

Federal Reserve Bank of Richmond

Macroeconomic Effects of Fiscal Policy

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8:50 AM **Welcome Remarks**

Kartik Athreya, Executive Vice President and Director of Research,
Federal Reserve Bank of Richmond

9:00 AM **The Fiscal Multiplier**

Iourii Manovskii, University of Pennsylvania

10:00 AM **Regional Consumption Responses and the Aggregate Fiscal Multiplier**

Marios Karabarbounis, Federal Reserve Bank of Richmond

11:00 AM **Break**

11:30 AM **High Marginal Tax Rates on the Top 1 Percent?**

Dirk Krueger, University of Pennsylvania

12:30 PM **Lunch**

2:00 PM **The Near-Term Growth Impact of the Tax Cuts and Jobs Act**

Karel Mertens, Federal Reserve Bank of Dallas

3:00 PM **Understanding the Size of the Government Spending Multiplier: It's in the Sign**

Christian Matthes, Federal Reserve Bank of Richmond

4:00 PM **Break**

4:30 PM **Recovery of 1933**

Eric Leeper, University of Virginia

5:30 PM **Reception**

Conference Summary

How does government spending influence the macroeconomy? How do individuals and firms respond to changes in tax rates? Despite decades of study, these fundamental economic questions and others related to fiscal policy are far from being conclusively answered. “The discrepancy in the literature arises not only due to methodological differences, but also because studies use data from different periods,” says the Richmond Fed’s Marios Karabarbounis. “I think people are just now trying to aggregate the research together and say, ‘Okay, this is what we know and this is what we don’t know.’”

That was the goal at a conference convened by the Richmond Fed on October 19, 2018. In addition to Karabarbounis, presenters included Iourii Manovskii of the University of Pennsylvania, Christian Matthes of the Richmond Fed, Dirk Krueger of the University of Pennsylvania, Karel Mertens of the Dallas Fed, and Eric Leeper of the University of Virginia.

Manovskii presented “The Fiscal Multiplier,” coauthored with Marcus Hagedorn of the University of Oslo and Kurt Mitman of Stockholm University. In general, the authors note, government spending may affect output directly, as firms increase production, and indirectly, as households increase consumption. Any model of the fiscal multiplier thus has two essential elements. The first is price rigidity, such that firms adjust quantities, and not just prices, in response to increased government demand. The second element is heterogeneity among households, such that some households deviate from the permanent income hypothesis and have a high marginal propensity to consume.

Manovskii and his coauthors develop a heterogeneous agents New Keynesian, or HANK,

model. This new class of model features traditional New Keynesian price rigidities, but also includes incomplete markets and heterogeneous rather than representative agents. The authors extend previous work on HANK models by introducing wage rigidity, which enables them to study distributional effects. The model is also fully dynamic, so that household demand takes into account either higher taxes or lower spending in the future. As a result, this paper is the first to analyze how the fiscal multiplier operates through both redistribution and intertemporal substitution. The main quantitative findings are that tax-financed spending yields a multiplier of 0.6 and deficit-financed spending generates a multiplier of 1.35.

The fiscal multiplier is also the focus of “Regional Consumption Responses and the Aggregate Fiscal Multiplier,” presented by Karabarbounis and coauthored with Bill Dupor of the St. Louis Fed, Marianna Kudlyak of the San Francisco Fed, and M. Saif Mehkari of the University of Richmond. Karabarbounis and his coauthors use regional variation in the American Reinvestment and Recovery Act of 2009 (ARRA) to analyze how government spending influences consumer retail and auto spending. Like Manovskii and his coauthors, they also contribute to the growing literature that combines heterogeneous agents with a New Keynesian framework.

Because ARRA dollars were potentially allocated based on existing economic conditions, the authors carefully examined the statutes to identify funding unlikely to be tied to the regional economy, such as funding for road maintenance or water quality improvements. Using consumer spending data from the Nielsen Consumer Panel/Retail Scanner and the New York Fed’s Consumer Credit Panel/Equifax, the authors calculate that a \$1 increase in county-level government spending increases local retail spending



by \$0.11 and auto spending by \$0.07.

What does the regional fiscal multiplier imply about the aggregate fiscal multiplier? To answer this question, Karabarbounis and his coauthors build a HANK model with the innovation that it includes two regions connected by trade. Because of trade linkages, an increase in local spending propagates across all regions simultaneously, thus leading to an aggregate multiplier that is larger than the local multiplier. The model successfully reproduces their empirical findings regarding the local multiplier and predicts an aggregate consumption multiplier of about 0.64.

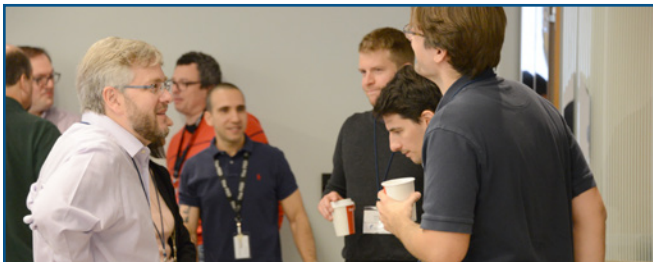
Most research implicitly assumes that increases and decreases in government spending have symmetrical effects: a decrease in spending creates a contraction of the same magnitude as an expansion due to increased spending. Matthes and Regis Barnichon of the San Francisco Fed relax this assumption in “Understanding the Size of the Government Spending Multiplier: It’s in the Sign.” Using a novel econometric procedure known as Functional Approximation of Impulse Responses, or FAIR, Barnichon and Matthes find that the government multiplier is less than one for spending increases but more than one for spending decreases. They also find that the expansionary multiplier is the same no matter the current state of the economy but that the contractionary multiplier is larger during downturns.

This asymmetry may help explain why recent research has come to conflicting conclusions regarding the size of the multiplier during times of slack. Research that uses a narrative identification approach has found that the multiplier is the same regardless of the point in the business cycle. But studies based on vector autoregression (VAR) find a much larger multiplier during downturns. The relative frequency of each type of shock varies

according to the identification scheme, however; the results in narrative approaches are based primarily on positive shocks, while shocks identified by VAR are evenly distributed between positive and negative. Thus, the average state dependence in VAR models may be driven by the state dependence of the negative multiplier.

As with the size of the fiscal multiplier, there is considerable debate about optimal tax rates. Recently, the large and well-documented increase in income inequality in the United States has led to calls to increase marginal tax rates for top earnings. Such policy might be appealing on normative grounds—but can it be justified by maximizing welfare for society as a whole? That’s the question Fabian Kindermann of the University of Bonn and Krueger ask in “High Marginal Tax Rates on the Top 1 percent?” They conclude “yes.” The optimal marginal tax rate for the top 1 percent of the earnings distribution is 79 percent, a result that holds even when the top 1 percent are included in the welfare calculation.

Kindermann and Krueger build a large-scale overlapping generations model that accurately predicts the actual wealth and earnings distributions in the data, particularly at the low and high ends. They proceed with their analysis in three steps. First, they calculate the marginal tax rate that maximizes revenue. Because revenue maximization does not imply welfare maximization, they then analyze the welfare gains and find that the welfare maximizing rate is lower than, but still close to, the revenue maximizing rate. The authors then dissect the sources of the welfare gains. They find that increases in marginal tax rates have large adverse effects on aggregate output, aggregate consumption, and hours worked, mainly for top earners. But these costs are far outweighed by the benefits of enhanced social insurance for the remaining 99 percent of the distribution.



The key to these results is a model that produces realistic income inequality. The crucial ingredient in this model is a labor productivity process in which individuals have a very small probability of reaching the top of the distribution and in which these outcomes are mean reverting but persistent. An important direction for future research, then, is to assess the plausibility of this process. It may be realistic for sports and entertainment stars, for example, but not for high-earning professionals who make substantial human capital investments.

At the end of 2017, policymakers cut taxes with the hopes of stimulating additional economic growth. The Tax Cuts and Jobs Act (TCJA) reduced tax rates for individuals and pass-through businesses until 2025 and permanently lowered the corporate income tax rate from 35 percent to 21 percent. The act also replaced a worldwide tax system with a territorial tax system. In “The Near-Term Growth Impact of the Tax Cuts and Jobs Act,” Mertens explores the macroeconomic effects of the TCJA over the next several years.

Mertens uses the reduced form estimates from a variety of recent studies on the effects of postwar tax changes to calculate the effects of the TCJA. The estimates vary, but in general, Mertens finds a positive effect on GDP growth in 2018, with less, or even a negative effect, in 2019 or 2020. The cumulative increase in GDP growth between 2018 and 2020 ranges from 0.77 percentage points to 2.74 percentage points, with an average of 1.32.

As Mertens notes, the main advantage of using reduced form estimates is that there is no need to make detailed theoretical assumptions. At the same time, the approach is valid only if the tax change is unexpected, exogenous, and reasonably similar to the past tax changes on which the estimates are based. One dimension in which the TCJA differs from previous postwar reforms is the magnitude of the business tax cuts. In addition, there is no historical counterpart to the international reforms. When Mertens accounts for this compositional difference, the impact on 2018 GDP growth is larger but the cumulative effect is the same. An additional difference is that the TCJA cuts tax rates relatively uniformly compared with previous postwar changes, which varied significantly by income level. When

Mertens takes this into consideration, the growth impact is delayed and occurs largely in 2019 and 2020.

Whatever the level of GDP in 2019 and 2020, it’s significantly better than it was in 1933, when the economy had been in severe decline for three years. In “Recovery of 1933,” Leeper, with Margaret Jacobson of Indiana University and Bruce Preston of the University of Melbourne, explores the role of fiscal policy in the United States’ recovery from the Great Depression. Most previous research has given little credit to either fiscal or monetary policy. Leeper and his coauthors argue, however, that a combination of monetary and fiscal policy led to an unbacked fiscal expansion that played a key role in “reflating” the economy.

The first step was leaving the gold standard. Under the gold standard, government bonds were effectively “real” bonds because the dollars were convertible to gold. But without the gold backing, the United States was freed from the obligation to raise taxes in the future to acquire the gold necessary to back the bonds. At the same time, President Roosevelt ran chronic deficits on the “emergency budget,” which was financed by the sale of nominal government bonds. In addition, monetary policymakers pegged short-term interest rates, which stabilized the cost of government debt. The combination of these policies, Leeper and his coauthors conclude, generated gold inflows and expanded the monetary base while also raising prices and output — without endangering the United States’ creditworthiness.

One lesson for modern policymakers, according to Leeper, Jacobson, and Preston, is that countries experiencing tepid growth and below-target inflation (as many have during the past decade) might achieve better results through a combination of fiscal and monetary policy rather than relying on monetary policy alone. In addition, the authors say, fiscal stimulus and fiscal sustainability are not necessarily mutually exclusive if the public believes the increase in nominal government debt will not lead to higher future taxes.

For more on the papers discussed at the conference, please see the interviews that follow. Interviews have been edited for length and clarity. ■

Regional Consumption Responses and the Aggregate Fiscal Multiplier

by Bill Dupor, Marios Karabarbounis, Marianna Kudlyak, and M. Saif Mehkari



Many techniques have been used to examine the effects of government spending on economic activity. Bill Dupor of the St. Louis Fed, Marios Karabarbounis of the Richmond Fed, Marianna Kudlyak of the San Francisco Fed, and M.

Saif Mehkari of the University of Richmond employ a new approach that relies on local consumer spending data coupled with data on local public spending as well as a structural model that translates the local consumption responses into an aggregate consumption response. Karabarbounis discussed their paper at the conference.

What is the goal of the paper?

Karabarbounis: We hope to understand the effect of government spending on macroeconomic outcomes, in particular consumer spending. One of the reasons we care about this is that these are very large programs. In our paper, we look at the American Recovery and Reinvestment Act (ARRA) of 2009, which in total appropriated around \$800 billion. So it's obviously important to understand whether these expensive programs actually benefit the overall economy.

We are focused on a particular strand of the ARRA: the direct purchases by the government, which were around \$220 billion. We use regional variation to understand what happened to consumer spending in counties that got more money compared with other counties that got less money or did not get any money at all.

How much variation is there between counties?

Karabarbounis: It is substantial, even when you look at the numbers in per capita terms.

What causes the variation?

Karabarbounis: Well, that's a key issue in the literature. I would say that the researchers are afraid that this variation is driven by local economic activity, which would bias the estimates. The perfect experiment would be if the money were allocated randomly. So we do two things in the paper. First, we want to test the economic characteristics of the counties that received funds; we find that there was no significant economic targeting, which is confirmed by other people in the literature. Actually, in some cases, counties with higher per capita income got more money. Still, maybe there's some relationship with respect to economic activity. Perhaps more active counties are more aware of the programs, apply more often, and have higher degrees of success.

Second, we use an instrument to uncover the exogenous component in spending related to the ARRA, which is related to previous work done by my coauthors. When we use that instrument, we see that the selection criteria had nothing to do with the local business cycle. We argue that by doing these two things we find there was not economic targeting, or if there was, we can partially control for it.

What are some of the principal challenges researchers face when estimating variations in aggregate consumption over time in relation to variations in government spending over time?

Karabarbounis: As I said, a key feature of the paper is that we are using regional variation to understand the effect of government expenditures on consumer spending. This has not been done before. People usually use time series analysis because good data on consumer spending at the local level are not readily available. But we are using micro-level data sets to estimate the effects.

More generally, when you have disaggregated geographical data obviously you have more observations than when you have time series data. Also, because we have geographical information, we can construct an instrument to look at many different components of the act. Usually when people try to construct an instrument they look only at military spending. This is a natural thing to do because it's an exogenous fiscal injection to local economies. But then you are constrained because this type of fiscal injection usually goes to a few states with a lot of military bases, such as Virginia and California. By using geographical information from the ARRA, however, we have many more observations, which addresses some of the challenges that time series analysis faces, and, at the same time, we can have a better instrument.

You talked about some of the benefits of using micro-level data. Is there anything else you want to add in that regard?

Karabarbounis: As I mentioned, it allows you to do actual variation relative to the time series analysis, and at the same time, it allows you to connect the model in more microfoundational ways. So, for example, if you use microdata, you can use a

different framework that allows you to discipline many key parameters by looking at the microdata directly. If you had a relatively more aggregated model, it would be harder to convince people that this parameter captures the heterogeneity that we see at the micro level.

What data sources did you use on the consumption side?

Karabarbounis: For government spending, we used ARRA data, of course, which were quite readily available until 2015. For consumption, we are using supermarket data from Nielsen, and for auto purchases, we are using credit balances from Equifax. This is not entirely novel. People have used these data sets for other purposes. I think the novelty, at least in terms of the Nielsen data, is that we look at them in the context of government spending, which has never been done before as far as we know.

Why might the regional fiscal multiplier be expected to differ from the aggregate fiscal multiplier? And how did you translate regional consumption responses into an aggregate consumption response?

Karabarbounis: This connects in general to the methodological approach we employ. When you use regional variation, you have more data and get all the benefits I have described. But at the same time, you hit other problems. For instance, what you estimate at the regional level is not exactly what would happen at the aggregate level. The simplest way to think about this is if one state gets money from the fiscal stimulus but another

wealthier state — let's say California — is mostly paying for it, then if you compare the two using regional variation, you would find a positive effect, but at the aggregate level the effect would be zero or much smaller. There are other reasons why the local multiplier would be expected to differ from the aggregate multiplier. For example, trade linkages could transfer some of the government spending across regions. So we acknowledge that the coefficient we find in the data is just a local estimate, what we call a local fiscal multiplier.

And then we try to estimate the aggregate multiplier using a model. The key thing is that the model generates the same local fiscal multiplier, and this gives us some confidence that what we are doing is reasonable. When we simulate the model, we get an aggregate fiscal multiplier that is much larger than the local multiplier, about twice as large. That is because of the trade linkages that effectively share government spending across many counties through trade. So, in the data it looks like the responsiveness is relatively small, but the response that actually took place is much larger because the trade linkages cannot be picked up by the cross-regional techniques.

What is your estimate of the aggregate multiplier?

Karabarbounis: The aggregate multiplier is 0.64. The paper is about consumption, so this is a consumption multiplier. One of the debates in the literature is whether the income multiplier is higher or lower than one, and this corresponds to the consumption multiplier being positive or negative. Since we find a positive consumption multiplier of

0.64, this would imply an income multiplier higher than one.

That is toward the higher range of estimates, correct?

Karabarbounis: I would say so, though there are papers that have found even larger multipliers. But we are definitely on the side of people who argue that fiscal policy can be stimulating. This might not be very surprising because a key element both in the data and in the model is that the monetary authority is not very responsive to fiscal stimulus. This is a key assumption. There is a long literature that suggests when you have nonresponsive monetary policy, government spending can generate high multipliers at the zero lower bound. When we relax the assumption of an unresponsive monetary authority, the local fiscal multiplier remains positive but the aggregate fiscal multiplier becomes negative.

What do you think accounts for the wide variation in estimates of the multiplier?

Karabarbounis: The discrepancy in the literature arises not only due to methodological differences, but also because studies use data from different periods. So there is no one multiplier; instead there are several multipliers depending on the state of the business cycle, the financing scheme, and other factors. I think people are just now trying to aggregate the research together and say, "Okay, this is what we know, and this is what we don't know." So I think this area of research is heading in the right direction. ■

High Marginal Tax Rates on the Top 1 Percent?

By Fabian Kindermann and Dirk Krueger



In the last forty years, income inequality has increased sharply in the United States, prompting calls to slow or reduce that gap. Fabian Kindermann of the University of Bonn and Dirk Krueger of the University of

Pennsylvania approach the issue of the income distribution from a different perspective. What policies could a benevolent government enact to produce the greatest overall well-being for current and future members of society? In particular, they ask: What marginal tax rates on the top 1 percent of earners would help to achieve that goal? Krueger discussed their paper at the conference.

When you talk about the “optimal” tax rate on the top 1 percent of earners, what do you mean by “optimal” in this context?

Krueger: “Optimal” means the rate that maximizes the weighted sum of lifetime well-being of the different households living in the economy, now and in the future. Traditionally, the theory of optimal fiscal policy worked with models in which all households were identical (so-called representative agent models). In that context, what “optimal” means is fairly uncontroversial. Optimal simply means welfare maximizing for the representative household. But in the type of models I work with, households differ by age, income, and wealth, as well as when they were born or will be born. These households differ in their assessment of a change in the top marginal rate: the 55-year-old top 1 percent earner with very substantial wealth will view a reform that raises the top marginal

income tax rate from 40 percent to 80 percent very differently than the 25-year-old non-college-educated worker who has virtually no chance of ever making it into the top 1 percent of income earners. What we call optimal is a tax system that maximizes the weighted sum of the welfare of these different households, including those to be born in the future.

What do you find to be the optimal tax rate on the top 1 percent of earners? How does that differ quantitatively from estimates in similar papers — and why?

Krueger: According to our results, the optimal top marginal rate (the rate applying to every dollar earned above the income threshold that constitutes the top 1 percent of earners) is 79 percent. It is higher than the rate advocated based on a static model of labor supply (Peter Diamond and Emmanuel Saez advocate for a rate of 73.5 percent based on a static model of labor supply, which ignores the fact that wealth falls in the economy over time, making labor supply less responsive to the tax hike in the long run.) Dynamic models in which top rates affect career choice or other aspects of human capital accumulation tend to find lower rates, for example, between 50 and 60 percent in the work of Alejandro Badel and Mark Huggett.

Why did you decide to look at only the top 1 percent instead of, say, the top 3 or 5 percent?

Krueger: I have written papers in the past that think about redistribution and social insurance more broadly, so this paper was clearly motivated by the political debate regarding the top 1 percent. It is our attempt to speak to a particular political as well as academic literature that has focused on the top

1 percent. But from the perspective of a model, that threshold is somewhat arbitrary.

Also, when you look within the top 1 percent, it's really, say, the taxation of the top one-hundredth of 1 percent that drives the results to a large extent. So the paper is written as if this is about the top 1 percent overall, but when you unpack things, it's largely about the top 20,000 families in the model and how they respond to those taxes in their consumption and labor supply. There are a small number of families who, given their income, account for a very substantial part of overall tax revenue and that's what makes them so important in the model. The successful lawyers or doctors, for instance, who make \$400,000 or \$500,000 don't account for much revenue in our model because they pay the very top rate on only a small share of their income. In fact, if you look at their average tax rates, they remain largely unchanged.

How close is the welfare-maximizing top marginal tax rate to the revenue-maximizing top marginal tax rate?

Krueger: It is fairly close: it's 79 percent, while the revenue-maximizing rate is 87 percent. It is to be expected that the optimal rate is lower than the rate that extracts maximal revenue from the top 1 percent of earners. First, the current top 1 percent receive weight in the social welfare function, and thus the policymaker takes into account the top 1 percent's well-being when setting the optimal rate. Second, through general equilibrium effects, the top rate affects well-being below the top 1 percent. For example, if the top 1 percent have lower after-tax incomes and thus save less, that reduces the capital stock in the economy and thus reduces wages at the lower end of the income distribution. So the government may want to set a rate lower than the revenue-maximizing tax rate even if it does not care directly about the well-being of the top 1 percent of earners.

What are the aggregate effects on output, consumption, and labor provision associated with

the implementation of the optimal top marginal tax rate?

Krueger: We find that the optimal top rate is very substantially higher than the current top rate. Implementing this rate does reduce labor supply in the top 1 percent. By reducing after-tax incomes of the top earners, it reduces their saving and thus, in turn, the accumulation of assets and capital in the economy. Therefore, output falls over time and so does aggregate consumption. This is not a reform that boosts aggregate economic activity, but since it increases consumption of most people (although clearly not the top 1 percent) and reduces the hours worked for most people, it leads to a welfare improvement, since households care about consumption and their leisure and not about aggregate output per se.

How do those effects compare to the redistributive and insurance benefits produced by implementation of the new tax rate? And how widely are those benefits accrued across households of differing types?

Krueger: We show that, essentially, consumption of everyone not in the top 1 percent is uniformly higher with the high marginal taxes at the top. For this result, it is crucial that the extra revenue created from the increase in the top marginal rate is used to reduce rates at the lower points of the income distribution.

Could you describe how the top 1 percent of earners respond to the new tax rate based on their type of profession and the length of their peak earning years?

Krueger: The increase in the marginal rate induces a strong substitution effect (away from work and toward leisure), but also a strong income effect in the other direction. Essentially, very highly productive individuals who fear losing that productivity (think about the aging NBA star) will maintain labor supply as the top marginal rate increases since they want

to earn most of their lifetime income during these high-productivity years. Once these individuals have accumulated a significant amount of wealth and still face high marginal rates, they start to effectively retire early, and thus the high marginal rates shorten the time these individuals choose to maintain their high hours and thus earnings.

How does the new tax rate affect skill accumulation among people who are prospective members of the top 1 percent of earners?

Krueger: In our model, the labor productivity process is, by assumption, not affected by changes in the tax system, although earnings are since households will adjust their labor supply. For some top earners (for example, sports and entertainment stars), I don't think the impact on human capital accumulation from a change in the marginal tax rate, even of the magnitude discussed in the paper, would be overly large. But it would definitely impact the choice of human-capital-intensive careers. Those effects would take some time to play out, since the human capital of those who completed their education is already installed, but it might be important in the long run.

A critique of papers of this sort goes along the lines of: we do not have benevolent planners in real life, and even if we did, they wouldn't, for a variety of reasons, be able to implement the redistributive and insurance programs/policies needed to see the type of gains you describe. What do you make of that critique?

Krueger: Well, the top marginal rate was higher than what we characterize as "optimal" under President Eisenhower in the early 1960s, although that rate admittedly applied to a very small share of the population only. So it seems to me that implementing these types of tax rates was definitely feasible in the past, although often in the context of a major war. It would be interesting to model these political constraints explicitly and characterize the constrained optimal system — for example, under the constraint that everybody has to be weakly

better off under the reformed tax system (a so-called Pareto-improving reform).

Another critique you sometimes hear is that if you raise rates on the top 1 percent to something like 79 percent, then you will have out migration. This seems somewhat unlikely given that jobs are not very portable, though you could imagine, say, superstar athletes moving within a country to play for a team in a state with a lower or no state income tax.

Krueger: I think it's certainly correct that if there were a chance for people to lower their overall taxes by moving within the country, then there would be a large incentive to do so. But looking internationally, we make the strong assumption that there is no rest of the world to go to, partially because potential earning power is greater in the United States than in most other countries and also because there is no obvious alternative country with lower marginal tax rates. But as with the political-economy dimension we discussed previously, this is clearly an aspect that requires more work — work that some others have started to do. There are some very interesting papers that look at soccer players in Europe, and it appears there is some evidence that players may be moving from one country to another for tax reasons. They can do this because there are so many large, successful leagues across Europe. This may also be true of superstar entrepreneurs and entertainers. But from a data perspective, it is still an open question.

The other very strong assumption we make is that households can adjust their labor supply in response to tax rates but their career choices are not affected. Other models relax that assumption, and therefore tax rates affect incentives to accumulate human capital in pursuit of a high-earning job. Those papers find that the optimal top marginal tax rate is lower than what we find — in the range of 50 to 60 percent. ■

The Near-Term Growth Impact of the Tax Cuts and Jobs Act

by Karel Mertens



At the end of 2017, Congress passed the Tax Cuts and Jobs Act (TCJA) with the hopes of stimulating additional economic growth. The act reduced tax rates for individuals and pass-through businesses until 2025 and permanently lowered the corporate

income tax rate from 35 percent to 21 percent. The act also replaced a worldwide tax system with a territorial tax system. In recent work, Karel Mertens of the Dallas Fed uses the reduced form estimates from a variety of recent studies on the effects of postwar tax changes to calculate the effects of the TCJA. The estimates vary, but in general, Mertens finds a positive effect on GDP growth in 2018, which diminishes over time and may even turn negative in 2020 and beyond.

What are some of the most significant provisions of the Tax Cuts and Jobs Act?

Mertens: It's a big bill. It does a lot of different things. If I were to single out a single thing, it would be the changes on the corporate side.

What's unique in this particular tax bill is the switch in how corporations that are active internationally are taxed. Under the old system, known as a worldwide system, U.S. corporations were taxed regardless of where revenues or profits were being generated across the world. Now that has changed to a territorial system, in which the only profits that are taxed are profits generated from economic activity within U.S. borders. That's

actually closer to the system that exists in most developed economies.

Another important element is the large cut in the corporate tax rate. The corporate tax rate has been roughly stable for a long period of time. So that's quite different. There are also many interesting changes on the individual income tax side, but nearly all of them will expire or are intended to expire in 2025. Whereas the corporate changes are legislated to be permanent, which makes them important for the longer run.

Wouldn't you expect that changing to a territorial tax system would give companies the incentive to just conduct a lot more of their activity outside the United States?

Mertens: Yes.

Which would seem to be the opposite of what policymakers would want.

Mertens: That's right, and it's especially true for assets on which the profits being made are particularly easy to move abroad — intangible assets, like patents, for example.

There are all kinds of provisions within the tax bill intended to prevent that from happening. So it's not fully a territorial system. It's more of a mixed system. You can almost say that for profits generated from intangible assets, it remains a worldwide system.

Why make the change to a territorial system in the first place, if you then have to put in place multiple provisions to prevent companies from shifting activity overseas?

Mertens: There are probably several reasons, but the biggest one is likely that under the old system, U.S. corporations were, regardless of where they were operating, always taxed at a very high corporate tax rate in the United States. That really made them uncompetitive with foreign companies that only had to pay the almost always lower domestic tax rate.

How does the TCJA differ from previous tax changes? How do those differences affect estimates of the effects?

Mertens: The individual side of the TCJA is not very different from previous individual tax reforms. But the corporate side is very different. Most of the variation in corporate tax policy that's used in previous research to identify the effect has been temporary, such as temporary investment tax credits or changes to the treatment of depreciation. If a change is temporary, that gives firms a big incentive to change the timing of their investment decisions.

The current bill is large, but a lot of the change comes from permanent provisions. So that's one reason to expect that the effects estimated based on previous models will be too large — because the corporate effects are probably overestimated.

In some estimates, the bill actually becomes a drag on growth after 2020. Why is that?

Mertens: It's very clear that over U.S. history tax rates tend to be mean reverting. So the model expects the future tax rates to revert to where they were before, that is, to be larger in the future.

Another reason is that when it comes to economic decisions, if you know that your tax rate is going to be higher in the future, that gives you an incentive to

shift taxable economic activity forward in time and then maybe reduce it later when it's being taxed at a higher rate.

How does the fact that the individual tax cuts are set to expire affect the growth estimates?

Mertens: Well, first of all, what matters is not whether they are legislated to be permanent or not but whether people expect today that they will be permanent or not. That's a big difference. Because quite often these tax rates changes are legislated to be permanent, but everybody knows that they will change again in the future.

A big reason why we tend to find a large short-run effect on economic growth is precisely because the tax cuts are transitory. But, assuming everyone were confident that the individual tax cuts would be permanent, my best guess is that you would get a somewhat less-pronounced immediate growth effect. But you would also not get the drag in the future.

What does the research suggest about the potential distributional effects?

Mertens: That's a very hard question. On the one hand, only slightly more than 50 percent of U.S. households have a positive federal income tax, which means if you change federal income tax rates, it's automatically going to affect only the top half of the U.S. income distribution. So in that sense, when you cut taxes, of course most of the benefits will go to quote-unquote "rich people."

That being said, this particular tax cut will have interesting distributional effects, because there is a big regional component to it. How this bill is going

to affect you as a household depends quite a bit on where you live in the United States. And one big reason for that is the fact that the TCJA introduces a cap on state and local tax deductions.

That means a lot of higher-income people who live in high local tax states such as New York or California are going to end up paying higher taxes. Whereas in states with a lower or zero state income tax, they're not going to be affected. In short, the distributional effects are going to be somewhat complex.

You note in the conclusion of your paper that the path of GDP over the next few years will be informative. What are you hoping to learn?

Mertens: One of the most robust findings in the empirical macro literature is a fairly large effect of tax policy. So if we don't see a fairly large growth pickup in the short term, then that would raise some questions about the validity of the empirical results of this literature.

At the same time, I think lots of people were very skeptical of this literature after 2008, and they were saying right after the bill passed that there was no way it was going to have much of an impact on U.S. economic growth in 2018. If we do see a pickup, then they also have to acknowledge that the literature may have it right.

We've been taxing ourselves for a really long time, yet there's still so much debate about the effects. What are some of the biggest challenges facing researchers?

Mertens: I would say there are two. The first challenge is that changes in tax policy do not occur at random points in time. They tend to be related

to the business cycle in the sense that you often have tax cuts during recessions. Also, you often find tax increases when you have big increases in government spending, to finance part of that spending. That's particularly true during wars.

In both these cases, you will expect to see a positive relationship between tax rates and overall economic activity. In the first case, taxes are lowered in response to the decline in the economy, and in the second case, taxes are raised right at the same time a big increase in spending is giving the economy a big boost.

So that creates the impression that there isn't much of a relationship between tax rates and economic activity. It's a standard reverse causality problem. Sorting out the cause and effect — how the state of the economy influences tax policy, versus the effect of tax policy on economic activity, is a tricky question. But I think we've actually made a lot of progress sorting it out.

The second big challenge is that tax policy is very complex. These tax reforms make changes to a whole bunch of different things at the same time — rates, deductions, et cetera. It's a highly multidimensional type of policy, so it's very hard to learn in greater detail the effects of all the different aspects of tax policy. This is a challenge that still requires a lot more work. ■

Understanding the Size of the Government Spending Multiplier: It's in the Sign

by Regis Barnichon and Christian Matthes



Economists have long agreed that changes in government spending produce “multiplier” effects — meaning, an increase or cut of \$1 in spending may produce something other than a \$1 change in economic output. While there is

no consensus on how large those changes are — quite the opposite — the economics profession has generally treated the effects of spending increases and decreases as symmetric and independent of the current state of the business cycle. Regis Barnichon of the San Francisco Fed and Christian Matthes of the Richmond Fed examine whether we should reconsider those assumptions. Matthes discussed their paper at the conference.

Could you describe the motivation for the paper?

Matthes: One key question in macroeconomics that has come up frequently over time, but especially since the recent financial crisis, has been the effect of government spending or, more generally, fiscal stimulus of the economy. Our point of departure for this paper was the huge variety of different results in the literature, ranging from very small to rather large effects.

Why has the range of estimates for the government spending multiplier been so wide? And why has the literature generally treated the effects of a spending shock as symmetric?

Matthes: There have been a lot of differences across these papers, from identifying assumptions to

calculations of these effects — or basically, in the language of this literature, how the multiplier has been defined to the exact statistical model that is used to compute the dynamics of all the variables that we’re interested in. So the first thing that we do is try to find common ground in terms of defining a summary statistic that can be called the fiscal multiplier. Second, we use a common statistical model that we propose to trace out the dynamics of these variables over time. And then third, because even after putting everything on common ground we still find large differences, we ask what can drive these residual differences in the literature. What we find is that nonlinearities or asymmetries are really crucial; that’s the key message of the paper. We have to move away from these linear models that people in the literature have proposed.

What does a linear model mean? A linear model means that the effects of unexpected positive changes in government spending have the same effects as unexpected negative changes and that these initial effects are independent of where we are in the business cycle. Those are the assumptions we are challenging in this paper. To be fair, linear models generally have served the economics profession well. They have helped answer a lot of questions that we are interested in. It just turns out that we find that for this specific question regarding the effects of government spending changes, it is really important to impose nonlinearities.

What do you find the size of the multiplier to be for expansionary as well as contractionary shocks?

Matthes: The exact number depends on how you identify changes in government spending, but there is a pretty tightly pinned down range. If there is an unexpected increase in government spending — that

is, an expansionary shock — we find the multiplier across a large variety of specifications to be less than one. If I had to put a ballpark number on it, I would say 0.5.

Now, if there is an unexpected decrease in government spending — that is, a contractionary shock — we find across a large variety of different specifications and also some different statistical models that that multiplier is larger than one. If I had to put a ballpark number on it, I would maybe say 1.3 or 1.4.

Do those results depend on where we are in the business cycle?

Matthes: We find that for expansionary shocks, where we are in the business cycle doesn't really matter much. But for contractionary shocks, it matters a lot. In particular, the effects of cutting government spending are more severe if we're in a downturn or if we're in a recession.

What are the possible policy implications of these findings?

Matthes: I think the results of this paper really caution against unexpectedly cutting government spending in a downturn. In general, unexpected cuts in government spending are harmful, but they're really harmful in a downturn. With regard to expansionary shocks, the results of the paper would suggest that a lot of the estimates of the effects of government spending that are out there actually overestimate the multiplier. So we should be cautious about how valuable we think that tool might be.

Are there reasons to believe that perhaps these findings may differ nontrivially across countries?

Matthes: So let me answer that question in a slightly roundabout way. At the end of the paper we offer a discussion of possible theoretical mechanisms that could generate the effects we've seen, and we think these mechanisms should be in play in a lot of other countries. And, in fact, we've written other papers

where we have looked at different shocks — not government spending shocks. For example, we have one paper where we look at shocks to liquidity in the financial sector. There we do two things. First, we argue that in terms of theoretical justifications, the same theoretical justifications that could drive our results in this government spending paper could also drive the results there. Also, in the paper where we talk about liquidity we find strong asymmetries as well, and we find that these effects are present in a lot of countries.

Does the composition of spending matter? For instance, are the effects of \$1 spent (or cut) on X the same as \$1 spent on Y?

Matthes: We don't have anything to say about that in the paper, but it is a very interesting question and one that I think the profession has gotten more interested in, especially as we think about infrastructure spending, for example. It is something we're thinking about working on in the future.

How does this work relate to or complement your work on the effects of monetary policy shocks?

Matthes: There are three papers in a series that discuss similar issues. The one on monetary policy shocks is in many ways an introduction to the methodology. In terms of the results, when we look at monetary policy shocks, we again find strong asymmetries. And because we find these strong asymmetries in these three different papers, that leads us to believe that there should be some common theoretical reason.

Do you think you might be able to employ similar methodology to assess another aspect of fiscal policy, the effects of shocks to tax policy?

Matthes: Yes, this methodology could say something about that. In fact, one of the coauthors of the third paper in the series, on liquidity, Alex Ziegenbein, has done something like that. He has written a paper that doesn't look precisely at the asymmetry when it comes to the effect of tax shocks; it looks at business

cycle dependence. And he finds a strong business cycle dependence when it comes to the effect of tax shocks. So, yes, I think there are strong asymmetries in the effect of tax shocks as well and how they translate to output.

What extensions to this paper might you pursue in future work?

Matthes: Two come to mind. One we have already mentioned: thinking harder about disaggregating different categories of government spending. A second is thinking harder about what people in the economics literature have called “fiscal foresight.” A lot of government actions are actually predictable a couple of months out because it takes time for measures to be passed by Congress and, in general, to be put into law. We try to control for this in the standard way that the literature does, by incorporating measures of expectations of government spending into our statistical models. But I think a lot more can be done there. In fact, some people in the economics profession, such as Eric Leeper, who presented at the conference, have made strides in that direction. This is another area where we think we can actually contribute with the statistical framework we have developed. ■

Recovery of 1933

by Margaret M. Jacobson, Eric M. Leeper, and Bruce Preston



Economists have long been interested in what drove the recovery from the Great Depression, of course. But that question took on renewed interest following the Great Recession. Margaret Jacobson of Indiana University, Eric Leeper of the University of Virginia,

and Bruce Preston of the University of Melbourne consider whether the argument that fiscal actions taken during the 1930s were relatively unimportant withstands scrutiny. Leeper discussed their paper at the conference.

How would you characterize the conventional view of the importance of monetary policy to the recovery from the Great Depression?

Leeper: I think there are two components to it. The first is what I consider to be the “dumb luck” explanation, which is that increasing political uncertainty in Europe leading up to World War II made people really edgy, so they started shipping their gold to the United States. The United States made the decision not to sterilize those gold inflows, which means that the increase in gold transmitted directly into an increase in the monetary base.

The second component to this was that there had been a series of banking crises, and the last one was early in the FDR administration. So one of the first things he did was try to get the banking system on secure footing. As a consequence, if you’re a monetarist, you want to think about how does an expansion in the monetary base translate into an

expansion in broad money, like M1 or M2? And that involves the money multiplier. What happened in the banking crises was everyone pulled their money out of banks. But then as confidence in the banking system grew, people started to put their money back into banks, which made the money multiplier get back to roughly normal. This expansion in base money was transmitted into broad money.

I think that is the most coherent conventional view of the role that monetary policy played. It is also pretty close to what Friedman and Schwartz would have said. As I said, according to this story, the gold inflows didn’t really have anything to do with U.S. policy. It had more to do with stuff that was going on overseas. Instability on the continent was driving part of those inflows, without a doubt. But I don’t think it was just a matter of political uncertainty driving it. Our VAR results suggest that a lot of the gold inflows appear to be endogenous and a reaction to the state of the U.S. economy.

When the United States announced that it was going to buy unlimited quantities of gold at a new and higher price, that made it pretty attractive to send gold here. Another thing that runs counter to the conventional view was that once the United States left the gold standard there was a massive depreciation in the dollar, which then made U.S. exports grow quite rapidly. That also brought gold into the United States. So I think the story that the gold inflows were driven entirely by exogenous factors misses an important element.

How do you see monetary policy and fiscal policy interacting during this period?

Leeper: The important thing that happened under the Gold Reserve Act was that essentially all gold

decisions were taken out of the hands of the Fed and put into the hands of the Treasury and the president. When that occurred, they allowed the monetary base to expand. I think part of the reason for that was FDR had other plans for fiscal policy. He wanted to expand debt in order to finance these emergency expenditures. I think to further expand debt by sterilizing the gold inflows would have run counter to his spending goals. He was taking a lot of criticism for his expansion of government debt and had to be pretty selective about the purposes for which he was willing to expand it. So, in the story that we tell, monetary policy plays a supportive role.

Monetary policy was not actively trying to fight the inflation that Roosevelt was trying to create. So you had what's called passive monetary policy, which allowed the price level to move. That was an important element in both achieving what FDR wanted to achieve and in stabilizing the expanding government debt.

You refer to the “regular budget” and the “emergency budget.” How do they differ? How large were emergency budget expenditures, and how long did they last?

Leeper: The regular budget bounced around a little, but it was pretty much balanced. The emergency budget, on the other hand, produced a deficit on the order of 6 percent of GNP. What we call emergency spending included a large list of things: the Federal Emergency Relief Administration, the Civil Works Administration, the Work Projects Administration, the National Youth Administration, the Civilian Conservation Corps, and all the things people kind of associate with New Deal spending. A lot of it continued all the way up to the start of World War II.

This was financed by selling nominal government debt, which more than doubled in roughly seven years after FDR took office. But when you look at the conventional explanations of recovery, they don't attribute any role to what I think is a pretty

massive expansion in government debt. It's a bit of a puzzle as to why this isn't part of that standard explanation.

You note that FDR never abandoned the idea of “sound finance” but that his approach was also flexible. Why did this flexibility seem to reach a limit as 1937-38 approached?

Leeper: Well, first, he had to get reelected, so that would be in 1936. Going into the election, he felt that, okay, I better now prove that I'm a fiscal hawk. And so they started backtracking somewhat on the fiscal expansions. In addition to being driven by politics, the decision to slow down the expansions was affected by the economy starting to turn around some, which made them seem less crucial.

Not long after the 1936 election, the economy takes another very sharp downturn. And then there is World War II. That makes it a very difficult story to tell, because you don't know the counterfactual. What would have happened if they hadn't had this massive expansion in government spending and debt associated with World War II?

You argue that the post-1933 experience demonstrates that fiscal stimulus and fiscal sustainability are not necessarily inconsistent. Could you elaborate?

Leeper: This is a reference to the experience of a lot of countries after 2008. Many countries implemented big fiscal expansions. Europe is a great example, because by about 2010 they declared victory and suddenly everything shifted to fiscal austerity. The bottom line is that if everyone believes an expansion in government debt is going to be backed by higher taxes, then debt as a share of the economy is going to grow over time, because it's those taxes that give debt its value. What happens with an unbacked fiscal expansion is that people don't believe that taxes are going to adjust, so the government sells more bonds,

but their value doesn't move in proportion to the new sales of bonds.

People say, "Gosh, these bonds aren't worth as much. I want to get out of bonds and into buying goods." That is what stimulates aggregate demand. But the problem is if you believe that taxes are going to rise, then you have no reason to get out of government bonds, because their value is being sustained by those future taxes. What I think a lot of countries got wrong during the Great Recession and the recovery was that they were thinking in terms of Keynesian hydraulics. If you believe in Keynesian hydraulics, then you do eventually have to raise taxes.

I think the most stunning picture in the whole paper is the one that shows debt as a share of GNP. During the Hoover administration, when the United States was still on the gold standard, that share rose steadily. But as soon as the United States left gold, it was flat, even though we were running big deficits and pumping a lot of nominal bonds into the economy. The reason for that is that the value of government debt can't rise if you don't believe taxes are going to rise in the future. That's what stabilizes the debt-to-GNP ratio. So I think this is a real success story in showing that you can do fiscal stimulus and not have to worry about whether fiscal policy is sustainable.

You talk a little bit about economists and their relationship to FDR in the paper. How much advice — and how much support — did he get from the economics community when considering what to do?

Leeper: He got a lot of heat, especially from either current or former Fed people. They were still apoplectic about inflation at a time when we had negative inflation. But on the other side, Irving Fisher had extensive correspondence with FDR. He wasn't advocating unbacked fiscal expansion, but he was advocating expanding the money supply and even how that could be done by calculating what the

optimum price level would be. Also, George Warren was one of his closest advisors, and he was calling for something similar.

I think a really pivotal piece of advice came from a *New York Times* letter that Keynes wrote. I think you can read that as an argument for an unbacked fiscal expansion. The irony of that is Great Britain went off the gold standard before the United States but refused to do any fiscal expansion, so its recovery was a lot slower. Ultimately, I think economists did have a lot of influence, in part because Roosevelt was agnostic about most things and was willing to listen.

This is one of your first papers in economic history. How has it been received, and do you plan on doing more historical work?

Leeper: It depends on the audience. As a novice at economic history, what I have learned is that it's impossible to please historians because they have a hard time coming down and saying, "This is the one thing that really mattered." So if you read some of the stuff about the Great Depression by economic historians, every page tells you about some new thing that's just as important as the previous thing. But the job of macro research, it seems to me, is to really try to zoom in on a single element, even though that doesn't mean I believe that was the only thing going on. I should say, though, that there have been a couple of economic historians who have seemed to embrace this idea.

How more conventional macroeconomists have taken it varies a fair amount. I consciously don't tell people that this is basically a story of the fiscal theory of the price level because there's almost a religious-like aversion to that. If you invoke those words, they just say, "Okay, I reject it." So I kind of sneak it in. And I try to tell the story in a way that seems really plausible, and people kind of nod along until they realize what's going on.

I think I will do more historical work, partly because I think history can give you examples

during which certain experiments were run and then you can evaluate them based on stories you think are plausible. Another reason is that you can think about policy as a kind of regularly changing regime, and I have done a lot of work on that. But there are all kinds of assumptions that you have to build in. For instance, that everyone understands what future possible policies might be pursued. If you are going to solve a rational expectations model, you have to believe they know what's going on. So it's a question of how do you nail down what people's beliefs were? And that's why, in this case, we emphasize that Roosevelt was very good at selling this policy. Even though it was an unprecedented policy, he made it clear that the stakes of recovery were really high. The alternatives were fascism or revolution. ■

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