

A Spatial Analysis of Incomes and Institutional Quality: Evidence from US Metropolitan Areas

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A Spatial Analysis of Incomes and Institutional Quality: Evidence from US Metropolitan Areas

Abstract: We use the Stansel (2013) metropolitan area economic freedom index and 25 conditioning variables to analyze the spatial relationships between institutional quality and economic outcomes across 381 U.S. metropolitan areas. Specifically, we allow for spatial dependence in both the dependent and independent variables and estimate how economic freedom impacts both per-capita income growth and per-capita income levels. We find that while economic freedom and income levels are directly and positively related, increases in economic freedom in one area result in negative indirect effects on income levels in surrounding areas. In addition, we find that economic freedom has an insignificant relationship with economic growth.

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1. Introduction

Institutional quality is widely believed to be a fundamental determinant of income levels (Acemoglu et al. (2005) and Helpman (2008)). This belief is supported by a wealth of cross-country empirical studies, several of which utilize the Fraser Institute's economic freedom scores as proxies for institutional quality.¹ These scores measure the extent to which "individuals are permitted to choose for themselves and engage in voluntary transactions as long as they do not harm the person or property of others" (Gwartney et al., 2013, p. 1). They proxy for institutions that are consistent with well-defined and enforced property rights, as well as for limited government in terms of both its size and scope.

The findings of cross-country empirical studies have largely been echoed by those using the analogous US state-level scores from the Economic Freedom of North America (EFNA) project (Stansel and McMahon, 2013).² Furthermore, Stansel (2013) has recently constructed US metropolitan area-level scores based on the EFNA methodology and, using these scores, reports a positive income-freedom correlation.³ The positive correlation between 381 metropolitan area (log) per capita income levels and their freedom scores is illustrated in **figure 1**. The left and right panels are based on, respectively, 2005 and 2011 income levels. However, both Stansel (2013) and **figure 1** report only simple bivariate correlations. One of our goals here is to more carefully estimate the relationship between real per capita incomes (or their growth rates) and

¹ Examples of cross-country studies reporting a positive and significant relationship between economic freedom scores and per capita income levels or their rate of growth include Easton and Walker (1997), Dawson (1998), Ayal and Karras (1998), Gwartney et al. (1999), de Haan and Sturm (2000), Sturm and de Haan (2001), Lundström (2002) and Young and Sheehan (2013). For a comprehensive survey of empirical studies utilizing the Economic Freedom of the World index see Hall and Lawson (2014).

² Karabegović et al. (2003) introduced the Economic Freedom of North America index and demonstrated that it correlated positively with income levels. (Their regressions also include observations on the 10 Canadian provinces as well as the 50 US states.) Using the US sample only, Wiseman and Young (2013) report a similar positive correlation. Kreft and Sobel (2005) and Wiseman and Young (2013) report that economic freedom is positively associated with entrepreneurial activity across US states, and Garret and Rhine (2011) find that economic freedom is associated with higher rates of employment growth.

³ Stansel (2013) specifically starts from the methodology outlined in the 2011 EFNA report (Ashby et al., 2011).

economic freedom in the US. We do this using Stansel's economic freedom scores for 381 metropolitan areas along with data on personal income and 25 additional control variables.

Another of our goals is to take advantage of the large number of US metropolitan areas and allow for spatial dependence in income levels and growth rates. Allowing for this possibility is important and interesting for at least two reasons. First, uncontrolled-for spatial dependence can result in inconsistent or otherwise biased estimates of the relationship between income and economic freedom (Corrado and Fingleton, 2012). Second, there are compelling reasons to believe that changes in one metropolitan area's institutional quality can affect the incomes of neighboring areas. For example, if a metropolitan area lowers its tax rates then this may increase business activity in part by drawing customers away from businesses in neighboring areas. Alternatively, lower tax rates can lead to increases in disposable income that are partially spent at businesses in neighboring areas. We are interested in knowing the extent to which freedom-increasing reforms are associated with positive sum effects; or are those effects actually zero- or even negative-sum once spatial dependence is taken into account?

The spatial dependence that we allow for is in geographic space. This makes sense if the individuals, firms, and governments of geographic neighbors face lower transaction costs to trading with and learning from one another. A geographic definition of a county's "neighbors" also ensures that the weight matrix employed in our estimations is independent of the variation in our control variables; i.e., the weight is exogenous. Given our focus on geographic space, our paper is similar to Ahmad and Hall's (2012) study of the relationship between institutions and income growth across 58 countries, and also to Arbia et al.'s (2010) study based on a sample of

271 NUTS-2 territorial units across 29 European countries.⁴ However, neither set of authors calculate estimates of the direct, indirect, and total effects in the way described by LeSage and Pace (2009). Doing so is important because, for any econometric model that includes a spatial lag of the dependent variable, the spillover and feedback effects make the interpretation of coefficients more complex than in the case of OLS.⁵ We improve upon recent practice in the literature and report the correct direct, indirect, and total effects estimates as described by LeSage and Pace (2009).

While the estimated direct effects of economic freedom on metropolitan area income levels are positive, the indirect effects on neighboring areas are negative, statistically significant, and of comparable size to the direct effects. When we examine income growth rates the evidence is considerably weaker. We find that over 3 years the direct effect of economic freedom is positive while the indirect effect is statistically insignificant. However, over 9 years the estimated effects, direct or indirect, are statistically insignificant.

We organize this paper as follows. In section 2 we describe the data, with particular attention given to Stansel's (2013) economic freedom index. In section 3 we explain our choice of empirical models and estimation method. We report and discuss our results in section 4. Then we offer some summary conclusions and comments in section 5.

2. Data

⁴ In some of their estimations, Arbia et al. (2010) define neighbor relationships using a nonconventional weight matrix based on geographic *and institutional* distances. Since economic growth can be a determinant of institutional quality, spatial weights defined in terms of institutions are likely endogenous.

⁵ LeSage and Fischer (2009) find that the coefficients on spatially lagged explanatory variables can actually be of a different sign than the correctly estimated indirect effects. Correct calculation of the effects estimates, then, is key to a correct qualitative (as well as quantitative) interpretation of the results.

The control variable of interest is the Stansel (2013) economic freedom index. An index value is available for each of the 384 US metropolitan areas for the year 2002. The index is designed to provide a comprehensive measure of the extent to which private property is protected from expropriation and individuals are allowed to engage in voluntary transactions.

The index is constructed on a scale from 0 to 10, with 10 indicating most free. The comprehensive index is an average of the scores that metropolitan areas receive for 3 areas of economic freedom separately (each also on a scale of 0 to 10). Each area of economic freedom is itself scored based on a number of related components:

- *Area 1: Size of Government:* (a) government consumption expenditures by government; (b) transfers and subsidies; (c) social security payments.
- *Area 2: Takings and Discriminatory Taxation:* (a) total tax revenue; (b) individual income tax revenue; (c) indirect tax revenue; (d) sales taxes collected.
- *Area 3: Labor Market Freedom:* (a) minimum wage annual income; (b) state and local government employment; (c) union density.

Most of the components listed above are in dollar terms and are taken as a percentage of metropolitan area personal incomes. Government employment is taken as a percentage of total employment, as are union employees to arrive at a measure of union density.

The 384 metropolitan areas include 355 metropolitan statistical areas (MSAs) and 29 metropolitan divisions (MDs). These MSAs and MDs are defined according to the 2009 Office of Budget and Management definitions. The 29 MDs are portions of 11 large MSAs that Stansel breaks down so that all of the metropolitan areas are of comparable sizes. Since we are pursuing a spatial econometric analysis, we limit ourselves to the 381 metropolitan areas of the contiguous US states (i.e., Alaska and Hawaii areas are excluded). As can be seen in **figure 2**, there is

considerable variation in the economic freedom scores across US metropolitan areas.

Furthermore, the scores appear to be spatially correlated. Casual inspection suggests that the spatial correlation is not entirely accounted for by intra-state similarities.

Our dependent variable will be metropolitan area real (log) personal per capita income, or its average annual rate of growth. We use the US Bureau of Economic Analysis's (BEA's) measure of personal income. The BEA's measure of personal income includes transfer payments. Since we are only interested in the income individuals receive from production, we will net out the BEA's estimate of transfer payments in each metropolitan area. Institutions and their effects on incomes are persistent. In lieu of a well-defined time frame for those effects, we consider income levels in 2005 and also in 2011 (or the rate of growth over 2002-2005 and also over 2002-2011.) In growth rate regressions we also include 2002 personal income per capita as an initial income level control (to account for convergence effects). Personal income is always converted in 2005 constant dollars.⁶ As in the case of economic freedom scores, per capita income levels appear to be spatially correlated across metropolitan areas (**figure 3**; 2011 levels); as do also their growth rates (**figure 4**; 2002-2011 growth rates).

We also use 25 control variables that are motivated by Higgins et al.'s (2006) and Young et al.'s (2010, 2013) county-level studies of income growth. These data are all from either the US Census Bureau or the BEA.⁷ The control variables include (i) a number of industry employment shares; (ii) three different educational attainment population shares (high school diploma, some college, and bachelor's degree or higher); and (iii) a number of demographic population shares

⁶ We used the World Bank's GDP deflator.

⁷ All data from the BEA and the Census Bureau were extracted from February to April of 2013. The Census does not update the relevant data according to new metropolitan area definitions. Also, data from the Census is often only available at the county level. We use the 2009 metropolitan area definitions provided by the BEA to aggregate the county level components. The data from the BEA are most often available at the metropolitan level and always constructed based on the 2009 metropolitan area definitions.

(e.g., age and racial demographics).⁸ We also control for a metropolitan area's land and water areas per capita. All estimations include state-level fixed effects to account for unobserved characteristics at that level.⁹ The data for (i), (ii), and (iii) are all based on either the year 2000 or the year 2002.

Definitions, years, and sources for all variables are reported in **table 1**, along with summary statistics.

3. Empirical Methodology and Model Choice

Our dependent variable is either a metropolitan area's (log) real per capita income level or its average annual growth rate. We relate this to, among other controls, a metropolitan area's economic freedom score from Stansel (2013). We employ Elhorst's (2010) testing procedure to determine whether there is spatial dependence in our data and, if there is, what is the appropriate spatial econometric model for our analysis.

In addition to (1) OLS, the Elhorst testing procedure evaluates four spatial models: (2) the spatial autoregressive model (SAR), (3) the spatial error model (SEM), (4) the spatial lag of X model (SLX), and (5) the spatial Durbin model (SDM). A general form that nests each of these alternative models is,

$$(3.1) \quad y = \alpha + \rho W y + X\beta + WX\theta + \varepsilon ;$$

$$(3.2) \quad \varepsilon = \lambda W\varepsilon + v ,$$

⁸ Like Higgins et al. (2006) and Young et al. (2010, 2013) we control for federal government employment as a percent of a metropolitan area's population. However, unlike those studies we do not control separately for state and local government employment. The reason for this is straightforward: state and local government employment are already a component of the freedom index's *labor market freedom* area

⁹ For metropolitan areas that cross state borders, we follow Stansel (2013) and use the state in which the principal city of the metropolitan area resides. California is the dropped dummy variable.

where y is an $n \times 1$ vector of cross-sectional observations on the dependent variable; X is an $n \times m$ matrix of control variables weighted by the $m \times 1$ vector of coefficients, β ; and ε is an $n \times 1$ vector of errors. In (3.1) and (3.2), W is an $n \times n$ weight matrix that defines neighbor relations, ρ and λ are scalar parameters, and θ is a $k \times 1$ vector of parameters (where k is the number of X variables). defining spatial effects across neighbors. In the simplest case, if ρ , θ , and λ are all zero then we are left with a standard OLS model. Alternatively, spatial dependence can exist in the dependent variable (y), the independent variables (X), or the error term (ε). Each of the specific models (1) through (5) can be arrive at through parameter restrictions on the general model (3.1) and (3.2):

- OLS: $\rho = \theta = \lambda = 0$;
- SAR: $\theta = \lambda = 0$;
- SEM: $\rho = \theta = 0$;
- SLX: $\rho = \lambda = 0$;
- SDM: $\lambda = 0$.

As LeSage and Pace (2009) explain, given that the true data generating process is uncertain, in the presence of spatial dependence the SDM model, (5), is the most likely model to produce unbiased estimates since it is actually a generalization of models (1) through (4).¹⁰ Consequently, SDM is likely to be the appropriate model unless testing provides statistically significant evidence to the contrary. The Elhorst (2010) testing procedure systematically searches for such evidence.

¹⁰ This is true because the error term is an innovation to the dependent variable and, therefore, spatial dependence in the error term amounts to spatial dependence in the dependent variable ($\rho \neq 0$).

To test for spatial dependence we first need to specify the weight matrix, W . We define neighbor relations according to a “ k -nearest-neighbors” criterion. Since US metropolitan areas have on average 6 contiguous neighboring areas, a reasonable assumption is $k = 6$. We therefore define a metropolitan area’s neighbors as the 6 other metropolitan areas that are closest to the center of its geographic mass.¹¹ Based on the 6 closest neighbors, entries in the W matrix are assigned 1s to indicate metropolitan area neighbor pairs. All of the other elements of W are assigned 0s. Following convention we “row normalize” the entries such that the rows of the W matrix all sum to one.¹² While $k = 6$ is reasonable, it is also to some extent arbitrary. However, for spatial models that include a ρ parameter, as long as the estimates are interpreted properly they will not be sensitive to this particular choice of k (LeSage and Pace, 2010).

With W specified as described above, we begin the Elhorst (2010) testing procedure by conducting Lagrange multiplier (LM) tests to determine if there is any spatial dependence in our data. Specifically, we estimate the OLS model and test the hypothesis of no spatial dependence in the dependent variable (SAR) using an LM lag test; then we test the hypothesis of no spatial dependence in the error term (SEM) using the LM error test. The appeal of these tests is that they only require the residuals of the OLS estimation and W . A drawback of both of the LM tests is that the specific sources of spatial dependence can sometimes be hard to distinguish from one another (i.e., each of the standard LM tests has power over the alternative form of spatial dependence). We employ robust versions of these LM tests that take this into account.

¹¹ We mention above that Hawaii and Alaska metropolitan areas are not included in our sample. The reasons for this is that those metropolitan areas have such large distances from their closest neighbors that estimating the same spatial relationships as assumed for the contiguous states is unreasonable.

¹²When a column vector is pre-multiplied by the spatial weight matrix (e.g. $W\gamma$) the resulting vector represents an average of the neighboring observations. More importantly, row-normalization ensures that the ρ parameter is bounded between $(-1/w_{\min}, 1/w_{\max})$ where w_{\min} is the minimum eigenvalue of W and w_{\max} is the maximum eigenvalue. The bounding of the ρ parameter ensures that the variance-covariance matrix for the errors is positive definite.

Table 3 and **table 4** report the results of these LM tests for per capita income levels (*INCOME_05* and *INCOME_11*) and average growth rates (*GROWTH_05* and *GROWTH_11*), respectively. The levels are for 2005 or 2011; the average growth rates are for 2002-2005 or 2002-2011. The results are uniform. The LM tests always reject the null hypothesis of no spatial dependence in the OLS model, suggesting that we have spatial dependence in the dependent variable, the error term, or both.

Having rejected the null hypothesis of no spatial dependence for both income levels and growth rates, the next step of the procedure is to estimate the SDM model to determine if the spatial dependence is more general than either the SAR or the SEM models allow for.¹ We use the estimate of the SDM model to conduct a likelihood ratio (LR) test to determine if SDM is more appropriate than either SAR or SEM. If SDM is found to be more appropriate than the SAR and SEM models, we then also need to test if the ρ parameter in the SDM model is statistically significant once we allow for spatial dependence in the explanatory variables. Specifically, we first test the following two hypotheses: $H_0: \theta = 0$ and $H_0: \theta + \rho\beta = 0$, where θ , β , and ρ are as defined in equation (3.1). The first hypothesis is that the SDM model can be collapsed into the SAR model, while the second hypothesis is that SDM model can be collapsed into the SEM model. If both hypotheses are rejected, then we accept that the SDM is more appropriate than both the SAR and SEM models. If $H_0: \theta = 0$ is not rejected then we employ the SAR model as long as the robust LM tests point to SAR. Similarly, if $H_0: \theta + \rho\beta = 0$ is not rejected then we employ the SEM model as long as the robust LM tests point to SEM. If either of these conditions is not satisfied then the SDM model is employed by default.

Furthermore, if we deem SDM more appropriate than either SAR or SEM, or both, we need to test if ρ is statistically different from zero in the SDM model as we are now allowing for

spatial dependence in the explanatory variables. If we cannot reject the null hypothesis that ρ is statistically different from zero, we then need to re-estimate OLS including spatially lagged explanatory variables, with no spatially lagged dependent variable, i.e. the SLX model. This SLX estimate would be used to test the hypothesis $H_0: \theta=0$; i.e. if the spatially lagged explanatory variables are collectively statistically different from zero. If this hypothesis cannot be rejected, we still use the SDM model since we found the spatial dependence in the data to be more general than the SAR or SEM models allow.

The results from this testing procedure are reported in **table 3** and **table 4** for, respectively, income levels and growth rates. Regarding income levels, the hypotheses that SDM can be collapsed into either the SAR or SEM models are rejected in all cases. However, the hypothesis that ρ is not statistically different from zero cannot be rejected in either case (**table 3**). Also, the spatially weighted explanatory variables in the SLX model are statistically different from zero according to a Wald test (**table 3**). We therefore conclude that the SLX model is the most appropriate specification to use for the income level regressions.

For growth rates, however, the estimate of ρ is statistically different from zero in both cases (**table 4**), implying that the SDM is the most appropriate model. In the case of growth rates, then, we estimate SDM models using maximum likelihood estimation. (As opposed to the SLX model which is estimated using OLS.) Maximum likelihood avoids the simultaneity bias in the spatially lagged dependent variable that would have been present if we used least-squares estimation.

4. Results

We begin by reporting OLS estimations (not allowing for spatial dependence) using metropolitan area data on both (log) per capita income levels and average growth rates as the dependent variables. To our knowledge, the present study is the first to estimate the relationship between economic freedom and income across US metropolitan areas while controlling for a large number of economic and demographic variables, as well as state fixed effects. The OLS results then, both serve as useful benchmark and are interesting in their own right. We then report estimations of spatial econometric models. Based on the Elhorst (2010) specification tests we estimate SLX models using both the 2005 and 2011 income levels as dependent variables; and we estimate SDM models using both the 2002-2005 and 2002-2011 annual growth rates as dependent variables. In the growth rate estimations we include the initial (2002) (log) per capita income level as an additional control. Otherwise the control variable set is the same across the four spatial econometric estimations. (See section 2 above and **table 1** for details on the control variable set.)

To conserve space **table 5**, **table 6**, and **table 7** report only the estimated effects associated with a metropolitan area's 2002 economic freedom score (*FREEDOM*), along with the R^2 of each estimation. (In **table 6** and **table 7** these estimated effects include direct, indirect, and total effects.) However, full estimation results are found in **table A1**, **table A2**, and **table A3** of the appendix.

The benchmark (no spatial dependence) OLS results are reported in **table 5**. In all cases we find that an increase in a metropolitan area's 2002 freedom score is associated with a statistically significant (5% level or better) increase in per capita income levels and growth rates. This is consistent with the previous literature based on US state-level and cross-country level economic freedom scores. However, the evidence reported in section 3 strongly suggests that

spatial dependence is present in our data. If spatial dependence is present and not controlled for then the benchmark OLS estimates are likely to be biased. Furthermore, we are interested in knowing not only the direct effects of a metropolitan area's economic freedom on its income, but also the indirect effects on its neighbors' incomes.

Results based on the estimation of SLX income level models are reported in **table 6**. Since an SLX model assumes that spatial dependence is not present in the dependent variable (i.e., there is no ρ parameter) the estimated effects estimates can be interpreted in the same way that one would interpret coefficients in a standard OLS regression. To identify the direct and indirect effects, then, we need only the estimate of β and θ , respectively, from equation (3.1) above. Based on those estimates, an increase in a metropolitan area's 2002 freedom score is associated with a statistically significant (1% level) increase in its own per capita income level in 2005. The same is true based on 2011 income levels and the coefficient point estimates are very similar (0.0509 versus 0.0470). A 1 point increase in *FREEDOM* is associated with, all else equal, a direct and positive effect on a metropolitan area's per capita income level of about a 5%. (A standard deviation increase in *FREEDOM* is 0.855, so its analogous direct effect on income levels is about 4.3%.) However, the indirect effects that occur through neighbor relations are negative and statistically significant (5% level), and the point estimates are comparable to those of the direct effects (-0.0478 and -0.0544 for, respectively, 2005 and 2011 income levels). We also note that the SLX models account of the largest part of the variation in the dependent variables. (The R^2 s are both greater than 0.88.)

The results reported in **table 6** suggest that a 1 point increase in a metropolitan area's economic freedom score is associated with an increase in its own per capita income of about 5%, but also a cumulative *decrease* in the per capita incomes of neighboring metropolitan areas of

about the same size. (Importantly, an indirect effect estimate represents cumulative effects across neighbors; not the effect per neighbor.) To put a 1 point change in the freedom score in some perspective, the difference between the San Francisco-San-Mateo-Redwood City metropolitan area (6.70) and the New York-White Plains-Wayne metropolitan area (4.60) is over 2 points; and the difference between the Dallas-Plano-Irving (7.86) area and the New York-White Plains-Wayne area is over 3 points. Despite the standard deviation of *FREEDOM* being less than 1 point, considerable differences in economic freedom exist across prominent metropolitan areas. Direct and indirect effects of 5% associated with a 1 point change constitute, then, economically large effects.

A *prima facie* interpretation of the **table 6** results is that reforms that increase economic freedom in a given metropolitan area lead to increases in that area's income only at the expense of other metropolitan areas that are not making similar reforms. As economic theory would suggest, resources tend to relocate to metropolitan areas where taxes are lower, the security of property rights is stronger, and regulations in labor markets are less burdensome. Over the course of up to 9-years, our results suggest that economic activity is dampened in the areas from which resources are relocating.

Furthermore, over the time frames that we explore, changes in *FREEDOM* appear to only have significant effects on income *levels*. **Table 7** reports the SDM model results where average income growth rates (from 2002-2005 and 2002-2011, respectively) are the dependent variables. Recall that since the SDM model assumes spatial dependence in the dependent variable (the ρ parameter from (3.1)) there are feedback effects that make the interpretation of coefficient estimates less straightforward than in the case of the SLX model. Therefore we compute correct estimates of the direct, indirect, and total effects as described by LeSage and Pace (2009). The

point estimates in all cases (direct, indirect and total) are very small. Only the estimated direct effect over the 3-year horizon is statistically significant at a conventional level (5%). The point estimate corresponds to a 0.22 percentage change in the annual growth rate. Both indirect effect estimates are an order of magnitude smaller and statistically insignificant. Using the 9-year (2002-2011) average growth rate as the dependent variable, the direct effect of *FREEDOM* is not only not statistically insignificant; the point estimate is also for all intents and purposes zero.

The spatial econometric results reported in **table 6** and **table 7** are puzzling in the sense that they are hard to reconcile with standard economic theory. Why would a reallocation of resources to areas providing greater economic freedom be zero-sum? A movement of resources towards greater freedom suggests that their owners are seeking higher private returns; and to the extent that economic freedom represents greater security of property rights, those owners will be internalize the costs of reallocating their resources in particular ways. Higher private returns will then, all else equal, correspond to higher social returns and the resource reallocation will be positive-sum.

One way to reconcile the findings with theory is to assume that lower taxes and government expenditures largely correspond to the provision of fewer productive public goods. While higher private returns may attract businesses and customers from neighboring areas, businesses and customers already in the reforming area may suffer offsetting losses due to less public good provision. In this case, the change in social returns may be zero. However, why public goods provision is not taken into account in resource reallocation decisions is unclear. Furthermore, this story may be at odds with Higgins et al. (2009) who report that, at the US county-level, state and local government employment are both negatively related to growth. Another possibility is that we are not picking up the longer-run, positive sum gains from higher

economic freedom. We are limited in this paper to exploring relatively short time frames (at most 9-years). In the short- and even medium-run, business-stealing effects may dominate and what appears to be a pure redistribution of resources manifests in the estimates. (By *business-stealing* we refer broadly both to the stealing of an area's customers and the actual stealing of an area's businesses.)

Regardless, the results reported above suggest at least two important conclusions. First, in the short- to even medium-run metropolitan area institutional reforms may be associated gains that are offset by comparable losses to neighboring areas. Neighboring areas may, therefore, have an incentive to “keep up with the Jones” in terms of undertaking similar reforms.¹³ Second, increases in economic freedom appear to be unrelated (or at most very weakly related) to economic growth once spatial dependence is controlled for. The benchmark OLS growth effects are positive and statistically significant effect (both at the 1% level; **table 5**). However, once spatial dependence is controlled for these positive effects diminish or entirely disappear, at least over the time horizons that we consider. The SDM model results reported in **table 7** highlight the importance of accounting for spatial dependence *and* calculating the direct, indirect, and total effects in a way that correctly takes into account feedback.

It is important to note that the OLS point estimates bear no straightforward relationship to either the SDM direct effects or total effects point estimates. The OLS results cannot simply be interpreted as the correct effects conditional on neglecting spillovers. Rather, in the presence of spatial dependence the OLS estimates are biased and inconsistent. They can only be interpreted as non-casual (though in some ways perhaps useful) partial correlations in the data.

¹³ An alternative, of course, would be to somehow prevent reforms in neighboring metropolitan areas. However, how one metropolitan area can block reforms in a neighboring area is unclear. Also, if doing so is accomplished “from above” (i.e., through federal government action) then the outcome may be costly in terms of *all* metropolitan areas giving up a degree of autonomy.

5. Conclusions

A substantial empirical literature reports that economic freedom is an important determinant of both income levels and their rates of growth. These findings seem to hold when looking both across countries and within countries. In particular, several studies focusing on the US utilize the state-level Economic Freedom of North America (EFNA) scores to examine this relationship. Stansel (2013) has recently developed a US metropolitan area-level economic freedom index based on the EFNA methodology. We utilize this new index to re-explore the relationships between economic freedom and both income levels and growth rates.

The Stansel (2013) index allows us to contribute to the existing literature in at least two ways. First, given the large number of metropolitan areas in the US (381 in our analysis) we are able to carefully examine these relationships while including 25 additional control variables in the analysis, as well as state-level fixed effects. Second, the previous literature largely ignores the possibility of spatial dependence. Across the US, the movement of both labor and capital are relatively cheap; it is also relatively cheap to consumers to move their purchasing activities. Resource flows in response to institutional forms are likely to be an important part of the story. We are interested in knowing whether freedom-increasing reforms are associated with positive sum gains; or whether those effects are actually zero- or even negative-sum once spatial effects are taken into account.

The results of this paper suggest at least two important conclusions: (1) the gains to institutional reforms in a particular metropolitan area may be associated with comparable losses to other areas that are not undertaking reforms and (2) institutional reforms seem to be unrelated to economic growth once spatial dependence is controlled for. The conclusions can only be made

regarding the relatively short time horizons that we study. Since these are 3- and 9-year horizons, (1) and (2) must be considered short- to medium-run conclusions. When more time-series data becomes available, subsequent studies may very well find positive long-run effects associated with increases in economic freedom. However, business-stealing effects may dominate in the short- to medium-run that we focus on. According to our estimates, over those time horizons a 1 point increase in a metropolitan area's economic freedom score is associated with its own per capita income increasing by about 5% while that of its neighbors decreases (cumulatively) also by about 5%.

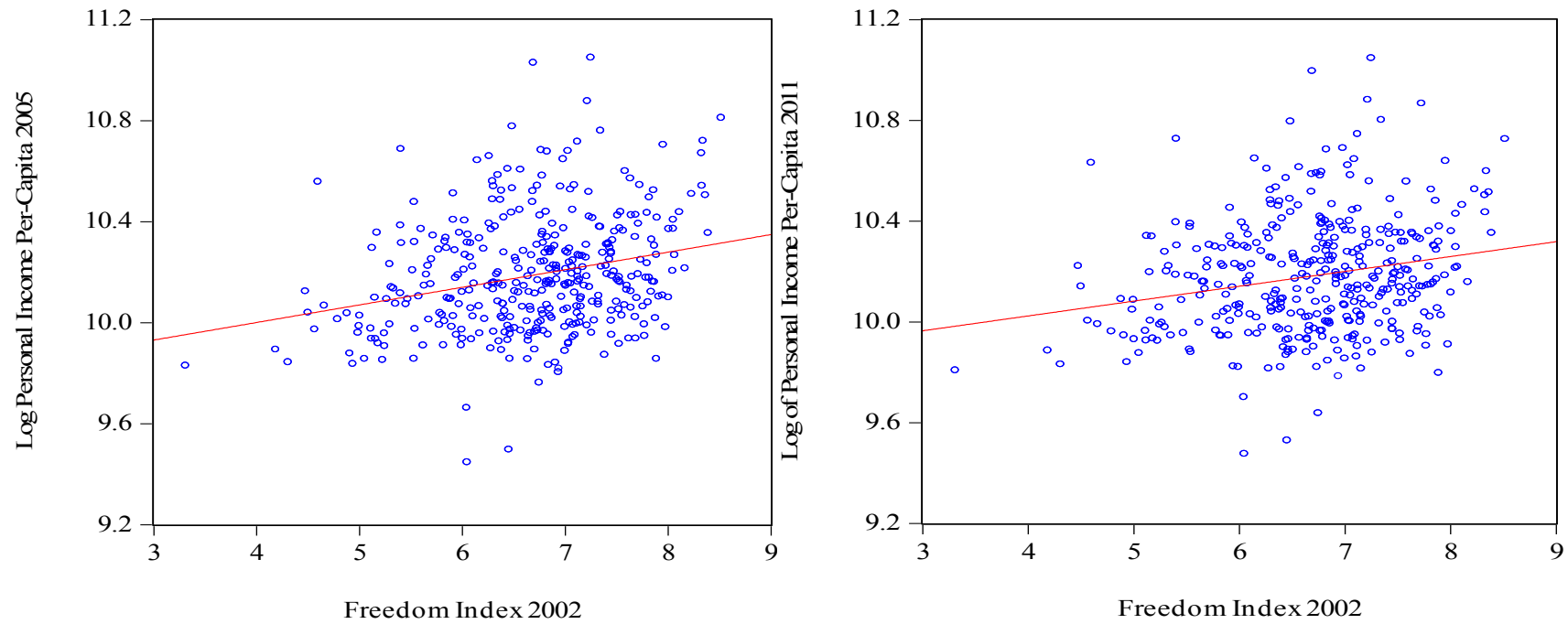
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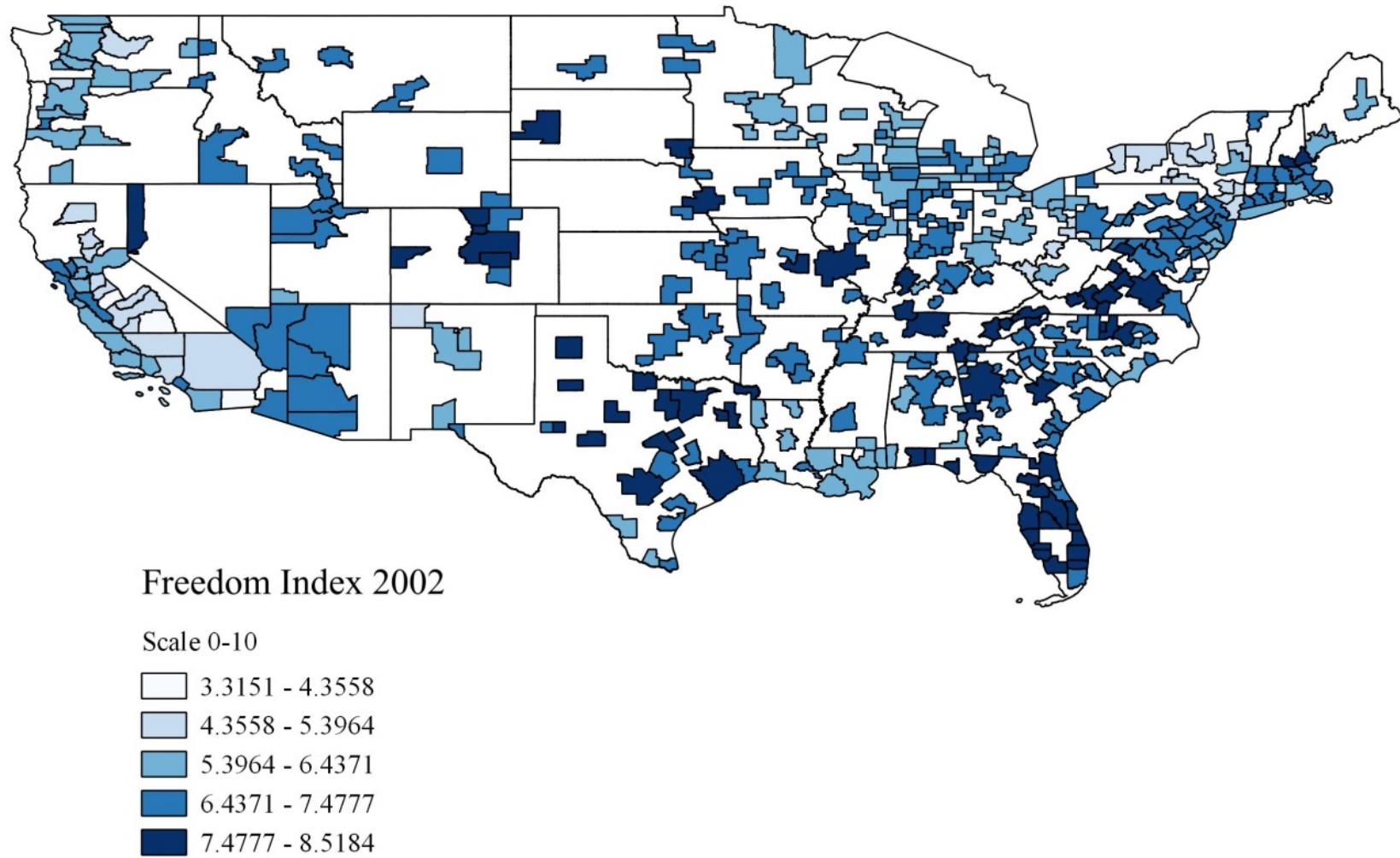
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Figure 1. Real (log) per capita personal incomes and economic freedom scores for US metropolitan areas.



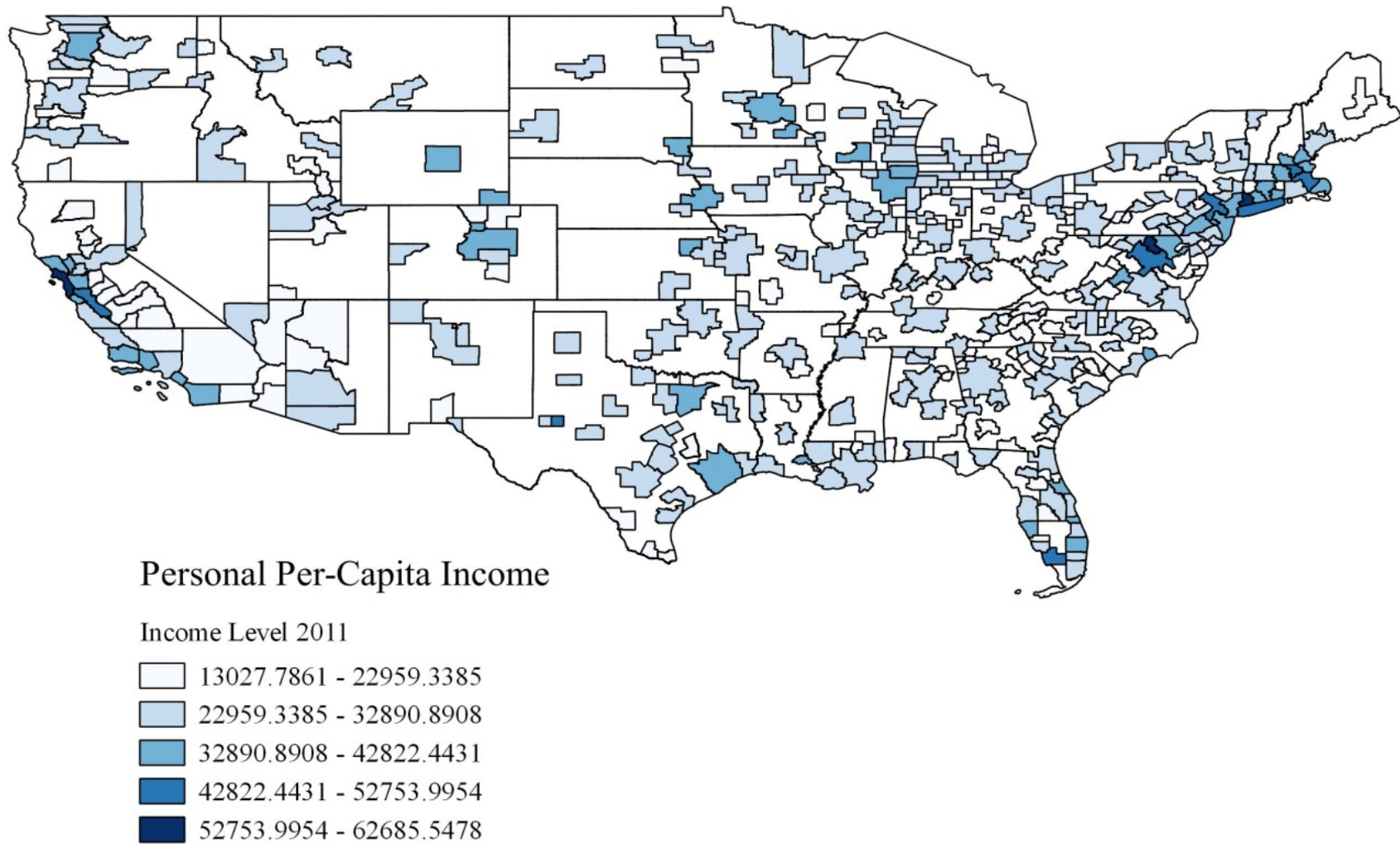
Sources: Personal income per-capita data excludes transfer payments, is expressed in 2005 dollars, and comes from the US Bureau of Economic Analysis (BEA). The freedom index is developed by Stansel (2013) and is expressed on a scale from 0-10 with 10 indicating most free. The fitted lines are OLS.

Figure 2. Economic freedom scores for US metropolitan areas



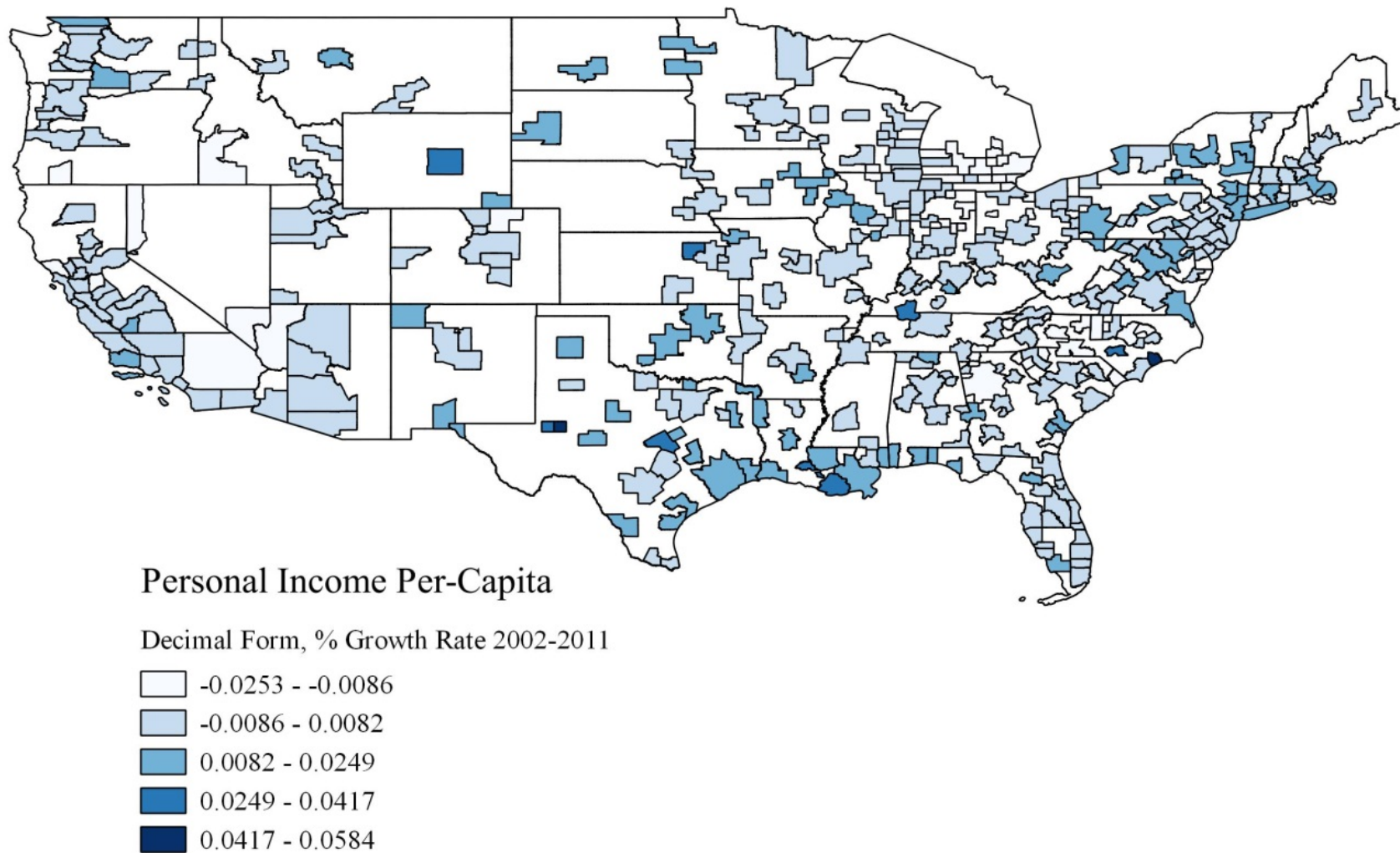
Source: Stansel (2013) metropolitan area economic freedom index for the year 2002. Index is on a scale of 0-10 with 10 indicating most free.

Figure 3. Personal income per-capita by metropolitan area in 2011



Source: Bureau of Economic Analysis (BEA). Personal income per-capita excludes transfer payments and is expressed in 2005 dollars.

Figure 4. Personal income per-capita average growth rate from 2002-2011 by metropolitan area



Source: Bureau of Economic Analysis (BEA). Personal income per-capita excludes transfer payments and is expressed in 2005 dollars.

Table 1. Variable definitions, sources, and summary statistics.

Name	Definition	Year	Source	Mean	Std. Dev.
<i>INCOME_05</i>	personal income per-capita (excluding transfer payments; 2005 constant dollars)	2005	BEA	27,313.520	6,757.524
<i>INCOME_11</i>	Personal income per-capita (excluding transfer payments; 2005 constant dollars)	2011	BEA	27,169.880	6,795.154
<i>GROWTH_05</i>	personal income per-capita average growth rate, 2002-2005(excluding transfer payments)	'02-'05	BEA	0.009	0.015
<i>GROWTH_11</i>	personal income per-capita average growth rate, 2002-2011 (excluding transfer payments)	'02-'11	BEA	0.002	0.010
<i>FREEDOM</i>	economic freedom index (Stansel, 2013)	2002	Stansel	6.691	0.855
<i>FEDERAL</i>	% of pop. employed by the federal government	2002	BEA	0.924	0.976
<i>AGRICULTURE</i>	% of pop. 15 years and over employed in agriculture, forestry, fishing, hunting, or mining	2000	Census	1.223	1.227
<i>CONSTRUCTION</i>	% of pop. 15 years and over employed in construction	2000	Census	4.061	0.840
<i>MANUFACTURE</i>	% of pop. 15 years and over employed in manufacturing	2000	Census	8.670	4.500
<i>WHOLESALE</i>	% of pop. 15 years and over employed in wholesale trade	2000	Census	1.998	0.570
<i>RETAIL</i>	% of pop. 15 years and over employed in retail trade	2000	Census	7.207	0.904
<i>TRANSPORT</i>	% of pop. 15 years and over employed in transportation, warehousing, utilities	2000	Census	2.805	0.755
<i>INFORMATION</i>	% of pop. 15 years and over employed in information	2000	Census	1.479	0.634
<i>FIRE</i>	% of pop. 15 years and over employed in finance, insurance, real estate	2000	Census	3.525	1.372
<i>PROFESSIONAL</i>	% of pop. 15 years and over employed in professional and related services	2000	Census	4.612	1.712
<i>EDU_HEALTH</i>	% of pop. 15 years and over employed in education, health and social services	2000	Census	12.418	2.768
<i>RECREATION</i>	% of pop. 15 years and over employed in arts, entertainment, recreation, accommodation or food services	2000	Census	4.806	1.602
<i>OTHER_SERV</i>	% of pop. 15 years and over employed in other services (except public admin.)	2000	Census	2.834	0.357
<i>SELF_EMPLOY</i>	Percent of population 15 years and over that are self employed	2000	Census	3.824	0.924
<i>HIGH_SCHOOL</i>	% of pop. 25 years and over with a high school diploma	2000	Census	30.079	5.971
<i>SOME_COLLEGE</i>	% of pop. 25 years and over with some college	2000	Census	28.421	4.459
<i>BACHELORS</i>	% of pop. 25 years and over with a bachelor degree or above	2000	Census	22.817	7.501
<i>TEEN</i>	% of pop. ages 15-19 years old	2000	Census	7.546	1.138
<i>WORKING</i>	% of pop. ages 20-64 years old	2000	Census	58.434	2.636
<i>SENIOR</i>	% of pop. ages 65 plus	2000	Census	12.706	3.494
<i>BLACK</i>	% of pop. that are black	2000	Census	10.396	10.642
<i>HISPANIC</i>	% of pop. that are Hispanic	2000	Census	9.432	14.059
<i>POVERTY</i>	% of pop. that are below poverty level	1999	Census	12.505	4.321
<i>LAND</i>	land area per capita in square meters	2010	Census	21.653	30.978
<i>WATER</i>	water area per capita in square meters	2010	Census	1.240	2.460

Table 3: Model specification tests: per capita income levels.

	Lagrange Multiplier Tests		Likelihood-Ratio Tests		SDM vs SLX		Suggested Model (1)...(5)
	LM LAG	LM ERROR	SDM VS SAR	SDM VS SEM	RHO $H_0: \rho = 0$	WALD TEST $H_0: \theta = 0$	
<i>INCOME_05</i>	13.7048***	7.6366***	0.0000	0.0000	0.0340	0.0000	SLX
<i>INCOME_11</i>	23.4205***	4.6398**	0.0000	0.0000	-0.0240	0.0000	SLX

Notes: Table gives LM value for the LM lag and LM error tests, p value for Likelihood-Ratio tests and WALD tests, and estimated coefficient for RHO in the SDM. *** indicates statistically significant at 1% level, ** indicates statistically significant at 5% level, * indicates statistically significant at 10% level.

Table 4: Model specification tests: average per capita income growth rates.

	Lagrange Multiplier Tests		Likelihood-Ratio Tests		SDM vs SLX		Suggested Model (1)...(5)
	LM LAG	LM ERROR	SDM VS SAR	SDM VS SEM	RHO $H_0: \rho = 0$	WALD TEST $H_0: \theta = 0$	
<i>GROWTH_05</i>	14.7924***	0.0003	0.0000	0.0000	-0.0290***	0.0000	SDM
<i>GROWTH_11</i>	48.6253 ***	1.3856	0.0000	0.0000	0.0320***	0.0000	SDM

Notes: Table gives LM value for the LM lag and LM error tests, p value for Likelihood-Ratio tests and WALD tests, and estimated coefficient for RHO in the SDM. *** indicates statistically significant at 1% level, ** indicates statistically significant at 5% level, * indicates statistically significant at 10% level.

Table 5: OLS effect estimates of economic freedom on metropolitan area per capita income levels.

	<i>INCOME_05</i>	<i>INCOME_11</i>	<i>GROWTH_05</i>	<i>GROWTH_11</i>
<i>FREEDOM</i>	0.0180** (0.0074)	0.0237** (0.0092)	0.0043*** (0.0009)	0.0021*** (0.0007)
R ²	0.8737	0.8100	0.5114	0.4807
Obs.	381	381	381	381

Notes: *** indicates statistically significant at 1% level, ** indicates statistically significant at 5% level, * indicates statistically significant at 10% level. Standard errors are in parentheses. Full set of controls, constant, and state fixed effects included in all regressions.

Table 6: SLX direct and indirect effect estimates of economic freedom on metropolitan area per capita incomes.

	<i>INCOME_05</i>		<i>INCOME_11</i>	
	β (<i>DIRECT</i>)	θ (<i>INDIRECT</i>)	β (<i>DIRECT</i>)	θ (<i>INDIRECT</i>)
<i>FREEDOM</i>	0.0509*** (0.0104)	-0.0478** (0.0219)	0.0470*** (0.0126)	-0.0544** (0.0266)
R ²	0.9221		0.8882	
Obs.	381		381	

Notes: *** indicates statistically significant at 1% level, ** indicates statistically significant at 5% level, * indicates statistically significant at 10% level. Standard errors are in parentheses. Full set of controls, constant, and state fixed effects included in all regressions.

Table 7: SDM direct, indirect, and total effect estimates of economic freedom on metropolitan area per capita income growth rates.

	<i>GROWTH_05</i>			<i>GROWTH_11</i>		
	<i>DIRECT</i>	<i>INDIRECT</i>	<i>TOTAL</i>	<i>DIRECT</i>	<i>INDIRECT</i>	<i>TOTAL</i>
<i>FREEDOM</i>	0.0022** (0.0011)	-0.0003 (0.0022)	0.0020 (0.0021)	0.0000 (0.0007)	-0.0005 (0.0015)	-0.0005 (0.0014)
R ²		0.7007			0.7470	
Obs.		381			381	

Notes: *** indicates statistically significant at 1% level, ** indicates statistically significant at 5% level, * indicates statistically significant at 10% level. Standard errors are in parentheses. Full set of controls, constant, and state fixed effects included in all regressions.

Appendix

Table A1: OLS estimates of economic freedom on metropolitan area per capita income levels and growth rates.

	<i>INCOME_05</i>	<i>INCOME_11</i>	<i>GROWTH_05</i>	<i>GROWTH_11</i>
<i>FREEDOM</i>	0.0180** (0.0074)	0.0237** (0.0092)	0.0043*** (0.0009)	0.0021*** (0.0007)
<i>INCOME_2002</i>			0.0133 (0.0082)	0.0042 (0.0060)
<i>FEDERAL</i>	-0.0001 (0.0069)	0.0066 (0.0086)	0.0000 (0.0009)	0.0007 (0.0006)
<i>AGRICULTURE</i>	0.0320*** (0.0069)	0.0462*** (0.0085)	0.0018** (0.0009)	0.0022*** (0.0007)
<i>CONSTRUCTION</i>	-0.0227** (0.0093)	-0.0348*** (0.0116)	-0.0002 (0.0012)	-0.0014 (0.0009)
<i>MANUFACTURE</i>	-0.0040* (0.0023)	-0.0111*** (0.0029)	-0.0016*** (0.0003)	-0.0013*** (0.0002)
<i>WHOLESALE</i>	0.0026 (0.0136)	-0.0153 (0.0169)	-0.0018 (0.0017)	-0.0026** (0.0013)
<i>RETAIL</i>	-0.0063 (0.0088)	-0.0059 (0.0110)	0.0001 (0.0011)	0.0001 (0.0008)
<i>TRANSPORT</i>	0.0137 (0.0087)	0.0205* (0.0109)	-0.0018 (0.0011)	0.0002 (0.0008)
<i>INFORMATION</i>	-0.0093 (0.0139)	0.0052 (0.0173)	-0.0016 (0.0018)	0.0011 (0.0013)
<i>FIRE</i>	0.0145*** (0.0055)	0.0137** (0.0068)	-0.0009 (0.0007)	-0.0004 (0.0005)
<i>PROFESSIONAL</i>	0.0198** (0.0078)	0.0155 (0.0098)	-0.0009 (0.0010)	-0.0008 (0.0007)
<i>EDU-HEALTH</i>	-0.0038 (0.0040)	0.0026 (0.0050)	-0.0015*** (0.0005)	0.0002 (0.0004)
<i>RECREATION</i>	0.0068* (0.0040)	-0.0039 (0.0050)	-0.0006 (0.0005)	-0.0014*** (0.0004)
<i>OTHERSERVICE</i>	0.0145 (0.0176)	0.0415* (0.0219)	-0.0006 (0.0022)	0.0028* (0.0016)
<i>SELF</i>	0.0042 (0.0090)	-0.0045 (0.0112)	0.0017 (0.0011)	-0.0004 (0.0008)

Table A1 (cont.): OLS estimates of economic freedom on metropolitan area per capita incomes.

	<i>INCOME_05</i>	<i>INCOME_11</i>	<i>GROWTH_05</i>	<i>GROWTH_11</i>
<i>HSDIPLOMA</i>	-0.0055** (0.0028)	-0.0028 (0.0034)	-0.0004 (0.0004)	0.0002 (0.0003)
<i>COLLEGE</i>	-0.0033 (0.0022)	-0.0047* (0.0028)	0.0000 (0.0003)	-0.0002 (0.0002)
<i>BACHELORS</i>	0.0099*** (0.0029)	0.0092*** (0.0036)	0.0000 (0.0004)	-0.0001 (0.0003)
<i>TEEN</i>	-0.0268** (0.0105)	-0.0277** (0.0131)	0.0007 (0.0014)	0.0001 (0.0010)
<i>WORKING</i>	0.0025 (0.0040)	0.0007 (0.0049)	-0.0006 (0.0005)	-0.0004 (0.0004)
<i>ELDER</i>	0.0001 (0.0039)	-0.0059 (0.0048)	-0.0003 (0.0005)	-0.0008** (0.0004)
<i>BLACK</i>	0.0026*** (0.0008)	0.0017* (0.0010)	0.0001 (0.0001)	-0.0001 (0.0001)
<i>HISPANIC</i>	0.0009 (0.0008)	0.0005 (0.0011)	-0.0001 (0.0001)	-0.0001 (0.0001)
<i>POVERTY</i>	-0.028*** (0.0032)	-0.0279*** (0.0040)	-0.0001 (0.0005)	0.0000 (0.0003)
<i>LAND</i>	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)
<i>WATER</i>	0.0000 (0.0000)	0.0000*** (0.0000)	0.0000 (0.0000)	0.0000** (0.0000)
R ²	0.8737	0.8100	0.5114	0.4807
Obs.	381	381	381	381

Notes: *** indicates statistically significant at 1% level, ** indicates statistically significant at 5% level, * indicates statistically significant at 10% level. Standard errors are in parentheses. Constants and state fixed effects included in all regressions.

Table A2: SLX direct and indirect effects estimates of economic freedom on metropolitan area per capita incomes.

	<i>INCOME_05</i>		<i>INCOME_11</i>	
	β	θ	β	θ
	(<i>DIRECT</i>)	(<i>INDIRECT</i>)	(<i>DIRECT</i>)	(<i>INDIRECT</i>)
<i>FREEDOM</i>	0.0509*** (0.0104)	-0.0478** (0.0219)	0.0470*** (0.0126)	-0.0544** (0.0266)
<i>FEDERAL</i>	0.0078 (0.0073)	-0.0043 (0.0239)	0.0105 (0.0089)	0.0176 (0.0291)
<i>AGRICULTURAL</i>	0.0316*** (0.0082)	0.0044 (0.0224)	0.0481*** (0.0100)	0.0193 (0.0273)
<i>CONSTRUCTION</i>	-0.0027 (0.0114)	-0.0237 (0.0297)	-0.0214 (0.0139)	-0.0133 (0.0361)
<i>MANUFACTURE</i>	-0.0021 (0.0027)	-0.0006 (0.0072)	-0.0055* (0.0033)	0.0039 (0.0088)
<i>WHOLESALE</i>	0.0020 (0.0147)	-0.0352 (0.0481)	-0.0055 (0.0179)	-0.0455 (0.0585)
<i>RETAIL</i>	0.0015 (0.0097)	0.0311 (0.0274)	-0.0017 (0.0118)	0.0465 (0.0334)
<i>TRANSPORT</i>	0.0181* (0.0096)	0.0346 (0.0303)	0.0204* (0.0117)	0.0492 (0.0368)
<i>INFORMATION</i>	-0.0089 (0.0142)	0.0122 (0.0398)	0.0005 (0.0172)	0.0815* (0.0484)
<i>FIRE</i>	0.0097 (0.0060)	-0.009 (0.0191)	0.0069 (0.0073)	0.0006 (0.0233)
<i>PROFESSIONAL</i>	0.0137 (0.0088)	-0.0148 (0.0239)	0.0149 (0.0107)	-0.0351 (0.0291)
<i>EDU-HEALTH</i>	-0.0079* (0.0046)	-0.0175 (0.0133)	-0.0095* (0.0056)	-0.0079 (0.0162)
<i>RECREATION</i>	0.0109** (0.0045)	-0.0124 (0.0137)	0.0050 (0.0054)	0.0019 (0.0166)
<i>OTHERSERVICE</i>	0.0240 (0.0194)	0.0344 (0.0579)	0.0343 (0.0236)	0.0741 (0.0705)
<i>SELF</i>	-0.0120 (0.0107)	0.0248 (0.0315)	-0.0234* (0.0130)	0.0215 (0.0383)

Table A2 (cont.): SLX direct and indirect effects estimates of economic freedom on metropolitan area per capita incomes.

	<i>INCOME_05</i>		<i>INCOME_11</i>	
	β (<i>DIRECT</i>)	θ (<i>INDIRECT</i>)	β (<i>DIRECT</i>)	θ (<i>INDIRECT</i>)
<i>HSDIPLOMA</i>	-0.0062* (0.0036)	0.0089 (0.0080)	-0.0040 (0.0044)	0.0059 (0.0098)
<i>COLLEGE</i>	-0.0066** (0.0033)	0.0034 (0.0061)	-0.0016 (0.0040)	-0.0070 (0.0075)
<i>BACHELORS</i>	0.0116*** (0.0035)	0.0112 (0.0093)	0.0127*** (0.0042)	0.0102 (0.0114)
<i>TEEN</i>	-0.0187 (0.0116)	-0.0126 (0.0344)	-0.0169 (0.0141)	-0.0113 (0.0418)
<i>WORKING</i>	-0.0038 (0.0048)	-0.0012 (0.0122)	-0.0023 (0.0058)	-0.0068 (0.0148)
<i>ELDER</i>	-0.0041 (0.0046)	-0.0023 (0.0117)	-0.0047 (0.0056)	-0.0011 (0.0142)
<i>BLACK</i>	0.0026** (0.0011)	-0.0017 (0.0024)	0.0007 (0.0013)	-0.0011 (0.0030)
<i>HISPANIC</i>	-0.0028** (0.0014)	0.0044* (0.0026)	-0.0033* (0.0017)	0.0038 (0.0031)
<i>POVERTY</i>	-0.0227*** (0.0038)	0.0075 (0.0092)	-0.0183*** (0.0047)	0.0168 (0.0112)
<i>LAND</i>	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000** (0.0000)
<i>WATER</i>	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)
R ²	0.9221		0.8882	
Obs.	381		381	

Notes: *** indicates statistically significant at 1% level, ** indicates statistically significant at 5% level, * indicates statistically significant at 10% level. Standard errors are in parentheses. Constants and state fixed effects included in all regressions.

Table A3: SDM Direct, indirect, and total effects estimates of economic freedom on metropolitan area per capita income growth rates.

	<i>GROWTH_05</i>			<i>GROWTH_11</i>		
	<i>DIRECT</i>	<i>INDIRECT</i>	<i>TOTAL</i>	<i>DIRECT</i>	<i>INDIRECT</i>	<i>TOTAL</i>
<i>FREEDOM</i>	0.0022** (0.0011)	-0.0003 (0.0022)	0.0020 (0.0021)	0.0000 (0.0007)	-0.0005 (0.0015)	-0.0005 (0.0014)
<i>INCOME_2002</i>	0.0320*** (0.0080)	-0.0175 (0.0188)	0.0145 (0.0206)	0.0154*** (0.0050)	-0.0245* (0.0127)	-0.0091 (0.0136)
<i>FEDERAL</i>	-0.0007 (0.0007)	0.0031 (0.0024)	0.0024 (0.0026)	0.0000 (0.0005)	0.0035** (0.0017)	0.0035* (0.0018)
<i>AGRICULTURE</i>	0.0003 (0.0009)	0.0007 (0.0023)	0.0010 (0.0026)	0.0019*** (0.0006)	0.0028* (0.0016)	0.0047** (0.0018)
<i>CONSTRUCTION</i>	-0.0012 (0.0012)	0.0026 (0.0030)	0.0014 (0.0032)	-0.0026*** (0.0008)	0.0019 (0.0021)	-0.0007 (0.0022)
<i>MANUFACTURE</i>	-0.0014*** (0.0003)	0.0010 (0.0007)	-0.0003 (0.0008)	-0.0009*** (0.0002)	0.0010* (0.0005)	0.0001 (0.0005)
<i>WHOLESALE</i>	-0.0011 (0.0014)	-0.0112** (0.0050)	-0.0123** (0.0056)	-0.0013 (0.0009)	-0.0053 (0.0034)	-0.0067* (0.0037)
<i>RETAIL</i>	0.0000 (0.0009)	0.0035 (0.0028)	0.0035 (0.0031)	-0.0002 (0.0006)	0.0028 (0.0019)	0.0026 (0.0020)
<i>TRANSPORT</i>	-0.0033*** (0.0010)	-0.0028 (0.0031)	-0.0061* (0.0036)	-0.0009 (0.0006)	0.0010 (0.0020)	0.0001 (0.0023)
<i>INFORMATION</i>	-0.0025* (0.0014)	0.0134*** (0.0042)	0.0110** (0.0044)	0.0002 (0.0009)	0.0128*** (0.0029)	0.0129*** (0.0031)
<i>FIRE</i>	-0.0010* (0.0006)	0.0051** (0.0020)	0.0041* (0.0022)	-0.0007* (0.0004)	0.0032** (0.0013)	0.0024* (0.0015)
<i>PROFESSIONAL</i>	-0.0026*** (0.0009)	-0.0057** (0.0025)	-0.0083*** (0.0028)	-0.0008 (0.0006)	-0.0040** (0.0017)	-0.0048** (0.0019)
<i>EDU-HEALTH</i>	-0.0019*** (0.0005)	-0.0003 (0.0014)	-0.0022 (0.0015)	-0.0009*** (0.0003)	0.0007 (0.0009)	-0.0001 (0.0011)
<i>RECREATION</i>	-0.0010** (0.0004)	-0.0004 (0.0014)	-0.0014 (0.0016)	-0.0010*** (0.0003)	0.0017* (0.0010)	0.0007 (0.0011)
<i>OTHERSERVICE</i>	-0.0023 (0.0019)	0.0003 (0.0057)	-0.0020 (0.0062)	0.0003 (0.0012)	0.0051 (0.0039)	0.0054 (0.0043)
<i>SELF</i>	0.0028*** (0.0010)	0.0090*** (0.0032)	0.0118*** (0.0034)	-0.0002 (0.0007)	0.0026 (0.0022)	0.0023 (0.0024)

Table A3 (cont.): SDM direct, indirect, and total effects estimates of economic freedom on metropolitan area per capita income growth rates.

	<i>GROWTH_05</i>			<i>GROWTH_11</i>		
	<i>DIRECT</i>	<i>INDIRECT</i>	<i>TOTAL</i>	<i>DIRECT</i>	<i>INDIRECT</i>	<i>TOTAL</i>
<i>HSDIPLOMA</i>	0.0001 (0.0003)	-0.0004 (0.0008)	-0.0003 (0.0008)	0.0003 (0.0002)	-0.0006 (0.0005)	-0.0002 (0.0005)
<i>COLLEGE</i>	0.0000 (0.0003)	-0.0010* (0.0006)	-0.0010 (0.0006)	0.0006*** (0.0002)	-0.0016*** (0.0004)	-0.0011** (0.0004)
<i>BACHELORS</i>	0.0001 (0.0003)	0.0003 (0.0010)	0.0005 (0.0011)	0.0002 (0.0002)	0.0003 (0.0007)	0.0004 (0.0007)
<i>TEEN</i>	-0.0002 (0.0012)	-0.0024 (0.0036)	-0.0026 (0.0041)	0.0002 (0.0008)	-0.0011 (0.0023)	-0.0009 (0.0026)
<i>WORKING</i>	-0.0003 (0.0005)	-0.0026** (0.0012)	-0.0028** (0.0013)	0.0001 (0.0003)	-0.0015* (0.0008)	-0.0015* (0.0009)
<i>ELDER</i>	-0.0014*** (0.0005)	-0.0001 (0.0012)	-0.0014 (0.0013)	-0.0005* (0.0003)	0.0001 (0.0008)	-0.0004 (0.0008)
<i>BLACK</i>	0.0000 (0.0001)	0.0002 (0.0002)	0.0002 (0.0002)	-0.0002*** (0.0001)	0.0002 (0.0002)	-0.0001 (0.0002)
<i>HISPANIC</i>	-0.0003* (0.0001)	0.0004 (0.0003)	0.0002 (0.0002)	-0.0001 (0.0001)	0.0001 (0.0002)	-0.0001 (0.0001)
<i>POVERTY</i>	0.0002 (0.0004)	0.0002 (0.0010)	0.0003 (0.0011)	0.0006** (0.0003)	0.0007 (0.0006)	0.0013 (0.0007)
<i>LAND</i>	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)
<i>WATER</i>	0.0000 (0.0000)	0.0000 (0.0000)	0.0000*** (0.0000)	0.0000*** (0.0000)	0.0000** (0.0000)	0.0000*** (0.0000)
R ²	0.7007			0.7470		
Obs.	381			381		

Notes: *** indicates statistically significant at 1% level, ** indicates statistically significant at 5% level, * indicates statistically significant at 10% level. Standard errors are in parentheses. Constants and state fixed effects included in all regressions.