Louisiana Structural Economic Model for Personal Tax Policy

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A recent surge in Louisiana fiscal policy proposals has motivated the need for state-of-the-art economic models to evaluate Louisiana's current tax structure, as well as proposed fiscal legislation. This report presents the results of an advanced simulation model that evaluates Louisiana personal income, property, and sales taxes on the basis of efficiency and equity. To be clear, a tax structure efficiency measures the distortions onto individuals' behavior, while tax structure equity measures tax burden by demographics.

1. Overview of Louisiana Income, Property, and Sales Taxes

The broad structure of Louisiana's personal income tax structure varies based on income, federal tax burden, marital status, and eligibility on a number of tax credits and deductions. Louisiana marginal income tax rates, after the deduction of federal taxes paid, are summarized as follows:

Rate	Single	Married (filing jointly)
2%	$12,500	$25,000
4%	$25,000	$50,000
6%	$50,000	$100,000

Table 1: Louisiana Marginal Income Tax Brackets

Louisiana property is only taxed at the sub-state level, and personal property is taxed at 10% of its assessed value. Despite the state's authority to tax property up to 57.5 mills, its only influence on property taxation is a $7,500 homestead exemption. This translates to $75,000 of a home's value to be exempt from local property taxes. The highest parish property tax rate in 2012 (based on 10% of assessed value and $7,500 homestead exemption) was 171.4 mills levied in Grant Parish, while the lowest was 50.3 mills levied by East Feliciana Parish. An estimate of the average millage rate in Louisiana is 112 mills.

Finally, Louisiana imposes 4% sales tax at the state level. Additional sales taxes paid by individuals are determined by individual municipalities. Parish tax rates in 2012 vary from 0% in Cameron Parish to 7% in East Carroll Parish, and the average over the effective local tax rates is 4.7%.

2. Model Overview

The simulation model designed to evaluate personal taxes in Louisiana is a structural overlapping-generations model, similar to the models used by the Congressional Budget Office (CBO), the Joint Committee on Taxation, and the Federal Reserve. The model accepts as inputs estimated parameters from an extensive literature into a computational model to simulate individuals' economic behavior. Once this simulator has been parameterized and calibrated to the Louisiana economy, the model economy can evaluate tax regimes on a positive basis.

After calibrating the model, moments of the simulated data can determine not only how aggregate values would respond to a change in policy, but also how a change in the tax structure would shift the tax burden across demographics. The model is designed to account for a wide range of heterogeneity among individuals, allowing the researcher to understand how fiscal policy alternatives would affect individuals across the dimensions of income, age, earnings potential, home-ownership status, and marital status.

Careful evaluation of changes in the tax structure involves understanding how fiscal policy alternatives not only shift the burden of taxes, but also how it distorts economic behavior directly and indirectly. For example, suppose the tax structure in a region is a proportional income tax and a proportional sales tax. Further, suppose that the income tax were eliminated and replaced by an increase in the sales tax. A reduction in the income tax tends to increase the incentives to work hard. However, an increase in the sales tax reduces the affordable consumption bundle for a given amount of income, which in turn, reduces incentives to work hard. Measuring these countervailing economic incentives can be difficult to disentangle, but fortunately, the structural simulation model can account for all of these distortions simultaneously.

The model is designed to understand the effects of three Louisiana (personal) taxes: income, property, and sales taxes. Each of these taxes distort individuals' behavior in unique ways. As in the previous example, the income tax tends to primarily distort individuals' labor choice. Specifically, increases in the income tax tend to reduce the incentive for individuals to supply labor. Similarly, property taxes affect decisions pertaining to home ownership at both the intensive and extensive margins. If the price of rental properties are not very responsive to changes in the property tax rate, then an increase in property taxes can discourage home ownership. Also, an increase in the property tax can reduce the amount that individuals are willing to spend on a home, causing substitution towards non-housing consumption. Finally, a sales tax tends to distort the relative price between taxable sales (such as computers) and goods that are not taxed at the sales tax rate (such as housing), distorting the demand for each. Again, the model is designed to measure not only the direct distortions caused by changes in these taxes, but also the indirect effects as well.

While it might seem favorable to choose a tax structure that minimizes the distortions on economic behavior, such a tax structure might create an inequitable distribution of the tax burden. Take, for example, a lump-sum tax of $5,000 on each Louisiana resident. This lump-sum tax might significantly reduce the distortions created by the current tax structure. However, individuals suffering a financial setback in life might find this tax extremely hard to pay. Also, newborns might prefer if this tax could wait until later in life, while low-income elderly might have trouble finding a job that could finance this tax. Because of this variability in individuals' ability to pay a tax, the model is well equipped to measure the tax burden as it relates individuals' income, age, and other demographics.

Another component of fiscal policy analysis involves implementability of a tax structure. A large literature in the academic field of normative public finance rules out the possibility of a lump-sum tax based on the lack of implementability (political, or otherwise), thereby focusing on the next best set of taxes. Louisiana recently began facing issues regarding implementability of the sales tax. In the advent of online purchasing, companies such as Amazon allow individuals to purchase goods online, while avoiding sales tax collection. Although this money is owed to the state, much of it goes unreported. Further, enforcement of the tax would be extremely costly to the government. These online shopping alternatives, such as Amazon, that do not collect sales taxes from shoppers tend to gradually reduce the implementability of sales taxation. While the model is not designed to determine whether or not a tax is implementable, it can determine how a change in implementability would affect the model's economic variables.

To summarize, the quality of a tax structure can be evaluated on the basis of efficiency (how much behavior is distorted), equity (who bears the tax burden), and implementability (feasibility of the tax). While the simulation model is designed to understand the tax structure in terms of efficiency and equity, implementability generally cannot be measured within this framework. However, once implementability has been determined, the model can evaluate how individuals respond to alternative tax structures.

3. Model Description

The model economy consists of overlapping generations of individuals. These individuals take their economic environment (e.g., prices, tax structure, age, productivity, etc.) as given and make decisions that maximize their wellbeing. This decision involves a careful evaluation of how much to spend, save, and work, and whether or not to buy a house. In the model, as in the real world, individuals face uncertainty regarding future work opportunities and housing status. Individuals are also born with different initial life conditions, such as labor productivity. The model is designed to account for extensive heterogeneity in demographic and economic status, as well as measurable uncertainty throughout an individual's lifetime.

The model takes as inputs a set of parameters that are exogenous (determined outside of the model) and generates a set of endogenous variables (outcomes that are determined by the model). The exogenous set of parameters include demographic characteristics of the population, including the population growth rate, mortality rates, and likelihood of marital status. The model also takes as exogenous a set of parameters that determine individuals' preferences over consumption (both current and future), leisure, and housing. These preference parameters are chosen from microeconomic studies and a growing literature categorized as "incomplete market models." The model also takes as exogenous a set of parameters that are unique to the model. For example, since we are concerned with evaluating the property tax, we include a set of parameters that determine fixed costs of buying a home, such as down payment (as a percentage of home value) and closing costs. Model inputs also include parameters potentially unique to Louisiana, including life-cycle productivity and the Louisiana tax structure. Model outputs include not only the optimal behavior by age and other demographics, but also the distributions over these variables. These outputs allow the researcher to determine how aggregate variables respond to changes in the tax structure.

Overview of Parameters

Preference Parameters

Perhaps the most important parameters in a fiscal policy study (other than the tax rates themselves) are the preference parameters. These parameters determine the responsiveness of economic behavior to changes in the economy's tax structure. For example, they determine how much labor supply adjusts to an increase in income taxes, or how much to spend on a new home if the homestead exemption increases.

The values of interest with respect to labor supply are the average time spent working and the Frisch labor supply elasticity. The annual time endowment in the model is normalized to 1, so the average time working tends to fall around 25% - roughly a 40 hour work week. As calibrated, the model generates labor supply of 28.3% of the time endowment. The Frisch labor supply elasticity (FLSE) measures the responsiveness of labor supply to changes in after-tax wages, holding constant the marginal utility of wealth. Applied microeconomists tend to estimate a value of the FLSE around 0.5, while macroeconomic model require a larger elasticity in the neighborhood of 3.0 to generate the aggregate fluctuations in observed working hours throughout the business cycle. A recent finding

(Peterman, 2014), however, shows how both estimates can be consistent. That paper explains that many applied microeconomists restrict their sample to middle-aged males, which generates the low FLSE of roughly 0.5. When the sample is extended to women and the near-retirees, the estimates rise significantly to roughly 3.0. While the academic debate on the FLSE continues, the simulation model presented in paper has an implied FLSE of 1.8, which falls in the middle of the range of estimates.

Another important value is the coefficient of relative risk aversion (CRRA). This parameter serves two purposes for the model's specific utility function, which is a constant relative risk aversion utility function. First, the CRRA determines individuals' preference towards risk, with respect to uncertain lifetime outcomes. Second, for the specification of the utility function, the CRRA is the inverse of the elasticity of intertemporal substitution (EIS). The EIS determines the responsiveness of demand for current consumption versus future consumption. This is critically important in evaluating policy that involves dynamic decisions, such as home ownership, or taxation of capital income. The model's CRRA is 2.15 (EIS =0.47), and empirical estimates of the CRRA are around 2.0 for an annual rate (EIS = .5).

The model divides total consumption into housing and non-housing consumption. Following Yang (2009), a composite good enters directly into the utility function. The composite good is an aggregation of housing and non-housing consumption according to a constant elasticity of substitution function. The elasticity of substitution between housing and non-housing consumption reported in Ogaki and Reinhart (1998) is 0.145, so that is the value applied in the structural model. Finally, the weight on non-housing consumption applied in the utility function is 0.85, which is slightly lower than the value of 0.9 used in Yang (2009), as the value the model shows to be a better fit to Louisiana housing data.

The remaining preference parameter is the discount rate. While this value must be lower than unity for the infinitely-lived agent – and indeed it was estimated to be close to, but below unity (Hansen and Singleton, 1982) – the value in a finitely-lived agent can exceed unity. A commonly used values of that parameter, once accounting for survival probability, fall in the range of 0.99 to 1.01. The value of the discount factor is an important determinant of housing demand, since housing choice is a largely a dynamic decision. Despite of the variability in the discount factor estimates, a value of 1.005 generates simulated housing patterns in the model that are consistent with Louisiana data.

Labor income

In the model, a household will take as given their level of productivity and choose labor supply accordingly. To map productivity into the model, male average log hourly wages by age are estimated from Louisiana data. It is standard in the literature to choose male hourly wages because this is the time length and gender whose measured productivity is least likely to be distorted by a labor supply decision. In other words, data on female annual salaries are likely to underestimate their true measure of productivity. Once the labor productivity has been estimated, individual variability of productivity about this mean is determined from estimates in the heterogeneous-agent model literature. Labor productivity in the model is assumed to grow at an economy-wide rate of 2% per period.

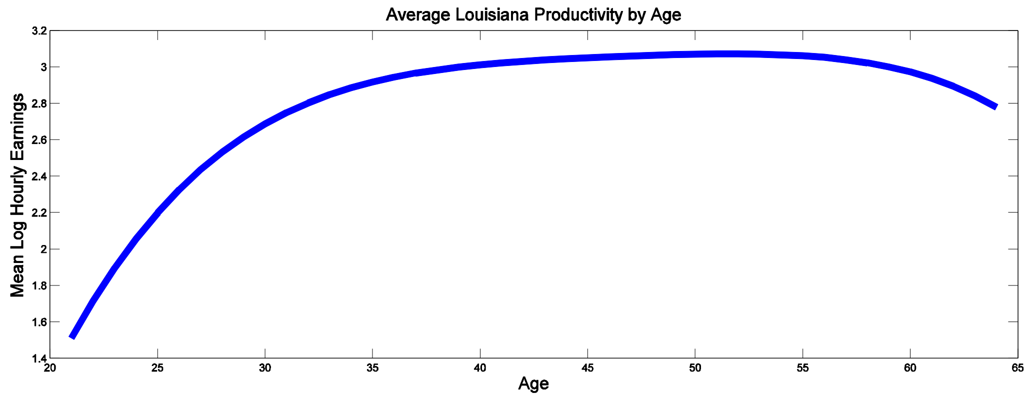

Figure 1: Louisiana Life-cycle Productivity

In addition to average labor productivity by age, three important variables that generate the income distribution are the variance of initial productivity, the persistence of the labor productivity shocks (which are measured by a first-order autoregressive (AR1) process on hourly wages), and the variance of productivity shocks (which are measured by the variance of the innovation in the AR1 process). Estimates of these values that are applied in the model are taken from the literature, and are, respectively, 1.25, 0.98, and 0.05. The AR1 process is then discretized into a finite-state Markov process using the method described in Adda and Cooper (2003). Individuals are assumed to reach retirement at age 65 and begin collecting Social Security payments in that period. These payments are assumed to be valued at $13,200 annually.

<u>Housing</u>

Housing in the model is both a durable good, for which individuals derive utility, and a stock of illiquid wealth. Home ownership is a discrete choice faced by individuals in the model, as it is in the real world. Individuals are assumed to either live in a home that they own or in a rental home. In order to model this correctly, I assume that the youngest cohort of households enters the model without home ownership. In order to purchase a house, it is assumed that a 15% down payment must be placed, and the remaining 85% is accumulated as debt. Further, household debt limits are constrained by the collateralized value of the house. This prevents individuals from buying a house until they can afford the down payment. Buying and selling a house also involves fixed costs of moving. Transaction costs of buying or selling a home follows Fang (2009) and assumes that this value is 7% of the value of the home. It is assumed that the home owner can improve the value of the house by up to that amount before incurring the transaction costs of moving. Further, the home owners incur annual depreciation expenses estimated at 1.4% of the house value. Finally, to account for the possibility that some individuals either prefer or temporarily must rent a home, it is assumed that households face an 11.5% probability of a “rental shock” in which home ownership is not feasible for one period. Housing can be rented at a price equal to the market interest rate (plus housing depreciation, but pre-tax) times the value of the home. Supply of housing is assumed to be perfectly elastic.

<u>Demographics</u>

In order to generate an accurate representation of age cohorts in the model, it is important to account for the demographic composition of individuals. The population growth rate is set to 1.2%, following the literature’s estimates on recent population growth in the United States. Mortality rates, or conversely, the likelihood of survival by age are determined from the 2008 Center for Disease Control and Prevention U.S. Life Expectancy Tables.

Finally, in order to map model values into real dollar amounts, the median income in the model is set equal to the median income reported for Louisiana by the U.S. Census Bureau. The value reported is approximately $44,000 for the years 2008-2012.

Tax Structure

The structural model replicates three personal taxes in the State of Louisiana: income, property, and sales taxes. The income tax is modeled as described in Table 1. To quantify the federal tax deduction on Louisiana income taxes in the model, the federal tax liability is approximated using a Gouveia-Strauss function commonly used by the CBO and academic models. Shinichi (2013) estimates an average tax deduction equivalent to $7,800 (roughly double for married filers), which is assumed to hold as well in this model. According to the American Community Survey, an estimated 55% of Louisiana residents above the age of 20 are married. Accordingly, this is the percentage of individuals that file jointly in the model.

Louisiana property tax code allows for a $75,000 homestead exemption. After the homestead exemption, the marginal tax rate on property is estimated at 1.12% (or 112 mills, based on the 10% assessed value of the home) annually.

The state taxes sales of goods at 4%. As mentioned earlier, an estimate of the local tax rates throughout the state adds an average of 4.7 percentage points to the state rate to a cumulative average of 8.7%. In order to carefully evaluate the sales tax, special consideration must be taken to understand both what is *available* to be taxed under the sales tax, and what is *feasibly* taxed by the sales tax. Currently in Louisiana, housing expenditures and services are not included as sales. According to the Bureau of Labor Statistics Report on Consumer Expenditures in 2012, expenditures on shelter comprised approximately 20% of total expenditures. Then, according to data from IMPLAN, only 15% of total expenditures were counted as goods (i.e., neither housing, nor services). This would imply that only 18.75% of non-housing purchases are taxed at the sales tax rate. However, given the growing rate of online purchases that avoid the sales tax, this estimate potentially overstates the actual amount of non-housing consumption that is taxed. In the absence of an accurate measure of unreported purchases, it is assumed that taxable non-housing consumption is 18.75% of total non-housing consumption.

4. **Results**

Before analyzing changes in the Louisiana tax structure, it is important to determine the strengths and limitations of the model. The model can be evaluated by generating statistics from simulated data and comparing them to the actual Louisiana data from public datasets, such as the American Community Survey (ACS) and the Current Population Survey (CPS). Some of these general statistics are summarized in the Table 2 below:

Variable	Model	Data (Source)
Median Income	$44,882	$44,673 (Census)
Home Ownership Rate	66%	70% (CPS)
Mean Home Value	$181,676	$172,430 (ACS)
Median Home Value	$129,600	$140,000 (ACS)
Average Property Tax per Home Owner	$1,264	$1,349 (CPS)

Table 2: Simulated Data versus Survey Data

It is important to keep in mind that the model-generated statistics, such as income and housing, are endogenous (i.e., determined *by* the model). This means that the statistics and distributions reported in this section are not imposed onto economic agents in the model, but rather a result of model agents responding rationally to their personal economic and demographic circumstances. Therefore, simulating results that can reasonably match the actual data justify using the model for counterfactual experiments, such as fiscal policy evaluation.

As mentioned in the previous section, evaluation of income tax alternatives requires careful consideration of the impact onto individual labor supply. Figure 2 below shows how the model generates a reasonable pattern of average time worked by age cohort. In order to interpret the results, both the model and data series are normalized so that average time spent working at age 40 is normalized to unity. Therefore, any point on the graph can be interpreted as a percentage deviation from average time worked at age 40.

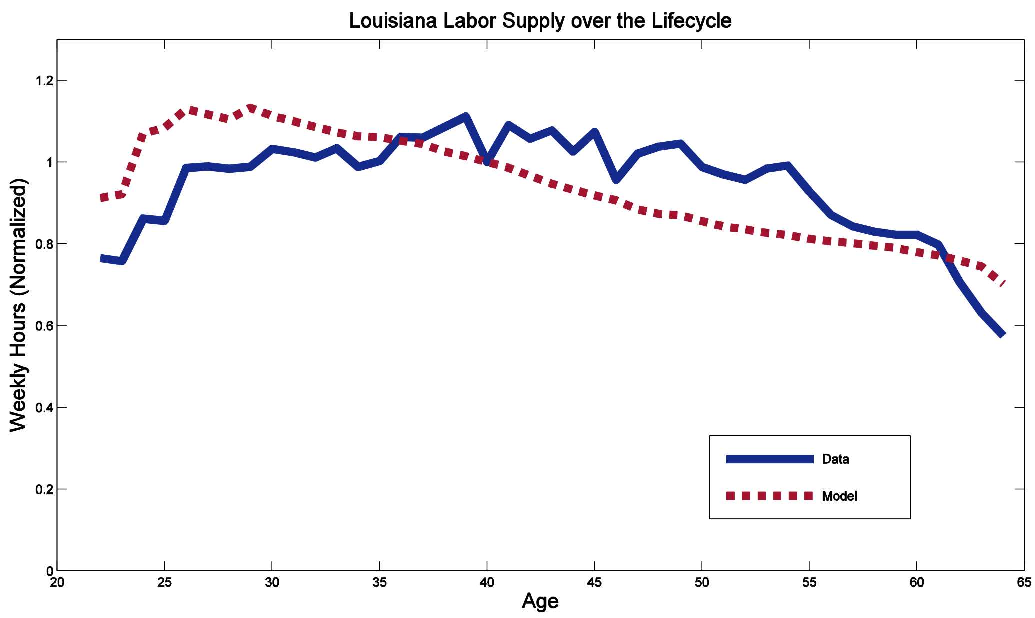

Figure 2: Louisiana Lifecycle Labor Supply

While the state does not currently impose a property tax, the individual parishes do impose property taxes. The state government does, however, determine the magnitude of the homestead exemption. Therefore, in order to analyze the effects of either changing the homestead exemption or determining the effects of levying a state property tax, we consider some features of the model's real estate predictions. Figures 3-5 show how the model generates reasonable predictions regarding the overall distribution of home values, the age-ownership profiles, and ownership rates by income. The ownership rates by income were estimated by predicting values from a logistical regression of the respective series.

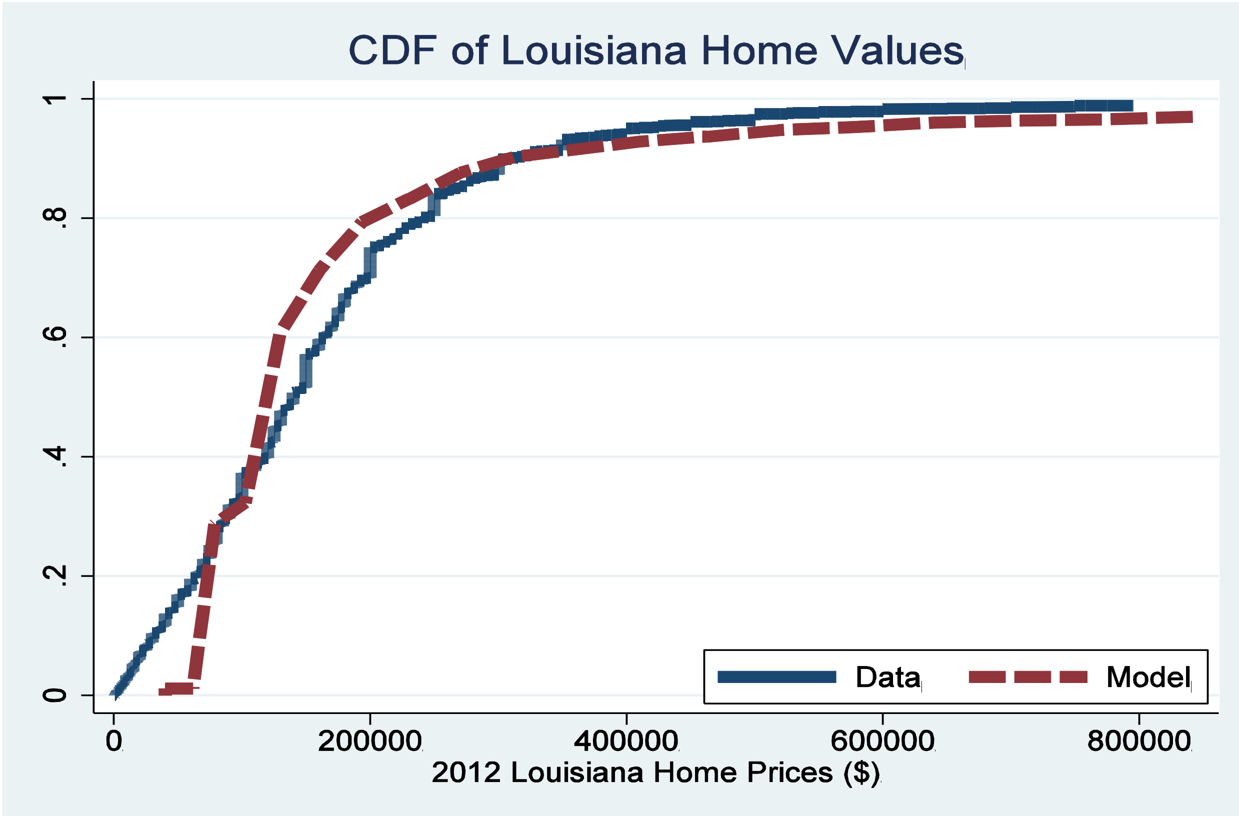

Figure 3: Distribution of Louisiana Home Values

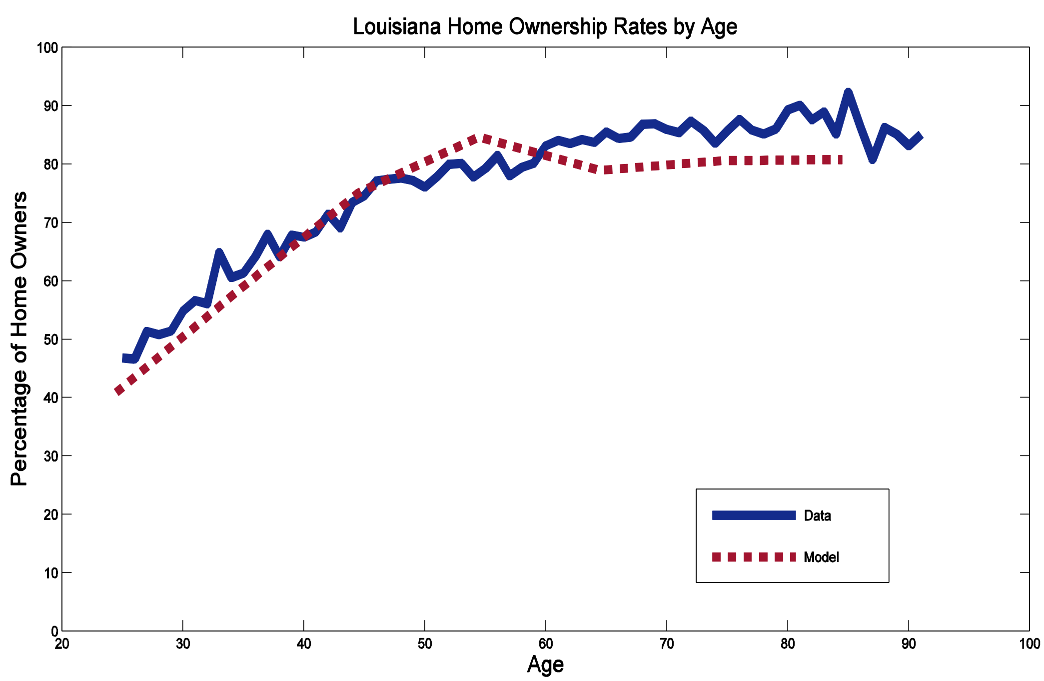

Figure 4: Louisiana Lifecycle Home Ownership

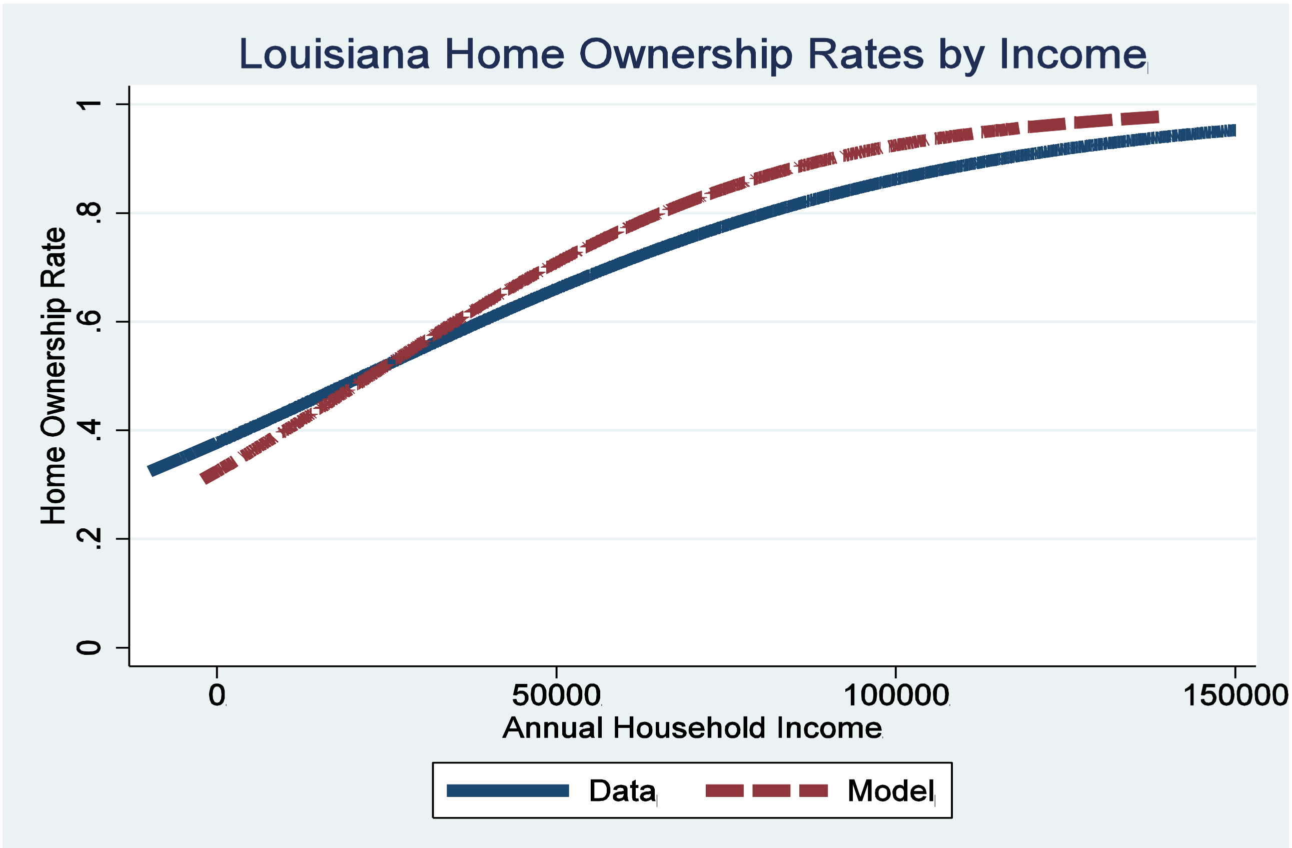

Figure 5: Louisiana Home Ownership by Income

Finally, although the primary purpose of the model is to measure and understand the efficiency and equitability of the tax system, the model can also provide estimates of the tax revenue generated by each tax. To calculate these tax revenues, the model per-capita tax generated by each tax is solved and weighted by the estimated portion of the Louisiana population paying the tax. According to the 2010 Census, the 24.7% of the Louisiana population is 18 years old or younger[1]. Since 20 years old is the minimum model age, 75% of the population is assumed to be 20 years old or older. Further, in accordance with recent estimates of the Louisiana population, Louisiana population is assumed to be 4.5 million residents. Then, estimates of the tax revenue (in millions) are calculated according to the following equations:

$$Income\ tax\ revenue = .75 \times 4.5 \times Average\ income\ tax\ revenue$$
$$Sales\ tax\ revenue = .75 \times 4.5 \times Average\ sales\ tax\ revenue$$
$$Property\ tax\ revenue = .75 \times 4.5 \times Average\ property\ tax\ revenue$$

[1] http://www.census.gov/prod/cen2010/briefs/c2010br-03.pdf

Estimates of the respective tax revenues are summarized in Table 3. It is extremely important to note that the model values do not target the data values. In other words, no *ad hoc* adjustments were made to the model in order to produce results close to the data values. This is a desirable feature of any structural model.

Tax Category	Model	Data (Source)
Total Personal Income Tax Revenue	$2,871	$2,754 (RA)
Total Personal Sales Tax Revenue	$2,677	Not Available
Total Residential Property Tax Collected	$2,796	Not Available

Table 3: Estimated Tax Revenue (in millions)

Table 3 shows that the personal income tax revenue estimated by the model closely matches the value actually collected in 2012. Special caution should be taken in interpreting the sales tax revenue, however. Sales tax revenue estimated by model assumes that households make all consumption purchases in Louisiana (and not outside of Louisiana) and that online purchases are truthfully reported. While sales tax revenue paid by Louisiana residents (i.e., not including tourism or corporate purchases) is not currently measured, total sales tax revenues collected in 2012 were $2,938 million (Richardson and Albrecht, 2014). Finally, Table 3 reports the model's estimated revenue generated from residential property. Again, tax revenue data is not cleanly broken down into residential and non-residential revenue. Regardless, total property tax revenues in 2012 were $3,896 million (Louisiana Department of Revenue). The model is now equipped to estimate percentage changes in personal tax revenue resulting from changes in the personal tax structure.

5. Evaluation of Louisiana Fiscal Policy

One popular way to measure the equity of a tax is to calculate the average taxes paid per level of income. For the income tax, this measure makes sense. However, attempts to measure the progressivity of other taxes on the basis of income might lead to misleading results. Take, for example, the property tax. Average property taxes paid by low income earners is extremely variable. This group would include a retiree earning only Social Security income who has paid off a valuable house. This group could also include low income earners who have inherited a valuable house or low income earners who simply live in an area that rises in relative property value. The issue is further complicated by the fact that roughly 30% of adults in Louisiana do not own their home and, therefore, do not explicitly incur a property tax bill. Higher-income earners, however, fairly consistently own their homes and live in higher-valued homes. Because of the variability in average property taxes as a function of income, measurements of property tax progressivity can result in a significant margin of error. Regardless, using taxes paid by income to measure progressivity gives a starting point for evaluating the equity of Louisiana's personal tax structure.

Figure 6 shows the model's measurement of progressivity of Louisiana's personal income, sales, and property taxes, as well as the total tax progressivity. As expected, the effective income tax rises with income. The sales tax progressivity declines with income, since wealthier individuals tend to save a larger portion of their income. The shape of the property tax progressivity can be explained by low-income earners having a low home-ownership rate and middle income earners spending a relatively large portion of their income on housing, and declining as income rises. The total personal tax burden relative to income is high for low income earners and remains reasonably flat for middle to high income earners.

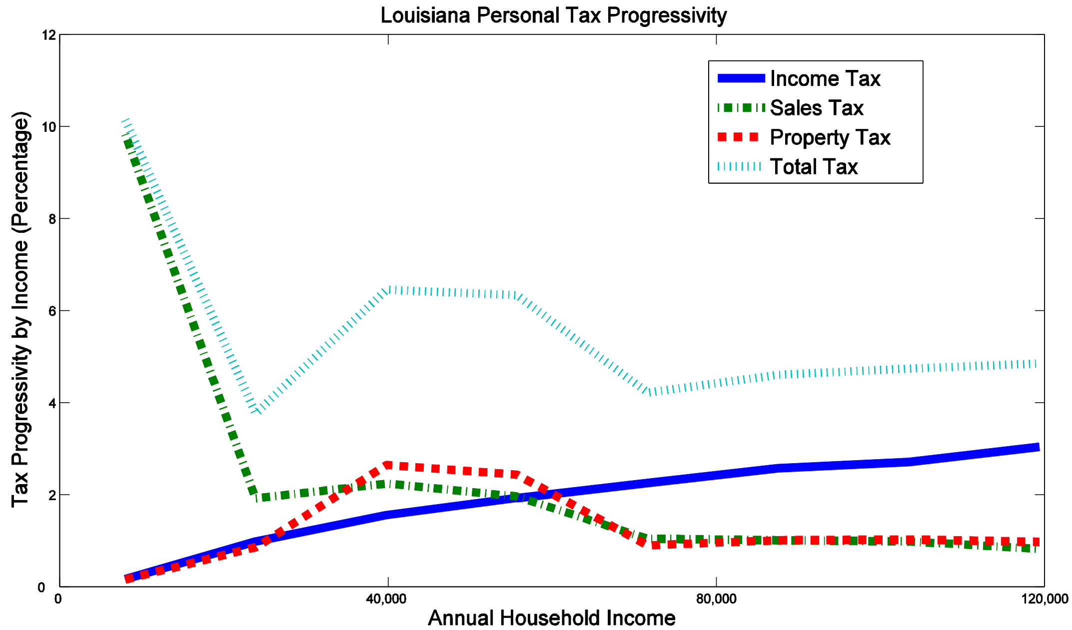

Figure 6: Louisiana Personal Tax Progressivity

6. Louisiana Fiscal Policy Alternatives

Because the model accounts for individuals' behavior endogenously, it can evaluate counterfactual experiments in a way that satisfies the Lucas Critique. This section presents the results of specific policy experiments. By computing the model with different policy experiments, we can not only quantify the effects of tax changes, but also learn about intricate behavioral features that result from the Louisiana personal tax structure. The first policy experiment involves eliminating the federal income tax deduction and determining the amount by which income tax rates could decline uniformly while keeping income tax revenue unchanged. The second policy experiment involves determining how much the sales tax rate could decline by incrementally increasing the percentage of services included in the sales tax base.

Eliminating the Federal Income Tax Deduction and Reducing Income Tax Rates

Consider first the policy experiment where the federal income tax deduction is eliminated, and the income tax rates are reduced uniformly. In other words, the relevant question is: If the federal tax deduction is eliminated, by how much can we reduce each of the individual income tax rates in a way that keeps income tax revenue equal? The simulated results suggests that the income tax rates could fall by 0.6 percentage points so that the rates reported in Table 1 would change to 1.4%, 3.4%, and 5.4%, respectively. Figure 7 shows how the model predicts the progressivity of the income tax would change. The model suggest that the policy change would increase the progressivity for most of the income distribution.

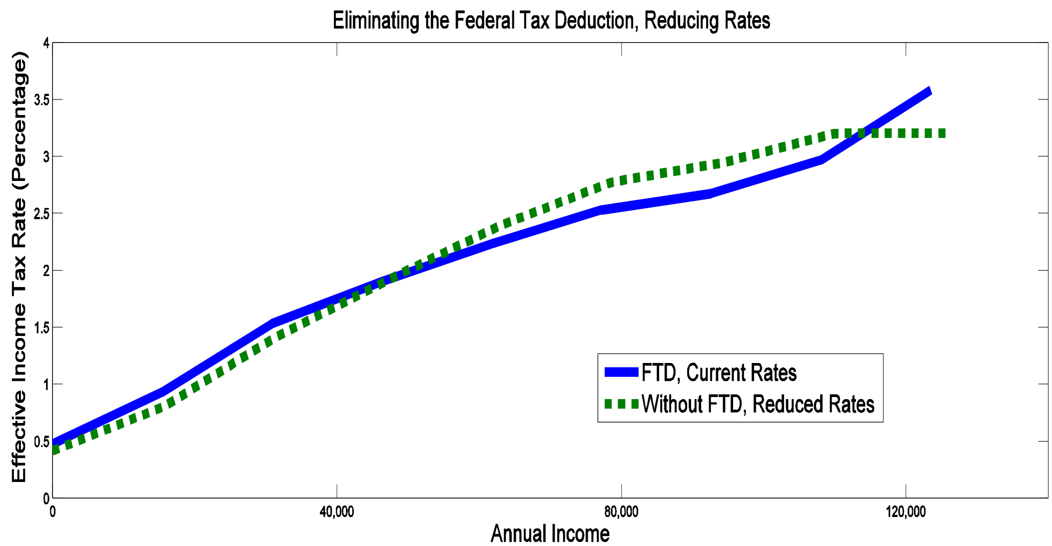

Figure 7: Change in Income Tax Progressivity

While the policy experiment kept the income tax revenue constant, other tax revenues did not remain constant. For example, sales tax revenues from personal purchases would fall 2.44%. The property tax revenue also falls by 4.75%. In order to determine why these tax revenues fall, we must consider what features of the distribution and the Louisiana tax code cause a change in behavior following this change in the tax structure.

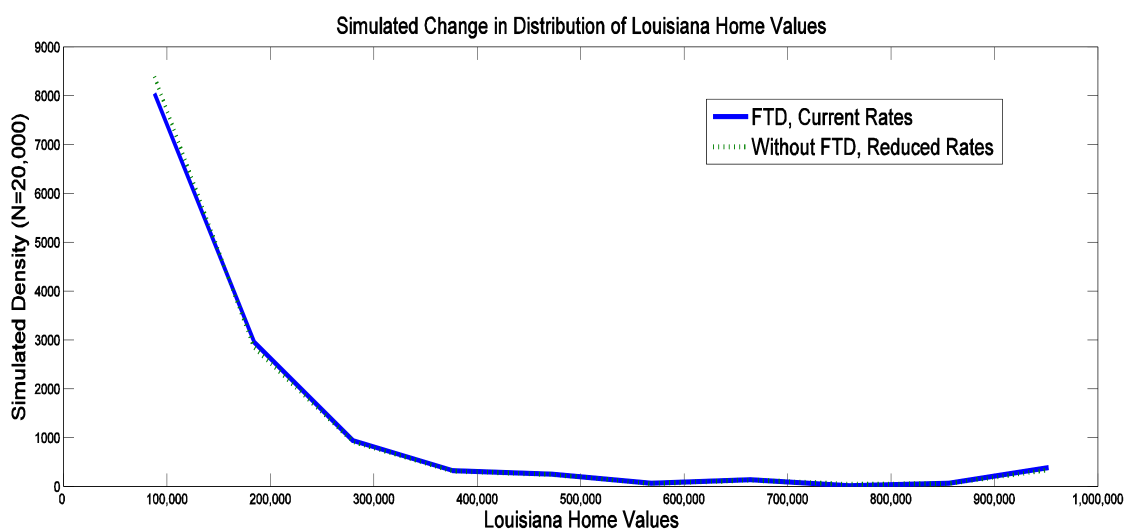

Figure 8: Change in the Distribution of Home Values

A key statistic in determining the cause of the decline in property and sales tax revenue is the home ownership rate. After the policy change, home ownership increases by 0.7 percentage points. Most of the increase in home owners are low income individuals benefitting from the increase in the progressivity of the new income tax schedule. As shown in Figure 3, home ownership is particularly sensitive to income changes at low to middle income categories. Further, because these individuals can now afford to own a home, many substitute towards housing consumption and away from non-housing consumption. This can explain the decline in sales tax revenue. Why does the property tax revenue decline?

The key feature of the tax system accounting for the decline in property tax revenue is the homestead exemption. After the change in the tax system, the number of homes below $150,000 rises by 4.4%, while total homes between $150,000 and $300,000 decrease by 4.3%, and total homes greater than $300,000 decrease by 4.0%. This is caused by an increase in low-income households purchasing low-priced homes, as well as a decline in housing consumption at the middle and high end of the distribution. The leftward shift in the distribution of home values depicted in Figure 8, increases the portion of the property tax base that is excluded from taxation by the $75,000 homestead exemption. Hence, the property tax revenue declines.

Inclusion of services in sales tax base and reduction of sales tax rate

Another policy consideration for Louisiana involves expanding the sales tax base to include services. Including services in the sales tax base would increase sales tax revenue. Accordingly, the object of the policy exercise in this section is to determine how much the state sales tax rate can be reduced to offset revenues generated by an increase in the sales tax base.

The model assumed that individuals enjoyed the benefits of a composite good, which was comprised of a housing good and a non-housing basket of goods. Therefore, individuals were implicitly consuming all non-housing goods in constant ratios, i.e., as perfect complements. Since the price elasticity of substitution of perfect complements is zero, the policy experiment reduces to an algebraic exercise described in the Appendix. The results of this exercise are shown in Figure 9. The curve shows what the state personal sales tax rate could be if the sales tax base was increased to include the corresponding percentage of services. For example, if the state decided to include 40% of all services in the sales tax base, the sales tax rate could be reduced to approximately 1.5%.

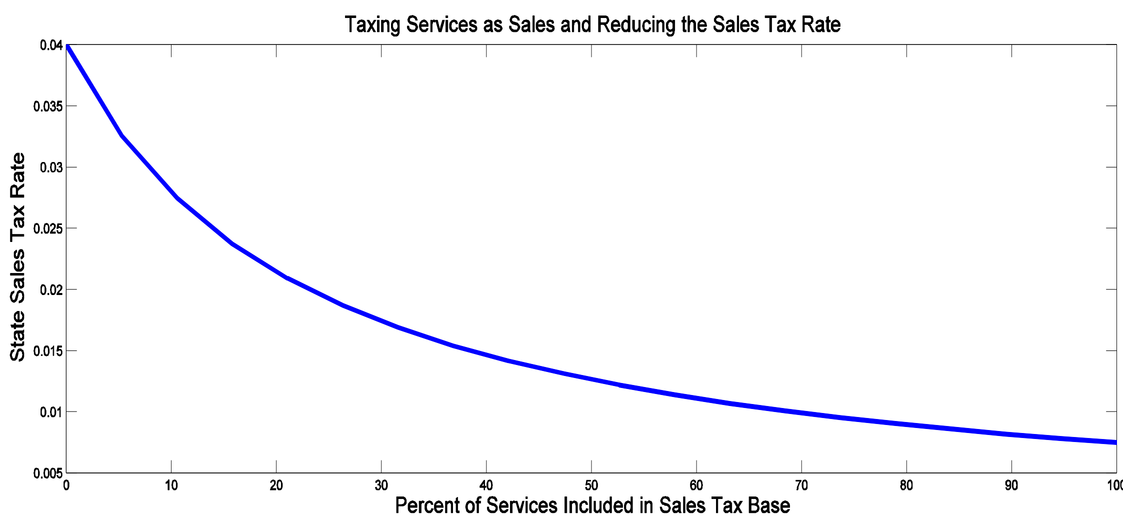

Figure 9: Tradeoff between the Sales Tax Rate and Total Services Taxed

7. Conclusion

This paper presents a state-of-the-art structural simulation model capable of evaluating Louisiana tax policy. The model focuses on evaluating the effects of changes in personal taxes, including income, property, and sales taxes. Moments of the simulated data are remarkably close to the actual Louisiana data, showing the model's usefulness in evaluating changes in tax policy.

After the model was carefully calibrated to the Louisiana economy, tax policy alternatives were evaluated. First, the model evaluated the effects of simultaneously eliminating the federal tax deduction and uniformly reducing the rates on each income tax bracket. The results of the model suggested that the federal tax deduction could be eliminated and each tax rate could be reduced by 0.6 percentage points to keep income tax revenue constant. The change in policy would also slightly increase the overall progressivity of the tax and slightly increase home ownership. However, the model also found that such a policy would indirectly cause a reduction in sales tax and property tax revenue.

A second policy experiment considered reducing tradeoff between including services into the tax base and reducing the sales tax rate. Because of the assumptions of the simulation model, this amounted to solving an algebraic problem described in the Appendix. Changes in the sales tax base and corresponding changes in the sales tax rate had no indirect consequences, since goods and services were assumed to be consumed in constant ratios.

Structural economic modeling is a growing trend in policy evaluation at the federal level, and the model presented in this paper provides the framework for tax policy evaluation at state and local levels. While the model evaluated a narrow set of policy alternatives, the full breadth of the model's capability remains to be explored.

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Appendix

This appendix describes in detail the algebraic relationship between the sales tax base and the sales tax rate that maintain surplus sales tax revenue at zero. Current estimates suggest that the total non-housing consumption subjected to the Louisiana sales tax base (goods, generally) is 18.75%. In other words, out of every dollar spent on something other than housing, 18.75 cents are spent on taxable goods. This suggests that 81.25% of non-housing consumption is spent on services.

The algebraic exercise can be understood as follows. Let *b* be the percentage of total goods and services that is taxed (i.e., *b* measures the sales tax base). Let *g* be the percentage of goods and services that is goods, and let *s* be the percentage of goods and services that is services. If only goods are taxed, as we currently have in Louisiana, then *b=g*. Let α be the percentage of services under consideration for taxation. Finally, let *t* be the sales tax rate. Then, if *C* is the total amount of goods and services consumed (recall, goods and services will be in constant ratios), total sales tax revenue *R* can be calculated as follows:

$$tbC = t(g + \alpha s)C = R$$

Currently, the state sales tax rate *t* is 0.04 and the percentage of consumption that is goods *g* is 0.1875. Therefore, the algebraic exercise reduces to varying the value of α between zero and one and finding the value of *t* that keeps $t(g + \alpha s)$ equal to the initial amount. This implies solving the following equation for *t*:

$$t\big(.1875 + \ \alpha(1 - .1875)\big) = \ 0.04(.1875)$$

This is exactly the relationship shown in Figure 9.