Fiscal Policy Shocks and Real Exchange Rates

David Parsley[†]
Owen Graduate School of Management
Vanderbilt University

Shang-Jin Wei[‡]
Colombia Business School
Colombia University

September 2014

Abstract

This study employs a novel approach to identify exogenous fiscal shocks, enabling us to provide evidence that exogenous increases in government spending cause real exchange rate appreciations. By focusing on intra-U.S. real exchange rates and exogenous shocks to state-level federal fiscal expenditures, we avoid several econometric issues (e.g., endogenous monetary policy, and Ricardian equivalence) which plague studies using observational data to study the effects of fiscal shocks. IV results differ from OLS and suggest that a one standard deviation exogenous fiscal stimulus at home produces a real exchange rate appreciation of about 3.3 percent. Virtually identical results hold for an exogenous fiscal contraction in the "foreign" state. These empirical results are consistent with simple neo-classical and Keynesian theory.

Keywords: exogenous, government spending, causal effects
JEL Classifications: F32; F31; E62; F41; C32

[†]Parsley acknowledges financial support from the Financial Markets Research Center at Vanderbilt University.

I. Introduction

One of the most important variables in open economy macroeconomic models is the real exchange rate, defined as the common currency relative price level between two locations. In a frictionless world, price levels might vary but this relative price would be constant and equal to one, i.e., purchasing power parity would hold. In fact, it is well known that real exchange rates often differ from one, and display little (or at best a very slow) tendency to adjust toward parity over time. More strikingly, real exchange rates are often found to be disconnected from fundamental economic influences altogether. Given the important role prices play in allocating real resources, these observations challenge conventional wisdom and have been the focus of a large empirical literature in international finance (see e.g., Obstfeld and Rogoff, 2001).

This study focuses on one important fundamental, namely unanticipated government spending. From a theory perspective, simple Neo-Classical as well as Keynesian models both predict real exchange rate appreciation in response to a fiscal stimulus.[1] However, as with many macroeconomic relationships, the existing empirical evidence is mixed; some studies find real exchange rate appreciation following positive fiscal shocks (e.g., Galstyan and Lane, 2009; and Ricci et al., 2013), while other studies (e.g., Enders, Muller, and Scholl, 2011; Kim and Roubini, 2008; Monacelli and Perotti, 2010; and Ravn, Schmitt-Grohe and Uribe, 2012) document statistically significant *depreciation* subsequent to fiscal stimulus.

We take the theoretical consensus as our starting point and focus on potential empirical and econometric resolutions to this puzzle. We suspect that the contradictory empirical findings stem both from a failure to identify truly exogenous fiscal shocks, and from the impossibility of maintaining the necessary ceteris paribus assumption, when using observational data. In particular, important influences, especially monetary policy, are not held constant in observational data – a fact that severely constrains the usefulness of such analyses, e.g., to make predictions, or to infer causality from the data. That is, since fiscal policy, monetary policy, and the real exchange rate, respond to developments in the economy, i.e., are endogenous, tracing cause and effect poses significant challenges to

[1] There is not complete consensus however, see e.g., Obstfeld and Rogoff, 1995, or Ravn, et al., 2012.

standard approaches. The aim of this paper is to provide an estimate of the response of real exchange rates to exogenous fiscal policy shocks. We study a set of natural experiments, each of which resulted in a redistribution of federal spending among U.S. states.

Our estimations are facilitated by employing an instrument for exogenous fiscal shocks, which enables us to cleanly estimate the real exchange rate response to changes in government spending. The fiscal shocks we study are changes in federal spending at the state level, hence there is no corresponding change in future tax or budgetary implications. Moreover, the fiscal policy instrument and empirical tests are conducted within the United States on a state-by-state level, i.e., in a setting where independent monetary policy is not possible. Specifically, following Cohen, Coval, and Malloy (2011), we instrument exogenous changes in government spending at the state level using changes in chairmanship of 'important' congressional committees. Cohen, et al. (2011) show that over the last 40 years, virtually every state has had a Senator or Congressman ascend to (and descend from), the chair of an important U.S. Congressional committee. They also demonstrate that the states with ascending (descending) chairs receive positive (negative) shocks to federal-state transfers. Importantly, these chairmanship shocks are essentially random events which change the flow of U.S. federal spending from one state to another.

To operationalize our empirical tests we construct U.S. state-level real exchange rates as the ratio of state-level Consumer Price Indexes (CPIs). However, since the Bureau of Labor Statistics (BLS) does not compute CPIs at the U.S. state level, we build these from an underlying sample of more than three million individual price observations using raw price data compiled by the American Chamber of Commerce Research Association (ACCRA).[2] Various authors have used subsets of the ACCRA data, including Parsley and Wei, (1996), but for this study we digitized the entire data set from its inception in 1968, and computed state price indexes using the BLS methodology. Despite covering only 83 products and services from six major final goods and services categories, we find that simple averages of state level price indexes track the overall U.S. CPI relatively well. Overall, our sample covers

[2] Information about the data is available online at http://www.coli.org/.

forty-four years (1968-2011) for more than one thousand bilateral intra-national U.S. real exchange rates.

It is useful to begin by reviewing the predictions of a standard neoclassical model where the intuition is perhaps more transparent than in other (e.g., DSGE) more complicated models. The standard New Keynesian model, e.g., Gali and Monacelli (2008) yields similar real exchange rate predictions. Our discussion follows Froot and Rogoff (1991) who point out that the key assumption driving the model's real exchange rate prediction is that a larger fraction of government spending falls on local nontradables (N) than does private spending.[3] In this small country setting, the world price of tradables (T) taken as a given, and an unanticipated increase in government spending falling predominantly on nontradables will raise the relative price ratio $\left(\frac{P_N}{P_T}\right)$, and hence the overall domestic price level (P).

Using the standard definition of the real exchange rate (Q) as the relative price of foreign (indexed by *j*) goods to home (*i*) goods expressed in a common currency, i.e., $Q = \frac{E_{ij}P_j}{P_i}$, where E_{ij} is the nominal exchange rate expressed as domestic currency (i) per foreign currency (*j*), and $P_i$and P_j are domestic and foreign price levels respectively. Note that in an intra-national context E_{ij} is just equal to 1. By definition, a rise in P_i lowers Q, i,e., the relative price of foreign goods declines, resulting in a domestic currency appreciation.

More formally, the model assumes a representative agent with utility function given by

$$U = \sum_{t=0}^{\infty} \frac{\beta^t}{1-\sigma} (C_{Nt}^{\alpha} C_{Tt}^{1-\alpha})^{1-\sigma}, \qquad (1)$$

where C_{Nt} is consumption of the nontraded good measured in terms of the traded good at time *t*, and, C_{Tt} is consumption of the traded good at time *t*. The representative agent maximizes (1) subject to the budget constraint

$$W_{t+1} = r\left(W_t + Y_{Tt} + \frac{P_{Nt}}{P_{Tt}} Y_{Nt} - C_{Tt} - \frac{P_{Nt}}{P_{Tt}} C_{Nt} - Y_T\right). \qquad (2)$$

[3] Implicitly, government spending is viewed as consumption; treating government spending as productivity enhancing investment reverses standard model predictions. Hence, this could be a possible (if implausible) resolution of the puzzling empirical findings. In our empirical exercise we split federal government spending at the state level into either consumption or investment, based on observed proportions of state-level spending, to check for possible differential effects.

In equation (2), W denotes wealth (measured in units of the tradable good), $\frac{P_N}{P_T}$ is the relative price of nontradables in terms of traded goods, τ_t is lump sum taxes at time t (which are assumed to satisfy the government's budget constraint, i.e., $\tau_t = \frac{P_{Nt}}{P_{Tt}} G_t$), and Y_T and Y_N denote domestic production of tradables and non-tradables, respectively. Maximizing (1) subject to (2), and imposing the equilibrium condition that total nontradable output each period (Y_{Nt}) is consumed either by the private sector (C_{Nt}) or government (G_t), yields

$$\frac{C_{Tt+1}}{C_{Tt}} = (r\beta)^{(\sigma+\alpha-\alpha\sigma)^{-1}} \left(\frac{Y_{Nt}-G_t}{Y_{Nt+1}-G_{t+1}}\right)^{(\alpha-\alpha\sigma)/(\sigma+\alpha-\alpha\sigma)} \qquad (3)$$

and,

$$\frac{P_{Nt}}{P_{Tt}} = \frac{\alpha C_{Tt}}{(1-\alpha)(Y_{Nt}-G_t)} \qquad (4)$$

By inspection of (3) and (4), a permanent rise in government spending permanently raises the relative price ratio $\left(\frac{P_N}{P_T}\right)$, and hence appreciates the real exchange rate. Similar logic applies to an unexpected increase in foreign government spending, with an opposite effect on the real exchange rate. This result holds for exogenous permanent increases in G, but also holds qualitatively for the case of temporary increases in G, and in the case where nontradable output Y_{Nt} increases in response to the increase in P_{Nt}.

We next turn to a brief review of related research in Section II. Section III describes the data on committee changes, as well as the construction of U.S. intra-national real exchange rates from underlying price observations. Section IV presents our results, including some robustness exercises, and finally, Section V concludes.

II. Review of Existing Evidence

The problem of measuring exogenous fiscal policy and maintaining ceteris paribus assumptions is not unique to studies of the real exchange rate. Indeed, these problems loom large in estimating a government spending multipliers and were central in the recent debates over policy responses during the global financial crisis (see Ramey, 2011 for a recent survey). For example, the International Monetary Fund, in its 2012 *World Economic Outlook* (see especially p.41-43), reports that systematically low estimates of fiscal multipliers contributed to unexpectedly sluggish European recovery by encouraging overly aggressive fiscal consolidation among European governments. The particular ceteris paribus failures the IMF cites include a failure to account for synchronized fiscal consolidation, cross-country economic slack, and the zero bound constraint on monetary policy. More recently, in their critique of standard methods of estimating fiscal multipliers, Nakamura and Steinsson (2014), take an intra-U.S. approach to estimate fiscal multipliers because monetary policy is constant within the United States. They follow other authors (e.g., Hooker and Knetter, 1997) in instrumenting exogenous fiscal shocks using differences in federal military spending at the state level; the identifying assumption being that the United States does not embark on military buildups because states receiving larger shares of military spending are doing systematically worse than other states.

The two common empirical methodologies used to estimate of the effects of fiscal shocks are panel methods and vector autoregressive models (VARs). Using panel methods, e.g., Galstyan and Lane, 2009, and Ricci et al., 2013 find that real exchange rates appreciate in response to fiscal stimulus shocks. Apparently, VARs are more likely to find the opposite. As is well known, the 'exogenous' shocks that are produced by VAR models rely on a number of strong assumptions leaving their 'surprising' findings open to criticism based on shortcomings of the method, e.g., omitted variables and 'incredible' identifying assumptions. Nonetheless, absent experimental evidence VARs provide one method of identifying exogenous fiscal policy shocks.

Kim and Roubini (2008) focus on the United States experience in the post Bretton-Woods period of flexible exchange rates and explain their contradictory evidence (real exchange rate depreciation) by citing an (exogenous) nominal exchange rate depreciation. In a similar setting, Monacelli and Perotti (2010), also using VAR methods, examine the U.S. and three other OECD economies over a time period similar to Kim and Roubini. They also confirm that real exchange rates depreciated in response to shocks to expansionary fiscal policy shocks but conclude the likely reason is related to the observed positive response of private consumption to the expansionary fiscal shock.

As a way to economically incorporate more data, and hence provide a richer VAR structure, Enders, Muller, and Scholl (2011) model the U.S. relative to an aggregate of industrialized countries consisting of the euro-area, Japan, Canada, and the U.K., and they derive and impose sign restrictions over parts of the impulse-responses of selected variables and over certain forecast periods following the shock while leaving real exchange rate dynamics unrestricted. Interestingly, their results confirm the puzzling behavior of the real exchange rate in response to exogenous expansions to fiscal policy. Enders et al. conclude by noting that some calibrated real business cycle models yield inconclusive predictions; hence the results tend to support some calibrations over others.

Finally, Ravn, Schmitt-Grohe, and Uribe (2012) impose some additional structure on the VAR by imposing the identifying assumption that only government spending shocks themselves can impact government spending within a quarter. They estimate their model using data from the U.K, Canada, Australia, and the United States, again over the post Bretton-Woods era, and they also find that the real exchange rate depreciated in response to positive government spending shocks. Confronted with this evidence these authors propose a model based on 'deep-habits' which leads firms to lower their markups following a positive fiscal shock, which translates into the observed real depreciation. The model also predicts the decline in markups induces households to reduce leisure subsequent to positive fiscal shocks, contrary to a simple neoclassical model (e.g., Cohen, Coval, and Malloy (2011). Interestingly, their model does not rely on a traded/nontraded distinction since all goods are traded. The authors note that while the model does well on several dimensions, it cannot explain the persistence of the real exchange rate.

III. Data: Exogenous Fiscal Policy Shocks and state-level real exchange rates

Of course, modifying the theory is only one approach to resolving the puzzle. Given the theoretical consensus as a starting point, perhaps a more obvious approach is to consider possible empirical resolutions. These include limitations of the VAR approach in addition to more general critiques of using observational data with its inherent limitation to statements about correlation.

Probably the most important critiques relevant to this puzzle are related to the ceteris paribus assumption. Monetary policy, in particular, is likely to be an important omitted variable since it is plausible that monetary policy can amplify, mitigate, or even negate fiscal policy effects. Moreover, post-Bretton-Woods U.S. history has had episodes of 'agreement' in fiscal and monetary policy stances, and, in other time periods these two important macroeconomic policies have been opposed. The real exchange rate response is likely to be very different in periods when fiscal policy and monetary policy are supportive than when they are in opposition.

Additionally, the importance of the ceteris paribus assumption is not limited to domestic monetary policy. Reverse causality is also a possibility. Indeed the list of confounding variables is large since the real exchange rate is potentially affected by many factors, including fiscal and monetary policies abroad, shocks to productivity, political and legislative events, and disasters. Given that the impacts of each of these will also vary depending on whether they were anticipated, it seems reasonable to question whether they can be adequately summarized by the time series autocorrelation structure of a few domestic and foreign variables, as implied by the structure of VARs. Hence, it seems very likely that the puzzling fiscal policy/real exchange rate findings may well be due to inadequately controlling for variables that mask the causal effects of fiscal policy.

In this study we focus on exogenous changes in federal spending at the state level. The source of exogenous shocks to federal spending is changes in chairmanship of important congressional committees. Cohen, Coval, and Malloy (2011) employ this instrument to study the impact of fiscal policy on investment by firms.[4] These authors show that changes in chairmanship are a good predictor of economically significant changes in flows of federal spending at the state level.[5] For example, federal earmark spending increases 40-50

---

[4] Following Edwards and Stewart (2006), Cohen, Coval and Malloy (2011) focus on ten committees in the U.S. Senate, and ten in the U.S. House of Representatives. The Senate committees are: Finance, Veterans Affairs, Appropriations, Rules, Armed Services, Foreign Relations, Intelligence, Judiciary, Budget, and Commerce. House of Representatives committees are: Ways and Means, Appropriations, Energy and Commerce, Rules, International Relations, Armed Services, Intelligence, Judiciary, Homeland Security, and, Transportation and Infrastructure. For this study, the data on congressional committees from Charles Stewart's website: http://web.mit.edu/17.251/www/data_page.html.

[5] We construct seniority shocks exactly as in Cohen, et al. (2011); specifically we focus on his "ShockTop1ChairOnly" measure of changes in important congressional committee chairs. This dummy equals

percent, federal-state transfers increase about 10%, and government contracts increase 24 percent, in the year following an appointment. Subsequent to a change in chair, federal funds get redirected from the former chairman's state to the new chairman's state, i.e., no new federal government funds, or tax liabilities are created. This implies, for example that Ricardian Equivalence need not apply to this setting.

There are several additional aspects of this instrument contributing to its suitability. First, changes in chairmanship are determined almost entirely by seniority; changes occur whenever the incumbent retires, dies, or fails to be re-elected, or if the party controlling that particular chamber (House/Senate) switches. Moreover, these events are essentially unrelated to conditions in the ascending chairman's state, and most ascending Senators are not even up for reelection when they become Chair. Cohen et al. (2011), conclude that "thus, a congressman's ascension to a powerful committee chair creates a positive shock to his or her state's share of federal funds that is virtually independent of the state's economic conditions."

Second, as reported in Cohen et al. (2011), these seniority shocks occur "in large part, in different states (and years). Thus, each chamber's shocks can be seen as independent testing samples for the effect of these government spending shocks". Appendix Table 2 shows that all but two states (Colorado and Nebraska) have had one of their senators or representatives chairing a powerful committee. In terms of Senators, West Virginia and Arizona lead the pack with 9 and 7 ascensions, respectively, with the median being 2.5. In the House of Representatives, California is the outlier with 16 ascensions, but even here, the median is only 3.5 ascensions.

Also, unlike national fiscal policy, these shocks represent a true spending shock without implications for future tax changes, i.e., when committees change chairs, only the location of the spending changes; future federal tax implications remain unchanged. Finally, since monetary policy does not independently and differentially affect interest rates and credit conditions at the state level, we can rule out monetary policy as a confounding omitted

1 if a senator or congressman of a given state first becomes chairman of an important congressional committee. Cohen, et al. (2011) construct other, more inclusive, shock dummies (e.g., including the ranking minority member), but find their results are consistent (though frequently weaker) across different dummy variable definitions.

variable. Hence, we believe these features make a compelling case that we are able to focus on truly exogenous fiscal shocks, as well as being faithful to the ceteris paribus assumption necessary for econometric interpretation of the results.

We now turn to a description of the price data from which we construct state-level real exchange rates. ACCRA price data is becoming fairly widely used across a variety of specializations. Representative studies for example, come from Macroeconomics, e.g., Nakamura and Steinsson (2014); Health economics, e.g., Choua, Grossman and Saffera (2004); regional economics, e.g., Basker (2005); legal research e.g., Knoll and Griffith (2003); and international finance, e.g., Parsley and Wei (1996). Here we provide only an abbreviated description of the data since this is not a new research data base.

The Council for Community and Economic Research (C2ER) is the umbrella organization that is responsible for the cost of living data and their signature *Cost of Living Index* publication (hereafter, *Index*) as well as several other data products. According to the C2ER website the raw price data can be grouped into six major final goods and services categories: grocery items, housing, utilities, transportation, health care, and miscellaneous goods and services.[6] Each quarterly issue of the *Index* contains comparative average price data for a sample of urban areas, and a cost of living index computed from these data by the association. In this study we use only the raw price data and not the area cost of living index C2ER produces from the raw price data.

Briefly, since 1968, local Chamber of Commerce staff or volunteers for each Chamber has collected individual goods and services price data according to instructions provided by C2ER, which then checks the data for errors. The voluntary nature of the data collection results in a varying sample of cities included in each issue of the *Index*. In the first issue of the *Index* (1968 Q1) there were 127 cities and 44 items priced. The number of cities has increased to 314 (and 60 items) in the final quarter of our sample (2011 Q4). This changing sample of cities has the ultimate implication that, over the 176 quarters of the sample, there were over 900 distinct cities sampled. The *Index* is apparently aimed at cross-section comparisons at a point in time.

---

[6] http://www.coli.org/Method.asp.

The goods and services reported in the *Index*, however, are much less variable, although there have been additions to and subtractions from the list as the relevance, and/or availability, of products and services (gauged by C2ER) has changed. Some goods or services have been replaced with ones more up to date as availability and tastes have changed. For example, there have been numerous packaging changes, e.g., in 1968 the 'soft drink' price referred to an 8 pack, 16oz., Coca-Cola. Today a soft drink refers to a 2 liter bottle Coca-Cola. As another example of a change, the product 'Man's Denim Jeans', referred to: Levi's, 501s or 505s, rinsed or washed or bleached, size 28/30 to 34/36; however this changed to 'Dockers No Wrinkles khakis', size 28/30-34/36'. Names and descriptions of the goods and services appear in Appendix Table 1. One final major change to the *Index* began in 2007, namely, C2ER began reporting three quarters per year, with the fourth quarterly publication being simply the average of the previous three quarters.

All of the pre-1990 quarterly *Index* reports were scanned and then converted to useable data by a private data entry firm in India. The post 1990 data is available electronically from C2ER itself. All of the data were checked extensively for errors using outlier screens both cross-sectionally and in the time-series. For example, we started by checking for outliers of more than 100 percent of the median price across cities, order of magnitude price changes, and quarterly price reversals of 100 percent or more. Applying these checking procedures to the matrix structure of each quarterly data file (cities x items) helped identify the most common type of problem, i.e., those affecting many prices or cities simultaneously, e.g., due to skipping a city or price in the original data - resulting in all remaining data for that quarter being one column, or one row off. Orders of magnitude changes often occurred when the description of the good or service changed, e.g., from a 6-pack to a 4-pack. To be conservative, we coded a missing value each time the product description changed. Finally, each time an apparent error was found the original print documents were manually checked and if necessary, the electronic data corrected.

To compute state-level CPIs we weight the individual prices using the BLS expenditure weights. Figure 1 shows the overall grand mean inflation for each state plotted against the average U.S. inflation using data from the BLS. A regression of the state average inflation on the U.S. inflation yields a coefficient of 0.76 with a t-statistic of 11.74, and an adjusted R^2 of

0.77, confirming the visual correspondence in Figure 1. Figure 2 presents the data from a different perspective by plotting the time series of the average state-level inflation versus the overall U.S. CPI, by year. Again, the impression is that the simple state-level average tracks the BLS inflation series very well. A time-series regression of the state average inflation on the BLS inflation series yields a coefficient of 1.03 with a t-statistic of 11.91, and an adjusted R^2 of 0.78,

We also use federal-state expenditure data available from the U.S. Department of Census website http://www.census.gov/govs/state/. Since federal-state expenditure data is available only at an annual frequency, we conduct the analysis using annual real exchange rate changes. However, given that we start with more than 2.25 million quarterly price observations, this reduction in dimension is not overly restrictive, and leaves us with a panel (state-pairs x year) with over 30,000 observations for most of the analysis. After cleaning the raw data, we linearly interpolate the quarterly price data up to four quarters, and then aggregate to the state level using several different methods (using the average of all prices within a state, the median price, and the average price of the two most frequent cities) which result in qualitatively similar results. Throughout the rest of the paper we focus on annual state average price data, where the average is computed across all four quarters, using the two cities which appear most frequently in the *Index*. Table 1 lists the most frequently occurring two cities by state. Using this criterion results in four states lacking enough data to be included (Hawaii, New Hampshire, New Jersey, and Rhode Island); hence from the remaining 46 states, we construct 1035 (= 46x45/2) real exchange rates for the analysis. Tables 2 and 3 present some summary statistics for the available state CPI inflation data, and Figures 3 and 4 summarize the real exchange rate variability over the entire sample for all state-pairs.

In Table 2 we see that the number of states with CPI data increased steadily from a low of 30 in 1969, before rising to the 40's in the mid-1980s. We also note that inflation, based on the cross-state maximum and minimum columns, was not identical across states. Table 3 shows the cross-state variation in more detail. In particular, the northeast states of Connecticut (with 14 years), Maine, (19 years) Massachusetts (19 years), and Delaware (22 years) have the fewest number of inflation observations, while about half of the states have

40 or more years of inflation data. At first glance, the mean across all states and years, at about 4.5% seems relatively high, but can be understood by noting that the sample includes the high inflation years of the 1970s and early 1980s, and by recalling that the sample excludes some of the well-known items with notoriously declining prices, e.g., computers. In Figure 3, the mean change is 3.67 percent, with some state level bilateral real exchange rates exhibiting 4 times the variability of others. To put this in perspective, using the average annual changes from the April 2014 World Economic Outlook of all 'advanced countries' using the IMF country classification, for all years available in the data base; that number is 4.02 percent. Hence, despite having a constant nominal exchange rate, U.S. intra-national real exchange rates on average exhibit comparable variability to country level real exchange rates (though the dispersion is much smaller for the intra-U.S. data). Finally, Figure 4 shows that while many real exchange rate changes are consistent with mean reversion, there is substantial variation about the mean. Indeed, roughly 10 percent of intra-U.S. real exchange rates experienced sustained absolute appreciations or depreciations of 25 percent or more. Besides highlighting the heterogeneity of intra-national real exchange rate experience within the U.S., these facts are noteworthy given the absence of barriers to economic integration in the U.S., as well as a single currency.

IV. Results: Exogenous Fiscal Policy and the Real Exchange Rate

Recall from above that Q is the relative price of foreign goods, i.e., $Q = \frac{E_{ij}P_j}{P_i}$, where E_{ij} is the nominal exchange rate expressed as domestic currency (i) per foreign currency (j), and P_i, P_j are domestic and foreign price levels respectively. Intra-nationally, Q is the ratio of price levels between two locations (i, and j), i.e., $Q = \frac{P_j}{P_i}$. Thus, Q rises whenever foreign prices (P_j) rise or domestic prices (P_i) fall, signaling a home state (i) real exchange depreciation.

According to the simple neoclassical model outlined in equations (1)-(4), an unexpected increase in government spending (G) in country i raises the relative price ratio $\left(\frac{P_N}{P_T}\right)$ in country i, and hence appreciates the real exchange rate (i.e., Q falls). Similar logic applies to an unexpected increase in foreign government spending (i.e., in country *j*), with an opposite effect on the real exchange rate. As discussed in Froot and Rogoff (1991), this result holds for exogenous permanent increases in G, but also holds qualitatively for the case of temporary increases in G, as well as in the case where nontradable output Y_{Nt} increases in response to the increase in P_{Nt}.

Hence, the regression (in logs) we start with is:

$$\Delta q_{ij,t} = \alpha_{ij} + \beta_j \Delta g_{jt} + \beta_i \Delta g_{it} + \epsilon_{ij,t} \tag{5}$$

where $\Delta q_{ij,t}$ is the change in the log of the real exchange rate (at time t), Δg_{jt} is the shock to government spending in state *j*, Δg_{it} is the shock in state *i,* and fixed effects α_{ij} are included in all regressions; we subsequently add time fixed effects as well. Whenever there is a change in chair, both state *i* and state *j* record that change. In principle, there should be a symmetric, but opposite, effect on the real exchange rate, whereas in practice there may be a difference given sampling variation in the distribution of committee changes. For example, according to Appendix Table 2, some states experienced four or more ascensions/departures while other states, saw only one.

We begin by reporting ordinary least squares results. According to column 1 of Table 4, a state *i* ascension appreciates its real exchange rate by about 1.4%, while an ascension in state *j* depreciates (state *i*'s) real exchange rate by about 0.5%. The corresponding numbers from Froot and Rogoff' (1991) European sample were about 2%. Alternatively, a one standard deviation increase in government spending in state *i* yields a nearly 20% (=14.2*0.01403) real exchange rate appreciation, while a one standard deviation increase in government spending in state *j* depreciates (state *i*'s) real exchange rate by about 7.7% (=14.2*0.00541).

While the estimates are not equal and opposite, they are of the sign predicted by most theories, including the neoclassical model outlined above. In columns (2)-(4) we add other controls to the regression. Following Froot and Rogoff (1991) we add budget surpluses in each state as a percent of state GDP. Ignoring the fact that budget surpluses are less likely to be exogenous, they address what happens to the rest of state spending, outside of federal-state transfers. Froot and Rogoff note that if Ricardian equivalence fails, an increase in the surplus should lead to a decrease in total expenditure, i.e., the signs should be opposite those on government shocks. In column (2), just as was the case for Froot and Rogoff, the estimates on government surplus are small and statistically insignificant. We also add two more variables, per capita income growth and population growth, as additional controls for differential trends in productivity growth, as well as population growth which might have a direct bearing on federal-state expenditures.

The Balassa-Samuelson effect predicts that higher productivity growth in state *i* is associated with a real appreciation since wages and therefore prices rise in the nontradable sector. Similarly, higher productivity growth in sate *j* will depreciate (i.e., raise Q) the real exchange rate. The evidence strongly supports the Balassa-Samuelson effect. Indeed, the effects appear to be stronger than government spending shock, and are nearly symmetric. To the extent productivity shocks are adequately captured by per capita income growth, the table suggests that higher productivity in state *j* leads to a real exchange rate depreciation, while higher productivity growth in state *i* leads to a real exchange rate depreciation.

Similarly, we might expect higher population growth to contribute to rising prices via a demand effect, and perhaps rising federal transfers for those categories allocated on the basis of population; hence controlling for population growth seems prudent. The estimates for population growth are of the predicted signs and are statistically significant. More importantly, the coefficients on government spending shocks remain virtually the same, though in column (2) the coefficient on State *j* spending shock loses statistical significance. However, in column (3) we add time dummies to the OLS regression. This brings a few changes. First, the coefficient on State *i* spending shock regains statistical significance, but now, the coefficient on government budget surpluses are both statistically significant, but the signs are unexpected. This could be due to endogeneity of the budget surpluses. Other coefficient estimates and significance levels remain similar.

Next we present our Instrumental Variables (IV) estimates, repeating the three OLS regressions, and adding a final regression which adds four years of lags of the dependent variable. Test statistics for the IV regressions are given at the bottom of the table and support the IV specification and estimation. The endogeneity test null is that government spending is actually exogenous; this null hypothesis can be rejected in all regressions except for equation (7). The weak identification test, given as the Kleibergen-Paap rk Wald F statistic, easily rejects the null that the instruments are weakly correlated with the endogenous regressors. Finally, the under-identification test is given as the Kleibergen-Paap rk LM statistic. This test of instrument relevancy is also easily rejected in all cases.

In addition to these post-estimation tests, the IV estimates are smaller than the OLS estimates as expected if the OLS estimates are biased, and the impression that one immediately gets from columns (4) to (7) is the overall stability of the results. According to the IV results, the coefficients on fiscal shocks are statistically significant and nearly equal and opposite in sign, as expected. Only the coefficients on government budget surpluses continue to be perplexing, since when the coefficient is statistically significant, its sign is unexpected. The stability of the coefficient estimates for government spending shocks remains even when including four years of lags of the real exchange rate. Overall the results are consistent with standard neo-classical and Keynesian model predictions for the response of real exchange rates to fiscal shocks; namely, fiscal stimulus produces real exchange rate appreciation, though the size of the effect is smaller than those implied by the OLS estimates. In particular, a one percent fiscal stimulus produces roughly a quarter percent real exchange rate appreciation. Alternatively, a one standard deviation increase in government spending in state *i* results in a 3.3% (=14.2*0.00233) real exchange rate appreciation, while a one standard deviation increase in government spending in state *j* depreciates (state *i*'s) real exchange rate by an equivalent amount (3.25% =14.2*0.00229). Finally, to the extent real exchange rate appreciation lowers competitiveness our results provide one channel supporting the corporate downsizing findings in Cohen, Coval, and Malloy (2011).

Robustness and extensions

In Tables 5 and 6, we attempt to characterize the government spending shocks as either government investment or consumption. In principle, government investment might increase the productivity of both tradables and nontradables in a state which would tend to depress the price and depreciate the real exchange rate, i.e., opposite the prediction for government consumption expenditures. To operationalize our tests we use the actual fraction of state *i*'s government spending (i.e., excluding any federal spending) in year *t* that went to capital outlays as the benchmark for investment, and assume the same fraction of federal-state transfers is also investment. This is clearly a simplifying assumption and readers should bear this caveat in mind in interpreting the results. To be clear, in Table 6 the assumed fraction of federal-state transfers classified as government consumption, is simply 1 minus the fraction classified as state government investment. Results presented in Tables 5 and 6 are very similar to those in Table 4; hence there is no evidence of a differential effect of government consumption and government investment shocks on real exchange rates based on this investment/consumption characterization.

Next we ask whether these effects have diminished over time and/or whether they depend on time varying state-level economic conditions. According to Table 7, the response of the real exchange rate (for both ascending and departing state chairs) has declined over time, though the rate of decline is small. In fact, the average response for State *j* (given in Table 4) is only 15% below that in the first year of the sample (0.15 = 1 - .00285/.00334). Second, the interaction terms indicate that the response of real exchange rates to government spending shocks vary with economic conditions. In particular, when both income and population are growing, the real exchange rate response is magnified. These results echo the recent findings for fiscal multipliers where, e.g., they are estimated larger in slack conditions.

V. Conclusions

This purpose of this study is to provide an estimate of the response of real exchange rates to fiscal policy shocks. Despite there being reasonably widespread agreement from theory that the real exchange rate will appreciate following a fiscal stimulus, this prediction has been difficult to establish empirically. Challenges include identifying exogenous fiscal shocks as well as controlling for the multitude of factors affecting real exchange rates. In this study we address these challenges by using a unique set of shocks to leadership of U.S. congressional committees as an instrument for fiscal shocks. To examine the real exchange rate implications, we construct U.S. state-level price indexes from more than three million raw price observations spanning the period 1968-2011. Thus we estimate real exchange rate responses intra-nationally, where two of the biggest empirical challenges in this area of research, i.e., endogenous monetary policy responses, and Ricardian equivalence considerations are mitigated.

The use of committee leadership changes to instrument exogenous fiscal shocks was recently proposed by Cohen, Coval and Malloy (2011), who establish that leadership changes lead to significant changes in federal-state spending flows. Their study also finds that investment by private sector firms responds inversely to fiscal shocks. This study takes a macroeconomic perspective and concludes that exogenous fiscal stimulus causes real exchange rate appreciation. In contrast to several recent studies, our empirical findings are also consistent with standard neo-classical and Keynesian model predictions for the response of real exchange rates to fiscal shocks.

References

Basker, Emek, 2005. "Selling a cheaper mousetrap: Wal-mart's effect on retail prices", *Journal of Urban Economics*, 58(2), 203-229.

Choua, Shin-Yi, Michael Grossman, and Henry Saffera, 2004. "An economic analysis of adult obesity: results from the Behavioral Risk Factor Surveillance System", *Journal of Health Economics*, 23(3), 565-587.

Cohen, Coval, and Malloy. 2011. "Do Powerful Politicians Cause Corporate Downsizing?", *Journal of Political Economy, 119(6), 1015-1060.*

De Gregorio, Jose, Alberto Giovannini, and Holger C. Wolf 1994. "International evidence on tradables and nontradables inflation", *European Economic Review, 38(6) 1225-1244.*

Edwards, Keith, and Charles Stewart. 2006. "The value of committee assignments in congress since 1994", MIT working paper.

Froot, Kenneth, and Kenneth Rogoff. 1991. "The EMS, the EMU, and the transition to a common currency," *NBER Macroeconomics Annual 1991*, 6, 269-328.

Galí, J. and Monacelli, T. (2008). "Optimal monetary and fiscal policy in a currency union", *Journal of International Economics* 76(1): 116–132.

Galstyan, Vahagn and Philip R. Lane. 2009. "The Composition of Government Spending and the Real Exchange Rate," *Journal of Money, Credit and Banking*, 41(6), 1233-1249.

Hooker Mark, and Michael Knetter, 1997. "The Effects of Military Spending on Economic Activity: Evidence from State Procurement Spending", *Journal of Money, Credit, and Banking*, 29(3), 400-421.

International Monetary Fund. 2012. *World Economic Outlook.*

Jahyeong Koo, Keith R. Phillips and Fiona D. Sigalla. 2000. "Measuring regional cost of living", *Journal of Business & Economic Statistics*, 18(1), 127-136.

Knoll, Michael S., and Thomas Griffith. 2003. "Taxing sunny days: adjusting taxes for regional living costs and amenities", *Harvard Law Review*, 116(4), 987-1025.

Lane, Philip R. and Roberto Perotti. 2003. "The Importance of Composition of Fiscal Policy: Evidence from Different Exchange Rate Regimes," *Journal of Public Economics.* 87, 2253—2279.

Nakamura, Emi, and Jon Steinsson, 2014. "Fiscal stimulus in a monetary union: evidence from U.S. regions", *American Economic Review*, 104(3), 753-792.

Nakamura, Emi, and Jon Steinsson. 2014. "Fiscal Stimulus in a Monetary Union: Evidence from U.S. Regions", *American Economic Review*, 104(3), 753-792.

Obstfeld, Maurice, and Kenneth Rogoff, 1995. "Exchange Rate Dynamics Redux", *Journal of Political Economy*, 103(3), 624-660.

Obstfeld, Maurice, and Kenneth Rogoff, 2001. "The six major puzzles in international macroeconomics: is there a common cause?", *NBER Macroeconomics Annual 2000*, 15, 339-412.

Parsley, David, and Shang-Jin Wei, 1996. "Convergence to the law of one price without trade barriers or currency fluctuations, *The Quarterly Journal of Economics*, 111(4), 1211-1236.

Ramey, Valerie, 2011. "Can Government Purchases Stimulate the Economy?", Journal of Economic Literature, 49(3), 673-685.

Ricci, Luca, Milesi-Ferretti, Gian Maria, and Jaewoo Lee, 2013. "Real Exchange Rates and Fundamentals: a cross-country perspective*", Journal of Money, Credit and Banking*, 45(5), 845-865.

Figure 1

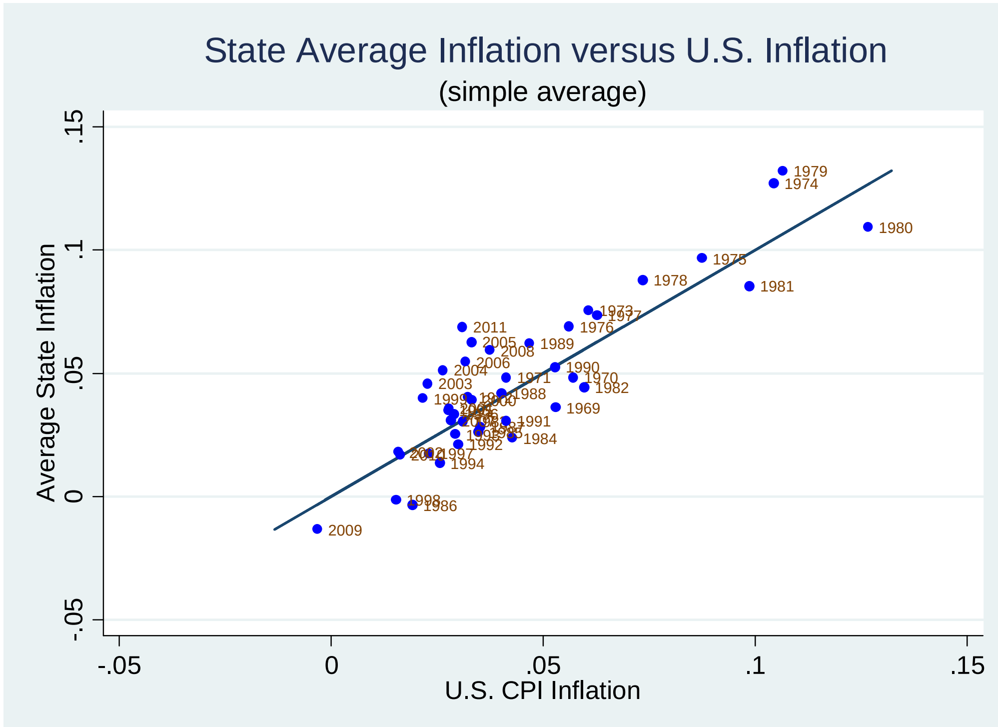

Figure 2

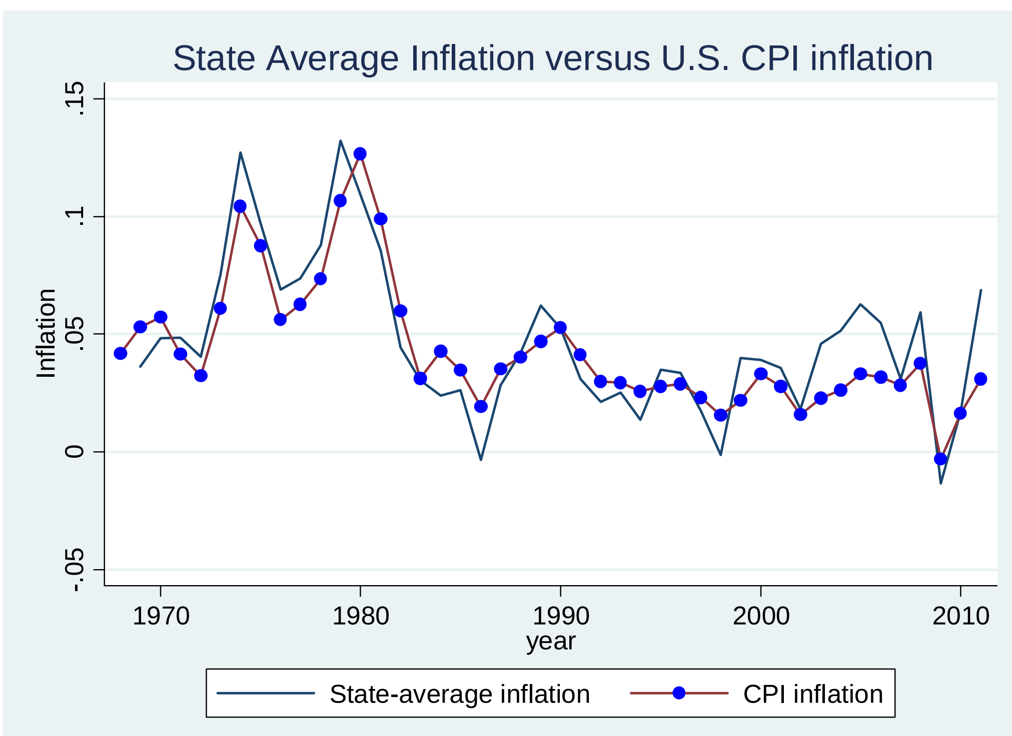

Figure 3

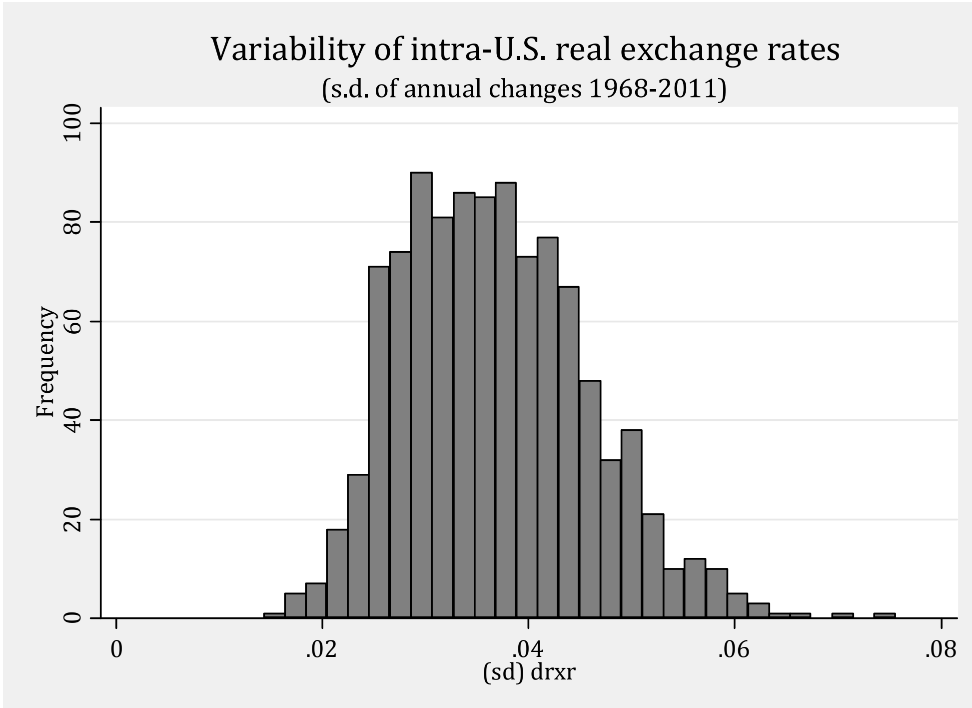

Figure 4

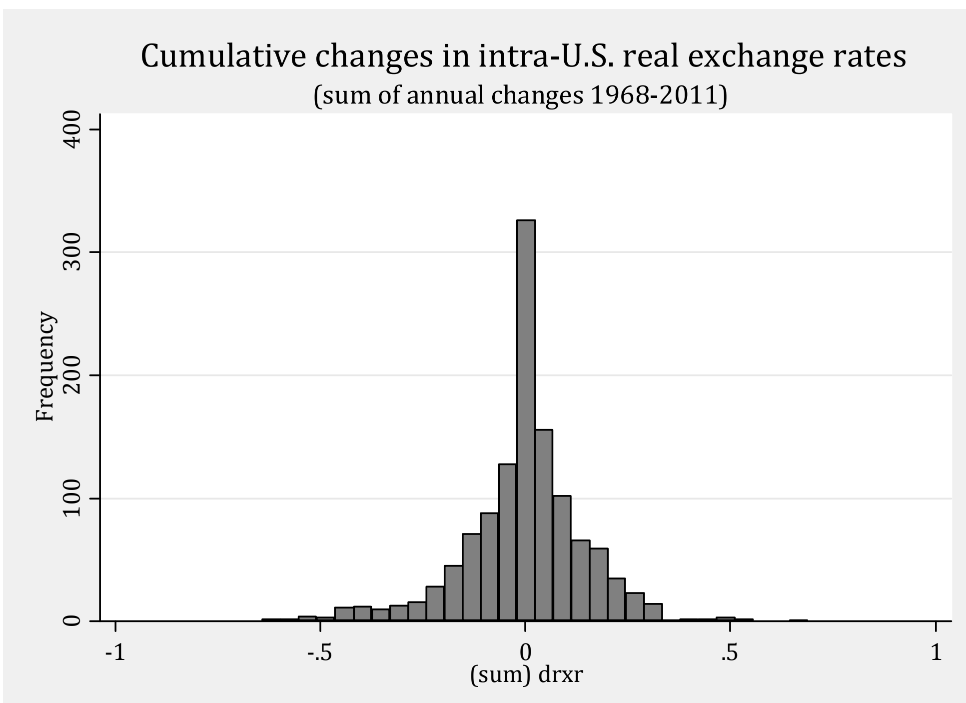

Table 1: Top 2 cities, by state

	State	City	observations	City	observations
1	AK	Anchorage	117	Fairbanks	110
2	AL	Mobile	176	Huntsville	167
3	AR	Little Rock	131	Fort Smith	129
4	AZ	Tucson	157	Phoenix	123
5	CA	Riverside	174	Palm Springs	165
6	CO	Denver	177	Colorado Springs	172
7	CT	Hartford	80	New Haven	64
8	DE	Dover	104	Wilmington	96
9	FL	Orlando	141	Jacksonville	135
10	GA	Atlanta	142	Augusta	122
11	IA	Cedar Rapids	173	Des Moines	114
12	ID	Boise	151	Twin Falls	91
13	IL	Peoria	158	Springfield	153
14	IN	South Bend	161	Indianapolis	157
15	KS	Lawrence	142	Manhattan	115
16	KY	Louisville	177	Lexington	174
17	LA	Lake Charles	165	Baton Rouge	149
18	MA	Boston	93	Fitchburg-Leominster	75
19	MD	Baltimore	127	Hagerstown	79
20	ME	Portland	65	Lewiston	12
21	MI	Lansing	127	Benton Harbor	86
22	MN	Minneapolis	126	Saint Cloud	126
23	MO	Saint Louis	177	Columbia	167
24	MS	Jackson	118	Hattiesburg	79
25	MT	Great Falls	127	Billings	122
26	NC	Winston-Salem	168	Charlotte	153
27	ND	Fargo	122	Minot	84
28	NE	Omaha	176	Lincoln	153
29	NM	Albuquerque	135	Las Cruces	109
30	NV	Reno-Sparks	158	Las Vegas	122
31	NY	Buffalo	137	Binghamton	119
32	OH	Columbus	155	Cincinnati	147
33	OK	Tulsa	161	Oklahoma City	136
34	OR	Portland	164	Eugene	83
35	PA	York	166	Philadelphia	112
36	SC	Charleston	155	Greenville	147
37	SD	Vermillion	149	Sioux Falls	118
38	TN	Chattanooga	171	Knoxville	167
39	TX	Houston	175	Lubbock	174
40	UT	Salt Lake City	163	Cedar City	90
41	VA	Roanoke	149	Richmond	137
42	VT	Burlington-Chittenden Co	81	Barre	61
43	WA	Spokane	133	Tacoma	125
44	WI	Wausau	166	Green Bay	151
45	WV	Charleston	165	Huntington	105
46	WY	Cheyenne	114	Casper	110

Table 2: Distribution of Consumer Price Inflation data, by year

Year	# of States	Average	Maximum	Minimum
1969	29	0.0361	0.1100	-0.0159
1970	32	0.0487	0.1005	-0.0015
1971	35	0.0481	0.1289	-0.0032
1972	36	0.0348	0.1335	-0.0381
1973	41	0.0756	0.1526	-0.0315
1974	38	0.1321	0.2055	0.0390
1975	38	0.0961	0.1618	0.0118
1976	33	0.0676	0.1281	0.0201
1977	35	0.0723	0.1249	0.0071
1978	35	0.0888	0.1670	0.0014
1979	32	0.1395	0.1942	0.0554
1980	36	0.1098	0.2149	0.0191
1981	36	0.0836	0.2129	0.0212
1982	37	0.0443	0.0961	0.0065
1983	36	0.0305	0.0669	-0.0017
1984	37	0.0231	0.0936	-0.0373
1985	40	0.0266	0.0948	-0.0084
1986	41	-0.0035	0.0753	-0.0577
1987	41	0.0283	0.0717	-0.0153
1988	39	0.0422	0.1081	0.0025
1989	39	0.0630	0.1263	-0.0054
1990	41	0.0530	0.1170	-0.0628
1991	40	0.0306	0.0967	-0.0241
1992	44	0.0212	0.0832	-0.0563
1993	42	0.0240	0.0739	-0.0196
1994	44	0.0136	0.0501	-0.0340
1995	44	0.0350	0.1005	-0.0229
1996	44	0.0335	0.0783	-0.0103
1997	44	0.0165	0.0627	-0.0213
1998	43	-0.0031	0.0739	-0.0725
1999	45	0.0398	0.1231	0.0052
2000	44	0.0500	0.1185	0.0209
2001	44	0.0578	0.1237	-0.0044
2002	43	0.0171	0.0933	-0.0287
2003	42	0.0459	0.0874	-0.0352
2004	44	0.0515	0.1633	-0.0132
2005	41	0.0636	0.2282	-0.0112
2006	42	0.0546	0.1424	0.0164
2007	44	0.0299	0.0748	-0.0130
2008	44	0.0360	0.1307	0.0014
2009	42	0.0244	0.0772	-0.0087
2010	42	0.0026	0.0493	-0.0746
2011	42	0.0688	0.1967	0.0179

This table displays summary statistics for state-level consumer price inflation computed from available from the American Chamber of Commerce price data. See text for computation details.

Table 3: Distribution of Consumer Price Inflation data, by state

State	# of years	Avg Inflation	Minimum	Maximum
Alaska	29	0.0327	0.0822	0.8142
Alabama	42	0.0446	0.1473	0.8034
Arkansas	42	0.0486	0.1341	0.8900
Arizona	39	0.0448	0.1374	0.7705
California	42	0.0514	0.1908	0.8550
Colorado	43	0.0475	0.1771	0.8168
Connecticut	14	0.0355	0.1139	1.0705
Delaware	22	0.0358	0.1263	0.7957
Florida	35	0.0439	0.2055	0.9363
Georgia	36	0.0392	0.1170	0.9583
Iowa	43	0.0440	0.1469	0.8011
Idaho	40	0.0507	0.1325	0.8484
Illinois	42	0.0474	0.1717	0.8336
Indiana	43	0.0447	0.1663	0.8725
Kansas	39	0.0481	0.1386	0.8063
Kentucky	43	0.0492	0.1912	0.9198
Louisiana	41	0.0490	0.1928	0.9452
Massachusetts	19	0.0495	0.1967	0.9197
Maryland	36	0.0476	0.2129	1.0701
Maine	19	0.0480	0.1165	0.5652
Michigan	33	0.0474	0.1432	0.9024
Minnesota	36	0.0469	0.1450	0.9424
Missouri	42	0.0421	0.1942	1.0222
Mississippi	33	0.0448	0.1010	0.7055
Montana	34	0.0460	0.1648	0.9967
North Carolina	41	0.0481	0.1581	0.8382
North Dakota	30	0.0463	0.1751	0.9813
Nebraska	43	0.0459	0.1491	0.8187
New Mexico	38	0.0419	0.1335	0.9019
Nevada	39	0.0483	0.1553	0.8017
New York	35	0.0433	0.1625	0.8492
Ohio	43	0.0466	0.1496	0.7988
Oklahoma	43	0.0462	0.1414	0.9216
Oregon	39	0.0430	0.1026	0.7155
Pennsylvania	39	0.0590	0.2282	1.0327
South Carolina	42	0.0490	0.2033	0.8739
South Dakota	37	0.0494	0.1518	0.7494
Tennessee	42	0.0490	0.1825	0.8623
Texas	43	0.0456	0.1685	0.9103
Utah	43	0.0446	0.1641	1.0741
Virginia	38	0.0448	0.1681	0.9394
Vermont	29	0.0526	0.2149	0.9044
Washington	37	0.0402	0.1048	0.7254
Wisconsin	42	0.0469	0.1573	0.7635
West Virginia	39	0.0465	0.1618	0.8880
Wyoming	42	0.0495	0.1786	0.9146

This table displays summary statistics for state-level consumer price inflation computed from available from the American Chamber of Commerce price data. See text for computation details.

Table 4: The Impact of Fiscal Shocks on the Real Exchange Rate

	OLS estimation			IV estimation (2 step feasible GMM)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
VARIABLES	Δq	Δq	Δq	Δq	Δq	Δq	Δq
Government spending shock: State j	0.00541**	0.00419	0.00766***	0.00285***	0.00291***	0.00231**	0.00233**
	(0.00236)	(0.00260)	(0.00276)	(0.00096)	(0.00073)	(0.00091)	(0.00105)
Government spending shock: State i	-0.01403***	-0.01242***	-0.01331***	-0.00180*	-0.00139*	-0.00225**	-0.00229**
	(0.00248)	(0.00255)	(0.00314)	(0.00097)	(0.00080)	(0.00099)	(0.00114)
State j government budget surplus % GDP		-0.02106	0.07898**		-0.03764	-0.00027	-0.01449
		(0.03210)	(0.03395)		(0.02764)	(0.03009)	(0.03727)
State i government budget surplus % GDP		-0.03425	-0.12738***		-0.10447***	-0.06953	-0.18822***
		(0.03672)	(0.03733)		(0.04027)	(0.04290)	(0.04632)
State j per capita income growth		0.12215***	0.09640***		0.10001***	0.08193***	0.12315***
		(0.00838)	(0.01384)		(0.01136)	(0.01413)	(0.01541)
State i per capita income growth		-0.10915***	-0.10013***		-0.08485***	-0.09665***	-0.13569***
		(0.00833)	(0.01237)		(0.01116)	(0.01244)	(0.01494)
State j population growth		0.13783***	0.28788***		0.16318***	0.15685***	0.15781***
		(0.01888)	(0.03015)		(0.02097)	(0.02147)	(0.02600)
State i population growth		-0.13309***	-0.35906***		-0.20407***	-0.19957***	-0.23252***
		(0.01916)	(0.02809)		(0.02164)	(0.02373)	(0.02826)
Lag 1 exchange rate change							-0.21100***
							(0.00870)
Lag 2 exchange rate change							-0.18489***
							(0.00810)
Lag 3 exchange rate change							-0.05515***
							(0.00756)
Lag 4 exchange rate change							-0.02794***
							(0.00781)
time dummies	no	no	yes	no	no	yes	yes
Observations	33533	33533	33533	29725	29725	29725	21573
Number of bilateral real exchange rates	1035	1035	1035	1035	1035	1035	1035
r2	0.0009	0.0103	0.0187	0.00912	0.00804	0.0183	0.0869
HAC standard errors in parentheses			Endogeneity	7.921	6.03	6.768	1.933
*** p<0.01, ** p<0.05, * p<0.1			p-value	0.0191	0.049	0.0339	0.3804
run at 14:09:50 23 Jul 2014							
HAC s.e.'s clustered by real exchange rate			Kleibergen-Paap rk Wald F statistic	227.207	318.508	943.160	372.225
b2b.do							
Definition: Q = Pj/Pi			Kleibergen-Paap rk LM statistic	301.203	470.813	517.568	535.467
			Chi-sq(1)	0.0000	0.0000	0.0000	0.0000

Table 5: The Impact of Fiscal (Investment) Shocks on the Real Exchange Rate

	OLS estimation			IV estimation (2 step feasible GMM)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
VARIABLES	Δq	Δq	Δq	Δq	Δq	Δq	Δq
Government spending shock: State j	0.00205	0.00111	0.00250*	0.00394***	0.00365***	0.00295**	0.00304**
	(0.00137)	(0.00137)	(0.00150)	(0.00095)	(0.00092)	(0.00116)	(0.00139)
Government spending shock: State i	-0.01015***	-0.00896***	-0.00798***	-0.00161*	-0.00172*	-0.00276**	-0.00295**
	(0.00125)	(0.00124)	(0.00131)	(0.00094)	(0.00099)	(0.00122)	(0.00149)
State j government budget surplus % GDP		0.05507*	0.07424**		-0.02885	0.00783	-0.00824
		(0.03146)	(0.03430)		(0.02773)	(0.03031)	(0.03771)
State i government budget surplus % GDP		-0.12615***	-0.12852***		-0.10410***	-0.06808	-0.18974***
		(0.03626)	(0.03749)		(0.04026)	(0.04300)	(0.04588)
State j per capita income growth		0.10587***	0.09493***		0.09900***	0.07920***	0.11996***
		(0.00940)	(0.01382)		(0.01138)	(0.01440)	(0.01557)
State i per capita income growth		-0.09270***	-0.09622***		-0.08333***	-0.09604***	-0.13612***
		(0.00987)	(0.01231)		(0.01112)	(0.01243)	(0.01498)
State j population growth		0.29277***	0.28326***		0.16324***	0.15672***	0.16198***
		(0.02737)	(0.03002)		(0.02106)	(0.02154)	(0.02691)
State i population growth		-0.38043***	-0.35283***		-0.19935***	-0.19175***	-0.22570***
		(0.02558)	(0.02837)		(0.02059)	(0.02224)	(0.02665)
Lag 1 exchange rate change							-0.21151***
							(0.00877)
Lag 2 exchange rate change							-0.18579***
							(0.00822)
Lag 3 exchange rate change							-0.05682***
							(0.00774)
Lag 4 exchange rate change							-0.02902***
							(0.00785)
time dummies	no	no	yes	no	no	yes	yes
Observations	33533	33533	33533	29725	29725	29725	21573
Number of bilateral real exchange rates	1035	1035	1035	1035	1035	1035	1035
r2	0.00243	0.0157	0.0271	-0.00545	0.00576	0.0158	0.0849

	(4)	(5)	(6)	(7)
Endogeneity	11.389	8.443	8.915	2.607
p-value	0.0034	0.0147	0.0116	0.2715
Kleibergen-Paap rk Wald F statistic	248.281	263.668	261.212	154.327
Kleibergen-Paap rk LM statistic	379.509	410.544	405.162	238.287
Chi-sq(1)	0.0000	0.0000	0.0000	0.0000

HAC standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
run at 14:09:50 23 Jul 2014
HAC s.e.'s clustered by real exchange rate
b2b.do
Definition: Q = Pj/Pi

Table 6: The Impact of Fiscal Shocks (Consumption) on the Real Exchange Rate

	OLS estimation			IV estimation (2 step feasible GMM)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
VARIABLES	Δq	Δq	Δq	Δq	Δq	Δq	Δq
Government spending shock: State j	0.00440*	0.00574**	0.00760***	0.00311***	0.00287***	0.00227**	0.00229**
	(0.00233)	(0.00233)	(0.00274)	(0.00074)	(0.00072)	(0.00089)	(0.00104)
Government spending shock: State i	-0.00915***	-0.00959***	-0.00853***	-0.00127*	-0.00137*	-0.00221**	-0.00224**
	(0.00253)	(0.00262)	(0.00317)	(0.00074)	(0.00079)	(0.00097)	(0.00112)
State j government budget surplus % GDP		0.06089*	0.07923**		-0.03850	-0.00096	-0.01506
		(0.03137)	(0.03384)		(0.02764)	(0.03009)	(0.03724)
State i government budget surplus % GDP		-0.11743***	-0.12569***		-0.10437***	-0.06939	-0.18763***
		(0.03632)	(0.03735)		(0.04031)	(0.04294)	(0.04645)
State j per capita income growth		0.11018***	0.09696***		0.10010***	0.08204***	0.12330***
		(0.00947)	(0.01388)		(0.01137)	(0.01413)	(0.01541)
State i per capita income growth		-0.09440***	-0.10085***		-0.08485***	-0.09666***	-0.13566***
		(0.00993)	(0.01244)		(0.01118)	(0.01244)	(0.01494)
State j population growth		0.29757***	0.28780***		0.16348***	0.15713***	0.15782***
		(0.02757)	(0.03022)		(0.02101)	(0.02151)	(0.02600)
State i population growth		-0.38688***	-0.35938***		-0.20444***	-0.20011***	-0.23302***
		(0.02582)	(0.02818)		(0.02174)	(0.02386)	(0.02840)
Lag 1 exchange rate change							-0.21095***
							(0.00869)
Lag 2 exchange rate change							-0.18481***
							(0.00809)
Lag 3 exchange rate change							-0.05500***
							(0.00754)
Lag 4 exchange rate change							-0.02784***
							(0.00781)
time dummies	no	no	yes	no	no	yes	yes
Observations	33533	33533	33533	29725	29725	29725	21573
Number of bilateral real exchange rates	1035	1035	1035	1035	1035	1035	1035
r2	0.000386	0.0143	0.0261	-0.00335	0.00807	0.0184	0.0868
HAC standard errors in parentheses			Endogeneity	9.376	5.998	6.744	1.977
*** p<0.01, ** p<0.05, * p<0.1			p-value	0.0092	0.0498	0.0343	0.3721
run at 14:09:50 23 Jul 2014							
HAC s.e.'s clustered by real exchange rate			Kleibergen-Paap rk Wald F statistic	285.854	319.679	360.335	231.005
b2b.do							
Definition: Q = Pj/Pi			Kleibergen-Paap rk LM statistic	412.983	471.648	529.198	323.203
			Chi-sq(1)	0.0000	0.0000	0.0000	0.0000

Table 7: Fiscal Shocks and the Real Exchange Rate: dependence on time and economic conditions

	IV estimation (2 step feasible GMM)			
	(1)	(2)	(3)	(4)
VARIABLES	Δq	Δq	Δq	Δq
Government spending shock: State j	0.00334***	0.00359***	0.00262***	0.00216**
	(0.00077)	(0.00078)	(0.00092)	(0.00105)
Government spending shock: State i	-0.00118	-0.00127	-0.00183*	-0.00142
	(0.00077)	(0.00080)	(0.00095)	(0.00108)
Lag 1 exchange rate change				-0.20132***
				(0.00871)
Lag 2 exchange rate change				-0.17796***
				(0.00798)
Lag 3 exchange rate change				-0.05478***
				(0.00755)
Lag 4 exchange rate change				-0.02104***
				(0.00781)
Government spending shock: State j * trend	-0.00042***	-0.00118***	-0.00087***	-0.00085***
	(0.00011)	(0.00014)	(0.00014)	(0.00016)
Government spending shock: State i * trend	-0.00021**	0.00054***	0.00122***	0.00105***
	(0.00010)	(0.00013)	(0.00015)	(0.00017)
State j per capita income growth		0.53543***	0.29561***	0.05717
* Government spending shock: State j		(0.05858)	(0.06465)	(0.07378)
State i per capita income growth		-0.49801***	-0.64332***	-0.38007***
* Government spending shock: State i		(0.05661)	(0.06337)	(0.07113)
State j per capita income growth			0.86112***	1.31329***
* population growth: State j			(0.16588)	(0.22244)
State i per capita income growth			-0.76058***	-1.16848***
* population growth: State i			(0.18295)	(0.23714)
Observations	29725	29725	29725	21573
Number of statepair	1035	1035	1035	1035
r2	-0.00273	0.00184	0.0177	0.0789

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
run at 15:48:27 30 Aug 2014
HAC s.e.'s clustered by real exchange rate
b2b.do
Definition: Q = Pj/Pi

APPENDIX TABLE 1: DESCRIPTIONS OF COMMODITIES INCLUDED

Item	Date added	Description
Antibiotic Ointment	94.4	½ oz. tube, Polysporin brand (94.4-02.4).
Apartment	68.1	Monthly rent (68.1-79.1); monthly rent, excl. all utilities except water, two bedrooms, one bath, unfurnished (79.2-81.4); monthly rent, excl. all utilities except water, two bedrooms, 1 or 1½ bath unit of approx. 950 sq. ft. (82.1-85.4); monthly rent, excl. all utilities except water, two bedrooms, unfurnished, 1 or 1½ baths, approx. 950 sq. ft. (86.1-88.3); monthly rent, excl. all utilities except water, two bedrooms, unfurnished, 1½ or 2 baths, approx. 950 sq. ft. (88.4-11.4).
Aspirin	82.1	Bayer brand, 100-tablet bottle (82.1-89.3); Bayer brand, 100-tablet bottle, 325-mg tablets (89.4-94.3).
Atorvastatin Calcium	05.1	20 mg. 30 tablets, Lipitor brand (05.1-11.4).
Automobile Registration	68.1	One year (68.1-68.4, 69.2-70.2).
Automobile Repair/Auto Maintenance	79.2	Spin balance of two front wheels (79.2-83.3); Spin balance of one front wheel (83.4-85.4); average price to balance one front wheel (86.1-88.3); average price to computer- or spin-balance one front wheel (88.4-11.4).
Baby Food	68.1	6 jars, Gerber's strained (68.1-69.4); 1 jar, Gerber's strained vegetables (70.1-81.4); 4 ½ oz. jar, Gerber's strained vegetables (82.1-83.3);4½ oz. jar, strained vegetables, lowest price (83.4-91.3); 4-4.5 oz. jar, strained vegetables, lowest price (91.4-98.3, 99.2, 99.4);4-4.5 oz. jar, strained fruit or vegetables, lowest price (98.4-99.1, 99.3, 00.1-03.4).
Bacon	68.1	lb., lowest price (68.1-85.4);price per pound, rashers, Oscar Mayer Hormel Black Label, Armour or Field's (86.1-88.3); 12 oz. package, rashers, Oscar Mayer, Hormel Black Label, or Field's (88.4-89.3); price per pound, Oscar Mayer, Hormel Black Label or Field's (89.4-90.3); price per pound, Oscar Mayer, Hormel Black Label or Bar-S (90.4-91.3).
Bananas	68.1	lb. (68.1-11.4).
Beauty Salon Visit	82.1	Woman's shampoo, trim and blow-dry (82.1-11.4).
Beer	82.1	6-pack, 12 oz. containers, excluding any deposit, Schlitz or Budweiser (82.1-89.3); 6-pack, 12 oz. containers, excluding any deposit, Budweiser or Miller Lite (89.4-99.4); 6-pack, 12 oz. containers, excluding any deposit, Heineken's (00.1-11.4).
Board Game/Child's Game	82.1	Parker Brothers' 'Monopoly', standard edition (82.1-83.3); Parker Brothers' 'Monopoly', No. 9 standard edition (83.4-02.4).
Bowling	68.1	Price per line (68.1-72.4); Price per line, evening prices (73.1-81.4); Price per line (game), evening rate (82.1-98.2, 99.2, 99.4);

		Price per line (game), Saturday evening non-league rate (98.3-99.1, 99.3, 00.1-11.4).
Boy's Jeans	05.1	Blue Denim Jeans, regular, relaxed or loose fit, sizes 8-20 (05.1-11.4).
Boy's Underwear	82.1	Fruit of the Loom brand, Package of 3 briefs (82.1-83.3); package of 3 cotton briefs (83.4-85.4); package of 3 cotton briefs, sizes range 28/30-34/36 (86.1-88.3); package of 3 briefs, cotton, lowest price (88.4-90.3); package of 3 briefs, size 10-14, cotton, lowest price (90.4-03.4); package of 6 briefs, size 10-14, cotton, lowest price (04.1-04.4).
Bread, white	68.1	20 oz., lowest price (68.1-80.2); 24 oz. loaf, lowest price (80.3-81.4, 83.4-90.3); 24 oz. loaf (82.1-83.3);24 oz. loaf, lowest price, or prorated 24 oz. equivalent, lowest price (90.4-11.4).
Bus Fare/Commuter Fare	68.1	Basic fare, 1 trip (68.1-81.4); one-way fare for commuting 10 miles to CBD (82.1-85.4); Typical one-way commuting fare, up to 10 miles (86.1-98.3, 99.2, 99.4); one-way commute, 10 miles (98.4-99.1, 99.3, 00.1-04.4).
Canola Oil	09.1	48 oz. bottle (09.1-11.4).
Cheese	82.1	Parmesan Cheese, grated, 8 oz. canister, Kraft (82.1-11.4).
Chunk Light Tuna	82.1	6.5 oz. can, Starkist or Chicken of the Sea, packed in oil (82.1-91.3); 6.125-6.5 oz. can, Starkist or Chicken of the Sea, packed in oil (91.4-93.1,93.4); 6.125 oz. can, Starkist or Chicken of the Sea (93.2-93.3, 94.1-95.3); 6-6.125 oz. can, Starkist or Chicken of the Sea (95.4-99.4); 6 oz. can, Starkist or Chicken of the Sea (00.1-09.4); 5 or 6 oz. can, Starkist or Chicken of the Sea (10.1-11.4).
Cigarettes	68.1	Carton, Winston, king-size (68.1-85.4); Carton, Winston, king-size, 85mm (86.1-94.3); Carton, Winston (Parliament in Canada), king-size, 85mm (94.4-03.4).
Coffee, vacuum packed	68.1	lb., Maxwell House (68.1-72.4); 2 lb., Maxwell House, Hills Bros., or Folgers (73.1-80.2); 1 lb. Maxwell House, Hills Bros., or Folgers (80.3-81.4); 1 can can, Maxwell House, Hills Bros., or Folgers (82.1-83.3); 1 lb. can, Maxwell House, Hills Bros., or Folgers (83.4-88.3); 13 oz. can, Maxwell House, Hills Brothers or Folgers (88.4-99.4);11.5 oz. can, Maxwell House, Hills Brothers or Folgers (00.1-11.4).
Corn, cream style	68.1	#303 can, lowest price (68.1-76.3); #303 can, 15-17 oz. lowest price (76.4-79.1).
Corn Flakes	79.2	12 oz. Kellogg's or Post Toasties (79.2-80.2); 18 oz. Kellogg's or Post Toasties (80.3-11.4).
Dentist, Office Visit	68.1	Teeth cleaning and inspection, no x-ray (68.1-78.3, 80.3-83.3); teeth cleaning and inspection, no x-ray, prevailing charge (78.4-80.2); teeth cleaning/inspection, no x-ray or fluoride treatment (83.4-89.3); American Dental Association procedures: 1110 adult teeth cleaning, and 0120 periodic oral examination (89.4-04.4); American Dental Association procedure 1110 adult teeth cleaning

		(05.1-11.4).
Dishwashing Powder	96.4	50 oz. Cascade dishwashing powder (96.4-00.4); 60 oz. Cascade dishwashing powder (01.1-02.3); 75 oz. Cascade dishwashing powder (02.4-11.4).
Doctor, Office Visit	68.1	General practitioner, prevailing charge (68.1-81.4); general practitioner, consultation fee (82.1-85.4); general practitioner, average charge (86.1-89.3); American Medical Association procedure: general practitioner's routine examination of established patient (89.4-11.4).
Dry Cleaning	68.1	Man's two-piece suit (68.1-79.1, 89.4-11.4); man's two-piece suit, cash & carry (79.2-85.4); man's two-piece suit, average price (86.1-89.3).
Eggs	68.1	Doz., Large, Grade A (68.1-11.4).
Electric Power	68.1	Average monthly bill (68.1-76.3); 12 month average bill (76.4-78.3); average monthly bill based on usage during preceding 12 months in house specified for item 'House Purchase' (78.4-79.1); average monthly bill based on usage during preceding 12 months in house specified for item 'House Purchase', Column A for all-electric homes, Column B for all other homes (79.2-11.4).
Fresh Orange Juice	04.1	64 oz. (1.89 liters) Tropicana or Florida Natural brand (04.1-10.4); 59 or 64 oz. Tropicana or Florida Natural brand (11.1-11.4).
Fried Chicken	82.1	Breast and drumstick, Church's, or Kentucky Fried Chicken if available (82.1-83.3); thigh and drumstick, no extras, Church's or Kentucky Fried Chicken if available (83.4-85.4); thigh and drumstick, with or without extras, Church's or Kentucky Fried Chicken, where available (86.1-90.3); thigh and drumstick, with or without extras, whichever is less expensive, Church's or Kentucky Fried Chicken, where available (90.4-11.4).
Frozen Corn	83.4	Whole kernel, 10 oz. package, lowest price (83.4-95.3); Whole kernel, 16 oz., lowest price (95.4-11.4).
Frozen Green Beans	80.3	10 oz. pkg., lowest price (80.3-81.4); 9 oz. pkg., lowest price (82.1-83.3).
Frozen Meal	04.1	8 to 10 oz. frozen chicken entrée, healthy choice or lean cuisine brand (04.1-11.4).
Frozen Orange Juice	68.1	6 pack, lowest price (68.1-69.4); 6 oz. can, lowest price (70.1-85.4); 12 oz. can, Minute Maid (86.1-03.4).
Frozen Peas	68.1	10 oz. pkg., lowest price (68.1-80.2).
Frying Chicken	68.1	Whole, lb., Grade A (68.1-78.3, 79.2-85.4); lb., Grade A (78.4-79.1); Whole fryer, price per pound (86.1-11.4).
Gasoline	68.1	Reg. grade, incl. taxes (68.1-72.4); Reg. grade, incl. taxes, national brands (73.1-76.3); Reg. grade, incl. taxes, national brands-full service (76.4-78.3); Gallon, reg. grade, incl. taxes, national brands-full service (78.4-79.1); Gallon, unleaded, incl. taxes, national

		brands-full service (79.2-81.4); 1 gal. unleaded regular, national brand, incl. all taxes, at self-service pump if available (82.1-11.4).
Green Beans	68.1	#303 can, lowest price (68.1-76.3); #303 can, 15-17 oz. lowest price (76.4-80.2).
Ground Beef	68.1	Ground Beef: lb. (68.1-72.4). Ground Beef or Hamburger: lb. (73.1-78.2); lb., lowest price (78.3-04.4); lb., lowest price, min 80% lean (05.1-11.4).
Hamburger Sandwich	82.1	½ lb. patty, McDonald's if available (82.1-83.1); $^{1}/_{4}$ lb. patty, McDonald's if available (83.2-85.4); $^{1}/_{4}$ lb. patty with cheese, McDonald's Quarter-Pounder with cheese, where available (86.1-90.3); $^{1}/_{4}$ lb. patty with cheese, pickle, onion, mustard and catsup, McDonald's Quarter-Pounder with cheese, where available (90.4-11.4).
Hospital Room	68.1	Semi-private, cost per day (68.1-99.4); private room, average cost per day (00.1-03.4).
House Purchase, Monthly Payment	68.1	Monthly payment (68.1-79.1); principal and interest only, new 1800 sq. ft. living area home, 25-year first mortgage on 25% down payment (79.2-81.4); principal and interest, new 1800 sq. ft. living area home, 25-year first mortgage on 25% down payment and current conventional fixed-rate of interest or adjustable rate mortgage plan (82.1-85.4); principal and interest, 25-year first mortgage based on 75% loan at current conventional fixed-rate of interest or adjustable rate mortgage plan (86.1-88.3); principal and interest, 30-year first mortgage based on 75% loan at current conventional fixed-rate of interest or adjustable rate mortgage plan (88.4-89.3); principal and interest, using mortgage rate from Item 'House Purchase, Mortgage Rate' and assuming 25% down payment (89.4-11.4).
House Purchase, Total Sales Price	82.1	1800 sq. ft. living area new house (82.1-85.4); 1800 sq. ft. living area new house, approx. 10,000 sq. ft. lot, urban area with all utilities (86.1-88.3); 1800 sq. ft. living area new house, approx. 8,000 sq. ft. lot, urban area with all utilities (88.4-99.4); 2400 sq. ft. living area new house, approx. 8,000 sq. ft. lot, urban area with all utilities (00.1-07.4);2400 sq. ft. living area new house, 8,000 sq. ft. lot, 4 bedrooms, 2 baths (08.1-11.4).
House Purchase, Mortgage Rate	89.4	Effective rate, including points and origination fee, for 30-year conventional fixed- or adjustable-rate mortgage (89.4-94.3); Effective rate, including points and origination fee, for 30-year(5-year in Canada) conventional fixed-rate mortgage (94.4-06.4); Effective rate, including points and origination fee, for 30-year (07.1-11.4).
Ibuprofen	03.1	200 mg. 50 tablets, Advil Tablets (03.1-08.4, 11.1-11.4); 200 mg. 100 tablets, Advil Tablets (09.1-10.4).
Jeans	82.1	Adult Denim Jeans: Levi's, straight leg (82.1-83.3); Levi's, straight leg, size 28/30 to

		34/36 (83.4-85.4). Man’s Denim Jeans: Levi’s, straight leg, size 28/30 to 34/36 (86.1-87.3); Levi’s, 501, size 28/30 to 34/36 (87.4-88.3); Levi’s, 500, size 28/30 to 34/36 (88.4-89.3); Levi’s, lowest price, 500, size 28/30 to 34/36 (89.4-91.3); Levi’s, 501s or 505s, size 28/30 to 34/36 (91.4); Levi’s, 501s or 505s, rinsed or washed or bleached, size 28/30 to 34/36 (92.1-99.4).
Lettuce	68.1	Head Lettuce, each (68.1-78.2); Head Lettuce, head, approx. 1 $^{1}/_{4}$ lb. (78.3, 79.2-88.3, 89.4-90.3); Lettuce, head, approx. 1 $^{1}/_{2}$ lb. (78.4-79.1); Iceberg Lettuce, head, approx.1 $^{1}/_{4}$ pound (88.4-89.3, 90.4-11.4).
Liquor	68.1	Fifth, Seagram’s 7-Crown (68.1-78.3); 750 ml. Seagram’s 7 Crown (78.4-88.3); J&B Scotch, 1 liter bottle (88.4-89.3); J&B Scotch, 750ml bottle (89.4-04.4).
Major Appliance Repair	79.2	Home service call, clothes washing machine, minimum service charge (79.2-83.3); Home service call, clothes washing machine, minimum labor charge, excl. any parts (83.4-11.4).
Man’s Dress Shirt	82.1	Arrow or Van Heusen, white, long sleeve, cotton/polyester blend (82.1-83.3); Arrow, Enro or Van Heusen, white, long sleeve, cotton/polyester blend, size 15/32 to 16/34 (83.4-85.4); Arrow, Enro, Sear’s Best or Van Heusen, white, long sleeve, cotton/polyester blend, size 15/32 to 16/34 (86.1-88.3);Arrow, Enro, Sear’s Best or Van Heusen, white, cotton/poly blend, at least 55% cotton, long sleeves, size 15/32-16/34 (88.4-89.3); Arrow, Enro, Van Heusen, or J.C. Penney’s Stafford, white, cotton/poly blend, at least 55% cotton, long sleeves (89.4-94.3); 100% cotton pinpoint Oxford, long sleeves (94.4-99.4); cotton/polyester, pinpoint weave, long sleeves (00.1-11.4).
Man’s Haircut	68.1	Prevailing price (68.1-79.1); Barbershop, average price, no styling (79.2-81.4); Barbershop, basic haircut, no styling (82.1-11.4).
Man’s Slacks	00.1	Dockers ‘No Wrinkles’ khakis, size 28/30-34/36 (00.1-02.4).
Margarine	68.1	lb., lowest price (68.1-85.4); 1 lb. Blue Bonnet or Parkay (86.1-90.3); one pound, cubes, Blue Bonnet or Parkay (90.4-11.4).
Movie	68.1	Downtown, indoor, evening (68.1-78.3); First-run indoor evening (78.4-90.3); First-run indoor evening, no discount (90.4-11.4).
Natural Gas/Other Energy	68.1	Natural Gas: Average monthly bill (68.1-76.3); 12 month average bill (76.4-78.3); average monthly bill based on usage during preceding 12 months in house specified for item ‘House Purchase’ (78.4-80.2); Other Fuel Sources-oil, natural gas, wood, etc./Other Home Energy: Average monthly bill based on usage during preceding 12 months in house specified for item ‘House Purchase’ (80.3-11.4).
Newspaper	82.1	Home delivery monthly cost for daily and Sunday (82.1-83.3);

Subscription		Home delivery monthly cost for daily and Sunday, large city newspaper (83.4-11.4).
Optometrist, Office Visit	04.1	Full vision eye exam for established adult patient (04.1-11.4).
Peaches	68.1	Halves, #2 can, lowest price (68.1-70.1); Halves, #2 ½ can, lowest price (70.2-76.3); Halves, #2 ½ can, approx. 29 oz. lowest price (76.4-85.4); Halves, 29 oz. can, Hunt's, Del Monte or Libby's (86.1-88.3); Halves or slices, 29 oz. can, Hunt's, Del Monte or Libby's (88.4-94.3); Halves or slices, 29 oz. can, Hunt's, Del Monte or Libby's(house brand in Canada) (94.4-99.4); Halves or slices, 29 oz. can, Hunt's, Del Monte, Lady Alberta or Libby's (00.1-07.4);29 oz. can, Hunt's, Del Monte, Lady Alberta or Libby's (08.1-11.4).
Peas, garden	68.1	#303 can, lowest price (68.1-76.3); #303 can, 15-17 oz. lowest price (76.4-79.1).
Pizza	82.1	12"-13" thin crust, regular cheese, Pizza Hut, Pizza Inn or Shakey's, if available (82.1-88.3); 12"-13" thin crust cheese pizza, Pizza Hut or Pizza Inn where available (88.4-94.3);11"-12" thin crust cheese pizza, Pizza Hut or Pizza Inn where available (94.4-11.4).
Potatoes	68.1	10 lbs., white or red (68.1-81.4, 89.4-98.3, 99.2, 99.4-09.4); 10 lb. sack, white or red, lowest price (82.1-89.3); 1 white or red (98.4-99.1, 99.3); 5 lbs., white or red (10.1-11.4).
Potato Chips	04.1	12 oz. plain regular potato chips (04.1-11.4).
Sausage	91.4	Price per pound, Jimmy Dean pure pork sausage (91.4-99.4); Price per pound, Jimmy Dean or Owens brand, 100% pork (00.1-11.4).
Shampoo	82.1	11 oz. container, Johnson's Baby Shampoo (82.1-88.3, 89.4-90.4, 91.2); 15 oz. bottle, Johnson's Baby Shampoo (88.4-89.3, 91.1, 91.3); 15 oz. bottle, Alberto VO-5 (91.4-11.4).
Shortening	68.1	3 lb. can, Crisco (68.1-83.3); 3 lb. can, all vegetable, Crisco brand (83.4-08.4).
Soft Drink	68.1	8 pack, 16oz., Coca-Cola (68.1-69.4); 6 pack, 12oz. cans 7-up (70.1-72.4); 6 pack, 12oz. cans 7-up, Coca Cola, or Pepsi Cola (73.1-74.1); 1 qt. Ginger Ale, 32 oz., lowest price (74.2-75.3);1 qt. Coca-Cola, 32 oz. (75.4-78.2); 1 qt. Coca-Cola, 32 oz. or 1 liter, returnable bottle, excl. deposit (78.3-79.1); 2 liter Coca-Cola, excl. deposit if any (79.2-11.4).
Steak	68.1	Round Steak: lb., USDA Choice (68.1-80.2). T-bone Steak: lb., USDA Choice (80.3-91.3); price per pound, lowest price (91.4); price per pound (92.1-11.4).
Sugar	79.2	5 lbs. cane or beet, lowest price (79.2-92.3); 4 lbs. cane or beet, lowest price (92.4-11.4).

Sweet Peas	80.3	#303 can, 15-17 oz. lowest price (80.3-85.4); 17 oz. can, Del Monte or Green Giant (86.1-91.4); 15-17 oz. can, Del Monte or Green Giant (92.1-06.2); 15-15.25 oz. can, Del Monte or Green Giant (06.3-11.4).
Taxi Fare	68.1	First two miles (68.1-81.4).
Telephone	68.1	Private line, monthly rate (68.1-78.3); private residential line, monthly rate (78.4-80.2); private residential line, monthly rate plus est. local usage charges, if any, incurred by a family of four (80.3-81.4); private residential line, 2 standard instruments, monthly rate plus est. local usage charges, if any, incurred by a family of four (82.1-83.3); private residential line, customer owns instruments, monthly rate plus: est. local usage charges, if any, incurred by a family of four, federal excise tax, any base charges and access charges to long distance (83.4-85.4); private residential line, customer owns instruments, basic monthly rate plus: additional local use charges, if any, incurred by a family of four, Touch-Tone fee, other mandatory monthly charges, such as long distance access fee or 911 fee, and all taxes on the foregoing (86.1-11.4).
Tennis balls	82.1	Wilson or Penn brands, yellow, can of 3 extra-duty (82.1-11.4).
Tissue	68.1	Toilet Tissue: 4 pack, Scott (68.1-69.4); 1 roll, Scott (70.1-72.4); 1 roll, Scott, 1000 sheets (73.1-74.1); 1 roll, lowest price (74.2-78.2); 1 roll of 4-pack lowest price (78.3); 1 roll of 4-pack, national brand, lowest price (78.4-79.1); 4-pack, two-ply, national brand, lowest price (79.2-80.2); Facial Tissue: Kleenex brand, 200 count box (80.3-83.3, 06.3-11.4); Kleenex brand, 175 count box (83.4-02.3); Kleenex brand, 160-count box (02.4-06.2);.
Tomatoes	68.1	#303 can, lowest price (68.1-76.3); #303 can, 15-17 oz. (76.4-85.4); 14.5 oz. can, Hunt's or Del Monte (86.1-04.4).
Toothpaste	82.1	6 to 7 oz. tube, Crest or Colgate (82.1-06.2); 6 to 6.4 oz. tube, Crest or Colgate (06.3-11.4).
TV Repair	68.1	Service call, excl. parts (68.1-72.4); Service call, excl. parts B&W (73.1-74.1); Service call, excl. parts, color (74.2-79.1).
Veterinary Services	03.1	Annual exam, 4-year-old-dog (03.1-11.4).
Washing Powder	68.1	Giant, Tide (68.1-72.4); Giant, Tide, 49 oz. or equivalent brand & size (73.1-80.2); Giant size, 49 oz. Tide, Bold or Cheer (80.3-85.4); 42 oz. or 49 oz. Tide, Bold or Cheer (86.1-88.3); 42 oz. Tide, Bold or Cheer (88.4-90.3); 39 oz., Tide, Bold or Cheer (90.4-91.3); 42 oz. Tide, Bold, or Cheer 'Ultra' (91.4-96.3).
Whole Milk	68.1	Fresh, ½ gal., carton (68.1-83.3); ½ gal. carton, homogenized (83.4-85.4);½ gal. carton (86.1-11.4).
Wine	82.1	Paul Masson Chablis 750 milliliter bottle (82.1-83.3); Paul Masson

		Chablis 1.5 liter bottle (83.4-90.3); Gallo Sauvignon Blanc, 1.5-liter bottle (90.4-91.3); Gallo Chablis Blanc, 1.5-liter bottle (91.4-97.3); Livingston Cellars or Gallo Chablis blanc, 1.5-liter bottle (97.4-00.4); Livingston Cellars or Gallo Chablis or Chenin blanc, 1.5-liter bottle (01.1-10.4); Chablis or Chenin blanc or any white table wine, 1.5-liter bottle (11.1-11.4).
Woman's Shampoo & Set	68.1	Prevailing price (68.1-79.1); average price (79.2-81.4).
Women's Slacks	03.1	100% cotton, twill khakis, misses 4-14 (03.1-05.3); At least 95% cotton, twill khakis, misses 4-14 (05.4-11.4).

APPENDIX TABLE 2: COMMITTEE CHAIR CHANGES, BY STATE (1966-present)

	Senate		House	
State	**Ascensions**	**Departures**	**Ascensions**	**Departures**
California	4	3	16	14
Michigan	3	2	9	6
New York	2	1	9	8
Texas	2	2	9	8
Florida	3	3	7	6
West Virginia	9	9	1	1
Arizona	7	7	1	1
Mississippi	5	5	3	3
South Carolina	6	6	2	2
Alaska	6	6	1	1
Indiana	4	4	3	3
Oregon	6	5	1	1
Pennsylvania	5	5	2	2
Virginia	4	4	2	1
Delaware	5	5	0	0
Illinois	1	1	4	4
Kentucky	3	3	2	1
Louisiana	2	2	3	3
Massachusetts	2	2	3	3
Wisconsin	0	0	5	5
Alabama	3	3	1	1
Vermont	4	2	0	0
Washington	4	3	0	0
Arkansas	2	2	1	1
Georgia	3	3	0	0
Kansas	2	2	1	1
Maryland	2	1	1	1
Minnesota	1	1	2	2
Missouri	1	1	2	2
Montana	3	3	0	0
New Mexico	3	3	0	0
North Carolina	3	3	0	0
North Dakota	3	3	0	0
Oklahoma	2	2	1	1
Utah	3	3	0	0
Connecticut	2	2	0	0
Idaho	2	2	0	0
Iowa	2	2	0	0
Nevada	2	2	0	0
Wyoming	2	2	0	0
Maine	1	1	0	0
Ohio	0	0	1	1
South Dakota	1	1	0	0
Tennessee	1	1	0	0
Colorado	0	0	0	0
Nebraska	0	0	0	0