

Hi Jiayi

Here is what we would like to do. Recall there are 3 sets of tax rates we want, and that all show up in the master excel file you are producing. We want versions of that excel file for each year 2005, 2006, 10, 11, 15, 16. We also want those files to include local sales taxes in addition to state ones. Finally, Johannes says it would be slightly more convenient if your code was in Julia instead of R (if that isn't too hard). The 3 sets of tax rates are:

1. Standard sales tax rates
2. Tax rates on food at home
3. Tax rates on services and excise-taxable goods

## 0.1 Standard sales tax rates

The first set of rates are available from the tax foundation. In the zip file I sent they are in this folder:

C:\Users\IRJHH01\Downloads\consumption\_taxes (1).zip\consumption\_taxes\Sales taxes on goods\Raw

There are state tax rates and local tax rates for 2010 and 2011 and for 2015 and 2016

For 2005 and 2006 there are only state tax rates.

Let's assume that the local tax rates in 2005 and 2006 are equal to the local tax rates for 2009.

The standard sales tax rate should be sum of the state and the local tax rate.

## 0.2 Tax rates on food at home

The second set of rates for food at home are from the Book of States.

The general source is

<https://issuu.com/csg.publications/stacks/46495f12f95847e6935d331969ed650a>

The 2015 version is here:

<https://issuu.com/csg.publications/docs/bos2015>

In 2015 the information is in Table 7.11. In other years, the table numbers are different.

Could you please save these tables as excel files for each of the years 05, 06, 10, 11, 15, 16

Perhaps you can find them already as excel files somewhere. If you can't find them as excel, you can print the relevant pages to screen, and then use imagetoexcel <https://imagetoexcel.com/> or something similar to convert the jpeg's to excel files.

We are only interested in the food at home numbers.

We will assume that if food at home is taxed at the state level, then local taxes also apply to food at home.

The tax rates in the Book of States generally do NOT include local taxes.  
 So the tax rates on food should be the sum of the food tax rate from the book of states plus the local tax rate from the Tax foundation  
 Please check that for one year (say 2015) that the standard state tax rates in the book of states match up with the state tax rates (excluding local taxes) from the tax foundation.

### 0.3 Tax rates on services

The third set of rates are those on services and excise taxable goods.  
 Those we take from the services2007\_clean.xlsx file that is from the federation of tax administrators

<https://www.taxadmin.org/sales-taxation-of-services>

and from my color coded excel file that maps these to CEX spending components.

I am cleaning up and better documenting my excel file – I will send that later today.

My excel file will report, for each broad component of the CEX, the shares of spending that are taxable at different rates, with those rates either being the standard state tax rate, or the rate corresponding to a particular line item in the services2007\_clean.xlsx file (with those indexed as JFXX)

There are two things we need to do to refine our measurement here.

The first is that we want tax rates that vary over time. We only have service tax rates for 2007. The second is that we want to include local tax rates.

Here is what we should do.

1. Take the standard state sales tax rates on goods (from above, excluding local taxes) for state  $s$  in year  $t$  – call those  $\tau_{s,t}^g$ . Every time we read in a rate for some service  $j$  from services2007\_clean.xlsx assume that

$$\tau_{j,s,t} = JF_{j,s,2007} * \frac{\tau_{s,t}^g}{\tau_{s,2007}^g}$$

In words, we are assuming that tax rates on services evolve in sync with tax rates on goods.

2. Add local taxes  $\tau_{s,t}^l$  if the tax rate is positive

$$\tau_{j,s,t} = JF_{j,s,2007} * \frac{\tau_{s,t}^g}{\tau_{s,2007}^g} + \tau_{s,t}^l I_{\{JF_{j,s,2007} > 0\}}$$

One last comment on services. Some of the CEX items are excise taxable. My color coded excel file gives the SALES tax rates that apply to those items on top of the excise taxes (we have the excise tax rates somewhere else).