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New Evidence on State Fiscal Multipliers: Implications for State Policies

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NEW EVIDENCE ON STATE FISCAL MULTIPLIERS: IMPLICATIONS FOR STATE POLICIES

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ABSTRACT

When state and local governments engage in balanced budget changes in taxes and spending, what fiscal multiplier effects do such policies have on creating local jobs? Traditionally, the view has been that possible job-creation effects of such state and local "demand-side" policies are smaller, second-order effects. Such effects might be worthwhile to take into consideration when a state or local government balances its budget during a recession, but the effects were believed to be of modest magnitude, and not of major importance for more general state and local public policies. However, recent estimates of fiscal multiplier effects of state and local spending and tax policies suggest much larger demand-side effects of such policies on local jobs. These fiscal multiplier effects are large enough to suggest relatively low costs per job created of some tax and spending policy combinations, sufficient to alter the net benefits of many public policies. In particular, this recent research suggests that policies that use tax increases on the top 10 percent of the income distribution to finance either public spending expansions or tax relief for the bottom 90 percent of the income distribution may offer some job creation benefits that are large enough to alter state and local policy decisions. Furthermore, the cost per job created of state business tax incentive policies or business tax cuts may be significantly altered after taking into account the opportunity costs of financing such policies by cutting public spending or raising taxes on the bottom 90 percent.

JEL Classification Codes: H71, H72, J23, R12

Key Words: job creation; fiscal multipliers; state and local taxation; state and local expenditures; local labor demand; income distribution; business tax incentives; state and local business taxes.

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Back in 2001, Peter Orszag and Nobel Prize–winning economist Joseph Stiglitz analyzed the following issue: when states need to balance their budgets during a recession, will they harm their economies less if they do so by cutting spending, or by raising taxes? Reflecting mainstream Keynesian macroeconomic thinking, Orszag and Stiglitz's (2001) memo argued that less damage is done by raising taxes than by cutting spending.

The argument is that both spending cuts and tax increases will depress demand for the state's goods and services and thereby destroy some jobs. But spending cuts do so more directly by cutting spending on goods and services produced in the state, while tax increases only depress demand for the state's goods indirectly by cutting after-tax income of state residents. Because only a portion of state residents' income is spent on goods and services produced in the state, the tax increase will not depress local demand as much. Therefore, if a state wants to preserve as many jobs as possible, it is preferable for a state to balance its budget during a recession by increasing taxes, not by cutting spending.

Orszag and Stiglitz go on to argue that in choosing among tax increases on different income groups, states might want to consider that high-income groups have a lower propensity to consume their income, and also have a lower propensity to consume local goods. Therefore, from the perspective of state policymakers, tax increases on high-income groups are likely to be less damaging to local demand for goods and services, compared to the damages from tax increases on lower-income groups.

Since 2001, much new empirical evidence has been produced on "state fiscal multipliers"—the magnitude of response of state economies to changes in public spending or taxes. This new evidence relies less on economic theory and assumption and more on good evidence from "natural experiments" of how state economies respond to fiscal shocks. What does this new evidence imply for state fiscal policies? This issue is the focus of this paper. As part of this discussion, this paper also highlights that state fiscal multipliers have broad implications for many state policies, not just that of what to do about state budget deficits during a recession. State fiscal multipliers have important implications for state job creation efforts, the benefit-cost analysis of state spending programs, state tax incentive policy, state business tax policy, and state tax policies in general.

TRADITIONAL CONVENTIONAL WISDOM ON STATE/LOCAL FISCAL MULTIPLIERS

Based on economic theory, what would we predict for the magnitude of state fiscal multipliers? What would be our prediction for the cost of creating one job in a state due to spending increases or one job due to tax reductions?

For state spending on goods and services, our prediction is that in the first round, each dollar spent would increase state output by the same amount. That induced increase in state output would in turn increase spending on other state goods and services by some fraction between zero and one, with that fraction depending upon to what degree businesses and governments in the state use in-state suppliers, and also depending upon to what degree consumers in the state buy goods and services produced in the state. We can refer to this fraction as the *marginal propensity to consume* (MPC) for state goods and services, but with the following two understandings:

1) This MPC depends not only on consumer behavior but on business behavior.
2) This MPC is the propensity to consume goods and services produced in the state, which will obviously be somewhat less than the propensity to consume goods and services produced anywhere, whether in-state or out.

In turn, this first round of *re*spending on goods and services produced in the state will yield more respending, and so on in subsequent rounds. If the initial spending on states and goods was \$X, the ultimate effect on state output would be the infinite sum \$X(1 + MPC + MPC^2 + MPC^3 + …), which equals \$X/(1 − MPC). The factor 1/(1 − MPC) is the "multiplier" of the initial spending change, translating it into an overall effect on state output. This multiplier is commonly encountered in undergraduate macroeconomics courses that include some exposition of Keynesian macroeconomic theory.

How about the cost per job created? This depends upon the ratio of state output, or "value added," to state jobs, along with the state multiplier factor. We would expect the number of jobs created by an initial public spending increase of \$X to be equal to the total output increase, multiplied by the ratio of jobs to value added in the state. For the United States in 2015, every full time equivalent (FTE) job corresponded to \$136,278 in value added.[1] Therefore, the public spending increase needed to create one job would be expected to be equal to value-added per job, divided by the state multiplier. What are likely state multipliers? In most state econometric models, multipliers in the range of 1.5 to 3.0 would not be considered out of line, with 2.0 perhaps being a plausible central value.[2] Therefore, the expected cost per job created for public spending increases might be \$68,139—a \$68,000 initial spending increase, with a multiplier of 2, would boost state value added or output by \$136,000, sufficient to create one job.

How about the effects of tax reductions on creating output and jobs in a state? A tax reduction can be similarly analyzed as leading to some increase in spending on state goods and services. However, the initial boost to spending on state goods and services is not the dollar

[1] This comes from downloading data on value added and FTE jobs from the databases of the U.S. Bureau of Economic Analysis.

[2] This also implies an effective state-level "marginal propensity to consume" state-produced goods and services of around 50 percent.

amount of the tax cut, but rather the portion of the tax cut that is spent on state goods and services. The multiplier for tax cuts would thus be expected to be MPC/(1 − MPC). If the effective MPC for goods and services produced in the state is around 50 percent, then the cost of creating jobs through state and local tax cuts will be about equal to value added per job, or $136,278. The tax cuts of $136,000 will boost spending initially by $68,000, and, with a multiplier of 2, value added will eventually go up by $136,000, just sufficient to create one job.[3]

These tax cut multipliers and costs per job should also be used for public spending that is in the form of income transfers. Economists regard income transfers as equivalent to negative taxes. In analyzing their effects on local job creation, what is relevant is that public spending that is in the form of income transfers, unlike public spending that directly provides some good or service, does not directly increase output or employment, but only indirectly does so through whatever effect on local demand occurs because of increased public transfers. Therefore, public spending on income transfers is more analogous to the effects of tax cuts than to the effects of public spending on goods or services.

In the real world, multipliers and costs per job created will differ from this simplistic theory because of various complications, including the following:

- <u>Cost feedback effects</u>. As spending increases or tax cuts boost a state's economy, this will increase wages of state residents, as well as housing and other local prices. These wage and price increases will have some negative effects on business location decisions. As a result, the cost per job created from spending increases or tax cuts will go up.

[3] It is possible that the effective MPC that is relevant for determining the initial spending impact of tax cuts will differ from the effective MPC that is relevant for determining the multiplier effect of spending increases. In this case, the cost per job created of tax cuts will be the tax cut MPC times (1 over 1 minus the spending increase MPC) times value added per job.

- Labor intensity effects. Public spending increases or tax cuts may favor industries that are either more or less labor intense than the average industry. A shift toward more labor-intensive industries will boost multipliers and lower costs per jobs, and vice versa for a shift toward less labor-intensive industries.
- Delayed housing and other capital accelerator effects. In the short run, boosts to state demand may be accommodated more by boosts to labor input, with less effect on the capital stock, which will lower costs per job created. In the medium run, boosts to demand will lead to larger adjustments to the capital stock to catch up with output demand, which will provide temporary boosts to the state economy, increasing output multipliers of fiscal shocks and potentially lowering costs per job created.[4]
- Agglomeration and other scale economy effects. As a state's economy expands because of public spending increases or tax cuts, this may affect the overall productivity of the economy. For example, a larger economy can afford to provide more specialized goods internally, which may increase the state's productivity as well as increase the MPC for goods produced in the state.
- Program-specific/policy-specific productivity effects. The specific types of spending increases or tax cuts may matter quite a bit if specific spending programs or tax policies have effects on state productivity. For example, infrastructure spending may raise the productivity of state businesses, which will attract additional businesses, thereby increasing multipliers and lowering the public spending cost per job created. As another example, on the tax side, tax cuts that increase the return to work—for example by expanding the state Earned Income Tax Credit—may boost state

[4] The recent job market paper by Howard (2017) provides some evidence for such "accelerator" effects.

residents' labor supply, which will increase multipliers and lower costs of creating jobs by way of tax cuts.

Traditionally, state fiscal multipliers for spending increases and tax cuts were derived from various regional econometric models. These regional econometric models were empirically based, but only in part. The empirical basis is that some of the parameters underlying the estimated multiplier numbers were based on data. For example, regional input-output models are based on data on whether businesses or households purchase goods and services locally or elsewhere, and on what those purchases are. More sophisticated regional econometric models such as the REMI model also incorporate feedback effects from state growth yielding higher local wages and housing prices (Treyz, Rickman, and Shao 1992). On the other hand, these data and estimates are then plugged into a model that generates the multiplier based on assumptions about the structure of the economy. In other words, in these regional econometric models, state fiscal multipliers are not estimated directly, but rather inferred from a combination of estimated parameters with model structure assumptions.

These traditional model-based estimates of state fiscal multipliers yield estimated fiscal multipliers and cost per job created that are broadly similar to predicted amounts, although sometimes somewhat lower. For example, in a 2004 study I did with my colleague George Erickcek, we used the REMI model to estimate that the cost of job creation in Michigan through spending increases was equal to what would be equivalent in the 2015 economy to $59,408 per job (Bartik and Erickcek 2004). The job-creation effect of tax cuts in Michigan was equivalent to a cost per job in the 2015 economy of $87,297.[5]

[5] These figures adjust the figures in the 2004 report by multiplying by the national ratio from the Bureau of Economic Analysis (BEA) of value added per FTE in 2015 to value added per FTE in 2004, which adjusts for both inflation and the likelihood that job creation costs will rise proportionately with output per worker. See the appendix to this paper for more detail on the precise calculations.

These numbers can be used to examine various policy scenarios. Given that state budgets are required by law to be balanced, the most relevant scenarios are balanced budget scenarios. For example, in our 2004 study, we followed Orszag and Stiglitz's suggestion to show that the state of Michigan would do better by closing a projected budget gap through tax increases than through spending cuts. The budget gap we analyzed would be equivalent to about $1.268 billion in today's economy.[6] Closing this gap through spending cuts would be predicted to cut FTE jobs in Michigan by 21,339 (21,339 = $1.268 billion divided by $59,408, using original unrounded numbers). Closing the budget gap through tax increases would be predicted to cut FTE jobs in Michigan by 14,521 (= $1.268 billion divided by $87,297). Therefore, compared to spending cuts, a tax increase would yield a job loss that would be smaller by 6,818 jobs (= 21,339 − 14,521).[7]

In addition to analyzing the effects of closing budget gaps, these fiscal policy multipliers/fiscal cost per job numbers can be used to estimate the "balanced budget multiplier": how many jobs would be created by a balanced budget increase in both taxes and public spending. An increase of $X in both taxes and public spending would destroy some jobs because of the tax increases and create some jobs because of the public spending increase. The jobs destroyed because of tax increases are equal to [$X/(tax cost per job)], and the jobs created because of the spending increase would be equal to [$X/(spending cost per job)]. If the spending cost per job is less than the tax cost per job, there will be net job creation. Under the estimates from the REMI model in Michigan, the balanced budget multiplier implies that an increase in

[6] This again adjusts for changes in the ratio of value added per FTE from 2004 to 2015. The actual number is $1,267,679,682.

[7] The FTE figures here adjust the numbers in the original report by the ratio of FTE jobs to nonfarm employment in the nation in 2004. In addition, the calculations throughout this paper use unrounded numbers, which causes some approximation differences at various places.

both taxes and spending of $185,591 would create one job {$185,591 = 1/[(1/59,408) − (1/87,297)]}.

So, taxing and spending creates some jobs but not very efficiently. At $185,591, the cost per job created is high enough that although this might slightly affect some benefit-cost analyses of public programs, it would clearly be inefficient to tax and spend more in a state simply to create more jobs for state residents. The average wage per FTE job in the United States in 2015 was $59,431 (data from BEA). Furthermore, creating jobs in a state is likely to have social benefits for state workers that are significantly less than the wage. Estimates suggest that in the long run, about 20 percent of jobs created in a state go to state residents (see estimates in Bartik 1991). In addition, jobs created will yield real-wage increases for state workers equal in dollar value to about 20 percent of the average wage. (See review of literature in Bartik [2015]). Therefore, the likely social benefits for state workers from a new job paying $59,431 is about 40 percent of that amount, or $23,773. This is only 13 percent of the likely cost of creating one job in a balanced budget fashion of $185,591. Given that total costs of a proposed public program will exceed the wage costs, the "balanced budget multiplier" only modestly affects the benefit-cost analysis of most government programs.

For example, in my 2011 book on preschool, *Investing in Kids*, I considered the claim of some advocates of preschool that there are large economic benefits to be reaped from preschool due solely to the program spending money on hiring adults to teach and run preschools (Bartik 2011). While this is true if a state receives the revenue needed to support preschool from some outside source (the federal government, a foundation), the economic benefits are estimated to be small if a state funds its preschool program from its own taxes. In the 2011 book, I estimated that the "balanced budget" job creation benefits of preschool programs might provide benefits amounting to 4 percent of a universal preschool program's costs.[8] My book argued that the main benefits that might justify preschool are the long-run effects on the former child participants.

NEW RESEARCH ON STATE/LOCAL FISCAL MULTIPLIERS

However, in recent years, and particularly since the debate over fiscal stimulus during the Great Recession, there has been a vast literature attempting to estimate fiscal multipliers of spending increases or tax cuts, at both the national and regional levels. But, as Smith (2017) points out in a blog post, simply referring to a "vast literature" does not provide convincing proof that readers can verify. What is needed are specific references to a few good papers that make verifiable claims about the topic and that are consistent with the overall literature's consensus. Therefore, rather than simply referring to a "vast" literature, let me identify, within the regional fiscal multipliers literature, three exemplary papers: Nakamura and Steinsson (2014), Suárez Serrato and Wingender (2016), and Zidar (2017). Nakamura and Steinsson estimate state and regional fiscal multipliers for military spending, Suárez Serrato and Wingender estimate county fiscal multipliers for federal grants and contracts, and Zidar estimates state fiscal multipliers for changes in federal taxes for different income groups.

These three papers are "exemplary" because they identify the causal effects of spending or tax changes using plausibly exogenous changes in spending or taxes due to "natural experiments." Nakamura and Steinsson predict variations in federal military procurement spending by state or region that are due to changes in national military procurement spending, coupled with various measures of how responsive each state or region would be expected to be to

[8] The benefits are somewhat smaller here than implied previously in this paper, as my 2011 book assumed smaller social benefits of job creation due to assumed fade-out of these social benefits over time.

such spending. Suárez Serrato and Wingender predict changes in what a county receives in federal grants and contracts due to census population numbers being adjusted from projections from the decade-old census numbers to more up-to-date current census population counts.[9] Zidar predicts changes in tax liability for different income groups in a state, as a share of the state economy, by combining national-level changes in tax liability for each group with state-specific measures of that group's share of tax returns. Although these papers are exemplary, it is also true that their estimates are similar to other papers in the research literature, as each of the papers shows in its review of prior research.

The Nakamura and Steinsson estimates imply, at the state level and in the 2015 economy, costs of $74,205 in creating a job using military procurement spending.[10] The Suárez Serrato and Wingender estimates imply, at the county level and in the 2015 economy, costs of $33,963 in creating an FTE job using federal grants and contracts.[11] The Zidar estimates imply, at the state level and in the 2015 economy, a cost of $39,177 in creating an FTE job from tax cuts for the bottom 90 percent of the income distribution.[12] On the other hand, tax cuts for the top 10 percent of the income distribution appear to have no job creation effects—in fact, some of the

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[9] This oversimplifies a bit. Their federal spending variable is mostly grants and contracts, as is evident from their Figure 5(b). However, it also includes some federal salaries and retirement benefits, as well as some loans and payments to individuals. But their measure excludes Social Security and Medicare payments. Thus, their public spending measure is mostly spending on goods and services, but a minority of the spending is for income transfers.

[10] My cost estimate uses the results for prime military contracts for states in Table 3 of Nakamura and Steinsson. (As one might expect, I find the results using baseline state military procurement activity more plausible than assigning a different propensity for each state, as Nakamura and Steinsson do in their Table 2). I use figures for 2015 GDP, CES employment, and FTE employment to adjust their estimated percentage effects on employment due to changes in military contracts as a percentage of GDP to effects on FTE employment. See the appendix for more details.

[11] My cost estimate adjusts their estimate in 2009 dollars of a $30,785 cost per job (Table 2, column 3), where job is private nonfarm jobs including proprietors, to 2015 dollars, and to FTE employees. In addition, because their job creation does not include the direct jobs created, I add in direct jobs created in state and local government, with an assumed cost of average 2015 value added per state and local government FTE employee. See the appendix for more details.

[12] My cost estimate adjusts Zidar's estimate of $31,513 (Zidar 2017, p. 17, footnote 31) from 2011 dollars to 2015 dollars, and adjusts for the difference between total employment in the Local Area Unemployment Statistics and FTE employment from BEA. See the appendix for more details.

point estimates suggest that tax cuts for the top 10 percent destroy jobs, although these point estimates are statistically insignificant.

How do these new estimates of fiscal multipliers compare with the prior estimates? For public spending, the most relevant estimates of fiscal multipliers imply costs per job created that are significantly lower than prior estimates. The estimates of military procurement cost per job in Nakamura and Steinsson are a little bit above prior estimates. This presumably occurs because military procurement is spent on relatively capital-intensive goods. However, the broader public spending considered in Suárez Serrato and Wingender is probably more relevant to ascertaining the public spending multiplier for all state and local public spending, as opposed to the particular type of public spending represented by military procurement. The broader public spending estimates in Suárez Serrato and Wingender show significantly lower costs per job than is true of the traditional estimates derived from input-output models and regional econometric models. This is even more surprising because the public spending estimates in Suárez Serrato and Wingender, although they are mostly due to public spending on goods and services, also include some public spending on transfers, for which we would expect higher costs per job created.

Why are the public spending costs per job created in the new estimates lower? One can speculate that this might occur because of various positive feedback effects not reflected in traditional regional econometric or regional input-output models. For example, these lower costs per job created of public spending could be due to effects of public spending that stem from housing or other capital stock accelerators, general agglomeration economies, or program-specific effects of public spending on local productivity.

The new Zidar estimates of fiscal multipliers of tax cuts are also surprising. Tax cuts for the bottom 90 percent have much larger fiscal multiplier effects on job creation than expected, based on prior regional econometric models, leading to surprisingly low costs per job created. In fact, the costs per job created are only slightly greater than the public spending estimates of Suárez Serrato and Wingender. Also surprising is that tax cuts for the top 10 percent have no impact.

What can explain the large tax cut effects found in Zidar? Upon reflection, these estimates make sense. As Zidar argues, tax cuts for the bottom 90 percent might be expected, under various specific tax policies, to have some direct effects in boosting local productivity. Zidar argues that the high tax cut multiplier for this income group might be due to labor supply responses and liquidity constraints. This income group might have more elastic labor supply in response to changes in net wages than has traditionally been incorporated into regional models—for example, the labor supply of this income group might respond negatively to increases in Social Security and Medicare payroll tax increases and positively to increases in the Earned Income Tax Credit. In addition, if this group in recent years has been increasingly liquidity constrained with high debts, low assets, and little excess disposable income, the MPC of this group might be higher than traditionally assumed in regional models. In contrast, for the top 10 percent, whose income has increased the most in recent years, their income and liquidity might be high enough that their consumption of local goods does not respond much to tax shocks.[13]

In addition, one should note, as pointed out by Zidar, that the average tax cut multipliers for all income groups might be closer to prior estimates. Estimates from the Institute for Taxation and Economic Policy (ITEP) suggest than in the average state, about 58 percent of nonbusiness

[13] Zidar's estimates, as constructed, reflect changes in federal tax liabilities for each group by state. State-specific policies might have different effects if such state differentials lead to migration effects—for example, for the top 10 percent. I consider this issue in an appendix and conclude that the likely job creation effects of migration responses of the top 10 percent are small enough that the cost per job created for state tax changes for this group are likely to be quite large.

taxes are paid by the bottom 90 percent of the income distribution, and 42 percent by the top 10 percent.[14] The average cost per job created from an average tax cut divided in this manner would be a little less than twice as great as the tax-cut cost per job for the bottom 90 percent, at $67,262.[15] This estimate is closer to what is produced by some regional econometric models. Where it differs is in emphasizing the importance of how tax changes are distributed across the income distribution.

IMPLICATIONS OF NEW FISCAL MULTIPLIERS FOR STATE POLICIES

These new estimates have potential implications for a wide variety of state policies. Consider the original Orszag/Stiglitz issue: if a state faces a budget deficit because of a recession, what is the best way to close that budget gap? We assume that all else being equal, the state government wants to minimize the job losses that will result from the demand-side effects of closing the state budget deficit. Under the new estimates, if a state wants to minimize job loss, the best course of action is to increase taxes on the top 10 percent of the income distribution. The next best is to raise taxes on the bottom 90 percent. The worst alternative is to cut public spending. However, whether it is better to raise taxes on the bottom 90 percent or cut public spending is a close call—either choice is similar in the effects it has on job destruction. Therefore, compared to the traditional Orszag/Stiglitz advice, the new advice places even more

[14] This is derived from their overall tax distribution tables for state and local taxes for the average state, and focusing in on nonbusiness taxes (ITEP 2015). Personal income taxes are distributed between business and nonbusiness based on Ernst and Young estimates of the share of personal income tax revenue at the state level that is attributable to business pass-through income (Phillips, Sallee, and Peak 2016). Their estimates break the income distribution at the eightieth and ninety-fifth percentile levels, so I interpolate halfway in between these two percentiles to infer a plausible share for the bottom 90 percent.

[15] $67,262 = 1/[58.2% × (1/$39,177)].

emphasis on raising the right types of taxes, not overall taxes. Furthermore, this new advice is accompanied by more specific multiplier job creation estimates per dollar of budget-gap closing.

Next, consider the balanced budget multiplier. The new estimates imply that a balanced budget increase in public spending, financed by taxes on the lowest 90 percent of the income distribution, will have little effect in creating jobs. In contrast, a balanced budget increase in public spending, financed by increased taxes on the top 10 percent of the income distribution, will have much larger effects on jobs for state residents. Under the traditional estimates, the balanced budget multiplier implied that a balanced budget increase in state taxes and spending increased jobs for state residents, but at a very high cost: $185,591 per job. The new estimates imply an even higher balanced budget multiplier for public spending financed by tax increases on the bottom 90 percent: $255,210 per job.[16] For public spending supported by taxes on the top 10 percent, the new estimates indicate a cost per job created that is much lower, at only $33,963.

Do these balanced-budget multiplier effects have a low enough cost per job that state budget increases will pass a benefit-cost test solely based on their job creation potential? The answer: not on average, but possibly in depressed areas or for public spending that targets job creation for the unemployed. As mentioned, we would expect that job creation in a state would yield benefits for state residents, due to increases in employment to population ratios and wages, that would be expected to average about 40 percent of wages. As mentioned already in this paper, average wages in the United States per FTE job were $59,431, so the social benefits for state workers of creating one job would be expected to average $23,773. This is 70 percent of the balanced budget multiplier cost of creating one job because of public spending increases that are financed by taxes on the top 10 percent.

[16] $255,210 = 1/[(1/33,963) − (1/39,177)].

However, these balanced-budget multiplier effects are high enough that they might significantly affect the benefit-cost analysis of many proposed public programs. For example, if, apart from job creation effects, a proposed public program would have a benefit-cost ratio of 0.50, or fifty cents on the dollar, the addition of job creation benefits equal to 70 percent of costs would push the benefit-cost ratio to 1.20. A program that failed a benefit-cost test, but offered some significant benefits relative to costs, would be tipped to the point where its net benefits become positive.[17]

Furthermore, job creation benefits might well become positive if the state economy is depressed, or even in boom times in economically depressed areas of the state. Suárez Serrato and Wingender (2016) estimate that in a slow-growth county, the cost of creating one job through extra public spending might be much lower, at around $14,000 per job.[18] This is less than the social benefits of $23,773 from creating one job. Furthermore, social benefits of creating jobs might be higher when the economy is depressed. In addition, if job creation efforts seek to target hiring the local unemployed, the percentage of jobs that go to state residents will be higher, which will further raise the social benefit per job created.

Consider also state business tax policies. For example, consider state business tax incentives, such as job creation tax credits, that seek to tip the location or expansion decisions of specific firms. A variety of estimates can be provided as to what these incentives cost per job

[17] Obviously, this depends crucially on social benefits of job creation as a proportion of a job's earnings. For the preschool program analysis I did in 2011, these new balanced budget multipliers would imply that a preschool program would have balanced budget multiplier benefits of around 21 percent of program costs, about 5.24 times my 2011 estimate of 4 percent of program costs. The lower benefits of 21 percent of program costs, compared to 70 percent of costs in the current paper's main text, are largely due to more conservative assumptions in my 2011 book about the social benefits of job creation, stemming from an assumption of more fadeout over time in effects of job creation on labor force participation and wages.

[18] Figure 11 of Suárez Serrato and Wingender's paper shows costs per job in slow-growth counties of $10,000 or less. If $10,000 is used as a figure, and the numbers are adjusted to 2015 dollars and to FTE jobs, and direct state and local jobs are added in, their $10,000 estimate becomes $14,333 per job.

actually induced by the incentive—that is, per job that would not have been created in this state "but for" the incentive—but one possible figure is a cost of around $13,000 per job created.[19] Thus, such cost-per-job figures imply that typical incentives today, which average around $2,600 per job year (or about 3 percent of wages for the average export-base company), would tip about 10 percent of such decisions, and that a typical incented job would have a multiplier effect of 2.[20]

But such incentives need to be financed, either by increases in other taxes or cuts in public spending. If business tax incentives are financed by increases in taxes on the top 10 percent of the income distribution, there is no demand offset, based on Zidar's results. But if business tax incentives are financed by public spending cuts, then Suárez Serrato and Wingender's estimates suggest that such public spending cuts might offset about two-fifths of the job-creating effects of the business tax incentives. For example, if we provide incentives of $1 million, this will create about 77 jobs directly (= $1 million divided by $13,000), but a public spending cut of $1 million will destroy about 29 jobs (= $1 million divided by $33,963). Alternatively, if business tax incentives are financed by tax increases for the bottom 90 percent of the population, then these household tax increases might offset about one-third of the job creation effects of the business tax incentive, based on Zidar's estimates. For example, the $1 million in business tax incentives might directly create about 77 jobs, but the household tax increases for the bottom 90 percent would destroy about 25 jobs (= $1 million divided by Zidar's cost per job destroyed by tax increases on the bottom 90 percent of $39,177).

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[19] I have used similar figures in previous work—for example, see Bartik (2016). These calculations are derived from the average long-run elasticity of businesses with respect to state and local business taxes, and assumptions about the multiplier effect of incented jobs. For some representative calculations, see the appendix.

[20] With this batting average and multiplier, about one net new job is created for every five jobs incented, and the annual job creation costs will be five times the cost of incentives per job year, or 5 times 2,600, or $13,000. See appendix for more detailed calculations.

General state and local business tax cuts would be expected to have even greater long-run costs per job created, as they go to all sectors of the state economy, not just the state's export-base firms. (In other words, one doesn't expect state and local business tax cuts for fast-food restaurants to generate many jobs, as their activity in a state is dictated more by the state's population and per capita income, which determine demand for fast food, than by their business taxes.) Therefore, for general state and local business tax cuts, offsets from spending cuts, or offsets from tax increases for the bottom 90 percent of the population, might eliminate an even greater share of the long-run job creation effects of the business tax cuts. In the short run, we would expect the private business sector and the state economy to only gradually adjust to the lower business costs brought about by business tax cuts, whereas the fiscal multiplier effects of spending cuts or household tax increases would be more immediate. Under most plausible scenarios, the short-run effect of a business tax cut financed by public spending decreases, or by tax increases in the personal taxes of the bottom 90 percent, would be a net destruction of state jobs.[21]

Of course, one could dispute the exact amount of these offsets to business tax incentives or business tax cuts. There are uncertainties about how sensitive business location decisions are to incentives or business tax cuts. There are uncertainties in the multiplier estimates from Zidar (2017) and Suárez Serrato and Wingender (2016). The important bottom line conclusion is that these fiscal multipliers are plausibly high enough that the financing of state business tax incentives or business tax cuts can significantly reduce their job creation effects, or even result in net job destruction in the short run.

[21] The appendix provides some illustrative calculations under various scenarios.

Zidar's estimates also have important implications for overall state tax policy. Redistributing some taxes from the bottom 90 percent of the income distribution to the top 10 percent would be estimated to create jobs. The estimate is that each $39,177 that is so redistributed would create one net job in the state. Presumably this finding is valid only within the range of variation of relative tax rates on these groups in his estimation sample, so one wouldn't want to assume that such an economic policy would work if we went well beyond the observed range of how state tax policies distribute taxes across the income distribution. But within that range, income redistribution via state tax policy would be expected to have positive effects on job creation.

CONCLUSION

The overall lesson from this recent research is that state budget and tax policy must consider demand effects. State public spending, and the level and distribution of state and local taxes, has potential fiscal multiplier effects that are large. These large fiscal multiplier effects can yield effects on state jobs that have large effects on state residents' well-being. These demand and job creation effects are large enough that they affect the benefit-cost analysis of many state policies.

Considering demand effects of state spending and taxes is a departure from traditional public finance analysis. Demand effects are customarily considered at the federal level, as the federal government can run budget deficits that can have important macroeconomic effects. The tradition at the state and local levels has been to assume that demand effects can largely be ignored, as being second-order effects that largely offset given balanced budget requirements. Based on this new fiscal multiplier research, this traditional assumption should be reexamined.

An important topic for future research on state and local public finance is providing estimates of public spending and tax effects for specific programs and policies. For different types of state and local public spending, or different types of taxes, how do the job creation effects vary per dollar? For example, perhaps job creation effects of public spending are greater for public spending that directly targets labor force participation, such as child-care subsidies. Or perhaps job creation effects of lower tax rates are greatest for policies, such as the Earned Income Tax Credit, that target improving net wages for persons who are most likely to otherwise be out of work.

State and local policymakers are interested in promoting local economic development to benefit state residents with more and better jobs. Researchers need to provide more direct evidence on how specific spending programs and tax policies affect local economic development.

APPENDIX

This paper presents many estimates of cost per job created of various policies, all based on previous research. I try to translate the estimates from prior research into a consistent measurement framework, in which costs are stated as costs in the 2015 national economy per full-time-equivalent (FTE) job. This appendix explains the specific adjustments made.

Bartik and Erickcek (2004) Estimates

The table in Bartik and Erickcek presents the costs per job for 2004. Jobs are defined as nonfarm employment from BEA, which includes both full-time and part-time jobs. The original stated costs per job are $925 million divided by 23,820 jobs for public spending changes, or $38,883 per job; and $925 million divided by 16,210 jobs for tax changes, or $57,064 per job.

I first adjust to 2004 dollars per FTE job by multiplying by the ratio of BEA nonfarm employment to BEA FTE nonfarm jobs. This ratio is 1.116 = 136.8/122.5. The resulting costs per job in 2004 dollars are $43,349 for public spending changes and $63,699 for tax changes, both in 2004 dollars in a 2004 economy.

I then adjust to the 2015 economy by multiplying by the ratio of 2015 value added per FTE nonfarm worker in 2015 to VA per FTE nonfarm worker in 2004. This ratio adjustment accounts for inflation from 2004 to 2015 and assumes that the real cost per job will scale with increases in real value added per worker. This ratio is 1.3705 = $135,964/$99,210. After this adjustment, the resulting cost per job are $59,408 for public spending and $87,297 for taxes.

Nakamura and Steinsson (2014) Estimates

The cost-per-job estimates in this paper are based on the 1.81 multiplier for states reported for employment in Nakamura and Steinsson's Table 3. Their dependent variable is the change in employment from two years ago, as a percentage of the employment level two years ago. Their shock variable is the change in prime military contracts from two years ago, as a percentage of GSP two years ago. Therefore, the implicit derivative of military costs with respect to job change is given by (1/1.81) times the ratio of GSP to employment lagged by two years.

I assume that this relationship would apply to FTE, and calculate this in 2015. This calculation uses nominal GDP from 2013, which is in 2013 dollars. To update to 2015, I use the Consumer Price Index Research Series Using Current Methods (CPI-U-RS).

The resulting calculation for the cost per job is (1/1.81) times ($16.692 trillion GDP in 2013) divided by (126.762 million FTE workers in 2013), and then multiplied by 348.2 CPI-U-RS for 2015 divided by 342.2 CPI-U-RS for 2013. The resulting dollars per job figure, in 2015 dollars per FTE job, is $74,025.

Suárez Serrato and Wingender (2016) Estimates

The calculations begin with their central cost estimate that the cost of creating one private sector job by federal government spending shocks is $30,785 (Table 2, column 3, and text on page 16). This figure is in 2009 dollars per total nonfarm jobs including part-time jobs and proprietors' employment.

This figure is first adjusted to FTE jobs by multiplying by the 2009 ratio of total private nonfarm jobs, including part-time and proprietors, to total private nonfarm FTE jobs. This ratio is 1.458 = 146.9 million/100.7 million. The resulting 2009 cost per FTE nonfarm job is $44,893.

This ratio is then adjusted to 2015 dollars and the 2015 economy by multiplying by the ratio of value added per FTE nonfarm employee in 2015 to value added per FTE nonfarm employee in 2009: 1.148 = $139,521/$121,533. The resulting cost per job of creating private nonfarm jobs via spending is $51,542.

However, this calculation does not count the jobs directly created by spending in the public sector. I assume that such jobs are created at a cost per job equal to value added per state and local general government FTE worker, which was $99,582 in 2015.

Combining these estimates, the cost of creating FTE jobs in both the private and public sector is $C/(P+G)$, where C is the government spending, P is private sector FTE jobs created, and G is government jobs created. Dividing both top and bottom by C and rearranging yields $C/(P+G) = 1/((P/C) + (G/C)) = 1/((1/(C/P)) + (1/(C/G))) = 1/((1/\$51{,}542) + (1/\$99{,}582))$. This calculation yields a cost per FTE job, including both private and government jobs, of $33,963.

Zidar (2017) Estimates

Zidar states a cost per job of $31,513. But this is in 2011 jobs and is per job, including part-time employment. To state it in 2015 dollars per FTE employee, I use a procedure similar to what was used above for Nakamura and Steinsson (2014). The Zidar $31,513 figure is based on a coefficient of 3.42 from an estimating equation that is similar to the Nakamura and Steinsson equation, where the percentage change in employment on a base of two years ago is related to the percentage change in the bottom 90 percent tax liability as a percentage of GSP two years ago.

To translate this fiscal multiplier into a cost per FTE job, the negative of the derivative of the change in tax cost per FTE job will be given by (1/3.42) times the ratio of GDP to FTE employment. This implicitly assumes that the change in FTE employment will in percentage terms be the same as the change in all employment. This is done using values from 2013, which is 2015 lagged by two years. We then adjust to 2015 dollars using the ratio of the CPI-U-RS in the two years. Therefore, the cost per job = (1/3.42) times ($16.692 billion GSP/126.762 million

FTE jobs) times (348.2 value of CPI-U-RS index in 2015/342.2 value of CPI-U-RS index in 2013). The resulting cost per job is $39,177.

Cost Per Job from Incentives

This calculation is similar to what has been done previously in Bartik (2016). However, the cost per job figures reported here are somewhat lower because I use a somewhat higher tax elasticity (in absolute value). I use a tax elasticity of −0.33 for business location decisions rather than −0.20, which was used in Bartik (2016). This tax elasticity is the long-run elasticity of business activity in a state and local area relative to all state and local business taxes. In the current context, I use a tax elasticity holding public services constant, which is relevant in calculating business location responses before allowing for the effects of the business incentive's financing. The mean value of this elasticity reported in Bartik (1991) is −0.33 (Table 2.3).

The implicit assumption used is that the effects of business costs on new firm location decisions, in percentage terms, will be the same as the long-run business tax elasticity. This is the assumption implicitly adopted in reporting the results used in Bartik (1991), and both Wasylenko (1997) and Phillips and Goss (1995) find no evidence that the micro elasticities so calculated differ from the aggregate long-run elasticities.

If this is the case, then the cost in forgone taxes per job created can be written as follows:

$$dT/dE = [(1/(d\ln E/d\ln T) \times (T/E)].$$

Here, T represents state and local business taxes per job, and $d\ln E/d\ln T$ is the long-run elasticity of business activity with respect to state and local business taxes.

As shown by Bartik (2017) and by Ernst and Young (Phillips, Sallee, and Peak 2016), state and local business taxes have generally been about 5 percent of value added. Value added for firms in 31 export-base industries (the ones used in Bartik 2017) in 2015 was an average of

$177,258 per FTE job. This implies that gross state and local business taxes averaged 5 percent as much, or $8,863 per job-year. Dividing by 0.33 gives a cost per job-year of $26,857. The implicit assumption is that incentives, which will generally have costs per job-year of $5,000 or less, will yield an effect on location probabilities that is consistent with that cost per incented job.

However, this calculation does not count multiplier jobs. If we assume the multiplier is 2, the cost per total job (incented plus multiplier jobs) will be half as great, or $13,429.

Obviously, we can get quite different values either from assuming different business tax elasticities or from assuming different multipliers. But the point remains that the financing effects for incentives may often be significant in determining the net cost per job created.

Cost Per Job from Business Tax Cuts

For business tax cuts, we use the same long-run elasticity of business activity with respect to state and local business tax cuts. So, the long-run cost per job is given by the same equation:

Cost per job = (1/.33) × (State and local business taxes per FTE job).

However, what differs here are two factors: 1) value added per FTE job is lower for businesses overall than for export-base businesses, so state and local business taxes will be lower, and 2) a multiplier effect will not apply to a cut to overall state and local business taxes, as the estimated elasticities in the research literature already implicitly incorporate such effects.

Value added per FTE job for the overall private business sector averaged $139,868 in 2015, so state and local business taxes at 5 percent of value added would be $6,993, and $6,993 divided by 0.33 yields a long-run cost of business tax cuts per FTE job created of $21,192.

But this is the long-run cost per job. In general, we expect sluggish adjustment of the private economy to new, lower business costs. Suppose the adjustment is only 9 percent per year, as estimated in Helms (1985), which is similar to what one gets in subsequent studies. Then the short-run cost per job created of business tax cuts, holding financing cost constant, will be over 10 times as great, or over $200,000 per job in the short run. Clearly, the fiscal multiplier effects estimated by Suárez Serrato and Wingender, or by Zidar, are sufficiently large to more than outweigh these short-run incentive effects.

One possible counterargument is that the business tax cut will have its own multiplier effects. However, the direct fiscal multiplier is likely to be slight, given two factors: 1) much of the business earnings flow out of state, and 2) most of the business earnings that stay in state are likely to go to the top 10 percent of the income distribution. Zidar's results suggest that shocks to the income of this top 10 percent group do not substantially affect local economies.

Alternatively, one could argue that there might be some direct shifting of business tax burdens that occurs immediately, without intermediary effects on economic variables. In most equilibrium models of tax-base shifting, such shifting occurs only indirectly. For instance, if some policy change, such as lower business taxes, financed either by lower public spending or higher nonbusiness taxes, leads to changes in labor demand relative to labor supply, this might lead to changes in wages that will shift some of the burden of the taxes. But if shifting occurs immediately and directly—that is, as soon as business taxes are lowered in a state—this leads firms to increase the wages they pay workers, as a form of rent sharing. Under those assumptions, then, the lower business taxes may have some spending multiplier effects through their direct effects on workers. However, unless such shifting is immediate and involves a very large percentage of business taxes, it is still quite likely that the short-term fiscal multiplier losses from public spending cuts, or from increases in taxes for the bottom 90 percent, will outweigh the short-run effects of business tax cuts in incentivizing additional state business activity.

Cost Per Job from Migration Effects of State Tax Changes for Top Income Groups

Zidar's estimates are based on changes in federal tax liability for income class by state. Because these changes reflect changes in federal tax liability, we would not expect such tax changes to lead to large migration responses.

However, for state-specific tax changes for the top income groups, such migration responses are more plausible. Would such migration responses be likely to lead to large job creation effects, per dollar of forgone tax revenue, for tax cuts for the top 10 percent?

Most of the research literature suggests little if any effect of state tax changes on migration (Mazerov 2014). However, one prominent and well-done recent paper, by Moretti and Wilson (forthcoming), has found large and statistically significant effects of tax changes for the top 1 percent on the migration choices of "star scientists." I want to explore in this subsection the implications of the Moretti and Wilson paper for fiscal multipliers for tax cuts for the top 1 percent. In addition, a paper by Young et al. (2016) finds some statistically significant but small effects of state taxes on the migration choices of millionaires, and I want to see what this paper implies for fiscal multipliers for the top 1 percent, whose incomes closely overlap those of the millionaire households considered by Young et al.

Moretti and Wilson estimate the influence of net income after taxes at the ninety-ninth percentile of income on the migration of star scientists, who are "defined as scientists . . . with patent counts in the top 5 percent of the distribution." They estimate a highly statistically significant elasticity of such location decisions. Specifically, they estimate that if a state's tax changes in its personal income tax system lead to a "permanent 1 percent increase in the net-of-tax rate for personal income," this "would lead to a 6 percent increase in the stock of scientists by the end of year $t + 10$." This increase in the stock of scientists reflects both demand and supply responses, and can be interpreted as a 6 percent increase in the number of employed scientists after 10 years.[22]

Suppose we extrapolated from Moretti and Wilson's results to assume that the employment response to state tax cuts for everyone in the top 1 percent would be as large as what they find for top scientists. Under that assumption, what would be the revenue cost per job created for tax cuts for the top 1 percent?

We want to calculate the following for effects of a state personal income tax change for the top 1 percent:

$$\mathrm{d}R/\mathrm{d}J,$$

where $\mathrm{d}R$ is the change in state income tax revenue and $\mathrm{d}J$ is the change in state jobs. The change in both numerator and denominator of this expression will be due to some change in the state personal income tax rate on the top 1 percent.

Personal income tax revenue from the top 1 percent can be written as the average state personal income tax rate on the top 1 percent, times the average income per household of the top 1 percent, times the number of households in the top 1 percent, or $R = T_s * Y * H$.

Because of a change in the state tax rate T_s, revenue changes by

$$\mathrm{d}R/\mathrm{d}T_s = Y * H + (T_s * Y) * \mathrm{d}H/\mathrm{d}T_s.$$

The number of jobs changes by

$$\mathrm{d}J/\mathrm{d}T_s..$$

[22] This is consistent with the migration literature, which generally has found that each migrant creates about one job, at least after a few years, with specific estimates of job creation effects of migration rarely varying widely from 1. See Muth (1971), Greenwood and Hunt (1984), and more recently Howard (2017).

Dividing one by the other gives the revenue gain or loss per job destroyed by state income tax rate increases, or the revenue gain or loss per job created by state income tax rate decreases.

I assume that dH/dT_s will be equal to dJ/dT_s times the ratio of households to full-time-equivalent jobs. According to the Congressional Budget Office (CBO), in 2013 the United States had 123.1 million households. In the same year, BEA reports 126.2 million FTE jobs. So the second term, divided by the denominator, simplifies to (T_s * Y * 123.1/126.2).[23]

According to data from the Institute for Taxation and Economic Policy, the average personal income tax rate at the state level for the top 1 percent is 4.3 percent, and the average income per family in the top 1 percent is $1,645,891. (I convert their 2012 figures to 2015 dollars using the CPI-U-RS data series.) Therefore, the second term simplifies to 4.3 percent times $1,645,891 times 123.1/126.2 = $68,687. This is the revenue gain collected from one more job that is attracted to the state by lower personal state tax rates, or the revenue loss from one more job that is repelled from the state by higher personal state tax rates.

The first term has $Y * H$ in the numerator. The denominator dJ/dT_s can be related to the elasticities estimated by Moretti and Wilson, as follows:

$$dJ/dT_s = [d\ln J/d\ln(1 - T_f - T_s(1 - T_f))] * (dJ/d\ln J) * (d\ln(1 - T_f - T_s(1 - T_f))/dT_s).$$

Here, T_f is the effective federal tax rate that is applicable to the personal income of the top 1 percent of households, and state personal income taxes are assumed to be deducted before federal taxes are levied. According to the CBO (2016), in 2013 the effective federal personal income tax rate on the top 1 percent averaged 23.1 percent. The first term is the elasticity estimated by Moretti and Wilson.

[23] Technically, this should be the ratio of households to FTE jobs for the top 1 percent, but in the absence of better information, I use the overall ratio for the entire economy.

The denominator can then be rewritten as follows:

$$(\text{Moretti and Wilson elasticity}) * (\text{Number of FTE jobs}) * \{1/[1 - T_f - T_s(1 - T_f)] * (-1) * (1 - T_f)\}$$

Dividing the numerator by this denominator, we then get for the first term

$$-1 * Y * (H/J) * (1/\text{Moretti and Wilson elasticity}) * [1 - T_f - T_s(1 - T_f)]/(1 - T_f).$$

This term is the gain in tax revenue on the existing base per job destroyed by raising state personal income taxes on the top 1 percent, or the loss in tax revenue on the existing base per job created by lowering state personal income tax rates on the top 1 percent.

The effective Moretti and Wilson elasticity after 10 years is about 6 (p. 41 of their forthcoming paper). Y as mentioned is $1,645,891 per year. ($H/J$) is quite close to 1 at (123.1 million/126.8 million) = 0.971. If the federal income tax rate for the top 1 percent averages 23.1 percent, and the state rate averages 4.3 percent, then one minus the combined rate term of $(1 - T_f - T_s(1 - T_f)) = 0.736$. And the last term in the denominator, $(1 - T_f)$, is equal to 0.769.

Multiplying all this together, the first term is equal to −$254,781. Per job gained from state personal income tax cuts on the top 1 percent, we have to give up $254,781 in static revenue from the existing tax base for the top 1 percent. This amount is so high, even with the significant Moretti and Wilson estimates, because so much personal income tax revenue at the state level is collected from the top 1 percent, given the U.S. income distribution, and also because the Moretti and Wilson elasticity is diminished by the deductibility of state personal income taxes on federal income tax returns.

Adding the two together, the cost per job created from personal income tax cuts on the top 1 percent is −$254,781 in static revenue loss, plus $68,687 in revenue gain from the newly created jobs from the top 1 percent. The net estimated cost is −$186,094 per job created.

As mentioned, most of the research literature does not find significant migration elasticities with respect to taxes. But even the Moretti and Wilson estimates do not imply that lowering personal income tax rates on the top 1 percent is a tremendously cost-effective way of creating jobs. The resulting cost per job created or fiscal multiplier is around $186,000, which is quite hefty.[24]

The recent Young et al. paper on how state taxes affect the migration of millionaires provides alternative estimates to Moretti and Wilson. Young et al. consider the migration choices of all tax filers who report a million dollars or more in earned income (in 2005 dollars) in any of the years from 1999 to 2011. They report an elasticity with respect to the combined federal and state tax rate of only minus 0.1—a 10 percent reduction in the combined tax rate would only be expected to increase a state's population of "millionaire" households by 1 percent. To be comparable to the elasticity reported by Moretti and Wilson, which is the logarithmic population response to the logarithm of (1 minus the combined federal and state personal income tax rate), this elasticity would need to be multiplied by minus 2.79.[25] So in Moretti and Wilson's elasticity units, the Young et al. elasticity would be measured as 0.279. But Moretti and Wilson's elasticity is 6, which is 21.5 times as great as what Young et al.'s results imply.

We can do a similar calculation to what was done for Moretti and Wilson to find the implied cost per job created from tax cuts for the top 1 percent, under the assumption that their

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[24] What about further multiplier effects of the additional 1 percent, stemming from their purchases of other local goods and services? In the migration literature, in general there is no basis for estimating an overall job effect of one more migrant that much exceeds 1. There might be other offsets; for example, migration of the top 1 percent might drive down wages of this group, which would depress demand, or they might drive up local costs, which could drive away other local jobs. Overall, most of the migration literature seems to agree that migration leads to a similar level of job growth, not to much greater job growth, when all these different effects are considered. See Muth (1971), Greenwood and Hunt (1984), and Howard (2017).

[25] Let $d\ln J/d\ln(1-k) = z * d\ln J/d\ln(k)$, where k is the combined federal and state personal income tax rate. If $k = T_f + T_s * (1-T_f)$, and T_f is 0.231 and $T_s = 0.043$, then $k = 0.264$. The ratio z would then be expected to be $d\ln(k)/d\ln(1-k)$, which will equal $-(1-k)/k = -0.736/0.264 = -2.79$.

location choices will be similar to the millionaire group considered by Young et al. The overlap appears likely to be good, as Young et al. report median millionaire income of $1.7 million in labor income (in 2005 dollars), which, adjusted using the CPI-U-RS in 2015 dollars, is $2.063 million and is quite comparable to the $1.645 million (2015 dollars) in average income reported for the top 1 percent by ITEP. As before, we are assuming that millionaire household migration reflects job creation in that the household labor supply adjustment must be accompanied by an accommodating job adjustment to be an equilibrium labor market response. Based on the migration literature (Muth 1971; Greenwood and Hunt 1984; Howard 2017), we would expect each migrant to create about one job.

In the Young et al. case, the second term will be the same as before, with a gain of $68,687 in 2015 revenue per top 1 percent FTE job created in a state. But the revenue loss in the first term, due to the lower elasticity, will imply 21.5 times the static revenue loss per job implied by Moretti and Wilson, or −$5,479,160 per FTE job created by a tax cut for the top 1 percent. Adding in the revenue gain from the additional FTE job of $68,687 gives a net cost per job created implied by Young et al.'s results of −$5,410,472.

Considering these results together, it seems unlikely that the migration responses to cutting taxes on the top 1 percent will be sufficient to imply a low revenue cost per FTE job created. The cost per job created ranges from extremely high values of over −$5 million to a still very large cost of over −$186,000.

Cost per migrant-created job could be lowered if it was legally or politically feasible to target tax relief to particularly mobile groups—for example, to give state income tax relief only to top scientists. But this approach appears to be of dubious feasibility.

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