

AFTER WAYFAIR: WHAT ARE STATE USE TAXES WORTH?

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The U.S. Supreme Court ruling in South Dakota v. Wayfair, Inc. that states may require sellers without a physical presence to collect use taxes has generated much enthusiasm and dread among observers. We present new panel data on revenues from the state use tax between 2010 and 2017. We also present a unique monthly series of remote vendor use tax collections for Indiana before and after the Wayfair ruling and use the synthetic control method to derive a treatment effect of the policy change. From this treatment effect we project state revenue impacts across the country.

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I. INTRODUCTION

On June 21, 2018 the U.S. Supreme Court (SCOTUS) provided a much anticipated ruling in the case of *South Dakota v. Wayfair* (138 S. Ct. 2080 (2018)). The case revisited the circumstances under which a retailer established nexus in a state, which would require said retailers to collect and remit taxes on sales to state residents. SCOTUS had previously determined the physical presence of property or employees in a state as the basis for sales tax nexus in a 1992 ruling in the case of *Quill v. North Dakota*. If residents purchased taxable goods or services from retailers without sales tax nexus, then the statutory requirement shifted to consumers who were to remit the equivalent payment to the state under the use tax. Compliance with the use tax is low and enforcement costly, but in 1992 and earlier interstate transactions were regarded as insignificant fractions of a potential sales tax base. However, in the ensuing decades the rise of e-commerce increased the role of interstate competition in the retail space, and low compliance arguably created an advantage for out-of-state vendors and a challenge to state tax revenue from one of its most significant bases. In *Wayfair*, SCOTUS effectively overturned *Quill* by upholding South Dakota's establishment of a broader economic nexus for tax registration and collection that did not rely on the presence of property or employees provided the state's law did not burden or discriminate against interstate commerce. The requirement for registration as a collector of the state tax changed from whether the vendor had physical presence in some way in the state to whether the vendor had a substantial economic presence or nexus in the state as measured by a considerable level of sales made in the state. Many states have responded to the *Wayfair* case by adopting the use of economic nexus for requiring remote vendors to register as tax collectors for the state (see Table 1).

This article assesses the standing of the use tax in the post-*Wayfair* era. To do this, we provide relevant background and history of the use tax to sharpen attention to the role of the use

tax in the state consumption tax system (section II). We provide unique data on use tax collections by state, which are not commonly reported as distinct from sales tax revenues (section III). We demonstrate that the role of the use tax is primarily to provide economic neutrality in the consumption tax system rather than serving as a revenue source, but nevertheless use tax produces significant sums in some states. Considering this view that *Wayfair* affects both sales and use tax collections, we then (section IV) explore recent monthly data on sales and use taxes from Indiana, which was readily prepared to enforce an economic nexus standard shortly after the *Wayfair* ruling. Using a synthetic control method for causal investigation, it is demonstrated that the economic nexus standard has, in the last quarter of 2018, had a very limited impact on state sales and use tax revenues. We conclude with a discussion of implications from our findings.

II. BACKGROUND ON USE TAX

The use tax is the poorly understood companion to the retail sales tax that, at least in recent years, for tax administrators and businesses has caused considerable trouble given the relatively modest revenue that the tax often produces. The idea of the use tax is simple and direct. As Criz (1941, 1) aptly summarized, “The function of the use tax is to eliminate avoidance of the sales tax.” The use tax is designed to close a method of easy sales tax avoidance that became a concern for states almost as soon as the earliest retail sales taxes emerged in the early 1930s. The earliest form of the problem was simple: if one state levied a retail sales tax and its neighbor did not, it would be easy for the purchaser of a large-ticket item (or those with a long shopping list of more modestly priced items) to purchase in the no-tax state and then to bring the purchases back to the taxing state and avoid the tax. Even when statutory rates were as low as one or two percent, it was a concern for merchants who might be losing sales to neighbors and for states who worried about the loss of

tax base. Of course, the concern increased as sales tax rates increased, and any vendor of taxable product near a border would be worried.

Origin states enjoyed the advantage for their merchants, while destination states were constrained in what they could do about the problem. Because the transactions were in interstate commerce, the destination states could not use the standard and most effective approach to collecting a tax on purchases or sales, that is, to require the vendor to register to collect and remit tax on combined transactions over a period, in other words to collect the tax on an indirect basis and to allow administrators to enforce the tax in bulk against the vendor. That system worked for the retail sales taxes and could work for the use tax as well but the destination states, the states that had an interest in enforcing their tax, could not apply it. The origin states would be less inclined to try it because their merchants enjoyed the market advantage, but they could not tax true interstate transactions either.

In 1935, California and Washington came up with the innovative fix. They adopted the idea of a use tax, that is, a tax that was comparable to the sales tax in coverage and rate but applied to the first use of the purchased product in the state. The Supreme Court accepted the tax as not applying to transactions in interstate commerce (and hence being constitutional) because they applied to the privilege of use after the interstate commerce was over (*Henneford v. Silas Mason Co., Inc.*, 300 U.S. 577 (1937)). The tax could be collected from the user, even though states could not enforce the tax by requiring sellers to register, collect, and remit. In other words, the use tax could be enforced as a direct tax from the purchaser, but not as an indirect tax via the vendor.

Vendor collection is the Holy Grail in collection of transaction taxes, so the use tax was crippled from the beginning. The convoluted legal history of use tax administration, terminating (at least so far) with *Wayfair v. South Dakota*, 138 S. Ct. 2080 (2018), represents a successful (at

least so far) struggle by states to get their use taxes to be collected in approximately the same system as their retail sales taxes are collected.¹

The use tax initially aimed at purchasers who physically crossed borders to make purchases in lower tax states. The options for such evasion narrowed as more states adopted the tax – eleven states levied the tax in 1933, a number that increased to thirty-five plus the District of Columbia in 1960 (Mikesell and Kioko, 2018, 22) – so changing state fiscal systems reduced one element of the issue. However, there were still border situations between states and between cities and surrounding areas (McAllister 1961; Mikesell 1970). There was clear evidence of sales impact, there was not much that jurisdictions could do to enforce use taxes, except for application to motor vehicles when they were registered in the destination state and in some other special cases. Due and Mikesell (1994, 262 – 264) detail number of these efforts against individual customers, even as administrators generally believed them not worth the trouble.

The next challenge came from the expansion of catalog sales and similar merchandising channels. The problem was not with old-line vendors like Sears or Montgomery Ward, because their retail outlets across the country gave them physical presence and they had to register. The problem was with vendors like L. L. Bean, a business that sold throughout the nation via its catalogs but did not have physical stores outside its home state of Maine, or Quill, a seller of office

¹ The battle has predominantly involved the overturn of a constitutional principle (*Quill v. North Dakota*, 504 U.S. 298 (1992)) that vendors were required to have physical presence in some way in a state to allow that state to impose a registration / collection requirement and replacing it with a principle hewing to the idea that substantial economic presence in the state, even lacking physical presence, would be sufficient. *Quill* had established that due process concerns did not prevent the state from requiring registration, but physical presence continued to be the standard. The massive literature involving that argument and its logic will not be repeated here. The best way to understand what is going on is the struggle to get use taxes collected within the same indirect collection approach used for the sales tax. An excellent review of the constitutional struggles is provided by Pomp (2016).

equipment by catalog. Vendors like that would register only voluntarily and most were not inclined to do so.

The compliance cataclysm came with the development of internet commerce. Many vendors with no physical presence in a state (remote vendors) started in business and the volume of sales in electronic commerce, while substantially smaller than the volume from brick-and-mortar stores, became considerable and was growing rapidly. While border crossing customers and catalog purchasers were irritants to enforcement of the retail sales / use tax tandem, the challenge from electronic commerce presented a consequential problem for fairness, protection of local brick-and-mortar vendors, and the tax base. And the dizzying array of local sales taxes made correct compliance a burden for a remote seller – the order could come from literally anywhere the internet reached and that was virtually everywhere and who could keep track of those thousands of local taxes? One catalyst for concern was the estimate by Bruce and Fox (2000, 1373) that states and localities would be losing \$23.9 billion in sales tax revenue in 2003; actual total sales tax revenue in that year was \$229.2 billion (Governments Division, Bureau of the Census), so the impact could not easily be dismissed. It became critical to develop a way to enforce the use tax and that is why the *Wayfair* decision is the most critical decision for state – local tax policy in at least the last quarter century. Getting the use tax generally applied was necessary for both base and local vendor protection.

In order to understand use tax collection behavior, it is important to understand when and how the use tax applies and operates. The standard for application of a use tax is simultaneously simple and direct and full of complication. At the simplest level, it applies when a purchase that would be taxable if purchased in the state has not borne a sales tax elsewhere that is equivalent to

what would be owed in the state is used in the state.² The more convoluted part about use tax application is exactly what sort of conditions would produce a use tax requirement and not all of them are easily apparent.

There are some structural differences among the states, but the following discussion and illustrations prepared by the state of Wisconsin provides excellent illustrations:

“Use tax is the counterpart of sales tax. Use tax must be paid when Wisconsin sales tax is not charged and no exemption applies. In addition to the 5% state use tax, a 0.5% county use tax or 0.1% baseball stadium use tax may apply. If you properly paid sales tax in another state, the sales tax paid may be used to offset the Wisconsin use tax due.

“If Wisconsin did not have a use tax, persons could buy items in another state to avoid paying Wisconsin tax on such purchases...

“Common use tax situations include the following:

- Property to be used in Wisconsin is purchased outside the state (e.g., Internet, mail order, catalog) and the property would have been subject to sales tax if purchased in Wisconsin.
- Building materials are purchased by a nonresident contractor from a seller located in another state, the seller either does not charge sales tax or charges tax at a rate less than the applicable Wisconsin rate (5.0%, 5.1%, 5.5%, or 5.6%), and the nonresident contractor uses the materials on a real property job in Wisconsin.
- Property is purchased for resale (to sell to others) or for a nontaxable use and then is used by the purchaser in a taxable manner. Sales tax was not charged when purchasing the property.
- Property is purchased outside Wisconsin without payment of the Wisconsin sales tax and is then brought into Wisconsin and given away free. Exception: If a retailer provides an item free of charge with the required purchase of another taxable product, the retailer may purchase the item provided free of charge without tax, for resale.
- Property is purchased from a supplier outside Wisconsin without payment of the Wisconsin sales tax and the supplier ships the property to the purchaser's Wisconsin location at the direction of the purchaser.
- Property is purchased from a supplier outside Wisconsin without payment of the Wisconsin tax and the supplier ships the property to Wisconsin where it is stored by the purchaser until subsequently shipped outside Wisconsin....

“Credit for tax paid in another state:

² The tax would not be applicable to purchases that have been well-used in the origin state.

- If tax was first due and paid to another state, the amount of Wisconsin use tax due may be offset by the tax paid in the other state.”
[www.revenue.wi.gov/Pages/FAQS/pcs-diff.aspx]

Depending on the law of the destination state, use tax may also apply to out-of-state newspaper and magazine subscriptions.

States usually, by law or practice, would not attempt application of the tax to purchases below some defined price or to purchases made some years ago. For example, the revenue departments in high rate states would not generally stop moving vans coming in from lower rate states, although use tax would apply when the new residents registered their vehicles.

The most apparent circumstances are when a household makes an otherwise taxable purchase from a remote vendor, by traveling to the remote vendor for the purchase, by making a catalog purchase, by purchasing on a television shopping program, or by making an online purchase. The use tax would be collected if the vendor is registered (and may well identify the tax as the sales tax rather than as use tax) according to *Wayfair* requirements.

Businesses make certain purchases without paying sales tax because of the way in which the purchase will be used. In many states, for instance, purchase of a forklift by a manufacturing firm would be exempt if it is to be used to move partially finished product along the production line. However, if the forklift is used in the warehouse, its purchase would be taxable. When a firm moves the forklift from exempt to taxable use, the use tax applies.³

Although some states have participated in information exchange to assist each other in collection of use taxes, the cooperation has always been voluntary and not all states have

³ Use tax revenue may appear in combined sales and use tax returns filed by registered vendors, in separate consumer or producer use tax returns, or in reports combined as lines on individual or business income tax returns. Most revenue appears on separate use tax returns, however.

participated. That pattern is likely to continue in the post-*Wayfair* environment, but there is no expectation that states will enforce the registration and collection requirements of others.

III. FISCAL ROLE OF THE USE TAXES

The use tax serves primarily as an enforcement tool to insure compliance with the retail sales tax. Nevertheless, the tax does yield revenue and its significance in combined sales and use totals and in overall state tax collections. Understanding its importance is complicated because many states do not report or maintain data that divide the combined sales and use tax collections between the two taxes. Fortunately, a number of states do separate the taxes and have provided such data for this research and that information will be the basis for the discussion here.⁴

Table 2 provides summary data for state use taxes from 2010 and 2017. The former year is at the end of the Great Recession and the latter is the most recent year for which data are generally available. All data come from years of national economic expansion, thereby improving the chances that the years are somewhat compatible.⁵

Several points are apparent from the data in the table. First, it is apparent that the use tax represents a minor component of state tax revenue. In both 2010 and 2017, use tax collections constitute on average around 3 percent of total state tax collections. Only in a few states do collections in the state reach one billion dollars in a year. Of course, it is important to recognize that, ultimately, the intent of the use tax is to protect in-state merchants and the overall sales tax base – to combat sales tax avoidance – and only indirectly to yield revenue. Therefore, the small

⁴ In light of the considerable importance seen for the *Wayfair* decision, it is surprising that states do not all maintain data on use tax collections. Without such data, states will have some difficulty in identifying what the impact of that decision has been on the sales tax.

⁵ Sales and use tax collection data are from state reports and from correspondence with state departments of taxation. Total tax collection data are from U. S. Bureau of Census Governments Division data.

relative contribution to tax totals does not fully gauge the significance of the tax to revenue systems.

Second, the use tax share of combined sales and use tax revenues is around 8 percent on average. The typical share is at that level in both 2010 and 2017. It is notable, however, that the share varies substantially across states, from around 0.20 in Arkansas and Michigan in 2010 to 0.01 or less in Hawaii and South Carolina. The use tax matters differently across the sales taxing states. For comparison, in the only other analysis available of use tax yields, Criz (1941, 40) found the average percentage of use tax collections to combined sales and use tax collections to have been 0.0288 in 1938 and 0.0354 in 1939 (ten states in 1938 and eleven states in 1939).

Finally, there is considerable stability in the use tax share of sales and use tax collections in the states across 2010 and 2017. The states with a relatively high share in one year generally show a relatively high share in the other. States do not show a high share in one year and then a low share in the other. This suggests that there are systematic influences on how important a component the use tax is of the overall sales and use tax system, a topic that clearly merits further research to identify those systematic causes.

In sum, use taxes do not constitute a major element of state tax collections in total nor of combined sales and use tax collections. However, their contribution shows considerable variation across the states and their relative contribution tends to remain either high or low across years. The primary purpose of use taxes is to close an important avenue for sales tax avoidance, so their importance cannot be gauged solely by the direct revenue that the taxes produce.

IV. PRELIMINARY EVIDENCE ON WAYFAIR FROM INDIANA

Less than one-year removed from the *Wayfair* ruling, much remains in flux with regards to policy adjustment among the states. States are still considering whether to move to an economic presence standard and on what terms. Some of those that initially adopted economic presence are changing registration standards. And more states are expanding registration requirements to firms that are not selling their own merchandise but are serving as a marketplace facilitator for other vendors. The national terms for compliance are certainly still a moving target, but some early idea of impact remains possible.

Indiana provides circumstances with which we can gather some preliminary evidence. Even prior to the ruling, Indiana was preparing for the possibility South Dakota would win the *Wayfair* ruling by passing a statutory nexus requirement (HEA 1129 (2017)) for remote vendors that was statutorily effective starting July 1, 2017 but was held in abeyance while *Wayfair* continued to be adjudicated. This requirement established vendor nexus in cases where the retail merchant's gross revenue from sales exceeded \$100,000 or represented more than 200 separate transactions, which Table 1 demonstrates to be the modal threshold adopted by the states. *South Dakota v. Wayfair* was decided by SCOTUS on June 21, 2018 and IDOR began formally began implementation of enforcing the nexus threshold registration on October 1, 2018.

There is little doubt that *Wayfair* and HEA 1129 resulted in revenue collected from vendors statutorily applicable to the use tax. As already indicated, however, the revenue impact is to close down the avenue of avoiding sales taxes by purchasing from vendors exempt from the tax, so presumably some of the revenue impact comes from Indiana residents making in-state purchases that are subjected to the sales tax that otherwise would have been made from remote out-of-state retailers via a substitution effect. Furthermore, Indiana residents who continue to make purchases of now-taxable sales from out-of-state vendors have less income available to make purchases of

all other goods, so the amount of revenue is also affected via the income effect of enforcing collection on the use tax base.

To explore this, we employ monthly sales and use tax revenue due for calendar years 2016 and 2017 provided by IDOR. As revealed in Table 2, as of 2017 use tax revenue represents just 13 percent of all sales and use tax revenues for Indiana, but the size of the now taxable consumption base for Indiana residents is unknown. We employ the synthetic control method first developed in Abadie et al. (2003, 2008) used to define a set of weights on covariates from donor states to produce a “synthetic Indiana.” The identification assumption is that the various weights that define the relationship between these predictors and the outcome of interest in the pre-treatment period remain constant in the post-treatment period, so that significant differences can be attributed to the newly introduced treatment, allowing for a causal analysis for case studies like this. From the original synthetic control method set forward by Abadie et al. (2003, 2008), there are many recent extensions (e.g. Doudchenko and Imbens (2017), Ferman and Pinto (2018), Gobillon and Magnac (2016), Xu (2015), and Dube and Zipperer (2015)), and this paper adopts the approach laid out in Hollingsworth and Wing (2018).

Like other extensions, the Hollingsworth and Wing (2018) synthetic control approach allows weights on donor predictors to be positive and does not impose the restrictions that weights sum to unity, and unlike other extensions it allows users to recommend a pool of potential predictors from which a Lasso regression selects, providing a data driven and automated means of choosing predictors. This is advantageous in reducing reliance on researcher judgement (Belloni et al., 2014), but are further helpful to the case at hand because there are relatively limited monthly data on state economic activities, particularly so recent to the treatment event. From the Bureau of Labor Statistics, we obtain monthly data on employment, hours, earnings, and labor force statistics

for states. For our donor group, we limit the pool of donors to those ten states which have not adopted the economic presence for nexus at the time of this writing.⁶ The result is 1,243 potential predictors from which the Lasso regression can select. We also follow the Hollingsworth and Wing's (2018) recommendation to replicate this full exercise on the donor predictors for the common placebo test in determining a treatment randomized p-value, which differs from other approaches that apply the same user-selected model to the placebo units that was chosen for the case study of interest. Finally, we adopt their recommendations for cross-validation, using the median lambda penalty arising from sub-sample pre-treatment tests with the best out-of-sample (but before the treatment period) prediction so as to better avoid overfitting the pre-treatment data.⁷

Enforcement of HEA 1129 began October 1, 2018, but we begin the post period in August. There may have been some anticipation effects, perhaps even earlier than September, but additionally the month-to-month sales tax due is a rather noisy series because of artifacts like the timing of weekends and length of the month, which we consequently used a rolling 3-month average to smooth the series, which meant that the moving averaged September would be affected by collections in October 2018.⁸ This choice to allow for potential anticipation effects is further substantiated by the state's Out-of-State Sales & Use Tax Registrations, which show a substantive increase in August of 2018, and is depicted in Figure 1.

Table 3 demonstrates the ten most significant predictors in terms of their contributing share of variation in February 2017. Again, these predictors are state-specific economic indicators selected from a pool of donor predictors that could have come from any economic sector. Clearly,

⁶ The ten states are Arizona, Arkansas, Florida, Kansas, Massachusetts, Montana, Missouri, New Mexico, Ohio, Tennessee, and Virginia.

⁷ These parameters are define the set the first training period as 12 months with a pseudo-post period of 4 months. Since the treatment period begins in month 19, this provides three cross-validation runs.

⁸ The moving average of series X in year t is calculated as $(X_{t-1}+X_t+X_{t+1})/3$.

the Lasso regression in mining these contributors for signal on the sales and use tax collections in Indiana tended to favor donor state factors that would likely be correlated with taxable goods and services in Indiana: retail trade, leisure and hospitality services. The largest predictor is Florida's total employment in retail trade department stores (7.0%), followed by Tennessee and Virginia's employment in leisure and hospitality (5.3% and 4.6%). These were selected over similar economic activities in sectors like construction, agriculture, and government, which inspires some confidence in the Lasso regressions selection of variables that contribute meaningful signal of pre-treatment activity in Indiana.

Figure 2 presents the results of the synthetic control results by plotting the actual sales and use due to Indiana against those predicted for Synthetic Indiana. The vertical line with short dashes indicates the last period (Month 19 = June 2018) given to the synthetic control in building the synthetic Indiana, whereas the long dash vertical line indicates the beginning of the actual effective policy date for enforcement of economic nexus. The figure demonstrates an extremely tight pre-treatment fit between synthetic and actual Indiana that continues to track afterwards including into the post-enforcement period. The post-enforcement period does see the actual Indiana does come in a touch higher than synthetic Indiana with the most significant deviation occurring in December 2018. For December 2018, Indiana actual came in 2.3 percent higher than its synthetic counterpart, a difference representing \$13.9 million for the month. For Indiana's tax rate of 7%, this implies a collective base expansion of \$198 billion during the holiday season. The month of October was less than half that of December, with the actuals exceeding the synthetic by 1.0 percent, good for an additional \$5.6 million and implying an \$80.2 million tax base expansion. November saw a nearly perfect coinciding of synthetic and actuals. While no state legislature will likely turn away

the occasional monthly gains seen here, they are also not sums that reverse fundamentals of state tax revenue systems.

To assess the significance of the result in terms of treatment randomization, we turn to the placebo tests where the entire synthetic control using Lasso regression method is replicated for each potential predictor in the donor pool. If we were to randomly study another outcome in this list, the placebo test reveals how frequently we would detect some kind of effect. Figure 3 plots the logged difference between the actual and synthetic predictor for both the Indiana sales and use tax revenue due as well as those of the 858 predictors for which the synthetic control scored no worse than a Cohen's d of 0.25 over the pre-treatment period, a threshold recommended by Hollingsworth and Wing (2018). As can be seen, the Indiana case of interest fits straight through the middle of the predictors, suggesting that the study of this time period was likely to turn up some kind of more significant treatment effect. In absolute value terms, about 16 percent of the placebo cases have more extreme post-treatment results in December than the Indiana case study, while 35% exceed that in October.

Table 4 provides the treatment effect by month and the corresponding randomized treatment p-value for both the already discussed levels, as well as the equivalent analysis if logged data is employed instead of the raw levels. As the Table 4 demonstrates, the October result becomes more muted, declining from 1.0% to 0.1%, while the December effect increases to 3.7%. The randomization p-value falls to 0.072, suggesting that only 7.2 percent of the placebo cases exceed the Indiana case.

So the preliminary evidence suggests that Wayfair has not much altered the fiscal outlook for Indiana. We can offer several speculations for Indiana's muted response should the preliminary findings continue to hold. One possibility is that the major e-commerce transactions Indiana

residents shop from were not affected by the economic nexus. Sales from Amazon, for example, were already subject to the sales tax since 2014, and Amazon is not obligated to collect for third parties selling on the Amazon.com platform. However, 2019 legislation requires all such third party marketplace facilitators to collect the tax as of July 1, 2019, so even the Indiana environment is changing. Relatedly, the standard for economic nexus in Indiana is total sales of \$100,000 or 200 separate transactions. While this threshold does not differ substantively with those of other states, it is possibly high enough to exclude many of the potential out-of-state vendors or low enough to make its experience differ from that in other states.

V. CONCLUSIONS

This paper updates our standing of knowledge on the role of the use tax in the American consumption tax system and provides early evidence on the revenue significance of the *Wayfair* ruling on state tax revenue using data from Indiana. First, the use tax represents a surprisingly large take of state sales and use tax revenue in some states considering that it often goes unreported or lumped together with the reporting of other sales and excises. On average, the use tax represented about eight percent of all sales and use collections for 2017, and just under three percent of all tax revenue. Second, the primary purpose of the use tax to prevent avoidance of the sales tax, so the combined revenue impact should properly consider impacts on sales tax revenues in addition to the collections under the use tax. Third, monthly collections in Indiana for the last quarter of 2018 demonstrate very little impact on these revenues. The highest estimate indicated a 3% increase for December 2018 collections that had a treatment randomized p-value of 0.07. October and November saw no substantive impact. This is perhaps because the threshold adopted in Indiana for economic nexus, which is comparable to those of other states, is sufficiently high that it does not add substantial new collectors given that they had already brought Amazon into the system.

Whether this continues to be true remains to be seen, but this early evidence suggests the impact of *Wayfair* will not be to provide a means of rectifying significant fiscal fortunes, but may be a nice token boost to an important source of revenue for the states.

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Any errors or omissions are the responsibility of the authors.

CONFLICT OF INTEREST DISCLOSURE

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Table 1: Economic Nexus Status as of December 2018 for Sales Taxing States

| State | Economic Presence Date | Threshold | Requirement |
|--------------|-------------------------------|--|---|
| Alabama | 10/1/2018 | \$250,000 and solicit orders | Vendors: remote vendors who can demonstrate that marketplace facilitator is collecting and remitting will be relieved of requirement, otherwise register and collect; Marketplace facilitators: collect or notify and report. |
| Arizona | N/A | | |
| Arkansas | N/A | | |
| California | 4/1/2019 | \$100,000 or 200 transactions | Vendor: register and collect |
| Colorado I | 7/1/2019 | \$100,000 | Collect or notify and report |
| Colorado II | 12/1/2018 | \$100,000 or 200 transactions | Vendors: register and collect |
| Connecticut | 12/1/2018 | \$250,000 and 200 transactions and regularly and systematically solicit sales. | Vendors: register and collect; Marketplace facilitators considered to be the retailer; Referrers: notify and report. |
| Florida | N/A | | |
| Georgia | 1/1/2019 | \$250,000 or 200 transactions | Collect or notify and report |
| Hawaii | 7/1/2018 | \$100,000 or 200 transactions | Vendors: register and collect |
| Idaho | 7/1/2018 | \$10,000 | Not economic presence: Collect if have referral agreement with Idaho retailer and sales above \$10,000 ("click through") |
| Illinois | 10/1/2018 | \$100,000 or 200 transactions | Vendors: register and collect |
| Indiana | 10/1/2018 | \$100,000 or 200 transactions | Vendors: register and collect |
| Iowa | 1/1/2019 | \$100,000 or 200 transactions | Vendors: register and collect; Marketplace facilitators: register and collect; Referrers: notify and report. |
| Kansas | N/A | | |
| Kentucky | 10/1/2018 | \$100,000 or 200 transactions | Vendors: register and collect; Marketplace: vendor responsibility |
| Louisiana I | 7/1/2017 | \$50,000 | Notify |
| Louisiana II | 1/1/2019 | \$100,000 or 200 transactions | Vendors: register and collect |
| Maine | 7/1/2018 | \$100,000 or 200 transactions | Vendors: register and collect |
| Maryland | 10/1/2018 | \$100,000 or 200 transactions | Vendors: register and collect |

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|----------------|-----------|--|---|
| Massachusetts | N/A | | |
| Michigan | 10/1/2018 | \$100,000 or 200 transactions | Vendors: register and collect |
| Minnesota | 10/1/2018 | 10 transactions totaling \$100,000 or 100 transactions | Vendor: register and collect; Marketplace facilitator: collect and remit unless seller remits or seller has less than \$10,000 sales |
| Mississippi | 9/1/2018 | \$250,000 and "purposefully or systematically" exploitation of market | Vendors: register and collect |
| Missouri | N/A | | |
| Nebraska | 1/1/2019 | \$100,000 or 200 transactions; must be engaged in business in Nebraska | Vendors: register and collect |
| Nevada | 10/1/2018 | \$100,000 retail sales of tangible personal property or 200 retail sales of tangible personal property | Vendors: register and collect |
| New Jersey | 11/1/2018 | \$100,000 or 200 transactions | Vendor: register and collect; Marketplace facilitator: register and collect even if seller is not required to have collected tax |
| New Mexico | N/A | | |
| New York | 1/15/2019 | \$300,000 and 100 transactions | Vendors: register and collect |
| North Carolina | 11/1/2018 | \$100,000 or 200 transactions | Vendors: register and collect |
| North Dakota | 10/1/2018 | \$100,000 or 200 transactions | Vendor: register and collect; Marketplace facilitator: may collect, otherwise retailer. |
| Ohio | N/A | | |
| Oklahoma | 7/1/2018 | \$10,000 sales | Vendor, Marketplace, Referrer: collect or notify and report. |
| Pennsylvania | 3/1/2018 | \$10,000 sales | Vendor, Marketplace Facilitators, Referrer: collect or notify and report. |
| Rhode Island | 8/17/2017 | \$100,000 or 200 transactions | Vendor: notify and report; Facilitators: Provide list of retailers who facilitator did and did not collect for; Referrers: notify retailer. |
| South Carolina | 11/1/2018 | \$100,000 | Vendor: register and collect; Marketplace Facilitator: register and collect (over \$250,000) |
| South Dakota | 11/1/2018 | \$100,000 or 200 transactions | Vendor: register and collect; Marketplace Facilitator: register and collect (March 1, 2019) |
| Tennessee | N/A | | Regulation for collection if over \$500,000 and regular and systematic solicitation is on hold. |
| Texas | 1/1/2019 | \$500,000 | Vendors: register and collect |

| | | | |
|---------------|-----------|--|--|
| Utah | 1/1/2019 | \$100,000 or 200 transactions | Vendors: register and collect |
| Vermont | 7/1/2018 | \$100,000 or 200 transactions and systematic solicitation | Vendors: register and collect |
| Virginia | N/A | | |
| Washington I | 1/1/2018 | \$10,000 | Notify and Report |
| Washington II | 10/1/2018 | Threshold One: \$100,000 or 200 transactions; Threshold Two: \$10,000 | Threshold One: Vendor and Marketplace Facilitators: register and collect; Threshold Two: Vendor and Marketplace Facilitator: collect or notify and report; Referrers: if \$267,000 income apportioned to Washington, collect or notify and report. |
| West Virginia | 1/1/2019 | \$100,000 or 200 transactions | Vendors: register and collect |
| Wisconsin | 10/1/2019 | \$100,000 or 200 transactions | Vendors: register and collect |
| Wyoming | 2/1/2019 | \$100,000 or 200 transactions | Vendors: register and collect |

Notes: N/A indicates the state taxes sales but as not adopted an economic nexus standard as of December 2018. Authors compilation from variety of state sources.

Table 2: Use Tax Collections by State for Fiscal Year 2017 and 2010

| State | Fiscal Year 2017 | | | Fiscal Year 2010 | | |
|----------------|------------------|----------------------------------|----------------------|------------------|----------------------------------|----------------------|
| | Total, \$ | Share of All Sales & Use Revenue | Share of Tax Revenue | Total, \$ | Share of All Sales & Use Revenue | Share of Tax Revenue |
| Alabama | \$ 376,550,851 | 0.1447 | 0.0361 | \$ 241,023,046 | 0.1178 | 0.0286 |
| Arizona | \$ 562,672,426 | 0.0861 | 0.0405 | \$ 271,763,845 | 0.0554 | 0.0254 |
| Arkansas | \$ 417,887,548 | 0.1571 | 0.0439 | \$ 393,766,846 | 0.1903 | 0.0521 |
| Colorado | \$ 258,604,000 | 0.0868 | 0.0196 | \$ 150,651,755 | 0.0739 | 0.0176 |
| Connecticut | \$ 85,966,949 | 0.0206 | 0.0053 | n.a. | n.a. | n.a. |
| Florida | \$ 669,276,979 | 0.0266 | 0.0166 | \$ 441,093,903 | 0.0263 | 0.0145 |
| Hawaii | \$ 33,996,000 | 0.0105 | 0.0048 | \$ 32,152,000 | 0.0139 | 0.0066 |
| Indiana | \$ 1,107,106,246 | 0.1371 | 0.0613 | \$ 915,185,835 | 0.1601 | 0.0663 |
| Iowa | \$ 465,600,000 | 0.1667 | 0.0477 | \$ 328,900,000 | 0.1469 | 0.0483 |
| Kansas | \$ 384,654,260 | 0.1440 | 0.0471 | \$ 205,539,545 | 0.1106 | 0.0317 |
| Maryland | \$ 160,533,967 | 0.0348 | 0.0074 | \$ 105,523,438 | 0.0281 | 0.0069 |
| Michigan | \$ 1,353,405,000 | 0.1481 | 0.0473 | \$ 1,579,529,000 | 0.2038 | 0.0711 |
| Minnesota | \$ 367,782,504 | 0.0617 | 0.0144 | \$ 378,254,232 | 0.0803 | 0.0220 |
| Mississippi | \$ 310,441,806 | 0.0913 | 0.0399 | \$ 253,304,802 | 0.0889 | 0.0404 |
| Nebraska | \$ 137,908,158 | 0.0784 | 0.0270 | \$ 115,434,550 | 0.0835 | 0.0299 |
| New Jersey | \$ 419,768,529 | 0.0504 | 0.0130 | \$ 338,596,426 | 0.0478 | 0.0131 |
| Oklahoma | \$ 238,518,802 | 0.0967 | 0.0278 | \$ 165,837,022 | 0.0828 | 0.0234 |
| Pennsylvania | \$ 423,681,000 | 0.0491 | 0.0112 | n.a. | n.a. | n.a. |
| South Carolina | \$ 5,254,107 | 0.0018 | 0.0005 | \$ 17,622,036 | 0.0080 | 0.0024 |
| Tennessee | \$ 447,559,794 | 0.0580 | 0.0322 | \$ 279,162,100 | 0.0509 | 0.0266 |
| Vermont | \$ 279,443,479 | 0.0457 | 0.0326 | \$ 243,212,417 | 0.0475 | 0.0968 |
| Washington | \$ 625,612,983 | 0.0617 | 0.0261 | \$ 428,576,000 | 0.0623 | 0.0266 |
| West Virginia | \$ 105,116,306 | 0.0860 | 0.0206 | \$ 84,769,231 | 0.0774 | 0.0176 |
| Wyoming | \$ 70,719,058 | 0.1205 | 0.0429 | \$ 67,276,605 | 0.1116 | 0.0312 |
| Mean | | 0.0819 | 0.0277 | | 0.0849 | 0.0318 |
| Median | | 0.0822 | 0.0274 | | 0.0788 | 0.0266 |

Note: Not exhaustive list as not all states track their use tax revenue distinctly from sales tax.
Source: Authors' compilation from contacts at various state tax and revenue departments.

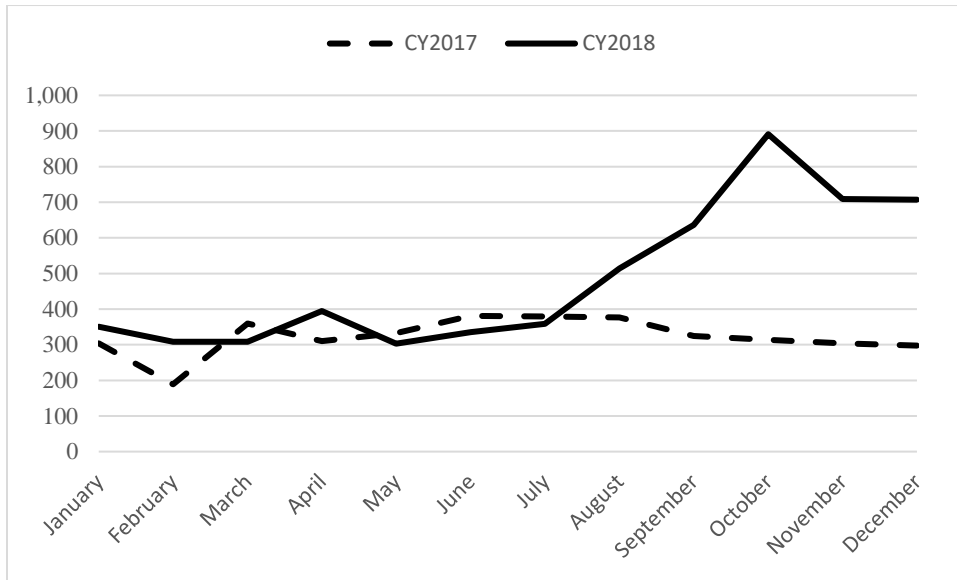
Table 3: Contribution Share of Top 10 Predictors for Synthetic Control Results, First Pre-Treatment Year

| Share | Predictor |
|--------------|---|
| 73.5% | Intercept |
| 0.1% | Arizona Retail Trade, Total Average Weekly Hours of Production Employees |
| 0.8% | Arkansas Leisure and Hospitality, Total All Employees, In Thousands |
| 7.0% | Florida Retail Trade, Department Stores All Employees, In Thousands |
| 0.1% | Massachusetts Leisure and Hospitality, Total Average Weekly Hours of All Employees |
| 3.5% | Montana Wholesale Trade, Total All Employees, In Thousands |
| 3.5% | Ohio Retail Trade, Total Average Weekly Earnings of Production Employees, In Dollars |
| 0.3% | Ohio Retail Trade, Building Material and Supplies Dealers All Employees, In Thousands |
| 5.3% | Tennessee Leisure and Hospitality, Total All Employees, In Thousands |
| 4.6% | Virginia Leisure and Hospitality, Total All Employees, In Thousands |
| | Virginia Leisure and Hospitality, Accommodation and Food Services All Employees, In |
| 1.2% | Thousands |

Table 4: Treatment Randomization P-Values for Post-Treatment Period

| Month | Levels | | Logged Values | |
|----------------|-------------------|----------------|----------------------|----------------|
| | Treatment | | Treatment | |
| | Effect (%) | p-value | Effect (%) | p-value |
| October, 2018 | 1.0 | 0.349 | 0.1 | 0.828 |
| November, 2018 | 0.0 | 0.949 | 0.4 | 0.571 |
| December, 2018 | 2.3 | 0.164 | 3.7 | 0.072 |

Figure 1: Indiana's Out-of-State Sales & Use Tax Registrations, 2017 and 2018



Source: Indiana Department of Revenue

Figure 2: Synthetic Control Results

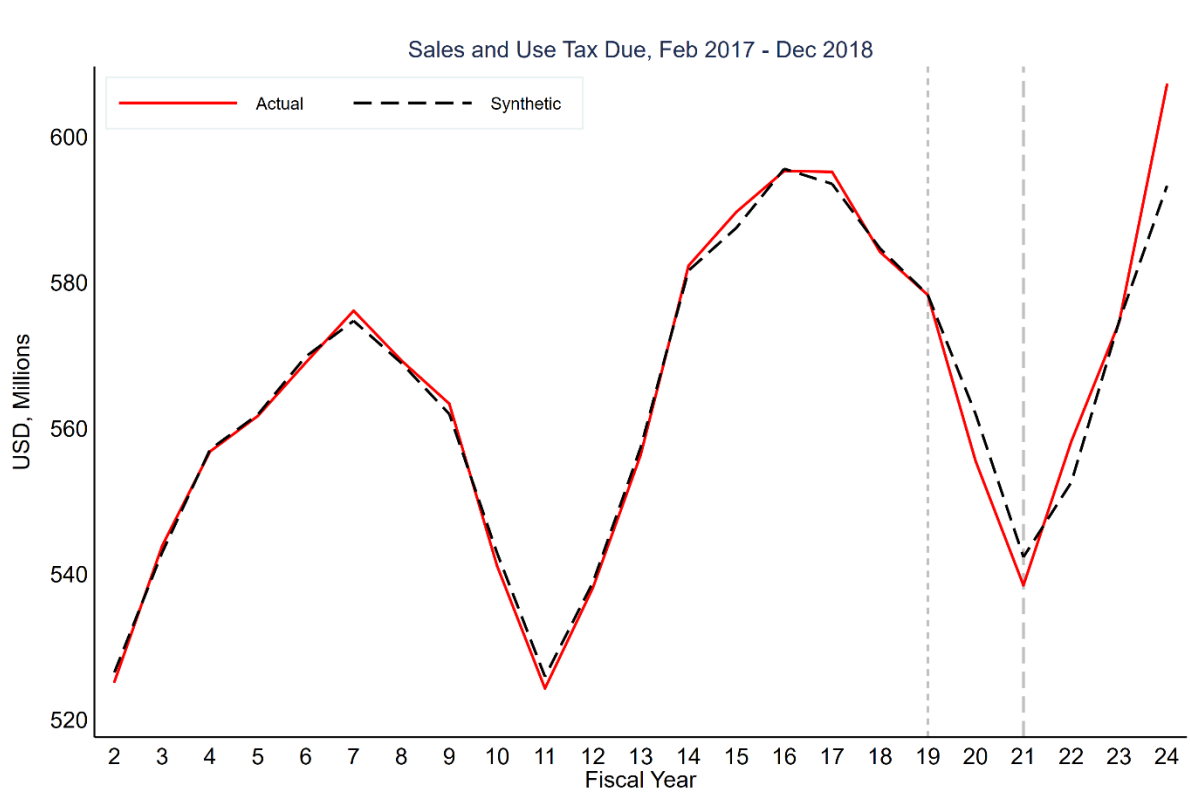


Figure 3: Logged Difference Between Actual and Predicted Values for Placebo Test

