Two Tales of Two U.S. States: Regional Fiscal Austerity and Economic Performance

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by

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Abstract. The recent fiscal austerity experiments undertaken in the states of Kansas and Wisconsin have generated considerable policy interest. Using a variety of identification approaches within a difference-in-differences framework and examining a wide range of economic indicators, this paper assesses whether the experiments have spurred growth in the states as promised by the governors and legislatures which enacted them into law. The overall conclusion from the paper is that the fiscal experiments did not spur growth, and if anything, harmed state economic performance. Among the identification approaches used, the Synthetic Control Method (Abadie and Gardeazabal 2003; Abadie et al., 2010) is demonstrated to provide the most compelling evidence.

Keywords: Fiscal austerity; State taxes; Synthetic Control Method

JEL Codes: H71; R12; R23

1. Introduction

Although the academic evidence on whether state income taxation affects economic growth is mixed (Bartik, 1991; Wasylenko, 1997; Buss, 2001; Rickman, 2013; Yu and Rickman, 2013), a number of states have recently reduced or considered reducing their personal and business taxes (Wall Street Journal, 2012). Dramatic reductions in taxes and cuts in government spending were the centerpieces of two recent controversial experiments in economic policy in the states of Kansas and Wisconsin. The Kansas and Wisconsin experiments began with the election of their Republican governors in 2010, Sam Brownback and Scott Walker, respectively, with both taking office January 2011. Governor Walker survived a recall election in Wisconsin during 2012, and both were re-elected in 2014.

The policies enacted after the election of the two governors were promoted as a means to stimulate growth in the state economies (Citizens for Tax Justice, 2012). They likely pleased the Republican Party base in each state and contributed to the reelection of both governors (Fredriksson et al., 2013). The attention surrounding the enactment of the fiscal austerity measures though generated considerable interest in their subsequent effects. To be sure, the performances of Kansas and Wisconsin economies have since often been compared to those of their neighbors, namely Nebraska and Minnesota, respectively. Neither Minnesota nor Nebraska enacted policies similar to those of Wisconsin and Kansas, making them potentially useful comparison states.

Wisconsin and Minnesota have been argued to be of similar size and economic structure (Chin, 2014), while also having similar climate and topography (Barnard-Schaber, 2015). One difference that has been noted is that Minnesota has its major university and capital in its major metropolitan area (Thompson, 2016). Wisconsin's economic performance has been reported as falling below Minnesota's economic performance since 2011 according to growth in total nonfarm employment, real gross state product and government production and employment (Chinn, 2014). In fact, Wisconsin's job growth fell far short of Governor Walker's pledge for job growth during his first term (Chinn, 2014).

The performance of the Kansas economy has mostly been compared to Nebraska's. The two states have been argued to have similar median income, per capita income, percentage of population in urban areas, and similar area under cultivation, though Kansas has a larger population (Fox, 2016). Both states also have a major East-West interstate. But Kansas ranked 10th in crude oil production, while Nebraska ranked 22nd (Fox, 2016); Kansas also possesses a sizeable aerospace sector (Chinn, 2015).

The performance of the Kansas economy similarly has lagged that of Nebraska since 2011. In fact, the gap in total nonfarm employment growth between Kansas and Nebraska widened each year since 2011, registering losses the last half of 2015, a fact which is not altered by removing oil-related job growth in the two states (Fox, 2016). Drought conditions and aerospace employment losses in Kansas also have been argued to not explain the relatively lower economic growth of Kansas (Chinn, 2014; 2015).

Lower growth in Kansas and Wisconsin post-2011 though is not sufficient to conclude that the economic experiments failed. What needs to be demonstrated is that the relative growth is lower (or at least not higher) than what would have occurred without the experiments. Post-treatment growth differences need to be compared to pre-treatment growth differences for control units that represent the baselines without the experiments. Therefore, we use a variety of empirical identification approaches that have been applied in the literature to compare the economic performances of Kansas and Wisconsin to those of other states since 2011 that represent the baseline.

There have been few studies on the effects of the party of the U.S. state governor and labor market outcomes. In a study of Democrat and Republican governors from 1941-2002, Leigh (2008) found that under Democrat governors states tended to experience higher median after-tax income, lower after-tax income inequality and lower unemployment rates; few differences in policy settings were found though between Democrat and Republican governors, suggesting they behaved more in accordance with the median voter theorem than ideology. Over the period 1951-2004, Chang et al. (2009) found that growth rates of real per capita income and

government spending tended to be higher with Democrat governors. Beland (2015) found a decrease in the annual earnings gap between whites and blacks under Democrat governors but not in weekly and hourly earnings.

We restrict the analysis to Kansas and Wisconsin because they had among the five largest personal income tax cuts since 2010 (Leachman and Mazerov, 2015) and a broad range of additional policies were driven strongly by ideology. There also can be heterogeneous responses to policy changes across time. In particular, the effects may have been stronger during a period of weak recovery following the Great Recession (Blanchard and Leigh, 2013).

We first compare the performances of Wisconsin with Minnesota and Kansas with Nebraska, pre- and post-2011, in difference-in-differences (DID) analysis of several economic indicators. Several economic indicators are examined to obtain a more accurate and holistic assessment of the relative economic performances (Partridge and Rickman, 1999). Across all the indicators, however, we find that Minnesota generally did not match well with Wisconsin and Nebraska did not match well with Kansas during the pre-treatment period, casting doubt on the use of Minnesota and Nebraska as the respective comparison states. Likewise, in using counties along the Kansas-Nebraska border and the Minnesota-Wisconsin border to control for potential differences in compositions at the state level in culture, geographic location and topography we similarly find that pre-treatment growth noticeably differed between the counties along the two borders for most economic indicators. We then apply the industry shift-share method at the state level within a DID framework to total employment to control for pre- and post-industry composition effects. Industry composition appears to explain the pre-treatment difference in total employment growth between Wisconsin and Minnesota, but not the difference between Kansas and Nebraska; the shift-share method also has limited usefulness because it can only be used for economic indicators with sector detail.

Finally, we then examine the economic performances of Kansas and Wisconsin since 2011 using the Synthetic Control Method (SCM) to construct counterfactual comparisons, or synthetic control groups. In SCM, the control groups are obtained as weighted–averages of

comparison states; the weights are applied to states based on pre-intervention characteristics in the process of matching pre-intervention paths of the indicator variables between the state of interest and the synthetic control group (Abadie and Gardeazabal 2003; Abadie et al., 2010). The respective synthetic control groups are demonstrated to have similarities to Kansas and Wisconsin and to match pre-2011 trends in the key economic indicators. Difference-in-differences are calculated for Kansas and Wisconsin and their synthetic controls.

In the next section, we discuss the policy changes enacted after the election of the Governors of Kansas and Wisconsin in 2010. Because of the respective comparisons to Minnesota and Nebraska we also discuss their policy experiences during the same period. In Section 3, we present the results of the analysis. Rather than spur growth, the overall conclusion from the analysis is that if anything, the experiments in fiscal austerity harmed the state economies. We also demonstrate that the Synthetic Control Method provides the most compelling evidence, suggesting its usefulness in regional policy evaluation.

2. Policy Comparisons

According to the National Council of State Actions Database,[1] immediately following Governor Walker taking office, Wisconsin cut taxes for businesses in the 2011-2013 budget (reducing corporate income taxes), reduced personal income collections through changing deductions etc., cut funding for K-12 education, limited how much property tax could be raised, raised college tuition 5.5%, changed collective bargaining process for most public employees, rejected federal health care funds for Medicaid expansion and rejected (federal) stimulus funds for high-speed rail. In the 2013-2015 budget corporate taxes were further reduced, some fees were raised, while large reductions in personal income taxes were enacted through reduced rates.

Correspondingly, following Governor Sam Brownback taking office, Kansas rejected Medicaid expansion, collapsed the three-bracket structure of personal income taxes 3.5, 6.25 and 6.45 percent into two brackets of 3.0 and 4.9 percent, repealed several income tax credits,

[1] http://www.ncsl.org/research/fiscal-policy/state-tax-actions-database.aspx

exempted certain non-wage business income of "pass-through" entities and increased the standard deduction for head of household and married taxpayers filing jointly. In 2013, for fiscal year 2014, the bottom bracket of 3.0 percent was reduced to 2.7 percent and the top bracket of 4.9 percent is reduced to 4.8 percent, while many deductions were reduced or repealed altogether, some of which had been raised during the previous budget.

In terms of policy, Minnesota pursued a different policy path during the period with the election of Mark Dayton, a Democrat, as governor. Minnesota enacted a sharp increase in taxes for the top 2 percent of household incomes, expanded unionization, froze college tuition, increased the minimum wage, boosted primary education spending and established all-day kindergarten (Patterson, 2015). In 2013, additional changes enacted to be implemented in subsequent years included modifications that brought in additional corporate and business taxes, raised fees and miscellaneous taxes, authorized a new personal income tax bracket at 9.85 percent on married and joint filers earning $250,000 of taxable income, expanded sales tax base (NCSL State Actions Database) and expanded Medicaid coverage[2].

In contrast to Kansas, Nebraska enacted few changes in fiscal policy (National Council of State Actions Database). In 2011, small effects on personal income tax collections occurred through an assessment on nursing home beds and a personal income tax credit for start-up high growth ventures. In 2012, personal income tax rates were slightly reduced across most brackets (a $7.7 million reduction). In 2013, Nebraska eliminated the state alternative minimum tax, increased the income tax credit for contributions to education savings plans, and provided a corporate tax credit from renewable electricity production.

3. Analysis

The wide range of policy decisions enacted by each governor and legislature makes it difficult to use computable general equilibrium or other structural models to assess the effects of the policies. In addition, dramatic shifts in policy also cause considerable uncertainty that may

[2] https://www.healthinsurance.org/minnesota-medicaid/

adversely affect economic activity in the state (Shelton and Falk, 2016) that are difficult to capture in a structural model. Therefore, we attempt to empirically estimate the effects of policies pursued early in each governor's first term using alternative identification approaches within a difference-in-differences (DID) framework.

Following Partridge and Rickman (1999; 2003), we examine a wide range of economic indicators to assess overall economic performance. Any one indicator may contain significant measurement error and interpretation of a single indicator may be misleading. Rising wages and per capita income at the regional level could reflect either relatively strong labor demand growth or alternatively relatively weak labor supply growth (Partridge and Rickman, 1999). The combination of indicators that best explains relative economic performance also can vary across states (Partridge and Rickman, 2003). We examine ten economic indicators at the state level: total employment, per capita income and real gross state product from the U.S. Bureau of Economic Analysis; total nonfarm wage and salary employment from the U.S. Bureau of Labor Statistics Quarterly Census of Employment and Wages (QCEW), the labor force participation rate and the unemployment rate from the U.S. Bureau of Labor Statistics; population, the poverty rate and median household income from the U.S. Census Bureau; and the average housing price from the Federal Housing Finance Authority.

Because of relative strengths and weaknesses of various empirical approaches to identification, we implement several approaches that have been applied in the literature. We first apply the DID to the ten economic indicators at the state level. Comparison states−Minnesota for Wisconsin and Nebraska for Kansas−however, may not necessarily match well with application of DID. Secondly, we apply DID for counties along the borders of each pair of states for potentially better matching. Yet, the counties along the borders of comparison states may not be representative of the states, nor represent much of the economic activity of the states. Thirdly, we apply the shift-share method long used in regional science (Loveridge and Selting, 1998). The shift-share method controls for the effects of differing industry compositions between the states, both pre- and post-treatment. But there may be factors other than industry composition affecting

the efficacy of the matched-comparisons. Finally, we use Synthetic Control Method (SCM) to construct control groups (Abadie and Gardeazabal 2003; Abadie et al., 2010). SCM does not require any single state to be a good match for comparison to the treated state. Rather, in SCM a weighted-average of states is constructed with the weights chosen based on affinities with the treatment state and pre-treatment matching in the outcome variable. We do not consider panel estimation because of the wide variety of policies enacted in the treatment states (and in some control states), and we do not seek a mean effect across geography and time.

3.1 State-level Difference-in Differences

Consistent with the previous reports (e.g., Chinn, 2014; 2015) total nonfarm employment grew relatively less in Kansas and Wisconsin than in their comparison states (Figure 1) post-2011. To be sure, as shown in column (1) of Table 1, economic performance of Wisconsin lagged that of Minnesota for all but one economic indicator over the post-2011 period. For Kansas (column (3)), the state lagged performance of Nebraska for six of the ten economic indicators.

Yet, as shown in columns (2) and (4), difference-in-differences (DID) estimates for the two periods suggest that Kansas and Wisconsin outperformed their respective comparison states in terms of total nonfarm employment growth. This occurs though because the pre-treatment declines in the two states exceeded those of the respective comparison states by greater amounts than by the amounts they underperformed post-2011. With the outcome values normalized to equal one in 2011, this is shown in Figure 1 by the lower beginning points of the outcome variables between the pairs of states.

Figures 2-4 show that this also happens for Kansas-Nebraska for per capita income and real gross state product and for Wisconsin-Minnesota for population and real gross state product. In fact, across the ten economic indicators for both pairs of states, in only a few cases is there approximately equal economic performance during the pre-treatment period−population for Kansas-Nebraska and per capita income for Wisconsin-Minnesota. This leads to five and seven of the economic indicators favoring Wisconsin and Kansas, respectively. In the case of pre-treatment matching of population growth between Kansas and Nebraska, the DID calculation

(Table 1) shows a negative effect for Kansas. This questions the efficacy of using Minnesota and Nebraska as comparison states for the baselines of Wisconsin and Kansas.

3.2 Border County Difference-in-Differences

In an attempt to control for other unmeasured characteristics, we next compute difference-in-differences (DID) for counties along the border of each pair of comparison states. Counties along the border more likely share common culture, economic structure and geography and hence may produce better pre-treatment matches. Data are only available for eight of the indicators at the county level though.

Consistent with the state-level results, Table 2 shows mixed results for the comparisons. Wisconsin and Kansas each fared better than their comparison state in one-half of the outcomes, based on using either the post-treatment changes (columns (1) and (3)) or the DID (columns (2) and (4)).[3] Yet, also as with the state-level analysis, the large differences between most of the 2011-2015 (2011-2014) post-treatment changes and the DID estimates reveal that the changes during the pre-treatment period mostly did not match closely between the border counties of the comparison states. This suggests that the border counties for each pair of states are not good matches.

In addition, little of the economic activity in these states is located in these border counties. Economic activity in Kansas and Nebraska mostly lies along the major interstates. Except for the Minneapolis-St. Paul metropolitan area, little economic activity lies along the border counties of Wisconsin and Minnesota; the two largest cities of Wisconsin lie in the interior (Madison) or on the eastern edge along Lake Michigan (Milwaukee). Two of the sixteen counties in the Minneapolis-St. Paul metropolitan area are in Wisconsin, and would be expected to have different growth dynamics than the central part of the metropolitan area in Minnesota. In addition, potential spillovers could be even more important for border county-level DID than the state aggregates.

[3] In results not shown, using matched-border counties based on contiguity does not change signs and hardly affects the magnitudes. Unweighted averages were used where there were more than one contiguous county in the neighboring state.

3.3 Shift-Share Analysis

The state- and county-level DID approaches likely do not control for growth differences that result from differences in industry composition. Industry composition growth differences are only accounted for in DID to the extent the comparison states/counties have similar industry structure. Differences in industry structure may explain some of the differences in pre-treatment growth between the pairs of comparison states. Therefore, we next apply the industry shift-share decomposition approach at the state level within a DID framework.

The shift-share model separates regional employment growth into three effects: national, industry mix and competitive (Loveridge and Selting, 1998). The national effect accounts for general growth across the nation, the industry mix effect represents the growth attributable to the region's (r) composition of industries (i), while the competitive effect is employment growth that is different from national growth and which is attributable to having a composition of industries growing differently than the average. In the following formulation, the national and industry mix effects are combined (im):

$\Delta im^{r}_{i,\,(t-0)}=(e^{r}_{i,0})*((\%\Delta e^{n}_{i,(t-0)})/100)$.

The sum of the industry mix effects across industries (i), including overall national growth, is the predicted change in regional employment from period 0 to t that is attributable to its employment composition of industries in time 0, which then is converted to a rate of change. The industry mix effect reflects employment effects of international trade shocks, national productivity shocks and national industry restructuring (Partridge et al., 2017) and is often used as an exogenous instrument for employment growth (e.g., Bartik, 1991; Moretti, 2010).

The results of applying DID to the decomposed shift-share BEA total employment growth components appear in Table 3.[4] The first two columns represent the growth in employment that would have been predicted for the state had all its industries grown at the national rates for the respective period. This captures both the national growth effect and the

[4] Year 2014 was the last period of data availability for BEA total employment at the time of the calculations. We used the BEA total employment data because of its greater sector detail relative to that in the BLS QCEW data.

effect of a state's composition of industries. The third and fourth columns contain the actual growth rates during the two periods. The fifth and sixth columns display the competitive effects, obtained by taking the difference between the actual and predicted growth rates. A positive number indicates growth that exceeds what would have been predicted by its composition of industries and suggests a competitive growth advantage (Loveridge and Selting, 1998). The seventh column displays the differences result across the two periods for the competitive component, in which the third and sixth rows contain the difference-in-differences estimates (shown in bold).

Wisconsin and Minnesota grew at approximately the rates predicted by their composition of industries during 2008-2011, as revealed by competitive growth effects close to zero. But for 2011-2014, both states grew slower than what would have been predicted based on their industry composition. Wisconsin's competitive effect was 0.79 percent lower during the 2011-2014 period than that of Minnesota (column 6, row 3). The corresponding DID between the two periods and two states for the competitiveness effect equals negative 0.55 percent (column 7, row 3), a slightly smaller relative decline than that reported in column (6) for the post-treatment period.

Kansas' total employment declined close to the prediction for 2008-2011, while Nebraska total employment did not decline nearly as much as predicted. Both states though moved to underperforming during 2011-2014. The negative change in growth rates was greatest for Nebraska, producing a DID estimate of 1.26 percent total employment improvement for Kansas relative to Nebraska. This stands in contrast to the slightly worse competitive effect for Kansas during 2011-2014 (column (6)).

The shift-share analysis confirms the DID BEA total employment advantage for Kansas in Tables 1 and 2.[5] But there was not a good match between Kansas and Nebraska in the competitive component during the pre-treatment period, again casting doubt on the predicted advantage for Kansas. There was a fairly good match in the competitive component between

[5] In the base case shown in Table 3, the 2007 employment share are used in the industry mix calculations for both 2007-2011 and 2011-2014. Using 2007 employment shares for 2011-2014 instead of 2011 shares does not affect the results.

Wisconsin and Minnesota, suggesting that much of the poor pre-treatment fit between the two states is attributable to differences in industry composition. This gives validity to the negative 0.55 percent lower DID shift-share growth in total employment growth for Wisconsin. There still can be other problems for matching in terms of the competitiveness effects, especially for Kansas-Nebraska during the pre-treatment period. The shift-share also can only be applied to data with industry detail.

3.4 Synthetic Control Method Analysis

The general lack of matching in the pre-treatment periods in the identification approaches above leads us to next use the Synthetic Control Method (Abadie and Gardeazabal 2003; Abadie et al., 2010). The Synthetic Control Method (SCM) provides a comparison unit, or synthetic control, that is a weighted-combination of other states. The weights applied to states that become part of the synthetic control are based on pre-intervention characteristics (predictor variables) in matching pre-intervention paths of the economic indicator variables between the state of interest and the synthetic control group (Abadie and Gardeazabal 2003; Abadie et al., 2010). The SCM has been increasingly applied at the U.S. state level (e.g., Abadie et al., 2010; Bohn et al., 2014; Ando, 2015; Liu, 2015; Munasib and Rickman, 2015; Eren and Ozbeklik, 2016; Luechinger and Roth, 2016; Rickman, Wang and Winters, 2017).[6]

3.4.1 Empirical Implementation

Construction of a synthetic control avoids the necessity of finding a "twin" for comparison, which can be difficult at the state level. Predictions for the synthetic control are obtained by multiplying the economic outcomes for the contributing states by the state weights and summing the values. Difference-in-differences can then be applied to the pre- and post-treatment predictions.

The predictor variables used in fitting the pre-intervention paths are from the regional science literature and were applied in SCM analysis by Munasib and Rickman (2015) and

[6] Technical presentations of the SCM can be found in Abadie and Gardeazabal (2003), Abadie et al. (2010) and Munasib and Rickman (2015).

Rickman, Wang and Winters (2017). The predictor variables used include several produced by the Economic Research Service of the United States Department of Agriculture: natural amenity scale; rural-urban continuum code; manufacturing dependence; mining dependence; farm dependence; persistent poverty counties; retirement destination; recreation dependence; long-term population losses (all year 2000 or earlier). Other predictor variables used include U.S. Census Bureau population density in year 2000, shift-share industry mix employment growth four-digit level (2002-2007) (Dorfman et al., 2010), U.S. Census Bureau educational attainment among the adult population (25+) in year 2000 (high school completion, associate's degree, bachelor's degree or higher, Fraser's Economic Freedom Index (Goetz et al., 2011) and following the convention in SCM, pre-intervention values of outcome variable (2006, 2008, 2010). The use of industry dependence and the shift-share growth industry mix growth as predictor variables should help control for industry composition effects, while the other predictor variables also should help improve the matches compared to simply using Minnesota and Nebraska as comparison states in DID analysis.

Thirty three of the lower forty eight states serve as potential donors to the synthetic control. Wisconsin and Kansas are eliminated as a potential donor for each other. States with significant energy or mining extraction during the period were removed from consideration because of differing cycles during the pre- and post-treatment periods related to energy price fluctuations: Colorado, Louisiana, Montana, New Mexico, Nevada, North Dakota, Oklahoma, Texas, West Virginia and Wyoming. Maine and Ohio were removed because, along with Kansas and Wisconsin, they were among the top five states with the largest personal income tax cuts during the treatment period (Leachman and Mazerov, 2015). [7] Michigan was removed because of large business tax cuts enacted during the period.[8]

[7]As presented by Leachman and Mazerov (2015), Maine's tax cuts took effect in January 2012. The cuts in Kansas, Ohio and Wisconsin took effect in January 2013. Because the tax cuts were enacted well before they took effect, and other actions were taken, we use the first year of the governors' terms as the treatment year. The other state with the largest personal income tax cut was North Carolina. But because it did not take effect until January 2014 we retained North Carolina as a potential donor.

[8]Source: NCSL State Tax Actions Database http://www.ncsl.org/research/fiscal-policy/state-tax-actions-database.aspx, last accessed February 1, 2017.

3.4.2 Results

As shown in Table 4, based on DID calculations for the same periods used in Table 1, across all but one economic indicator for Kansas, and all but two indicators for Wisconsin, economic performance in the synthetic control group matched or exceeded that of the respective treated state. This stands in contrast to the results of Table 1, where Wisconsin was compared to Minnesota, and Kansas was compared to Nebraska. Notably, total nonfarm QCEW employment grew 2.55 percent less in Kansas relative to its synthetic control and 1.34 percent less in Wisconsin relative to its synthetic control.[9]

However, it was not that Kansas and Wisconsin performed better than Nebraska and Minnesota, respectively. QCEW total nonfarm employment in Kansas and Wisconsin grew slower post-2011 than in the respective comparison states, just not compared to the pre-treatment differences, suggesting poor matches for the states. With the Synthetic Control Method (SCM), by design the pre-treatment matches were significantly improved.

Figures 5-8 show the SCM results for total nonfarm QCEW employment, per capita income, population and gross domestic product. Although both governors took office and began changing policy, it was not until the tax cuts were enacted and implemented did total nonfarm employment growth begin to lag that of the respective synthetic control, particularly for Kansas. Although generally matching well during the pre-treatment period, the trend in Kansas population flattened in 2010 (Figure 7) compared to that of the synthetic control, prior to Governor Brownback taking office. The trend in Kansas gross state product matched that of the synthetic control (Figure 8) better than it did that of Nebraska (Figure 4), but not as well as Wisconsin did with its synthetic control.

Table 5 shows the weights the states received in the construction of the synthetic control for total nonfarm employment (columns 1 and 3) and for the average across all ten economic

[9] In sensitivity analysis, when Maine, Michigan and Ohio are included in the donor pool, the latter two states feature prominently in the construction of the synthetic control group for Wisconsin across most indicators. Yet, the results are mostly unchanged, where only for three economic indicators does Wisconsin outperform the synthetic control group. The three states do not become contributors to the synthetic control group for Kansas, leaving its results unchanged.

indicators (columns 2 and 4). In order, the states with the largest weights in the construction of the total nonfarm employment synthetic control for Wisconsin are Iowa, Delaware and Indiana. On average across all ten economic indicators the top five states for Wisconsin's comparison synthetic control are Indiana, Iowa, Delaware, Pennsylvania and Vermont. Minnesota has the seventh largest weight, suggesting it has some relevance for comparison to Wisconsin, but not as the primary state of comparison. For nine of the fifteen predictor variables (not shown), the composite values for the synthetic control are closer to those of Wisconsin than are Minnesota's: amenity scale, mining dependence, manufacturing dependence, farm dependence, population loss counties, recreational dependence, rural-urban continuum, bachelors' degree and high school completion.

The four states receiving weights in the construction of the total nonfarm employment synthetic control for Kansas in order of importance are Washington, Nebraska, Missouri and Alabama. On average across all ten economic indicators the top five states for Kansas' comparison synthetic control are Iowa, Washington, Nebraska, South Dakota and Utah. Nebraska fares well as a state of comparison for Kansas, though by itself does not produce pre-treatment matching in the outcome variables. In fact, the composite values for the synthetic control are only closer to those of Kansas than are Nebraska's in about one-half of the predictor variables: manufacturing dependence, farm dependence, rural-urban continuum code, associates' degree, high school completion, economic freedom index and the state-industry mix employment growth rate for 2000-2007.[10]

3.4.3 Policy Differences in Treated States versus Synthetic Control Units

We next examine the differences in state fiscal policy between the treated states and the donors to the synthetic control units. Although we removed the states with the largest tax changes as potential donors in the construction of the synthetic controls, most states make some

[10] We do not conduct placebo analysis because clearly there can be differences in economic performance among the donor states for other reasons. Rather, our aim was in constructing efficacious comparison units for Kansas and Wisconsin and evaluate them in terms of differences in state fiscal policy (Section 3.4.3)

adjustments in taxes and expenditures each year. We compare the changes in expenditures in the treated states to weighted-average changes in state expenditures, in which the weights are the corresponding average state synthetic control unit weights from columns 2 and 4 of Table 5.[11]

As shown in Figure 9, real per capita state general expenditures declined in both Wisconsin and Kansas relative to those of their corresponding synthetic control units. The respective DID calculations for Wisconsin and Kansas are -7.7 and -1.5 percent, respectively. This is consistent with the relatively poorer economic performance in the two states as attributable to changes in state fiscal policy. The relative declines began in 2011, prior to the implementation of tax cuts, providing additional evidence for the relative declines in economic performance that began in 2011, likely associated with spending cuts that preceded the tax cuts.

The relative declines especially occur in total real per capita construction expenditures (Figure 10), in which the respective DID calculations for Wisconsin and Kansas are -8.7 and -30.8 percent. Figure 11 shows relative declines in total real per capita education expenditures. The DID calculations are -11.8 and -3.2 percent, respectively. The results are especially notable given that 2013 is the last year of data for state expenditures and the state fiscal policies were only getting fully implemented.

4. Discussion and Conclusion

This paper assessed the effects of U.S. state fiscal austerity on state economic performance using the recent economic experiments in Kansas and Wisconsin. Our results suggest that rather than experiencing stimulative growth effects from reductions in taxes, if anything, Wisconsin and Kansas experienced negative economic multiplier effects from reduced state government spending (Chinn, 2014) and increased economic uncertainty. It remains to be seen what the long-run economic effects of the experiments will be. But the economic experiments in Wisconsin and Kansas, along with those elsewhere (Arduin, Laffer and Moore Econometrics, 2011) were advocated as a means to stimulate growth in the short-run without having to reduced state

[11] State expenditures are from the Annual Survey of Government Finances: Urban Institute-http://slfdqs.taxpolicycenter.org/pages.cfm.

government expenditures because of offsetting growth-induced tax revenue collections. In these two cases, the governing parties appeared to negatively affect their economies in the short run. Internationally, the International Monetary Fund likewise admits underestimating the negative multiplier effects of fiscal austerity on European economies (Blanchard and Leigh, 2013).

The study also points to the perils of comparing state economic performance to that of its neighbors. Although the relatively poorer performance of Wisconsin relative to Minnesota and Kansas to Nebraska reported in the media post-2011 generally holds up in the synthetic control analysis, state- and county-level DID analysis in this study suggests that the two pairs were not sufficiently efficacious matches. We also conclude that following Partridge and Rickman (1999), multiple indicators should be examined. Not all aspects of the state economies appear to have been uniformly affected by the policy changes.

Future research will be needed to evaluate the long-term effects of the Kansas and Wisconsin experiments. But short-term budget difficulties may lead the states to reverse course and raise some taxes (Carpenter, 2017). The long-term evaluation then may be in terms of disruption and volatility rather than a consistent long-run move in a definitive ideological direction.

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Table 1. State-Level Difference-in-Differences (2015-2011 vs 2011-2007)

	WI-MN 2011-2015 (1)	WI-MN DID (2)	KS-NE 2011-2015 (3)	KS-NE DID (4)
Total Nonfarm Emp.	-1.29%	0.1%*	-1.13%	1.01%*
Per Capita Income	-0.08%	0.26%*	-1.36%	0.72%*
Real GSP	-2.88%	-1.4%	-6.71%	-1.59%
Population	-1.62%	-0.06%	-1.54%	-1.34%
BEA Total Emp.[a]	-0.8%	0.36%*	0.24%*	1.91%*
Unemployment Rate	-0.4%*	-1.4%*	-0.9%*	-1.8%*
LF/Population	-0.05%	0.61%*	1.14%*	2.95%*
Median HH Income[a]	-3.98%	-1.03%	2.3%*	6.7%*
Poverty Rate[a]	0.5%	0.1%	0.3%	-0.1%*
Housing Price	-11.96%	-23.32%	-5.98%	-3.83%

[a] Because of data availability 2008-2011 and 2011-2014 were the periods used in the calculations
* Indicates Wisconsin/Kansas with the preferred outcome

Table 2. Border County Difference-in-Differences

	WI-MN 2011-2015 (1)	WI-MN DID (2)	KS-NE 2011-2015 (3)	KS-NE DID (4)
Total Nonfarm Emp.	-1.56%	-2.59%	-1.29%	-0.66%
Per Capita Income	0.69%*	-0.11%	-9.80%	-17.75%
Population	3.62%*	3.96%*	0.77%*	-0.60%
BEA Total Emp.[a]	-0.71%	-0.94%	0.53*	4.36%*
Unemployment Rate	0.23%	-0.21%*	0.21%	0.30%
LF/Population	-0.2%	-1.62%	-0.75%	1.95%*
Median Income[a]	0.94*	4.93%*	1.46*	6.18%*
Poverty Rate[a]	-0.17*	-0.58%*	-0.06*	-0.02%*

[a] Because of data availability 2008-2011 and 2011-2014 were the periods used in the calculations
* Indicates Wisconsin/Kansas with the preferred outcome

Table 3. Shift-Share Difference-in-Differences Results

	Predicted (%) (Industry Mix Effect)		Actual (%)		Actual-Predicted (%) (Competitive Effect)		DID (%)
	2008-2011 (1)	2011-2014 (2)	2008-2011 (3)	2011-2014 (4)	2008-2011 (5)	2011-2014 (6)	Post-Pre (7)
MN	-1.99	5.29	-1.84	3.87	0.15	-1.42	-1.57
WI	-2.87	5.32	-2.96	3.11	-0.09	-2.21	-2.12
WI-MN	-0.88	0.03	-1.12	-0.76	-0.24	-0.79	**-0.55**
KS	-2.2	5.45	-2.22	4.25	-0.02	-1.2	-1.18
NE	-2	5	-0.57	3.99	1.43	-1.01	-2.44
KS-NE	-0.2	0.45	-1.65	0.26	-1.45	-0.19	**1.26**
US	-1.87	5.4	-1.87	5.4	0	0	0

Table 4. State-Level SCM Difference-in-Differences

	Wisconsin-Synthetic	Kansas-Synthetic
Total Nonfarm W&S Emp.	-1.34%	-2.55%
Per Capita Income	1.63%*	-0.25%
Real Gross State Product	0.13%*	-7.82%
Population	-0.00%	-0.95%
BEA Total Employment	-0.20%	-0.67%
Unemployment Rate	0.45%	0.13%
Labor Force/Population	-0.55%	-0.79%
Median Household Income	-0.78%	2.67%*
Poverty Rate	0.62%	0.11%
Housing Price	-6.60%	-1.17%

* Indicates Wisconsin/Kansas with the preferred outcome

Table 5. Synthetic Control State Weights

State	Wisconsin-QCEW (1)	Wisconsin-Average (2)	Kansas-QCEW (3)	Kansas-Average (4)
AL	0.068	0.042	0.106	0.014
AZ	0.042	0.004	0	0.005
AR	0	0.001	0	0.011
CA	0	0	0	0.012
CT	0	0	0	0.006
DE	0.363	0.074	0	0
FL	0.007	0.001	0	0
GA	0	0.010	0	0.001
ID	0	0.031	0	0.014
IL	0	0.032	0	0.008
IN	0.13	0.225	0	0.035
IA	0.378	0.117	0	0.235
KY	0	0.005	0	0.003
MD	0	0.007	0	0
MA	0	0	0	0
MN	0	0.052	0	0.001
MS	0	0.003	0	0
MO	0	0.032	0.155	0.016
NE	0	0	0.339	0.153
NH	0	0.047	0	0.064
NJ	0	0	0	0
NY	0	0.011	0	0
NC	0	0	0	0.007
OR	0	0	0	0
PA	0.004	0.073	0	0.001
RI	0	0.051	0	0
SC	0	0.040	0	0.001
SD	0	0.009	0	0.119
TN	0	0.019	0	0.002
UT	0	0	0	0.082
VT	0.007	0.063	0	0
VA	0	0	0	0.034
WA	0	0.053	0.4	0.178

Note: columns sums may not equal 1 due to rounding

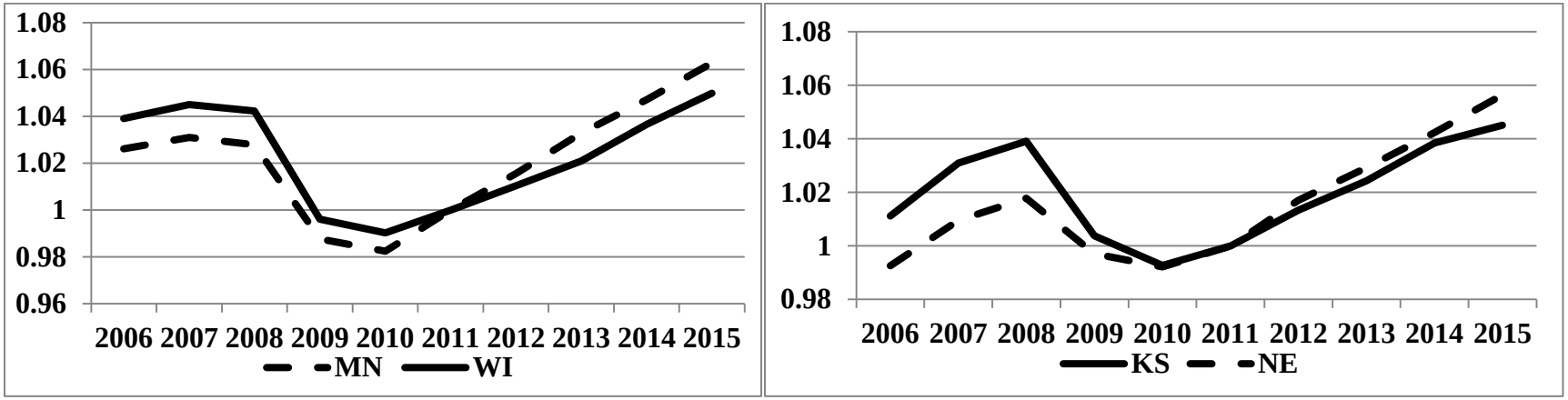


Figure 1. Difference-in Differences Annual Average BLS Total Nonfarm Employment (QCEW) (treatment year: 2011=1)

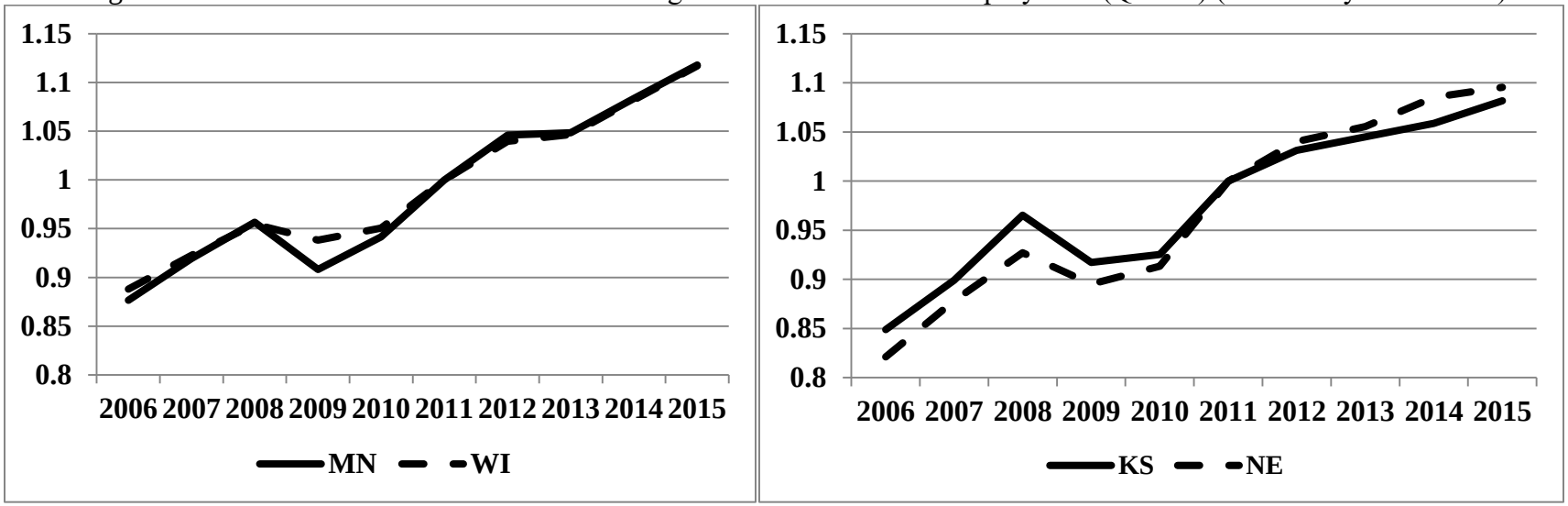
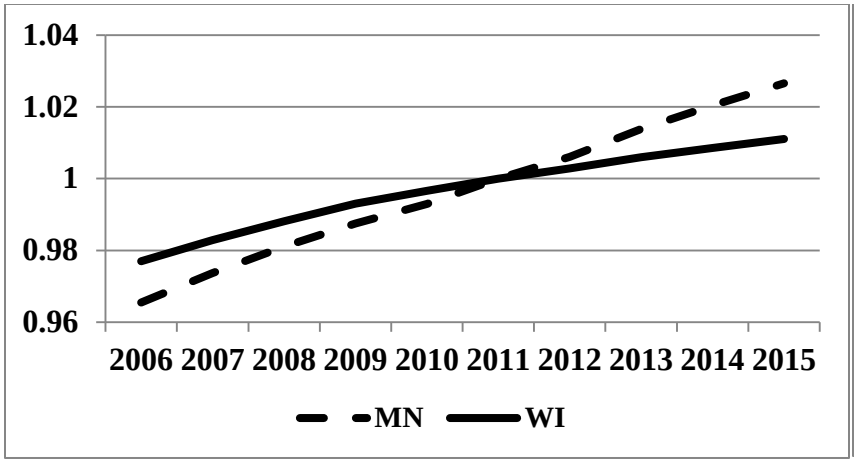


Figure 2. Difference-in Differences BEA Per Capita Income (treatment year: 2011=1)



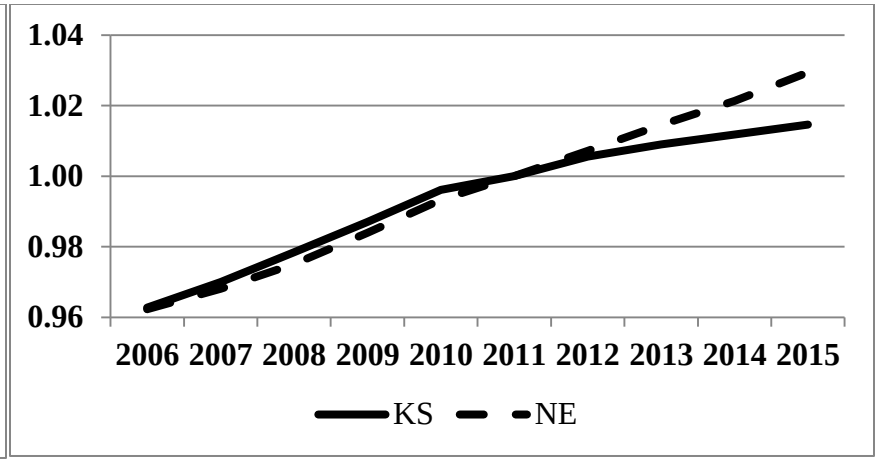
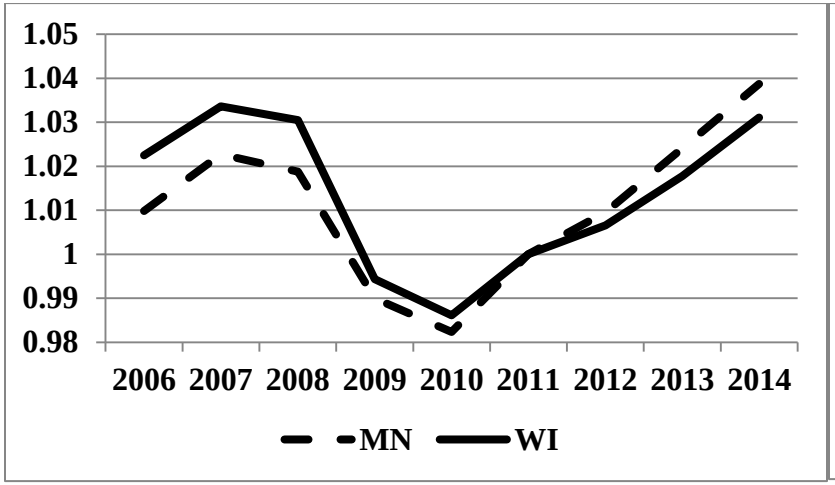


Figure 3. Difference-in Differences Census Population (treatment year: 2011=1)



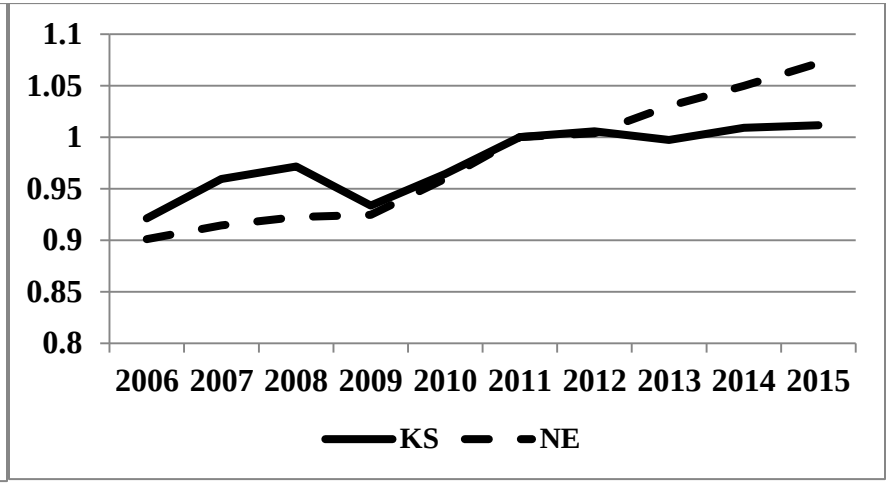


Figure 4. Difference-in Differences Real Gross State Product (treatment year: 2011=1)

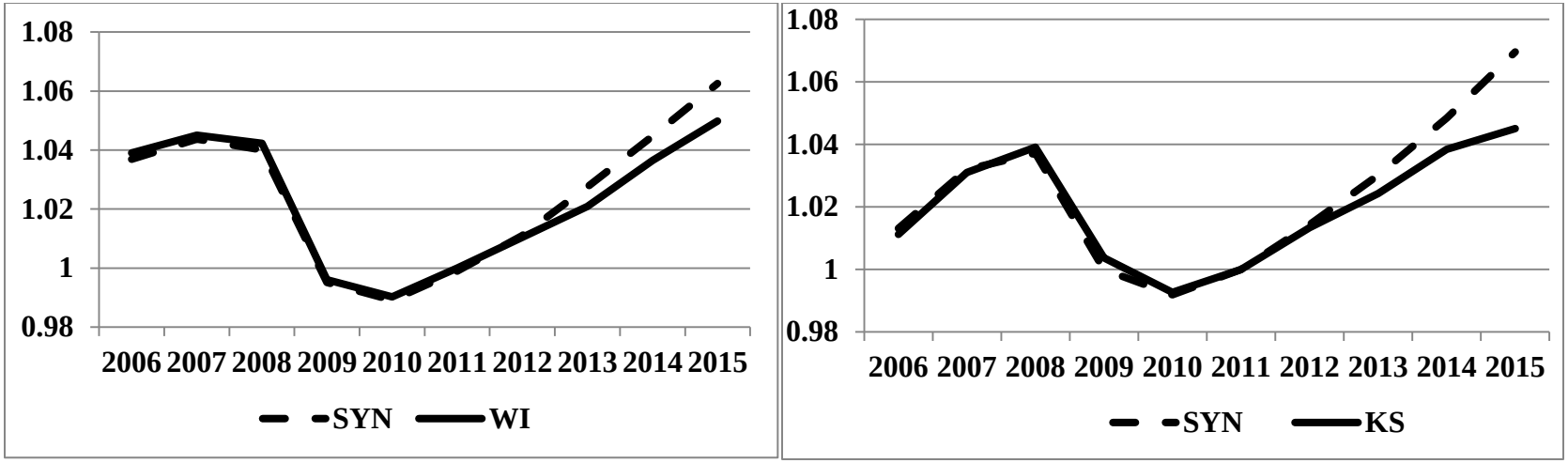


Figure 5. Synthetic Control Annual Average BLS Total Nonfarm Employment (QCEW) (treatment year: 2011=1)

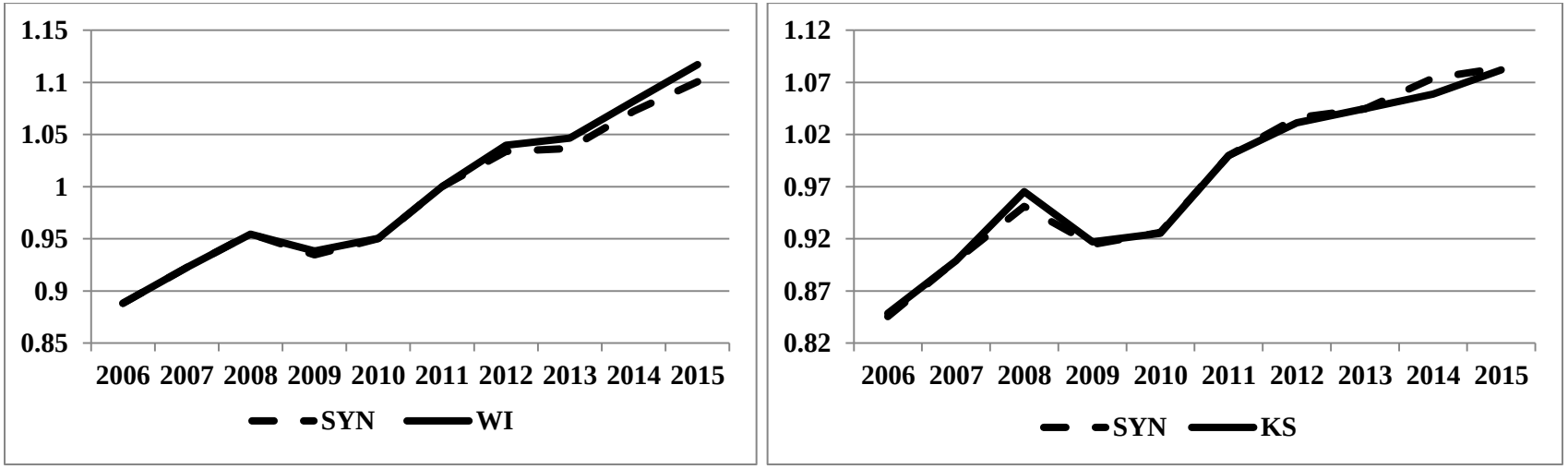


Figure 6. Synthetic Control Per Capita Income (treatment year: 2011=1)

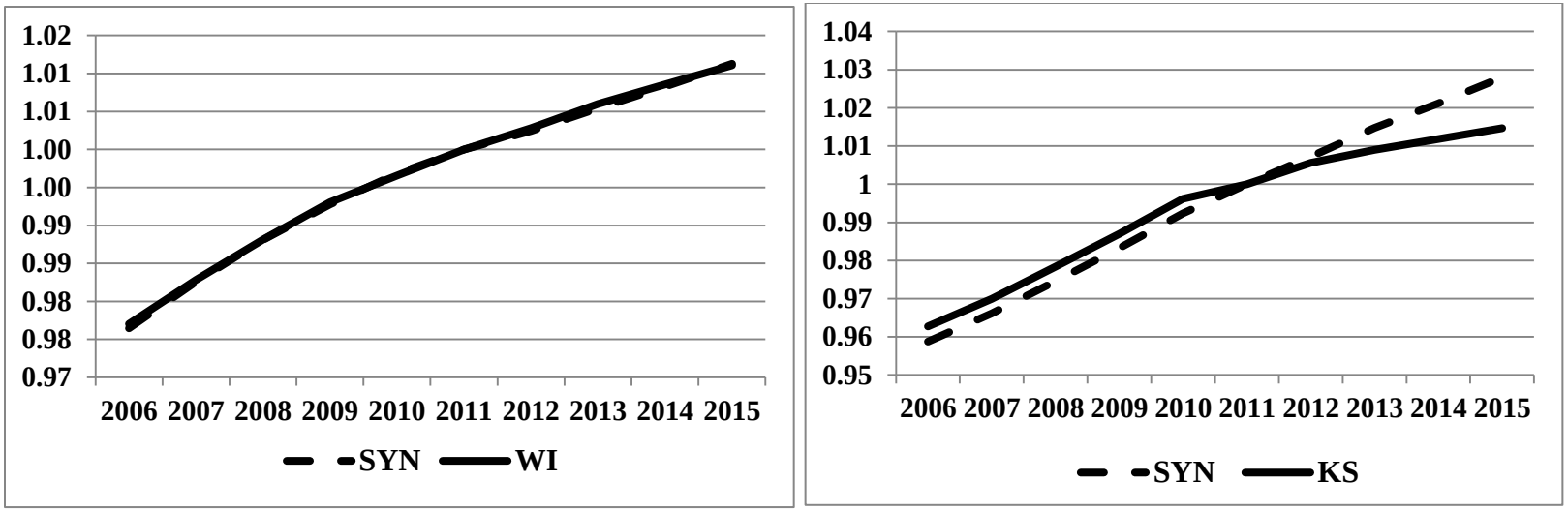


Figure 7. Synthetic Control Population (treatment year: 2011=1)

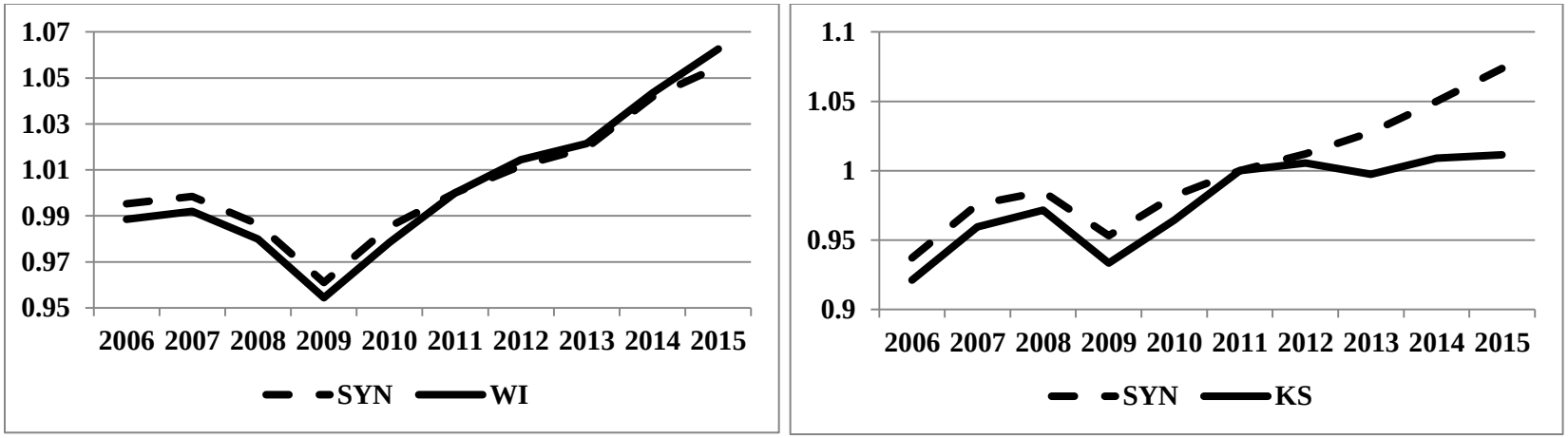


Figure 8. Synthetic Control Real Gross State Product (treatment year: 2011=1)

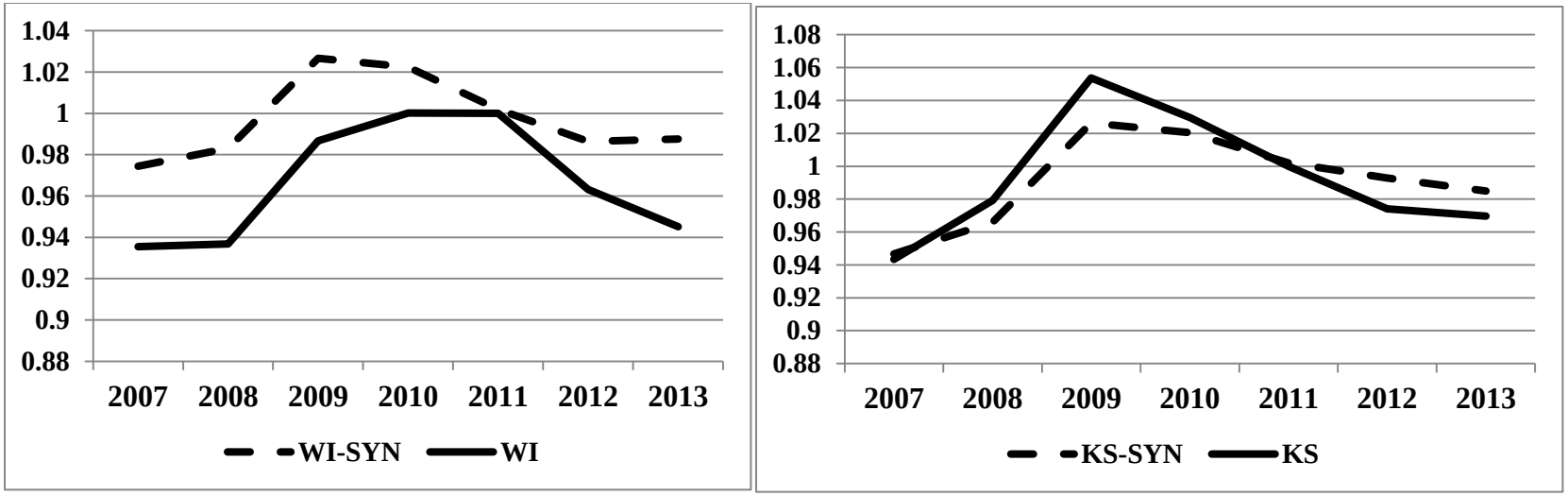


Figure 9. Real Per Capita General State and Local Expenditures (Annual Survey of Government Finances) (treatment year: 2011=1)

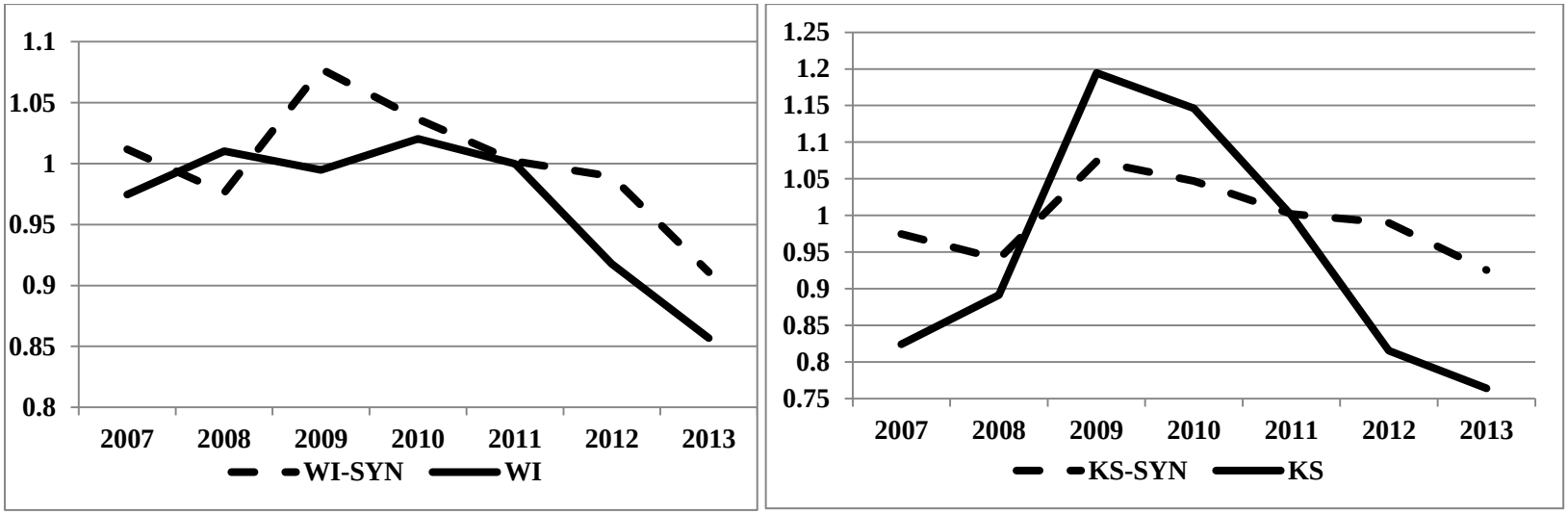


Figure 10. Real Per Capita Total Construction Expenditures (Annual Survey of Government Finances) (treatment year: 2011=1)

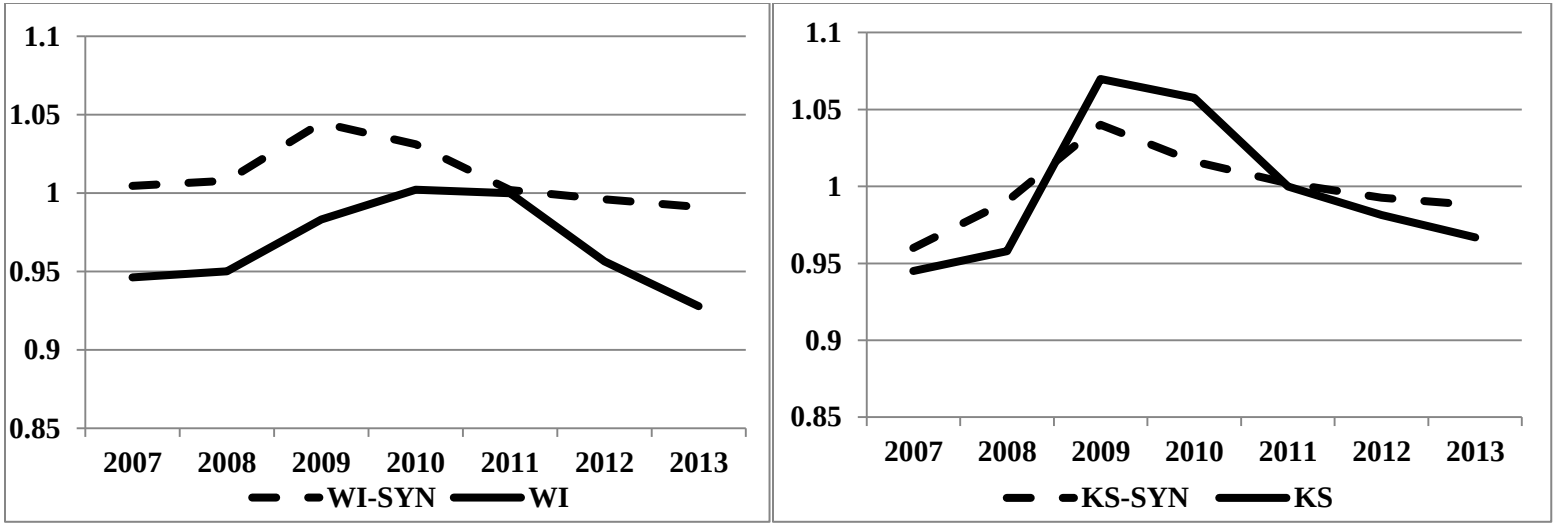


Figure 11. Real Per Capita Total Education Expenditures (Annual Survey of Government Finances) (treatment year: 2011=1)