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Institutions, Trade, and Economic Prosperity: An Examination of the U.S. and Mexican States

Dean Stansel
Southern Methodist University

Meg Patrick Tuszynski
Southern Methodist University

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Dean Stansel
O'Neil Center for Global Markets and Freedom
Southern Methodist University

Meg Patrick Tuszynski
O'Neil Center for Global Markets and Freedom
Southern Methodist University

Abstract

We provide the first subnational-level examination of the relationship between the presence of policies and institutions that are consistent with economic freedom and trade volume. To do so, we create a new comprehensive dataset detailing export activity between each U.S. state (that is, for the volume of trade between Texas and Oklahoma, Texas and New Mexico, etc.) and between each U.S. state and each Mexican state (Texas and Chihuahua, Texas and Coahuila, etc.). Our empirical strategy allows us to explore what effect institutions have on both interstate trade and cross-border trade, and also what impact the national border has on these trade relationships. Additionally, we examine the relationship between trade volume and economic prosperity. Most previous work in this area utilizes country-level data. Because individual states differ, understanding subnational trade flows can help us gain a clearer picture of both the determinants and consequences of trade between the nations. By utilizing state-level data, we are in the unique position of being able to understand both subnational relationships and the micro-determinants of national relationships.

Keywords: regional trade, interstate trade, border effects, gravity model, economic freedom, institutions, trade barriers

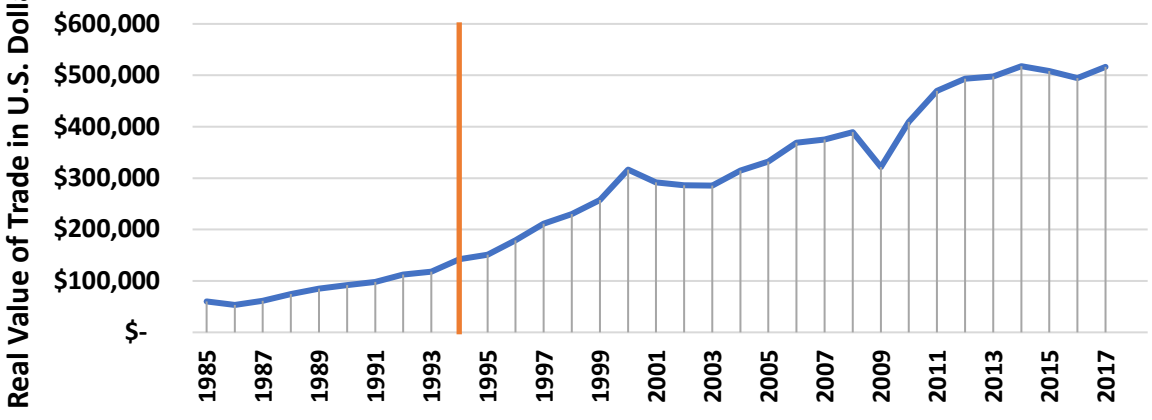
JEL Codes: C33, H73, R50

1. Introduction

In the mid-1980s, Mexico began liberalizing its restrictive trade regime in response to a debt crisis, both relaxing protectionist trade barriers and liberalizing the rules for foreign investment in the country. In 1986, the country joined GATT, and lowered its maximum tariff rate to 50%. By the time NAFTA negotiations began, Mexico was already demonstrating a strong desire to build up strong trade relationships with its neighbors to the North and others.

NAFTA was implemented on January 1, 1994. Since that time, trade in goods between the U.S. and Mexico has more than tripled in real terms (see Figure 1). In 2017, Mexico was both the second largest goods export market for the U.S. and the second largest supplier of goods imports (USTR 2018). When looking at total goods trade, Mexico is the third largest trading partner for the U.S., behind China and Canada.[1] The U.S. is by far the most significant partner in Mexico's merchandise trade (Villarreal 2018). Due in large part to the liberal trade environment created through NAFTA, Canada, the U.S., and Mexico currently comprise one of the world's largest free trade areas, and contain about one-third of the world's GDP (ibid.). Indeed, nearly all tariffs were eliminated between the three countries as a result of the NAFTA negotiations. Between 1993, the year prior to the enactment of NAFTA, and 2014, U.S. exports to Mexico increased by 479% in real terms, before beginning a slight downward trend.[2] Trade in services has also exhibited a steady upward trend, though at a much lower overall level. The stock of foreign direct investment, both of Mexico in the U.S. and of the U.S. in Mexico, has increased dramatically since the passage of NAFTA as well.[3]

Figure 1
Total Goods Trade Between U.S. and Mexico



Source: U.S. Census Bureau; U.S. International Trade Data; Trade in Goods with Mexico

[1] U.S. Census Bureau. *U.S. International Trade Data.* Top Trading Partners, June 2018. Available online at: https://www.census.gov/foreign-trade/statistics/highlights/top/top1806yr.html
[2] Compiled by Congressional Research Service? (CRS) using the United States International Trade Commission (USITC) Interactive Tariff and Trade DataWeb at http://dataweb.usitc.gov.
[3] Compiled by CRS using USITC Interactive Tariff and American Industrial Classification (NAIC) 4-digit level.

However, in his 2016 presidential campaign, Donald Trump pledged to renegotiate NAFTA, and to scrap the entire deal if an agreeable compromise could not be reached. Though some thought this could be an historic opportunity to "produce a 'freer' free trade agreement" (Lester, Manak, and Ikenson 2017: 1), many feared that this renegotiation would instead harm existing cross-border exchange and supply chain relationships. Indeed, President Trump's primary impetus for wanting to modify NAFTA stems from alleged destruction of American jobs as a result of the trade deal, though many warn that an ill-conceived renegotiation might actually be a net-negative for American workers. The renegotiation of NAFTA that occurred in 2018 resulted in a substantially inferior arrangement. The United States-Mexico-Canada Agreement (USMCA) was agreed to on September 30, with the formal signing being done on November 30. While it did provide an increased level of certainty about what the rules of the game would be, the details left much to be desired. At nearly 2,000 pages long, it's full of harmful interventions that make it harder and more costly for businesses and people in North America to engage in trade across country lines. The new country-of-origin rules, which will raise the cost of producing automobiles in North America, are particularly problematic, as are the restrictions on negotiating free trade agreements with "non-market" economies outside of North America. In sum, the new agreement threatens to fundamentally disrupt the vibrant trade relationship that has existed between the U.S. and Mexico since the passage of NAFTA.

What is missed in much of the political discussion surrounding trade restrictions is the fact that trade never takes place between two *nations,* but rather between individual *companies* in these nations. Discussing this macrophenomena without having an understanding of the micro-foundations which underpin it can result in policy prescriptions that are at odds with the underlying reality of the situation. Indeed, some U.S. exporters have reported that just threatening to leave NAFTA has had a deleterious effect on their business (Panetta 2017). In this paper, we examine trade between U.S. and Mexico not on a national, but instead on a subnational level. We look at dyadic trade relationships between each U.S. and Mexican state, and examine what impact both economic institutions and the existence of a national border have on trade between the states. Because NAFTA created a common economic market between the U.S. and Mexico (albeit with some small caveats), theoretically the national border should be relatively unimportant, at least as compared to the impact of the border on trade between the U.S. and other nations without this preferential agreement. Yet as other studies examining border effects within otherwise common economic markets have found, we find that the national border still serves as a barrier to trade between the states. Indeed, depending on the specification, we find that after controlling for a variety of other factors that influence trade, U.S. states are as much as fifteen and a half times less likely to trade with Mexican states than with other U.S. states. In a truly integrated market, we would expect to see an insignificant point estimate on our border variable; however, we find that the point estimate is robustly significant across a variety of specifications. We also find that the economic freedom score of the importing state is systematically important for explaining trade between the states. States with higher overall economic freedom scores tend to see more import activity, though when economic freedom is broken down into its component parts, the relationship is no longer universally positive.

We should mention that we chose not to examine Canada in this paper because that case has already been extensively studied. Indeed, the seminal paper to examine trade relationships using a gravity model at the regional level looked at the case of trade between the U.S. states and

Canadian provinces (McCallum 1995). Since that time, many have used increasingly more refined gravity models in order to examine the impact of the border on trade between the U.S. and Canada (Anderson and van Wincoop 2003 being the most notable). We are the first to study the impact of the border on trade between the U.S. and Mexican states in a gravity model context, and are also the first to incorporate institutional variables into such a study. As a final step, we also examine how trade between the U.S. and Mexican states affects broader measures of economic prosperity in the two nations. We find, interestingly, that trade is a more important determinant of prosperity for the *importing* state than for the *exporting* state. This empirical exercise will help us better understand what problems might arise from a possible new regime of trade restrictions as envisioned by the Trump administration.

2. Literature Review

The gravity model has become an increasingly popular empirical tool for assessing the magnitude of cross-country trade, and the factors that cause trade relationships to vary. Pioneered by Jan Tinbergen in 1962, the gravity model of trade modifies the standard gravity equation of physics in order to understand the conditions that lead countries to trade with one another. The gravity model of physics assumes that the mass of two objects will be positively related to their force of attraction, and the distance between the objects will be negatively related to their force of attraction. Likewise, the gravity model of trade assumes that trade will be positively related to the "economic mass" of two locations (generally defined in terms of GDP), and will be negatively related to the distance between the two locations. The gravity model has not been confined to examining trade relationships. In recent years it has been applied to topics like migration (Karemera, Oguledo, and Davis 2000; Beine, Bertoli, and Moraga 2016), foreign direct investment (Brenton, DiMauro, and Lücke 1999; Benassy-Quere, Coupet, and Mayer 2007), and remittances (Lueth 2006, Lueth and Ruiz-Arranz 2008).

Empirically, this simple model has performed very well in terms of explaining cross-country trade relationships, and recent contributions to the literature have provided the model with substantial theoretical underpinnings.[4] These theoretically grounded models avoid the charge of conducting naïve empirical exercises by grounding their analysis in various theories of international trade (Bergstrand 1989; Deardorff 1998; Eaton and Kortum 2002; Helpman et al. 2008). Additionally, beginning with Anderson and van Wincoop (2003), most researchers using gravity models have been careful to incorporate "multilateral resistance terms" of some sort. These variables reflect the fact that bilateral trade relationships are not only influenced by factors within the two trading nations being analyzed, but also by anything that influences trade relationships with all other current and potential trading partners. Scholars have also added a variety of other independent variables to gravity models in order to understand how trade relationships are affected by these variables. Popular variables in the literature include colonial origins, common religions, common borders, and common languages. Indeed, the gravity model can be thought of as seeking to explain the factors that either facilitate or hinder trade. Trade between individuals in two different countries will be relatively easier if those individuals share a common language, for example.

[4] See Anderson (2011) for an overview of the theoretical underpinnings of the gravity model.

Recently, scholars have also begun to consider the effect institutions might have on trade relationships. These examinations have generally taken two forms: (1) they have examined whether countries with better institutions see higher levels of trade, and/or (2) they have examined whether countries which are institutionally similar are more likely to trade with one another. Often, these examinations are undertaken in the same paper. Wall (1999), for example, uses the Heritage Foundation's cross-country economic freedom index,[5] and finds that countries with more restrictive trade environments see reduced merchandise imports. Brenton, DiMauro, and Lücke (1998) consider FDI to be a substitute for trade, and examine the impact of institutions consistent with economic freedom on the propensity for countries to receive FDI. They, too, use the Heritage Foundation's *Index of Economic Freedom*, and find that freer countries tend to receive higher levels and flows of FDI. Kimura and Lee (2006) use both the *Economic Freedom of the World* (EFW) index[6] and an income adjusted version of the index to examine the impact of the institutional environment on imports and exports. No matter which version of the index they use, they find EFW to be positive and highly significant in all specifications, suggesting economic freedom is important for both importers and exporters. Walsh (2008) uses the EFW to examine the impact of institutions on the trade in services, and finds economic freedom to be positive and significant. Other scholars have used the Australian Productivity Commission's Trade Restrictiveness Index (Grunfeld and Moxnes 2003; Dee 2004), the OECD's measure of product market regulation (Nicholetti, Scarpetta, and Boylaud 2000; Lejour and de Paiva Verheijden 2004; Kox and Lejour 2005), and the World Bank's database measuring the quality of governance across countries (de Groot et al. 2004) to measure the impact of institutions on trade relationships in the context of gravity modelling. In all cases, researchers have found institutions to be important determinants for explaining patterns of cross-country trade.

The overwhelming majority of papers in the gravity model literature use panels of countries to examine these relationships. Recently, some authors have begun to use gravity models to explain sub-national trade relationships. McCallum (1995) was the first to use a gravity model to examine how the border between the U.S. and Canada impacted trade between the U.S. states and Canadian provinces. He found that after controlling for distance and size, interprovincial trade was 22 times larger than province to state trade, indicating quite a sizeable border effect. Other scholars have reexamined this relationship and found a smaller border effect, but nonetheless have consistently found that the U.S.-Canada border is a deterrent to trade, even after controlling for a variety of potentially confounding variables. Still other scholars have examined the impact of borders on regional trade by looking at the OECD (Olper and Raimondi 2008; Wang et al. 2010), Latin America (Carillo-Tudela and Li 2004), and the European Union (Nitsch 2000; Braconier and Pisu 2013). Recently, some authors have begun to use gravity models to examine within-country relationships, either between states or regions. Coughlin and Novy (2016), for example, look at trade relationships within the US, and examine the impact of domestic borders on trade between the states (and of the national border on state-level trade with other countries). They build on Wolf (2000) and Millimet and Osang (2007), both of whom also use gravity models to examine interstate trade. We could, however, find no examples of papers that used a gravity model to examine trade between the U.S. and Mexican states. Indeed, in a

[5] See Miller, Kim, and Roberts (2018) for the most recent version of this index.
[6] See Gwartney et al. (2018) for the most recent version of this index.

recent review of the empirical literature on sub-national gravity models, Mexico was not mentioned at all (Havranek and Irsova 2017).

In this paper, we examine the relationship between institutional quality and bilateral trade patterns between Mexican states and U.S. states. We are contributing to the small, but growing, literature which uses gravity models to examine economic exchange at the subnational level (see Havranek and Irsova 2017 for a recent review of this literature). We are the first to explicitly incorporate institutional quality into a model of trade between the U.S. states and Mexican states, and the first to examine these sorts of relationships between the U.S. and Mexican states more generally. Poor institutions can be viewed as a cost for potential trading partners, and economic theory tells us that when an action becomes more costly, less of that action will be undertaken. Conversely, when an action becomes less costly, more of that action will be undertaken. We find that states with better institutional environments as measured by the *Economic Freedom of North America*[7] index do, indeed, realize higher levels of trade. We also contribute to the literature examining trade border effects (Hillberry and Hummels 2002; Chen 2004; Head and Ries 2001) by examining the impact the border has on trade between the U.S. states and Mexican states. Finally, we use our dataset to examine the relationship between trade volume and three measures of economic prosperity.

3. Data and Model

Our key dependent variable is the dollar value of exports from one state to another. [8] All dollar values are expressed in nominal terms in this analysis, as is the norm for gravity models.[9] Data for exports from one U.S. state to another U.S. state is drawn from the Census Bureau's Commodity Flow Survey. We include data on both trade *within* a particular state (i.e.: trade between one IL business and another IL business), and trade *between* states (i.e.: trade between a business in IL and another in IN).[10] Data from the Commodity Flow Survey is available in 5-year intervals from 1993 onward, and is collected as part of the Economic Census during years ending in "2" and "7".[11] Data for trade between the U.S. states and Mexican states comes from the Bureau of Transportation Statistics' TransBorder Freight Data database. This data is available yearly from 1993 onward. However, methodological changes in the data collection make data for the years 1993-2006 incomparable to the data collected in 2007 onward. Consequently, we are limited to a two-period panel using the years 2007 and 2012.[12] We drop

[7] See Stansel, Torra, and McMahon (2018) for the most recent version of this index.
[8] We should note that our dataset includes a number of zeroes for this variable. The data source states that it is unclear whether each of these reflect missing data or the absence of trade. However, we have no reason to suspect that these zeroes are anything other than randomly distributed. Consequently, we follow the previous literature in dropping the zeroes from the analysis.
[9] Deflation of any variables expressed in dollar values could introduce bias into the analysis, and therefore result in spurious correlations. The gravity model traditionally relates nominal GDP to nominal imports. Further, use of time fixed effects will act as an implicit deflator.
[10] The Commodity Flow Survey uses a subset of establishments from the Census Bureau's Business Register in its survey, sampling around 100,000 establishments. Establishments complete detailed surveys, which include information on the destination state or country of their shipments. Within-state shipments are still counted as exports using their methodology. See Appendix C (Sample Design, Data Collection, and Estimation) of the 2012 survey for more information.
[11] Data is available for the years 1993, 1997, 2002, 2007, and 2012.
[12] Data for the 2017 Commodity Flow Survey was not yet available at the time this paper was written.

Alaska, and Hawaii from our sample due to concerns over the comparability of this data to the data from the other states. Indeed, in some ways, trade with Alaska and Hawaii resembles international trade more than domestic trade. We lack data for Washington, D.C. in our economic freedom variable, so other data for this area is also dropped. This leaves us with data for dyadic trade between the 48 contiguous U.S. states (i.e.: both Texas to Arkansas and Arkansas to Texas are included as separate observations), intrastate trade for each of the 48 contiguous U.S. states, and one-way trade data reflecting exports from each U.S. state to each Mexican state (we lack data for exports from each Mexican state to each U.S. state). With two years of data, this results in a total of 7,680 observations.

The gravity model assumes that trade is a positive function of the economic mass of the trading partners and a negative function of trade costs. Historically, gravity models have used GDP to represent economic mass. Our GDP data for the U.S. comes from the Bureau of Economic Analysis' Regional Economic Accounts database, and is listed in millions of U.S. dollars. Our GDP data for the Mexican states comes from the Instituto Nacional de Estadística y Geografía (INEGI).[13] We use the official OECD exchange rate to convert pesos to dollars, and record the result in millions of U.S. dollars. As with our export variable, we use nominal GDP, not real GDP.

We use several different variables as proxies for trade costs. First, we use the traditional distance variable as is common in the gravity literature. However, instead of using the great circle distance (that is, the shortest distance between two points on the globe), we instead use a measure of vehicle miles travelled between the most populous cities in each state. This measure was obtained by plugging each city pair into Google Maps and recording the number of miles reflecting the fastest route between the two cities. We use the most populous cities instead of the capital cities, since the more populous cities tend to be economically more important to a state than the capital cities. Our use of online mapping tools follows Braconier and Pisu (2013), who use Bing Maps Routing Services in their gravity analysis of trade across continental Europe, and Benz (2013) who uses Google Maps in his analysis of trade between the U.S. states and Canadian provinces. Additionally, we use two different dummy variables; the first one takes the value of one if the two states are adjacent, and the other takes the value of one if the two states are separated by an international border. We label these "adjacent" and "cross border" respectively. The latter variable captures the primary border effect we are interested in examining; that is, the effect of the U.S.-Mexico border on trade between the U.S. and Mexican states.

The distance and set of dummy variables just discussed are common in the gravity model literature as proxies of trade costs. As discussed in the literature review, the use of institutional variables is much less common, though not altogether absent from the literature. In addition to examining trade relationships between U.S. and Mexico at the sub-national level, the other major innovation of our paper is to incorporate economic freedom into the analysis. With the passage of NAFTA, the set of formal trade barriers between the U.S. and Mexican states shrank considerably. Further, there exist few formal trade barriers between U.S. states. We contend, however, that differences in economic freedom across the states might act alternatively as an implicit barrier to both interstate and cross-border trade. Here, we use the overall subnational

[13] This translates to "National Institute of Statistics and Geography".

summary score from the *Economic Freedom of North America* (hereafter, EFNA) index (Stansel, Torra, and McMahon 2018). This index is broken down into three component areas: (1) government spending, (2) taxes, and (3) labor market freedom. We use both the overall index and the three component areas in our study, in order to determine whether any particular area of economic freedom is driving our results.

For many years, the economic mass and trade cost variables were the only types of variables included in gravity models. In recent years, Anderson and van Wincoop's (2003) "multilateral resistance terms" have become a mainstay in the empirical literature. Essentially, these terms reflect the fact that bilateral trade depends not only on the trade costs between any two particular countries, but also on trade costs in all other export markets. That is to say, these terms are able to incorporate relative price effects, since a change in relative prices in one bilateral relationship can ripple through many other trade routes. Though there are a variety of different ways to incorporate multilateral resistance terms into a gravity model, excluding them represents a clear case of omitted variable bias. We use two different methods, both common in the empirical literature, to approximate the multilateral resistance terms. First, we use importer, exporter, and year fixed effects. Though many researchers prefer to use pairwise fixed effects in their gravity models, this type of fixed effect drops from the analysis anything that does not vary over time within a bilateral pair. So, for example, it would drop the distance variable and both dummy variables from our model. Bacchetta et al. (2012) argue, however, that in panels with few time periods, it is perfectly acceptable to use exporter and importer fixed effects instead of pairwise fixed effects. Secondly, we use a remoteness index, popularized by Head (2003), which provides an average weighted index of each country from all other trading partners, in which the weights are partner country shares of world GDP. Though some have criticized the remoteness index as only capturing one facet of multilateral resistance (Anderson and van Wincoop 2003; Baier and Bergstrand 2009), we nonetheless contend that it is valuable when used in concert with other types of specifications. Summary statistics can be found in Table 1.

In order to test the robustness of our results, we use three different types of specifications, all of which are common in the empirical literature. We first use a pooled OLS specification, then turn to a panel specification in which we use remoteness terms as a proxy for multilateral resistance. Finally, we employ a panel fixed effects specification, which uses both importer and exporter fixed effects, as well as year fixed effects. This is our preferred specification, and achieves the best fit in each set of regressions. We alternate between using the full EFNA index in our analysis, and each of the three components that make up the EFNA index. These results, which we will discuss further below, can be found in Table 2.

Additionally, we employ both contemporaneous and lagged independent variables in different sets of tests. Because our panel only includes two periods, we are only able to run panel fixed effects specifications in our contemporaneous models. In addition to providing proxies for the multilateral resistance terms, our fixed effects also help us control for potential endogeneity in our model. Using a lagged specification is another way to help mitigate (but not eliminate entirely) any potential endogeneity. In our lagged specifications, found in Table 3, all of our independent variables (with the exception of our indicator and distance variables, which do not vary over time) are lagged by 5 years. We once again alternate using the three different types of specifications we used in our contemporaneous regressions.

After examining the relationship between both economic freedom and international borders and trade between the U.S. and Mexican states, we turn to an examination of the relationship between trade volume and wider measures of prosperity in the states. Due to the unique construction of our dataset, we are able to independently evaluate both the origin and the destination states; that is to say, we can examine both importer and exporter prosperity. We employ three separate measures of economic prosperity: employment per capita (employment divided by population), per capita income, and per capita GDP. We use the natural log of the latter two variables in order to allow all three variables to have an elasticity interpretation.

For the U.S., employment figures come from the Bureau of Economic Analysis' Regional Economic Accounts database. Per capita income for the U.S. comes from the U.S. Census Bureau's *Annual Survey of State and Local Government Finances*. For Mexico, both figures come from the Instituto Nacional de Geografía y Estadística (INEGI). We also add two control variables into our prosperity regressions: state population and percent of the population with at least a high school diploma.[14] Data for these two variables for the U.S. comes from the U.S. Census Bureau's *American Community Survey,* 3-year estimates. Data for Mexico once again comes from INEGI. We prefer to use a parsimonious model for our prosperity regressions, so we avoid adding any additional control variables, instead assuming that these two regressors, along with our economic freedom variable, create appropriate proxies for a variety of other potential determinants of prosperity.

4. Results

Following the literature, all of our variables (with the exception of our indicator variables) appear in logged form, which allows us to interpret the results as elasticities. Table 2 contains the results of our gravity model regressions. Essentially, we are testing the extent to which traditional gravity model variables (distance and GDP) matter for trade, versus institutional variables, versus borders. That is to say, are borders, the economic freedom environment, or the traditional gravity model variables more important in explaining patterns of cross-state trade? Or, alternatively, do all three categories of variables act somewhat in concert? Further, we examine whether any particular component of economic freedom exerts disproportionate influence on trade relationships between the states. To do this, we alternate using the full EFNA index and the three components of the index in alternative specifications.

Our results are very robust to our different specifications. In every specification, we find that the point estimate on our distance variable enters with a statistically significant negative sign, and is very close to the value of negative one that is common in the literature. The GDP variables for both origin and destination are positive and significant in all specifications. Additionally, the variable indicating whether two trading states are adjacent to one another is positive and highly significant across all specifications, confirming the intuition that states situated right next to one another are more likely to trade than those that are more distant. In order to get the magnitude of

[14] For Mexico, data is recorded as the percent of the population aged 15+ with at least a basic education, which includes having completed at least secondary school. For the U.S., the corresponding figure is the percent of the population aged 25+ with at least a high school education. Though there are slight recording differences, these figures are capturing essentially the same information.

the effect with our indicator variables, we take the antilog of the point estimate.[15] So, for example, regression 3 tells us that states that are adjacent to one another are 2.2 times more likely to trade than states that are not adjacent. The point estimate on our adjacent indicator lies within a fairly narrow band between 0.71 and 0.86, indicating that adjacent states are somewhere between 2.03 and 2.39 times more likely to trade with one another than with non-adjacent states.

Our cross-border indicator is negative and robust across all specifications, and is much larger in magnitude than our adjacent indicator. This indicates that states that lie across the U.S.-Mexico border are significantly less likely to trade with one another than with states in their own country. This relationship holds even after controlling for a variety of potentially confounding variables, indicating that it is *the border itself* which dissuades trade. Once again, we take the antilog of the point estimate to obtain the magnitude of the effect. Here, the specification matters greatly. Our panel fixed effects specifications indicate a much smaller border effect than our pooled OLS or panel remoteness specifications. Regression 6, for example, indicates that states lying across an international border are 2.3 times less likely to trade with one another than states within the same country. Regression 10, however, indicates that states lying across an international border are 15.64 times less likely to trade with one another. Even if the true effect lies somewhere in between these two extremes, it is clear that the international border exerts some considerable influence on trade between the U.S. and Mexican states.

The results for our economic freedom variables are very sensitive to the specification used. When looking at the overall economic freedom score, for example, the point estimate on our destination-state economic freedom variable is positive and significant in our OLS specification and negative and significant in our panel fixed effects specification. The same pattern holds when we are looking at the government spending subcomponent of economic freedom (area 1); though in this case the point estimate on destination economic freedom in our panel remoteness specification is also positive and significant. In the regressions which employ the labor market freedom subcomponent (area 3), all point estimates on destination state economic freedom are positive and significant. In contrast, in our regressions which employ the tax subcomponent of economic freedom (area 2), all point estimates on destination state economic freedom are negative and significant. This indicates that an increase in the tax freedom score of the destination state is associated with less trade activity (particularly, fewer imports), perhaps due to a greater volume of domestic production in that lower-tax state leading to a reduced need for imports. The only subcomponent of economic freedom for origin (exporting) states which shows any consistent relationship with trade activity is the tax freedom subcomponent (area 2), which is positive, significant, and similar in magnitude in two out of three specifications. This indicates that an increase in the tax freedom subcomponent of exporting states is associated with an increase in export activity from those states. Regression 9, for example, indicates that a one percent increase in the tax freedom score of a state is associated with nearly half a percent rise in exports from that state.

Table 3 repeats the tests from table 2, but with all independent variables (with the exception of the distance and indicator variables) lagged by 5 years. This is done both to help reduce any potential endogeneity, and to reflect the fact that current levels of trade might not reflect current economic conditions, but rather the economic conditions of the recent past. Because we only

[15] That is, *e* to the power of the coefficient for the variable (which in this case was *e*^0.79).

have two time periods in our analysis, we are unable to run lagged panel specifications, so we use OLS in all specifications.[16] Our results are substantially similar to what we found in our contemporaneous regressions. In all specifications, distance is negative, significant, and very close to the negative one value that is commonly found in the literature. GDP is positive and significant across all specifications, as expected. Both indicator variables maintain the same signs, are significant across all specifications, and are similar in magnitude to what we found in Table 2.

The only substantial change we find in our lagged specifications in Table 3 is that the association between economic freedom and trade becomes much clearer. The economic freedom score of the destination (importing) state is significant across all specifications: positive for the overall economic freedom score and areas 1 and 3, and negative for area 2. When looking at overall economic freedom, for example, this indicates that a one percent increase in the economic freedom score of an importing state is associated with between 1.77 and 2.16 percent more imports five years later. That same positive relationship holds true for areas 1 and 3 of the index. In contrast, a one percent increase in the tax freedom score is associated with between 0.79 and 0.86 percent less imports five years later. Additionally, the tax freedom score of the *exporting* state appears to be positively related to future trade volume. As we see in regressions 17 and 18, an increase in the tax freedom score of a state is associated with between one-third and one-half of a percent increase in exports five years later.

We have just examined the factors that influence trade across the U.S. and Mexican states. In our final set of regressions, we turn to an examination of the relationship between trade and broader measures of prosperity. Due to the unique setup of our data, we are able to independently examine both the exporting (origin) states and the importing (destination) states. We use three separate measures of prosperity to test the robustness of our results: percent of the population that is employed, the logged value of per capita income, and the logged value of per capita gross domestic product (GDP). Because we are primarily interested in the relationship between trade and prosperity, we use only the overall economic freedom score in our regressions (instead of breaking economic freedom down into its subcomponents).

As Table 4 shows, we find that after controlling for economic freedom, trade is an important determinant of prosperity in the destination state, but matters little for prosperity in the origin state. That is to say, trade is much more important for prosperity in the *importing* state than in the *exporting* state once we take the underlying institutional environment of the state into account. This contradicts the protectionists' argument that imports are bad for the economy. The magnitude of the effect does vary significantly depending on the specification, but it is positive and significant in five out of the six specifications that look at the relationship between trade and destination-state prosperity (compared to only one out of six specifications for origin-state prosperity). Our largest coefficient is found in the pooled OLS specification in which employment as a percent of the population is the dependent variable, where we find that a one percent increase in imports is associated with a 0.74 percent increase in the employment rate in

[16] We chose not to include the results from our fixed effects OLS specifications. Because we are controlling for endogeneity with our lagged specification, the addition of fixed effects appears to provide some spurious results. Since we control for the multilateral resistance terms with our remoteness index, we maintain the ability to proxy for changes in trade conditions along one bilateral route affecting trade in other bilateral routes.

the importing state. This benefit for the importing state is unsurprising to economists, but certainly runs against popular political rhetoric that imports displace domestic employment. Incidentally, the level of economic freedom in origin states was positively associated with all three measures of origin prosperity. For destination states the relationship was positive for the employment rate, but negative for per capita GDP, and mixed for per capita income.

In Table 5, we rerun the tests from Table 4, but lag all of our independent variables by 5 years. As before, this both allows us to better control for endogeneity, and to examine how current prosperity is impacted by conditions in the recent past. Because of our lagged specification, we are unable to perform any panel analysis, since we only have two time periods in our dataset. In this case we find lagged exports to be positively associated with both the employment rate and per capita GDP in both the origin states and the destination states. It is also positively related to per capita income in the destination states. Once again, our largest point estimates appear on those specifications which use employment as a percent of the state population as the dependent variable. Here, for the exporting state, a one percent increase in export activity is associated with a 0.21 percent increase in the employment rate five years later. For the importing state, a one percent increase in imports is associated with a 0.51 percent increase in the employment rate five years later. This is consistent with the standard economist's story that trade is mutually beneficial for both the exporting and the importing entity. The lagged level of economic freedom in origin states was positively associated with all three measures of origin prosperity, as was the contemporaneous level. For destination states the relationship was positive for the employment rate, but negative for the other two, which was also similar to our findings for the current level of economic freedom.

5. Concluding Remarks

Though the passage of NAFTA in 1994 significantly facilitated trade relationships between the U.S. and Mexico, the border still exerts a significant negative impact on trade between the U.S. and Mexican states. Furthermore, the new US-Mexico-Canada Agreement (USMCA) that will likely soon replace NAFTA is a substantially inferior arrangement, and thus can only serve to make that border impact stronger. Fortunately, as our analysis has shown, focusing on improving economic freedom at the state level might serve to increase trade, thereby offsetting some of that negative impact.

Additionally, in the immediate term, trade seems to be more economically beneficial (in terms of employment, income, and GDP) for the importing state than for the exporting state, though we know that exchange would not occur unless both parties to the exchange view it as beneficial. Our current political rhetoric, however, is very focused on the current imbalance between exports and imports that exists in US-Mexico trade. Indeed, the charge that U.S. jobs are moving to Mexico has been somewhat of a rallying cry for creating the new trade deal. Our paper suggests that this narrative might empirically be false. Though jobs in particular industries might have moved to Mexico in recent years, we find that the relationship between trade and the overall employment rate in the importing states is robustly positive over both the short and the longer run.

Examining trade at the subnational level helps us to tease out relationships that may be missed by focusing on national relationships. We must always keep in mind that trade does not occur between nations, but rather between individuals and/or individual companies within those nations. By analyzing these sorts of relationships at the sub-national level, we are better able to understand both the determinants and benefits of trade. Our analysis of U.S. and Mexican states indicates 1) that states with greater economic freedom tend to engage in more trade with other states, 2) that states that engage in more trade with other states tend to have greater economic prosperity, and 3) states that have greater economic freedom tend to have greater prosperity. The latter two findings support the case for reducing restrictions on trade between the U.S. and other countries, which is the opposite of what is being pursued by the current political leadership in both the U.S. and Mexico. It also suggests that the current protectionist policy strategy will make both countries less prosperous.

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Table 1: Summary Statistics					
Variable	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
Logged Value of Exports (Dollars)	6910	18.54	3.63	7.83	27.99
Logged Value of Vehicle Miles Traveled	7584	7.16	0.70	2.56	8.25
Logged Value of GDP, Origin	7680	12.14	1.02	10.12	14.57
Logged Value of GDP, Destination	7680	11.32	1.38	8.54	14.57
Adjacent Indicator	7680	0.06	0.23	0	1
Cross Border Indicator	7680	0.40	0.49	0	1
Logged Value of EFNA, Origin	7680	1.80	0.15	1.38	2.08
Logged Value of EFNA, Destination	7680	1.77	0.18	1.28	2.08
Logged Value of EFNA Area 1, Origin	7680	1.85	0.23	1.29	2.25
Logged Value of EFNA Area 1, Destination	7632	1.74	0.42	-0.67	2.25
Logged Value of EFNA Area 2, Origin	7680	1.74	0.17	1.14	2.02
Logged Value of EFNA Area 2, Destination	7584	1.67	0.34	-0.32	2.20
Logged Value of EFNA Area 3, Origin	7680	1.79	0.16	1.39	2.17
Logged Value of EFNA Area 3, Destination	7680	1.83	0.18	1.39	2.22
Remoteness Index, Origin	7584	872092.60	1343252.00	195.57	8688627.00
Remoteness Index, Destination	7584	222220.70	289129.80	169.49	2238734.00
Percent Employed, Origin	7,680	60.75	5.91	8.31	83.94
Percent Employed, Destination	7,680	53.04	10.65	35.83	83.94
Logged Income Per Capita, Origin	7,680	10.60	0.16	10.28	11.08
Logged Income Per Capita, Destination	7,680	9.50	1.37	7.19	11.08
Logged GDP Per Capita, Origin	7,680	10.77	0.22	8.30	13.65
Logged Income Per Capita, Destination	7,680	10.10	0.90	8.26	11.26
Percent with a High School Diploma, Origin	7,680	86.37	3.57	78.00	92.20
Percent with a High School Diploma, Destination	7,680	75.75	13.64	43.40	92.20
Logged Population, Origin	7,680	15.19	0.99	13.15	17.44
Logged Population, Destination	7,680	15.03	0.92	13.15	17.44

Table 2: Exports, Borders, and Economic Freedom - Contemporaneous Regressions												
Dependent Variable: Logged Dollar Value of Exports												
	EFNA			Area 1			Area 2			Area 3		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Pooled OLS	Panel Remoteness	Panel FE	Pooled OLS	Panel Remoteness	Panel FE	Pooled OLS	Panel Remoteness	Panel FE	Pooled OLS	Panel Remoteness	Panel FE
Log Distance	-1.07***	-0.90***	-0.97***	-1.05***	-0.89***	-0.97***	-1.08***	-0.90***	-0.98***	-1.04***	-0.89***	-0.97***
	(0.04)	(0.05)	(0.04)	(0.04)	(0.05)	(0.04)	(0.05)	(0.05)	(0.04)	(0.05)	(0.05)	(0.04)
Log GDP Origin	1.08***	1.02***	0.56*	1.09***	1.03***	0.50*	1.06***	1.01***	0.56**	1.07***	1.03***	0.59**
	(0.02)	(0.03)	(0.29)	(0.02)	(0.03)	(0.30)	(0.02)	(0.03)	(0.29)	(0.02)	(0.03)	(0.29)
Log GDP Destination	1.21***	1.01***	1.41***	1.16***	1.01***	1.63***	1.15***	0.94***	1.29***	1.16***	1.00***	1.59***
	(0.02)	(0.02)	(0.24)	(0.02)	(0.02)	(0.25)	(0.02)	(0.02)	(0.25)	(0.02)	(0.02)	(0.26)
Adjacent Indicator	0.71***	0.86***	0.79***	0.73***	0.87***	0.80***	0.72***	0.87***	0.79***	0.74***	0.86***	0.79***
	(0.10)	(0.09)	(0.08)	(0.09)	(0.09)	(0.08)	(0.09)	(0.09)	(0.08)	(0.10)	(0.09)	(0.08)
Cross Border Indicator	-2.24***	-2.19***	-1.32***	-2.14***	-2.10***	-1.04***	-2.63***	-2.53***	-1.44***	-2.75***	-2.55***	-1.07***
	(0.08)	(0.08)	(0.37)	(0.07)	(0.08)	(0.38)	(0.09)	(0.09)	(0.38)	(0.09)	(0.09)	(0.39)
Logged EFNA Origin	0.22	-0.17	-0.06	-0.08	-0.33***	0.19	0.43***	0.19	0.45*	0.09	-0.27**	-0.20
	(0.16)	(0.15)	(0.38)	(0.10)	(0.08)	(0.18)	(0.15)	(0.12)	(0.27)	(0.14)	(0.12)	(0.22)
Logged EFNA Destination	1.73***	0.18	-1.16***	1.16***	0.41***	-0.25**	-0.64***	-0.59***	-0.58***	2.02***	1.60***	1.53***
	(0.14)	(0.12)	(0.18)	(0.08)	(0.07)	(0.11)	(0.07)	(0.06)	(0.07)	(0.15)	(0.13)	(0.21)
Remoteness, Origin		0.00***			0.00***			0.00***			0.00***	
		(0.00)			(0.00)			(0.00)			(0.00)	
Remoteness, Destination		0.00***			0.00**			0.00***			0.00**	
		(0.00)			(0.00)			(0.00)			(0.00)	
Constant	-3.49***	1.99***	5.98	-1.6***	1.76***	2.21	1.38**	3.77***	5.10	-3.18***	-0.37	-1.05
	(0.65)	(0.67)	(4.30)	(0.54)	(0.57)	(4.38)	(0.60)	(0.55)	(4.45)	(0.64)	(0.64)	(4.37)
N	6814	6814	6814	6782	6782	6782	6718	6718	6718	6814	6814	6814
R^2	0.82	0.84	0.93	0.83	0.84	0.93	0.81	0.84	0.93	0.82	0.84	0.93
Exporter FE	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes
Importer FE	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes
Year FE	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes

Table 3: Exports, Borders, and Economic Freedom - Lagged Regressions								
Dependent Variable: Logged Dollar Value of Exports								
	EFNA		Area 1		Area 2		Area 3	
	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
	Pooled OLS	OLS Remoteness	Pooled OLS	OLS Remoteness	Pooled OLS	OLS Remoteness	Pooled OLS	OLS Remoteness
Log Distance	-1.10***	-0.94***	-1.07***	-0.92***	-1.12***	-0.94***	-1.09***	-0.93***
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.06)	(0.05)	(0.06)
Log GDP Origin, Lagged 5 Years	1.04***	1.00***	1.05***	0.99***	1.04***	1.00***	1.04***	0.99***
	(0.03)	(0.04)	(0.02)	(0.04)	(0.03)	(0.04)	(0.02)	(0.04)
Log GDP Destination, Lagged 5 Years	1.18***	0.98***	1.09***	0.94***	1.12***	0.89***	1.14***	0.96***
	(0.03)	(0.03)	(0.02)	(0.02)	(0.03)	(0.03)	(0.02)	(0.03)
Adjacent Indicator	0.70***	0.82***	0.72***	0.83***	0.71***	0.85***	0.72***	0.84***
	(0.10)	(0.09)	(0.10)	(0.09)	(0.10)	(0.09)	(0.10)	(0.09)
Cross Border Indicator	-2.17***	-2.06***	-2.06***	-1.98***	-2.19***	-2.06***	-2.38***	-2.25***
	(0.08)	(0.09)	(0.08)	(0.08)	(0.09)	(0.09)	(0.09)	(0.09)
Logged EFNA Origin, Lagged 5 Years	0.29	0.12	0.05	-0.03	0.52***	0.33**	0.18	0.08
	(0.18)	(0.18)	(0.13)	(0.13)	(0.17)	(0.17)	(0.16)	(0.15)
Logged EFNA Destination, Lagged 5 Years	2.16***	1.77***	2.11***	1.93***	-0.79***	-0.86**	2.10***	1.80***
	0.20	(0.21)	(0.13)	(0.13)	(0.14)	(0.13)	(0.17)	(0.17)
Remoteness, Origin, Lagged 5 Years		0.00***		0.00***		0.00***		0.00***
		(0.00)		(0.00)		(0.00)		(0.00)
Remoteness, Destination, Lagged 5 Years		0.00		0.00**		0.00		0.00*
		(0.00)		(0.00)		(0.00)		(0.00)
Constant	-3.28***	-0.29	-2.26***	-0.04	2.64***	5.13***	-2.58***	0.05
	(0.77)	(0.82)	(0.66)	(0.69)	(0.73)	(0.73)	(0.71)	(0.73)
N	3432	3432	3432	3432	3384	3384	3432	3432
R^2	0.80	0.81	0.82	0.82	0.80	0.81	0.81	0.81
Exporter FE	No	No	No	No	No	No	No	No
Importer FE	No	No	No	No	No	No	No	No
Year FE	No	No	No	No	No	No	No	No

Table 4: How Does Trade Impact Wider Measures of Prosperity? Contemporaneous Specifications

	EFNA Summary Score											
	Origin Prosperity						Destination Prosperity					
Dependent Variable	Employment		Logged Per Capita Income		Logged Per Capita GDP		Employment		Logged Per Capita Income		Logged Per Capita GDP	
	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)
	Pooled OLS	Panel FE	Pooled OLS	Panel FE	Pooled OLS	Panel FE	Pooled OLS	Panel FE	Pooled OLS	Panel FE	Pooled OLS	Panel FE
Logged Exports	0.04	0.00	0.00	0.00	0.01***	0.00	0.74***	0.03***	0.10***	0.00	0.10***	0.01***
	(0.02)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)	(0.03)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)
Logged EFNA Origin	12.35***	15.82***	0.07***	0.40***	0.07***	0.28***	-0.45	0.09	-0.12***	0.00	-0.13***	-0.01
	(0.35)	(1.35)	(0.01)	(0.04)	(0.02)	(0.03)	(0.38)	(0.48)	(0.03)	(0.02)	(0.03)	(0.02)
Logged EFNA Destination	3.81***	-0.03	-0.06***	0.01	-0.04***	0.00	4.23***	1.82***	-0.15***	0.52***	-0.40***	-0.15***
	(0.29)	(0.39)	(0.01)	(0.01)	(0.01)	(0.01)	(0.33)	(0.38)	(0.03)	(0.01)	(0.04)	(0.02)
Percent HS Diploma Origin	0.78***	0.44***	0.03***	0.02***	0.02***	0.01***	-0.02	0.00	0.00	0.00	0.00	0.00
	(0.01)	(0.07)	(0.00)	(0.00)	(0.00)	(0.00)	(0.02)	(0.02)	(0.00)	(0.00)	(0.00)	(0.00)
Percent HS Diploma Destination	-0.01	0.00	0.00	0.00	0.00***	0.00	0.55***	-0.52***	0.08***	0.02***	0.04***	0.00***
	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)
Logged Population Origin	-1.43***	-1.47**	0.06***	0.06***	0.04***	-0.98***	-0.86***	-0.10	-0.11***	0.00	-0.12***	0.00
	(0.07)	(0.75)	(0.00)	(0.02)	(0.00)	(0.01)	(0.07)	(0.09)	(0.01)	(0.00)	(0.01)	(0.00)
Logged Population Destination	-0.14**	-1.65	0.00**	0.04	-0.01	-0.03	-2.28***	-19.48***	0.00	-0.16***	-0.08***	-1.04***
	(0.06)	(2.62)	(0.00)	(0.05)	(0.00)	(0.05)	(0.08)	(1.47)	(0.01)	(0.04)	(0.01)	(0.05)
Constant	-12.01***	36.48	7.28***	6.76***	8.11***	24.77***	40.17***	340.30***	4.10***	8.06***	9.19***	24.10***
	(2.21)	(37.97)	(0.07)	(0.86)	(0.17)	(0.78)	(2.75)	(21.61)	(0.24)	(0.58)	(0.25)	(0.74)
N	6910	6910	6910	6910	6910	6910	6910	6910	6910	6910	6910	6910
R^2	0.52	0.98	0.33	0.97	0.15	0.99	0.81	0.99	0.91	0.99	0.79	0.99
Exporter FE	no	yes	no	yes	no	yes	no	yes	no	yes	no	yes
Importer FE	no	yes	no	yes	no	yes	no	yes	no	yes	no	yes
Year FE	no	yes	no	yes	no	yes	no	yes	no	yes	no	yes

Table 5: How Does Trade Impact Wider Measures of Prosperity? Lagged Specifications

	EFNA Summary Score					
	Origin Prosperity			Destination Prosperity		
Dependent Variable	Employment	Logged Per Capita Income	Logged Per Capita GDP	Employment	Logged Per Capita Income	Logged Per Capita GDP
	(33)	(34)	(35)	(36)	(37)	(38)
	Pooled OLS	Pooled OLS	Pooled OLS	Pooled OLS	Pooled OLS	Pooled OLS
Logged Exports, Lagged 5 Years	0.21***	0.00	0.00**	0.51***	0.11***	0.09***
	0.03	0.00	0.00	0.05	0.00	0.00
Logged EFNA Origin, Lagged 5 Years	8.04***	0.08***	0.08***	-0.33	-0.10**	-0.09**
	0.5	0.02	0.03	0.53	0.05	0.04
Logged EFNA Destination, Lagged 5 Years	-0.13	0.00	-0.04	4.40***	-0.67***	-0.57***
	0.53	0.02	0.04	0.54	0.05	0.06
Percent HS Diploma Origin, Lagged 5 Years	0.94***	0.02***	0.03***	0.01	0.00	0.00
	0.02	0.00	0.00	0.02	0.00	0.00
Percent HS Dipoma Destination, Lagged 5 Years	-0.04***	0.0	0.00**	0.64***	0.09***	0.04***
	0.01	0.00	0.00	0.01	0.00	0.00
Logged Population Origin, Lagged 5 Years	-1.40***	0.04***	0.05***	-0.54***	-0.13***	-0.11***
	0.12	0.00	0.01	0.10	0.01	0.01
Logged Population Destination, Lagged 5 Years	-0.30***	0.00	-0.01	-1.86***	0.00	-0.06***
	0.10	0.00	0.01	0.13	0.01	0.01
Constant	-9.88***	7.71***	7.87***	21.74***	4.33***	8.88***
	3.05	0.11	0.26	4.04	0.38	0.35
N	3430	3430	3430	3430	3430	3430
R^2	0.52	0.29	0.15	0.79	0.90	0.81
Exporter FE	no	no	no	no	no	no
Importer FE	no	no	no	no	no	no
Year FE	no	no	no	no	no	no