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Evidence on the Insurance Effect of Marginal Income Taxes*

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Abstract:
Marginal income taxes may have an insurance effect by decreasing the effective fluctuations of after-tax individual income. By compressing the idiosyncratic component o personal income fluctuations, higher marginal taxes should be negatively correlated with the dispersion of consumption across households, a necessary implication of an insurance effect of taxation. Our study empirically examines this negative correlation, exploiting the ample variation of state taxes across US states. We show that taxes are negatively correlated with the consumption dispersion of the within-state distribution of non-durable consumption and that this correlation is robust.

JEL Classification: E21, H20, H31

Keywords: Undiversifiable Earnings Risk, Consumption Insurance, Tax Distortions

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1 Introduction

Much analysis of household consumption focuses on the study of choices made by forward-looking wealth-accumulating agents who face exogenous uninsurable idiosyncratic labor-income shocks and liquidity constraints.[1] Incorporating this partial-equilibrium consumer problem into workable simulation/calibration models of the macro economy that explicitly allow for heterogenous agents has become standard ever since the pioneering work by Bewley (1986), Huggett (1993) and Aiyagari (1994). Critical policy issues arise from the inclusion of idiosyncratic risk. Bewley (1986) shows that, in these models, idiosyncratic risk implies that markets are incomplete and agents face the probability of not being able to smooth consumption through borrowing. Hence the competitive equilibrium is not Pareto efficient. Consequently, distortionary income taxes might improve welfare, because they directly compress the spread of uncorrelated idiosyncratic income shocks a-priori. In other words, marginal income taxes may have an insurance effect by decreasing the effective fluctuations of after-tax individual income, a point also made in an earlier literature by Mirrlees (1974) and Varian (1980). Consistent with these ideas, Conesa, Kitao and Krueger (2006), calibrate a heterogeneous agent model with idiosyncratic risk and find that optimal tax rates are positive and sizeable.

In any idiosyncratic earnings risk model where consumer goods are normal, with or without labor/savings distortions, the insurance effect of marginal income taxation would

[1]For example, Deaton (1991), Carroll (1997), Hubbard, Skinner, Zeldes (1995), and Gourinchas and Parker (2002) offer supporting evidence that some combination of precautionary saving and/or liquidity constraints can be important determinants of saving and consumption dynamics.

imply that higher taxes decrease the standard deviation of consumption across households. The traditional approach without idiosyncratic risk has emphasized the distortionary effect of taxes which reduces average consumption and reduces welfare. The more recent literature, in which agents face uninsured idiosyncratic risk, demonstrates the insurance effect of redistributive taxes which reduces each household's consumption variability and can raise welfare.[2] The relative importance of these two effects is crucial for the evaluation of fiscal policy. Hence it is important to empirically test whether the distortionary and insurance effects of redistribution through the tax and benefit system can indeed be observed in the data. Testing for these effects is therefore the aim of this study.[3]

Performing our task requires using household data to construct aggregate measures of the tax system, and of the distribution of consumption. One possibility is to investigate households in different countries. However, we believe that cross-country variation in the key variables may reflect differences in institutional, cultural and other country-specific features, as well as differences in the measurement of the appropriate household level variables in different national surveys. Moreover, the design of these household surveys differs substantially among countries, making it difficult to construct consistent measures of consumption and of the tax system across countries.

Rather than use differences across countries, we exploit differences across US states to

[2]Floden (2001) provides a clear evaluation of the welfare effects showing the tradeoff between distortions and insurance.

[3]A transfer system is not necessary for higher marginal taxation to generate a more compressed distribution. Elmendorf and Kimball (2000) show in a partial equilibrium model how realistic increases in labor income marginal tax rates can cause large reductions in after-tax labor income risk.

investigate the relationship between marginal taxation and the observed within-state variance of consumption. The difficulties highlighted above are likely to be much less important for US states since, in measuring taxes or consumption, the same survey can be exploited for all households in the sample. Using the same survey across tax regimes reduces the chance that differences in survey design spuriously generate the different measured policy responses.

An obvious problem with working with states (or regions) from the same country has to do with the extent of variation in levied taxes according to state tax legislation. The lower the variation, the harder to identify the effect of taxes on the distribution of consumption. Therefore, our identification strategy requires showing that there is enough variation in state-level taxes and that using observations from different US states offers an appropriate "laboratory" in which to assess the effect of taxes on consumption. Accordingly, we show that there is surprisingly substantial variation both in levels and in the time evolution of state taxes. Another problem may be the fact that households find it easier to move between US states than between countries. But this easier mobility makes more difficult to demonstrate the insurance effect of marginal income taxation on the distribution of consumption, making our investigation challenging.

We utilize household consumption data for 24 years from the American Consumer Expenditure Survey (CEX) to compute the mean and the standard deviation of log non-durable consumption by year and state. To construct our measure of a state's marginal income tax rate we use the TAXSIM model, as provided by the NBER.[4] The model is run on household income data as supplied by the Statistics of Income Division (SOI) of the Internal

[4]Details on the TAXSIM model can be found in Freenberg and Coutts (1993).

Revenue Service (IRS) and computes the marginal tax rate on state net of federal taxes for several income factors, including labor, interest, dividend and pension income. The marginal tax rate is averaged by state and year and made available through the web at http://www.nber.org/taxsim. There are three reasons for using the mean marginal tax rate based on IRS data as provided by the NBER. First, IRS data are less likely to be affected by measurement error compared to survey data.[5] Second, using consumption and taxes from different sources makes measurement error across the two measures to be uncorrelated and avoids problems of possible spurious correlation. Third, the NBER provides a series for the mean marginal tax rate computed holding the income distribution fixed, which allows us to distinguish the effect of cross-state differences in the state legislation from cross-state differences in the income distribution.

We find evidence that higher marginal tax rates are negatively correlated with the standard deviation of non-durable consumption. The conclusions are robust to unobserved heterogeneity at the state level and to expanding the specification to include variables that vary both across states and over time, such as the unemployment rate, and to the use of instrumental variables, for labor-earnings, interest/dividend, and pension income. We therefore find compelling evidence supporting the presence of an insurance effect of taxes in the US. Demonstrating the insurance effect means it is important to stress the appropriate policy tradeoffs (between the distortionary and insurance effects) in models of taxes which incor-

[5]The IRS data are virtually the overall population data of US non-corporate tax payers. The SOI division does not reveal the state of residence for taxpayers with annual gross income greater than $200,000 (nominal). The number of such taxpayers by state is available for most years since 1989, and used to impute states for high income taxpayers. More details can be found at www.nber.org/taxsim.

porate idiosyncratic risk. Yet, we do not find robust evidence supporting the distortionary effect of taxation. The negative correlation between unconditional mean consumption and marginal taxation does not persist under the same robustness tests we run for the insurance effect.

In Section 2 we describe the data and compare the tax system in different US states. We present the empirical findings and provide robustness checks in Section 3, while we make concluding remarks in Section 4.

2 Data

2.1 Consumption

Since our empirical exercise exploits cross-state differences in the evolution of state taxation we need to measure the yearly mean and standard deviation of consumption for each US state. To construct the standard deviation of consumption requires household-level data. We use CEX data from 1980 to 2003.

The CEX is a household level survey, run on a yearly basis by the Bureau of Labor Statistics (BLS) for computing the weights for the American Consumer Price Index. The CEX has detailed information on individual expenditure items, as well as on a variety of household characteristics. This allows us to construct a measure of non-durable consumption that includes food and beverages, tobacco, housekeeping services, fuel, public utilities, repairs, public transport, personal care, entertainment, clothing, and books. More details on the CEX survey can be found in Attanasio, Battistin and Ichimura (2005).

The survey is made of two components, the Interview and the Diary survey; here, we use the Interview survey. This is made of four interviews for each household, in which the respondent is asked to report the expenditures in the 3 months before the interview month. In order to keep the sampling error low we include only those states with at least 200 observations per year. Because state information is sometimes suppressed for confidentiality reasons, we exclude Maine, Mississippi, Montana, New Mexico, North Dakota, Rhode Island, South Dakota, West Virginia, and Wyoming, from our sample.[6]

We deflate consumption data by the Consumer Price Index in order to convert nominal values into real ones. To account for differences in the family structure across US states we divide non-durable consumption by the OECD equivalence scale. This assigns a value of 1 to the first household member, of 0.7 to each additional adult and of 0.5 to each child. To further control for cross-state differences in demographic composition, we regress non-durable consumption on a cubic polynomial in age, education, family-size, race, and marital status and construct group averages from the residuals. Nevertheless, we find that omitting these first stage controls does not affect our results.

2.2 Household Taxes

US households pay taxes on earned and unearned income, as well as sales and property taxes. We concentrate on income taxes and exclude sales and property taxes. Sales taxes are paid

[6]By comparing the sample for which we have state information with the sample for which we do not have state information, we find that the share of male household heads in the missing state information sample is comparable to that in the non-missing information sample (71% versus 70%). Moreover, in both of these subsamples the average age is 47.5, the family size 2.5 persons, and the number of kids 0.7.

at the place of sale rather than residence, making difficult to measure the sales taxes levied on households within the state if cross-border shopping takes place. In the CEX, the spending figure excludes sales taxes, so that expenditure is comparable across states. Property taxes are largely levied at the county/schoolboard/city level. Therefore, the property tax legislation may be very diverse within each state depending on the locality where the households resides. Moreover, the effects of property taxes on aggregate consumption moments are not obvious, and we are not aware of models that make unambiguous predictions. Potential complications include the nonlinearities induced by the tax deductibility of mortgage payments, the endogenous nature of the decision between being a renter or a home owner and whether consumption and housing are separable in the utility function.

Constructing a single measure of a marginal tax rate in each state is not trivial and entails addressing a number of problems. Income tax systems can be complicated since not only do different households face different tax rates, and there is also considerable variation in tax rates across jurisdictions. Table 1 illustrates the wide variation in state marginal tax rates and exemptions across states. It shows that several states, including Texas and Florida, do not levy any income taxes on their residents while New Hampshire and Tennessee only charge tax on dividend and interest income. The other states have a variety of income tax bands and exemptions (or tax credits) that are applicable. Although some states, such as Massachusetts and Illinois, have a flat rate income tax, in most states, the marginal tax rate increases with income. The difference between the highest and lowest marginal tax rate can sometimes be large. In Iowa the lowest marginal tax rate is 0.36% and the highest is 8.98, while several states have marginal tax rates even higher for the highest earning

households. There are also, typically, a variety of tax allowances to which households are entitled. While there is no tax exempt income in Pennsylvania, up to $24,000 of income is exempt from state income tax in Connecticut for married couples. However, Connecticut allows no exempt income for other dependents, in contrast to Minnesota which allows the same exempt level of income for the earner, their partner, and each other dependent.

To construct each household's income tax burden, we exploit the TAXSIM 8.0 program developed by Freenberg (see Freenberg and Coutts, 1993, for details), provided by the NBER and run on the IRS data. Using a variety of household variables, including a husband's and wife's earnings, interest, dividends and other income, and information about the household's characteristics (such as the number of dependant children) and other deductibles (like property costs) as well as the year and state of residence, the program calculates both the state and the federal tax liability, and the marginal tax rates, explicitly controlling for a variety of allowances.

2.3 The cross-state marginal-tax variation

We use the mean marginal tax rate for state taxes on labor, interest, dividend and pension income. Such marginal tax rates are computed at the NBER running the TAXSIM model on the household income data as supplied by the SOI division of the IRS. The NBER provides marginal state (net of federal taxes) as well as marginal combined state and federal income taxes. We use the former, since the latter confounds our identification strategy by mixing the effect of state and federal tax legislation on household tax burden.

Table 2 averages over time the state marginal tax rates and their changes for each US

state. This table confirms that there is substantial variation across states both in the level and in the dynamics of marginal tax rates. Marginal state taxes are zero in Alaska, Florida, Nevada, New Hampshire, South Dakota, Tennessee, Texas, Washington and Wyoming, but are positive in all other states. Moreover, the marginal state taxes on labor ranges from 2.5% in Pennsylvania to 8.7% in the District of Columbia. The ranking is similar for interest and dividend income. The former ranges from 2.5 in Pennsylvania, to 8.2 in the DC, the latter from 2.5 to 7. The ordering among US states is somewhat different if one looks at the state marginal rate on pension income. Hawaii is among the states with the lower marginal tax rate (below 1%) but also features a very high marginal tax rates on the other income sources (8.4 on labor, 7.7 on interest, 7.9 on dividend income).

The changes reported in Table 2 reveal that there are also substantial differences in the time evolution of the marginal state taxes. The marginal tax rate on labor and interest income has decreased by almost 3% in Delaware between 1980 and 2003 and by 5.54 and 4.4% in Connecticut. The state marginal tax rate on dividend interest has decreased for most states and increased by 2 and 4% for Kentucky and Massachusetts, respectively; that on pension income had decreased by 1.7% for Kentucky and increased by 4.9% for Connecticut.

The variation in the state marginal tax rate is driven by variation in the state legislation as well as by variation in the state income distribution. To distinguish the former source of variation from the latter, the NBER computes the state marginal tax rates assuming that the distribution of income is constant across states and over time. Specifically, the distribution of income in each state is assumed to be equal to the national distribution of income in 1995.

In Figure 1 we present a US state thematic map. Each state is colored according to the

state tax legislation: states featuring lower marginal tax rates on labor income over the years 1980-2003 are darker. Figure 1 displays ample variation in state tax legislation on earned income. This is confirmed in Figures 2, 3 and 4, which refer to state marginal tax rates on interest, dividend and pension income.

Furthermore, Figures 1 through 4 show that holding the distribution of income fixed little affects the across states ordering of state marginal tax rates and their evolution, and leaves the overall picture unchanged. The state of DC now features the third highest rate on labor (7.9%), the second on interest (7.6%), and the highest on dividend and pension income (8.3 and 7.8%, respectively), and Hawaii is the state with the highest rates on labor and interest income, 8.4 and 7.7% respectively.

The evolution of state legislation is analyzed in Figures 5 through 8. These figures show the changes in the state marginal tax rates on labor, interest, dividend and pension income, holding fixed the income distribution. The solid line stemming from the center of each state means that the marginal tax rate has increased between 1980 and 2003, the dotted that it has decreased; lines are longer, the larger the change in absolute value. Figures 5 through 8 show that in most states the marginal tax rate has changed, but at a different extent. In Connecticut the marginal tax rate on labor income has increased by 5.5, and in Delaware has decreased by 2.6 percentage points. The US states also display noticeable differences in the time evolution of the marginal tax rates on interest, dividend and pension income. In Massachusetts, the marginal tax rates on interest and dividend income have increased by 4.3 and 4.5 percentage points respectively, while in Delaware they have decreased by 2.65 and 3.8 percentage points.

3 The Empirical Evidence

The substantial variation of tax regimes across US states and over time allows us to show how the mean and standard deviation on non-durable consumption are related to marginal taxes. Figures 9 and 10 plot the marginal tax rate on labor income against the mean and standard deviation of log non-durable consumption.[7] For both the mean and the standard deviation of log non-durable consumption, we have also fitted a regression line through the observations. The line is downward sloping in both graphs, which means that the mean and the standard deviation of non-durable consumption are negatively related to taxes.

The regressions underlying Figures 9 and 10 are reported in Table 3. The association between the mean of log non-durable consumption and taxes is negative for all income factors, and statistically significant at the 0.1%, 1% and 5% level for labor, interest and pension income taxes and not significant for dividend income. Taxes are negatively related to within-state consumption dispersion: the coefficient on labor income marginal tax rate is significant at the 5% level, that on interest, dividend and pension income marginal tax rate at the 0.1%.

Our marginal income tax measure depends on the actual income distribution within each state. The same average marginal tax rate might result from very different income distributions, which biases the results against finding effects of taxes on consumption moments. Moreover, cross-state variation in the average marginal tax rates might be driven mainly by differences in the income distribution rather than by differences in the state tax legislation.

[7]The figures for the marginal tax rates on interest, dividend and pension income are similar and we do not report them for brevity.

To account for the possibility that differences in the income distribution might lie behind our results, we regress the mean and the standard deviation of log-nondurable consumption on the average marginal tax rates on labor interest, dividend- and pension income, computed holding the income distribution fixed over time and across states.[8] The results are reported at the bottom part of Table 3 and confirm the negative association between taxes and the mean and the standard deviation of log non-durable consumption.

The simple regressions reported in Table 3 neglect a number of issues. First, there might be differences across states that might obscure or amplify the effects of taxes on consumption moments. Such differences might depend on differences in the population composition across states and might not be orthogonal to the marginal tax rates. Second, business cycle effects jointly affect income and consumption, and therefore have the potential to lie behind the association between taxes and consumption moments. Third, state specific time-varying income risks might affect the consumption dispersion, and to the extent that tax variables proxy for these, one finds a negative association between consumption dispersion and taxes, which has nothing to do with the insurance effect of taxation. Fourth, taxes and consumption might be jointly determined and therefore our estimates are affected by a standard endogeneity problem. The rest of this section addresses these issues.

3.1 The insurance effect of taxation

To account for the cross-state differences in the composition of population within each state and for the effect of unobservable variables that might be correlated with taxes, we use a

[8] As we discussed in Section 2, we use the 1995 nationwide income distribution.

fixed effect within-group estimator in the regression of consumption dispersion on taxes. The results are reported in the second column of Table 4. In comparison with the first, which displays the results for the baseline specification, the second column shows that the effect of taxes on consumption dispersion is larger if one uses the fixed effect estimator. This suggests that failing to control for permanent differences across US states might obscure the effect of taxes on consumption dispersion.

The third column of Table 4 adds year dummies to the second column specification. Year dummies take care of business cycle effects, which jointly affect income, taxes and consumption. The results confirm that consumption dispersion is negatively related to taxes, which we view as evidence of the insurance effect of taxation. Business cycle effects might actually be state-specific and come in the form of time-varying income risk, which is due to affect the consumption distribution. To proxy for state-specific business cycle effects we use the state unemployment rate, which we add to our regression. The results are reported in the fourth column of Table 4 and show that there is a positive relationship between the unemployment rate and consumption dispersion. This accords with the idea that a high unemployment rate entails high income risk, which in turn is associated with high consumption dispersion. The coefficient on the marginal tax rates is negative and statistically significant: it ranges from -0.434 (with s.e. equal to 0.156) for the labor income tax to -0.241 (0.094) for the dividend income tax.

To further address the joint determination of taxes and consumption dispersion, we employ an instrumental variable estimator. It would be particularly useful to look at a measure of the expected tax system where the expectation depends on the effectiveness of the state

administration in raising tax revenue. We therefore use as instrument a measure of tax effort. For the years up to 1991 the data are available from ACIR (Advisory Commission on Intergovernmental Relations, 1993), while subsequent data are taken from Tannenwald (2002), although it was necessary to linearly interpolate the series for some years.[9]

The results from the IV estimation are reported in the fifth column of Table 4 and imply that, if any, the endogeneity of taxes biases the results against finding an effect of taxes on consumption dispersion. The coefficients on the marginal tax rates have negative signs and are significant, except that for the dividend income, which is not statistically different from zero.

As a further check, we use as measure of the marginal income tax the average marginal tax rate computed using the 1995 nationwide income distribution. This marginal tax measure changes over time and across states only due to changes in state tax legislation, which we have seen to evolve differently across the different states. The results are reported in Table 5 and mirror those reported in Table 4. Taxes are negatively related to consumption dispersion in the baseline regression, in the fixed-effect regression, in the specification with time dummies and with the unemployment rate added, and in the IV regression.

As a further robustness check, and to reduce the influence of possible outliers, we use the interquartile range as an additional measure of the dispersion of non-durable consumption. The interquartile range is then regressed on our marginal tax measure. For brevity, we focus on taxes on labor income. The results are shown in Table 6. The upper panel of Table 6 uses the average marginal tax rate as regressor, computed using the actual within-state income

[9]For more details on the tax effort measure, we refer to Tannenwald (2002).

distribution, the lower the average marginal tax rate computed using the 1995 nationwide income distribution. In both panels, the coefficient in the baseline specification is reported in the first column of Table 6 and is not significant at the standard level. The lack of significance of the labor income tax coefficient might be due to the baseline regression not controlling for unobserved heterogeneity at the state level.

The second column of table 6 runs the fixed effect estimator and displays sizeable and statistically significant coefficients in the regression of non-durable consumption dispersion on taxes in the upper (-0.794 with standard error 0.288) and lower panel (-0.970 with s.e. 0.325) of Table 6. The third column corrects for time effects by adding year dummies and show negative and significant coefficient of taxes on consumption dispersion. Controlling for state-specific business cycle effects is done in the fourth column, where we add the unemployment rate to specification of the third column. The results show that consumption dispersion is positively related to unemployment and negatively to taxes: in both panels the coefficients are statistically significant. The results from the IV estimation appear in the fifth column of Table 6 and confirm that, whatever measure of marginal tax rate one uses, the effect of taxes on consumption dispersion is negative, sizeable and statistically significant.

In summary, the evidence presented here points towards a negative relation between taxes and consumption inequality. This finding supports the premise that tax systems might actually provide insurance to households.

3.2 The distortionary effect of taxation

We have repeated all the robustness checks for the negative correlation between taxes and mean of log consumption. We have re-run the regressions of Table 3, expanding the specification to include state fixed effects, time effects and variables that vary both across states and over time, such as the unemployment rate. These additional tests do not lend support for the robustness of a negative correlation between taxes and mean of log consumption.[10]

Our results about the distortionary effect of taxes are consistent with the literature that has tried to estimate the elasticity of taxable income with respect to the marginal tax rate. This line of research, initiated by studies such as Lindsey (1987) and Feldstein (1995), has shown how difficult it is to find empirically a distortionary effect from higher taxation.[11] This inconclusiveness is also similar to Backus, Henriksen, and Storesletten (2007), who, in a different setting, focus on the effect of taxes on global capital allocation and find mixed evidence on the relation between taxes and capital. We thus leave the investigation of the possible distortionary effect of taxes on consumption as an open question for future research. It seems that one first needs to investigate the channels through which taxes affect consumption. Such channels may be hidden behind labor-supply decisions (possibly more complex in multiple-earner households), behind how consumption responds to transitory or permanent income innovations, and also behind general-equilibrium effects on consumption

[10]The full set of results is not reported for brevity, but can be provided from the authors upon request.

[11]For a review and evidence, see Goolsbee (1999), who exploits six decades of tax reforms in the US, and shows that the distortionary effect of taxes is negligible except for that in the eighties. Moreover, Goolsbee (2000) distinguishes the short from the long run elasticity and shows that the former is larger than 1, the latter close to zero.

through interest rates and capital accumulation.

4 Conclusions

When consumers face idiosyncratic and uninsurable income risk marginal income taxes have two countervailing effects: an insurance effect and a distortionary effect. The first effect is captured by a negative relationship between taxes and measures of non-durable consumption dispersion across households. The second effect is shown by a negative relationship between taxes and mean non-durable consumption. Hitherto, however, there has been little empirical research into whether we can observe either of these effects in the data, which is perhaps surprising given the prominence and vehemence with which these effects have been discussed. This may partly be explained by the difficulty in devising an appropriate test. We have addressed this issue by investigating the differences in the mean and standard deviation of log non-durable consumption when the marginal income tax rates vary across US states. Measuring both the tax system and the non-durable consumption dispersion requires using household level data. We have taken data for income and for consumption from different data sources to eliminate spurious correlation in the state level tax and consumption measures.

We find robust evidence supporting the insurance effect of taxation on consumption, starting from a negative correlation between taxes and the standard deviation of log non-durable consumption. This negative correlation is robust to different controls like unobserved heterogeneity at the state level, to nationwide and state-specific business cycle effects, and to the potential endogeneity of taxes. On the other hand, we do not find robust evidence supporting the distortionary effect of taxation. The negative correlation between uncondi-

tional mean consumption and marginal taxation does not persist under the same sensitivity tests.

Our findings emphasize the relevance of models with uninsurable idiosyncratic risk, such as, for instance, Aiyagari and McGrattan (1998), Floden (2001), Domeij and Heathcote (2002), and Conesa, Kitao and Krueger (2006), and stress an important issue in the welfare evaluation of policies financed through marginal income taxes.

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TABLE 1. Income tax rates in the US States

State	Tax Rates		Exemptions		
	min.	max.	single	married	dependents
Alabama	2.0	5.0	1,500	3,000	300
Alaska	no state tax				
Arizona	2.87	5.04	2,100	4,200	2,300
Arkansas	1.0	6.5	20*	40*	20*
California	1.0	9.3	80*	160*	251*
Colorado	4.63	4.63		none	
Connecticut	3.0	4.5	12,000	24,000	0
Delaware	2.2	5.95	110*	220*	110*
Dist. Columbia	8.7	9.0	1,370	2,740	1,370
Florida	no state tax				
Georgia	1.0	6.0	2,700	5,400	2,700
Hawaii	1.5	8.25	1,040	2,080	1,040
Idaho	1.6	7.8	3,000	6,000	3,000
Illinois	3.0	3.0	2,000	4,000	2,000
Indiana	3.4	3.4	1,000	2,000	1,000
Iowa	0.36	8.98	40*	80*	40*
Kansas	3.5	6.45	2,250	4,500	2,250
Kentucky	2.0	6.0	20*	40*	20*
Louisiana	2.0	6.0	4,500	9,000	1,000
Maine	2.0	8.5	4,700	7,850	1,000
Maryland	2.0	4.75	2,400	4,800	2,400
Massachusetts	5.0	5.0	4,400	8,800	1,000
Michigan	4.0	4.0	3,000	6,000	3,000
Minnesota	5.35	7.85	3,000	6,000	3,000
Mississippi	3.0	5.0	6,000	12,000	1,000
Missouri	1.5	6.0	2,100	4,200	2,100
Montana	2.0	11.0	1,610	3,220	1,610
Nebraska	2.56	6.84	94*	188*	94*
Nevada	no state tax				
New Hampshire	taxes unearned income only				
New Jersey	1.4	6.37	1,000	2,000	1,500
New Mexico	1.7	8.2	3,000	6,000	3,000
New York	4.0	6.85	-	-	1,000
North Carolina	6.0	8.25	3,000	6,000	3,000
North Dakota	2.10	5.54	3,000	6,000	3,000
Ohio	0.743	7.5	1,200	2,400	1,200
Oklahoma	0.5	7.0	1,000	2,000	1,000
Oregon	5.0	9.0	145*	290*	145*
Pennsylvania	2.8	2.8		none	
Rhode Island	2.5	8.5			
South Carolina	2.5	7.0	3,000	6,000	3,000
South Dakota	no state tax				
Tennessee	taxes unearned income only				
Texas	no state tax				
Utah	3.6	7.0	2,250	4,500	2,250
Vermont	3.6	9.5	3,000	6,000	3,000
Virginia	2.0	5.75	800	1,600	800
Washington	no state tax				
West Virginia	3.0	6.5	2,000	4,000	2,000
Wisconsin	4.6	6.75	700	1,400	400
Wyoming	no state tax				

Note. *Refers to Tax Credits rather exempt income. The data refer to 2003 and are available from the Federation of Tax Administrators at 444 N. Capital Street, Washington DC. The 'min.' and 'max.' refer to the minimum and maximum tax bracket in the state, 'single' and 'married' refer to single filers and households in which the husband and wife jointly file, while 'dependents' refer to each additional dependent person for which the file may claim.

TABLE 2. Marginal tax rates on earned and unearned income for US States

State	Labor income		Interest income		Dividend income		Pension income	
	$\bar{\tau}$	$\tau_{2003} - \tau_{1980}$	$\bar{\tau}$	$\tau_{2003} - \tau_{1980}$	$\bar{\tau}$	$\tau_{2003} - \tau_{1980}$	$\bar{\tau}$	$\tau_{2003} - \tau_{1980}$
Alabama	3.7	0.6	3.3	0.2	3.2	1.8	3.4	0.4
Alaska	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Arizona	4.4	-1.4	4.0	-0.9	4.0	-3.8	3.7	-1.5
Arkansas	4.8	1.3	4.4	1.3	5.6	-0.1	2.7	4.0
California	6.8	0.5	6.7	-0.1	7.6	-8.7	5.8	0.7
Colorado	4.8	0.7	4.5	0.4	4.7	-4.4	3.9	0.6
Connecticut	2.7	5.5	3.5	4.4	5.2	-6.2	2.3	4.9
Delaware	6.2	-2.9	5.8	-3.0	5.0	-9.4	4.9	-0.5
District of Columbia	8.7	1.4	8.2	0.8	7.0	-8.8	8.0	1.0
Florida	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Georgia	5.5	0.4	5.1	-0.4	5.2	-5.6	4.9	-0.1
Hawaii	8.4	-1.0	7.7	-1.1	7.9	-8.4	0.1	0.0
Idaho	7.0	0.7	6.4	0.7	6.6	-6.0	6.0	0.1
Illinois	2.8	0.5	2.7	0.3	2.7	0.3	0.0	0.0
Indiana	3.1	1.5	2.9	0.9	2.9	-1.8	2.9	0.7
Iowa	4.5	1.6	5.3	1.3	5.3	-4.2	4.5	2.0
Kansas	5.1	2.1	5.2	1.7	5.3	-3.6	5.4	3.6
Kentucky	4.4	1.4	4.4	1.3	4.6	2.1	3.4	-1.8
Louisiana	2.8	2.6	2.6	1.9	2.8	-1.9	2.1	2.1
Maine	7.0	1.7	6.7	0.1	7.6	-7.2	6.1	-1.4
Maryland	4.8	-0.2	4.6	-0.2	4.6	-4.8	3.8	-0.5
Massachusetts	5.5	0.1	3.3	4.3	3.3	4.1	5.5	0.2
Michigan	4.6	-0.6	4.3	-1.2	4.3	-4.4	2.0	-0.4
Minnesota	7.6	-1.9	7.2	-1.1	7.2	-7.6	6.5	1.6
Mississippi	3.6	1.6	3.4	0.8	4.0	0.5	0.9	-1.6
Missouri	3.9	2.1	4.1	1.5	4.2	-2.9	4.2	2.1
Montana	5.0	0.6	4.8	0.7	5.0	-4.9	5.0	-0.6
Nebraska	4.3	2.2	4.2	1.3	4.5	-6.1	4.3	2.9
Nevada	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
New Hampshire	0.0	0.0	4.4	-0.5	4.7	-0.6	0.0	0.0
New Jersey	3.6	2.3	3.4	2.7	3.6	-2.2	2.9	2.1
New Mexico	4.8	2.4	4.6	1.0	5.4	-5.3	5.2	3.2
New York	7.7	-1.5	7.2	-2.8	5.0	-2.0	4.4	1.8
North Carolina	5.8	4.0	6.2	1.7	6.3	-6.1	5.9	2.2
North Dakota	2.9	0.3	3.0	1.0	3.4	-3.0	2.7	1.1
Ohio	4.6	2.7	4.4	2.8	5.0	-2.9	3.9	2.8
Oklahoma	5.7	1.9	4.9	0.3	5.6	1.5	5.0	2.1
Oregon	8.3	1.1	7.5	-0.3	7.6	-8.3	6.9	1.3
Pennsylvania	2.5	0.5	2.5	0.6	2.5	0.4	0.0	0.0
Rhode Island	5.7	0.9	5.5	1.1	6.6	-6.8	4.8	1.0
South Carolina	6.2	0.0	5.5	-1.2	6.0	-6.6	4.8	-1.7
South Dakota	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tennessee	0.0	0.0	5.4	-0.3	5.7	-0.3	0.0	0.0
Texas	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Utah	6.1	0.9	5.1	4.0	5.6	-2.9	4.7	3.8
Vermont	5.8	0.0	5.2	-0.1	5.9	-7.6	5.5	1.9
Virginia	5.2	0.8	4.6	-0.1	4.9	-5.7	4.7	0.7
Washington	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
West Virginia	5.0	1.2	4.9	0.9	5.2	-5.1	4.3	2.6
Wisconsin	7.3	-0.9	7.0	-1.1	6.9	-8.2	6.8	2.2
Wyoming	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Note. $\bar{\tau}$ is the state marginal tax rate averaged over 1980-2003, τ_{1980} is the marginal tax rate in 1980, τ_{2003} in 2003.

TABLE 3. Baseline results

	Labor income	Interest income	Dividend income	Pension income
		Mean		
constant	5.915	5.907	5.893	5.898
	(0.008)***	(0.009)***	(0.008)***	(0.007)***
τ	-0.687	-0.518	-0.181	-0.372
	(0.162)***	(0.179)**	(0.162)	(0.160)*
		Standard deviation		
constant	0.581	0.586	0.586	0.585
	(0.003)***	(0.003)***	(0.003)***	(0.003)***
τ	-0.132	-0.258	-0.261	-0.288
	(0.065)*	(0.071)***	(0.063)***	(0.063)***
		Mean		
constant	5.915	5.907	5.893	5.898
	(0.008)***	(0.009)***	(0.008)***	(0.007)***
$\tilde{\tau}$	-0.687	-0.518	-0.181	-0.372
	(0.162)***	(0.179)**	(0.162)	(0.160)*
		Standard deviation		
constant	0.582	0.588	0.586	0.587
	(0.003)***	(0.003)***	(0.003)***	(0.003)***
$\tilde{\tau}$	-0.166	-0.318	-0.253	-0.340
	(0.065)*	(0.072)***	(0.067)***	(0.063)***

Note. τ is the average state marginal tax rate computed using the actual distribution of income within each state; $\tilde{\tau}$ is the average state marginal tax rate computed using the 1995 nationwide income distribution. Standard errors are reported in parentheses. One star means 5% significant, two 1%, three 0.1%.

TABLE 4. Standard deviation of log non-durable consumption

	Baseline	Fixed effect	Fixed and time effect	Unemployment rate	IV
			Labor income		
constant	0.581	0.620	0.569	0.559	0.541
	(0.003)***	(0.014)***	(0.014)***	(0.015)***	(0.031)***
τ	-0.132	-1.009	-0.392	-0.434	-1.853
	(0.065)*	(0.172)***	(0.156)*	(0.156)**	(0.464)***
u				0.253	
				(0.110)*	
			Interest income		
constant	0.586	0.598	0.573	0.562	0.723
	(0.003)***	(0.012)***	(0.012)***	(0.013)***	(0.077)***
τ	-0.258	-0.739	-0.471	-0.457	-4.289
	(0.071)***	(0.139)***	(0.120)***	(0.121)***	(1.551)**
u				0.190	
				(0.109)	
			Dividend income		
constant	0.586	0.564	0.548	0.537	0.313
	(0.003)***	(0.010)***	(0.008)***	(0.010)***	(0.145)*
τ	-0.261	-0.251	-0.249	-0.241	6.013
	(0.063)***	(0.090)**	(0.094)**	(0.094)*	(3.264)
u				0.205	
				(0.109)	
			Pension income		
constant	0.585	0.589	0.556	0.546	0.518
	(0.003)***	(0.010)***	(0.012)***	(0.013)***	(0.039)***
τ	-0.288	-0.631	-0.240	-0.271	-3.037
	(0.063)***	(0.108)***	(0.128)	(0.129)*	(0.922)***
u				0.244	
				(0.110)*	

Note. τ is the average state marginal tax rate computed using the actual distribution of income within each state, u is the the unemployment rate. The first column shows the baseline specification, the second adds state fixed effects, the third year effects, the fourth the state unemployment rate and the fifth provides the instrumental variables estimates using as instruments the ACIR tax effort measure. Standard errors are reported in parentheses. One star means 5% significant, two 1%, three 0.1%.

TABLE 5. Standard deviation of log non-durable consumption, holding the income distribution fixed over time and across states

	Baseline	Fixed effect	Fixed and time effect	Unemployment rate	IV
			Labor income		
constant	0.582	0.637	0.577	0.567	0.540
	(0.003)***	(0.016)***	(0.015)***	(0.016)***	(0.031)***
$\tilde{\tau}$	-0.166	-1.255	-0.502	-0.551	-1.762
	(0.065)*	(0.194)***	(0.177)**	(0.178)**	(0.430)***
u				0.258	
				(0.109)*	
			Interest income		
constant	0.588	0.604	0.567	0.556	0.733
	(0.003)***	(0.012)***	(0.012)***	(0.014)***	(0.089)***
$\tilde{\tau}$	-0.318	-0.842	-0.397	-0.372	-5.257
	(0.072)***	(0.146)***	(0.131)**	(0.132)**	(2.117)*
u				0.184	
				(0.109)	
			Dividend income		
constant	0.586	0.587	0.563	0.551	-0.269
	(0.003)***	(0.012)***	(0.011)***	(0.013)***	(1.436)
$\tilde{\tau}$	-0.253	-0.582	-0.323	-0.310	21.431
	(0.067)***	(0.129)***	(0.112)**	(0.112)**	(37.140)
u				0.198	
				(0.109)	
			Pension income		
constant	0.587	0.615	0.545	0.538	0.532
	(0.003)***	(0.015)***	(0.015)***	(0.015)***	(0.033)***
$\tilde{\tau}$	-0.340	-0.921	-0.077	-0.138	-2.148
	(0.063)***	(0.171)***	(0.160)	(0.162)	(0.563)***
u				0.235	
				(0.111)*	

Note. $\tilde{\tau}$ is the average state marginal tax rate computed using the 1995 nationwide income distribution, u is the the unemployment rate. The first column shows the baseline specification, the second adds state fixed effects, the third year effects, the fourth the state unemployment rate and the fifth provides the instrumental variables estimates using as instruments using as instruments the ACIR tax effort measure. Standard errors are reported in parentheses. One star means 5% significant, two 1%, three 0.1%.

TABLE 6. Interquartile range of log non-durable consumption

	Baseline	Fixed effect	Fixed and time effect	Unemployment rate	IV
			Actual income distribution		
constant	0.771	0.765	0.749	0.730	0.651
	(0.006)***	(0.024)***	(0.027)***	(0.029)***	(0.059)***
τ	-0.117	-0.794	-0.688	-0.768	-2.355
	(0.109)	(0.288)**	(0.302)*	(0.304)*	(0.868)**
u				0.488	
				(0.213)*	
			1995 nationwide income distribution		
constant	0.773	0.777	0.760	0.567	0.540
	(0.006)***	(0.026)***	(0.030)***	(0.016)***	(0.031)***
$\tilde{\tau}$	-0.171	-0.970	-0.836	-0.551	-1.762
	(0.110)	(0.325)**	(0.345)*	(0.178)**	(0.430)***
u				0.258	
				(0.109)*	

Note. τ is the average state marginal tax rate on labor income computed using the actual distribution of income within each state, $\tilde{\tau}$ is the average state marginal tax rate computed using the 1995 nationwide income distribution, u is the the unemployment rate. The first column shows the baseline specification, the second adds state fixed effects, the third year effects, the fourth the state unemployment rate and the fifth provides the instrumental variables estimates using as instruments using as instruments the ACIR tax effort measure. Standard errors are reported in parentheses. One star means 5% significant, two 1%, three 0.1%.

FIGURE 1. State marginal tax rate, labor income, 1980-2003 average

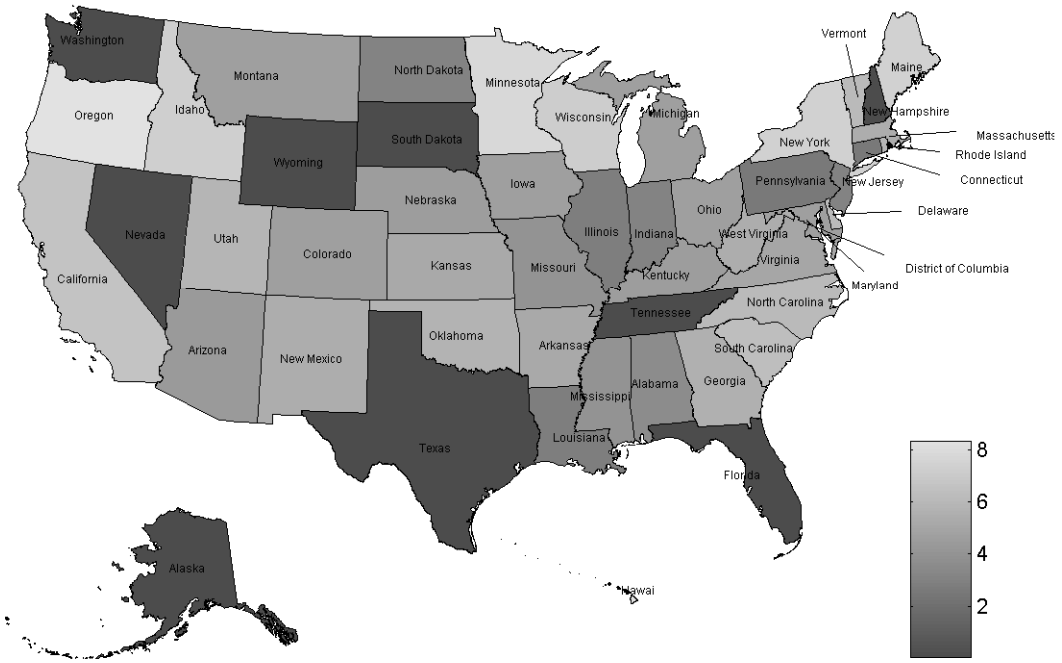


FIGURE 2. State marginal tax rate, interest income, 1980-2003 average

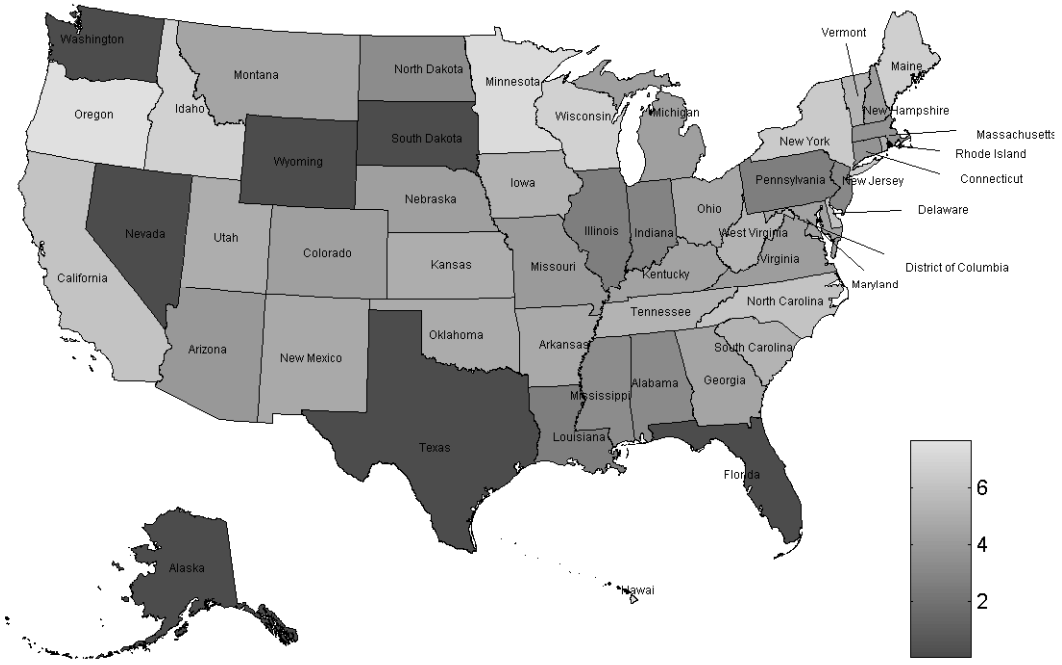


FIGURE 3. State marginal tax rate, dividend income, 1980-2003 average

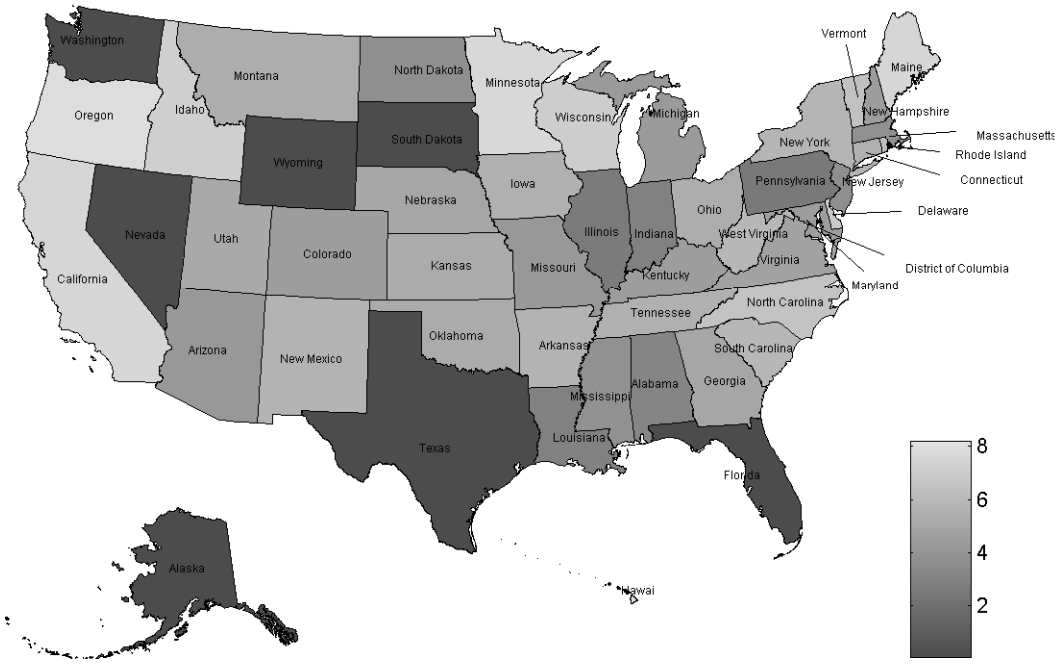


FIGURE 4. State marginal tax rate, pension income, 1980-2003 average

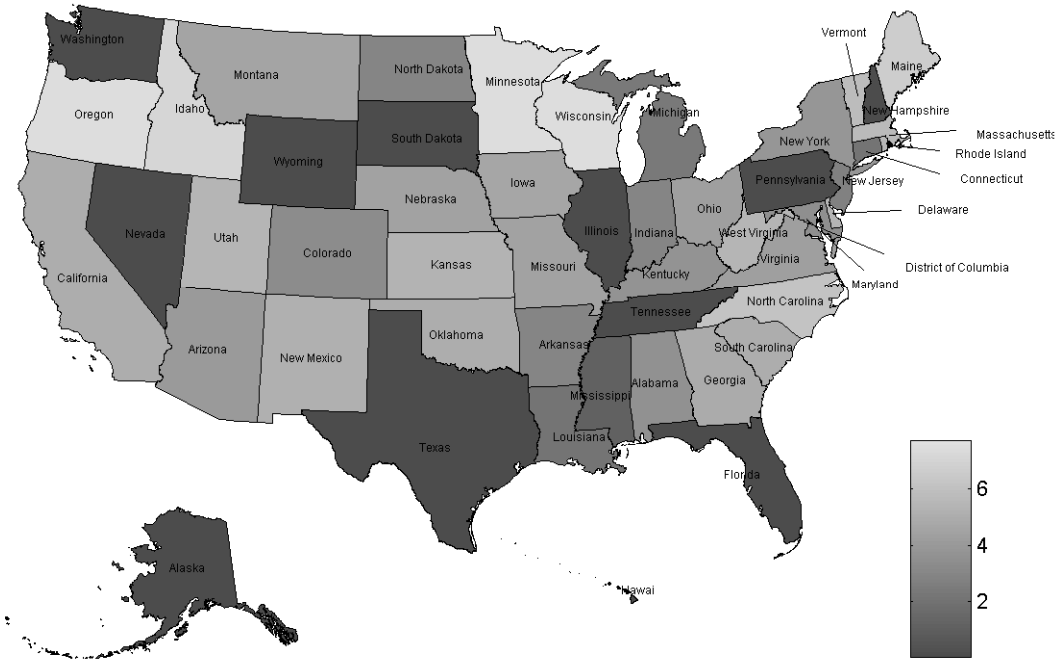


FIGURE 5. State marginal tax rate, labor income, 1980-2003 changes

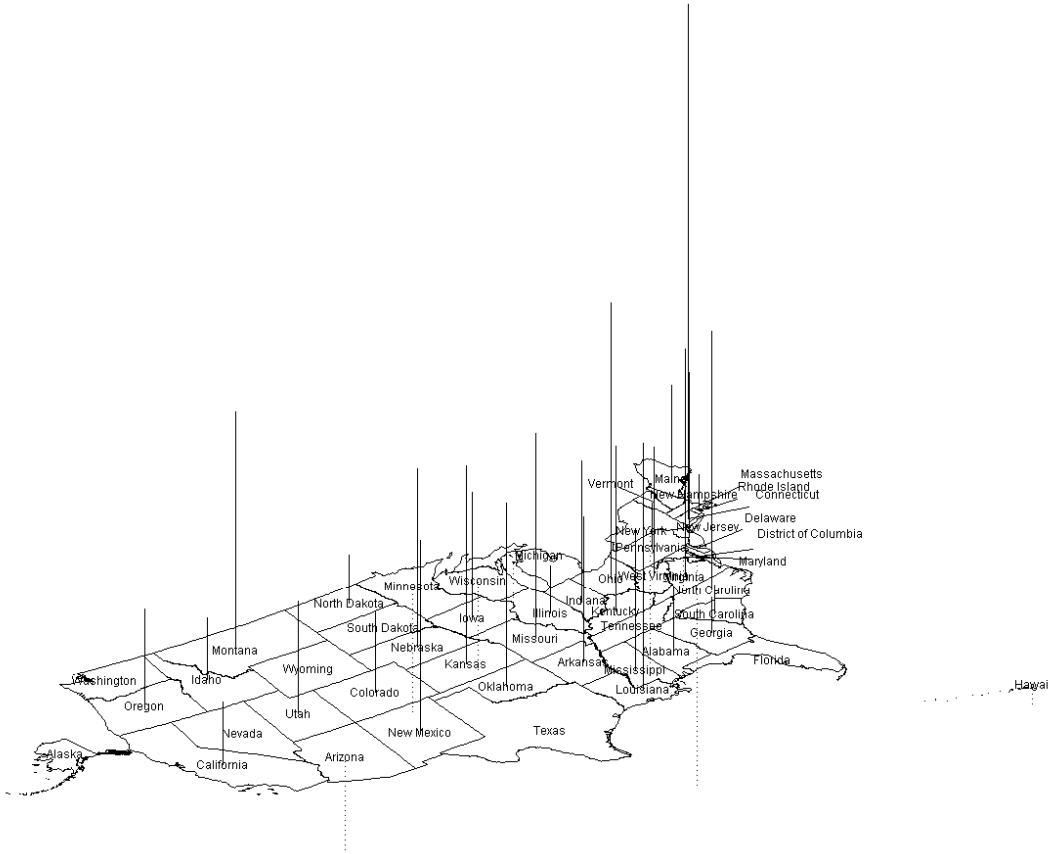


FIGURE 6. State marginal tax rate, interest income, 1980-2003 changes

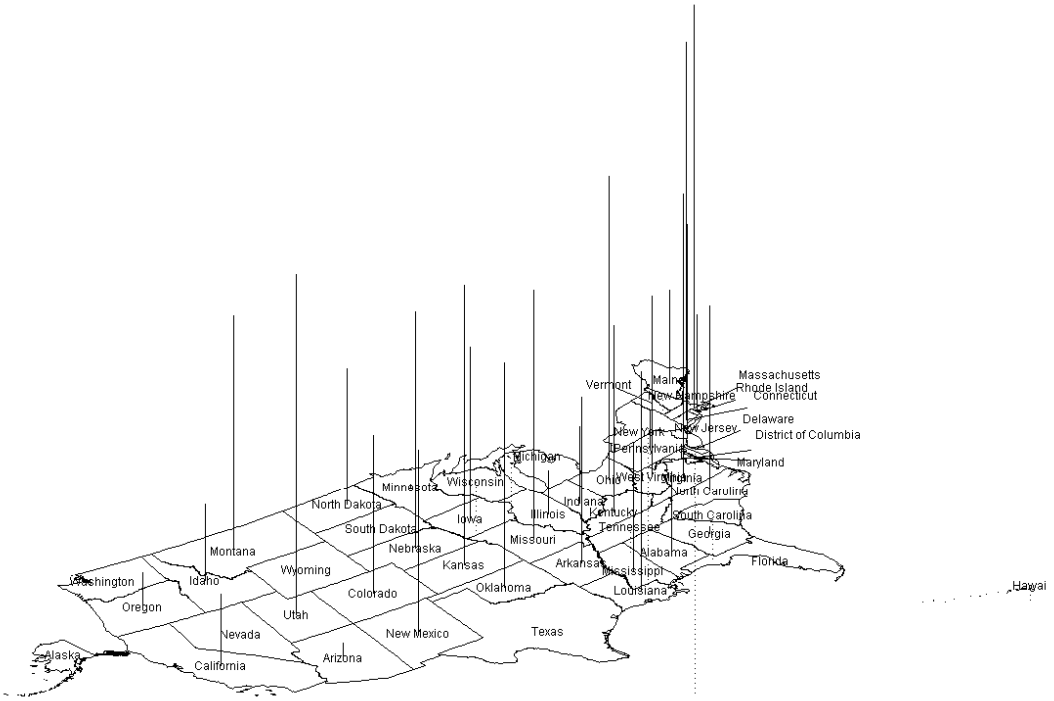


FIGURE 7. State marginal tax rate, dividend income, 1980-2003 changes

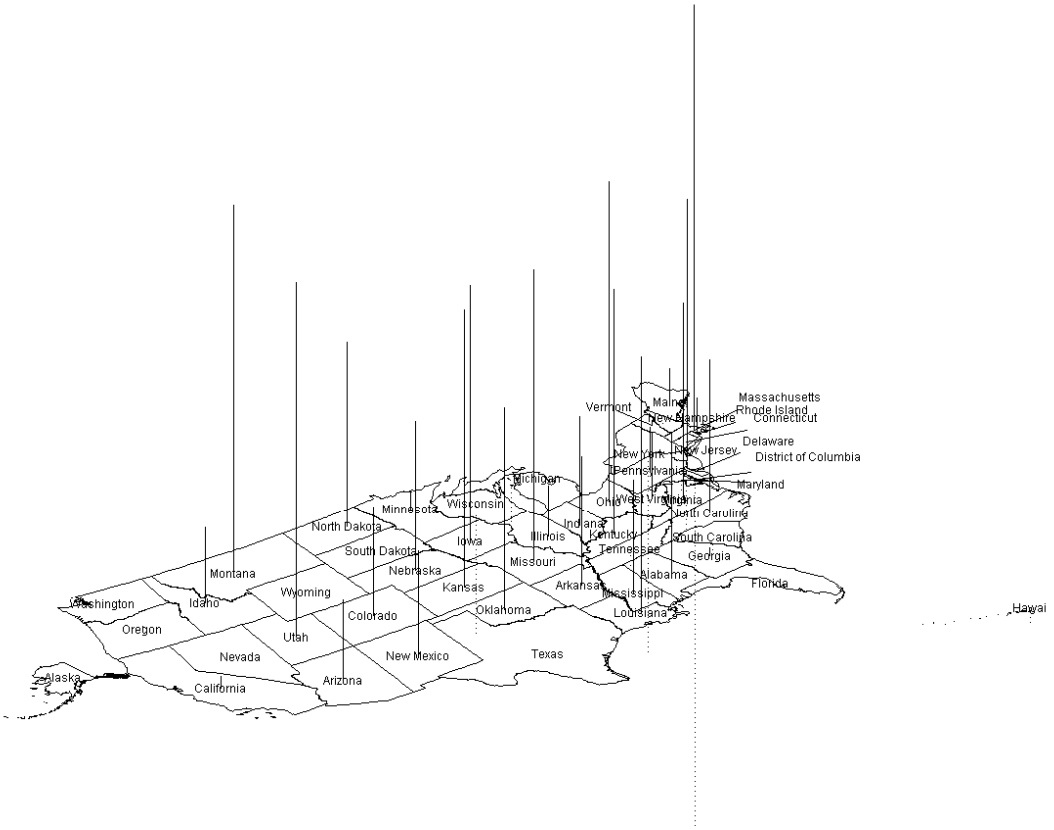


FIGURE 8. State marginal tax rate, pension income, 1980-2003 changes

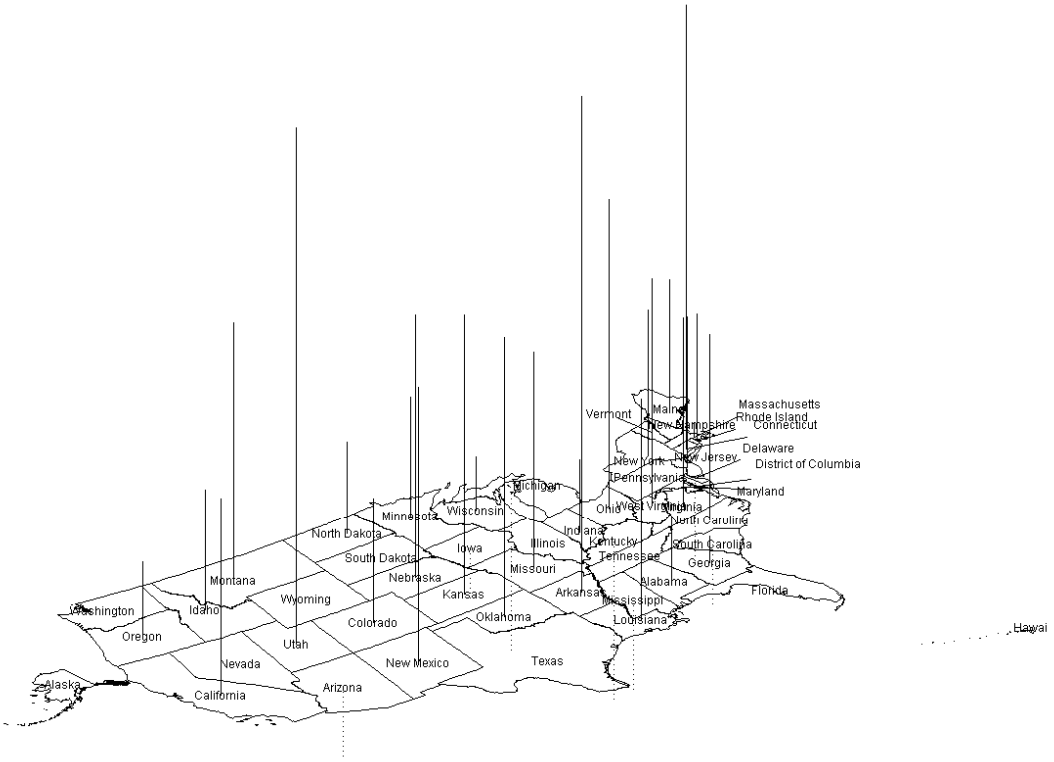


FIGURE 9. Mean of log non-durable consumption

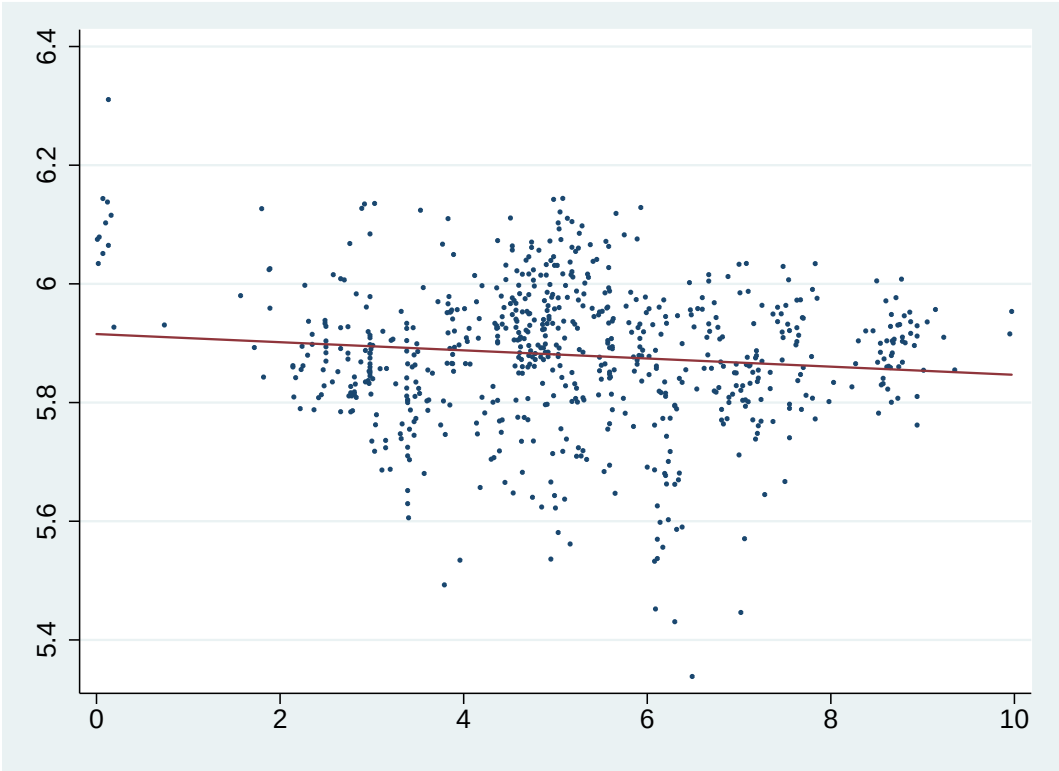
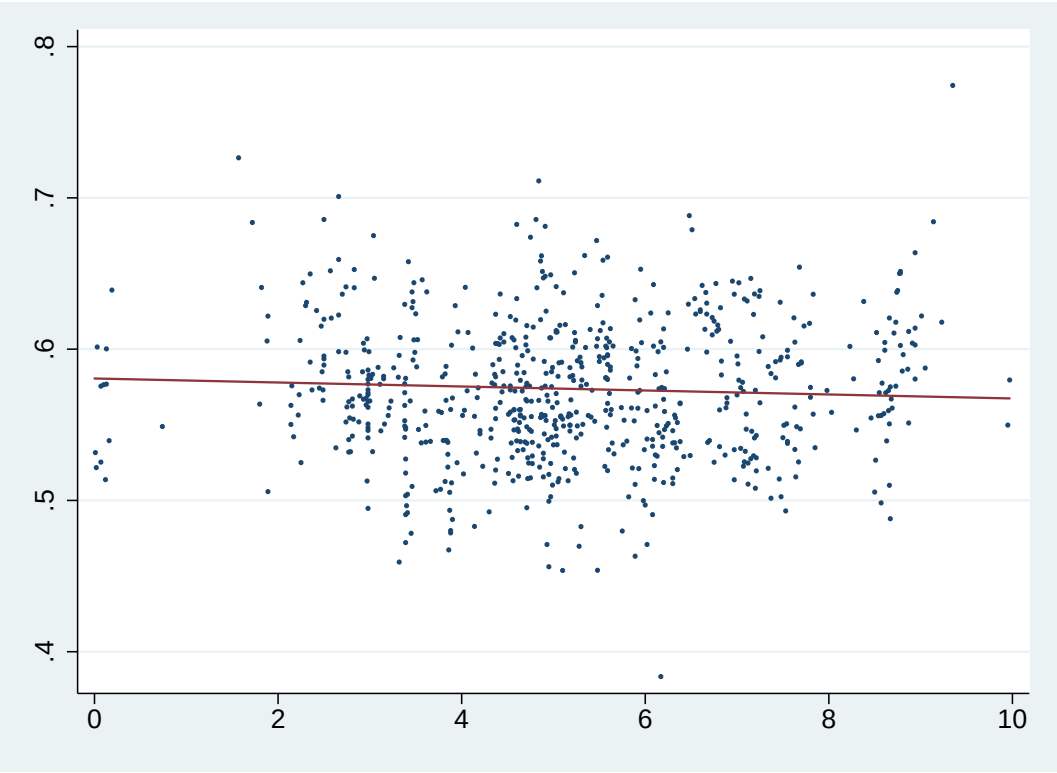


FIGURE 10. Standard deviation of log non-durable consumption



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