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Have American Income Stabilizers Become More Effective in Dealing With Income Shocks?

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Intro:

Automatic stabilizers are at the basis of nation's defense against shocks in their economies. Automatic stabilizers are mostly defined as elements of fiscal policy that mitigate output fluctuations without discretionary government action (Dolls et all, 2012). During economic downturns aggregate demand decreases, government spending automatically increases, which raises aggregate demand and government revenue automatically, decreases. The goal of automatic stabilizers during a recession is to offset the decrease in aggregate demand. During economic booms government spending automatically decreases in order to prevent the formation bubbles in the economy (in't Veld, J, Larch, 2013). In short an automatic stabilizer is a budgetary policy that automatically (meaning without the need for action from the government) stabilizes the fluctuations in GDP.

Despite the importance and need for automatic stabilizers not much research has been done on this topic recently, most of the work on this subject being done in the 1960's to 1980's (Blanchard, 2006). As shown by the 2008 recession it is important to research automatic stabilizers because it is an economy's first barrier against an unexpected shock. Not all automatic stabilizers are defined, but there is a consensus among economists that the main examples of automatic

stabilizers are income taxes and unemployment benefits. Taxes stabilize the upturns in aggregate demand while unemployment benefits stabilize the downturns in aggregate demand. However, Automatic stabilizers stabilize more than just aggregate demand (in't Veld, J, Larch, 2013). They also stabilize unemployment and income. This paper will examine income stabilizers, a form of automatic stabilizers, that effect income stabilization. Taxes and unemployment benefits stabilize income the same way they stabilize aggregate demand.

Previous research on automatic stabilization has mainly relied on macro data (Girouard and André, 2005). However more work has been done recently with micro data pioneered by Auerbach and Feenberg (2000). Micro data has been found to be more useful in comparative work (Piketty and Saez, 2007). There has been little research done to find out whether income stabilizers have gotten better or worse over time using micro data.

In this paper, I will examine the American economy in three different years to see if state and federal income tax has become more or less effective in stabilizing income shocks. The years that will be examined will be 2007, 2009, and 2011. These years will be used because they are the three years with all data necessary to preform micro-simulations. The question being answered in this paper is: Has American state and federal income tax become more effective in stabilizing income shocks ?

In order to determine the effectiveness of income stabilization I use a micro simulation model, called TAXSIM. The micro simulation approach allows me to investigate the effects of different income shocks on disposable income holding everything else constant (Bourguignon and Spadaro, 2006). This is much more difficult with macro level data as it is not possible to distinguish between the effects of automatic stabilizers and active fiscal and monetary policy and behavioral responses, for example changes in the labor supply (Dolls et al, 2012).

I run a controlled experiment in the years 2007, 2009 and 2011. I introduce an income shock of 5% meaning a decline in an individual's adjusted gross income. This is the normal way of modeling aggregate shocks in micro simulation studies analyzing income stabilizers (Dolls et al, 2012). Income shocks in 2007, 2009, and 2011 will both be 5% so they can be compared to see if income stabilizers have gotten better at stabilizing income shocks. My income stabilization coefficient relates the shock absorption of the tax and transfer system to the overall size of the income shock. I take into account personal income taxes, social insurance contributions and the payroll tax, personal tax exemptions, and the deductions allowed as well as transfers to individuals such as unemployment benefits and social security benefits. These will be discussed in more detail later in the paper.

What does this paper contribute to the existing body of literature? First, my analysis is focused income stabilization and if American federal and state income tax have become more or less effective. Most analyses are focused on only federal

income tax, as an automatic stabilizer and not as a income stabilizer. Second, my analysis includes a micro simulation of the American economy using federal and state tax code for the given year being studied. This is done through TAXSIM, software available in STATA as TAXSIM9. This can explain why my results stabilization can be higher than in other papers, since they don't take in state tax systems and unemployment benefits. Lastly my paper will examine the effectiveness of state income tax as an income stabilizer.

Literature Review:

Automatic stabilizers are budgetary arrangements that help smooth output without the explicit need for intervention by the country's fiscal authority. There are two types of major automatic stabilizers revenue based automatic stabilizers and expenditure based automatic stabilizers. Revenue based are mainly taxed based, they increase during upturns and shrinks during downturns. On the expenditure side, the most prominent automatic stabilizer is unemployment benefits, their total amount increases during economic downturns and shrinks during upturns. United State policy makers were debating over the size and effectiveness of automatic stabilizers during and after the recession, many wanting to shrink unemployment benefits (in't Veld, J, Larch, 2013). This section of the paper will review the literature on how to find the effectiveness of revenue and expender based automatic stabilizers so policy recommendations can be made later in the paper.

When analyzing automatic stabilizers Jan in't Veld suggests to look at both the size and the degree of output smoothing. The size is generally defined as the change in the budget resulting from a change in economic activity. There are two types of indicators to measure this change: the budgetary sensitivity and the semi-elasticity. The budget sensitivity, which measures the change in the level of revenues and expenditure resulting from a marginal change in GDP (in't Veld, J, Larch, 2013):

$$\in R = \theta R = \left[\frac{\left(\frac{dR}{dY} * \frac{Y}{R}\right) R}{Y}\right] = \frac{dR}{dY}$$

$$\in R = \theta G = \left[\frac{\left(\frac{dG}{dY} * \frac{Y}{G}\right) G}{Y}\right] = \frac{dG}{dY}$$

Where R denotes government revenues, G government expenditure, and θR and θG the GDP elasticity of government revenues and expenditures respectively. The budgetary semi-elasticity, which is used by the IMF and the OCED, measures the reaction of the ratios of the expenditure and revenues to GDP to a relative change in GDP (in't Veld, J, Larch, 2013).

$$\eta R = \frac{\frac{d\left(\frac{R}{Y}\right)}{dY}}{Y} = \frac{(\theta R - 1)R}{Y}$$

$$\eta G = \frac{\frac{d\left(\frac{G}{Y}\right)}{dY}}{Y} = \frac{(\theta G - 1)R}{Y}$$

While the estimates of sensitivity and semi-elasticity are roughly the same in

the paper by Jan in't Veld comparing the automatic stabilizers of different European countries in regard to the budget, they differ significantly as regards the relative contribution of government expenditures and revenues. The budgetary sensitivity indicator allocates the predominant contribution to automatic stabilization to the revenue side of the budget, with expenditure playing a marginal part. The semi-elasticities in contrast, present the mirror view. The bulk of automatic stabilization is associated with the expenditure ratio, with almost no contribution from the revenue side of the budget (in't Veld, J, Larch, 2013).

While there is an intuitive understanding of what automatic stabilizers are, there is no agreed upon view on the relative importance of the different elements of automatic stabilizers. Different studies use different automatic stabilizers. More sophisticated measures that research studies include are measure to cyclical of different budget components such as income tax, social security contributions, corporate tax, indirect taxes and unemployment benefits (Dolls et al, 2012).

One of the first important models to analyze the effects of these different automatic stabilizers is from Christiano (1984), which showed the possibility that; the automatic stabilizers could work using an example framework of an optimizing consumer facing uncertain income prospects. It attempted to analyze the consumer choice problem in the face of automatic stabilizers. The consumer choice problem relates to preferences to consumption expenditures and to consumer demand curve, which can effect aggregate demand, and therefor have to be controlled for when

calculating the effect of automatic stabilizers. Christiano took the basic Keynesian model that the automatic stabilizers, which damp any effect of the shock on current personal disposable income, mitigate the impact on aggregate demand (Blanchard, O 2000). He does that by evaluating the multiplier, the impact of an exogenous change in aggregate demand on output, which can be shown as:

$$\frac{\alpha\tau}{(1-\alpha+\beta)(1-\alpha+\alpha\tau+\beta)}$$

Where α is the marginal propensity to consume out of after tax income, τ is the marginal income tax rate, and β is a term that captures the crowding- out effect of higher interest rates on consumption demand.

Christiano was the first to find a role for the automatic tax stabilizers in the context of an optimizing consumer choice problem. He developed a two period model, consumers maximize expected utility, specifically a constant absolute risk aversion utility function of consumption in each period, but not leisure, is used. Labor income is uncertain in the first period owing to the possibility of both common aggregate and idiosyncratic shocks that are normally distributed, while labor income in the second period, which rules out the possibility that the income taxes in the first and lump sum taxes in the second period, which would rule out the possibility that the income tax can play insurance role, even if the second period wage income was uncertain. Any change in equal aggregate income taxes in the first period is offset by an equal present value increase in taxes in the second period (Blanchard, O 2000).

Another important paper is "The Significance of Federal Taxes as an

Automatic Stabilizers by Auerbach and Feenberg (2000). Their paper analyzed the federal tax system as an automatic stabilizer using the TAXSIM model. They suggest that the progressive income tax may help to stabilize output via its effect on labor supply, additional effect that may even be of similar magnitude to the more "traditional path" of stabilization through aggregate demand. Their first step in the paper was to estimate the sensitivity of the after tax income to before tax income has changed over time, reducing this sensitivity provides greater stabilization, since either increase or decreases in before tax income. They consider separately the role of payroll tax and the Earned Income Tax Credit (EITC), a major redistributive component of the federal income tax (Auerbach, A, & Feenberg, D 2000). Then they account any additional changes in real tax liabilities induced by the changes in the inflation rate that are associated with real income shocks.

The second step of their analysis is translating the reductions in income fluctuations into aggregate demand. The extent to which consumption reacts to current disposable income is very important. Since upper income households are less likely to consume a smaller share of temporary additions to income, their change in consumption as a share of the change of disposable income will be less than for the middle income and the lower income households. However lower income households might respond significantly to changes in payments because they pay a very small share of the income tax, and therefor tax fluctuations will have little effect on their consumption. The EITC and the payroll tax are significant among lower income households, and hence can have a greater impact on

stabilization (Auerbach, A, & Feenberg, D 2000).

Before Auerbach and Feenberg (2000) researchers used many different techniques to estimate the responsiveness of the tax system to fluctuations in income. One approach focuses on estimating and aggregate relationship between total taxes and income. This approach picks up the effects of the changes in the composition of income that occurred as aggregate income changes, but its usefulness depends on the ability to hold other factors constant, and can't deal effectively with changes in the tax law over time. Auerbach and Feenberg (2000) were able to over come the problem of changes in the tax law with a simulation model based on a file of actual tax returns to consider the impact of hypothetical changes in income and its components on individual tax payments (Auerbach, A, & Feenberg, D 2000).

They used a simulator called TAXSIM from The National Bureau of Economic Research (NBER). TAXSIM refers to a collection of data sets and programs implementing a micro-simulation model, which divides into three components. The first component is a database of real tax returns. The TAXSIM model has data for every year since 1973 prepared by the Income Division of the Internal Revenue Service. This file is called the "Tax Model" by the IRS and includes almost 200 variables for each taxpayer. The second part of the model is a tax calculator. It takes the raw data on incomes and deductions and calculates the tax liabilities. The tax calculator is the re-creation of each year's tax law in FORTRAN and does,

essentially, what H&R Block does. The final component of TAXSIM is the table generator, which produces tables of population-weighted statistics by any specified tabulation variable that is usually some measure of income (Feenberg, D, & Coutts, E 1993).

Feenberg and Coutts (1993), the creators of TAXSIM, describe TAXSIM's use as a State tax calculator. Starting in 1981 TAXSIM started to calculate state tax liabilities and now has calculations for all the states for each year since 1981. Most states have different tax regimes than one another most share the basic structure of the federal tax. That is the deductions and exemptions are subtracted from the adjusted gross income to obtain taxable income. Auerbach and Feenberg (2000) use the tax calculator feature to allow them to estimate the impact on tax liability of changes in tax return components of income and deductions (Feenberg, D, & Coutts, E 1993).

However, Feenberg and Coutts talk about the limitations or drawbacks of the TAXSIM model, data limitations have forced the use of several variables that have an impact on state tax liabilities. First, the federal tax returns provide no data on household rent payments, but rent credits are an important component of the state tax systems. Second, social security benefits are not reported until 1984 but low rent and low-income credits often depend upon benefits. Third, in some states separate filing is often advantageous. Since federal returns do not list husbands' and wives' income separately TAXSIM has not allowed that variable. Lastly,

taxpayers with no state identification, because their income exceeded $200,000, were assigned randomly to states (Feenberg, D, & Coutts, E 1993).

Dolls et al (2012) build on the model of Auerbach and Feenberg (2000). Doll et al (2012) analyzes the effectiveness of the tax and transfer systems in the European Union and the United States to provide income insurance through automatic stabilization in the 2008 economic crisis. I will discuss this paper in the context of the United States because that is where my area of researched is focused. They look the macroeconomic indicators such as revenue and expenditure to GDP ratios, which are used by the IMF, that were explained at the beginning of the Literature Review, as a measure of automatic stabilization. They also examine the more complicated measures of stabilization, such as income tax, social security contributions, the corporate tax, indirect taxes, and unemployment benefits. Dolls et al (2012) looks at different empirical strategies have been proposed in previous research. They look at Sachs and Sala-i Martin (1992) and Bayoumi and Masson (1995) which regresses changes in fiscal variables on he growth rate of GDP or estimating elasticties on the basis of macroeconomic models. Sachs and Sala-i Martin (1992) and Bayoumi and Masson (1995) use time series data and finds values of 30 percent to 40 percent for disposable income stabilization in the US. However, these approaches raise a few issues, in particular the challenge of separating discretionary actions from automatic stabilizers with identification problems resulting from endogenous regressions (Dolls et al, 2012).

Dolls et al (2012) noticed that not much research has been done on automatic stabilizers using micro data. Kniesner and Ziliak (2002) analyze the impact of the United States tax reforms of the 1980's on automatic stabilization of consumption and found that there was a reduction in consumption stability of about 50 percent introduced by ERTA81 and TRA86 (which are different United States tax policies). Dolls et al then look at Auerbach and Feenberg (2000), which uses the NBER's micro simulation model TAXSIM to estimate the automatic stabilization of disposable income ranging from 25 percent to 35 percent for the years 1962 to 1995. Auerbach and Feenberg (2000) are one of the few if not only (in the year 2012) research study, which uses a simulation that estimates the demand effect taking into account liquidity constraints. They use a method developed by Zeldes (1989) and find that approximately two thirds of all households are likely to be liquidity constrained. Given this, the contribution of automatic stabilizers to demand smoothing is reduced to about 15 percent of the initial income shock (Dolls et al, 2012). This matters because if households that are liquidity may not recover as well after a shock than households who have more

The extent to which automatic stabilizers mitigate the impact of income shocks on household demand mostly relies on two factors. The first is the tax and transfer system determines the way that a shock to gross income translates into a change in disposable income. For example if there was proportional income tax with a tax rate of 30 percent, a shock on gross income of one hundred dollars leads to a decline in disposable income of 70 dollars. In this case the tax absorbs 30% of

the shock to gross income. A progressive tax would have a stronger stabilizing effect. The second factor is the relationship between current disposable income and current demand for goods and services. If the income shock is seen as transitory and current demand on some concept of permanent income, and if households can borrow or use accumulated savings, their demand will not change. In this case the impact of automatic stabilizers on the current demand would be equal to zero (Dolls et al, 2012). Things would change if some households are liquidity constrained or acting as a "rule of thumb" consumers (Campbell and Mankiw, 1989). If this were to happen their current expenditures do depend on disposable income so the automatic stabilizers play a role.

Dolls et al used a common measure for estimating automatic stabilization is the normalized tax change used by Auerbach and Feenberg (2000) which it can be interpreted as the tax system's built it flexibility (Pechman, 1973, 1987). It shows how fluctuations in market income translate into changes in disposable income through changes in personal income via tax payments. Dolls et al extends these concepts past normalized tax changes to include other taxes as well as social insurance contributions and transfers like unemployment benefits. They take into income taxes, at all government levels, social insurance contributions and payroll taxes and transfers to private households, for example unemployment benefits (Dolls et al, 2012).

Market income Y_i^M of individual i is defined as the sum of all incomes from market activities:

$$Y_i^M = E_i + Q_i + I_i + P_i + O_i$$

Where E_i is labor income, Q_i is business income, I_i is capital income, P_i property income, and O_i is other income. Disposable income Y_i^D is defined as market income minus income minus the net government intervention, $G_i=T_i+S_i-B_i$:

$$Y_i^D= Y_i^M - G_i = Y_i^M - (T_i+S_i-B_i)$$

Where G_i is net government intervention, T_i are direct taxes, S_i employee social insurance contributions, and B_i are social cash benefits (negative taxes) (Dolls et al, 2012).

Dolls et al analyze the impact of automatic stabilizers in two steps. The first stabilization of disposable income and the second is stabilization of disposable of demand. The stabilization of income, they denote the income stabilization effect as the coefficient τ^l. τ^l is derived form the general functional relationship between disposable income and market income (Dolls et al, 2012).

$$\tau^l = \tau^l(Y^M,T,S,B)$$

The derivation can be done at the macro or micro level, the macro level, the aggregate change in market income (ΔY^M) is transmitted via τ^l into an aggregate change in disposable in- come (ΔY^D) (Dolls et al, 2012):

$$\Delta Y^D = (1- \tau^l) \Delta Y^M$$

In order to isolate the impact of automatic stabilization from other effects, compute τ^l using arithmetic changes (Δ) in total disposable income ($\Sigma_i \Delta Y^D$) and market income ($\Sigma_i \Delta Y_i^M$) based on micro data information taken from a micro simulation tax benefit calculator, which avoids endogeneity by simulating

exogenous changes (Bourguignon and Spadaro, 2006):

$$\Sigma_i \Delta Y^D = (1 - \tau^l)\, \Delta Y_i^M$$

$$\tau^l = 1 - (\Sigma_i \Delta Y^D) / (\Sigma_i \Delta Y_i^M) = (\Sigma_i \Delta G_i) / (\Sigma_i \Delta Y_i^M)$$

Where τ^l measures the sensitivity of disposable income, Y_i^D, with respect to market income, Y_i^M. The larger τ^l is the stronger the stabilization effect. The income stabilization coefficient is not just determined by the size of government, measured as expenditure or revenue in percent of GDP, but it also depends on the structure of the tax benefit system and the design of different components (Dolls et al, 2012).

Data and Methodology:

I use micro simulation techniques to simulate benefits, taxes, and disposable income under different scenarios for a sample of individuals. The micro-simulation analysis allows for a controlled experiment by changing the parameters of interest while holding everything else constant (Bourguignon, Spadaro, 2006). So there will be no endogeneity problems when discussing the results.

The simulations that will be done in this paper will be done with TAXSIM, the NBER's micro-simulation model for calculating liabilities under US Federal and State income tax laws from individual data. The way this works is I take my individual level data from the PSID, from the years 2007, 2009, 2011, and put them into STATA. I then create variables needed for TAXSIM to run. These variables are the year, the marital status of individuals known as "mstat", gross social security

benefits known as “gssi”, the wage income of the primary taxpayer known as “pwages”, the wage income of the secondary taxpayer known as “swages”, property tax know as “proptax”, and unemployment compensation benefits known as “ui”. All of these variables are provided by PSID data for the years of 2007 and 2011. I run TAXSIM through STATA and TAXSIM returns new variables for me to work with to calculate the stabilization due to an income shock of 5%.

TAXSIM can stimulate direct taxes and most benefits on all levels of government except the benefits based on previous contributions because the information is not available in the cross sectional survey data. The main stages of the simulation are, first, a micro-data sample and tax benefit rules and read into the model. Then for each tax-benefit instrument the model constructs corresponding assessment units, ascertains which are eligible for that instrument and determines the amount of benefit or tax liability for each member of the unit. Lastly, after all taxes and benefits that were simulated, disposable income is calculated (Dolls et al, 2012).

This paper will compare the stabilization effect of income stabilizers in three different years, 2007, 2009, and 2011. The income stabilizers that will be analyzed in this study are federal income tax, state income tax, the payroll tax, tax for social security and medicare, unemployment compensation, personal tax exemptions and deductions allowed. In order to find out if the effectiveness of income stabilization has increased or decreased. I will compare a scenario where gross incomes are

proportionally decreased by 5% for all individuals (income shock). In order to measure the effect of income stabilization due to American income stabilizers I borrowed a model from Dolls et al, 2012.

Market income Y_i^M of individual i is defined as the sum of all incomes from market activities:

$$Y_i^M = E_i + Q_i + I_i + P_i + O_i$$

Where E_i is labor income, Q_i is business income, I_i is capital income, P_i property income, and O_i is other income. Disposable income Y_i^D is defined as market income minus income minus the net government intervention $G_i=T_i+S_i-B_i$:

$$Y_i^D= Y_i^M - G_i = Y_i^M - (T_i+S_i-B_i)$$

Where G_i is government intervention, T_i are direct taxes, S_i individuals social insurance contributions, and B_i are social cash benefits (negative taxes) (Dolls et al, 2012).

The stabilization of income denotes the income stabilization effect as the coefficient τ^l. τ^l is derived form the general functional relationship between disposable income and market income (Dolls et al, 2012).

$$\tau^l = \tau^l(Y^M,T,S,B)$$

In order to isolate the impact of automatic stabilization from other effects, compute τ^l using arithmetic changes (Δ) in total disposable income ($\Sigma_i\Delta Y^D$) and market income ($\Sigma_i\Delta Y_i^M$) based on micro data information taken from a micro

simulation tax benefit calculator, which avoids endogeneity by simulating exogenous changes (Bourguignon and Spadaro, 2006):

$$\Sigma_i \Delta Y^D = (1 - \tau^l)\, \Delta Y_i^M$$

$$\tau^l = 1 - (\Sigma_i \Delta Y^D) / (\Sigma_i \Delta Y_i^M) = (\Sigma_i \Delta G_i) / (\Sigma_i \Delta Y_i^M)$$

Where τ^l measures the sensitivity of disposable income, Y_i^D, with respect to market income, Y_i^M. The larger τ^l is the stronger the stabilization effect. The income stabilization coefficient is not just determined by the size of government, measured as expenditure or revenue in percent of GDP, but it also depends on the structure of the tax benefit system and the design of different components (Dolls et al, 2012).

When I calculated Y_i^M I used the TAXSIM's variable v32, which is an individuals income in AGI (adjusted gross income), which factors in the necessary components Y_i^M because it was calculated from them. G in my model is calculated from the sum of taxes and benefits of 2007, 2009, and 2011. The taxes used in my model are the federal income tax, state income tax, OASDI and HI payroll tax, and taxes for social security and Medicare. The benefits and deductions, i.e negative taxes I use are compensation from unemployment benefits in AGI, social security income in AGI, personal tax exemptions and tax deductions allowed.

After income stabilization is calculated for 2007, 2009, 2011. Another simulation will be done to find out the effectiveness of state income tax as an income stabilizer. This is calculated by using the same variables as used in the simulations

above, but has few added steps. States are separated into two groups: states with an income tax and states without an income tax. Income stabilization is calculated using the same method as above. Then I subtract the income stabilization of states with an income tax, from the income stabilization of the states that don't have an income tax, which gives the effectiveness as state income. This analysis will be done for 2007, 2009, and 2011.

Results:

I calculated the stabilization of aggregate demand that would occur due to an income shock in 2007 that would decrease total income by five percent. I calculated this by using TAXSIM9 on Stata and PSID data. First I calculated Y_i^M, which is the market income of an individual. Where E_i is labor income, Q_i is business income, I_i is capital income, P_i property income, and O_i is other income (Dolls et al, 2012).

$$Y_i^M = E_i + Q_i + I_i + P_i + O_i$$

Variable	Obs	Mean	Std. Dev.	Min	Max
YiM	8,289	49508.5	75343.73	0	3350000

This variable is summed together in Taxsim9 as v30 or State Income AGI (adjusted gross income).

Next I calculated G, government intervention, is represent by the equation $G_i=T_i+S_i-B_i$ Where T_i are direct taxes, S_i employee social insurance contributions, and B_i are social cash benefits (negative taxes) (Dolls et al, 2012).

Variable	Obs	Mean	Std. Dev.	Min	Max
G	8,010	9784.777	38409.11	-120147.7	1362652

The taxes and benefits that are used to calculate G are shown below:

Variable	Obs	Mean	Std. Dev.	Min	Max
fiitax	8,010	6647.646	20594.59	-428	1082387
siitax	8,010	1702.675	4519.26	-2252	215660.3
fica	8,010	6657.296	6743.29	0	121330
v11	8,010	179.2	1066.13	0	21214
v12	8,010	464.9176	2574.619	0	42840
v14	8,010	5023.735	1706.58	1133.33	6800
v17	8,010	6212.283	22671.95	0	175788.3
v29	8,010	6657.296	6743.29	0	121330

Where fiitax is the federal income tax and siitac is the state income tax. Fica is the OASDI and HI Payroll taxes. v11 is the compensation an individual gets from unemployment benefits. v12 is the amount the an individual would get paid by social security and v29 is the amount the an individual would by in taxes for social security and Medicare. v14 is personal tax exceptions and v17 is personal deductions allowed.

Disposable income was then calculated, Y_i^D, with the equation: $Y_i^D = Y_i^M - G_i = Y_i^M - (T_i + S_i - B_i)$ (Dolls et al, 2012):

Variable	Obs	Mean	Std. Dev.	Min	Max
YiD	8,010	39730.86	51941.3	3400	1987348

In order to calculate the change in Y^D and Y_i^M I ran Taxsim9 on the same 2007 PSID data but changed the data so that an individual's income was reduced by five

percent. The number "2" was used to denote that it is the data with the 5 percent income shock.

Variable	Obs	Mean	Std. Dev.	Min	Max
G2	8,010	8702.133	37024.74	-119323.3	1293633
YiM2	8,289	47033.07	71576.55	0	3182500
YiD2	8,010	38337.72	49975.85	3400	1888868

The same data variables were used to G2 as G:

Variable	Obs	Mean	Std. Dev.	Min	Max
fiitax	8,010	6116.24	19396.5	-428	1026432
siitax	8,010	1588.947	4275.61	-2323.5	204680.6
fica	8,010	6364.786	6502.299	0	116472.5
v11	8,010	179.2	1066.13	0	21214
v12	8,010	415.6549	2380.082	0	40698
v14	8,010	5027.896	1706.634	1133.33	6800
v17	8,010	6109.874	22556.88	0	168158.6
v29	8,010	6364.786	6502.299	0	116472.5

The stabilization effect of automatic stabilizers is calculated by the formula, τ^{l}= 1-$(\Sigma_i \Delta Y^D)/ (\Sigma_i \Delta Y_i^M) = (\Sigma_i \Delta G_i)/ (\Sigma_i \Delta Y_i^M)$ (Dolls et al, 2012):

Variable	Obs	Mean	Std. Dev.	Min	Max
t	6,639	.2948807	4.693809	-222.6562	1.354133

t is τ, or the stabilization coefficient. These results show that automatic stabilizers absorb approximately of 29.48% of income shock of 5% in 2007. Next the stabilization is calculated in order to see if automatic stabilizers have become more or less effective over the years. The year 2009 was used to see if automatic stabilization improved. These results follow the same process as before. First I calculated Y_i^M , which is the market income of an individual was calculated:

Variable	Obs	Mean	Std. Dev.	Min	Max
YiM	8,690	52353.3	91533.46	0	5300000

Government intervention, G, is then calculated from the same tax and benefit variables that were used in the previous analysis:

Variable	Obs	Mean	Std. Dev.	Min	Max
fiitax	8,392	6652.298	25575.37	-1224.19	1635512
siitax	8,392	1883.927	7752.344	-2487.25	562909.4
fica	8,392	7031.003	7374.215	0	178103.2
v11	8,392	177.423	1177.614	0	23198
v12	8,392	620.083	3124.487	0	53600
v14	8,392	5356.887	1814.264	2433.33	7300
v17	8,392	5206.339	21532.59	0	537563.3
v29	8,392	7031.003	7374.215	0	178103.2
G	**8,392**	**11237.5**	**42127.81**	**-122373.1**	**2012197**

Disposable income was then calculated, $Y_i^{D,}$, the same way as it was for 2007 data:

Variable	Obs	Mean	Std. Dev.	Min	Max
YiD	8,392	41030.46	60639.65	3650	3287803

In order to calculate the change in Y^D and Y_i^M I ran Taxsim9 on the same 2009 PSID data but changed the data so that an individual's income was reduced by five percent. The number "2" was used to denote that it is the data with the 5 percent income shock.

Variable	Obs	Mean	Std. Dev.	Min	Max
G2	8,392	10069.45	40404.79	-122458.5	1909383
YiM2	8,690	49735.64	86956.79	0	5035000
YiD2	8,392	39585.11	58081.91	3650	3125617

Government intervention, G, is then calculated from the same tax and benefit variables as 2009:

Variable	Obs	Mean	Std. Dev.	Min	Max

fiitax	8,392	6086.213	24143.4	-1229.12	1551833
siitax	8,392	1758.831	7347.523	-2487.25	534339.9
fica	8,392	6720.676	7104.983	0	169860.2
v11	8,392	177.423	1177.614	0	23198
v12	8,392	590.3342	3050.681	0	51262.5
v14	8,392	5359.507	1815.393	2433.33	7300
v17	8,392	5089.678	21320.87	0	511643.9
v29	8,392	6720.676	7104.983	0	169860.2

The stabilization effect of income stabilizers is calculated by the formula that was used to compute the stabilization effect of automatic stabilizers that used in 2007:

Variable	Obs	Mean	Std. Dev.	Min	Max
t	6,991	.3466224	3.233647	-200.1968	2.853311

The results show that income stabilization was 34.66% in 2009 for the selected income stabilizer variables for an income shock decreasing income by 5%.

Next, the income stabilization for the year 2011 was calculated. These results follow the same process as before. First I calculated $Y_i^{M,}$ which is the market income of an individual was calculated:

Variable	Obs	Mean	Std. Dev.	Min	Max
YiM	8,907	48174.89	73289.37	0	2000000

Government intervention, G, is then calculated from the same tax and benefit variables that were used in the previous analysis:

Variable	Obs	Mean	Std. Dev.	Min	Max
fiitax	8,619	6469.017	18720.51	-464	585133.7
siitax	8,619	1771.098	4897.509	-2182.53	204725.1
fica	8,619	5681.702	6241.019	0	69107.2
v11	8,619	730.2032	2960.914	0	42897

v12	8,619	665.6075	3242.597	0	42500
v14	8,619	5387.087	1842.92	3700	7400
v17	8,619	3718.352	17134.56	0	234708.1
v29	8,619	5681.702	6241.019	0	69107.2
G	**8,619**	**9102.269**	**32868.13**	**-146878.1**	**685965.1**

Disposable income was then calculated, Y_i^D, the same way as it was for 2007 data:

Variable	Obs	Mean	Std. Dev.	Min	Max
YiD	8,619	39078.63	50068.09	3700	1314035

In order to calculate the change in Y^D and Y_i^M I ran Taxsim9 on the same 2011 PSID data but changed the data so that an individual's income was reduced by five percent. The number "2" was used to denote that it is the data with the 5 percent income shock.

Variable	Obs	Mean	Std. Dev.	Min	Max
G2	8,619	8120.616	31464.79	-146864.5	648901.6
YiM2	8,907	45766.15	69624.91	0	1900000
YiD2	8,619	37651.24	47981.77	3700	1251098

Government intervention, G, is then calculated from the same tax and benefit variables as 2011:

Variable	Obs	Mean	Std. Dev.	Min	Max
fiitax	8,619	5957.779	17599.15	-464	553870.6
siitax	8,619	1653.712	4631.176	-2194.96	194047.7
fica	8,619	5430.08	6010.587	0	66207.2
v11	8,619	730.2032	2960.914	0	42897
v12	8,619	632.3472	3160.68	0	42500
v14	8,619	5387.087	1842.92	3700	7400
v17	8,619	3601.399	16909.58	0	224031.1
v29	8,619	5430.08	6010.587	0	66207.2

The stabilization effect of automatic stabilizers is calculated by the formula that was used to compute the stabilization effect of automatic stabilizers that used in 2007 and 2009:

Variable	Obs	Mean	Std. Dev.	Min	Max
t	6,942	.2928279	3.206599	-200.2579	2.586098

These results show that automatic stabilizers absorb approximately of 29.28% of income shock of 5% in 2011.

After the income stabilization was calculated for 2007, 2009, and 2011. The effect of state income tax is calculated by subtract the income stabilization of states with an income tax from states that do not have an income tax. The way that income stabilization was calculated was the same. The states without income tax are Alaska, Florida, Nevada, New Hampshire, South Dakota, Tennessee, Texas, Washington, and Wyoming. In the year 2007 for states with income stabilization was:

Variable	Obs	Mean	Std. Dev.	Min	Max
t	5,704	.4223084	4.424107	-222.1372	1.884587

The income stabilization effect of states without an income tax for 2007 was:

Variable	Obs	Mean	Std. Dev.	Min	Max
t	1,058	.3474993	.1287677	-.3590001	.6510002

The results show that the difference in income stabilization between states that have an income tax and those that do, in 2007, was 7.48%. For the year 2009 the process is repeated. Income stabilization of states with income tax in 2009 was:

Variable	Obs	Mean	Std. Dev.	Min	Max
t	5,347	.4186528	4.211651	-225.6746	2.129463

The income stabilization effect for states without an income tax for 2009 was:

Variable	Obs	Mean	Std. Dev.	Min	Max
t	1,018	.3689237	.1400834	-.4024689	.6541085

The results show that the difference in income stabilization between states that have an income tax and those that do, in 2009, was 4.97%. For the year 2011 the income stabilization effect for states that have income tax was:

Variable	Obs	Mean	Std. Dev.	Min	Max
t	5,946	.385809	3.321656	-200.0744	2.586098

The income stabilization for states without income tax for 2011 was:

Variable	Obs	Mean	Std. Dev.	Min	Max
t	996	.3364377	.1108922	0	1.30954

The results show that the difference in income stabilization between states that have an income tax and those that do, in 2011, was 4.94%.

Discussion:

The results shows that after an income shock of 5% that decreases American

income, income stabilizers have roughly stayed as effective as they did in 2007 compared to 2011. Stabilization effects due to an income shock of 5% by income stabilizers were 29.48% in 2007. In 2009 income stabilization was 34.66%. In 2011 the effectiveness of income stabilizers in America went back down to 29.28% meaning if there was an income shock of 5%, income stabilizers would absorb that percentage of that shock. These numbers show the average amount of stabilization that can occur due to automatic stabilizers and actual stabilization can be smaller in the event of an actual income shock of 5%.

The lack of change between income stabilization is most likely due to the ratio between market income and government spending being constant over the past few years. To change income stabilizers at the federal level policy makers would have to change the federal tax code, which is always a divisive issue in congress and makes those bills unlikely to be past. Alternatively more people can go on welfare, which increase income stabilization. This is the likely reason that income stabilization rose in 2009 to 34.66% and went 29.28% in 2011, less than a percent off from where it was in 2007.

Like income stabilizers as a whole, state income tax as a income stabilizer has not changed very much since 2007. In 2007 state income tax effectiveness as an income stabilizer was 7.48%. In 2009 state income tax effectiveness as an income stabilizer was 4.97% and in 2011 state income tax effectiveness as an income

stabilizer was 4.94%. From 2009 to 2011 state income tax as an automatic stabilizer has remained the same at just below an effective rate of 5%. These results are consistent with other research, where state income tax as income stabilizer was roughly around 5% (Dolls et al, 2012).

There are two main limitations to the results presented for the income stabilization. First, is that this paper examines specific income stabilizers effectiveness dealing with a 5% income shock in the economy that decreases income by 5%. This means it is a measure of income stabilization and not of all possible stabilizations of all income stabilizers. The second is that the results of income stabilization in 2007, 2009, and 2011 are averages and are not exact measurements of stabilization. There is one more limitation that applies to state income tax as an income stabilizer. When calculating the stabilization of state income tax the number of observations, n, is much higher for states with income taxes compared to states without state income tax. This can lead too less accurate results of income stabilization for states without an income tax.

Conclusion:

There has been massive gridlock in American politics for years, not much could be done to pass sweeping policy changes to improve the economy, sadly that gridlock has not diminished completely. This stagnation in American policy making, sparked interest in factors that help the economy that is independent of the need for

lawmakers to take action. Income stabilizers work automatically, meaning that they don't need lawmakers to make them work. This paper attempted to analyze the effectiveness of specific income stabilizers dealing with an income shock to see whether or not they have become more effective and to analyze the effectiveness of state income tax as an income stabilizer.

In this paper I have used micro simulation models for the tax and benefit system of the United States in three different years, 2007, 2009 and 2011, using TAXSIM. This was done in order to find out whether income stabilizers have become more or less effective in dealing with income shocks. The micro simulation approach allows me to investigate the effects of the income shocks on disposable income, holding all else constant (Bourguignon and Spadaro, 2006). The taxes used in the model were federal income tax, state income tax, OASDI and HI payroll tax, and taxes for social security and Medicare. The benefits and deductions, i.e. negative taxes were used in the model are compensation from unemployment benefits in AGI, social security income in AGI, personal exemptions, and deductions.

In 2007 income stabilizers absorbed approximately 29.48% of an income shock of 5%. In 2009 income stabilizers absorbed approximately 34.66% of an income shock of 5%. In 2011 income stabilizers absorbed approximately 29.28% of an income shock of 5%. This shows that income stabilizers in the United States have not become more or less effective since 2007. The increase in 2009 is likely due to the Great Recession, which is why income stabilization returned back to its

rate of 29% after the recession.

This paper contributes to the existing body of literature in three ways. The first is to find out whether American income stabilizers have become more effective dealing with income shocks. The second contribution is the use of micro simulation analysis that includes state and federal level tax and benefit systems. The third is calculating the effectiveness of state income tax as an income stabilizer, since most literature focuses on only federal income tax.

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