positive impact on investment. The latter finding is also crucial for a comprehensive cost-benefit analysis of future corporate tax reforms.

More understandably, given the length and complexity of this research, much of the policy discussion surrounding this and related papers often conflates results derived from microdata with results obtained from macro models. For instance, in Chodorow-Reich et al. (2023), the findings from micro, firm-level data are complemented by a macro model to calculate dynamic aggregate effects. While they are necessary for a comprehensive analysis of major reforms like the TCJA, macro models rely on specific assumptions and transmission mechanisms that can significantly influence the aggregate results. These assumptions are worth examining for a better understanding of a paper that has important policy implications.

The purpose of this technical note is to provide a high-level overview of the approach and main results in Chodorow-Reich et al. (2023) and to delve into some possible limitations, mostly focusing on the aggregate results. The note is addressed to policymakers and other non-academics interested in the imminent tax policy debate. Beyond the specifics of this paper, we believe this comment could be valuable for broader tax policy discussions.[1]

[1] Any errors in the interpretation of the methodology and results of this paper are the responsibility of the authors of this note, not the authors of the original paper.

Approach and Main Findings

As noted above, Chodorow-Reich et al. (2023) approaches the analysis of the TCJA in two parts: First, the authors use microdata to estimate the differential effect of the reform, comparing firms that were more affected by the TCJA with firms that were less affected. Second, the authors estimate the macro impact of the TCJA using a macro general equilibrium model.

Micro estimates

The empirical strategy that Chodorow-Reich et al. (2023) employ is the following. Using a panel of mid-size and large C-corporation tax returns, the authors compute firm-level effective tax rates and investment subsidies both before and after the TCJA. The purpose is to analyze the effect of changes in effective tax rates and subsidies on investment. Although the TCJA was a corporate tax reform across the board (e.g., the statutory tax rate decreased from 35% to 21%, and full expensing of equipment became applicable to most firms), there was some heterogeneity across firms in the changes of effective tax rates and investment subsidies due to differences in deductions, credits, and other pre-TCJA circumstances. The authors exploit this heterogeneity to estimate the differential effect of the reform across firms. If firms that benefited most from the reduction in the tax rate or the increase in subsidies had a stronger investment response, one could conclude that the TCJA had positive effects on investment.

Two important results emerge from this analysis: First, both the reduction in the corporate rate and full expensing of investment stimulated domestic investment. In particular, firms with the mean tax change increased investment by 20% relative to firms experiencing no change. Second, domestic investment of firms with international operations responded positively to the 10% deduction in the GILTI tax. According to the authors, the response of domestic investment to this foreign investment subsidy indicates complementarity between domestic and foreign capital.

Macro estimates

To compute aggregate effects, the authors expand their investment model to a general equilibrium setting, where prices can potentially respond to changes in tax policy parameters. Their model assumes an inelastic labor supply, meaning that wages, but not the equilibrium level of employment, respond to changes in labor demand. Additionally, they assume a fixed return to capital, which results in wages being the only factor price that adjusts following a policy change. As we explained below, these assumptions have some implications for the aggregate results.

Using this general equilibrium model, they find the following two results:

- **Effects on aggregate variables**
  - **Physical capital** The long-run effect on domestic physical capital is 7.2%. Roughly half of the increase in capital stock can be attributed to a decrease in marginal effective tax rates, primarily resulting from the reduction in the statutory corporate tax rate. Bonus depreciation (investment subsidies) accounts for nearly a quarter of the impact (assuming no phase-out).

The incentive to accumulate foreign capital due to the GILTI deduction accounts for about a 1% increase in domestic capital, via complementarity between foreign and domestic capital.

  - **Wages** Wages are estimated to rise by approximately 0.9% in the long-run.

- **Effects on tax collections** Due to the increase in capital and labor income, tax collections are expected to rise; however, these additional revenues are mostly offset by the higher depreciation deductions. Consequently, the dynamic feedback from growth has little impact on revenue, which remains close to the mechanical effect of a 41% decline in corporate collections.

Interpreting the Micro Estimates

Typically, micro estimates like those in Chodorow-Reich et al. (2023) are precise because they rely on firm-level data and are based on a well-designed identification strategy. Specifically, the results in Chodorow-Reich et al. (2023) seem to be consistent with both standard economic theory and previous findings in the literature: Firms that experienced a larger decline in the cost of capital increased their investment relatively more. The domestic impact of subsidies on foreign investment is large, but the authors cite previous literature that also finds evidence that is consistent with complementarity between domestic and foreign capital.

It is important to understand that such micro estimates can only provide information about how a policy reform such as the TCJA affected some firms relative to others. They are silent regarding the aggregate effects of the reform. This is because the regression analysis on which they are based cannot capture the effects of common factors that affect all firms, such as changes in market prices that occur as a consequence of the reform. This is a standard limitation of any regression analysis of this type, and it is what typically motivates the use of general equilibrium models to complement micro empirical results. This limitation might be of particular relevance when evaluating an extensive policy reform. For instance, we might consider the following scenario, which is not implausible following a large tax cut such as the TCJA:

- Imagine a tax reform that introduced a tax break, resulting in corporation A experiencing a larger decrease in effective taxes than corporation B.

- Both firms might respond positively to the tax break by increasing investment. However, micro estimates only capture whether corporation A behaved differently from corporation B. Assuming it did, one can argue that the tax break had a positive effect on investment.

- Now, suppose that, as a result of the tax break, shareholders demanded that both firms distribute some of the additional available resources to them, rather than letting the firms reinvest them. This might represent a common factor affecting all firms that is reflected in change in the market rate of return demanded by investors.

- The micro estimates indicate that the tax breaks stimulated investment, as observed through the differential behavior between corporation A and corporation B. However, simultaneously, both firms may have fewer overall resources available for investment.

- The presence of competing forces, with shareholders reacting in the opposite direction to the direct impact of the tax break, renders the aggregate effect of the reform unknown. Micro estimates inform us about whether firm A actually invested more than firm B, but they fall short of providing conclusive evidence regarding the overall effect of the reform.

To account for the price changes induced by the reform, such as the change in the rate of return described above, economists use general equilibrium models, where the discussion about assumptions becomes highly relevant. Due to the heavy reliance on these assumptions, macro estimates are less precise but still provide valuable insights for evaluating large-scale reforms that impact prices.

Understanding Macro Estimates

The following section discusses three assumptions that may bias the macro findings of papers such as Chodorow-Reich et al. (2023) that likely deserve a more careful examination.

- **Assumptions about the relation between wages and investment**

  In models assuming a standard neoclassical labor market, an increase in capital stock leads to a predicted rise in wages. This happens because higher marginal productivity of labor shifts the labor demand curve upwards. In the general equilibrium model used by Chodorow-Reich et al. (2023), the assumption of an infinitely inelastic labor supply means the entire shift is absorbed by higher wages, leaving the equilibrium level of employment unchanged.

  Under this assumption, the model predicts an increase in domestic wages of about 0.9%. When evaluated at the 2019 level of compensation per full-time equivalent of $\$81,900$, that equates to roughly \$750, as shown in footnote 40 of the paper. Although this estimate is substantially below the range of $\$4,000$ to $\$9,000$ predicted by TCJA proponents before its approval, the general equilibrium feedback of the model relies strongly on this increase, as it significantly mitigates the rise in capital stock. Without this wage increase, the investment response would have been larger. When the authors simulate the model with no wage change (i.e., in partial equilibrium), the predicted increase in domestic capital stock is 12.8% instead of 7.2%. This implies that physical capital would have increased by an additional 5.6 percentage points if wages had remained constant.

  The issue is that other empirical studies show minimal wage changes for workers in the bottom 90% of the income distribution within firms (Kennedy et al., 2023). Consequently, the model's dampening mechanism, which makes the investment figures plausible, is not reflected in the data.

  To reconcile the wage and investment responses, three phenomena, individually or in combination, might be occurring. First, the wage increase may be happening or may have occurred, but it is not yet reflected in empirical results such as those in Kennedy et al. (2023), which use data through 2019. This is a reasonable hypothesis that future research can investigate.

  Second, the increase in capital stock might be boosting labor productivity without affecting wages, with the gains instead being absorbed by higher markdowns, consistent with the increase in profits

and earnings of firm managers and executives, as shown in Kennedy et al. (2023). The relationship between labor productivity and wages is not necessarily one-to-one and can be influenced by factors such as workers' and unions' bargaining power, government policies like minimum wage laws, and economic conditions. These factors affect how productivity gains are distributed between firms and workers. Recent literature has explored the decoupling of wages and productivity. Although this paper does not focus on that issue, analyzing how general equilibrium effects are influenced by reduced-form representations of these factors would be beneficial.

Finally, the increase in investment may not have been as strong as predicted by the general equilibrium model in Chodorow-Reich et al. (2023), leading to no significant impact on wages. The following two assumptions explore this possibility.

- **Assumption about the supply of capital**

  An important assumption of the macro model in Chodorow-Reich et al. (2023) concerns the supply of capital. The authors assume a fixed return to savings, which is equivalent to assuming that the supply of capital is perfectly elastic at the fixed rate of return. In other words, the model assumes that households are willing to supply as much capital as demanded at the fixed rate of return. With this assumption, any changes in investment demand or other factors affecting the capital market are absorbed entirely through changes in quantities of capital rather than returns, which tend to exacerbate the response of investment to any policy change.

  The reason for making this assumption is typically to simplify the theoretical analysis, as it helps avoid the complications arising from variations in rates of return. However, when evaluating the long-term effects of a policy change, using an upward-sloping capital supply curve is more realistic and less extreme than assuming a perfectly elastic supply of savings, particularly when studying large policy changes like the TCJA that most probably have an effect on prices. It is also a feature of overlapping generations (OLG) models, models with a life-cycle component, and models with labor income risk and incomplete markets, which are used to study in optimal taxation in the presence of distributional considerations (Domeij and Heathcote, 2004). Recent papers that study capital accumulation also rely on an upward-sloping capital supply curve, as it is considered an important feature to explain the dynamics of capital stock and capital returns over the last decades (Moll et al., 2022), as well as the evolution of wealth inequality (Hubmer et al., 2021).

  One implication of assuming a fixed return to capital, when combined with perfectly competitive markets, is that the burden of a corporate tax falls mostly on labor. In other words, a model like Chodorow-Reich et al. (2023) assumes that an increase in the corporate tax rate would reduce investment, leading to a decrease in labor productivity and wages, while leaving long-run capital returns unchanged. This view contradicts both the prevailing consensus and empirical evidence on corporate tax incidence (Clausing, 2013). The predominant view among tax policy experts is that a large fraction of the burden of corporate tax is borne by capital (Gravelle and Hungerford, 2007), suggesting that corporate taxes primarily affect long-term profits and returns on capital, rather than labor income.

- **Assumption about perfect competition**

  The difference in assumptions above provides one reason why Chodorow-Reich et al. (2023)'s findings might overstate the aggregate increase in investment. Another assumption that may further challenge their findings is the presence of market power.

  Due to the fact that corporate taxes are levied on profits, and given that market power rents constitute a significant and expanding portion of these profits, understanding market power is crucial in comprehending the impacts of corporate taxation on the economy. In an economy where corporations derive significant market power rents, either from goods and services markets or from the labor market, reducing corporate taxes may lead to different general equilibrium effects compared to textbook competitive economies, such as the one used in this paper.

  In the scenario where market power is absent, such as Chodorow-Reich et al. (2023), corporate taxes might impact the return on capital, thereby exerting a direct effect on investment. However, in a world with market power, tax cuts would mostly be funneled to rents, particularly when cuts in the tax rate come with generous business subsidies, as in the case of the TCJA. In such circumstances, a corporate tax cut would benefit shareholders but have little or no effect on investment. Therefore, this factor might further dampen the investment impact of a corporate tax cut.

Final Comment

Chodorow-Reich et al. (2023) analyzes the effects of the TCJA on corporate investment. The micro estimates are convincing and non-controversial. This note focuses on the macro analysis, which is less convincing and seems to rely on assumptions that to some extent tend to overestimate the effect on aggregate investment. Other aspects of the paper may be important to consider as well; we leave it to others to comment on them.

Overall, the paper fits one of two narratives: In the first, the TCJA had the desired effect on investment but at a high cost in terms of revenue. In the second, we do not observe an aggregate effect on investment – as noted by multiple policy analysts – likely due to other factors that suppressed investment demand. Considering that the macro results on aggregate investment are not the strongest evidence in the paper, and that investment is not an adequate proxy for welfare, as wages and employment are, it seems reasonable to conclude that the distributional and negative revenue effects of the TCJA are too substantial to justify it based on its macro-level impact on investment.

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