THE EFFECT OF TAX EXPENDITURES ON AUTOMATIC STABILIZERS: METHODS AND EVIDENCE

Hautahi Kingi and Kyle Rozema

We analyze the effect of tax expenditures on the stabilizing power of the tax system. We propose a microsimulation strategy which exploits links that we identify between automatic stabilizers, tax expenditures, and effective marginal tax rates. Using the Survey of Consumer Finances from 1988 to 2009, we estimate that, on average, the Mortgage Interest Deduction and the Charitable Contributions Deduction increased the sensitivity of aggregate consumption to income fluctuations from a baseline of 0.14 by 1.13% and 0.97%, respectively.

Keywords: Tax Expenditures, Automatic Stabilizers, Marginal Propensity to Consume, Hand-to-Mouth, Effective Marginal Tax Rates.

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Hauthi Kingi: Department of Economics, Cornell University, Uris Hall, Ithaca, New York 14850, e-mail: hrk55@cornell.edu, website: www.hautahikingi.com.

Kyle Rozema: Northwestern Pritzker School of Law, Levy Mayer Hall, 375 East Chicago Avenue, Chicago, Illinois 60611, e-mail: kyle.rozema@law.northwestern.edu, website: www.kylerozema.com.

1 Introduction

The federal government "spends" through the tax code by exempting certain economic activities from taxation. Research has examined how these "tax expenditures" affect individual behavior (Hilber and Turner, 2014) and how the benefits of such tax expenditures are unequally distributed across income groups (Burman et al., 2008). We broaden these insights by examining tax expenditures within the wider context of the federal tax system. In particular, we investigate how tax expenditures affect the ability of the tax system to stabilize household disposable income and consumption.

The income tax system reduces fluctuations in disposable income by partially absorbing shocks to market income. Tax expenditures may distort this ability of the tax system to function as an automatic stabilizer (Listokin, 2012). In this article, we analyze these potential distortions empirically. We propose a method to estimate the effect of a tax expenditure on the ability of the tax system to act as an automatic stabilizer. In developing this method, we exploit underlying theoretical links we identify between measures of the automatic stabilizing power of a tax system, the size of tax expenditures, and effective marginal tax rates (EMTR).

We measure the automatic stabilization of disposable income using the Normalized Tax Change (NTC) (Auerbach and Feenberg, 2000), which captures how much aggregate tax revenue changes in response to a change in aggregate market income (Slitor, 1948). To measure how a tax expenditure affects automatic stabilization of disposable income, we estimate the change in the NTC induced by the removal of the provision. This change, which we call the NTC Shifter (NTCS), measures the destabilizing effect of a tax expenditure on disposable income. We show that the NTCS can be interpreted as (1) the extra proportion of a fluctuation in market income that would be absorbed by the tax system in the absence of the tax expenditure, (2) the sensitivity of the tax expenditure to income changes, or (3) the sensitivity of the EMTR to the removal of the tax expenditure.

Automatic stabilizers deal with business cycle fluctuations, which are inherently transitory. Because consumption of rational agents depends on permanent—not transitory—income, the effect of tax expenditures on disposable income stabilization must be translated into demand stabilization by adjusting for each household's marginal propensity to consume (MPC). To estimate demand stabilization, we adopt the standard assumption that Hand-to- Mouth (HtM) households have a MPC equal to one, while all other households have a zero MPC (Auerbach and Feenberg, 2000; Dolls et al., 2012). The MPC Adjusted NTC (ANTC) measures how much aggregate tax revenue *that would have otherwise been spent* changes in response to a change in aggregate market income.

We define our empirical measure of the effect of a tax expenditure on automatic stabilization as the change in the ANTC induced by the removal of the provision. This measure, which we call the ANTC Shifter (ANTCS), estimates the extra amount of consumption, as a proportion of a fluctuation in market income, that the tax system would have absorbed in the absence of the tax provision.

Using microdata from the Survey of Consumer Finances (SCF) from 1988 to 2009, we find strong evidence that two of the largest tax expenditures—the Mortgage Interest Deduction (MID) and the Charitable Contributions Deduction (CCD)—alter the federal tax system's role as an automatic stabilizer. The MID and CCD decreased the ability of the tax system to absorb fluctuations in aggregate consumption by an average of 4.92% and 4.20%, respectively. These estimates tell us how much the tax provisions change the relative ability of the tax system to absorb consumption.

In order to interpret the findings in terms of how a tax provision changes the sensitivity of consumption to income fluctuations, which can be directly compared to equivalent measurements from the consumption response literature (Kniesner and Ziliak, 2002), we must normalize the ANTCS by the baseline sensitivity of consumption to income fluctuations (Kingi and Rozema, 2015). This normalized measure estimates the increase in the reaction of

consumption to income changes caused by the tax provision. We find that the MID and CCD increased the sensitivity of consumption to income fluctuations from a baseline of 0.14 by 1.13% and 0.97%, respectively. A back of the envelope calculation suggests that, in light of a 3% recession, the removal of the MID and CCD would stabilize annual consumption by an average of $3.5 and $3.1 billion (in 2012 dollars), respectively. The MID and CCD substantially decrease the tax system's ability to stabilize demand.

The attractiveness of a tax expenditure, both politically and as a means to increase social welfare, is rarely analyzed in light of its relationship with the general stabilizing effect of the federal tax system (Listokin, 2012). It is our view that the assessment of the desirability of a tax expenditure ought to take this relationship into account. An important part of this assessment lies in knowing the magnitude of the change in automatic stabilization caused by a tax expenditure. Our paper makes a first attempt at measuring this.

We make two contributions. First, we consolidate concepts of automatic stabilizers, effective marginal tax rates, and tax expenditures into a single theoretical framework. Our main contribution is to exploit this framework to propose and implement a method for estimating the effect of a tax expenditure on the ability of the tax system to act as an automatic stabilizer. In addition to microsimulation techniques from the automatic stabilization literature (Auerbach and Feenberg, 2000; Dolls et al., 2012), our empirical approach incorporates techniques used to estimate the size of tax expenditures (Poterba and Sinai, 2011) and the methods used to estimate changes in the EMTR (Barro and Sahasakul, 1983; Saez, 2004; Mertens, 2015). We show that changes in the NTC can be explicitly expressed in terms of tax expenditures and of changes in the EMTR. These links justify our empirical method for estimating the destabilizing effect of a tax expenditure.

The paper proceeds as follows. Section 2 sets out the theoretical framework behind our analysis. We develop our empirical methodology in Section 3. In Section 3.1, we propose our empirical measure of the effect of a tax expenditure on the ability of the tax system to act as an automatic stabilizer and discuss the complications that arise in estimating this measure. In

Section 3.2, we derive the connection between the NTC and the EMTR, and introduce a new formula that encompasses both of these concepts. Section 3.3 demonstrates the key concepts of how tax expenditures can influence automatic stabilizers through simple numerical examples. Section 4 describes the data and the channels through which tax expenditures can influence stabilization. Section 5 presents our results and Section 6 concludes.

2 Theoretical Framework

2.1 Literature Review

Our research lies at the intersection of the literatures on automatic stabilizers and tax expenditures. The income tax system functions as an automatic stabilizer by partially absorbing shocks to market income. Theoretical work on automatic stabilizers began with Musgrave and Miller (1948) and Slitor (1948). Empirical work that measures the size of automatic stabilizers can be divided into micro and macro studies. Our work is closely related to the micro studies. These studies apply microsimulation techniques to overcome the main limitation of endogenous aggregate measures of stabilization used in macro studies (Auerbach and Feenberg, 2000; Auerbach, 2009; Dolls et al., 2012), such as the ratio of tax revenue and GDP (International Monetary Fund, 2009), the cyclical elasticity of tax system components with respect to income (van den Noord, 2000; Fatas and Mihov, 2012), and the relationship between government size and output volatility (Gali, 1994; Fatas and Mihov, 2001). Unlike macro approaches using these aggregate-level measures, microsimulation is able to isolate the effects of *automatic* stabilizers from behavioral and general equilibrium effects.

The tax system functions as an automatic stabilizer through at least three channels. First, workers are incentivized to substitute work effort away from booms and into recessions when faced with tax rates that rise in expansionary periods and fall in recessionary periods (Christiano, 1984). Second, if low income households have higher propensities to spend than

high income households, redistribution from high to low-income households means that aggregate consumption will rise with redistribution during recessions (Blinder, 1975). Finally, the tax system absorbs fluctuations in market income directly.

We focus on the latter aspect of automatic stabilizers. To do this, we use the concept of a tax system's "built-in flexibility" introduced by Slitor (1948), which says that an income tax system dampens the variability of disposable income and therefore provides insurance against market income volatility (Musgrave and Miller, 1948; Brown, 1955; Brown and Kruizenga, 1959; Cohen, 1959; Pechman, 1973). Auerbach and Feenberg (2000) proposed a microsimulation strategy to estimate built-in flexibility by simulating a 1% change in aggregate income spread neutrally across the population, and estimating tax liability for each tax filer before and after the hypothetical income increase. Auerbach and Feenberg (2000) measure built-in flexibility by estimating the Normalized Tax Change (NTC) according to Equation (1).

$$\text{NTC} = \frac{\sum_i \left(\widehat{T}_i - T_i\right)}{\sum_i \left(\widehat{Y}_i - Y_i\right)} \tag{1}$$

where $\widehat{T}_i$ is the amount of tax paid by tax filer *i* after the hypothetical increase in income from Y_i to $\widehat{Y}_i$ and T_i was the actual amount of tax paid by tax filer *i.* The NTC measures the degree to which total tax revenue fluctuates with income.

2.2 MPC Adjustment

In order for aggregate demand to be stabilized, the cushioning effect of taxes on disposable income must be translated into a cushioning effect on household consumption, the primary component of aggregate demand. A high reaction of consumption to transitory changes in current disposable income is inconsistent with rational, forward-looking behavior which implies that current demand should depend on some permanent income concept (Auerbach and Feenberg, 2000). In other words, without HtM households with nonzero MPCs, automatic stabilizers would

not impact current demand.

To analyze demand stabilization, we adopt the approach of Auerbach and Feenberg (2000) and Dolls et al. (2012) who assume that HtM households fully adjust consumption after changes in disposable income (MPC = 1) while non-HtM households do not adjust consumption at all (MPC = 0). The MPC Adjusted NTC (ANTC) is estimated according to Equation (2).

$$\text{ANTC} = \frac{\sum_{i \in \text{HtM}} (\widehat{T}_i - T_i)}{\sum_i (\widehat{Y}_i - Y_i)} \tag{2}$$

where HtM is the subset of HtM households. The ANTC measures the change in aggregate taxes *that would have otherwise been spent* in response to, and as a proportion of, changes in market income.

3 Empirical Methodology

3.1 Measuring the Stabilizing Effect of a Tax Expenditure

We estimate the effect of tax expenditure *X* on the tax system's ability to stabilize disposable income and consumption by estimating its impact on the NTC and ANTC, respectively. Specifically, for tax expenditure *X* we define the NTC Shifter (NTCS) according to Equation (3) and the ANTC Shifter (ANTCS) according to Equation (4).

$$\text{NTCS}_X = \widehat{\text{NTC}}_{X=0} - \text{NTC} \tag{3}$$

$$\text{ANTCS}_X = \widehat{\text{ANTC}}_{X=0} - \text{ANTC} \tag{4}$$

where $\widehat{\text{NTC}}_{X=0}$ and $\widehat{\text{ANTC}}_{X=0}$ are the estimated NTC and ANTC in a counterfactual world without tax provision *X* and with tax credits held constant, respectively. The value of NTCS_X gives the extra proportion of a fluctuation in market income that would be absorbed by the tax system in the absence of tax provision *X*. The value of ANTCS_X gives the extra amount of

consumption, as a proportion of a fluctuation in market income, that the tax system would have absorbed in the absence of tax provision *X*.

It is worth emphasizing what exactly our estimators capture and how the estimates should be interpreted. The microsimulation used to derive the estimators is designed to assess the sensitivity of consumption to *potential* changes in income (Auerbach and Feenberg, 2000), which, importantly, is precisely what automatic stabilizers deal with.

The main complication that arises in this exercise lies within the assumptions made regarding the counterfactual world in which the tax provision no longer exists. This complication is exactly the well-known complication faced when attempting to estimate tax expenditures (Burman, 2003; Altshuler and Dietz, 2011; Poterba, 2011), as we will show below. We therefore briefly discuss the complication that arises within our method and how we address it in the more familiar setting of how it relates to tax expenditure estimation.

Unlike direct expenditures, tax expenditures cannot be measured using standard accounting methods. Estimating the expenditure from a tax provision instead amounts to estimating the change in federal income tax revenue caused by the hypothetical elimination of a provision in the tax code. Traditional tax expenditure estimates are "static," meaning the exercise assumes that the hypothetical elimination of the tax provision does not influence economic behavior. On the one hand, this is a strong assumption, given that many tax expenditures are precisely designed to alter economic behavior. MID tax expenditure estimates are likely to differ from the amount of revenue that would be gained by eliminating the MID provision (Burman et al., 2008). A substantial literature examines changes in portfolio adjustments that are likely to result from the elimination of the MID (Poterba, 1984; Berkovec and Fullerton, 1992; Jones, 1995; Follain and Melamed, 1998; Dunsky and Follain, 2000; Amromin et al., 2007; Gale et al., 2007; Gervais and Pandey, 2008; Poterba and Sinai, 2008). Poterba and Sinai (2011) estimate that repealing the MID in 2003 would have raised income tax revenues by $72.4 billion in the absence of any household portfolio adjustments, but by $58.5 billion if homeowners drew down

financial assets to pay down their mortgage debt.

On the other hand, the alternative assumption of optimal household portfolio reallocation that is required to overcome the limitations of the static estimates is perhaps an even stronger assumption. Like Poterba and Sinai (2011), we find that many households could reduce their tax burden by modifying their asset portfolio, implying that households are not optimizing. Rather than taking a stand on issues of asset portfolio allocation, we simply follow the tax expenditure literature and use static estimates (Burman, 2003; Altshuler and Dietz, 2011; Poterba, 2011).

In the case of the CCD, however, the static assumption has little to no effect on our estimator for stability. This is because charitable giving decisions are expenditure decisions rather than asset allocation decisions and therefore any change in behavior induced by removing the CCD is unlikely to alter personal income. In other words, the removal of the CCD simply makes the consumption good of charitable giving more expensive.

With this complication in mind, consider the procedure for estimating tax expenditures. It consists of running tax filers through a tax calculator under the baseline normal tax structure with and without the tax provision and comparing tax revenues. More formally, the tax expenditure of tax provision *X*, E_X, is estimated according to Equation (5).

$$E_X = \sum_i \left(T_i^{X=0} - T_i\right) \tag{5}$$

where $T_i^{X=0}$ is the tax liability of tax filer *i* in the counterfactual world without tax provision X, and T_i is the actual amount of tax liability for tax filer *i*. With this definition in hand, we can be more explicit about the relationship between the NTCS and tax expenditures. The NTCS can be expressed as a function of two types of tax expenditures according to Equation (6).

$$\text{NTCS}_X = \frac{\hat{E}_X - E_X}{\sum_i \left(\hat{Y}_i - Y_i\right)} \tag{6}$$

where $\hat{E}_X$ is the estimated tax expenditure on provision *X* in a counterfactual scenario with a 1% increase in income for each tax filer and with tax credits held constant. Equation (6) demonstrates that a tax expenditure that is highly sensitive to changes in income has a larger effect on stabilization. Our measure can therefore be alternatively interpreted as the sensitivity of tax expenditures to income changes.

In the next section, we set forth a general concept of the economy-wide marginal tax rate, and show how the NTCS can also be interpreted as the sensitivity of the EMTR to the removal of the tax expenditure.

3.2 Weighted Average Marginal Tax Rates

Slitor (1948) noted that built-in flexibility (the NTC) is related to the concept of EMTR that is commonly used in the macroeconomics literature on the response of aggregate economic activity to changes in marginal tax rates (Barro and Sahasakul, 1983; Saez, 2004; Mertens, 2015). To our knowledge, the mathematical relationship between the NTC and the EMTR has not been formally articulated. Equation (7) lays out a concept we refer to as the Weighted Average Marginal Tax Rate (WAMTR), which embeds the NTC and the EMTR as special cases.

$$\text{WAMTR} = \sum_i \omega_i \left(\frac{\hat{T}_i - T_i}{\Delta_i} \right) \tag{7}$$

where $\hat{T}_i$ is the amount of tax paid by tax filer *i* after a hypothetical increase in income by Δ_i, and ω_i is the weight attributed to tax filer *i*. The difference between the NTC and the EMTR amounts to differences in the assumed size of the income change Δ_i when numerically constructing the marginal tax rates of each tax filer, where both use income weights $\left(\omega_i = \frac{Y_i}{\sum_i Y_i}\right)$. The NTC is estimated using a 1% change in income ($\Delta_i = 0.01 Y_i$); the EMTR is estimated using a marginal change in income ($\Delta_i = \$1$).

The exercise of estimating the NTCS and ANTCS is therefore very similar to estimating changes in the EMTR common in the business cycle literature (Barro and Sahasakul, 1983). Rather than measuring the effect of marginal income changes on a version of the WAMTR as in the macro literature (specifically, where the WAMTR is the EMTR), we measure the effect of whole tax provisions on a version of the WAMTR (specifically, where the WAMTR is the NTC). The NTCS can therefore be interpreted as the sensitivity of the WAMTR to the removal of the tax provision.

Before we turn to the empirical section, we present simple numerical examples to illustrate the economic intuition of how tax expenditures can impact automatic stabilizers.

3.3 Numerical Examples

All the examples we present feature an economy with two tax brackets and two tax filers. The tax system is characterized by marginal tax rates of 10% and 20% with an income threshold of \$10,000. We denote the gross income of tax filer 1 and 2 by Y_1 and Y_2, respectively. Unless stated otherwise, we follow the notation in the previous sections.

Example 1 (Base Case): $Y_1 = \$8{,}000, Y_2 = \$12{,}000$

$$T_1 = \$8{,}000 \times 0.10 = \$800, \qquad \hat{T}_1 = \$8{,}000 \times 1.01 \times 0.10 = \$808$$

$$T_2 = \$10{,}000 \times 0.10 + (\$12{,}000 - \$10{,}000) \times 0.20 = \$1{,}400$$

$$\hat{T}_2 = \$10{,}000 \times 0.10 + (\$12{,}000 \times 1.01 - \$10{,}000) \times 0.20 = \$1{,}424$$

$$\text{NTC} = \frac{(\$808 - \$800) + (\$1{,}424 - \$1{,}400)}{(\$8{,}080 - \$8{,}000) + (\$12{,}120 - \$12{,}000)} = 0.16$$

$$EMTR = 0.1 \times \frac{\$8{,}000}{\$20{,}000} + 0.2 \times \frac{\$12{,}000}{\$20{,}000} = 0.16$$

Example 1 first outlines the calculation of tax liabilities before (T_i) and after ($\hat{T}_i$) the hypothetical 1% increase in income. Using these tax liabilities, we calculate the NTC using

Equation (1) and the EMTR by summing over the income-weighted marginal tax rates.

In this example, the NTC and the EMTR coincide because the 1% income increase used to calculate the NTC does not push tax filer 1 into a higher tax bracket. Therefore, the relevant increase in tax revenue as a percent of income coincides with the marginal tax rates faced by each tax filer. In the next example, we allow for a $1,000 lump sum deduction from taxable income.

Example 2 (Tax Deduction): $Y_1 = \$8{,}000, Y_2 = \$12{,}000$, lump-sum deduction $= \$1{,}000$

$$T_1 = \$700, \hat{T}_1 = \$708, T_2 = \$1{,}200, \hat{T}_2 = \$1{,}224$$

$$\text{NTC} = 0.16, \text{EMTR} = 0.16$$

$$T_1^{X=0} = \$800, \hat{T}_1^{X=0} = \$808, T_2^{X=0} = \$1{,}400, \hat{T}_2^{X=0} = \$1{,}424$$

$$E = (\$800 - \$700) + (\$1{,}400 - \$1{,}200) = \$300$$

$$\hat{E} = (\$808 - \$708) + (\$1{,}424 - \$1{,}224) = \$300$$

Example 2 shows that this tax deduction has no effect on the NTC. This surprising result is a consequence of the fact that the deduction in this example does not depend on income and is not sufficiently large as to induce the movement of tax filers across tax brackets.

Using Equation (5) to estimate tax expenditures, we subtract the actual tax revenue raised with the hypothetical amount of taxes raised in a world without the deduction to calculate $E = \$300$. Repeating this exercise under the counterfactual scenario of a 1% increase in income $(\hat{E})$, tax expenditures do not change. This is consistent with Equation (6) because an unchanged level of tax expenditures implies an unchanged value of the NTC. In the next two examples, we relax the properties that the tax deduction does not induce bracket shifting (Example 3) and that it does not depend on income (Example 4).

Example 3 (Bracket Shifting Deduction): $Y_1 = \$8{,}000, Y_2 = \$12{,}000$, lump-sum deduction $= \$3{,}000$

$$T_1 = \$500, \hat{T}_1 = \$508, T_2 = \$900, \hat{T}_2 = \$912$$

$$\text{NTC} = 0.10, \text{EMTR} = 0.10, E = \$800, \hat{E} = \$812$$

Example 3 demonstrates that the NTC is reduced when a tax deduction allows tax filer 2 to occupy the lower tax bracket. The impact of tax deductions on the stabilizing ability of the tax system depends on the extent to which the deductions induce "bracket shift." Bracket shifting depends on the size of the tax deduction, the number of tax brackets, and the extent to which tax filers are distributed closely to the tax bracket thresholds. Specifically, more bracket shifting occurs with larger tax deductions, more tax brackets, and more tax filers clustered around tax bracket thresholds.

Moving our attention toward tax expenditure estimation, we observe that a tax regime with a larger deduction will have higher tax expenditures. Furthermore, the tax expenditure in the counterfactual scenario with a 1% increase in income, $\hat{E}$, is now larger because tax filer 2 would witness a higher marginal tax rate in the world without the tax expenditure. We can also confirm the important relationship in Equation (6) which shows that the value of the NTCS = (0.16 − 0.10) = 0.06 can be expressed in terms of tax expenditure estimates:

$$\text{NTCS} = \frac{\$812 - \$800}{(\$8{,}080 - \$8{,}000) + (\$12{,}120 - \$12{,}000)} = 0.06$$

In the next example, we consider the situation where the deduction is dependent on income. In particular, we assume that the deduction is a fixed percentage of income so that any change in income causes a proportional change in the deduction.

Example 4 (Income-Dependent Tax Deduction): $Y_1 = \$8{,}000, Y_2 = \$12{,}000$, lump-sum deduction $= 12.5\% \times Y_i$

$$T_1 = \$700, \hat{T}_1 = \$707, T_2 = \$1{,}100, \hat{T}_2 = \$1{,}121$$

$$\text{NTC} = 0.14, \text{EMTR} = 0.16, E = \$300, \hat{E} = \$303$$

Example 4 demonstrates that a tax deduction which is an increasing function of income reduces the NTC, even without bracket shifting. The tax system is unable to absorb as large a proportion of income when income is increased, because that income increase is accompanied by an increase in the tax deduction.

We next consider the case with no explicit tax deduction, but where tax filer 1 is sufficiently close to the income threshold that a 1% income increase changes her tax bracket.

Example 5 (Bracket Creep): $Y_1 = \$9{,}950, Y_2 = \$12{,}000$

$$T_1 = \$995, \hat{T}_1 = \$1{,}010, T_2 = \$1{,}400, \hat{T}_2 = \$1{,}424$$

$$\text{NTC} = 0.178, \text{EMTR} = 0.155$$

Example 5, when compared to Example 1, demonstrates that the NTC increases when tax filer 1 is sufficiently close to the income tax threshold that a 1% increase in income triggers a change in her marginal tax rate. The economy is better able to absorb fluctuations in income when those fluctuations induce "bracket creep." Because part of the incremental income is taxed at a higher rate, bracket creep diminishes the impact of the income change on disposable income. This occurs despite the fall in the EMTR, which is a result of a larger share of the economy's income being held by tax filer 1 who faces a lower marginal tax rate. The stabilizing effect of bracket creep resulting from an increase in income has the potential to offset the destabilizing effect of bracket shifting induced by tax deductions. Finally, we demonstrate the properties of the ANTC by assuming that tax filer 1 is HtM.

Example 6 (MPC Adjustment): $Y_1 = \$8{,}000\ (\text{HtM}), Y_2 = \$12{,}000$

$$T_1 = \$800, \hat{T}_1 = \$808, T_2 = \$1{,}400, \hat{T}_2 = \$1{,}424$$

$$\text{NTC} = 0.16, \text{EMTR} = 0.16$$

$$\text{ANTC} = \frac{\$808 - \$800}{(\$8{,}080 - \$8{,}000) + (\$12{,}120 - \$12{,}000)} = 0.04$$

The ANTC is always less than the NTC because the ANTC only depends on changes in taxes of HtM tax filers, which is by definition less than total changes in taxes. Unless every tax filer is HtM, the NTC will therefore overestimate the cushioning effect of the tax system. Through these examples, we hoped to build intuition for the NTCS and ANTCS.

In the next section, we describe the data and present the workings of the MID and CCD. In doing so, we will discuss how the intuition presented here relates to each of these provisions.

4 Data and Descriptive Statistics

We estimate the destabilizing effect of the MID and CCD using data from the Survey of Consumer Finances (SCF). The SCF is a nationally representative triennial survey of U.S. households conducted by the Board of Governors of the Federal Reserve System in co-operation with the Statistics of Income Division (SOI) of the Internal Revenue Service (IRS). The SCF collects information on a broad array of assets, liabilities, and related information on items such as interest rates on loans. Notably, it contains information on the amount of mortgage holdings and applicable interest rates as well as on charitable contributions. In addition, the survey collects information on household demographics that are important for the estimation of federal income tax liability, including information on wage and capital income, number of dependents, and marital status.

We investigate the impact of the MID and CCD on automatic stabilizers for the years 1988 to 2009. The MID and CCD have unique characteristics and have differed in their respective historical prominence. In the following subsections, we briefly describe them. For the purpose of demonstrating how each policy can impact stabilization, we present some basic descriptive evidence from the SCF and, at times, from aggregate administrative data from the IRS SOI.

4.1 Mortgage Interest Deduction

The MID allows tax filers to reduce their taxable income by the amount of interest paid on home mortgages. Given that more than $300 billion in mortgage interest payments were made in 2012, the MID provides significant potential tax savings for homeowners. However, because the MID is an itemized deduction, it is not necessarily the case that all mortgage interest paid is technically eligible as a tax write off.

The MID reduces taxable income so that its primary effect will be to diminish the stabilizing effect of the tax system. The stabilizing effect of the MID, as demonstrated in Examples 2 and 3, depends on the extent to which it lowers the marginal tax rate faced by tax filers. This in turn depends on the extent to which tax filers are clustered around the marginal tax rate thresholds (and are therefore vulnerable to MID-induced bracket shifting).

Figure 1 demonstrates how itemizers and MID claimants are distributed across income groups. It shows the average percentage of tax filers who itemize deductions (left) and the average percentage of all tax filers who claim the MID (right) broken down by income from 1980-2012 (in $2012), where the confidence bars indicate +/- one standard deviation for the particular income group over time. The increasing popularity of the MID across a wide range of the income distribution beyond $40,000 indicates that the MID is likely to cause at least some bracket shifting.

[Insert Figure 1 about here]

4.2 Charitable Contributions Deduction

The deduction for charitable contributions is one of the oldest tax provisions. It was added to the tax code by the War Revenue Act of 1917, when income tax rates were sharply raised to pay for World War I. The concern was that raising the top rate from 15% to 67% would deprive tax filers of the disposable income from which they had been making charitable contributions. Like the MID, the CCD is an itemized deduction, so it allows tax payers who itemize deductions to reduce their taxable income by the amount paid for gifts to certain organizations with charitable status. Thus, the stabilization mechanisms relating to the MID are also at work in the CCD. We therefore expect the CCD to decrease the stabilizing ability of the tax system.

The left hand panel of Figure 2 plots the number of tax filers claiming the CCD and the total amount of tax filer spending on charities over time. Since 1980, CCD-eligible spending has increased from under $50 billion to $200 billion per year (in $2012). The right hand panel of Figure 2 shows annual average aggregate charitable giving broken down by income, where the confidence bars indicate +/- one standard deviation for the income group (in $2012). Aggregate giving captures both the average giving per tax filer and the distribution of tax filers across income groups. Unlike the top income groups, the largest group of aggregate givers—the $100,000 to $200,000 income group—is subject to bracket shifting. This is important because the destabilizing effects of the CCD work through the extent to which it lowers marginal tax rates via bracket shifting.

[Insert Figure 2 about here]

5 Results

We estimate the NTC by running the SCF microdata through TAXSIM—the NBER's microsimulation tax model—to estimate each tax filer's tax liability with actual income and again after increasing all income items by 1%. Using the actual and counterfactual tax liabilities, we calculate the NTC according to Equation (1). To translate these estimates into MPC adjusted estimates that are relevant for demand stabilization, we identify HtM tax filers following the approach in Kaplan and Violante (2014). We leave a short discussion of this procedure and some of the benefits of this approach over other approaches for the Appendix.

Figure 3 shows the proportion of HtM tax filers and the median income of HtM tax filers over time. Both the proportion of HtM tax filers and median income of HtM tax filers have remained fairly stable at around 28% and $30k, respectively. Because HtM tax filers make up less than 30% of the population (and a likely lower proportion of aggregate income, as indicated in Example 6), we expect the change in aggregate tax revenue that is relevant for stabilizing aggregate demand (ANTC) to be substantially less than the change in aggregate tax revenue (NTC).

[Insert Figure 3 about here]

Table A1 in the Appendix provides the results that we will now describe. We find that the tax system absorbed 25.4% of fluctuations in market income (the NTC), 3.7ppt of which would have otherwise been spent (the ANTC).[1] Finally, we conduct the counterfactual simulations in which we remove each of the tax provisions of interest, and estimate the $NTCS_X$ and $ANTCS_X$ for the MID and CCD. In the case of the MID, for example, we set each tax filer's mortgage interest paid to zero, estimate $NTC_{MID=0}$ and $ANTC_{MID=0}$, and then use these estimates

[1] See Dolls et al. (2012) for a discussion on how ANTC estimates significantly depend on the particular HtM definition employed, which can explain differences in the magnitudes of our ANTC estimates and the equivalent series produced by Auerbach and Feenberg (2000). See Kingi and Rozema (2015) for empirical evidence on this issue.

to estimate the $NTCS_{MID}$ and $ANTCS_{MID}$ according to Equations (3) and (4). Figure 4 plots our yearly NTCS and ANTCS estimates. On average between 1988 and 2009, the value of the NTCS for the MID and CCD was 50.2 and 38.2 basis points, respectively. This means that, on average, the MID and the CCD decreased the absorption effect of the tax system on disposable income by 1.98% (0.00502/0.254) and 1.50% (0.00382/0.254), respectively. The magnitudes of the effects of the tax expenditures on the ANTCS are smaller in absolute terms, but larger in relative terms. The average values of the ANTCS for the MID and CCD were 18.2 and 15.5 basis points, respectively. This means that the effect of the MID and CCD was to decrease the tax system's ability to absorb fluctuations in consumption by 4.92% (0.00182/0.037) and 4.20% (0.00155/0.037), respectively.

[Insert Figure 4 about here]

These are relative estimates that say how much the tax system's automatic stabilizers are affected by the tax expenditure. However, because the effectiveness of the tax system in stabilizing the sensitivity of consumption to changes in market income is the measure of interest in the design of the tax system's automatic stabilizers, these relative estimates are not directly relevant to policy making. For example, our estimates imply a much larger destabilizing effect for an initial consumption sensitivity of 10% as opposed to, say, 50%.

We therefore normalize our estimates by the sensitivity of consumption to market income fluctuations in the absence of a tax system. As pointed out by Kingi and Rozema (2015), normalizing the ANTC in this manner reveals the extent to which the tax system as a whole reduces the response of consumption to market income changes. By normalizing the ANTCS, we reveal how a tax expenditure alters the ability of the tax system to reduce the sensitivity of consumption with respect to market income changes, which can be directly compared to equivalent measurements from the consumption response literature (Kniesner and Ziliak, 2002).

These adjusted measures are ultimately of interest for policy makers not only in the design of tax expenditure and automatic stabilization policies, but also for the design of discretionary stabilization policies that target the residual fluctuations left over after the built-in stabilizers.

Figure 5 plots our yearly adjusted estimates. We find that, on average, the MID and CCD increased the sensitivity of consumption to income fluctuations by 1.13% and 0.97%, respectively. To convert these changes in the sensitivity of consumption to dollar values, one needs to first impose a counterfactual business cycle fluctuation by assuming a size of the change in income. The eleven U.S. recessions in the post war period have witnessed drops in Gross Domestic Product (GDP) from as small as under 0.5% to as large as 5.1% (in 2008), with five recessions witnessing a drop between 2% and 4% (Federal Reserve Bank, 2015). To be able to compare the destabilizing effect of the tax expenditures with the stabilizing effect of enacted discretionary stabilizing policies that do not usually occur in mild recessions (e.g., tax rebates), we base our back of the envelope calculations on a somewhat severe 3% recession.[2]

Using the annual total personal income in the U.S., which was on average $10 trillion (in $2012) (row 7 of Table A1), a 3% recession leads to an average annual reduction in personal income of $0.3 trillion (in $2012). Given the estimated consumption sensitivity in the presence of the tax system (on average, 13.5%, row 9 of Table A1), consumption in the recession therefore falls, on average, by $40.5 billion (in $2012). However, in the absence of the MID (CCD), consumption would have only fallen, on average, by $37.0 billion ($37.4 billion) (in $2012).[3] Importantly, the difference between the fall in consumption with and without the tax provision is exactly equal to the ANTCS multiplied by the change in total personal income, which highlights the appeal of our estimator. We calculate that the removal the MID (CCD) in

[2] Recessions are defined with respect to reductions in GDP rather than personal income subject to federal taxes. However, we follow Auerbach and Feenberg (2000) in assuming that a change in GDP is reflected in an identical change in aggregate personal income spread evenly across the population.

[3] The monetary change in consumption without a tax provision is calculated by the product of the consumption sensitivity in the presence of the tax system *but in the absence of the tax provision* and the change in total personal income.

light of a 3% recession would yield an average $3.5 billion ($3.1 billion) injection of consumption automatically into the economy (in $2012).

[Insert Figure 5 about here]

To contextualize the magnitude of these estimates in terms of the size of discretionary stabilization policies, consider the 2001 tax rebate, which has been estimated to have increased aggregate consumption by $31.6 billion (in $2012) (Johnson et al., 2006). Our back of the envelope calculation therefore suggests that the removal of the MID and CCD would have stabilized consumption by about 11.1% ($3.5 billion/$31.6 billion) and 9.8% ($3.1 billion/$31.6 billion) of the change in consumption induced by the 2001 tax rebate, respectively.

6 Conclusion

One goal of the U.S. federal income tax system is to encourage particular economic activities by exempting them from taxation. Another is to automatically reduce fluctuations in the aggregate economy. Most assessments of the merits of tax expenditures have ignored their intrinsic relationship with automatic stabilization. In this article, we examine the interaction of these goals and show how measures of automatic stability relate to existing measures of tax expenditures and effective marginal tax rates.

We make two contributions. First, we consolidate concepts of automatic stabilizers, effective marginal tax rates, and tax expenditures into a single theoretical framework. Our main contribution is to exploit this framework to propose a method for estimating the effect of a tax expenditure on the ability of the tax system to act as an automatic stabilizer and estimate this measure using the Survey of Consumer Finances.

From 1988 to 2009, the Mortgage Interest Deduction (MID) and the Charitable Contributions Deduction (CCD) decreased the ability of the tax system to absorb fluctuations in income by an average of 4.92% and 4.20%, which increased the sensitivity of consumption to income fluctuations from a baseline of 0.14 by 1.13% and 0.97%, respectively. A back of the envelope calculation suggests that, in light of a 3% recession, the removal of the MID and CCD would have been to stabilize annual consumption by about an average of $3.5 and $3.1 billion (in 2012 dollars). Our findings suggest that, even relative to the size of discretionary stabilization policies, the MID and CCD substantially decrease the tax system's ability to stabilize demand.

It is our view that the desirability of tax expenditures ought to be assessed within the wider context of the income tax system. Our estimator speaks to the total effect of a tax expenditure on automatic stabilization. However, our methods are applicable to the analysis of any future tax reform proposal, whether it be the repeal of a current provision, the enactment of a new provision, or a modification of a prevailing provision. Instead of the hypothetical elimination of a tax provision to measure its stabilizing effect as we did here, the policy analyst simply conducts a simulation where the counterfactual calculation of tax liabilities, disposable income, and consumption takes place under the proposed policy regime. These simulations can be used to better inform policy makers on the stabilization impact of proposed tax reforms.

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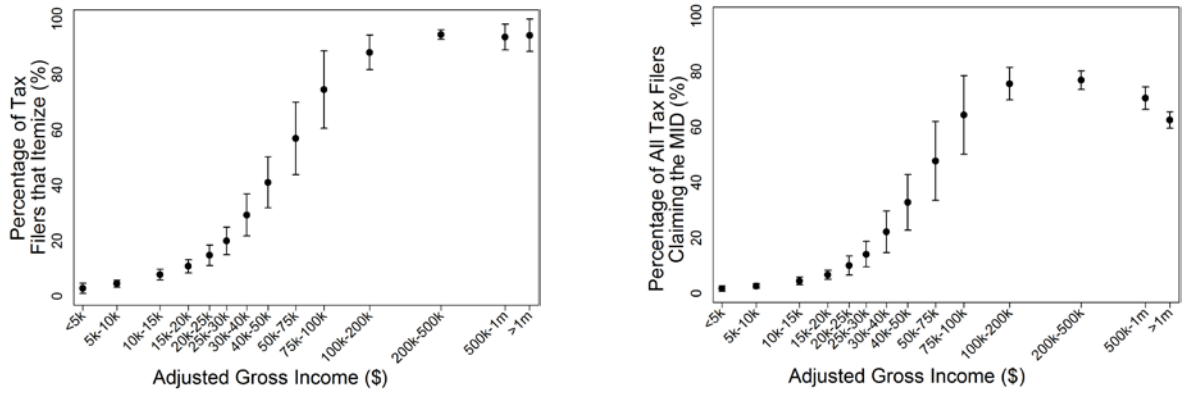
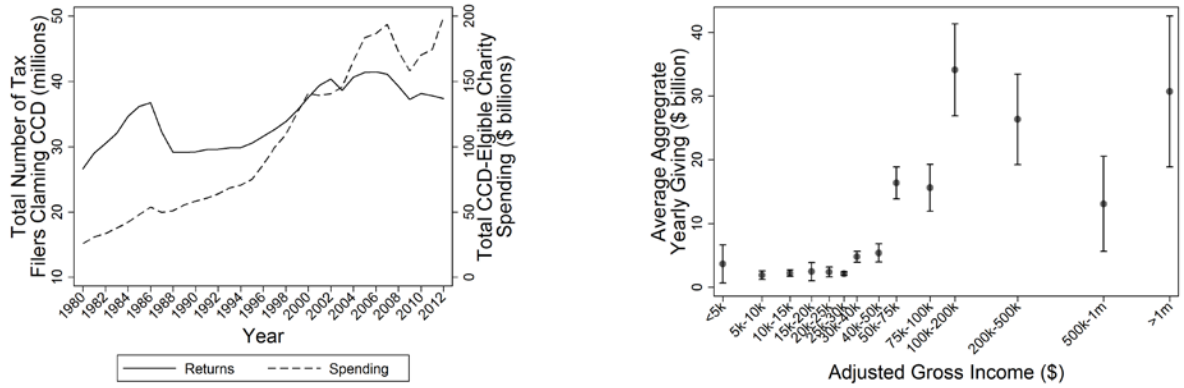
Figures and Tables

Figure 1: Percentage of Tax Filers Itemizing Deductions (left) and Claiming the Mortgage Interest Deduction (right) by Income



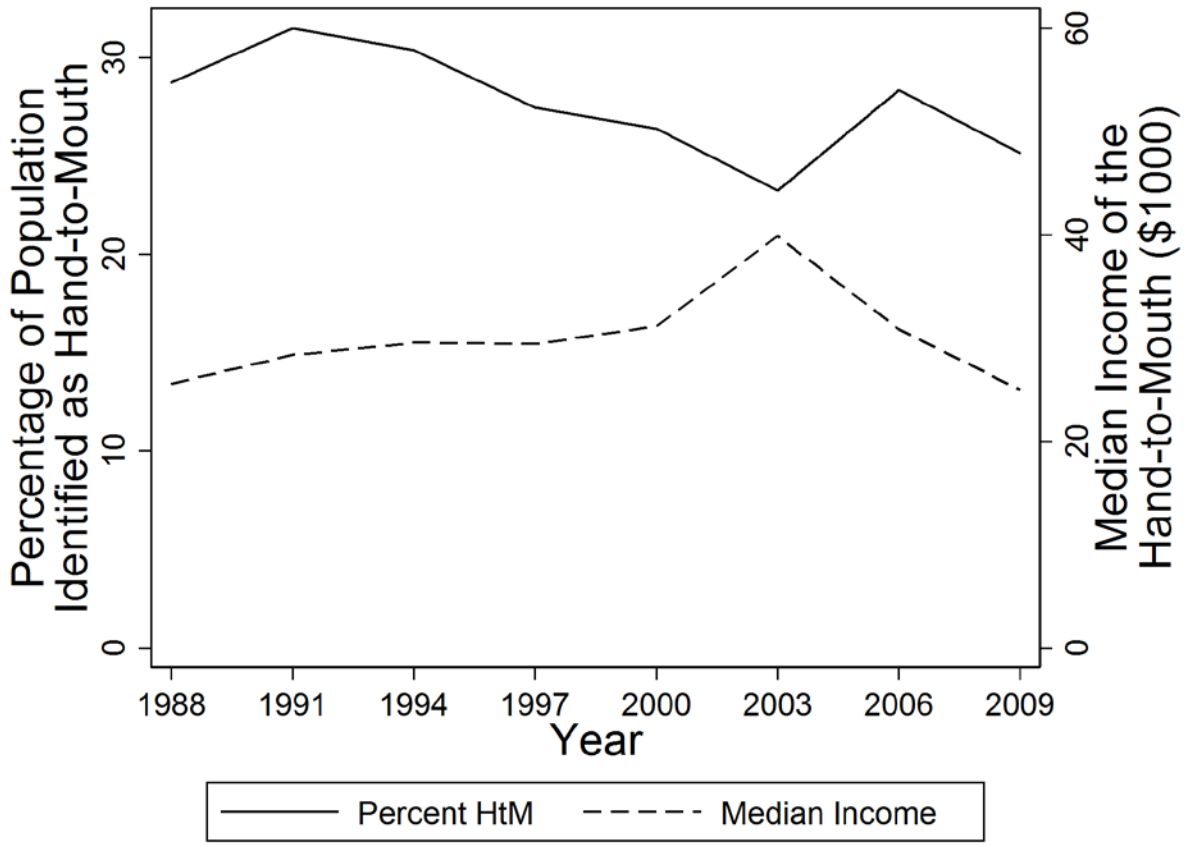
Source: Own illustration using data from the Internal Revenue Service's Statistics of Income Tax Stats on Individual Tax Returns. The panels report the averages in the given income bracket from 1980 to 2012 (adjusted to 2012 dollars) with confidence bars indicating +/- one standard deviation.

Figure 2: Total Yearly Tax Filers Claiming the Charitable Contributions Deduction and Total Eligible Charity Spending (left) and Aggregate Charitable Giving by Income (right)



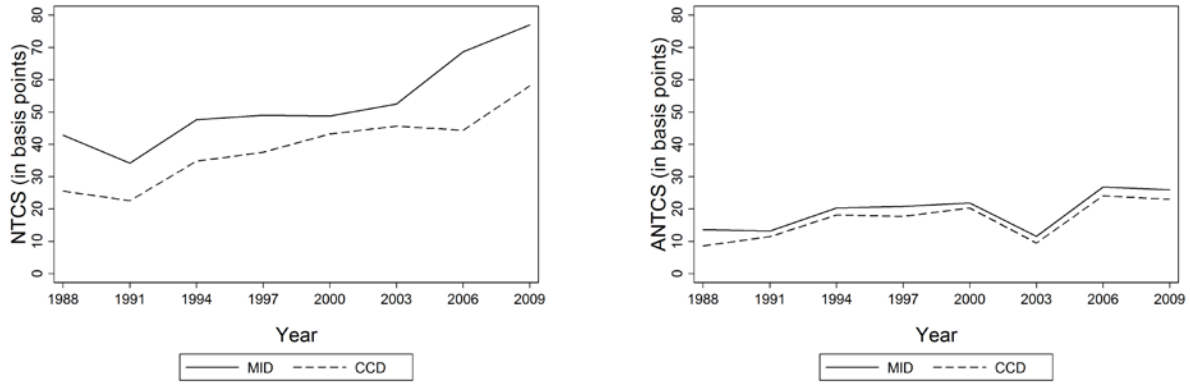
Source: Own illustration using data from the Internal Revenue Service's Statistics of Income Tax Stats on Individual Tax Returns (left). Own illustration using data from the Survey of Consumer Finances (right). The points in the right hand panel indicate the average aggregate giving in the given income bracket from 1988 to 2009 (adjusted to 2012 dollars) with confidence bars indicating +/- one standard deviation.

Figure 3: Percentage of U.S. Population Identified as Hand-to-Mouth (HtM) and Median Income of HtM Households Over Time



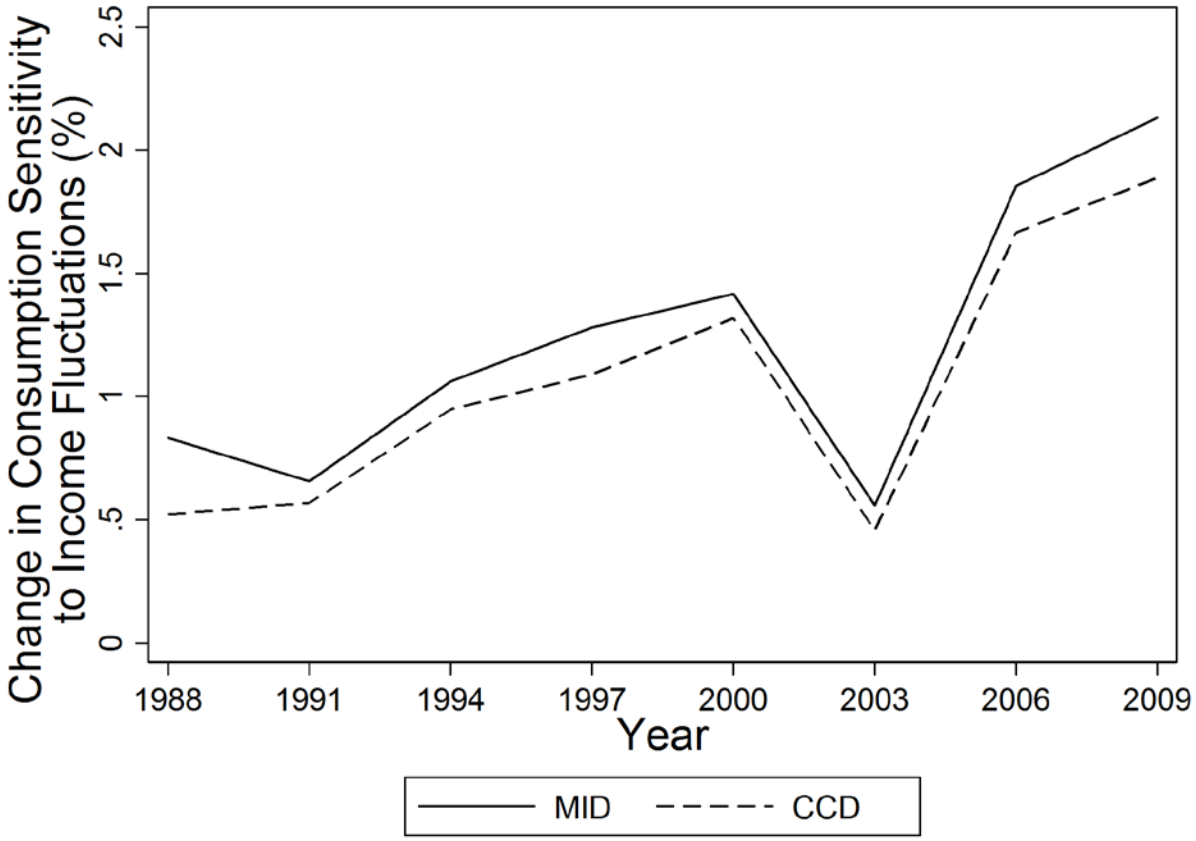
Source: Own illustration using data from the Survey of Consumer Finances, 1988 to 2009. The median income has beenadjusted by CPI to 2012 dollars.

Figure 4: Normalized Tax Change Shifter (NTCS) (left) and MPC Adjusted NTCS (ANTCS) (right) for the Mortgage Interest Deduction (MID) and the Charitable Contributions Deduction (CCD)



Source: Own illustration using data from the Survey of Consumer Finances, 1988 to 2009. Each line represents the change in the stabilizing effect of the tax system that would have occurred without the particular tax provision as indicated in the legend. The NTCS measures the destabilizing effect of a tax expenditure on disposable income, which we show can be interpreted as (1) the extra proportion of a fluctuation in market income that would be absorbed by the tax system in the absence of tax provision, (2) the sensitivity of the tax expenditure to income changes, or (3) the sensitivity of the effective marginal tax rates to the tax expenditure, where we estimate the change with respect to the hypothetical elimination of a tax expenditure rather than a marginal ($1) change in income commonly used throughout the empirical macroeconomics literature. The ANTCS for each tax expenditure estimates the extra amount of consumption, as a proportion of a fluctuation in market income, that the tax system would have absorbed in the absence of the tax provision.

Figure 5: The Increase in Sensitivity of Consumption to Income Fluctuations Induced by the Mortgage Interest Deduction (MID) and the Charitable Contributions Deduction (CCD)



Source: Own illustration using data from the Survey of Consumer Finances, 1988 to 2009.

Appendix

To estimate the ANTC according to Equation (2), we must first identify whether each household is hand-to-mouth (HtM). Under the standard assumption that each HtM household has an MPC = 1 while all other households have zero MPC, the change in disposable income for these households is then interpreted as a change in consumption. The automatic stabilization literature attempts to tackle the problem of identifying HtM households in a number of ways. Zeldes (1989) and Auerbach and Feenberg (2000) use a wealth to income ratio cutoff to define HtM households. Runkle (1991) classifies those households that do not own their own home as HtM. Jappelli et al. (1998) and Dolls et al. (2012) define a household as HtM if (1) a credit application has been either rejected or not fully approved, or (2) a credit application has not been submitted because of the fear of rejection. The main drawback of these approaches stems from the fact that they fail to capture the many wealthy households that have been widely identified in the literature as HtM (Campbell and Hercowitz, 2009; Broda and Parker, 2014; Hsieh, 2003; Agarwal et al., 2007; Misra and Surico, 2014; Telyukova, 2013; Browning and Collado, 2001; Browning and Crossley, 2001).

Kingi and Rozema (2015) point out that, within the context of estimating automatic stabilizers, the approach to identify HtM households in Kaplan and Violante (2014) (KV) overcomes this limitation. KV explain wealthy household HtM behavior by showing that many of these households choose to hold their wealth in the form of high return illiquid assets. These wealthy households choose to consume a large proportion of income fluctuations in order to avoid the costs associated with liquidating illiquid assets. KV define a household to be HtM if it either has zero liquid wealth or is at its credit limit. More formally, household *i* is HtM if either

$$0 \leq m_i \leq \frac{y_i}{2f_i}$$

or

$$m_i \leq 0 \text{ and } m_i \leq \frac{y_i}{2f_i} - n_i$$

where m_i is the average balance of liquid assets over the past month, y_i is monthly labor income, n_i is the credit limit, and f_i is the pay period frequency. Liquid wealth includes cash, money market, checking, savings and call accounts. The SCF does not record household cash holdings, so KV identify revolving debt and impute cash holdings. For identifying revolving unsecured debt, KV follow the common strategy of excluding from debt the purchases made through credit cards between regular payments (Telyukova, 2013). In particular, they use direct evidence from the SCF that asks about credit card balances, including: (1) "How often do you pay your credit card balance in full?", where possible answers include: (a) Always or almost always; (b) Sometimes; or (c) Almost never, and (2) "After the last payment, roughly what was the balance still owed on these accounts?" KV identify households with revolving debt as those households that respond to the first question with (b) or (c), and for these households then compute statistics about credit card debt using the answer to the second question. To impute cash holdings, KV make use of previous estimates of median household cash holdings (Foster et al., 2011), and adjust for cash holdings by increasing the median wealth in checking, saving, money market, and call accounts as measured in the SCF by this amount.

The two separate HtM conditions in the KV approach capture how households with sufficiently low liquid assets with respect to their monthly income behave as HtM. Both conditions are important in defining HtM households because households at kinks of their budget constraint have a high MPC out of a windfall gain in income, regardless of how they got there. The distinguishing factor between the KV approach and the Jappelli et al. (1998) approach is that the former can account not only for households living at their credit limit, but also for wealthy households who hold no liquid wealth. A more detailed discussion of this intuition and identification of these HtM households using the SCF can be found in Appendix B of KV. A complete discussion of how KV's HtM definition impacts the estimation of automatic stabilizers and, more generally, is important for the design of the microsimulation techniques used in the estimation of automatic stabilizers can be found in Kingi and Rozema (2015).

Table A1: Yearly and Average Estimates of the Destabilizing Effects of the Mortgage Interest Deduction (MID) and the Charitable Contributions Deduction (CCD)

	Year									
Measure	1988	1991	1994	1997	2000	2003	2006	2009	Mean	StDev.
NTC (%)	23.6	24.5	25.9	26.7	28.3	24.9	24.6	23.9	25.4	1.7
ANTC (%)	3.3	4.3	4.2	3.5	3.6	5.0	2.6	2.1	3.7	0.9
NTCS (basis points)										
MID	42.8	34.2	47.6	49.0	48.7	52.5	68.6	76.9	50.2	13.2
CCD	25.6	22.5	34.8	37.6	43.2	45.6	44.4	58.1	38.2	12.2
ANTCS (basis points)										
MID	13.6	13.2	20.3	20.8	21.8	11.6	26.8	25.9	18.2	5.4
CCD	8.6	11.4	18.1	17.7	20.3	9.5	24.1	23.0	15.5	5.6
Total Personal Income (in $2012 trillion)										
	8.5	8.2	8.9	9.8	11.1	11.4	12.5	12.4	10.0	1.6
Consumption Sensitivity in the Absence of the Tax System (%)										
	16.4	20.1	19.1	16.2	15.4	20.7	14.5	12.2	17.2	3.0
Consumption Sensitivity in the Presence of the Tax System (%)										
	13.1	15.8	14.9	12.8	11.8	15.8	11.8	10.0	13.5	2.2
Change in the Consumption Sensitivity Induced By the Expenditure (%)										
MID	0.83	0.67	1.06	1.28	1.42	0.59	1.85	2.13	1.13	0.54
CCD	0.52	0.57	0.95	1.09	1.32	0.46	1.67	1.89	0.97	0.52
Converted to Dollars (in $2012 billions)										
MID	2.1	1.6	2.8	3.8	4.7	1.9	7	7.9	3.5	2.2
CCD	1.3	1.4	2.5	3.2	4.4	1.6	6.3	7.0	3.1	2.1

Source: Own illustration using data from the Survey of Consumer Finances, 1988 to 2009. Each column represents the yearly estimated values of the row variables in the year indicated on the column headings, and the last two columns report the average and standard deviation of these yearly estimates. The Normalized Tax Change (NTC) estimates how much aggregate tax revenue changes in response to a change in aggregate market income. The MPC Adjusted NTC (ANTC) estimates the change in aggregate taxes that would have otherwise been spent as a proportion of the change in aggregate market income. The NTC Shifter (NTCSX) estimates the extra proportion of a fluctuation in market income that would be absorbed by the tax system in the absence of tax provision X. The ANTC Shifter (ANTCSX) estimates the extra amount of consumption, as a proportion of a fluctuation in market income, that the tax system would have absorbed in the absence of tax provision X. Total personal income is the aggregate gross income subject to the federal income tax, which was obtained from the Internal Revenue Service's Statistics of Income Tax Stats on Individual Tax Returns. The "Consumption Sensitivity in the Absence of the Tax System" is the estimated income-weighted marginal propensity to consume, which can also be interpreted as the baseline response of aggregate consumption to income fluctuations in the absence of a tax system. The "Consumption Sensitivity in the Presence of the Tax System" is the estimated income-weighted marginal propensity to consume less the ANTC, which can also be interpreted as the response of aggregate consumption to income fluctuations in the presence of the tax system. The "Change in the Consumption Sensitivity Induced By the Expenditure" estimates the extent that the tax expenditure decreased the ability of the tax system to reduce the sensitivity of consumption with respect to market income changes, which is converted to dollar values based on a 3% recession by multiplying the it by the change in total personal income resulting from the 3% recession.