Spring 2020

Intragovernmental Autonomous Stabilizers

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Thesis Submitted to Levy Economics Institute of Bard College

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Annandale-on-Hudson, New York May 2020

ACKNOWLEDGEMENTS

I'd like to thank my folks for always encouraging me to do what I thought was interesting, even when they didn't understand what it was or why. Next I'd like to thank L. Randall Wray for writing the book that got me to go to the MMT conference in 2017 at UMKC, which pulled me back into economics. Then I'd like to thank Rohan Grey, Nathan Tankus and Scott Ferguson for showing me where the good books were and encouraging me to go on to graduate school. From there, thanks to everybody on Twitter, couldn't have done it without you all as a world, especially Mike, Sam, George, Gabriel, Brock, Scaggs, and Trombley. I'd like to thank my beloved advisor Jan Kregel for listening to me run through several theses worth of speculation before landing on this one. Lastly, I'd like to thank Anna for listening to me talk about this and nothing else for months on end and still wanting to hang out.

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Alex Williams
21 May 2020

ABSTRACT

We present a novel framework for understanding the relationship between the federal and state governments of the United States of America. Drawing on the experience of state government finances during and after the Great Recession in 2008, we propose the establishment of novel intragovernmental budgetary stabilization mechanisms. We draw out the flawed arguments of the existing fiscal federalism literature and demonstrate how the work of Michael Pettis and Modern Monetary Theory provide more usable insights when crafting public policy. We propose several potential policy responses and produce a counterfactual model of state finances after the Great Recession using the new policy response. These results are analyzed to show their effectiveness. Finally, it is demonstrated that this policy could be implemented by either the Treasury Department as past programs have been, or by the Federal Reserve.

Keywords: Fiscal Federalism, Automatic Stabilizers, Public Finance, Moral Hazard, Modern Monetary Theory, Capital Structure, State and Local Government Budget Constraint, Devolution, Countercyclical Fiscal Policy, Intragovernmental Policy

JEL Classifications: B50, E12, E32, E61, E62, E63, H11, H29, H70, H74, H77

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INTRODUCTION

Following the Great Financial Crisis in 2008, and the subsequent persistently anemic growth, a long-dormant conversation about the role of automatic stabilizers has restarted. In this paper, I will look over a wide cross section of the macroeconomic literature, as well as some more niche public finance literature in order to propose a robust new framework for ensuring countercyclical fiscal policy at all levels of government in a federal system. To achieve this, I model a theoretically well-founded policy for automatic stabilization payments to state governments. These payments allow state governments to react quickly to macro-level downturns beyond their control in a manner that is not subject to traditional moral hazard critiques. This allows federal-level macroeconomic stabilization policy to make effective use of existing spending channels through state government purchasing and hiring. After modeling this policy, we demonstrate that – following a corporate finance framework elucidated in Pettis (2001) – this proposal could be implemented equally effectively through the Federal Reserve bank, or the Treasury, and as such has a unique ability to provide automatic stabilization insulated from political pressure.

CHAPTER 1: THE 2008 RECESSION

The Global Financial Crisis and ensuing worldwide recession have occupied economists – both mainstream and heterodox – for over ten years now. Depending on the writer and audience, it was either impossible-to-foresee or obvious. Again, depending on who you ask, models have either been confirmed or completely overhauled in light of new facts. For our purposes, the period following the crisis provides a concise account of the inability of state governments to ameliorate macroeconomic downturns in their current institutional arrangement. State governments are forced into highly procyclical actions over the business cycle, which both exacerbates the downturn and forces the federal government into ever-larger stimulus in order to achieve their desired aggregate fiscal stance. Additionally, given their differences in demographics, sectoral composition, and tax base, different states have different intensities of response to cyclical downturns. We find that states lose substantial revenues at the start of the crisis, which were never fully covered by either economic recovery or intergovernmental

transfer. Following this revenue loss, state and local governments pursued contractionary fiscal policy in order to ensure a balanced general operations budget. This contractionary stance lengthened the downturn, and further contributed to sluggish growth in state revenues, as the failure to provide countercyclical sources of demand suppressed income growth. The overall picture is one of state and local governments forced to destabilize their own economies in the face of a generalized macro contraction.

Given that recessions are considered to be short-run phenomena in the mainstream literature, much of the mainstream analysis of the response of state and local governments to the 2008 recession focuses on the period during and immediately after the declared NBER recession. The crisis led to sudden and severe revenue shortfalls, which state and local governments scrambled to cover.

The early years of the crisis look like a normal recession. As the crisis began in 2008, the same-year impact on state and local governments was minimal. Tax receipts declined by less than five percent at both the state and local level and state budget gaps as a percentage of tax receipts were roughly two percent, in aggregate (Jonas 2012). States tapped rainy day funds in order to cover this comparatively small budget gap (Jonas 2012).

However, in 2009 and 2010 the recession became much more severe. Unemployment hit double digits and GDP growth went into reverse (U.S. Bureau of Labor Statistics n.d.; U.S. Bureau of Economic Analysis n.d.). For state and local governments, the reduction in tax revenue became severe, shrinking almost ten percent from 2009 to 2010. This contributed to budget gaps on the order of fifteen percent of total tax revenues for the years 2009 and 2010 for states and locals considered in aggregate (Jonas 2012). Interestingly, local tax revenues increased over these years, buoyed by the lag in tax assessments (Jonas 2012). Housing had appreciated dramatically over the preceding years, increasing the tax base for many local governments (Lutz, Molloy, and Shan 2010). In spite of this, the fall in revenues from more income-elastic taxes was sufficiently large that the aggregate position was negative for states and locals considered together (Lutz, Molloy, and Shan 2010; Jonas 2012; Mattoon 2012).

States responded to this yawning budget gap with strongly procyclical austerity measures, cutting spending and raising taxes. This emphasis on austerity is key, as states cut three dollars in spending for every one dollar of increased taxation (McNichol 2012). This austerity led to cuts in services that more citizens sought to utilize over the downturn, most notably health care and unemployment support (McNichol 2012). Additionally, the turn to austerity by itself killed jobs, as states pursued multiple waves of layoffs over the long period of crisis.

Some of this was mitigated through discretionary – not automatic – fiscal policy through the American Recovery and Reinvestment Act, in February of 2009. This bill contained tax cuts, additional money for unemployment insurance, infrastructure allocations, and fiscal transfers to stabilize state budgets (111th Congress of the United States of America 2009). While these provided a measure of stabilization, the ARRA funds were insufficient to close state budget gaps (McNichol 2012). States continued to draw down their rainy-day funds and cut spending. When ARRA support essentially ended in 2012, many states had yet to see either their tax receipts or rainy-day funds recover, leading to a second aggressive round of budget cuts (McNichol 2012). At this point, the federal government was focused on the debt ceiling and size of the deficit, while other observers began to talk about a "double-dip recession" and "fifty Herbert Hoovers" in the state capitals (Krugman 2010).

After leaving state governments in the lurch, the recovery continued slowly until the spring of 2020, with unemployment steadily dropping and the employment-population ratio rising. Tax receipts eventually regained pre-crisis trend growth levels, but many state services still have not recovered (Pollin and Thompson 2016). A good example of the degree to which this austerity has continued to constrain domestic demand can be seen in the ongoing fiscal squeeze in many state education systems. These conditions led to a series of wildcat strikes in 2018, over pay increases and material support for education (French 2019). It is against this backdrop of the total failure to protect state budgets from an unprecedented macro downturn that we turn to the theoretical portion of the literature review.

CHAPTER 2: THEORIES ON COUNTERCYCLICAL STABILIZERS

The idea that governments should pursue countercyclical fiscal and monetary policy in order to stabilize the economy is as old as macroeconomics itself. The English-language lineage traces its way from Mandeville through Malthus to its canonical expression in Keynes' *General Theory*. Much of twentieth century macroeconomics has focused on sorting out exactly how this countercyclical policy works, when it should be applied, how big it should be, where fiscal policy ends and where monetary policy begins. From the publication of the *General Theory* to the mid-1970s, the focus was largely on stimulus through fiscal policy. An entire literature cropped up, purporting to make Keynes' insights legible within a mainstream framework, on how much demand can be stimulated without leading to runaway inflation. Following the stagflationary episodes of the 1970's and the Volcker shock, macroeconomics shifted focus to countercyclical policy through the operation of monetary policy alone. Despite untold costs in terms of human misery, the persistent breaching of the zero-lower-bound for interest rates following the 2008 Global Financial Crisis finally shifted focus back towards fiscal policy for countercyclical stabilization. In this section we will briefly examine the original impetus to countercyclical fiscal policy in the work of Keynes and its development among the post-Keynesians. With that theoretical justification in hand, we will examine some novel approaches to countercyclical macro policy, specifically in the work of Claudia Sahm and Yair Lisotkin, among several others.

The broad history of Anglo-American macroeconomics is a well-understood and oft-told tale that I will gloss in brief here. The marginalist revolution, especially Walras and Jevons, relied on a supply-side closure often referred to as "Say's Law," that supply creates its own demand (Snowdon and Vane 2005). In this kind of model, involuntary unemployment is impossible as the supply of labor creates the demand for labor and the model closes through a sufficiently low wage rate. Following the extended downturn in the 1930's, Keynes and Kalecki rejected this framework in favor of one that closes on the demand side (Foley, Michl, and Tavani 2019; Keynes 1953). Output was constrained by spending, rather than vice versa. A reduction in wages during a downturn would perversely lower output further, rather than raise employment (Snowdon and Vane 2005; Foley, Michl, and Tavani 2019). The central problem is that the decision to save and the decision to invest are made by unrelated actors. Investors may decide

the outlook for investment is bad and stop investing. When this happens, several things follow: the wage bill falls, spending falls, and hiring falls. Private actors drive the downturn on until it finds a bottom, at which point they may begin to invest again at rock-bottom prices, surrounded by human misery. What Keynes and Kalecki argue is that government dollars serve the same purpose as private sector dollars, from an effective demand perspective, and so the government can arrest a downturn by increasing spending as the private sector falters. Keynes famously referred to this as "magneto trouble" (Keynes 1930). With this in mind – to varying degrees – governments were able to spend their way out of the Great Depressions, whether through public works or public armament.

This basic insight went two ways in the macroeconomics literature. The mainstream approach took the dynamics described by Keynes to be necessarily short-run and tied to the inability of prices and wages to adjust sufficiently to clear markets in a downturn. While this is explicitly opposite to the arguments made by Keynes – most pointedly those of chapter 19 in the *General Theory* – it did lead to discipline-wide interest in macroeconomic stabilization (Keynes 1953; Snowdon and Vane 2005). The Hicks-Hansen model and the Phillips Curve became so hegemonic that Monetarists and New Keynesians took them to be the entire field of battle for the duration of the postwar era (Snowdon and Vane 2005). The second direction taken by these insights is clear in the work of the post-Keynesians. Rather than discarding Keynes' financial frame, these theorists further expanded on Keynes' basic insights. Much of this involved pulling in legal theories of the corporation, quasi-institutionalist insights, up-to-date financial models, and novel approaches to price theory (Snowdon and Vane 2005; Lee 1999). Despite substantial internecine disagreements, the entire post-Keynesian literature is characterized by a resolute insistence on the aspects of Keynes' theory that the mainstream literature rejected out of a need to retain a neoclassical theory of the labor market (Lee and Jo 2018). Importantly for our purposes here, many of the major insights of the post-Keynesian literature return in the Modern Monetary Theory literature addressed below, and we will wait until then to discuss it.

Following this period of focus on macroeconomic stabilization, a second generation of theorists – beginning in the 1970s, hegemonic by the 1980s – rejected the entire apparatus. New Classical and New Keynesian economics have ruled the roost since the early 1980s. Central to this literature is the assumption that all agents are rational maximizers, and that economic

fluctuations are either desired by these agents or purely unavoidable (Snowdon and Vane 2005). Within this literature, there is little to no role for government intervention to prevent downturns, aside from tweaks to the overnight interest rate when it is perceived to have deviated from the so-called "natural rate" (Snowdon and Vane 2005). Additionally, macroeconomics itself is considered to consist of summing over microeconomic agents, with no unique rules, identities, or constraints of its own (Lucas 1976). Inarguably, the shift to this mode of theorizing has set the entire discipline back decades. Much of the mainstream literature surveyed in this paper is hampered by its commitment to, at best, a Hicks-Hansen approach, and at worst, a New Keynesian-New Classical approach.

A brief survey of the scorecards of these approaches is necessary, as the policy response to the Global Financial Crisis and Great Recession was guided by a broadly New Keynesian approach. As illustrated above and below – to the extent that policy was based on models rather than raw political concerns – the response was severely handicapped by a reliance on benchmark New Keynesian Dynamic Stochastic General Equilibrium (NK-DSGE) models (Phillip Mirowski 2013). Policymakers utilizing these models focused on monetary policy rather than fiscal policy, and even then, misunderstood the impacts of novel monetary policy like Quantitative Easing. The problem facing the economy after 2008 was a credit crunch and liquidity trap in the short run, and mammoth 1990s Japan-style balance sheet overhang sapping demand in the long run (Krugman and Eggertsson 2010). After an initial, too-small, attempt at fiscal stimulus, policymakers set the interest rate at zero (Krugman and Eggertsson 2010). When this failed to stimulate the economy, Quantitative Easing (QE) – in which a broader selection of debt instruments can be warehoused on the Fed's balance sheet to provide short term cash for banks – was tried. NK-DSGE models predicted that this massive rise in reserve balances would result in a huge demand boost, to the point of causing inflation as supply failed to adjust (Phillip Mirowski 2013). When this failed to happen, QE was run twice more, causing little other than reserve positions so large that the Federal Reserve had to intervene to keep interest rates within their target range (Tymoigne 2014). Inflation fears tied to both the operation of QE and the size of the federal debt then motivated a sharp turn to austerity in 2012 and 2013 that curtailed what recovery there had been so far. It is against this backdrop that some small amount of soul-searching has occurred in economics as to the fitness of the existing macroeconomic approach to macroeconomic governance.

By contrast theorists using even the IS-LM version of a Keynesian model, such as Paul Krugman, made better calls. In his newspaper columns, he argued that the economy was in a textbook liquidity trap wherein monetary stimulus would be useless, as agents would simply hoard cash (Krugman 2010). Large-scale fiscal stimulus would be necessary for an end to the recession, as had been true in earlier deep recessions (Krugman 2008). Krugman and Eggertson arrived at the same conclusion and coined the "Fisher-Minsky-Koo Approach," to make these thinkers safe for mainstream economists (Krugman and Eggertsson 2010). Post-Keynesian economists – especially those utilizing the Stock-Flow Consistent approach to macroeconomic modeling – had seen the crisis coming, and that this was the only way out (Godley and Lavoie 2007). Some of the most forceful of these arguments were published years ahead of time in *Seven Unsustainable Processes* (Godley 1999). Clearly, the ability to understand the crisis and the required policy response was conditional on macroeconomic framework.

A particularly extreme example of the impact of these theoretical concerns as they pertain to automatic stabilizers can be found in a recent paper. In McKay and Reis, 2016, the baseline model is a "new Keynesian model of nominal rigidities and business cycles," wherein the economy operates at equilibrium full employment, and is disturbed by three types of aggregate shocks: technology, monetary policy and markups (Mckay and Reis 2016). They build a three-agent model wherein agents are characterized by different levels of wealth and they find that automatic stabilizers function by redistribution over these three kinds of agents (Mckay and Reis 2016). The crucial finding of the model is that, due to sticky wages and prices, "the aggregate demand channel of fiscal policy is weak [and] monetary policy still plays a significant role in the economy," the precise opposite of the Keynesian model (Mckay and Reis 2016). Contrary to decades of research and experience, they find that automatic stabilizers play a "negligible role in the dynamics of the business cycle" (Mckay and Reis 2016). No discussion is made of discretionary fiscal policy as a stabilization measure. This wing of the literature has dismissed stabilization through discretionary fiscal policy on the basis of timing and informational problems for the last forty years (Snowdon and Vane 2005). In papers published as late as 2016, when yields on safe assets began to reliably turn negative, monetary policy was still found to be the main channel through which stabilization occurs.

Despite this, there has been a begrudging admission that Keynesian models will be required for a productive engagement with the modern economy. This is the central argument of Baron Skidelsky's recent *Return of the Master*. Even dyed-in-the-wool New Keynesians like Larry Summers have begun using the phrase "secular stagnation" – a favorite of the midcentury "stagnationists" like Hansen, Keynes, Kalecki, Steindl, among others – to refer to the ongoing failure of aggregate demand to pick up (Teulings and Baldwin 2014). In the last few years, this has been driven home more forcefully by the persistently negative yields of perceived safe assets, especially within the Eurozone. Against this backdrop, some macroeconomists have begun to assemble possible new automatic stabilizers with a view to mitigating the inevitable next recession.

Acknowledging that the developed world is now in a demand-limited regime rather than a supply- or inflation- or balance of payments-limited regime, new approaches are beginning to be articulated in the realm of macroeconomic stabilization. We will examine proposals made by three economists in detail below, and quickly gloss several others.

Researcher and ex-Federal Reserve forecaster Claudia Sahm presents an interesting proposal grounded in her extensive research into consumer behavior. At the basic level, Sahm proposes that whenever a recession is detected, direct payments should be made to individuals automatically (Sahm 2019). Helicopter money is a very old idea for direct stimulus, however Sahm's proposal makes use of a novel recession detection mechanism that will be of great use for the proposal advanced in this paper. Sahm's proposal makes use of a series now known as the "Sahm Rule." Quoting directly from the paper, the recession detection mechanism is as follows: "the direct stimulus payments to individuals begin after a 0.50 percentage point increase or more in the three-month moving average of the unemployment rate relative to its low in the prior 12 months" (Sahm 2019). We intend to use this method, with state-level unemployment data rather than national-level, to identify recessions and trigger intragovernmental stabilization payments.

Yair Lisotkin offers a variety of interesting stabilization proposals in his recent book *Law and Macroeconomics*. His proposals fall into two broad categories, and for our purposes some of his critiques of existing policies are more useful than the new policies he presents. The central

argument of the book is that when expansionary monetary policy fails, as in a liquidity trap, fiscal policy is the best option; if fiscal policy fails as well – whether through political gridlock or poor targeting – the next best option is what he refers to as "expansionary legal policy" (Lisotkin 2019). Essentially, many regulatory agencies are given powers which have impacts on aggregate demand through their operation. Legal scholarship around regulation has largely ignored this question, as much economic thinking in a legal context is Law and Economics-informed microeconomics. Lisotkin's argument rests on the fact that regulatory agencies can tailor their enforcement to macroeconomic conditions without specific congressional authorizations. This ability is embedded in the original laws which created the regulatory agencies themselves. To believers in strong-form central bank independence as a reason monetary policy is superior to fiscal policy, the case for expansionary legal policy is even stronger. Regulatory agencies are essentially autonomous, and can structure themselves to be procyclical, neutral, or countercyclical, from a macroeconomic perspective.

As with any new approach to old economic questions, this leads to some self-evidently good ideas, and some more bizarre ones. One interesting case study examines the regulation of the price of electricity, which often perversely increases during recessions. This regulated price increase squeezes more household demand in downturns than in boom times, automatically destabilizing a portion of the economy, however small. A slightly more out-there approach is to have the permitting process for capital investment be sensitive to the macroeconomic cycle, with more stringent requirements in an expansion and looser ones in a recession. Lisotkin argues, essentially, that the investment dollars from building the Keystone XL pipeline were worth more in the trough of the 2008 recession than when it was actually built, nine years into the recovery (Lisotkin 2019). This is somewhat perverse, as clearly much more is at stake in these kinds of projects than macroeconomic stabilization, but he is right to acknowledge that projects of this sort have macroeconomic impacts.

Lisotkin's analyses of the existing limitations on countercyclical spending, and how those can best be avoided, are most germane to the task at hand. The idea that discretionary fiscal policy will be ineffective due to long and variable lags in legislative enactment is an old one (Snowdon and Vane 2005). Of a similar age is the argument that infrastructure investments are a good use of countercyclical fiscal policy (Snowdon and Vane 2005). This is largely for political reasons;

infrastructure investment is famously "unsexy" and so is likely to be more difficult to fund during boom times than when it can be justified as recession relief. However, Lisotkin identifies a bigger problem: so-called "shovel-ready projects" often have a significant lag between when the appropriation is made and when the money starts moving out the door (Lisotkin 2019). While it may be possible for states to have a list of projects it intends to allocate stimulus money towards, the uncertainty regarding the timing of recessions prevents them from having the site and permit in hand when the appropriations are signed. Even automatically funded capital projects are liable to function like discretionary policy.

However, at the same time as this funding is meant to occur, states are facing a fiscal squeeze and cutting jobs and outlays from the general operations budget. That stimulus dollars should be funneled to infrastructure projects with long lead times while state payroll jobs – which already have a full administrative system in place – are cut, is perverse. Lisotkin identifies the ARRA money allocated to state fiscal relief as one of the fastest means for moving stimulus dollars into the economy. This stands as sufficient criticism of capital investment as a central plank of a fast-acting stimulus program. Sahm identifies this problem as well, arguing that "putting administrative systems in place ahead of time could ensure that the stimulus is delivered more quickly and more broadly" (Sahm 2019). State and local jobs already contain the entire administrative and bureaucratic apparatus for moving the stimulus into the economy as fast as possible.

Following these insights to their logical conclusion, there is clearly much to be gained in pursuing broad-based federal-level automatic stabilizers to state governments. Discretionary stimulus like the ARRA which includes some fiscal relief for states is helpful, but suffers from the well-known problems of discretionary stimulus, especially against a backdrop of extreme partisanship. Given the high multiplier in terms of output and employment relative to federal level transfer programs, automatic allocation to state governments provides even better countercyclical outcomes on a cheaper per-dollar basis (Sharp 1956; Mccubbins and Moule 2010; Poterba 1994; Shoag 2013). Additionally, an automatic stabilizer between levels of government is merely a question of efficiency from a sectoral balances perspective (Wray 2015a). State, local, and federal governments are aggregated when looking at the familiar

sectoral trio of public, private and rest of world (Wray 2019, 2015a). As such, contributions from one level to another net out to prevent spending from being double counted.

That a program of this type is needed has been recognized before, but proposals have often been hamstrung by their underlying economic model. A good example of this is a recent paper in the *Recession Ready* collection which grasps the basic principle but fails to develop it in a sufficiently broad manner. As it stands, Medicaid at the state level is partly funded through federal grant, and partly at the state level through an unfunded mandate (Fiedler, Furman, and Powell III 2019). This paper proposes that Medicaid matching rates from the federal government to the state governments be sensitive to the business cycle, rising during recessions and falling outside of them (Fiedler, Furman, and Powell III 2019). For the authors, this provides two separate kinds of stabilization. First, fiscally constrained states face a budget squeeze on state-level healthcare transfer programs, in that the number of users increases just as the funding – through the state tax base – decreases. This leads states to either cut back on outlays per person or cut back elsewhere in the already squeezed budget. Federal support in the form of greater matching rates is likely to keep states from cutting as deeply into Medicaid during a downturn. Second, state-level general operation funds are highly fungible. An increase in Medicaid funding through increased matching rates translates directly to an increase in state general operations funds available for other uses. ARRA funds were partly allocated via Medicaid grants (111th Congress of the United States of America 2009; Wilson 2012). The authors find a ten-year projected cost of $114 billion, and believe that the program is commended by its low cost relative to US GDP (Fiedler, Furman, and Powell III 2019). The authors use a different stimulus trigger than Sahm: the 25th percentile unemployment rate measured in the state, plus one percentage point. This is a less fluid and adaptable trigger than used by Sahm and used in the present paper, in that it takes longer to adapt to structural changes and may fail to trigger spending on some recessions.

For his part, Lisotkin also identifies Medicaid matching rates as a source of unnecessary procyclicality in federal budgeting. However, rather than focusing on the risk that states may cut Medicaid in a recession, Lisotkin assumes – backed by empirical data – that they do. Since matching is done proportional to state spending, there is a feedback mechanism whereby every dollar cut on Medicaid spending by states also cuts the amount of aid received by the state. He

offers a simpler response: rather than variable matching rates, just give a fixed and demographically adjusted rate. One of the possible fixed rates is 100%, federalizing funding of the program as unfunded mandates dramatically and unnecessarily reduce the fiscal space available to already limited states.

However, the Medicaid and Children's Health Insurance Program matching grant proposal (Medicaid proposal) in Recession Ready is at best a very partial solution. In many ways, this comes out of a desire to minimize the level of federal debt driven by the use of NK-DSGE models that, as explored below, assume substantial economic costs accompany arbitrary levels of federal debt. In 2008-9, one of the authors, Jason Furman, was working in the Obama administration and almost exclusively concerned with deficit reduction. Following the initial stimulus, he advocated sharply curtailing deficit spending in order to decrease the size of the debt rather than supporting aggregate demand in a weak economy (Hundt 2019). Similarly, this proposal is estimated to have a total expected spend of $114 billion over the next ten years. It is helpful to compare this to the state aid provided by the ARRA, which was roughly twice as much as the Medicaid proposal and which still only closed a small percentage of state budget gaps. While the ARRA certainly helped, it is also evidence that the Medicaid proposal is insufficient. The explicit goal of the proposal is to provide cover for 2/3 of the gap in spending within one program that accounts for roughly twenty percent of state budgets, rather than to provide general macroeconomic stabilization. This reluctance to commit to substantial spending to support aggregate demand in a downturn is evidence of reliance on a model that predicts substantial costs to an expansion of the federal debt through a crowding-out mechanism. This finance anxiety shows up in the Medicaid proposal as a demand cost of $.033 per every additional dollar of federal debt. As will be shown below, this figure comes from reliance on a failed macroeconomic framework, and our proposal supports much larger spending on the basis of a realistic account of the behavior of federal-level debt.

In the same spirit, it is clear that the Medicaid proposal is driven by political expediency; however, the bases of this practicality are open to challenge. The proposal makes the crucial assumption that state governments would like to expand the social safety net to better provide for low-income residents. For reasons explained in the section on the Fiscal Federalism literature, mainstream economists assume that politicians try to provide a concentrated local

benefit at the expense of a dispersed cost. However, the ongoing rejection of Medicaid expansion provided by the ACA – a prime example of concentrated local benefit with cost dispersed to the federal level – contradicts this narrative and constrains the Medicaid proposal. As demonstrated in the Fiscal Federalism section below, even an elementary reading of political economy is sufficient to dismiss the entire literature. However, a countercyclical program structured within a program that states can and have significantly curtailed does not significantly reduce the ability of states to frustrate federal macroeconomic policy.

Lastly, the Medicaid proposal requires that there be no significant other changes in the mechanisms of the healthcare system in the US in order to continue functioning as an effective automatic stabilizer, even on its own small scale. Recent proposals for a "Medicare For All" would invalidate much of the background administrative structures underlying the Medicaid proposal, and it is far from clear that the same multi-level financing would obtain under a Medicare For All regime. Additionally, credibility issues arise due to the complexity of the proposals involved as it may be hard for states to predict scale of stabilization payments. Most crucially, the program suffers from timidity. It ends up being a part of a part of a solution to a well-identified problem in an environment where more complete solutions can easily be developed.

Several other proposals are presented in *Recession Ready* alongside the Sahm and Medicaid proposals. The majority of these involve federal supports for individuals, rather than intergovernmental stabilization, and as such are desirable yet solve different problems than those addressed here. Stabilization through infrastructure investment is proposed, however even automatic programs have the issues outlined by Lisotkin (Boushey, Nunn, and Shambaugh 2019). Additionally, and rarely addressed, these programs suffer from Harrodian problems, where increased investment in capacity provides demand stimulus in the near term at the expense of higher maintenance costs in the long term. Stabilization through TANF and subsidized jobs or through SNAP are also proposed, offering the possibility of making good countercyclical use of existing social welfare programs (Boushey, Nunn, and Shambaugh 2019).

Another proposal enjoying a recent vogue is that of the Federal Job Guarantee (JG). Initially proposed by Hyman Minsky among others, the JG represents the limit case of countercyclical labor market policy, simply hiring everyone who wants a job but cannot find one in the private sector (Wray 2015a). Modern Monetary Theory, a framework addressed in more detail below, offers another conception of the JG that goes beyond simple stabilization and becomes, in a way, a stalking horse for a return to industrial policy. The job guarantee is a fantastic program, because it exchanges worker uncertainty about wages for state uncertainty about labor productivity, effectively allocating uncertainty to entities that can bear it. However, it requires a much heavier administrative lift in the near-term in order to accomplish. The present proposal sits between the Medicaid proposal and the JG in the same way that the Medicaid proposal sits between the present proposal and doing nothing.

CHAPTER 3: MORAL HAZARD IN A MODERN FEDERATION

At some point, all discussions of fiscal federalism reduce to questions of moral hazard. The discussion starts with one of a variety of different questions: whether or not there are free-riders, whether the costs and benefits of actions accrue to the same people and places, how responsible each level of government is for other levels of government, whether local control should be allowed to thwart federal goals. All moral hazard problems arise from the separation of principal and agent. The principal absorbs the cost or benefit of actions undertaken by the agent. The agent has an incentive to act in their own interest, which may be the same as the principal, opposed to the principal, or simply orthogonal. The fiscal federalism literature, which seeks to guide public policy in governments with more than a single level, answers the above questions by posing them as principal-agent problems.

In all of these questions the smaller federated units are considered agents, while the federation itself is considered as the principal. The problem is, this framing gets the economic reality exactly backwards. In the following, we will show how the institutional constraints of state governments prevent them from acting as agents with respect to the business cycle. Once this is understood, it becomes clear that the moral hazard problem runs in the opposite direction, with the federal government as sole agent for myriad state principals. This reversal implies that the

entire fiscal federalism research program within mainstream economics must be reconstructed from the ground up in order to yield productive economic insight.

Our argument has several steps and is constructed in reference to the institutions of the United States. First, we will gloss the traditional arguments within the fiscal federalism literature that situate states as agents and the federal government as principal. Next, we will use the work of Michael Pettis to examine the necessary conditions for a government to have agency with respect to macroeconomic cycles beyond its control. We will show that state governments in the United States do not clear these conditions, while the federal government does. This inverts the traditional moral hazard arguments. When a depression hits, the federal government is able to refrain from supporting state governments monetarily and can successfully shift responsibility for negative outcomes to the state governments themselves. The federal government gets credit for spending less money while avoiding blame for the layoffs and funding crises experienced by state governments. The approach to state fiscal support in the aftermath of the 2008 crisis provides ample evidence of this dynamic. Though the players have changed places, we have returned to a normal moral hazard problem. This problem can be resolved by aligning incentives between principal and agent and mandating fiscal support of state governments by the federal government. However, this support must be automatic, unconditional, and tied to economic indicators rather than the capriciousness of federal legislators.

Moral hazard problems are central to the fiscal federalism literature. To paraphrase Mencken, this literature is haunted by the fear that someone, somewhere, may be receiving a benefit that they did not pay the full cost of. The arguments take a number of forms, but the most important is that of "concentrated benefit and dispersed cost" (Tresch 2015; Oates 1988). In these arguments, it is assumed that state governments will spend more than they can afford on services and infrastructure improvements. They are considered to be agents over their local spending in the current period, while the federal government – as a group of all of the other states engaged in Coasean bargaining, not as an independent entity – is the principal.

This makes a kind of microeconomic sense: if the state is unable to pay for its operations, it will have to be bailed out by the other states together, in the guise of a federation. All of the states are each believed to have a finite revenue stream – state taxes, and federal taxes as a sum of

contributions by individuals within each state – and this bailout is seen as a redirection of that revenue stream. Often these arguments have a moral flavor, with the bailouts rewarding greedy or fiscally irresponsible actors while penalizing the frugal, forgotten man. State governments are figured as households with strict budgets, rather than businesses or governments with managed capital structures. We will discuss the problems with considering the federal government as though it is reducible to negotiations between state governments.

The traditional moral hazard argument also makes a kind of single-period sense: if we assume that all budgets are created *de novo* in each period, with perfect foresight, then an imbalanced budget is evidence of too much spending. If this cycle repeats too many times, debt builds up and interest payments swamp the state budget and force a bailout or bankruptcy. That the economy is a dynamic system with expectations extending into the future and investment validation extending into the past is not considered.

Despite offering an alluring morality play which validates progressively stricter austerity by state governments, the moral hazard argument used in the fiscal federalism literature is nonsensical in the United States context. There are structural problems in the argument itself, methodological problems in applying it to the experience of state governments, and substantial empirical disconfirmation in the historical experience of the United States. We will deal with each of these in turn.

Most important is that the moral hazard arguments within the fiscal federalism literature misunderstand what it means to be an agent. Their story looks at static allocations against a near-constant revenue stream. States spend too much because they are "living above their means," like a household. They are prevented from accumulating significant on-budget debt by balanced budget amendments, but still accumulate debt through off-budget enterprises and their capital account (Joulfaian and Marlow 1983; Bennett and Dilorenzo 1982). They also, in this argument, put together insufficient savings in rainy day funds to weather a cyclical downturn. Problems are believed to happen because of choices made by states about the level of spending in isolated economic periods. Macroeconomic factors like the interest rate and state of aggregate demand do not enter. In this story, when there is a downturn, the correct response – the response that is considered the agent acting in the interest of the principal – is to cut spending and raise

taxes to balance the budget (McNichol 2012). If all states do this, the argument presumes, then there is no more budget problem because states are "living within their means." The benefits and costs of services consumed in each state are localized to that state, and there is no longer any risk of concentrated benefit and dispersed risk.

This is the kind of story a parent tells a child about why it is important to save some of their allowance. We have known since Keynes that an approach like this will exacerbate the economic downturn, as explained above. It is not the kind of story that can guide economic policy. For that, we have to look to the work of Michael Pettis in *The Volatility Machine*. Pettis examines fiscal policy from the perspective of corporate finance, rather than economics per se. This provides a much clearer view not only of government finance, but of what one has to be able to do in order to be considered an agent with respect to the business cycle.

From this perspective, governments have a capital structure, same as corporations. The ultimate goal of most corporations is the production and sale of some good or service. However, corporations are subject to a massive number of economic crosswinds that may frustrate this simple goal. The classic example is a car manufacturer that sells a large number of cars in the export market. The car manufacturer is good at making cars, not timing changes in the exchange rate. As such, they try to break out risks that aren't related to their core business and buy or sell those risks off. In this case, the car company would attempt to hedge its exposure to changes in the exchange rate between its home country and the country where it exports cars. This can happen in a variety of ways – currency swaps, forward contracts, other derivatives – but the goal is the same, to protect the company's profitability from changes in revenue unrelated to their core business (Hull 2018). This is the classic model of financial derivatives as insurance policies for productive enterprise, rather than gambling.

All of these different financial products – in addition to the physical investment goods that the company uses in production, debt, and equity – constitute the capital structure of the company. Every company's capital structure is sensitive to changes in many different economic variables. The company's goal when constructing a capital structure is to choose physical and financial combinations such that when revenue increases, costs increase and when revenue decreases, costs decrease. This reduces volatility and ensures that revenue exceeds expenditure under as

many states of the world as possible (Pettis 2001). Companies give up on the possibility of big windfalls in exchange for safety from extreme downsides (Hull 2018). While the company may make more or less money by operating in this way, it can be reasonably certain that its status as a profitable going concern will not come under threat from changes in economic variables unrelated to their core business. This certainty allows the company a longer window to plan projects in their core competencies. A well-run company tailors their capital structure so as to reduce volatility in net revenue while a poorly-run company ends up with a capital structure that amplifies volatility and which may force default, bankruptcy, or severe curtailment of operations.

However, what is crucial in this is that companies are able to build a capital structure in the first place. No company runs a balanced budget, and the structure of production requires that money be spent before revenue can be recouped. The goal of the capital structure is to ensure that business operations are not disrupted by changes in economic variables outside their control. A correlated capital structure creates autonomous stabilizers on both the revenue and expenditure side of the balance sheet. When revenues go up, costs go up. When revenues fall, costs fall. Pettis takes this basic corporate finance insight and extends it to sovereign budgets and capital structures.

In *The Volatility Machine*, Pettis argues that countries avoid costly financial crises by pursuing capital structures that reduce volatility. The goal is to create a balance sheet that ensures autonomous stabilization between the flows of revenue and expenditure in a variety of forms. These include the mix of loans taken in domestic and foreign currencies, foreign currency swaps, and a variety of other measures. Even the prices of commodities that the country imports and exports are taken into account as quasi-assets and quasi-liabilities to be hedged against (Pettis 2001). What is most important about the capital structure is that both the revenues and expenditures both adjust in the same direction when external economic conditions change. This protects the ability of the country to meet its import and foreign currency needs while providing a constant level of services.

This works well as a practical approach but implies a radically different underlying theory of economic agency than that of the moral hazard story presented in the fiscal federalism literature. In the traditional story, states have direct control over the amount they receive in tax receipts, and the amount they spend on services, investment, and state employment. In each static current period, they set spending and income. If one believes that this is the case, then the deficit is a control variable and states can and should be held accountable for the failure to match revenues and expenditures. It is a simple case of choosing to spend too much and hoping to be bailed out. This is what the fiscal federalism literature argues.

In contrast, Pettis's account implies that current period revenue and expenditure are not under the direct control of governments. Attempts to match revenue and expenditure are easily and frequently thwarted by changes in economic conditions outside the control of the government. Despite this, governments are not powerless. They have the ability to control whether revenue and expenditure move together when the economic situation changes. A state that pursues an anti-correlated capital structure in an attempt to maximize growth during a boom can be held accountable for its failure and need of a bailout. Similarly, a state that pursues a correlated capital structure to hedge against the boom and the bust can be commended and will not suffer a fiscal crisis during an economic downturn.

The ability to target policy outcomes – to target a certain level of taxation, and a certain level of spending – requires that the state have the ability to build a capital structure. In this way they exercise agency with respect to the business cycle, ensuring that they will be able to meet their payment commitments regardless of the state of demand, the interest rate, or the exchange rate. It may not seem like single-period agency such as choosing the level of social welfare benefits or taxation. However, it is the condition of possibility of being able to choose any single period value. If movements in variables outside the control of the government can destroy the government's ability to make required payments, it cannot be said to have agency over the single period values either.

Logically, if an entity does not have control over the decision variable in a principal-agent problem, it is a principal, not an agent. In a sovereign state which can build a capital structure that has the possibility of ensuring that it is resilient to adverse moves in unrelated economic

variables, it is an agent and the people and businesses of the state are the principal (Pettis 2001). This is the situation facing emerging market sovereigns in Pettis' account. The moral hazard problem there is to avoid the temptation to run an anti-correlated capital structure during an unrelated boom.

In state governments in the US the situation is radically different. Statutory, constitutional, and institutional requirements prevent states from choosing their capital structure. They have highly variable tax receipts from a variety of different channels, and mandated expenditures that increase dramatically when the economy crashes (Mattoon and Mcgranahan 2012; Mccubbins and Moule 2010). In financial terms, state governments have massive directional exposure to the state of the US economy. By itself, this is not an insurmountable problem. Were states able to hedge these risks, by owning financial assets which provided greater income during an economic downturn or by financing operations through debt whose payments declined in a downturn, they could construct a manageable capital structure. However, balanced budget requirements prevent states from assembling the necessary capital structure on their own. States are mandated to keep current period spending in line with current period tax receipts and are unable to issue debt for general operations (Mattoon and Mcgranahan 2012). The only option states have to counterbalance their naturally anti-correlated capital structure is to accumulate savings. However, as we have seen throughout this paper, states face swings in revenues sufficiently large as to swamp even sizable "rainy-day funds" frequently. What states need is insurance against falls in tax revenue, and they are institutionally prevented from acquiring this.

With this in mind, it is not possible for states to be represented as the agents in a moral hazard problem. Their insolvency when the economy crashes is not their fault. Given the highly procyclical nature of both their income and expenditure streams, they face an acute capital structure trap in an economic downturn. The only agent capable of providing them insurance against this capital structure trap – capable of providing them with a correlated capital structure – is the federal government. There are many mechanisms by which the federal government can accomplish this, and they are explored in the final chapter of this thesis.

With this turnaround in mind, there is clearly still a moral hazard problem, albeit a very different one from that posed by the fiscal federalism literature. When there is an economic crisis, state government finances collapse. They are forced to cut spending and increase taxes during a recession. The severity of the response is mainly dictated by the severity of the economic crisis, but it can be somewhat ameliorated by the use of "rainy-day funds" held by the states. The procyclical response by state governments worsens the recession locally, as the government lays off workers and curtails spending at the same time as the private sector. This redounds on the tax base available to the state government, which forces a further round of retrenchment. This process mimics Pettis' account of the capital structure trap, where traders are forced into counterproductive, procyclical positions by virtue of their expenses rising at the same times as their incomes fall. Traders are forced to sell into a declining market while state governments are forced to cut services into a crashing economy.

In a way, this is the social or governmental equivalent of Minsky's "selling position to make position" (Minsky 2008). In order to balance the budget – make position – state governments are forced to fire teachers and police officers – to sell position. The solution to this problem in a market context is well-identified: provide a lender of last resort to market participants. This has been known to work since Bagehot and is available to participants in an ever-expanding variety of markets (Wray 2015b). A solution of this sort is required for state governments to build resilient capital structures, but it must be constructed around the institutional fact that states cannot take on debt to finance current operations.

The only entity capable of providing a counterbalance that would arrest this process is the federal government. At this point, moral hazard reappears. Politicians at the federal level pride themselves on spending as little money as possible, in the name of "sound finance" and "deficit reduction" (Henwood 2019). They consider themselves responsible for – and their voters hold them responsible for – national outcomes. Federal-level politicians are able to avoid blame for the fiscal crises of state governments by claiming that the state governments were living above their means and undeserving of a bailout by the federal government. They can demand that state governments pursue counterproductive austerity safe in the knowledge that its failure as an economic policy will not affect them politically. This is a classic principal-agent problem. The federal government is the only entity that can alleviate the capital structure trap of state

governments, but its incentives are such that it benefits from exacerbating the capital structure trap. The moral hazard problem in a modern federation is one in which the federal government is the only entity that can protect the state governments from economic conditions outside of their control, but which has an incentive structure that keeps them from protecting state governments. This is radically different from the conception within the fiscal federalism literature.

Now that we have addressed the structural problem with the traditional moral hazard arguments, we can take a methodological perspective. In posing the moral hazard problem contested above, the fiscal federalism literature takes the state governments as primary and represents the federal government as a confederation of states rather than as an independent entity. Arguably, this applies in the European Union, where fiscal spending by federal government represents less than one percent of European Union gross domestic product. The EU functions as a coordination mechanism for member states, and political base for the European Central Bank. These member states are allowed to run operating deficits of a certain level and have recourse to global financial markets to design their capital structure (Henning and Kessler 2012; Fossati and Panella 1999). However, in the American context, federal government spending represents well over twenty percent of GDP. The scale of federal government spending requires that we understand the federal level as a coherent unit, rather than as a Coasean bargaining union agreed to by fifty member states. It is responsible for macroeconomic governance, and state governments are not. As such, the behavior of the federal government cannot be methodologically reduced to a coordination between state governments.

Finally, from an empirical perspective, the traditional moral hazard arguments simply do not explain the historical data. There has been one bailout of state governments by the federal government since the United States became a country (Henning and Kessler 2012). The problem is, the fiscal federalism literature poses their problem as unfalsifiable. The fact that no state has spent so excessively as to force a federal bailout is taken as evidence that the moral hazard argument is correct, and that state politicians have adjusted their behavior so as not to be accused of operating as agents in a moral hazard problem (Aizenman 2010). The proof that states spend too much money and trigger bailouts is that states have never triggered a bailout by spending too much money. However, states have, many times, faced a long period of fiscal

retrenchment. States have also had substantial revenue declines due to external factors which forced them to dramatically curtail spending. The argument put forward above that the moral hazard problem is posed in the wrong direction fits the facts much more closely. Our argument does not rely on the assumption that everyone described by the argument is adjusting their behavior in order to prove its correctness. Reality is much simpler: states are principals with respect to the business cycle rather than agents, and the moral hazard arguments presented in the fiscal federalism literature are wrong.

CHAPTER 4: THE USE OF MODERN MONETARY THEORY

Modern Monetary Theory (MMT) presents a compelling alternative perspective that takes into account both the Keynesian insights about the necessity of countercyclical fiscal policy as well as the importance of the balance sheet view attributed to Hyman Minsky and Michael Pettis above. While MMT comprises a heterogenous and hotly debated set of ideas, we will be focusing on how a few of the core approaches inform the proposal put forward in this paper. First, MMT puts the distinction between sovereign and non-sovereign debt front and center in its analysis. Much mainstream theorization of public finance suffers from the conflation of debt of currency users with that of currency issuers. Second, MMT foregrounds the "functional finance" approach traditionally attributed to Abba Lerner. There is some debate as whether functional finance and MMT require or imply one another, and this paper will engage with different perspectives on the issue. The last major concept we pull from the MMT literature – especially the work of Randy Wray and Éric Tymoigne – is the idea that Fed-Treasury separation is in fact impossible. Monetary and fiscal policy are always already intertwined in a monetary production economy utilizing its own sovereign currency. These three arguments will prove to be crucial planks in developing our novel intragovernmental automatic stabilizers.

A major source of confusion in the mainstream literature as regards debt and automatic stabilizers is the belief that private sector debt, public sector debt of currency users – states and locals – and public sector debt of currency issuers – the federal government – are and operate the same. At the state and local government level, finances work similarly to those of the household level, in that both are currency users rather than issuers, and so taxes pay for

spending. We see the household example of this in the balance sheet crunch following 2008 that led to substantial declines in consumption. Household wealth fell and budget constraints relative to debt bit hard, leading to even less demand (Mason 2018). We see the state and local government example of this in the literature surveyed above pertaining to the experience of the 2008 financial crisis and great recession. States and locals have a small rainy-day fund generally, but have to run balanced budgets within general operating. Much of the hiring is out of the general operating budget rather than the capital account budgets where debt can be carried. A drop-off in tax revenue leads directly to a drop-off in employment as seen above.

Meanwhile taxes do not pay for spending at the federal level, as the federal government is a currency issuer and not a currency user. As the currency issuer, the federal government pays for things by allocating spending, and generates debt for the Federal Reserve to use in order to stabilize interest rates (Wray 2015a). The debt is sold by the Treasury to Primary Dealers who are mandated to clear the market, and then the Fed provides stabilization in the repurchase market as well as balance sheet space in order to achieve its interest rate targets. Recent tensions in the repurchase market and large-scale actions by the Fed to support Primary Dealers bear this out (Pozsar 2019).

More importantly, federal debt does not function the same way in the real world as it does in the mainstream literature. In the mainstream literature, it is assumed that debt issued by sovereign governments is subject to the same limitations as all other debt. The story is familiar and runs like the following: when the Treasury needs money it must issue debt. To issue debt, it must find buyers for that debt who will give the government money denominated in the currency which it issues in exchange for a promise to pay later. However, in this story, debt buyers are sensitive to the level of outstanding debt, much as they are in corporate or municipal bond markets (Wray and Nersisyan 2010). Larger outstanding debt is expected to be connected to a higher default risk, and so debt buyers demand ever higher interest rates as more debt is issued (Reinhart and Rogoff 2009). Not only that, but there is assumed to be a finite debt capacity for the economy as a whole, set by the stock of savings held by economic actors in a given currency. Whether this passes through a so-called “fractional-reserve banking” story or not is immaterial, the economy can only absorb so much debt, and greater issuance by the federal government eats into the economy’s supply of “loanable funds” (Snowdon and Vane 2005).

This in turn leads to higher interest rates for state and local governments as well as private sector firms, since they are forced to compete for a now-smaller quantity of "loanable funds" after government debt has been issued. The failure of this account can be illustrated most humorously in two ways. The first is the strong and simple negative correlation between the stock of Treasury debt and interest rates since 2008 (Board of Governors of the Federal Reserve System (US) n.d.; U.S. Department of the Treasury. Fiscal Service, n.d.). The second – and much funnier – proof is that following the political brinksmanship over the debt ceiling in 2013 S&P downgraded US Treasury debt to AA+ (*The Economist* 2011). Usually, this is a measure of the riskiness of a given bond, and changes in rating have substantial impacts on interest rates as investors reprice the novel credit risk. In this case, however, interest rates did not move.

Mechanisms like this are pervasive within the mainstream economic literature. They have been crucial in construing the "debt limit" as a real barrier for the US Treasury, a political fight which played into the decision to limit transfers to states following the expiration of the ARRA in 2012. Most egregious among these works are Reinhart and Rogoff's 2013 paper, which claimed the US stood at a sort of fiscal precipice once its debt-to-GDP ratio crossed the 90% threshold (Reinhart and Rogoff 2010). This paper was subsequently debunked by graduate students at the University of Massachusetts Amherst, however, by that point the damage had already been done. Similar concerns – this time applied to the size of the Fed's balance sheet – animated a belief that the broad-based debt monetization pursued under the heading of Quantitative Easing would lead to massive inflation through an increase in the monetary base.

The MMT literature by contrast has provided a much better guide to Fed and Treasury operations since the 2008 crisis. Central to the MMT account is the simple fact that Treasury debt does not function the same way that state/local or private debt does, for two reasons. The first, and simplest reason is that as the issuers of the currency, the Treasury has zero credit risk: it will simply make all payments on the debt as they come due (Wray 2015a). As such, debt buyers have no ability to set prices for government debt, and bond vigilantes have yet to be sighted. There may be inflation or exchange rate risk to debtholders, however it is to be expected that market participants hedge their exposure to each to their desired level. Since market participants know this, even if most economists do not, Treasury debt does not eat into the credit risk appetite of the market as a whole. Treasury debt in fact provides a safe asset to

which market actors – especially large institutional ones with little appetite for credit risk, such as pension funds – flee to when the broader market flashes "risk off." This is a fortiori true in that the Treasury de facto has a buyer of last resort in the Federal Reserve. The market will always clear at a predetermined interest rate, thanks for management of overnight interest rates by the Fed. This will be explored in greater detail below when we examine the work of Éric Tymoigne and Fed-Treasury independence. The second problem with the mainstream account is the relation between debt and savings. The "loanable funds" account requires an exogenous money supply for greater debt issuance to necessarily lead to higher interest rates. MMT instead incorporates an endogenous money supply, where the volume of money available to make loans is limited by bank decisions to underwrite loans, rather than the money supply. Deposits create loans in the mainstream account, while loans create deposits in the MMT account (Snowdon and Vane 2005; Wray 2015a).

This is important, because a major part of the creation of an optimal capital structure is the assignment of risk to entities best able to bear it. As a currency issuer, the federal government is able to bear a much higher debt load than state or local governments. One way of thinking about this is that the implied equity position of a currency issuer is basically infinite when denominated in its own currency. For this reason, it's impossible to run into a debt-equity problem in one's own currency. State and local governments, however, can run into problems at much lower debt levels.

Similarly, the Federal government is able to bear much larger fluctuations in revenue than can state or local governments. Since federal spending is analytically prior to federal tax revenue collection, large changes in revenue can be borne without issue, in contrast to state governments, who have a small buffer before the budget constraint binds (Wray 2015a). Since the duration of any macro downturn is unpredictable, and states have at most savings on the order of 30% of one year's tax revenues, they have incentive to tightly ration their rainy-day fund and so undershoot on spending (McNichol 2012). This limits the amount of downturn – considered as intensity of downturn times duration – that can be mitigated at the state or local level using own funds. If we look at the consolidated balance sheets of the entire public sector, there's no reason to have one level pulling demand out of the economy while another level is attempting to inject it, when transfers between them could easily make it so that both levels are

adding demand to the economy; the delivery mechanism is just faster at the state level. As such, allocating debt or quasi-debt in the form of savings against expected revenue volatility to state and local governments represents an inefficient allocation of available fiscal space across different levels of government.

The next major insight of the MMT literature we will be using is the Functional Finance approach to public finance. MMT adopts the "functional finance" approach from the work of Abba Lerner. Lerner contrasts a "functional finance" approach with a "sound finance" approach, and the MMT literature follows him in this (Forstater 1999). The "sound finance" regime is the presumed default of mainstream public finance literature, as well as mainstream economics more broadly. Under a "sound finance" regime of the type espoused by, for example, Doug Henwood, the fundamental outcome of public finance is that the budget balance (Henwood 2019). Under this rubric, the success of government finance can be seen in the matching of revenue and expenses to ensure a balanced budget. Other macroeconomic outcomes such as the growth rate or the unemployment rate are essentially irrelevant.

The "functional finance" approach flips this relationship on its head. It takes an instrumental view of government functioning, asserting that the key indicators of success of government engagement with the economy can be seen in the unemployment rate and the growth rate. The fiscal balance is ignored, as it is essentially a residual that can neither be predicted prior to spending nor used to understand anything about the condition of the economy. Rather than picking zero as the ideal net borrowing of the public sector, Lerner argues that the correct net borrowing is whatever level produces the desired macroeconomic outcomes. As we will see below, this covers not just traditional macroeconomic indicators such as growth, inflation and unemployment, but also that a negative net borrowing position for the Treasury is necessary for the Federal Reserve to be able to successfully govern money market interest rates (Tymoigne 2014).

The "functional finance" approach is helpful within the MMT literature, because it gives a guide to how governments should use all the newfound fiscal space. An implicit ideology shows up, whereby human flourishing is the goal of public finance. This follows from a broadly Keynesian perspective, which has an almost Nietzschean relationship to prior economics. The correct policy is not that which works for a scaled-up version of an individual, or a household, but

rather that which provides the condition of possibility for policies which work for individuals and households. The goal of the public purse is to ensure full employment of resources, not to act like another firm in the economy, or simply ensure the orderly working of the price mechanism (Tresch 2015; Wray 2015a). What that full employment economy produces remains a political question. How this fiscal space is turned into actual policy is contested. Functional finance is merely a better way of cognizing the goals of public finance.

This is in contrast with the fiscal federalism and public choice literature surveyed above, in which the implicit ideology is entirely geared towards preventing benefits from accruing to those who do not "deserve" them, by whatever metric. These literatures see the fundamental problem as being that government taxation and transfers distort the market mechanism, and necessarily lead to inefficient outcomes. Ideally the government for them shrinks to the size that it can be "drowned in the bathtub" (Kilgore 2003). They seek to do this through progressive devolution such that government action comes to resemble more and more price discovery by firms and consumers in an open market (Tresch 2015). From this perspective, sound finance is all that matters. Full employment is unimportant as compared to platitudes about the potential tax burden to future generations (Barro 1989). For this literature, there is no need for the government to run deficits or external sector to run surpluses for the private sector to accumulate savings. The savings and employment come from the automatic workings of the price mechanism and the goal of the government is to stay out of the way.

However, some question remains as to whether MMT and the functional finance approach require one another, or merely complement one another. Recent work by JW Mason and Arjun Jayadev indicates that a functional finance regime is possible without adopting the entire MMT program. In a recent paper, they argue that so-called "sound finance" can be circumvented without bringing on unsustainable debt dynamics through a simple reassignment of instruments between the Federal Reserve and Treasury (Mason and Jayadev 2017). At present, the Fed has a dual mandate to pursue full employment and price stability by varying monetary policy over the business cycle (95th Congress 1978). The Treasury meanwhile has an implied mandate to pursue fiscal sustainability by varying the level of taxation and spending in the economy (Mason and Jayadev 2017). The authors then argue that these responsibilities should be swapped: the fiscal balance is a much more powerful tool for attaining full employment and

price stability, while the majority of debt dynamics come from changes in interest rates rather than changes in the debt stock.

With this instrument reassignment, the Treasury can pursue whatever taxation and spending leads to full employment and price stability in the economy, whether through the design of optimal automatic stabilizers, or frequent discretionary fiscal changes. The Fed then targets an interest rate below the rate of growth of the economy as a whole that prevents the interest payments on the debt issued by the Treasury from spiraling upward indefinitely. With this rearrangement, the ends and means of macroeconomic policy become much clearer and much easier to obtain. One can pursue functional finance without completely reorienting to an MMT perspective, expanding the generality of the proposal put forward in this paper.

Additionally, one way to conceptualize the approach of the republican party to public finance in the past forty years is as a kind of right-wing MMT that ignores both sound and functional finance, preferring instead to simply allocate more and more income to the wealthy and powerful, no matter the impact on the budget balance or broader economy (Galbraith 2009). This approach has created some problems in terms of extremely depressed yields. There is a copious literature on both the "global search for yield" and "savings glut" which addresses this problem. These were addressed above, and most parsimoniously described using Joe Wiesenthal's joke that negative yields are the market's way of taxing those who refuse to countenance fiscal stimulus (Wiesenthal 2019). This approach has also led to persistent demand shortfalls and the accompanying political economy problems also addressed above. Pursuit of profit-led growth in a regime of wage-led growth leads to increased inequality and overall economic stagnation (Bhaduri and Marglin 1990).

Finally, it was touched on above, but it will be very important for our proposed intragovernmental stabilizer that the Fed and Treasury work together. This may seem controversial, but it is well-documented that they already do in order to stabilize interest rates. However, this aspect of public finance operations is often ill-understood, and a brief recap will be important to demonstrating later on that our ideal stabilizer can function equally well through either Treasury allocation or via the Federal Reserve. The Fed and Treasury are forced to

coordinate through a variety of structures in order to ensure that fiscal decisions do not have adverse impacts on interest rate targeting by the Fed.

Éric Tymoigne offers persuasive evidence that this kind of coordination is already pursued by the Federal Reserve. In order to prevent money market disruptions from fiscal deficits or surpluses, the Fed has developed a wide variety of methods to stabilize the volume of reserves within the banking system. In the absence of these stabilization methods, every change in the fiscal balance would mechanically create a change in benchmark interest rates for mechanical, rather than economic, reasons. We examine a few historical episodes and institutional structures pointed out in Éric Tymoigne's 2014 paper below.

The massive reserve injections made to support the financial system during the 2008 crisis placed extreme downward pressure on overnight interest rates, as banks sought to hold the minimum reserve position required (Tymoigne 2014). The Fed held a significant amount of Treasuries at the start of this stabilization strategy, and had to liquidate the majority of the portfolio in order to defend their overnight interest rate target. So many treasuries were sold that the Fed had to request additional debt from the Treasury over and above what the Treasury issued in connection with fiscal spending (Tymoigne 2014). This is clear evidence of necessary cooperation.

Similarly, the Fed and Treasury developed a complex structure of coordinating mechanisms through the Treasury Tax and Loan accounts and Treasury General Accounts to allow the government to run fiscal surpluses and deficits without disrupting the orderly operation of money markets. When the government runs a fiscal deficit, reserves in the banking system increase mechanically. When the government runs a fiscal surplus, reserves in the banking system decrease mechanically (Wray 2015a; Tymoigne 2014). Changes in reserves have put a mechanical pressure in the opposite direction on the interest rate, as banks seek to economize on reserves and lend their excess. As the short-term interest rate is and has been their central policy variable, the Fed needs to be able to change the level of reserves. When the changes are small enough, it can displace excess reserves to the Treasury General Account and Treasury Tax and Loan accounts. The systems for this coordination arose gradually since the 1950s (Tymoigne 2014). As such, it is clear that – rather than forbidden – collaboration between the Fed and

Treasury is actually required for both fiscal policy and macroprudential monetary policy. That a complex structure of institutions has arisen over the past seventy-five years to provide plausible deniability to this dynamic for political reasons does not change the underlying necessity of its existence.

Additionally, the Federal Reserve is unique among government agencies in the degree to which it is independent from all other branches of government. This is addressed in a wide-ranging paper by Peter Conti-Brown who identifies total budgetary independence and questionable political independence in the Fed as created by legislative drift since the original Federal Reserve Act in 1913 (Conti-Brown 2015). However, this budgetary independence co-evolved with the development of strategies for stabilizing the money market in the context of ever-larger government spending, first to support the war effort, and later to support the welfare state. Originally, the Federal Reserve was constrained by real bills doctrine, the gold standard and the governors of the constituent Reserve Banks. However, the real bills doctrine prohibiting rediscounting was lifted during the war in order to support orderly money markets in a war finance environment and was never replaced (Conti-Brown 2015). The gold standard was ended in 1971 and never replaced. These developments led to the Federal Reserve we know now: and unlimitedly self-funding monopoly issuer of central bank currency as explained in Tymoigne, 2014, with budgetary if not agency independence (Conti-Brown 2015).

The policy upshot of this explains the present-day situation where the Fed has wide latitude and a broad mandate to pursue unconventional monetary policy. There is no structural or a priori reason this latitude and mandate cannot be used to provide financial services that significantly enhance the capital structure of sub-national governments. After the explication of our model and its benefits, it will be explained how the Federal Reserve can offer something structured like a put option to state and local governments in order to provide these stabilizing financial services. If stabilization through the Treasury is politically non-feasible, the Fed offers an extra-political way to achieve the same goal.

There is essentially no reason the collaboration between the Fed and Treasury outlined above cannot go the other direction, ensuring that fiscal rather than monetary policy comes off. What is critical to take away is that given that fiscal policy and monetary policy are always already

intertwined with one another. As such, an automatic stabilizer that proceeds from the Treasury eventually winds up on the balance sheet of the fed, in the same way that an automatic stabilizer that proceeds from the Treasury would. This follows from basic mechanics of the banking system. Fiscal spending introduces excess reserves into the banking system which must be drained off using Treasury debt in order to maintain benchmark interest rates (Wray 2015a). At the end of the day, this spending ends up on the balance sheet of the Fed, and if one wished, the structure of puts or an Office of Fiscal Harmonization proposed below could be equally well represented as a reserve path through the banking system from the state governments to the Fed. Some MMTers have addressed this line of thought, notably the Levy Institute's own Randy Wray in a recent working paper. Indeed, some of the analysis reconstructed above is also put forward in *Fiscal Reform to Benefit State and Local Governments: The Modern Money Theory Approach*. Wray also engages much more directly with the ideological aspects of recent trends in fiscal federalism, most importantly devolution. He correctly links the notion of the "fiscal crisis of the state" in the 1970s, Gerald Ford's refusal to bail out New York City, and libertarian arguments in favor of devolution of services together as all working in service of a general reduction of the economic role of the state (Wray 2019). Devolution merely served as a formal cover for what was essentially a substantial rollback of services by assigning their fulfillment to entities with drastically reduced fiscal capacities, and then acting surprised when those limited agencies were unable to fulfil their mandate (Wray 2019; Philip Mirowski 2019; Maclean 2017).

Ultimately, Wray's conclusions are qualitatively the same as those reached here, that "true "reform" would involve more funding flowing from Washington to state and local governments" (Wray 2019). The proposals in the Wray paper break down into two broad groupings, national-level policy proposals that incidentally reduce fiscal pressure on state and local level budgets, and transfer policies. Three national level policies are put forward. Medicare for All eliminates the effect of unfunded mandates for Medicare and Medicaid on state and local budgets and works essentially like the Medicaid proposal explored above, but on a grander scale (Fiedler, Furman, and Powell III 2019; Wray 2019). The Federal Job Guarantee provides jobs to all who want them at fixed national wage which in turn automatically provides a spatially targeted demand backstop through differential program take-up (Mitchell and Muysken 2008). A national green infrastructure program with administration delegated to state and local

governments and nationalized funding allows greater local leeway for infrastructure investment without forcing budget constraints to bind. The paper also proposes revenue sharing and block grants targeted to persuading state and local governments to abandon the regressive tax structures often associated with state and local finance. These proposals are the closest in spirit to the proposal made in the present paper, and presumably expand and contract to some degree in order to smooth the business cycle.

Clearly, the MMT approach has much to offer the serious student of public finance. It provides insight into the inner workings of the institutions of government finance, and its embrace of functional finance provides a model for understanding the ideal goals of public economics unencumbered by general equilibrium models.

CHAPTER 5: STUDY METHODOLOGY

Now that the broad theoretical armature behind this proposal has been outlined, we can examine how its implementation would have looked over the 2008 recession from a quantitative perspective. We do not develop a comprehensive counterfactual for how the economy would have behaved with this stabilization program in place. Instead, we will estimate the payouts by state for three different versions of the proposed stabilization mechanism: a 3% match, a 5% match, and an 8% match. We will examine some qualitative characteristics of the program across different states and compare them to the fiscal relief portion of the 2009 American Recovery and Reinvestment Act.

We avoid a full economic counterfactual for several reasons. First, the mainstream models are generally unacceptable for the reasons outlined above. They fail to capture the hysteresis effects in demand shortfalls, and assume reversion to exogenous trend growth as quickly as possible. Essentially, they are “Keynesian” in the short term, insofar as they allow deviations from full employment output, but are “Ricardian” in the long term, requiring that the economy return to the same trend growth of output (Godley and Lavoie 2007). There is a long history through the recovery from the 2008 crisis of economists and commentators predicting that things were just about to return to normal at all times, while this normalcy failed to materialize. The recession

fundamentally changed the growth trajectory of the economy, and since we wish to work with a model that captures that, mainstream models are not usable.

Next, there exist many benchmark heterodox models for understanding broad macro behavior, but few incorporate unemployment dynamics while preserving path dependency and hysteresis in output. Many of these heterodox models – the benchmark Kaleckian model, the Klein-Goldberger dynamic model, a variety of Tobinesque "pitfalls" models, and the Stock-Flow Consistent literature – provide good accounts of the relationship between various aggregate economic quantities grounded in the fundamental conservation laws provided by the rules of accountancy. However, this literature lacks a consistent way to convert these macro aggregates into employment outcomes. Okun's law is a good empirical regularity, but for forecasting requires an exogenous rate of growth in order to function. We do not wish to include this, as the empirics demonstrate that there is no exogenous growth rate to which the economy converges (Godley and Lavoie 2007). As such, we abstain from developing a macroeconomic counterfactual from our proposed policy intervention, and instead contrast it with the policy actually undertaken at the time, to get a sense of qualitative differences.

To begin outlining our proposal, we develop a benchmark unemployment rate. For this, a variety of measures would be acceptable, and we use a method situated between those used by Claudia Sahm and the Medicaid proposal outlined above. We use the Sahm rule for the onset of a recession, using monthly Local Area Unemployment Survey data. This rule states that when unemployment rises half a percentage point above its three-month moving average, a recession is beginning. With this recession start point, we then use the prior two years as an unemployment benchmark distribution. We take the average over these two years and add one percentage point to capture normal fluctuation. This captures differences in benchmark unemployment by state, and also implicitly takes into account state-level lawmakers expected unemployment rate and tax revenues. For this proposal, we use the monthly data to inform our trigger, but convert our unemployment data to quarterly in order to model with state tax revenue, which is reported on a quarterly basis.

Next, we assemble data on own-source tax revenues at the state level. We are interested in own-source tax revenues because they are most likely to be impacted by cyclical macroeconomic fluctuations, and also exclude any pre-existing or agency-constrained transfer programs between

different levels of government. A broader study may want to look at the consolidated fiscal position by state, looking at state, federal and local taxation and expenditure, however this is beyond the scope of the current proposal. Quarterly own-source tax revenues are graciously made available by the Bureau of Economic Analysis.

The last part of our dataset to assemble is the fiscal transfers included in the American Reinvestment and Recovery Act (ARRA). This data has actually been taken offline by the Trump Administration, so we have had to reconstruct it from several available sources. We have total spending on fiscal transfer per year out of the ARRA from a report published by the Center on Budget and Policy Priorities (McNichol 2012). We also have access, through Recovery.gov via the Wayback Machine, to total cumulative ARRA spending by state (US Government 2013). From this, making the heroic assumption that spending by year was equal for each quarter within the year, we can construct a quarterly series at the state level for fiscal transfers made by the ARRA. This is admittedly low-fidelity but is the closest to an apples-to-apples comparison possible in this situation.

With the data in hand, we estimate for each state how much quarterly unemployment exceeds the baseline unemployment rate in the years it does. We then offer three policy proposals using this measure of excess unemployment over baseline. We take the number of percentage points by which the observed unemployment rate by quarter by state exceeds that state's baseline unemployment rate and multiply that by our policy matching coefficient, then multiply by state tax revenues in that period to get the size of the transfer. Our first matching proposal is three percent, essentially a bare minimum. This will be explored further in the results section, but three percent is similar to ARRA spending, but slightly more generous, and in effect over a longer time period. Our next matching proposal is five percent, which corresponds to a level that ensures that trend growth in tax revenues remain stable for most states. The final matching proposal is an eight percent match, which in many states provides a substantial enough boost that it would be possible for state governments to undertake some degree of macroeconomic stabilization through countercyclical spending. These models are then run on Microsoft Excel, and the results can be seen in the appendices below.

There are some caveats, however, to this method of estimating both the cost and extent of the stabilization program. First, there is substantial endogeneity between tax receipts, output and unemployment, due to the existence of an automatic stabilization channel through the tax system, as well as Okun's law regularities in the relationship to total output. What that means for our proposal here is that these stabilizers would have been self-limiting to some extent, had they been implemented. Quick spending by state governments – or aversion of spending cuts – would have infused demand into the system and bulked up tax receipts and reduced unemployment. This is true both in the narrow sense of unemployment decreasing due to the retention of state government jobs as well as the broad sense of the fiscal multiplier increasing output and employment overall. This in turn would have cut later transfers from the federal government by lowering unemployment. As such, recovery would have happened more quickly and at lower dollar values of total intragovernmental transfer than those implied by the model run here. However, the degree to which this is true requires a counterfactual model be run, which is outside of scope for this paper.

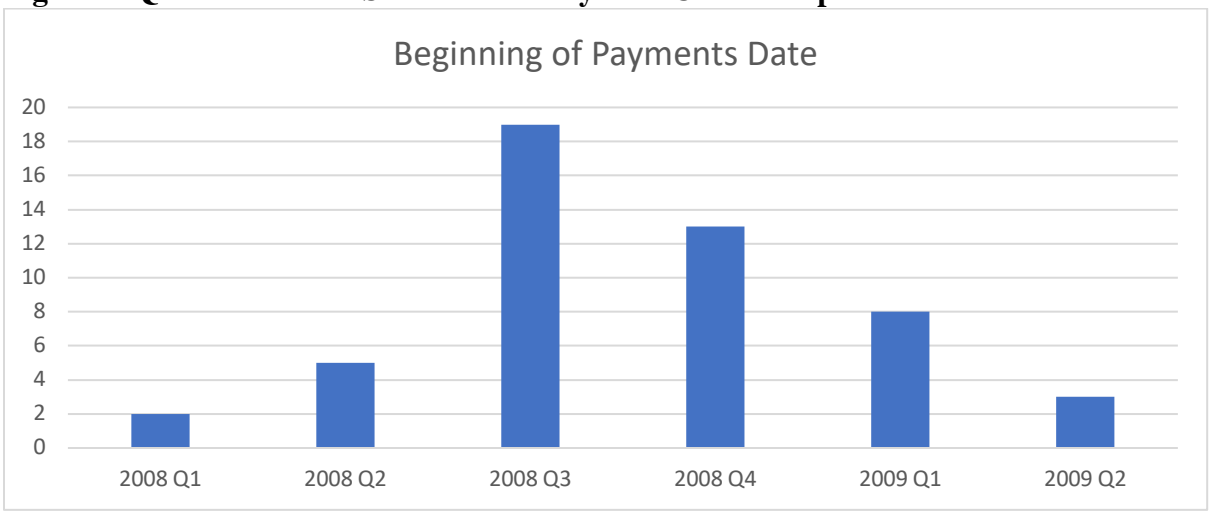
CHAPTER 6: STUDY ANALYSIS

In this section, we will review the results of the modeled version of our three proposed automatic stabilizer policies and compare them to the fiscal transfers included as part of the American Reinvestment and Recovery Act (ARRA). The differences between our proposals and the ARRA are of two broad kinds: timeline and dollar amount. We will also examine a few pathological cases, where our proposed mechanism provided less support than the ARRA and examine what can be done to rectify the situation in these instances.

First, we examine differences in timeline between our proposal and the ARRA. Fiscal transfers from the ARRA appropriations began in the first quarter of 2009, when the bill was passed. This is fairly quickly by legislative standards, but not by economic ones. In addition, the first year's payments were quite small relative to the overall total (McNichol 2012). The majority of payments in dollar terms do not roll out until the second and third year of the program.
By contrast, our proposal has a staggered onset, as different states trigger the automatic payouts at different times. Different states with different sectoral and demographic bases react to an

aggregate financial shock with different lag times, but all are impacted. Once this shock feeds through to the labor market in a given state, our proposal begins issuing automatic transfers. We see the first match payments begin to go out in the first quarter of 2008, and we see that all states have received match payments by the second quarter of 2009. The following chart presents a histogram of the quarter of first stabilization payment by state.

Figure 1. Quarter of First Stabilization Payment Under Proposal



Source: Author's calculations using Local Area Unemployment Statistics (https://www.bls.gov/web/laus/laumstrk.htm)

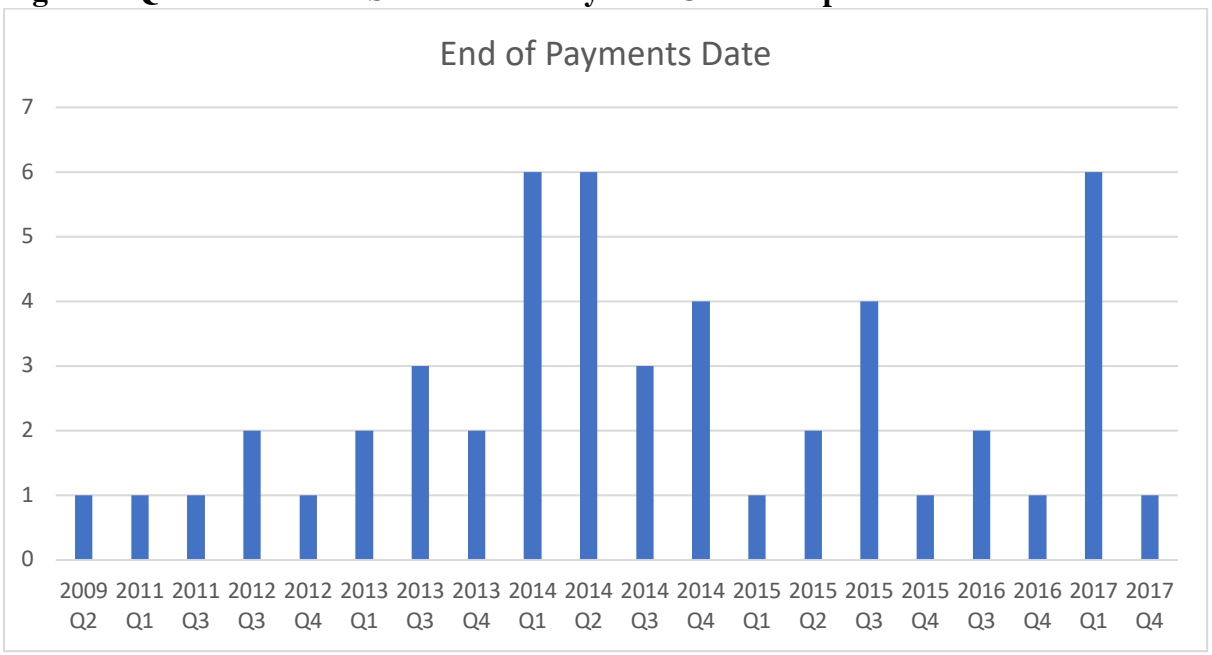
This chart shows that while there is some difference in start time between states, it is not a dramatic difference. The median state receives its first match payment in Q3 of 2008. The 2008 shock was sufficiently severe to be seen in most locations immediately, especially insofar as it was a shock to asset values in addition to incomes. This early support is crucial, and in distinct contrast to fiscal transfers under the ARRA. At the beginning of the crisis, there is an expectation that declines in state revenues will slightly lag headline changes in unemployment and output. This is more or less fair, depending on the elasticity of those states tax base with respect to changes in unemployment and output. Additionally, states are expected to smooth small variations in tax receipts using their rainy-day funds saved previously. However, we know from historical experience that states tend to try to conserve their rainy-day funds, because it is unclear to them how long the decline will last and prefer instead to enact immediate spending cuts and use the rainy-day fund more slowly. These spending cuts worsen the demand position of the local economy.

This timeliness is one of the benefits of an automatic stabilizer regime over a discretionary stabilizer regime. The ARRA was negotiated over at the federal level at the same time as the Troubled Asset Repurchase Program (TARP) and a wide variety of other bailouts. Had intragovernmental fiscal transfers such as those proposed here been in place, there would have been one fewer legislative and administrative task urgently required at the beginning of the crisis. Under an automatic stabilization regime, as soon as the money is needed, the appropriations appear. This allows agents at both the state and federal level to confidently administrate through the crisis. There is no need to wait for long bouts of haggling in congress, and a potentially uncooperative executive branch in order to ensure continuity of service at the state level. Given that the money is used for already-approved budget expenditures in the state level, there is no need to haggle a second time over the use of the money. The initial allocation was achieved through normal political means. Interestingly, this means that a stabilizer regime such as this produces the minimal political overreach between the federal and state levels. The federal government provides the condition of possibility of continuity, and the state governments provide the content of that continuity.

In addition to starting stabilization transfers earlier than the ARRA, our program lasts substantially longer than the ARRA. The ARRA ceases paying out to states in 2013, however, the 2013 payments are so small – 10% of the peak imputed quarterly payments – that it is reasonable to think of the program as fundamentally ending at the beginning of 2012. As explored above, states faced a second budget squeeze starting in 2013 when ARRA payments ended (McNichol 2012). By that point, many states had already substantially depleted their rainy-day funds, and had little choice but to react by cutting spending further and raising taxes. An automatic stabilizer minimizes this kind of policy uncertainty. Under a discretionary framework, an additional discretionary payment structure would have had to be authorized by the federal government to provide further fiscal relief transfers. We know that at the time the government was consumed with discussions about the size of the deficit and the debt ceiling, which effectively prevented any further fiscal stabilization. Under this framework, states are expected to use their rainy-day funds before discretionary funding kicks in and hope that the recession ends before the federal support does. In 2008, we saw that this approach does not work.

Under our proposal, match payments last substantially longer, as they are an automatic function of observed unemployment levels. In the long 2008 downturn, unemployment levels remained elevated in many states for years after ARRA payments ended. With this, the impact of unemployment on tax revenues continued as well. This can be seen in the following graph, laying out a histogram of when the date of final transfer payment is made.

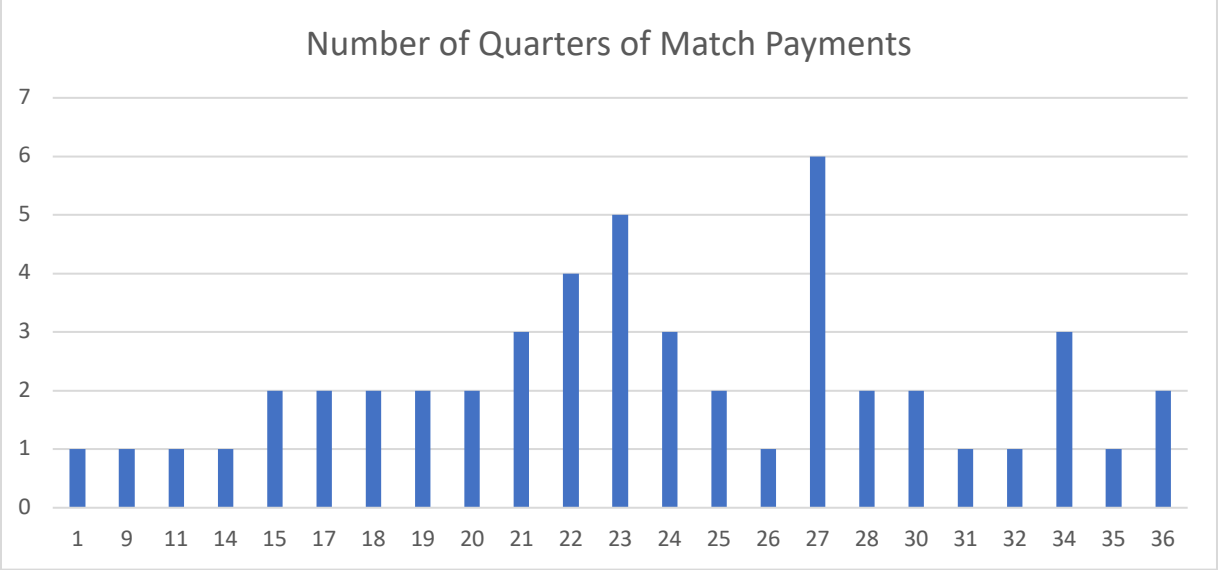
Figure 2. Quarter of Final Stabilization Payment Under Proposal



Source: Author's calculations using Local Area Unemployment Statistics (https://www.bls.gov/web/laus/laumstrk.htm)

The median state receives its final match payment in Q2 of 2014. A significant number of states require payments until the first quarter of 2017, as their unemployment rates remained elevated until then. The graph below looks at how long states received match payments.

Figure 3. Length of Stabilization Payments in Quarters



Source: Author's calculations using Local Area Unemployment Statistics (https://www.bls.gov/web/laus/laumstrk.htm)

The ARRA runs for a total of 16 quarters. By contrast, only seven out of fifty states receive match payments for 16 or fewer quarters under our proposal, and some of those are pathological cases that are explained below. The median state receives match payments under our proposal for 23 quarters, while ten states qualify for matching payments for 30 quarters or longer. This reflects the fact that the downturn was sustained, and many states suffered significant impairments both in their unemployment levels and the trend growth rates of their tax revenues. Some require match payments under our model until well into 2017, a full nine years of stabilization as compared to the four offered by the ARRA. This would allow states to operate under less overall uncertainty, and so manage their affairs with a view towards providing the best services possible, and mild countercyclicality, rather than cutting spending in the teeth of a recession. States would then be able to use their rainy-day funds not to make up for the entirety of shortfalls, but rather to make up for any discrepancies after match payments are made. This is a decidedly more robust framework. In conclusion, our proposed automatic stabilizer program both starts earlier and runs longer than the discretionary fiscal transfers included in the ARRA.

Beyond differences in timing, our plan has substantial differences in spending, both between different proposals made here, and between those proposals and spending by the ARRA. We start by describing the different spending levels proposed in this paper before moving on to contrasting them with spending by the ARRA.

We outline three proposals that utilize the same mechanism but offer a different multiple of state tax receipts when calculating the size of the transfer payment – a 3% match, a 5% match, and an 8% match – which we will describe in detail. All three match levels pay out over the same timeframe, since all three use a common recession detection mechanism, described above. The difference between the plans is in payout per period, and thus total payout as well. The table below illustrates the yearly total spending for our program as well as the ARRA spending for the period in question. A quarterly version of this table that also includes average spending per state is provided in appendix A.

Table 1. Yearly Spending for Three Policy Specifications and ARRA

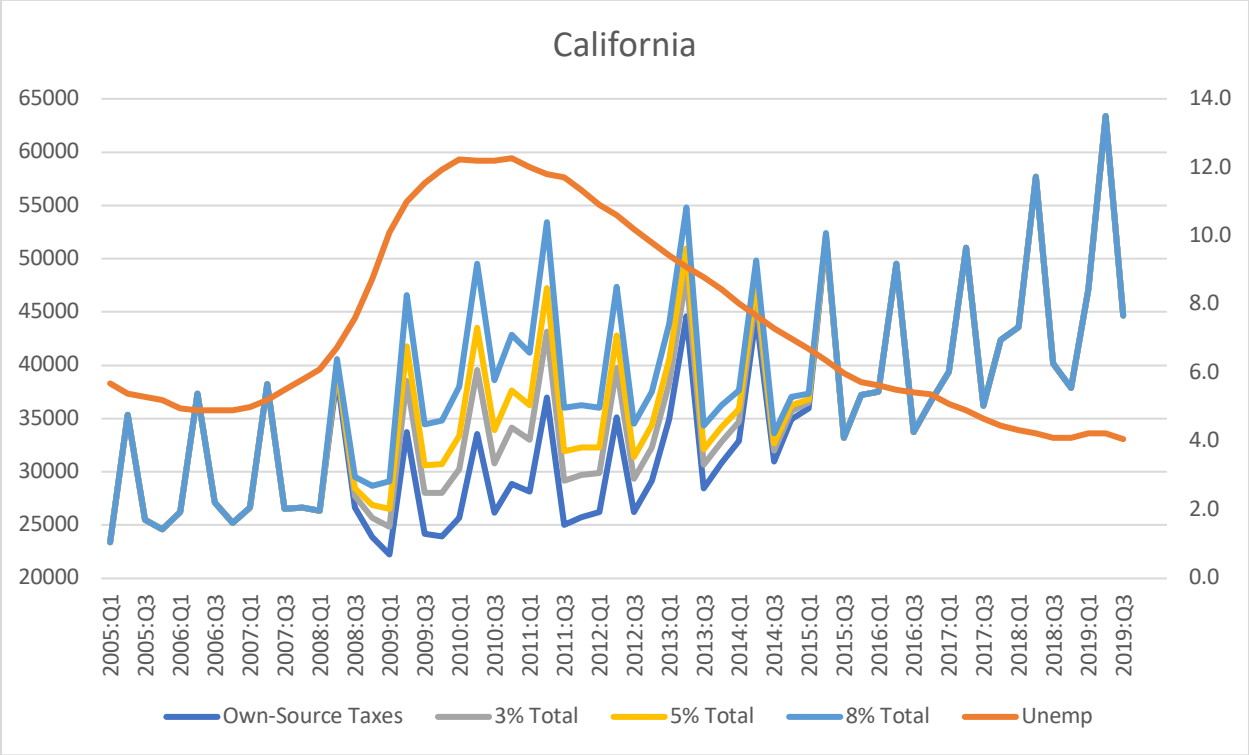
	3% Match	5% Match	8% Match	ARRA
2007	0	0	0	0
2008	$ 10,248.73	$ 17,081.21	$ 27,329.94	0
2009	$ 74,284.70	$ 123,807.83	$ 198,092.52	$ 29,000.00
2010	$ 86,177.29	$ 143,628.82	$ 229,806.11	$ 62,000.00
2011	$ 76,416.37	$ 127,360.62	$ 203,776.99	$ 58,000.00
2012	$ 58,768.35	$ 97,947.25	$ 156,715.59	$ 7,000.00
2013	$ 45,723.54	$ 76,205.90	$ 121,929.43	$ 200.00
2014	$ 19,193.34	$ 31,988.89	$ 51,182.23	$ -
2015	$ 4,895.68	$ 8,159.47	$ 13,055.15	$ -
2016	$ 1,548.23	$ 2,580.39	$ 4,128.62	$ -
2017	$ 105.67	$ 176.12	$ 281.78	$ -
2018	0	0	0	$ -
2019	0	0	0	
Total	$ 377,361.89	$ 628,936.48	$ 1,006,298.36	$ 156,200.00

Source: Author's calculations using Local Area Unemployment Statistics (https://www.bls.gov/web/laus/laumstrk.htm), State and Local Finance Data provided by the Urban Institute (https://state-local-finance-data.taxpolicycenter.org/pages.cfm) and total ARRA expenditures (https://web.archive.org/web/20130621004120/http://www.recovery.gov/pages/default.aspx)

First, we look at the 3% match variant of the proposal. The 3% match sees a total expenditure of $377 billion over the full period of program implementation. Yearly spending peaks in 2010, with $86 billion transferred, and tapers off dramatically after 2014, with no year seeing more

than $5 billion from 2015 on. As explained earlier, the majority of states have resolved their unemployment problems by this point, but for states that haven't, the support would remain critical. We find that the average spend per state over the entire program is roughly $7.5 billion. In the year of highest payout, 2010, we find that the average state receives $1.7 billion. Granted, given dramatic differences in the size of state economies, averages offer little information. For example, over the course of the program, California would receive just over $90 billion in transfers and just over $20 billion in 2010. This can be seen in the following graph.

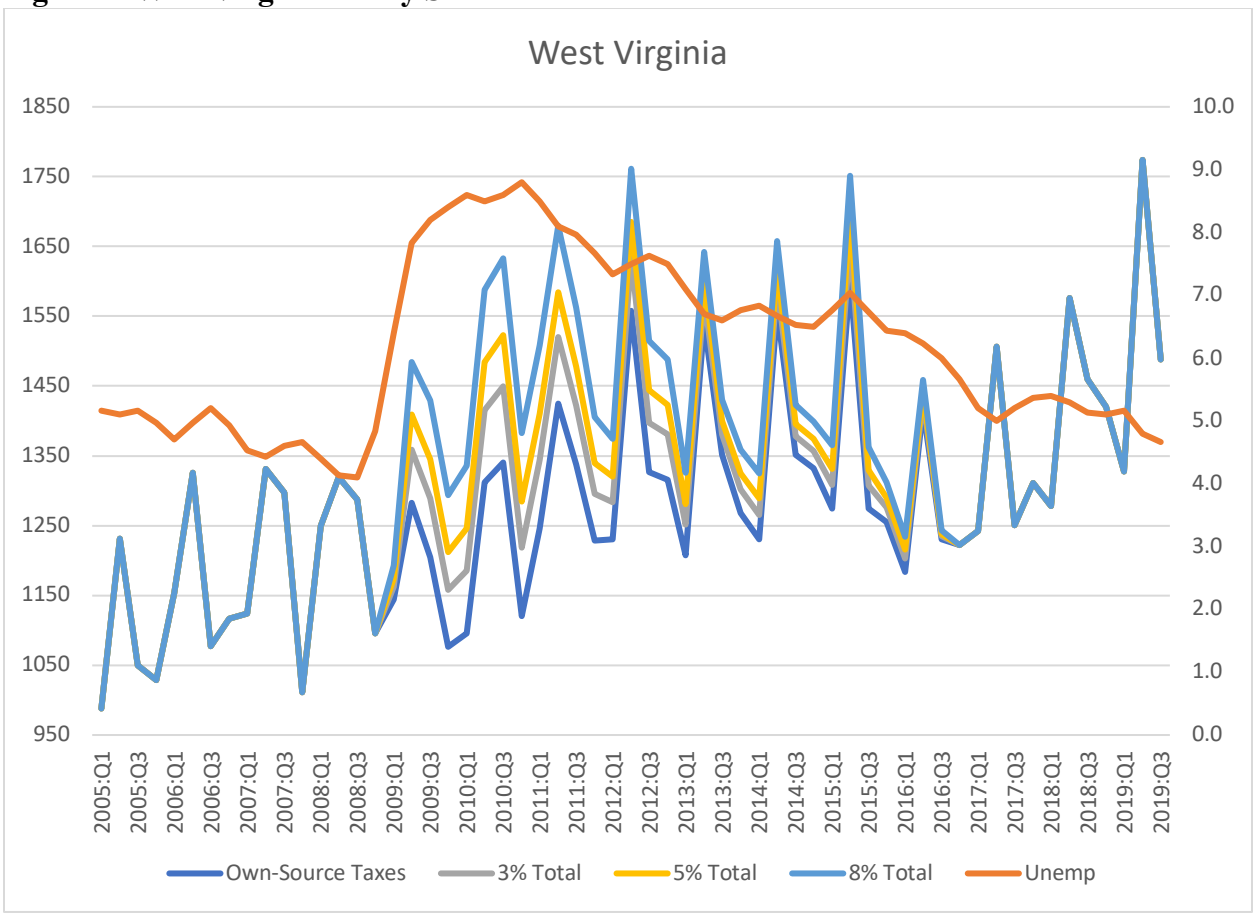
Figure 4. California Policy Simulation



Source: Author's calculations using Local Area Unemployment Statistics (https://www.bls.gov/web/laus/laumstrk.htm), State and Local Finance Data provided by the Urban Institute (https://state-local-finance-data.taxpolicycenter.org/pages.cfm) and total ARRA expenditures (https://web.archive.org/web/20130621004120/http://www.recovery.gov/pages/default.aspx)

By contrast, a country with a much smaller Gross State Product and a higher baseline unemployment rate like West Virginia receives $1.7 billion over the duration of the entire program, and just over $400 million in 2010.

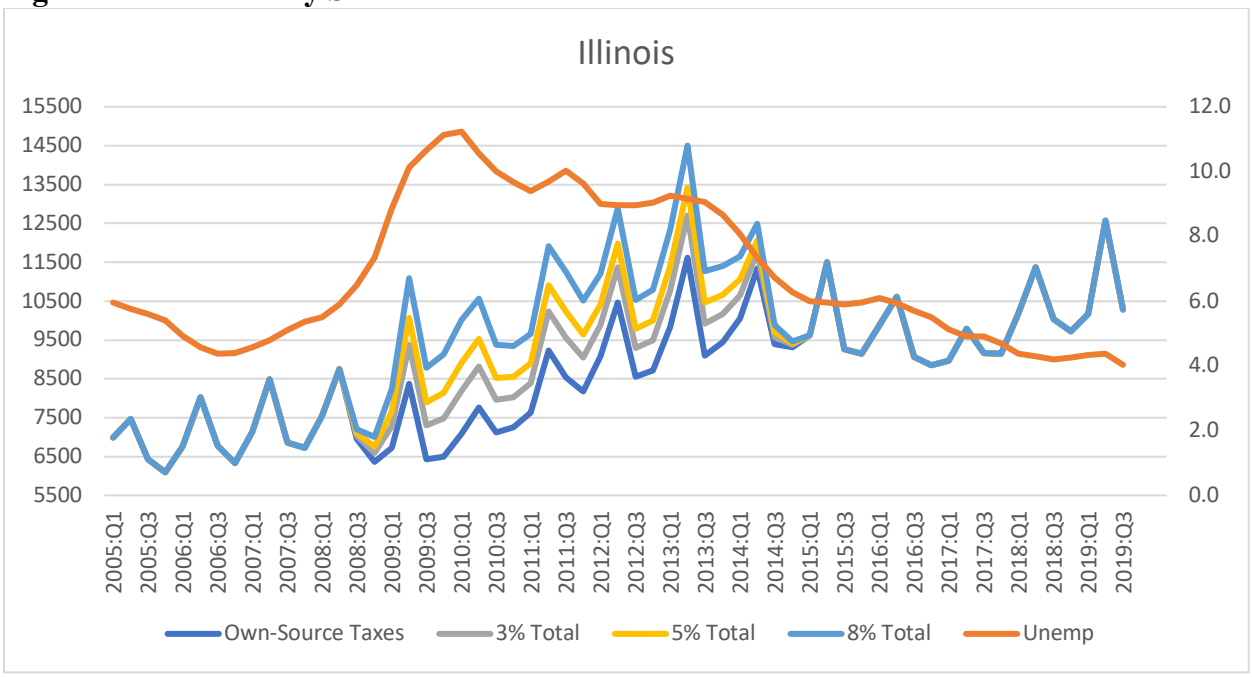
Figure 5. West Virginia Policy Simulation



Source: Author's calculations using Local Area Unemployment Statistics (https://www.bls.gov/web/laus/laumstrk.htm), State and Local Finance Data provided by the Urban Institute (https://state-local-finance-data.taxpolicycenter.org/pages.cfm) and total ARRA expenditures (https://web.archive.org/web/20130621004120/http://www.recovery.gov/pages/default.aspx)

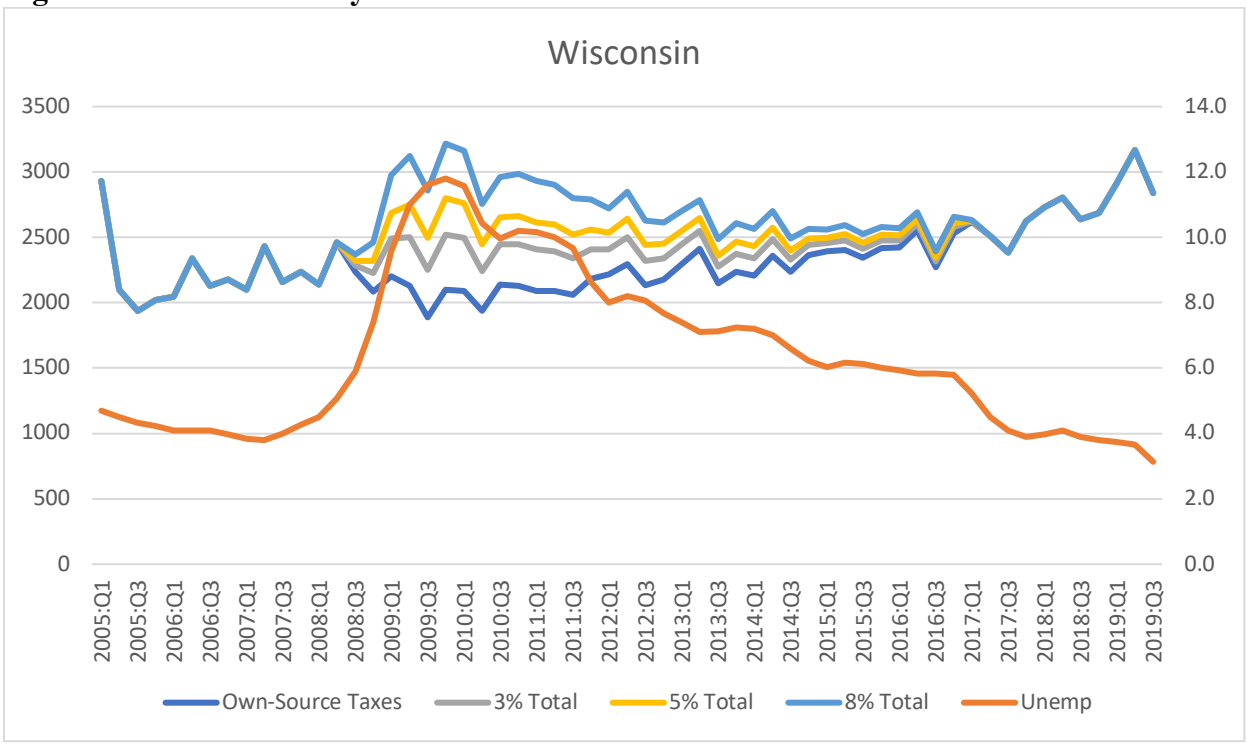
We found that a 3% match was sufficient to roughly restore trend growth to tax receipts for 18 states. These states were Alabama, Arkansas, Connecticut, Idaho, Illinois, Kentucky, Maine, Michigan, Nevada, New Jersey, New York, Rhode Island, South Carolina, Tennessee, Washington, West Virginia, Wisconsin and Wyoming. These states have surprisingly little in common on the face of it, leading one to believe that the level of match required is largely a function of tax structure rather than economic or demographic base. However, we can see in the graph for Illinois and most clearly and concisely in the graph for Wisconsin that a 3% match is sufficient.

Figure 6. Illinois Policy Simulation



Source: Author's calculations using Local Area Unemployment Statistics (https://www.bls.gov/web/laus/laumstrk.htm), State and Local Finance Data provided by the Urban Institute (https://state-local-finance-data.taxpolicycenter.org/pages.cfm) and total ARRA expenditures (https://web.archive.org/web/20130621004120/http://www.recovery.gov/pages/default.aspx)

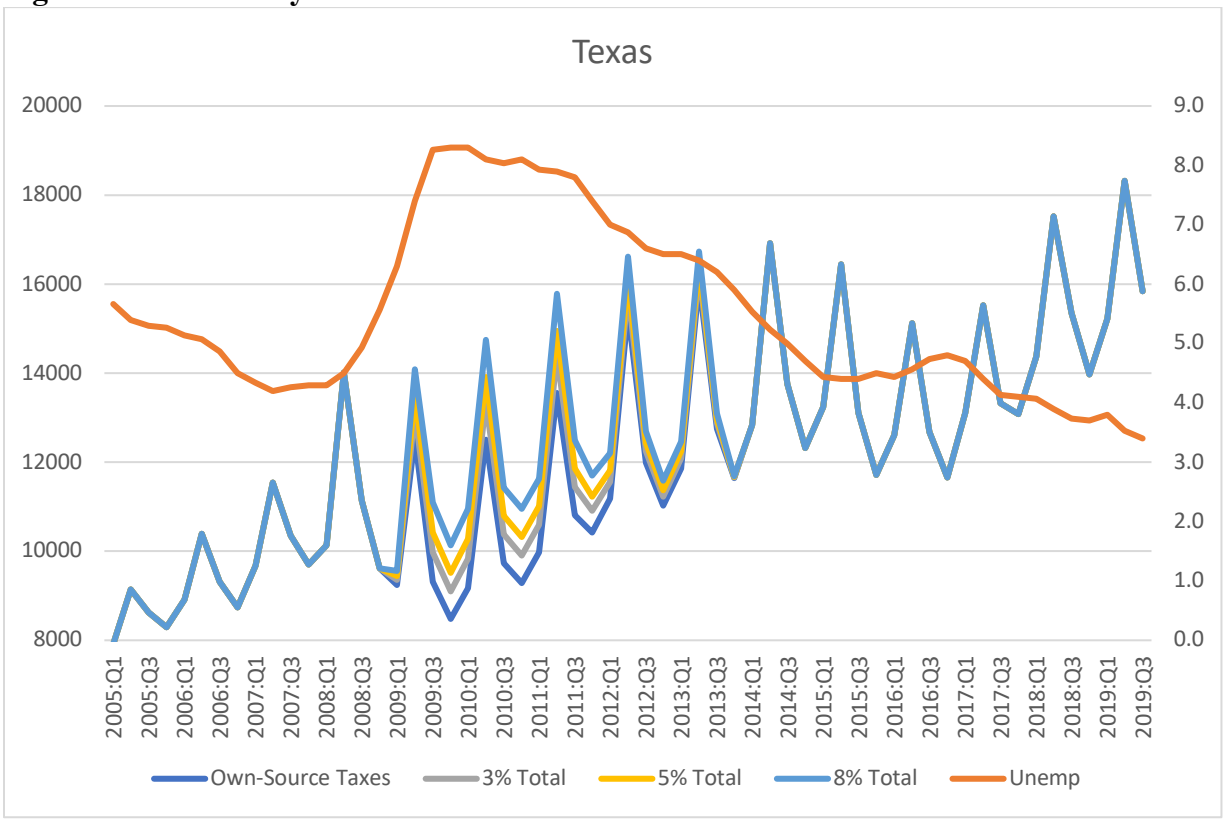
Figure 7. Wisconsin Policy Simulation



Source: Author's calculations using Local Area Unemployment Statistics (https://www.bls.gov/web/laus/laumstrk.htm), State and Local Finance Data provided by the Urban Institute (https://state-local-finance-data.taxpolicycenter.org/pages.cfm) and total ARRA expenditures (https://web.archive.org/web/20130621004120/http://www.recovery.gov/pages/default.aspx)

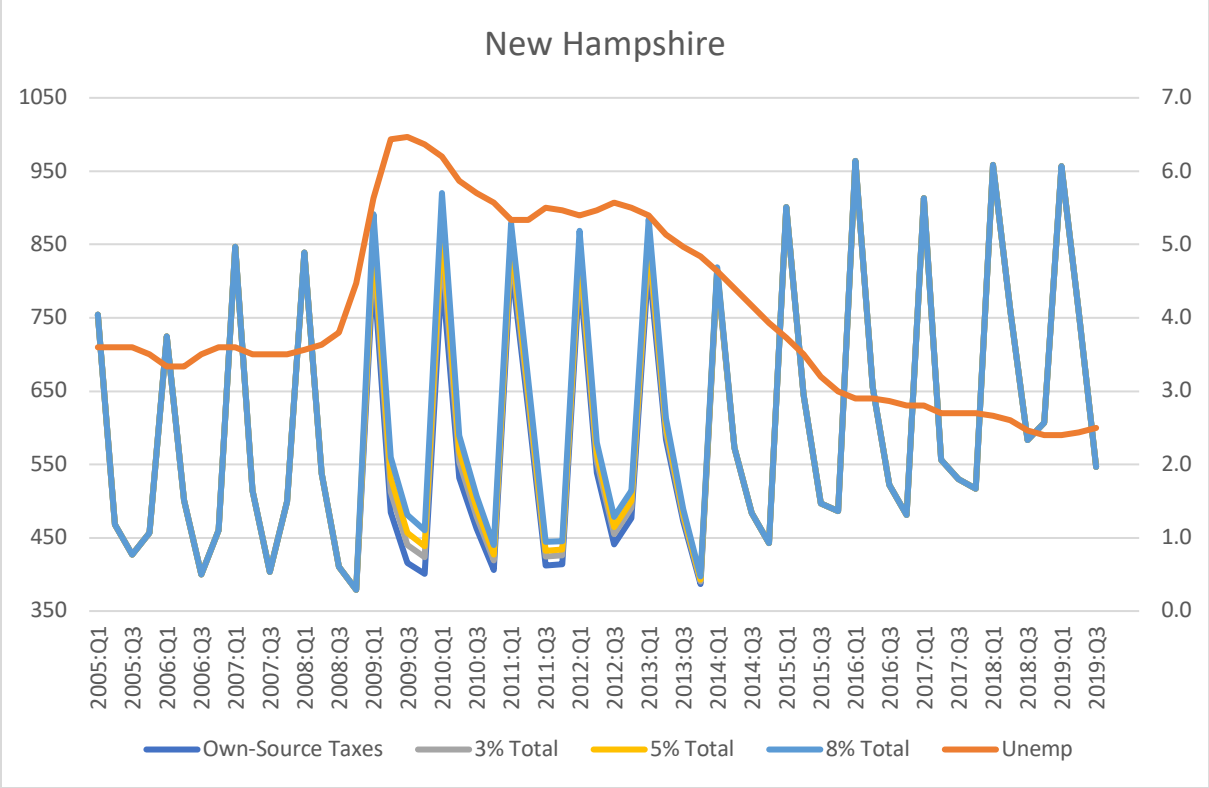
Next we examine our proposal using a 5% match. The dynamics of a 5% match are similar, with all of the values scaled up by a factor of 1.66. This leads to a total spend of $628.9 billion and a peak yearly spend of $143.6B. The average state receives $12.6 billion over the course of the program and $2.9 billion in the peak year 2010. The relative state dynamics are similar to those above, with the same heterogeneity between states. We found that a 5% match was required to roughly restore trend growth to tax receipts for 16 states. These states were Arizona, California, Florida, Georgia, Hawaii, Indiana, Maryland, Mississippi, Missouri, New Hampshire, North Carolina, Pennsylvania, Texas, Utah, Vermont, Virginia. As above, there is very little to knit these states together conceptually. Texas and New Hampshire run a very tax-light government, while California runs a comparatively tax-heavy one. That said, we can see the appropriateness in the following graphs illustrating the outcomes for Texas and New Hampshire below.

Figure 8. Texas Policy Simulation



Source: Author's calculations using Local Area Unemployment Statistics (https://www.bls.gov/web/laus/laumstrk.htm), State and Local Finance Data provided by the Urban Institute (https://state-local-finance-data.taxpolicycenter.org/pages.cfm) and total ARRA expenditures (https://web.archive.org/web/20130621004120/http://www.recovery.gov/pages/default.aspx)

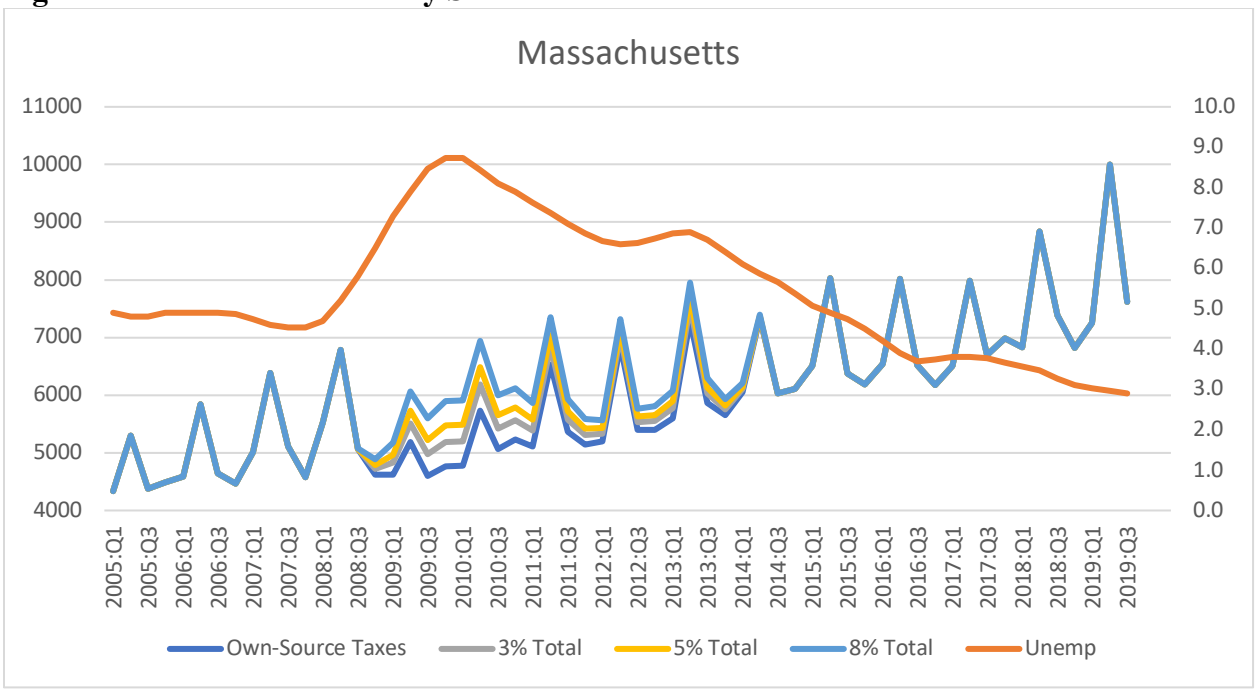
Figure 9. New Hampshire Policy Simulation



Source: Author's calculations using Local Area Unemployment Statistics (https://www.bls.gov/web/laus/laumstrk.htm), State and Local Finance Data provided by the Urban Institute (https://state-local-finance-data.taxpolicycenter.org/pages.cfm) and total ARRA expenditures (https://web.archive.org/web/20130621004120/http://www.recovery.gov/pages/default.aspx)

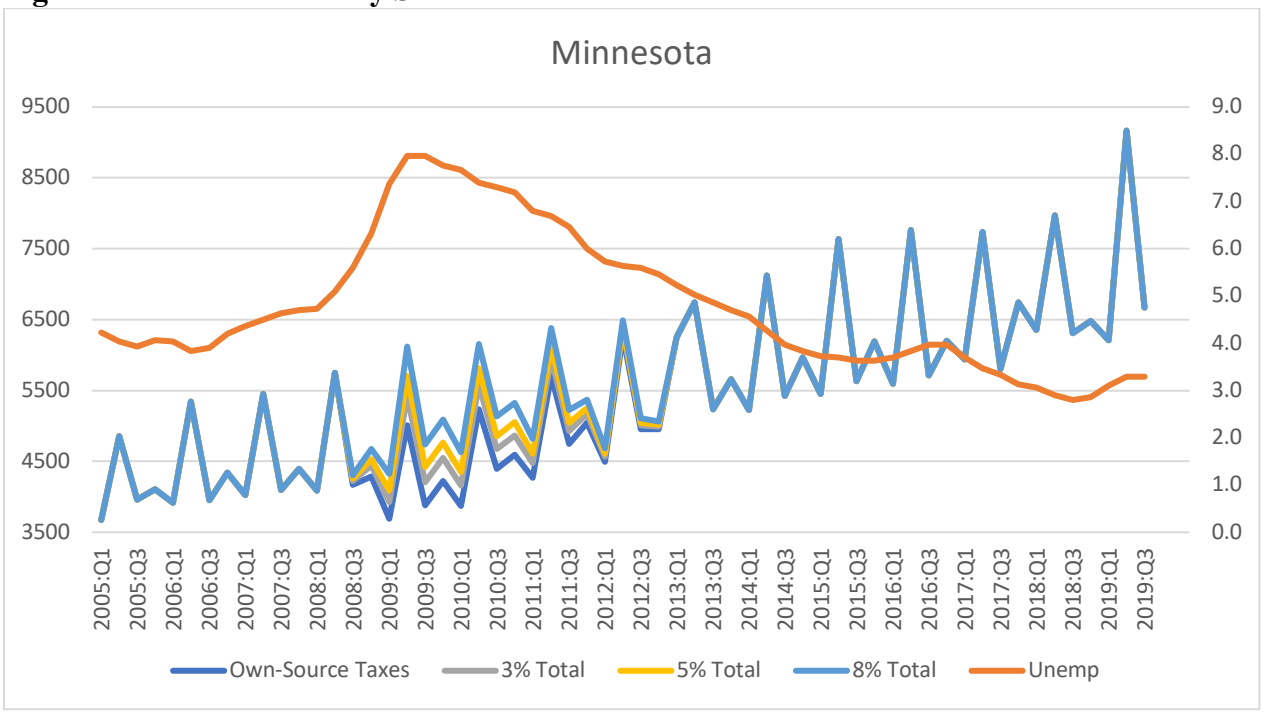
Next, we turn to the 8% match version of the proposal. The dynamics of an 8% match are similar to the 3% and 5%, with all of the values scaled up by a factor of 1.6 over the 5% values. This leads to a total spend of $1 trillion and a peak yearly spend of $229.8 billion. The average state receives $20.1 billion over the course of the program and $4.6 billion in the peak year 2010. This may seem like an incredible price tag, but in fact it is similar to the estimated ten-year cost of the recent Tax Cuts and Jobs Act (Office 2017). The relative state dynamics are similar to those above, with the same heterogeneity between states. We found that an 8% match was necessary to roughly restore trend growth to tax receipts for 10 states. These states are: Colorado, Delaware, Louisiana, Massachusetts, Minnesota, Montana, New Mexico, Ohio, Oregon, South Dakota. Once again, there is very little available to string these states together conceptually, neither geography, demographics, settlement pattern or dominant economic sector. As above, we choose two illustrative states, this time Massachusetts and Minnesota which each show clearly that an 8% match is required to maintain trend growth in tax receipts.

Figure 10. Massachusetts Policy Simulation



Source: Author's calculations using Local Area Unemployment Statistics (https://www.bls.gov/web/laus/laumstrk.htm), State and Local Finance Data provided by the Urban Institute (https://state-local-finance-data.taxpolicycenter.org/pages.cfm) and total ARRA expenditures (https://web.archive.org/web/20130621004120/http://www.recovery.gov/pages/default.aspx)

Figure 11. Minnesota Policy Simulation



Source: Author's calculations using Local Area Unemployment Statistics (https://www.bls.gov/web/laus/laumstrk.htm), State and Local Finance Data provided by the Urban Institute (https://state-local-finance-data.taxpolicycenter.org/pages.cfm) and total ARRA expenditures (https://web.archive.org/web/20130621004120/http://www.recovery.gov/pages/default.aspx)

Given the sheer difference in scale, it is not terribly productive to compare the ARRA fiscal transfers to the 5% or 8% match proposed here, as its total spend is roughly half that of the 3% match. As such, we will be contrasting the ARRA with the 3% match proposal, understanding that the 5% and 8% are dramatically more generous. The ARRA provides roughly half as many total transfer dollars as the 3% match. This is partly because of the much shorter duration of the ARRA fiscal transfers, but mostly due to higher payouts during the peak years of 2010 and 2011.

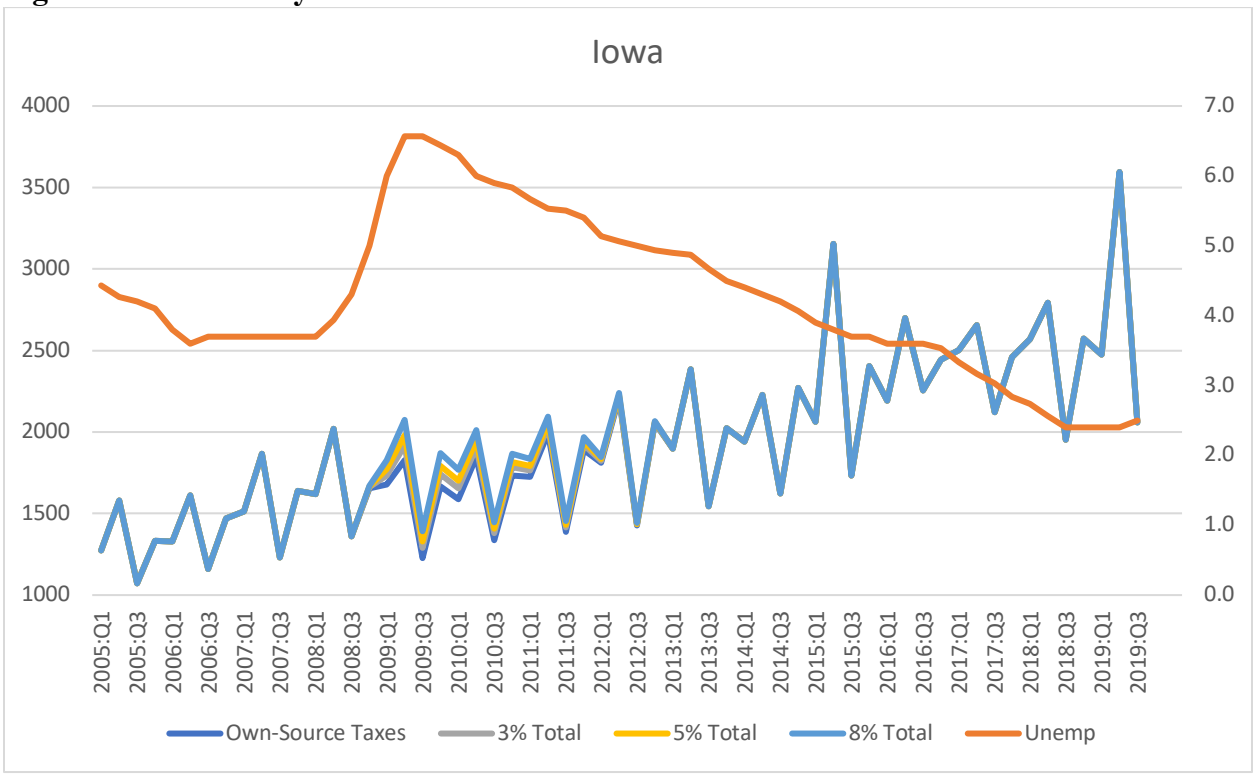
While both programs were ongoing, the 3% match paid out substantially more than the ARRA. In the peak years of ARRA transfer spending, 2010 and 2011, the ARRA paid out 72% and 76% of what a 3% match would have paid out, respectively. In off-peak years, the 3% match paid dramatically more. Under a 3% match, transfers are almost as large in 2009 as they are in 2011. By comparison, the ARRA featured a gradual ramp up. As such, in 2009 the ARRA paid out 39% of what a 3% match would have, and in 2012 it paid out only 12%. In 2013, 3% match spending remained robust at over $45B, while ARRA spending was a rounding error at $200M. Additionally, 3% match spending had a long taper as the recovery slowly trudged onward. Over 90% of spending under a 3% match program would have occurred while the ARRA spending was ongoing. Three quarters of the remaining 10% happens after the ARRA ends in 2013, while the rest happens in 2008.

We now turn to the question of which proposal presented here ought to be adopted. Given what we've laid out above in our theoretical section, it should be clear that the 8% match is preferred. This level ensures that states that require an 8% match to maintain trend growth in tax receipts receive it. States that require lower matches to maintain trend growth get extra budget space to play with in pursuit of countercyclical spending. Paying large amounts up front are likely to have an aggressive stimulating impact and lessen the need for more payments down the line. This is similar to the logic behind the stabilizer proposal put forward by Claudia Sahm, coupled with a credible commitment to continue stabilization payments every quarter if they are not immediately effective in bringing down the unemployment rate.

If political pressures prevent an 8% match, 5% is clearly preferable to 3%. Another potentially interesting, if unnecessarily complex, possibility is to create gradations of match level that increase as unemployment worsens. Modeling this is beyond the scope of the current proposal however it is worth noting that a mechanism like that would be consistent with the spirit of the original proposal, and so is worth considering as a fallback position in negotiation.

There are, however, some anomalies with our proposal. Astute readers will have noticed that the number of states listed above only sums to 44, indicating that there are six states for which it is not possible to conclude from the model that a 3%, 5% or 8% match is sufficient to restore trend growth in tax receipts. We examine these six states in turn. The first state is Iowa, whose graph is produced below.

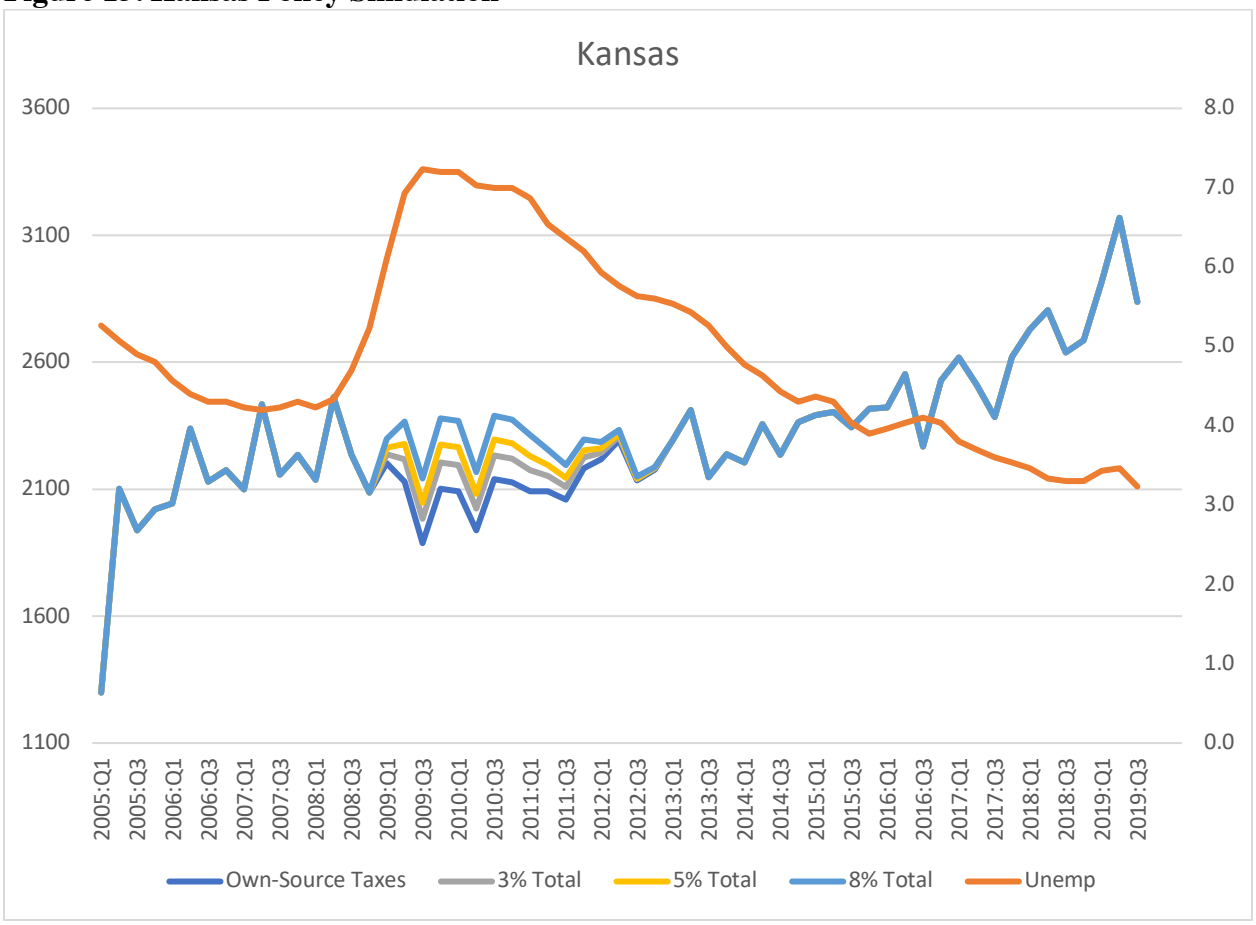
Figure 12. Iowa Policy Simulation



Source: Author's calculations using Local Area Unemployment Statistics (https://www.bls.gov/web/laus/laumstrk.htm), State and Local Finance Data provided by the Urban Institute (https://state-local-finance-data.taxpolicycenter.org/pages.cfm) and total ARRA expenditures (https://web.archive.org/web/20130621004120/http://www.recovery.gov/pages/default.aspx)

We see that in Iowa's experience, very little transfer is needed, as the own-source taxes do not deviate far from their trend growth or level. Simultaneously, very little transfer is provided, since unemployment peaks barely above benchmark. Although this is technically a pathological case since no transfer is needed to ensure trend growth in tax receipts, it is a neutral anomaly at worst. Iowa suffered comparatively little unemployment relative to baseline, and its tax system proved resilient to the fluctuation. The next state is Kansas, whose graph is produced below.

Figure 13. Kansas Policy Simulation

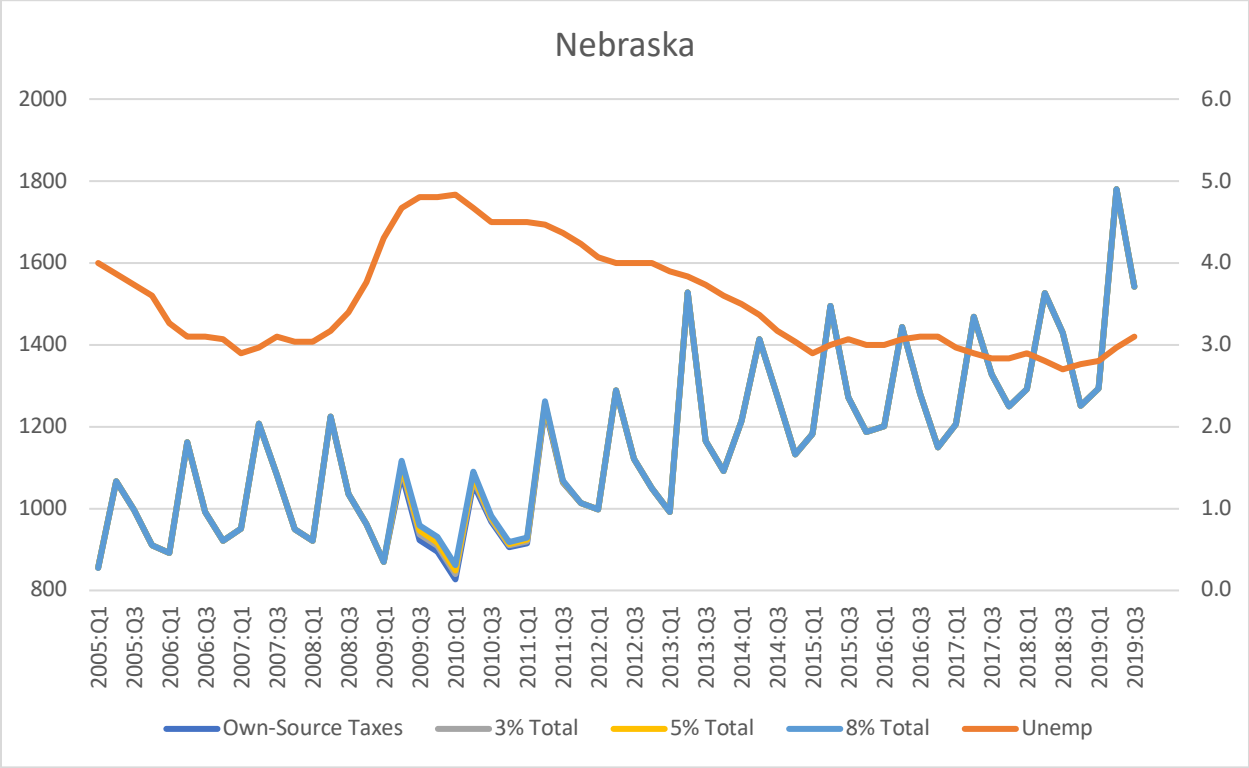


Source: Author's calculations using Local Area Unemployment Statistics (https://www.bls.gov/web/laus/laumstrk.htm), State and Local Finance Data provided by the Urban Institute (https://state-local-finance-data.taxpolicycenter.org/pages.cfm) and total ARRA expenditures (https://web.archive.org/web/20130621004120/http://www.recovery.gov/pages/default.aspx)

Kansas is a strange case, because over the course of the recession, there is no clear trend of tax receipts, and unemployment was only elevated above the benchmark level for roughly two years. Additionally, Governor Sam Brownback pursued a variety of idiosyncratic tax policies, dubbed the "red-state experiment" (Scott 2014). This saw huge tax cuts and concomitant budget shortfalls, which were rolled back in 2017. These are clearly visible in the own-source tax data

above, which flatten starting in 2011, only to return to growth in 2017. Evaluating the benefit of these kinds of aggressive state-level tax moves fall outside the purview of the plan put forward here. The next state is Nebraska, whose graph is produced below.

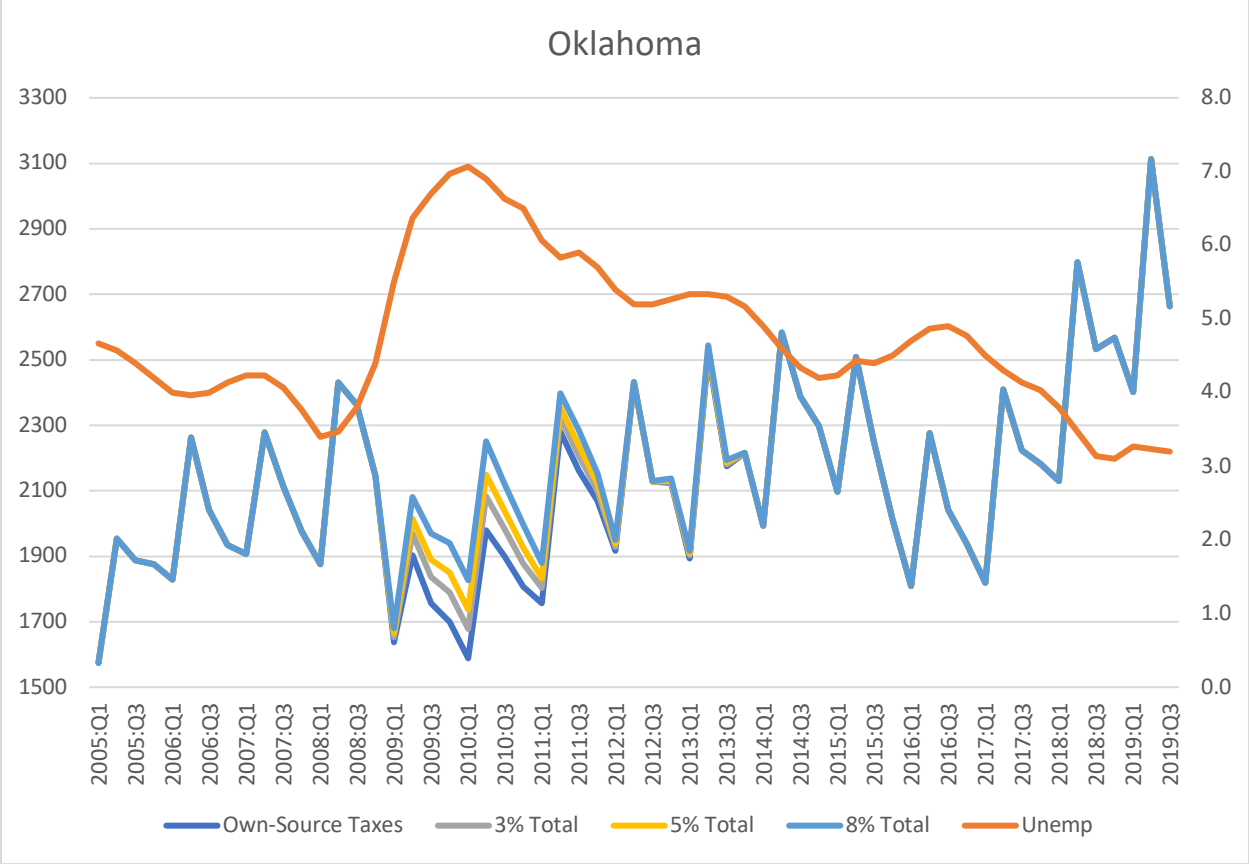
Figure 14. Nebraska Policy Simulation



Source: Author's calculations using Local Area Unemployment Statistics (https://www.bls.gov/web/laus/laumstrk.htm), State and Local Finance Data provided by the Urban Institute (https://state-local-finance-data.taxpolicycenter.org/pages.cfm) and total ARRA expenditures (https://web.archive.org/web/20130621004120/http://www.recovery.gov/pages/default.aspx)

Interestingly, Nebraska sees its tax revenues fall substantially for two years despite a very small increase in unemployment over benchmark rates. This is one of the only true cases where our mechanism does not work as expected and can only be explained as Nebraska tax revenues having an extreme elasticity with respect to unemployment rates. For our mechanism to work, Nebraska would have needed substantially more than an 8% match to maintain trend growth. The next state is Oklahoma, whose graph is produced below.

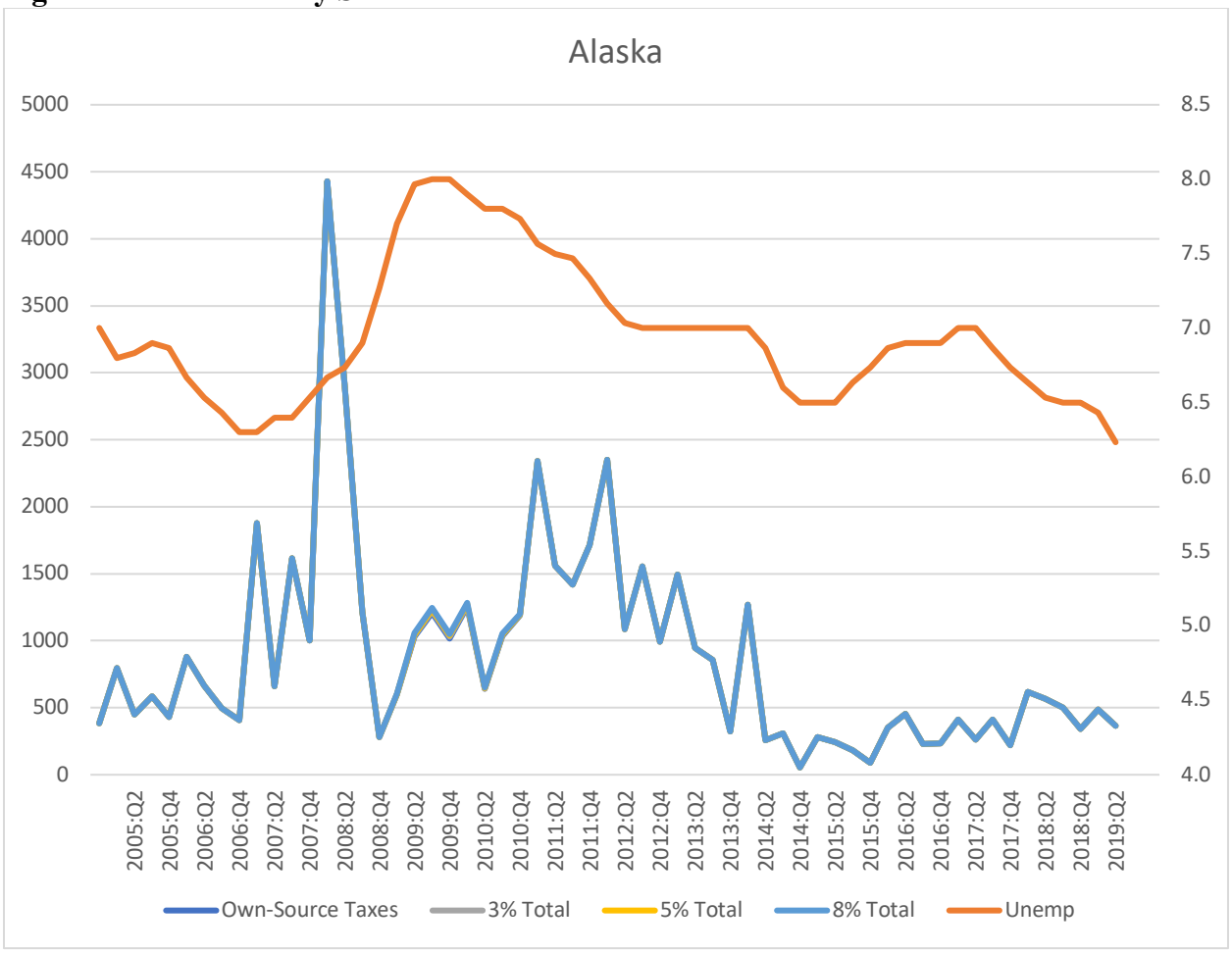
Figure 15. Oklahoma Policy Simulation



Source: Author's calculations using Local Area Unemployment Statistics (https://www.bls.gov/web/laus/laumstrk.htm), State and Local Finance Data provided by the Urban Institute (https://state-local-finance-data.taxpolicycenter.org/pages.cfm) and total ARRA expenditures (https://web.archive.org/web/20130621004120/http://www.recovery.gov/pages/default.aspx)

Oklahoma's graph is an odd one, as there is a clear and fairly extreme elasticity of tax revenues with respect to unemployment rates. Although it is a small jump by the standards of other states, we see a clear drop-off in tax receipts that requires substantially more than an 8% match to return to trend growth. However, we see this elasticity equally when unemployment rates fall again, as revenues sharply rise at the end of our sample. Oklahoma is a case which invites closer study. The next state is Alaska, whose graph is produced below.

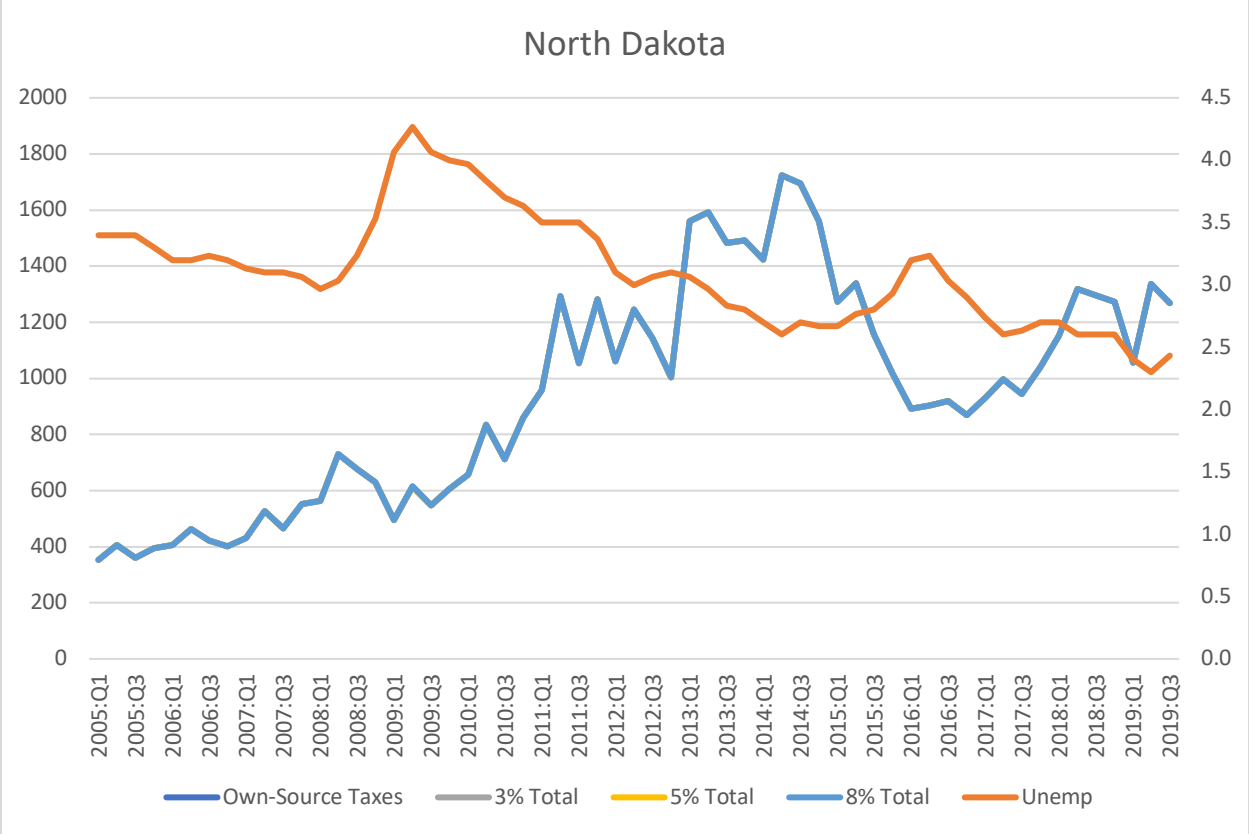
Figure 16. Alaska Policy Simulation



Source: Author's calculations using Local Area Unemployment Statistics (https://www.bls.gov/web/laus/laumstrk.htm), State and Local Finance Data provided by the Urban Institute (https://state-local-finance-data.taxpolicycenter.org/pages.cfm) and total ARRA expenditures (https://web.archive.org/web/20130621004120/http://www.recovery.gov/pages/default.aspx)

Alaska offers one of the strangest graphs of any state surveyed. They have a very high benchmark unemployment rate, meaning that the stabilization mechanism was barely triggered at all. Additionally, there is a very strange one-off spike in the first quarter of 2008 that is almost double the next highest single quarter tax receipt. Alaska has a unique economy largely built around resource extraction, but importantly, the state tax base is built into this resource extraction through the Alaska Permanent Fund. As such, the strange stability in unemployment and instability in tax receipts is hard to explain with a macro business cycle story. The last state North Dakota, whose graph is produced below.

Figure 17. North Dakota Policy Simulation



Source: Author's calculations using Local Area Unemployment Statistics (https://www.bls.gov/web/laus/laumstrk.htm), State and Local Finance Data provided by the Urban Institute (https://state-local-finance-data.taxpolicycenter.org/pages.cfm) and total ARRA expenditures (https://web.archive.org/web/20130621004120/http://www.recovery.gov/pages/default.aspx)

North Dakota is unique among states surveyed for having increasing tax receipts over the period in question. This was coupled with an unemployment rate that did not see a sufficient rise over the period to trigger our automatic transfer mechanism. Much of the North Dakota experience however can be explained by two factors. One is the comparatively small size of the state government itself, with concomitantly small baseline tax receipts. The other is a long bull market in different forms of energy that drove substantial investment into extractive industries in North Dakota. Rather than being tied to a broader business cycle, we see that North Dakota is essentially tied to commodity prices. Since these do not factor into our analysis, and North Dakota saw some of the most minimal disruptions of any state surveyed over the period in question, it is hard to conclude that the mechanism failed to work as designed.

The unemployment mechanism did not ensure transfers to all states, which indicates that the transfer mechanism is not completely foolproof. However, discrepancies can be more easily made up for using discretionary policy rather than by creating a more complex automatic policy. Some states had very mild upswings in measured unemployment over the period surveyed, while some other states had very high baseline unemployment, so the detector was tripped only minimally. Some states dramatically changed their tax policy over the period surveyed, and some had a tax base that was highly correlated to the price of certain commodities.

Now that we have explored the implications of our stabilizer proposals and concluded that they work exactly as designed, even in seemingly pathological cases, we can move on to examining their implementation within an MMT-informed public finance frame.

CHAPTER 7: POLICY RECOMMENDATIONS

One of the most interesting aspects of this plan is that it can be implemented by either the Treasury as a direct transfer program to states, or by the Federal Reserve as a debt instrument or derivative on tax revenues whose triggering event is a function of the unemployment rate.

At the Treasury, this plan is fairly straightforward. Much like other automatic stabilizers, the appropriations are written into the budget ahead of time and scored by the CBO. Budgets are made adjusting around the expected cost of these stabilizers. Ideally an independent agency is set up to coordinate this – the Office of Fiscal Harmonization – with an appropriation set by the payouts required with congressional pre-approval. In this scenario, the Treasury simply transfers the money to the accounts of the individual states at the rates set by unemployment as measured by Local Area Unemployment Survey and either expected or previous tax receipts.

The Department of the Treasury has provided a similar service before, in fact. From 1972 to 1986, there existed within the Treasury an Office of Revenue Sharing, which shared federal tax revenue with balanced budget burdened state governments (Dales 1974). This was repealed during the Reagan era, as the federal government pursued progressive devolution of both government services and funding. A version of a revenue sharing agreement survived on in

more counterintuitive and less stabilizing form through the State and Local Tax (SALT) deduction. The SALT deduction represented a transfer from federal revenues to states by allowing higher state tax rates to be deducted from federal taxes, but this transfer itself was procyclical, as tax receipts rise and fall with the business cycle. Even this though, has been significantly hampered of late, following the Tax Cuts and Jobs Act of 2017 (Leachman and Lav 2017).

At the Federal Reserve, this proposal could either function as a debt instrument – something like a catastrophe bond whose triggering event and payout level are set by unemployment – or as a derivative instrument, like a put option on the implied securitized value of forward tax revenue streams. The easiest way to conceive of both approaches is as a form of hedging or insurance that the federal government can provide to the states. The main problems with portfolio insurance of this kind – particularly in the 1987 crash – is that when it is provided by the market, a market participant who can go bankrupt has to backstop it. When tail risk events happen, rather than providing security, these insurers go insolvent or illiquid and become the problem themselves. For this reason, it's unlikely that market provision of this kind will exist for states at a price that is anywhere near acceptable. However, as issuer of the currency and market backstop simultaneously, the Fed is able to provide this backstop to states for free.

Issuing this backstop solves the capital structure problem outlined in the section exploring the work of Michael Pettis, as well as the associated moral hazard problem in a modern federation. With free provision of insurance, state governments are able to produce correlated capital structures without having to contract with private markets. Given the degree of constraint state governments face, there is very little that so-called "market discipline" would have to offer, even independent of the injunction against state-level debt (Jayadev, Mason, and Schr 2018). These correlated capital structures are then resilient to macro downturns, easing the required expenditure from own sources at the same moment that own-source revenues decline.
One of the most straightforward ways to think of this proposal is as issuing a portfolio of infinite-dated catastrophe bonds to each state government. When a given unemployment level above baseline is hit, the portion of the quasi-portfolio linked to that unemployment level pays out continuously. At each higher unemployment level, more quasi-catastrophe bonds in the

quasi-portfolio pay out. When unemployment falls again, the payouts from the tranche of the quasi-portfolio with the higher unemployment rate as a trigger stop.

Another way of framing this is as the Federal Reserve offering a free put on realized tax revenues. In this situation, unemployment rates trigger the payout of a put option on the value of the tax receipts. This works like a conditional swap: when the unemployment trigger is not hit, the states keep their tax receipts and the Fed pays nothing. When the unemployment trigger is hit, states swap their actual tax revenues for their tax revenue as adjusted by 3%, 5% or 8% match, depending on which version of the program the Fed endorses. At the end of the day, the notional doesn't change hands, only the difference between the realized and the realized plus match rate. The swap settles with the Federal Reserve paying out to the state whose unemployment trigger hit. In this manner, Fed balance sheet space can be used directly to provide state governments with correlated capital structures and resilient balance sheets.

Interesting, when viewed from the perspective of consolidated balance sheets, these two proposals work out to the same thing. Regardless of whether one uses a sound finance or functional finance frame, as outlined above, the Treasury issues debt when spending exceeds taxation. This debt clears through the Primary Dealer banks. Primary Dealer banks either resell to banks/entities that want to hold Treasury debt, or they sell back to the Fed, whether by selling directly or through a repo mechanism (Pozsar 2019). At the end of the day, spending by the Treasury can be mapped onto the Federal Reserve's balance sheet. Despite the protests of some mainstream economists, and Marc Lavoie, it is safe and conceptually robust to model a consolidated public sector (Tymoigne 2014). As such, offering puts on tax revenue or unemployment-triggered "cat" bonds to state governments using Fed balance sheet space works essentially the same as having the treasury spend the money and move its own debt to the Fed balance sheet through a variety of Rube Goldberg mechanisms that have arisen over the past seventy years.

The main implication of the fact that either the Treasury or Federal Reserve can provide this backstop is political, that these automatic stabilizers can be implemented with or without congressional approval and treasury authorization. As of the time of writing, the Federal Reserve has already headed down this path, using its authority under Section 13(3) of the

Federal Reserve Act to accept municipal bonds as collateral for repurchase agreements (Moran and Albright 2020; Lane 2020). This was done to ensure orderliness in markets for issuance of already approved municipal debt, however, there have been intimations of wider facilities to come, involving syndication of small-issue municipal debt, and possible non-recourse loans. While the Fed has yet to use its authority under section 14(2)(b) to outright purchase initial offerings of municipal bonds of duration less than 6 months, it is likely to be used in the near future, absent sufficient allocations to states from the Department of the Treasury (63rd Congress 1913). Non-recourse loans of the sort given to businesses through the Small Business Administration Paycheck Protection Program also offer a model of the kind of quasi-grant that the Federal Reserve could issue. Ideally, there would be a standing offer to states of non-recourse loans with the total offer set by the unemployment rate at date of issue.

A seeming takeover of fiscal policy – or at least, redefinition of total fiscal space – in this way by the Federal Reserve may seem antidemocratic. However, it is the condition of possibility of greater democracy at the state level. For states to have real choice, we must decouple their ability to act on spending priorities from macroeconomic fluctuations. This is fundamentally a question of intragovernmental finance, and there is no political or economic reason that the Federal Reserve should only be concerned with questions at the federal level. In fact, given the size of some states' economies – California in particular – and the degree of their distress during the events of 2008, one could argue that these kinds of supports for sub-federal governments fall under the Federal Reserve's aegis as macroprudential policy. Finally, as mentioned before, appropriations made at the state level on state level expenditures were already arrived at more or less democratically, and do not need to go through a second process at the Federal level in order to ensure this fact.

CONCLUSION

As we have seen, there is a firm basis in a variety of macroeconomic literatures for an intragovernmental budget stabilization transfer program. This program can be implemented through the Federal Reserve or the Treasury and is equally effective whether one is working from a mainstream perspective, or one informed by Modern Monetary Theory. This program

would allow states to operate much more effectively in the environment of a macroeconomic downturn of uncertain length. At the same time, stimulus funds would enter the economy at the absolute highest speed, utilizing existing spending channels rather than needing to invent new ones for the dispersal of funds. If adopted, this program will substantially smooth differences in reaction to the next recession between state governments and the federal government, as well as between different state governments. This greater coherence in turn will shorten recessions by more effectively backstopping both government services and private sector employment. It will accomplish all of this at a minimum of cost and administrative difficulty.

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APPENDIX A: QUARTERLY TABLE

All numbers in millions of Dollars

Table A.1 Quarterly Spending Under Three Policy Specifications

	Total 3% Support	Total 5% Support	Total 8% Support	Average 3% Support	Average 5% Support	Average 8% Support
2005:Q1	$ 18.20	$ 30.33	$ 48.53	$ 0.36	$ 0.61	$ 0.97
2005:Q2	$ -	$ -	$ -	$ -	$ -	$ -
2005:Q3	$ 57.44	$ 95.74	$ 153.18	$ 1.15	$ 1.91	$ 3.06
2005:Q4	$ 244.11	$ 406.85	$ 650.96	$ 4.88	$ 8.14	$ 13.02
2006:Q1	$ -	$ -	$ -	$ -	$ -	$ -
2006:Q2	$ -	$ -	$ -	$ -	$ -	$ -
2006:Q3	$ -	$ -	$ -	$ -	$ -	$ -
2006:Q4	$ -	$ -	$ -	$ -	$ -	$ -
2007:Q1	$ -	$ -	$ -	$ -	$ -	$ -
2007:Q2	$ -	$ -	$ -	$ -	$ -	$ -
2007:Q3	$ -	$ -	$ -	$ -	$ -	$ -
2007:Q4	$ -	$ -	$ -	$ -	$ -	$ -
2008:Q1	$ 100.69	$ 167.82	$ 268.51	$ 2.01	$ 3.36	$ 5.37
2008:Q2	$ 1,008.61	$ 1,681.02	$ 2,689.63	$ 20.17	$ 33.62	$ 53.79
2008:Q3	$ 2,493.04	$ 4,155.07	$ 6,648.10	$ 49.86	$ 83.10	$ 132.96
2008:Q4	$ 6,646.38	$ 11,077.30	$ 17,723.69	$ 132.93	$ 221.55	$ 354.47
2009:Q1	$ 12,452.63	$ 20,754.39	$ 33,207.02	$ 249.05	$ 415.09	$ 664.14
2009:Q2	$ 21,380.43	$ 35,634.05	$ 57,014.47	$ 427.61	$ 712.68	$ 1,140.29
2009:Q3	$ 19,465.21	$ 32,442.02	$ 51,907.24	$ 389.30	$ 648.84	$ 1,038.14
2009:Q4	$ 20,986.42	$ 34,977.37	$ 55,963.78	$ 419.73	$ 699.55	$ 1,119.28
2010:Q1	$ 21,383.86	$ 35,639.76	$ 57,023.62	$ 427.68	$ 712.80	$ 1,140.47
2010:Q2	$ 24,614.15	$ 41,023.58	$ 65,637.73	$ 492.28	$ 820.47	$ 1,312.75
2010:Q3	$ 19,631.37	$ 32,718.95	$ 52,350.32	$ 392.63	$ 654.38	$ 1,047.01
2010:Q4	$ 20,547.92	$ 34,246.53	$ 54,794.45	$ 410.96	$ 684.93	$ 1,095.89
2011:Q1	$ 19,284.45	$ 32,140.76	$ 51,425.21	$ 385.69	$ 642.82	$ 1,028.50
2011:Q2	$ 23,258.89	$ 38,764.81	$ 62,023.70	$ 465.18	$ 775.30	$ 1,240.47
2011:Q3	$ 17,535.08	$ 29,225.13	$ 46,760.20	$ 350.70	$ 584.50	$ 935.20
2011:Q4	$ 16,337.95	$ 27,229.92	$ 43,567.87	$ 326.76	$ 544.60	$ 871.36
2012:Q1	$ 14,962.25	$ 24,937.09	$ 39,899.34	$ 299.25	$ 498.74	$ 797.99
2012:Q2	$ 18,104.45	$ 30,174.08	$ 48,278.52	$ 362.09	$ 603.48	$ 965.57
2012:Q3	$ 12,868.87	$ 21,448.11	$ 34,316.98	$ 257.38	$ 428.96	$ 686.34
2012:Q4	$ 12,832.78	$ 21,387.97	$ 34,220.75	$ 256.66	$ 427.76	$ 684.42
2013:Q1	$ 13,304.29	$ 22,173.82	$ 35,478.12	$ 266.09	$ 443.48	$ 709.56
2013:Q2	$ 14,891.40	$ 24,819.01	$ 39,710.41	$ 297.83	$ 496.38	$ 794.21

2013:Q3	$ 9,399.32	$ 15,665.53	$ 25,064.84	$ 187.99	$ 313.31	$ 501.30
2013:Q4	$ 8,128.53	$ 13,547.54	$ 21,676.07	$ 162.57	$ 270.95	$ 433.52
2014:Q1	$ 6,675.63	$ 11,126.05	$ 17,801.68	$ 133.51	$ 222.52	$ 356.03
2014:Q2	$ 6,330.83	$ 10,551.39	$ 16,882.22	$ 126.62	$ 211.03	$ 337.64
2014:Q3	$ 3,393.87	$ 5,656.45	$ 9,050.32	$ 67.88	$ 113.13	$ 181.01
2014:Q4	$ 2,793.00	$ 4,655.00	$ 7,448.01	$ 55.86	$ 93.10	$ 148.96
2015:Q1	$ 1,935.13	$ 3,225.22	$ 5,160.35	$ 38.70	$ 64.50	$ 103.21
2015:Q2	$ 1,655.93	$ 2,759.88	$ 4,415.81	$ 33.12	$ 55.20	$ 88.32
2015:Q3	$ 706.73	$ 1,177.89	$ 1,884.62	$ 14.13	$ 23.56	$ 37.69
2015:Q4	$ 597.89	$ 996.49	$ 1,594.38	$ 11.96	$ 19.93	$ 31.89
2016:Q1	$ 489.72	$ 816.20	$ 1,305.91	$ 9.79	$ 16.32	$ 26.12
2016:Q2	$ 431.15	$ 718.59	$ 1,149.74	$ 8.62	$ 14.37	$ 22.99
2016:Q3	$ 330.99	$ 551.64	$ 882.63	$ 6.62	$ 11.03	$ 17.65
2016:Q4	$ 296.38	$ 493.96	$ 790.34	$ 5.93	$ 9.88	$ 15.81
2017:Q1	$ 60.17	$ 100.29	$ 160.46	$ 1.20	$ 2.01	$ 3.21
2017:Q2	$ 26.30	$ 43.83	$ 70.13	$ 0.53	$ 0.88	$ 1.40
2017:Q3	$ 16.33	$ 27.21	$ 43.54	$ 0.33	$ 0.54	$ 0.87
2017:Q4	$ 2.87	$ 4.78	$ 7.66	$ 0.06	$ 0.10	$ 0.15
2018:Q1	$ -	$ -	$ -	$ -	$ -	$ -
2018:Q2	$ -	$ -	$ -	$ -	$ -	$ -
2018:Q3	$ -	$ -	$ -	$ -	$ -	$ -
2018:Q4	$ -	$ -	$ -	$ -	$ -	$ -
2019:Q1	$ -	$ -	$ -	$ -	$ -	$ -
2019:Q2	$ -	$ -	$ -	$ -	$ -	$ -
2019:Q3	$ -	$ -	$ -	$ -	$ -	$ -
Total	$ 377,681.64	$ 629,469.39	$ 1,007,151.03			

Source: Author's calculations using Local Area Unemployment Statistics (https://www.bls.gov/web/laus/laumstrk.htm), State and Local Finance Data provided by the Urban Institute (https://state-local-finance-data.taxpolicycenter.org/pages.cfm) and total ARRA expenditures (https://web.archive.org/web/20130621004120/http://www.recovery.gov/pages/default.aspx)