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Does the tide raise all boats: Entrepreneurial response to economic conditions across the urban-rural hierarchy?

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Introduction

- Goal: Tie into two related literatures:
- 1) Does entrepreneurship/small business development promote economic development—namely jobs? Or is it better to promote W&S growth?
- 2) What are the spillovers across the urban hierarchy in terms of promoting self-employment and wage and salary employment.
- Regarding 1), there is a debate as to whether small businesses or new businesses create more jobs.
 - Neumark et al. (2011) show that small businesses create a disproportionate amount of *net* new jobs (especially in services), though nowhere near rate that Birch found.
 - Haltiwanger et al. (2013) argue that it is actually new firms (which tend to be small) that are the reason for the positive small/job relationship.
 - One thing is both only examined *direct* job creation and did not consider spillovers or multiplier effects.

Introduction

- A related literature asks whether higher *initial* levels of “entrepreneurship” produce faster *subsequent* job growth.
- They usually use the initial share of self employment, though other measures such as new start-ups and small business share are sometimes used. The results are mixed:
 - Positive: Shrestha, Goetz, and Rupasingha (2007); Rupasingha and Goetz (2013); Stephens and Partridge (2011) in lagging regions; Stephens et al. (2013); Faggio and Silva (2014) in urban areas/not rural; Loveridge and Nizalov (2007); Komarek and Loveridge (2015); Buntten et al. (2015)
 - Negative or mixed: Fritsch and Mueller (2004); Mueller et al. (2008); Acs (2006); Duranton (2013; JRS lecture).

Introduction

- Much of this debate revolves around the notion of *opportunity vs. necessity* entrepreneurship (Acs, 2006). Stephens and Partridge (2011) argue that this is at least in part, a false notion. Small firms can generate jobs for the owners and other employees and change the business culture, especially in lagging regions.
 - Also there is a “numbers game” of having more draws for a very successful new firm.
- We ask a related but different question than the previous literature:
- (1) What are the **net** employment spillovers from net changes in self employment (**SE**) and are these spillovers different than those from net changes increases in wage and salary (**W&S**) employment (which would mostly be derived from existing (larger) firms)?
 - Do exogenous net changes (shocks) in SE spur more or less increases in employment than do equal changes in W&S employment?

Introduction

- Question 2 is whether these patterns vary across the urban-hierarchy and what are the associated spillovers of differing sized urban centers.
- Duranton and Puga (2001) argue that innovative (or high-growth) firms arise in diverse cities—that tend to be larger. Then after gaining critical mass, these firms move to smaller more concentrated cities to gain localization economies.
- Competition effects may reduce self-employment start-ups in large cities, though negative selectivity may encourage them in large cities.
- In smaller cities, the impetus may be more to provide for existing demand and smaller scale in rural areas often means that small firms fulfil local demand.

Introduction

- Closely related is do these patterns differ between small, medium, and large cities in that in the U.S., small and medium-sized cities have outperformed the largest cities in terms of job and population growth (Partridge, 2010).
- Then, how do these urban effects spillover onto smaller cities and rural areas. For example, Partridge et al. (2008, 2009) found that there were positive spillovers in terms of population and job growth from urban areas up to 500,000 people (1990 population) onto smaller towns and rural areas. Thereafter, there are no additional effects.
- Hence, we ask whether SE and W&S employment spillover effects vary within small, medium, and large MSAs and ask whether the spillovers into smaller areas vary by MSA size.

Conceptual Issues

- The first questions are simple descriptive questions regarding the relative size of the SE and W&S multipliers.
- W&S multipliers are the realm of U.S. consultants with *models* such as IMPLAN and REMI. There are positive direct effects of hiring the workers, indirect (I-O) effects, and induced effects from higher incomes.
 - Yet, these are *offset* by displacement effects from crowding out of other firms and higher input costs, which are not typically taken into account and would require looking at the data *ex post*.
- Though there are exceptions, there has not been much U.S. academic research on (*ex post*) multipliers (or elsewhere) that use the actual data and directly estimate the multipliers.

Conceptual issues—cont.

- SE may differ from W&S multipliers. SE multipliers could be larger because:
 - a) The firm may hire workers, so not just the owner(s) gets a job.
 - b) Small firms may buy more inputs locally (Bartik, 1993).
 - c) Small firm profits stay local (Fleming and Goetz, 2011).
 - d) Signal of new innovative processes (I doubt this is economically significant in this case) and it is a “numbers game” to get one new firm that is highly successful (Haltiwanger et al.).
 - Empirically, we are picking up net-new SE, which could have a larger effect than existing new.
 - Li, Goetz, Partridge, and Fleming (2016) find that high-growth firms can be located anywhere (including rural) and they are split across about all industries.
 - e) Supports an entrepreneurial climate—especially in small rural areas.
 - Rural development often focusses on small business development.
 - f) More net-start-ups could signal (information) a better business climate in general that encourages more start-ups (Bunten et al., 2015).

Conceptual issues—cont.

- SE multipliers could be smaller because:
 - It might simply displace one W&S worker by switching to SE.
 - One subset is that it may only be a relabeling of W&S workers to “independent contractors.”
 - Necessity SE may have few prospects and would be “economically” more efficient as W&S workers.

Conceptual Issues-cont.

- Regarding urban hierarchy effects, we mainly rely on the models employed by Partridge et al. (2008, 2009).
- Specifically, the models use a simple Central Place Theory framework that suggests that different-sized urban areas have different services desired by firms and households. They access the nearest level of services and will go onto the higher level cities when the nearest city doesn't have the services they demand.
 - NEG frameworks don't work particularly well by comparison for the US.
 - Empirical example follows.
- In terms of different responses for small, medium, and large MSAs, we are somewhat agnostic. Business start-ups may have larger effects in smaller urban settings if they fill in supply-chain gaps.

Empirical Model and data

- Our employment data is from EMSI (www.economicmodeling.com) who uses the QCEW, along with BEA REIS, BLS, County Business Patterns to fill in suppressed cells from the QCEW. The major advantage is that we have three- and four-digit level NAICS data in order to construct more accurate measures.
- For SE, EMSI uses American Community Survey data for their estimates. Importantly, this means that these are people who report that their primary job is SE—i.e., this is not like BEA data in which anyone with *1099* or *Schedule B* income is counted as a SE job. We will use nonfarm SE and nonfarm W&S employment.
 - This is a major improvement over most studies that used BEA SE data.

Empirical Model and data

- **Timeframe:** 2001-2013 for 3-year differencing to net out noise with annual data.
- **Sample:** 3,028 (1,987 non-metropolitan and 1,041 metropolitan) counties using 2003 MSA definitions.
- **We use nonfarm employment.**
- **Estimated model is first differences to remove county fixed effects.**
- **Estimation approach:** is OLS. The model resembles a first-stage IV employment growth model, but we are interested in the multiplier effects of the shock (e.g., Bartik, 1991):

$$\Delta Y_{ic} = \beta_0 + \beta_1 \Delta SEIM_{ct} + \beta_2 \Delta WSIM_{ct} + \beta_3 DIST_c + \beta_4 AGGLOM_{ct} + X_{ct} \beta + \theta_t + \varepsilon_{ct}$$

Empirical Model and data

$$\Delta Y_{ic} = \beta_0 + \beta_1 \Delta SEIM_{ct} + \beta_2 \Delta WSIM_{ct} + \beta_3 DIST_c + \beta_4 AGGLOM_{ct} + X_{ct} \beta + \theta_t + \varepsilon_{ct}$$

where $\Delta Y_{ic} = Y_{ict} - Y_{ict-3}$ and $Y_{ict} = (Emp_{ict} - Emp_{ict-3}) / TotEmp_{ct-3}$

$$\Delta SEIM_c = SEIM_{ct} - SEIM_{ct-3} \text{ and}$$

$$SEIM_{ct} = (\sum_i SEshare_{cit-3} SENatGr_{it-3,t}) * SEemp_{cit-3} / TotEmp_{cit-3}$$

$$\Delta WSIM_c = WSIM_{ct} - WSIM_{ct-3} \text{ and}$$

$$WSIM_{ct} = (\sum_i WSshare_{cit-3} WSNatGr_{it-3,t}) * WSem_{cit-3} / TotEmp_{cit-3}$$

- **Dependent variable:** ΔSE employment growth rate over the periods—eg, if 2004-2007 SE growth was 2.5% and 2001-2004 SE growth was 2.1%, then the dependent variable would be 0.4% for the first difference change during the period.
- Dependent variables of W&S growth rate is defined analogously.
- **Explanatory variables:**
- (1) SE industry mix term= percent change in SE employment if all the county's industries grow at the SE national growth rate using the SE county industry share. β_1 is the SE multiplier when scaled by the share of the SE as a share of total employment (following Moretti, 2010). These are the "Bartik" multipliers, so they should be exogenous.
- 2) WS industry mix term= percent change in WS employment if all the county's industries grow at the WS national growth rate using the WS county industry share. β_2 is the WS multiplier when scaled by the share of W&S as a share of total employment.

Empirical Model and data

- The next set of control variables are the distance variables based on prior work (Partridge et al. 2008, 2009). Distance to nearest metro of any size and then incremental distances to MSAs of at least 250k, 500k, 1.5million based on 1990 population.
 - One issue is we difference out the fixed effects (which would include distance effects), so the distance variables are picking up “disequilibrium” movements. This applies to the other control variables.
 - Metro models are a little less complex.
- We will add additional size/distance/growth interactions to assess spillovers by metropolitan size.
- The highest VIF in our most complete model is 6.85 in the W&S model (WSIM) and 3.85 in the SE model (SEIM). Thus, multicollinearity is not a concern.

Distance calculations

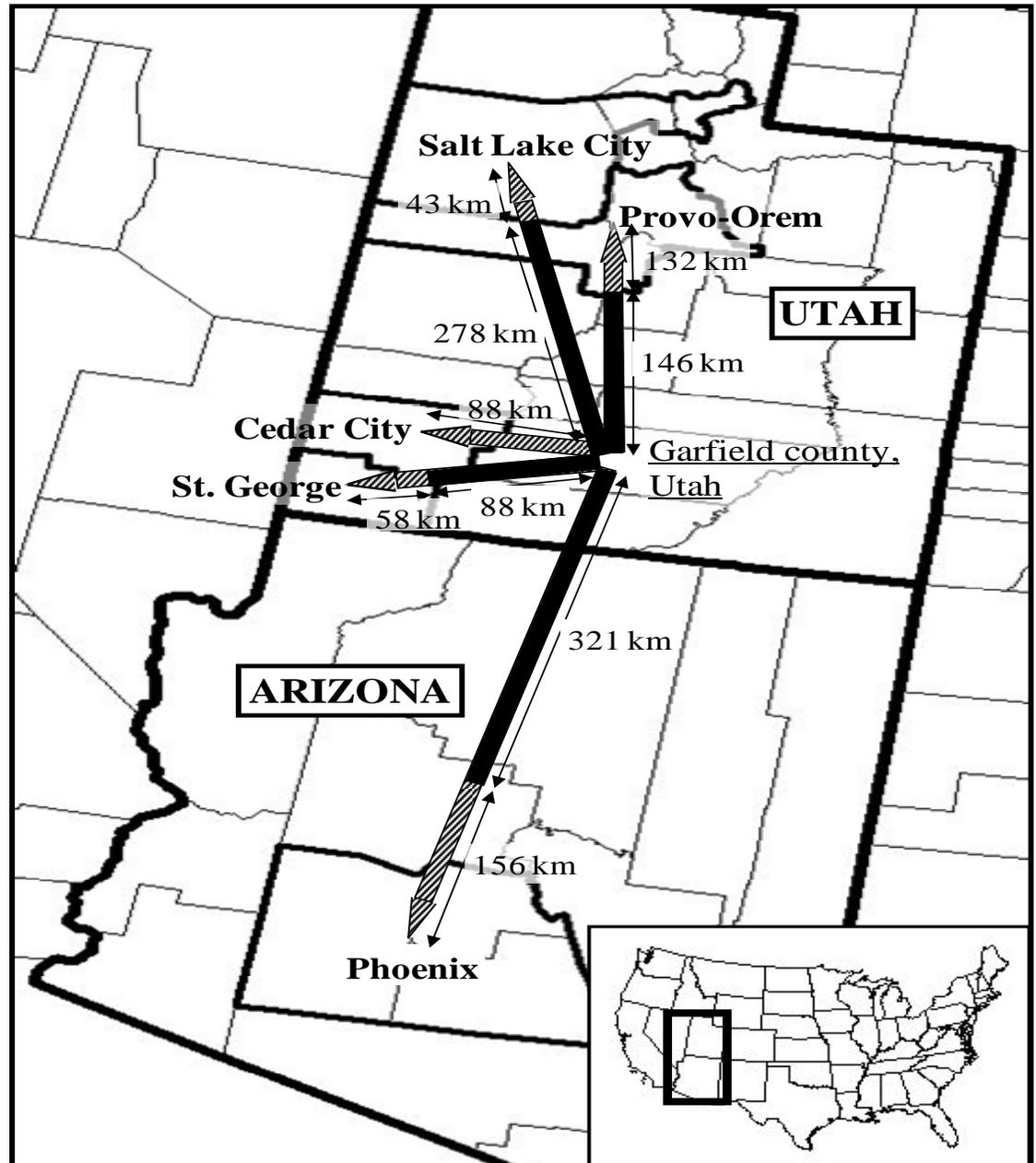
Garfield County, a rural Utah county, about 4,000 residents (1990).

1. The nearest urban area is **Cedar City (MICRO)** located **88kms** away. The nearest MA is **St. George** (about 90,000 population), 146kms away, an **incremental distance of 58kms** (146-88).

2. Nearest larger MA > 250K, which is **Provo-Orem, UT** (pop. of 377,000), is 278kms from Garfield County, **incremental distance versus St. George is 132kms** (278-146).

3. The nearest MA > 500K, the next higher tier, **Salt Lake City, UT** (969,000 people). Salt Lake is 321kms from Garfield County, **incremental distance of 43kms** (321-278).

4. Nearest MA > 1.5 million people, the next higher tier above Salt Lake, is **Phoenix, AZ** (3.25 million 1990 pop.). Phoenix is 477kms away from Garfield County, an **incremental distance of 156kms** (477-321).

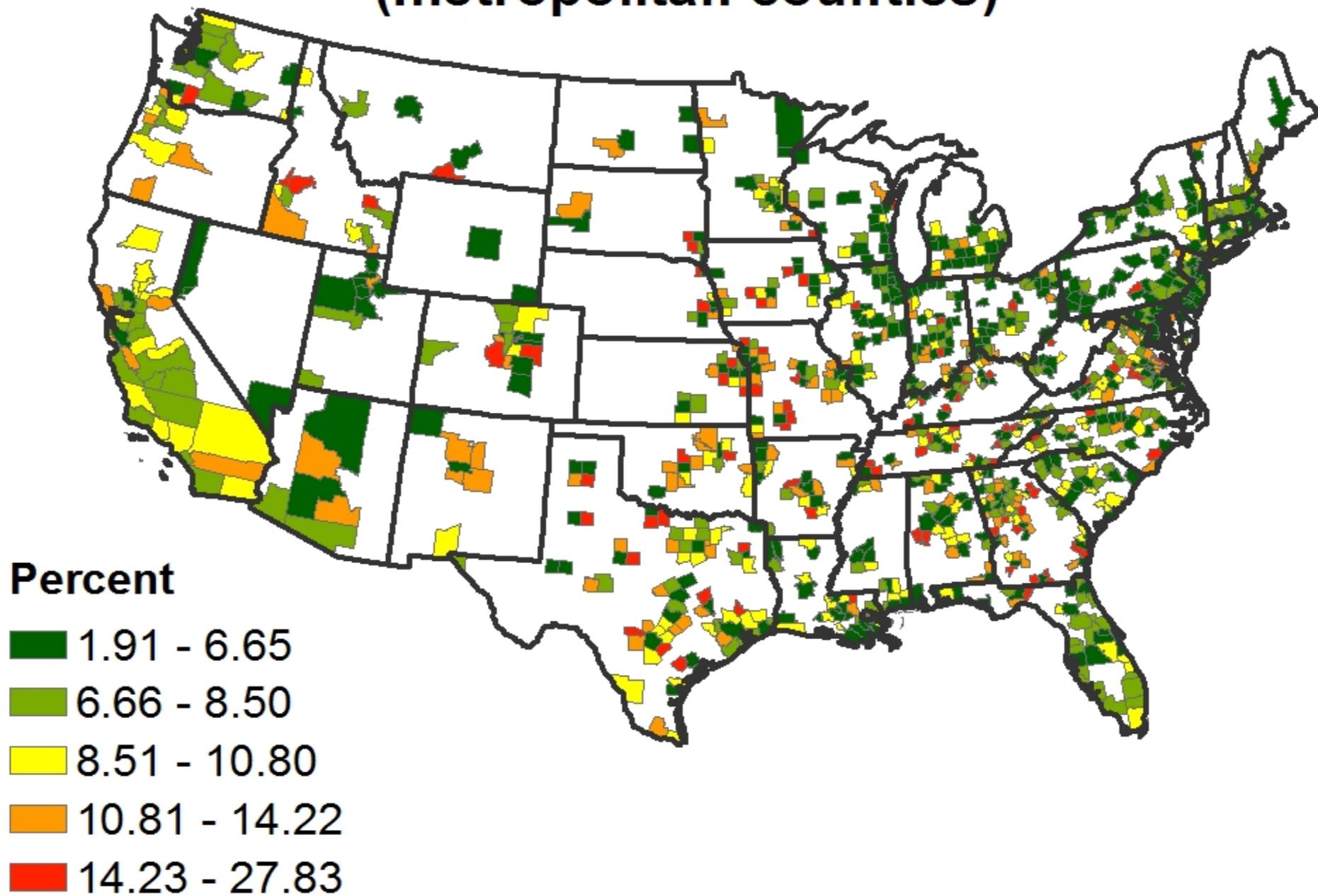


Empirical Model and data

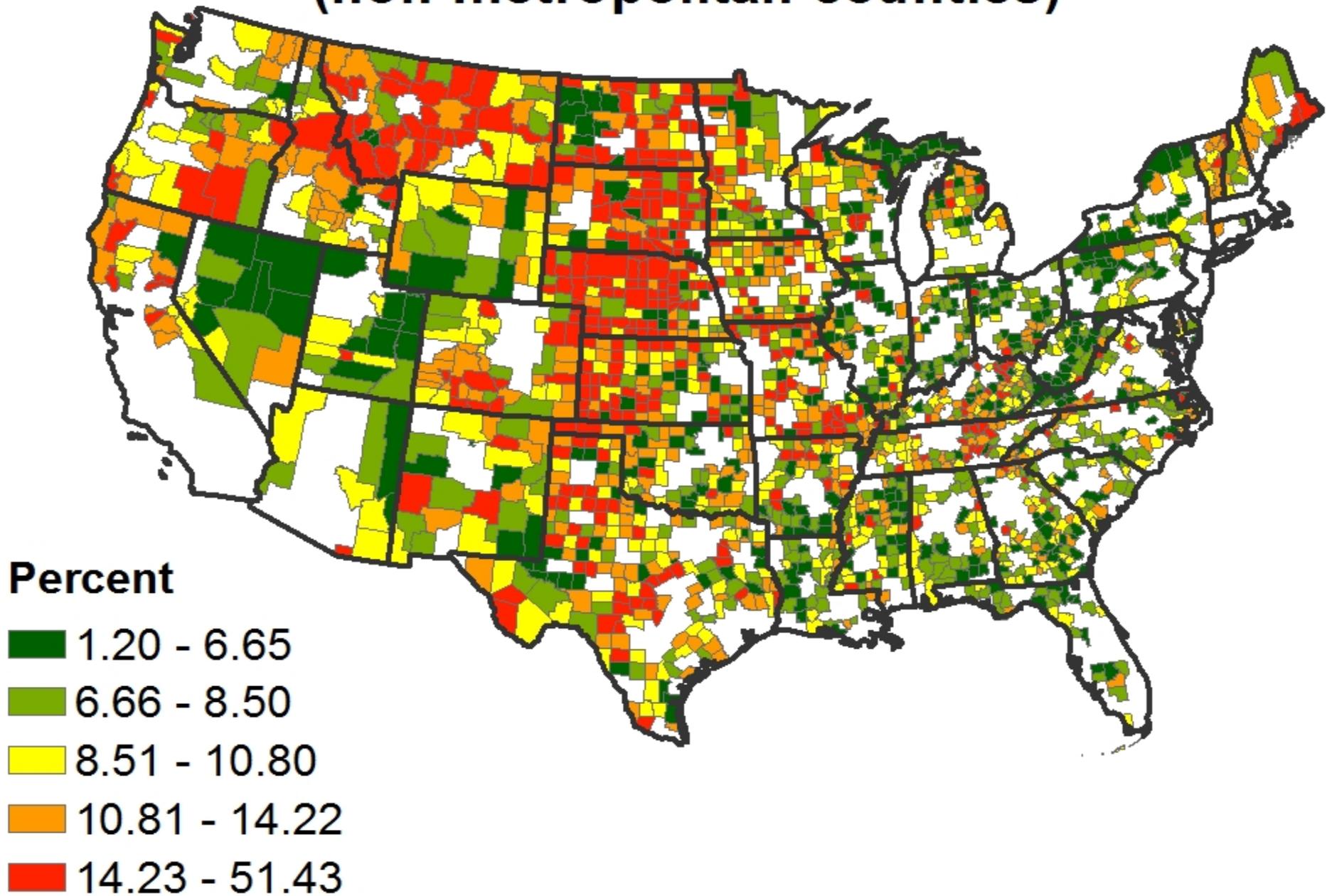
- A nice feature of the first difference model is we can control lagged levels of key variables to account for disequilibrium effects:
- **The 1990 SE employment share to capture long-term entrepreneurial climate;**
- 1990 In county population; 1990 In MSA pop for the actual metro or nearest MSA pop in nonmetro sample;
- Share of adults with at least a BA degree and share of adults with a high school degree but no BA degree;
- 1990 share of agricultural employment;
- 1990 share of manufacturing employment;
- time period dummies θ_t .
- **Three MSA size indicators for interaction models:**
 - **Less 250K, 250K-1M, More than 1M population.**

Results

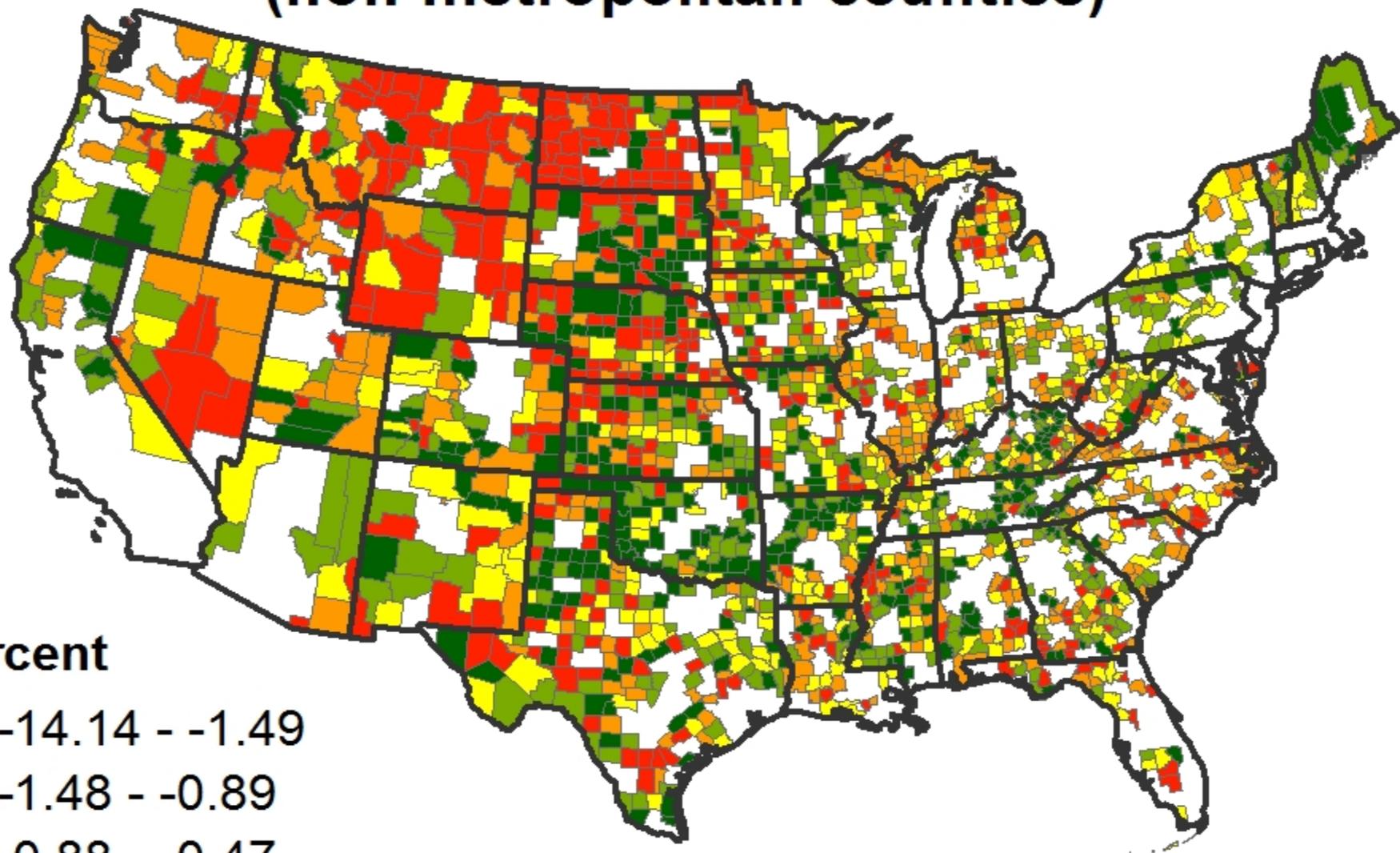
2013 Self-Employment Share (metropolitan counties)



2013 Self-Employment Share (non-metropolitan counties)



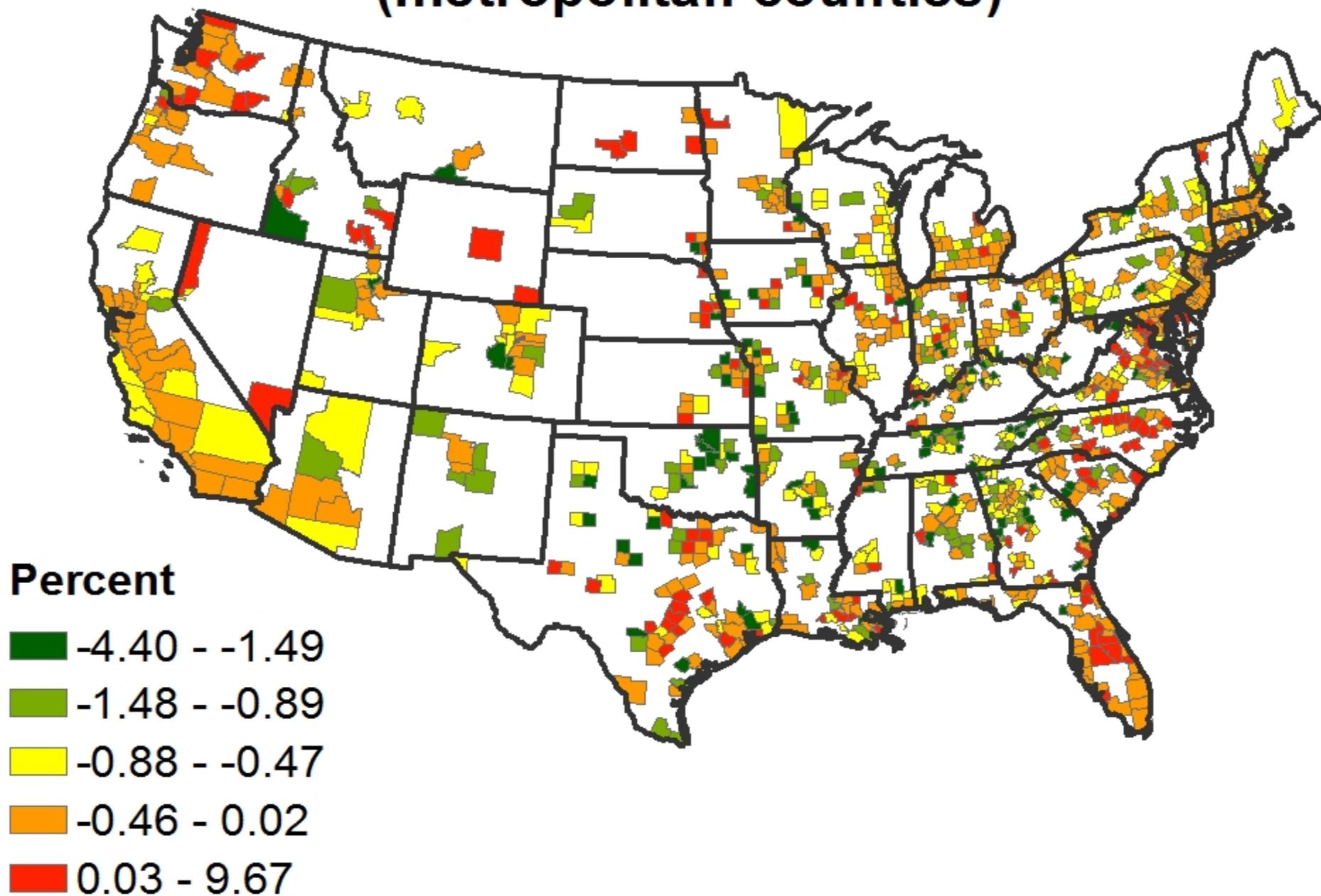
Self-Employment Growth, 2010-2013 (non-metropolitan counties)



Percent

- 14.14 - -1.49
- 1.48 - -0.89
- 0.88 - -0.47
- 0.46 - 0.02
- 0.03 - 48.32

Self-Employment Growth, 2010-2013 (metropolitan counties)



OLS estimation results for total self-employment (metropolitan counties, 3-year differences)

Explanatory variable	Base model			Model with interaction	
	Small MSAs	Medium MSAs	Large MSAs	Small MSAs	Medium MSAs
SE Industry mix	4.8*** (4.61)	2.7* (1.86)	3* (1.78)	4.6*** (4.56)	2.7** (2.01)
W&S Industry mix	.052 (0.32)	.16 (0.50)	-.22 (-1.19)	.038 (0.23)	.17 (0.49)
Nearest MSA of 1.5m growth				.24* (1.81)	-.066 (-0.56)
Nearest MSA of 1.5m growth*distance				-1.2e-04 (-0.03)	-.02** (-2.21)
Distance to nearest MSA	.12* (1.72)	.043 (1.16)	-.018 (-1.22)	.12* (1.77)	.029 (0.77)
Incremental distance to MSA of 250k	6.0e-03** (2.14)	NA	NA	5.4e-03* (1.86)	NA
Incremental distance to MSA of 500k	8.6e-04 (0.24)	4.1e-03 (1.48)	NA	3.6e-04 (0.10)	3.7e-03 (1.35)
Incremental distance to MSA of 1500k	-1.6e-03 (-0.72)	7.1e-04 (0.45)	5.0e-05 (0.03)	-2.0e-03 (-0.90)	6.5e-05 (0.04)

Average coef across all three sizes types (Models 1-3). 1 S.D. change in SEIM is related to a **2.42%** growth in SE. Since SE is **6.3%** of MSA total employment, that represents a **0.15%** increase in total employment
WSIM is not statistically significant.

**OLS estimation results for total self-employment
(metropolitan counties, 3-year differences, controls)**

Explanatory variable	Base model			Model with interaction	
	Small MSAs	Medium MSAs	Large MSAs	Small MSAs	Medium MSAs
Proprietors share, 1990	2.2e-04** (2.12)	-9.7e-06 (-0.30)	1.7e-06 (0.63)	2.0e-04* (1.87)	-1.8e-05 (-0.57)
Manufacturing share, 1990	.014 (0.49)	1.1e-03 (0.02)	-.016 (-0.69)	.016 (0.55)	2.6e-03 (0.06)
Agriculture share, 1990	.019 (0.30)	.081 (0.92)	.14 (1.38)	4.9e-03 (0.08)	.069 (0.83)
Share of adults with HS only, 1990	.076 (1.53)	.19*** (3.37)	.12* (1.81)	.08 (1.58)	.18*** (3.05)
Share of adults with BA, 1990	.11 (0.95)	.073 (0.72)	-.04 (-0.47)	.11 (0.94)	.052 (0.52)
Share of adults with prof/grad degree, 1990	.081 (0.70)	.31*** (2.65)	.42*** (4.56)	.091 (0.77)	.32*** (2.70)
Population (ln), 1990	.29 (0.28)	1.5 (1.51)	.74* (1.83)	.33 (0.32)	1.4 (1.48)
Population in own MSA (ln), 1990	-3* (-1.98)	-.12 (-0.14)	-.52 (-0.96)	-3** (-1.99)	.099 (0.11)
Constant	19 (1.39)	-33* (-1.86)	-15* (-1.69)	18 (1.34)	-34** (-2.00)
R ²	0.372	0.382	0.299	0.376	0.395
Observations	1,098	1,014	1,068	1,098	1,014
Time period fixed effects	Yes	Yes	Yes	Yes	Yes

*** - significant at 0.01; ** - significant at 0.05; * - significant at 0.1; t-stat in parentheses; standard errors clustered at 177 BEA economic areas

**OLS estimation results for self-employment in tradable industries
(metropolitan counties, 3-year differences)**

Explanatory variable	Base model			Model with interaction	
	Small MSAs	Medium MSAs	Large MSAs	Small MSAs	Medium MSAs
SE Industry mix	.36** (2.01)	.21 (1.34)	.27*** (3.84)	.37** (2.06)	.2 (1.28)
W&S Industry mix	9.0e-03 (0.45)	-.047 (-0.94)	-7.2e-03 (-0.51)	8.4e-03 (0.42)	-.05 (-1.00)
Nearest MSA of 1.5m growth				.013 (0.94)	.032** (2.05)
Nearest MSA of 1.5m growth*distance				4.5e-04 (1.10)	1.0e-03 (0.62)
Distance to nearest MSA	9.1e-03* (1.82)	6.4e-03 (1.58)	-2.2e-03** (-2.05)	9.4e-03* (1.87)	6.7e-03 (1.34)
Incremental distance to MSA of 250k	1.4e-05 (0.07)	NA	NA	-9.3e-06 (-0.04)	NA
Incremental distance to MSA of 500k	-4.3e-05 (-0.11)	4.5e-04 (1.57)	NA	-3.1e-05 (-0.08)	4.4e-04 (1.45)
Incremental distance to MSA of 1500k	2.4e-05 (0.12)	3.5e-04 (1.64)	5.9e-05 (0.45)	2.9e-05 (0.15)	3.5e-04 (1.43)

**OLS estimation results for self-employment in non-tradable industries
(metropolitan counties, 3-year differences)**

Explanatory variable	Base model			Model with interaction	
	Small MSAs	Medium MSAs	Large MSAs	Small MSAs	Medium MSAs
SE Industry mix	4.6*** (4.50)	2.7** (2.42)	2.9* (1.97)	4.5*** (4.49)	2.7** (2.60)
W&S Industry mix	.13 (0.93)	.24 (0.83)	-.13 (-0.85)	.12 (0.85)	.24 (0.83)
Nearest MSA of 1.5m growth				.19* (1.67)	-.089 (-0.78)
Nearest MSA of 1.5m growth*distance				9.0e-04 (0.26)	-.017** (-2.23)
Distance to nearest MSA	.056 (1.19)	.035 (1.09)	-9.7e-03 (-0.75)	.058 (1.24)	.023 (0.72)
Incremental distance to MSA of 250k	4.9e-03** (2.06)	NA	NA	4.4e-03* (1.82)	NA
Incremental distance to MSA of 500k	1.4e-03 (0.46)	3.2e-03 (1.24)	NA	1.1e-03 (0.36)	2.9e-03 (1.12)
Incremental distance to MSA of 1500k	-1.2e-03 (-0.65)	-8.2e-05 (-0.05)	6.8e-04 (0.37)	-1.5e-03 (-0.81)	-6.2e-04 (-0.40)

OLS estimation results for total W&S employment (metropolitan counties, 3-year differences)

Explanatory variable	Base model			Model with interaction	
	Small MSAs	Medium MSAs	Large MSAs	Small MSAs	Medium MSAs
SE Industry mix	3.3*** (2.96)	3.1*** (3.18)	2.6** (2.43)	3.1*** (2.79)	3*** (3.14)
W&S Industry mix	1.4*** (8.00)	1.7*** (6.16)	1.1*** (5.63)	1.4*** (7.86)	1.6*** (5.99)
Nearest MSA of 1.5m growth				.24** (2.14)	.38*** (2.87)
Nearest MSA of 1.5m growth*distance				-2.1e-03 (-0.64)	2.9e-03 (0.50)
Distance to nearest MSA	-.032 (-0.99)	.011 (0.40)	9.5e-03 (0.74)	-.031 (-0.97)	7.7e-03 (0.29)
Incremental distance to MSA of 250k	-5.3e-04 (-0.29)	NA	NA	-1.2e-03 (-0.62)	NA
Incremental distance to MSA of 500k	-5.1e-03** (-2.53)	-3.3e-03 (-1.14)	NA	-5.7e-03*** (-2.77)	-3.6e-03 (-1.24)
Incremental distance to MSA of 1500k	-2.0e-03* (-1.67)	-1.4e-03 (-0.87)	-7.9e-04 (-0.64)	-2.5e-03** (-2.00)	-1.7e-03 (-1.15)

Average coef across a three size types (Models 1-3).

1 S.D. change in WSIM is related to a **10.8%** growth in WS. Since WS is **93.7%** of MSA total employment, this represents a **10.2%** increase in total employment.

1 S.D. change in SEIM is related to a **2.07%** growth in WS. Since WS is **93.7%** of MSA total employment, this represents a **1.94%** increase in total employment.

Total SE Effect:
0.15 + 1.94 = 2.09%
Total WS Effect:
0.0 + 10.2 = 10.2%

**OLS estimation results for total W&S employment
(metropolitan counties, 3-year differences, controls)**

Explanatory variable	Base model			Model with interaction	
	Small MSAs	Medium MSAs	Large MSAs	Small MSAs	Medium MSAs
Proprietors share, 1990	2.5e-04*** (3.83)	3.3e-05* (1.74)	-1.4e-07 (-0.08)	2.2e-04*** (3.30)	3.5e-05** (2.02)
Manufacturing share, 1990	-.023 (-1.00)	.024 (1.01)	7.6e-03 (0.31)	-.021 (-0.90)	.026 (1.11)
Agriculture share, 1990	-7.8e-03 (-0.23)	.055 (0.86)	.19** (2.63)	-.026 (-0.74)	.035 (0.58)
Share of adults with HS only, 1990	-.043 (-1.28)	-.011 (-0.24)	-.091* (-1.77)	-.038 (-1.13)	-.01 (-0.23)
Share of adults with BA, 1990	-.19*** (-2.83)	-.057 (-0.71)	-.082 (-1.43)	-.19*** (-2.75)	-.075 (-1.00)
Share of adults with prof/grad degree, 1990	.05 (0.94)	.03 (0.33)	.11 (1.60)	.061 (1.09)	.051 (0.58)
Population (ln), 1990	-1.8** (-2.57)	-.13 (-0.25)	.88*** (4.41)	-1.7** (-2.43)	-.31 (-0.67)
Population in own MSA (ln), 1990	.057 (0.08)	.16 (0.21)	-.37 (-1.53)	.11 (0.15)	.21 (0.31)
Constant	21** (2.29)	-.79 (-0.07)	-3.4 (-0.69)	19** (1.99)	.068 (0.01)
R ²	0.481	0.471	0.506	0.491	0.480
Observations	1,098	1,014	1,068	1,098	1,014
Time period fixed effects	Yes	Yes	Yes	Yes	Yes

*** - significant at 0.01; ** - significant at 0.05; * - significant at 0.1; t-stat in parentheses;
standard errors clustered at 177 BEA economic areas

**OLS estimation results for W&S employment in tradable industries
(metropolitan counties, 3-year differences)**

Explanatory variable	Base model			Model with interaction	
	Small MSAs	Medium MSAs	Large MSAs	Small MSAs	Medium MSAs
SE Industry mix	.098 (0.32)	.58 (1.17)	.66 (1.61)	.052 (0.18)	.57 (1.17)
W&S Industry mix	.35*** (4.40)	.41*** (3.14)	.37*** (6.25)	.35*** (4.37)	.4*** (3.10)
Nearest MSA of 1.5m growth				-3.7e-03 (-0.11)	.022 (0.54)
Nearest MSA of 1.5m growth*distance				-1.2e-03 (-1.05)	-6.8e-04 (-0.38)
Distance to nearest MSA	4.9e-03 (0.41)	-5.8e-03 (-0.50)	8.1e-03** (2.09)	4.3e-03 (0.37)	-6.7e-03 (-0.58)
Incremental distance to MSA of 250k	-1.2e-03* (-1.89)	NA	NA	-1.3e-03* (-1.90)	NA
Incremental distance to MSA of 500k	-1.8e-03*** (-2.72)	-1.0e-03 (-0.99)	NA	-1.9e-03*** (-2.84)	-1.1e-03 (-1.01)
Incremental distance to MSA of 1500k	-4.0e-04 (-0.74)	2.2e-04 (0.50)	-6.3e-04** (-2.14)	-4.7e-04 (-0.89)	1.7e-04 (0.38)

**OLS estimation results for W&S employment in non-tradable industries
(metropolitan counties, 3-year differences)**

Explanatory variable	Base model			Model with interaction	
	Small MSAs	Medium MSAs	Large MSAs	Small MSAs	Medium MSAs
SE Industry mix	2.2** (2.42)	2.5*** (2.98)	1.8* (1.78)	2** (2.22)	2.4*** (2.91)
W&S Industry mix	.86*** (6.44)	1.3*** (4.97)	.74*** (3.94)	.85*** (6.36)	1.2*** (4.78)
Nearest MSA of 1.5m growth				.22** (2.20)	.34*** (2.75)
Nearest MSA of 1.5m growth*distance				-1.4e-03 (-0.42)	3.8e-03 (0.68)
Distance to nearest MSA	-.031 (-1.23)	.017 (0.76)	-3.7e-04 (-0.03)	-.03 (-1.19)	.015 (0.69)
Incremental distance to MSA of 250k	8.1e-04 (0.62)	NA	NA	2.2e-04 (0.15)	NA
Incremental distance to MSA of 500k	-2.5e-03 (-1.48)	-2.0e-03 (-0.92)	NA	-3.1e-03* (-1.76)	-2.3e-03 (-1.02)
Incremental distance to MSA of 1500k	-1.8e-03** (-2.13)	-1.6e-03 (-1.17)	-1.9e-04 (-0.17)	-2.3e-03** (-2.48)	-1.8e-03 (-1.47)

OLS estimation results for total self-employment (non-metropolitan counties, 3-year differences)

Explanatory variable	Model I	Model II	Model III
SE Industry mix	5.1*** (6.00)	4.9*** (5.86)	4.9*** (5.80)
W&S Industry mix	.34*** (3.69)	.28*** (2.80)	.28*** (2.83)
Nearest MSA growth		.26*** (3.89)	
Nearest MSA growth (small)			.3*** (3.98)
Nearest MSA growth (medium)			.17 (1.34)
Nearest MSA growth (large)			-.22 (-0.67)
Distance to nearest MSA	5.2e-03* (1.83)	6.8e-03** (2.15)	5.3e-03* (1.97)
Near MSA growth*distance		3.3e-04 (0.93)	
Near MSA growth*distance (small)			5.6e-04 (1.37)
Near MSA growth*distance (medium)			-5.4e-04 (-0.66)
Near MSA growth*distance (large)			1.0e-03 (0.68)
Incremental distance to MSA of 250k	7.8e-03*** (3.46)	7.8e-03*** (3.79)	7.9e-03*** (3.84)
Incremental distance to MSA of 500k	1.1e-03 (0.62)	2.8e-03 (1.57)	2.7e-03 (1.48)
Incremental distance to MSA of 1500k	-3.9e-04 (-0.26)	1.8e-04 (0.12)	2.2e-04 (0.14)

1 S.D. change in SEIM is related to a **3.83%** growth in SE. Since SE is **7.7%** of nonmetro total employment, that represents a **0.29%** increase in total employment (Model 1).

1 S.D. change in WSIM is related to a **2.44%** growth in SE. Since SE is **7.7%** of nonmetro total employment, that represents a **0.19%** increase in total employment (Model 1).

**OLS estimation results for total self-employment
(non-metropolitan counties, 3-year differences, controls)**

Explanatory variable	Model I	Model II	Model III
Proprietors share, 1990	2.4e-04 (1.28)	2.1e-04 (1.21)	2.1e-04 (1.22)
Manufacturing share, 1990	-.014 (-0.65)	-.014 (-0.62)	-.012 (-0.57)
Agriculture share, 1990	.074** (2.28)	.069** (2.17)	.069** (2.18)
Share of adults with HS only, 1990	.051** (2.09)	.043* (1.87)	.049** (2.03)
Share of adults with BA, 1990	.17** (2.36)	.17** (2.59)	.18*** (2.62)
Share of adults with prof/grad degree, 1990	-.072 (-0.72)	-.088 (-0.88)	-.078 (-0.77)
Population (ln), 1990	-1.4** (-2.08)	-1.3** (-2.06)	-1.4** (-2.13)
Nearest MSA population (ln), 1990	1.2e-03 (0.01)	-.11 (-0.69)	-.059 (-0.36)
Constant	5.4 (0.72)	6.8 (0.99)	5.3 (0.71)
R ²	0.200	0.205	0.206
Time period fixed effects	Yes	Yes	Yes

*** - significant at 0.01; ** - significant at 0.05; * - significant at 0.1;
t-stat in parentheses; standard errors clustered at 177 BEA economic areas;
number of observations: 6,027

OLS estimation results for self-employment in selected sectors (non-metropolitan counties, 3-year differences)

Explanatory variable	Tradable industries			Non-tradable industries		
	Model I	Model II	Model III	Model I	Model II	Model III
SE Industry mix	1.6** (2.50)	1.6** (2.49)	1.6** (2.49)	2.8*** (5.23)	2.7*** (4.96)	2.7*** (4.89)
W&S Industry mix	.049** (2.53)	.048** (2.45)	.048** (2.49)	.29*** (4.48)	.25*** (3.47)	.25*** (3.47)
Nearest MSA growth		7.3e-03 (0.95)			.2*** (4.01)	
Nearest MSA growth (small)			.01 (1.36)			.24*** (4.43)
Nearest MSA growth (medium)			-5.1e-03 (-0.24)			.094 (0.86)
Nearest MSA growth (large)			-.038 (-1.23)			-.06 (-0.19)
Distance to nearest MSA	-1.7e-03 (-1.61)	-1.7e-03 (-1.56)	-1.7e-03 (-1.61)	7.0e-03*** (3.55)	7.4e-03*** (3.68)	-1.7e-03 (-1.61)
Nearest MSA growth*distance		2.7e-06 (0.06)			2.4e-04 (0.99)	
Nearest MSA growth*distance (small)			-4.0e-05 (-0.69)			4.8e-04* (1.80)
Nearest MSA growth*distance (medium)			1.6e-04* (1.89)			-7.0e-04 (-1.02)
Nearest MSA growth*distance (large)			2.0e-04 (1.15)			7.9e-04 (0.45)
Incremental distance to MSA of 250k	-1.9e-04 (-0.49)	-1.9e-04 (-0.51)	-1.7e-04 (-0.46)	6.6e-03*** (3.99)	6.7e-03*** (4.43)	6.7e-03*** (4.54)
Incremental distance to MSA of 500k	-3.2e-05 (-0.10)	-3.5e-05 (-0.12)	-3.0e-05 (-0.10)	6.8e-04 (0.43)	2.0e-03 (1.29)	1.9e-03 (1.22)
Incremental distance to MSA of 1500k	3.0e-04 (0.85)	2.9e-04 (0.82)	2.7e-04 (0.77)	-5.3e-04 (-0.45)	-5.6e-05 (-0.05)	-1.8e-05 (-0.01)

OLS estimation results for total W&S employment (non-metropolitan counties, 3-year differences)

Explanatory variable	Model I	Model II	Model III
SE Industry mix	1.8** (2.19)	1.6** (1.97)	1.6** (1.98)
W&S Industry mix	1.5*** (9.96)	1.5*** (9.37)	1.5*** (9.37)
Nearest MSA growth		.23*** (3.71)	
Nearest MSA growth (small)			.19*** (2.89)
Nearest MSA growth (medium)			.34*** (3.37)
Nearest MSA growth (large)			-.055 (-0.29)
Distance to nearest MSA	6.1e-03* (1.73)	7.8e-03* (1.91)	6.0e-03* (1.72)
Nearest MSA growth*distance		1.3e-04 (0.34)	
Nearest MSA growth*distance (small)			-5.2e-05 (-0.13)
Nearest MSA growth*distance (medium)			1.0e-03* (1.74)
Nearest MSA growth*distance (large)			-2.8e-03** (-2.28)
Incremental distance to MSA of 250k	4.5e-03 (1.42)	4.5e-03 (1.49)	4.4e-03 (1.43)
Incremental distance to MSA of 500k	-6.4e-03*** (-2.86)	-5.1e-03** (-2.34)	-5.3e-03** (-2.52)
Incremental distance to MSA of 1500k	-1.7e-03 (-1.24)	-1.3e-03 (-1.02)	-1.3e-03 (-1.02)

1 S.D. change in WSIM is related to a **10.8%** growth in WS. Since WS is **92.3%** of nonmetro total employment, that represents a **10.0%** increase in total employment (Model 1).

1 S.D. change in SEIM is related to a **1.35%** growth in WS. Since WS is **92.3%** of nonmetro total employment, that represents a **1.25%** increase in total employment (Model 1).

Total SE Effect:
0.29 + 1.25 = 1.54%

Total WS Effect:
0.19 + 10.0 = 10.19%

**OLS estimation results for total W&S employment
(non-metropolitan counties, 3-year differences, controls)**

Explanatory variable	Model I	Model II	Model III
Proprietors share, 1990	2.0e-04 (1.22)	1.8e-04 (1.11)	1.9e-04 (1.15)
Manufacturing share, 1990	-.013 (-0.93)	-.013 (-0.98)	-.012 (-0.87)
Agriculture share, 1990	-2.3e-03 (-0.06)	-7.1e-03 (-0.17)	-7.4e-03 (-0.18)
Share of adults with HS only, 1990	-1.2e-03 (-0.04)	-9.9e-03 (-0.38)	-.013 (-0.52)
Share of adults with BA, 1990	-.031 (-0.45)	-.028 (-0.41)	-.037 (-0.54)
Share of adults with prof/grad degree, 1990	4.0e-03 (0.05)	-.013 (-0.17)	-8.7e-03 (-0.11)
Population (ln), 1990	-.83 (-1.53)	-.77 (-1.45)	-.81 (-1.53)
Nearest MSA population (ln), 1990	1.4e-03 (0.01)	-.1 (-0.70)	-.096 (-0.66)
Constant	6.4 (1.01)	7.9 (1.34)	7.9 (1.27)
R ²	0.236	0.241	0.242
Time period fixed effects	Yes	Yes	Yes

*** - significant at 0.01; ** - significant at 0.05; * - significant at 0.1

t-stat in parentheses; standard errors clustered at 177 BEA economic areas;

number of observations: 6,027

**OLS estimation results for W&S employment in selected sectors
(non-metropolitan counties, 3-year differences)**

Explanatory variable	Tradable industries			Non-tradable industries		
	Model I	Model II	Model III	Model I	Model II	Model III
SE Industry mix	-.3** (-2.17)	-.31** (-2.19)	-.31** (-2.25)	2*** (4.01)	1.8*** (3.78)	1.8*** (3.78)
W&S Industry mix	.51*** (9.39)	.5*** (9.27)	.5*** (9.28)	.9*** (8.16)	.86*** (7.56)	.86*** (7.54)
Nearest MSA growth		.011 (0.78)			.2*** (3.78)	
Nearest MSA growth (small)			1.8e-03 (0.11)			.18*** (3.04)
Nearest MSA growth (medium)			.053* (1.69)			.26*** (3.06)
Nearest MSA growth (large)			.015 (0.25)			-.049 (-0.31)
Distance to nearest MSA	1.9e-04 (0.33)	-2.1e-04 (-0.33)	6.0e-03* (1.72)	5.4e-03* (1.86)	7.4e-03** (2.38)	5.3e-03* (1.85)
Nearest MSA growth*distance		-1.4e-05 (-0.21)			1.4e-04 (0.36)	
Nearest MSA growth*distance (small)			4.4e-05 (0.58)			-5.8e-05 (-0.14)
Nearest MSA growth*distance (medium)			-3.4e-04** (-2.24)			1.1e-03** (2.12)
Nearest MSA growth*distance (large)			4.3e-04 (1.28)			-2.8e-03** (-2.50)
Incremental distance to MSA of 250k	-4.1e-04 (-1.09)	-4.3e-04 (-1.11)	-4.2e-04 (-1.08)	3.0e-03 (1.25)	3.1e-03 (1.34)	3.0e-03 (1.25)
Incremental distance to MSA of 500k	-1.2e-04 (-0.30)	-9.3e-05 (-0.23)	-5.8e-05 (-0.14)	-4.3e-03** (-2.57)	-3.0e-03* (-1.87)	-3.3e-03** (-2.09)
Incremental distance to MSA of 1500k	-3.4e-05 (-0.09)	-1.6e-05 (-0.05)	-1.2e-05 (-0.04)	-1.2e-03 (-1.33)	-8.6e-04 (-0.96)	-8.5e-04 (-0.95)

Conclusion

- Job creation effects suggest that there are larger marginal effects from net increases in SE (even though incorporated net start-ups are not included) than for marginal increases in W&S jobs.
 - Yet, the economic significance are much smaller for SE as it is a much smaller share of total employment and has a much smaller std dev.
- In terms of urban hierarchy effects, small MSAs tend to have larger job multipliers.
 - Weak evidence of positive spillovers from the largest MSAs onto the smallest MSAs.
- For nonmetro areas, spillovers from MSAs tend to be positive for small and medium MSAs, but not from the largest MSAs, which tend to create backwash.



Thank You!
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APPENDIX

OLS estimation results for self-employment in tradable industries (metropolitan counties, 3-year differences, controls)

Explanatory variable	Base model			Model with interaction	
	Small MSAs	Medium MSAs	Large MSAs	Small MSAs	Medium MSAs
Proprietors share, 1990	4.6e-06 (0.79)	-5.0e-06 (-1.29)	9.0e-08 (0.63)	4.4e-06 (0.71)	-4.4e-06 (-1.34)
Manufacturing share, 1990	-1.7e-03 (-0.59)	3.8e-03 (0.81)	1.2e-03 (0.57)	-1.7e-03 (-0.59)	3.9e-03 (0.85)
Agriculture share, 1990	3.8e-03 (0.72)	.015 (1.34)	6.9e-03** (2.04)	4.2e-03 (0.79)	.014 (1.17)
Share of adults with HS only, 1990	-2.5e-03 (-0.57)	2.4e-03 (0.56)	1.8e-03 (0.44)	-2.4e-03 (-0.54)	2.9e-03 (0.61)
Share of adults with BA, 1990	-4.7e-03 (-0.41)	.01 (0.89)	3.6e-03 (0.68)	-5.0e-03 (-0.44)	9.8e-03 (0.82)
Share of adults with prof/grad degree, 1990	.014* (1.78)	2.3e-03 (0.18)	2.5e-03 (0.38)	.014* (1.87)	3.6e-03 (0.28)
Population (ln), 1990	.052 (0.75)	.17 (1.36)	-.015 (-0.64)	.052 (0.76)	.16 (1.23)
Population in own MSA (ln), 1990	-.11 (-1.03)	.12* (1.91)	.015 (0.59)	-.13 (-1.17)	.11* (1.94)
Constant	.56 (0.46)	-3.9** (-2.01)	-.37 (-0.78)	.74 (0.60)	-3.8** (-2.07)
R ²	0.026	0.021	0.078	0.027	0.027
Observations	1,098	1,014	1068	1,098	1,014
Time period fixed effects	Yes	Yes	Yes	Yes	Yes

*** - significant at 0.01; ** - significant at 0.05; * - significant at 0.1; t-stat in parentheses; standard errors clustered at 177 BEA economic areas

OLS estimation results for self-employment in non-tradable industries (metropolitan counties, 3-year differences, controls)

Explanatory variable	Base model			Model with interaction	
	Small MSAs	Medium MSAs	Large MSAs	Small MSAs	Medium MSAs
Proprietors share, 1990	2.3e-04*** (2.65)	-8.2e-06 (-0.29)	1.5e-06 (0.59)	2.1e-04** (2.42)	-1.6e-05 (-0.56)
Manufacturing share, 1990	-1.1e-03 (-0.05)	9.3e-03 (0.23)	-0.016 (-0.70)	7.9e-05 (0.00)	.01 (0.26)
Agriculture share, 1990	.088* (1.74)	.17** (2.31)	.16 (1.64)	.079 (1.58)	.16** (2.33)
Share of adults with HS only, 1990	.1** (2.31)	.17*** (3.31)	.13* (2.02)	.1** (2.35)	.16*** (2.99)
Share of adults with BA, 1990	.058 (0.56)	.064 (0.68)	-0.034 (-0.43)	.057 (0.54)	.047 (0.50)
Share of adults with prof/grad degree, 1990	.087 (0.78)	.32*** (3.06)	.41*** (4.78)	.094 (0.84)	.32*** (3.07)
Population (ln), 1990	-.47 (-0.73)	1.3 (1.51)	.7* (1.83)	-.44 (-0.68)	1.2 (1.50)
Population in own MSA (ln), 1990	-2* (-1.86)	-.032 (-0.04)	-.53 (-1.17)	-2.1* (-1.93)	.16 (0.18)
Constant	17* (1.85)	-31* (-1.94)	-14* (-1.73)	17* (1.89)	-32** (-2.08)
R ²	0.408	0.406	0.316	0.411	0.418
Observations	1,098	1,014	1,068	1,098	1,014
Time period fixed effects	Yes	Yes	Yes	Yes	Yes

*** - significant at 0.01; ** - significant at 0.05; * - significant at 0.1; t-stat in parentheses; standard errors clustered at 177 BEA economic areas

**OLS estimation results for W&S employment in tradable industries
(metropolitan counties, 3-year differences, controls)**

Explanatory variable	Base model			Model with interaction	
	Small MSAs	Medium MSAs	Large MSAs	Small MSAs	Medium MSAs
Proprietors share, 1990	5.7e-06 (0.30)	-5.1e-06 (-0.63)	5.0e-07 (1.13)	3.3e-06 (0.17)	-5.3e-06 (-0.66)
Manufacturing share, 1990	8.5e-03 (0.75)	.05*** (3.76)	.027*** (3.14)	8.7e-03 (0.76)	.05*** (3.78)
Agriculture share, 1990	2.2e-04 (0.02)	.027 (0.92)	.025** (2.40)	-2.6e-03 (-0.22)	.025 (0.86)
Share of adults with HS only, 1990	1.1e-03 (0.10)	-.019 (-1.14)	-.025** (-2.48)	1.3e-03 (0.12)	-.019 (-1.15)
Share of adults with BA, 1990	8.2e-03 (0.34)	-.022 (-0.59)	-.04*** (-2.87)	9.1e-03 (0.38)	-.024 (-0.66)
Share of adults with prof/grad degree, 1990	-.026 (-1.38)	-.028 (-0.77)	.021 (1.16)	-.026 (-1.37)	-.026 (-0.73)
Population (ln), 1990	.02 (0.09)	-8.5e-03 (-0.05)	.01 (0.19)	.024 (0.11)	-.024 (-0.14)
Population in own MSA (ln), 1990	-.17 (-0.61)	.38* (1.76)	-.12* (-1.71)	-.13 (-0.48)	.4* (1.81)
Constant	1.7 (0.67)	-4.5 (-1.13)	2 (1.67)	1.1 (0.45)	-4.5 (-1.14)
R ²	0.199	0.243	0.288	0.201	0.245
Observations	1,098	1,014	1,068	1,098	1,014
Time period fixed effects	Yes	Yes	Yes	Yes	Yes

*** - significant at 0.01; ** - significant at 0.05; * - significant at 0.1; t-stat in parentheses; standard errors clustered at 177 BEA economic areas

**OLS estimation results for W&S employment in non-tradable industries
(metropolitan counties, 3-year differences, controls)**

Explanatory variable	Base model			Model with interaction	
	Small MSAs	Medium MSAs	Large MSAs	Small MSAs	Medium MSAs
Proprietors share, 1990	1.8e-04*** (3.72)	3.7e-05** (2.19)	1.8e-04*** (3.72)	1.6e-04*** (3.15)	4.0e-05** (2.54)
Manufacturing share, 1990	-7.7e-03 (-0.43)	-.026 (-1.49)	-7.7e-03 (-0.43)	-5.8e-03 (-0.32)	-.024 (-1.38)
Agriculture share, 1990	4.0e-04 (0.02)	.03 (0.69)	4.0e-04 (0.02)	-.016 (-0.57)	.012 (0.30)
Share of adults with HS only, 1990	-.032 (-1.20)	6.2e-03 (0.16)	-.032 (-1.20)	-.028 (-1.02)	7.9e-03 (0.23)
Share of adults with BA, 1990	-.15*** (-2.66)	-.038 (-0.65)	-.15*** (-2.66)	-.15** (-2.58)	-.053 (-0.95)
Share of adults with prof/grad degree, 1990	.084* (1.76)	.062 (0.90)	.084* (1.76)	.093* (1.88)	.081 (1.16)
Population (ln), 1990	-1.2** (-2.45)	-.11 (-0.23)	-1.2** (-2.45)	-1.2** (-2.29)	-.27 (-0.60)
Population in own MSA (ln), 1990	.23 (0.44)	-.22 (-0.37)	.23 (0.44)	.26 (0.48)	-.19 (-0.36)
Constant	11 (1.62)	3.5 (0.36)	-5.3 (-1.17)	9.9 (1.33)	4.3 (0.46)
R ²	0.383	0.394	0.450	0.395	0.403
Observations	1,098	1,014	1,068	1,098	1,014
Time period fixed effects	Yes	Yes	Yes	Yes	Yes

*** - significant at 0.01; ** - significant at 0.05; * - significant at 0.1; t-stat in parentheses;
standard errors clustered at 177 BEA economic areas

**OLS estimation results for self-employment in selected sectors
(non-metropolitan counties, 3-year differences, controls)**

Explanatory variable	Tradable industries			Non-tradable industries		
	Model I	Model II	Model III	Model I	Model II	Model III
Proprietors share, 1990	7.7e-05** (2.37)	7.6e-05** (2.32)	7.6e-05** (2.33)	-2.5e-05 (-0.22)	-4.3e-05 (-0.40)	-4.4e-05 (-0.42)
Manufacturing share, 1990	-8.2e-03 (-1.60)	-7.5e-03 (-1.49)	-8.1e-03 (-1.58)	-.017 (-1.32)	-.018 (-1.45)	-.016 (-1.26)
Agriculture share, 1990	.015** (2.23)	.015** (2.21)	.015** (2.24)	.081*** (3.03)	.077*** (2.94)	.077*** (3.00)
Share of adults with HS only, 1990	8.3e-04 (0.22)	9.4e-04 (0.25)	5.4e-04 (0.14)	.065*** (3.30)	.058*** (3.11)	.064*** (3.34)
Share of adults with BA, 1990	-.018 (-1.47)	-.02 (-1.64)	-.018 (-1.51)	.17*** (3.12)	.18*** (3.37)	.18*** (3.32)
Share of adults with prof/grad degree, 1990	.055 (1.61)	.059* (1.71)	.055 (1.62)	-.12 (-1.54)	-.14* (-1.80)	-.13 (-1.57)
Population (ln), 1990	-.27** (-2.48)	-.26** (-2.40)	-.26** (-2.44)	-.41 (-1.05)	-.38 (-1.03)	-.38 (-1.06)
Nearest MSA population (ln), 1990	.046 (1.13)	.048 (1.13)	.059 (1.37)	-.07 (-0.51)	-.16 (-1.16)	-.13 (-0.91)
Constant	2.3* (1.87)	2.1* (1.80)	2.1* (1.76)	-3.5 (-0.72)	-1.9 (-0.42)	-3 (-0.67)
R ²	0.056	0.056	0.057	0.224	0.230	0.232
Time period fixed effects	Yes	Yes	Yes	Yes	Yes	Yes

*** - significant at 0.01; ** - significant at 0.05; * - significant at 0.1;

t-stat in parentheses; standard errors clustered at 177 BEA economic areas; number of observations: 6,027

**Appendix: OLS estimation results for self-employment
(non-metropolitan counties, 3-year differences; nearby MSA growth)**

Explanatory variable	Total		Tradable		Non-tradable	
	Any MSA	1.5m MSA	Any MSA	1.5m MSA	Any MSA	1.5m MSA
SE Industry mix	4.9*** (5.86)	5.1*** (5.92)	1.6** (2.49)	1.6** (2.51)	2.7*** (4.96)	2.8*** (5.15)
W&S Industry mix	.28*** (2.80)	.33*** (3.67)	.048** (2.45)	.049** (2.54)	.25*** (3.47)	.29*** (4.32)
Nearest MSA growth	.26*** (3.89)	.33*** (3.58)	7.3e-03 (0.95)	.03* (1.68)	.2*** (4.01)	.27*** (3.46)
Distance to nearest MSA	6.8e-03** (2.15)	-5.2e-03 (-0.94)	-1.7e-03 (-1.56)	-2.9e-03* (-1.77)	7.4e-03*** (3.68)	3.2e-03 (0.94)
Nearest MSA growth*distance	3.3e-04 (0.93)	5.0e-03* (1.93)	2.7e-06 (0.06)	5.9e-04 (1.30)	2.4e-04 (0.99)	1.5e-03 (0.99)
Incremental distance to MSA of 250k	7.8e-03*** (3.79)	7.4e-03*** (3.15)	-1.9e-04 (-0.51)	-2.1e-04 (-0.58)	6.7e-03*** (4.43)	6.2e-03*** (3.59)
Incremental distance to MSA of 500k	2.8e-03 (1.57)	1.4e-03 (0.79)	-3.5e-05 (-0.12)	1.1e-05 (0.03)	2.0e-03 (1.29)	7.0e-04 (0.43)
Incremental distance to MSA of 1500k	1.8e-04 (0.12)	-4.1e-04 (-0.27)	2.9e-04 (0.82)	3.0e-04 (0.88)	-5.6e-05 (-0.05)	-6.7e-04 (-0.55)
Time period dummies	Yes		Yes		Yes	
R ²	0.205	0.206	0.056	0.058	0.230	0.229

**OLS estimation results for W&S employment in selected sectors
(non-metropolitan counties, 3-year differences, controls)**

Explanatory variable	Tradable industries			Non-tradable industries		
	Model I	Model II	Model III	Model I	Model II	Model III
Proprietors share, 1990	8.5e-05 (1.51)	8.6e-05 (1.51)	8.5e-05 (1.51)	3.7e-05 (0.41)	1.8e-05 (0.19)	2.7e-05 (0.29)
Manufacturing share, 1990	.014** (2.50)	.014** (2.43)	.014** (2.50)	-.017 (-1.60)	-.017* (-1.66)	-.017 (-1.52)
Agriculture share, 1990	-.011 (-1.13)	-.011 (-1.17)	-.011 (-1.13)	.025 (0.88)	.021 (0.76)	.02 (0.75)
Share of adults with HS only, 1990	-1.3e-03 (-0.23)	-1.8e-03 (-0.30)	-1.3e-03 (-0.23)	.013 (0.77)	5.6e-03 (0.34)	2.7e-03 (0.16)
Share of adults with BA, 1990	-.041** (-2.10)	-.04** (-2.04)	-.041** (-2.10)	.032 (0.74)	.034 (0.82)	.027 (0.66)
Share of adults with prof/grad degree, 1990	.041* (1.72)	.04 (1.62)	.041* (1.72)	-.022 (-0.36)	-.036 (-0.59)	-.033 (-0.55)
Population 1990 (ln)	-.3 (-1.59)	-.32 (-1.61)	-.3 (-1.59)	-.26 (-0.88)	-.19 (-0.66)	-.24 (-0.84)
Nearest MSA population (ln), 1990	-.018 (-0.39)	-.02 (-0.43)	-.018 (-0.39)	-.014 (-0.12)	-.11 (-1.00)	-.095 (-0.85)
Constant	2.1 (0.95)	2.3 (1.01)	2.1 (0.95)	1.2 (0.33)	2.4 (0.73)	2.4 (0.68)
R ²	0.194	0.194	0.194	0.167	0.174	0.176
Time period fixed effects	Yes	Yes	Yes	Yes	Yes	Yes

*** - significant at 0.01; ** - significant at 0.05; * - significant at 0.1; t-stat in parentheses; standard errors clustered at 177 BEA economic areas; number of observations: 6,027

**Appendix: OLS estimation results for W&S employment
(non-metropolitan counties, 3-year differences; nearby MSA growth)**

Explanatory variable	Total		Tradable		Non-tradable	
	Any MSA	1.5m MSA	Any MSA	1.5m MSA	Any MSA	1.5m MSA
SE Industry mix	1.6** (1.97)	1.7** (2.10)	-.31** (-2.19)	-.3** (-2.16)	1.8*** (3.78)	1.9*** (3.88)
W&S Industry mix	1.5*** (9.37)	1.5*** (9.89)	.5*** (9.27)	.51*** (9.37)	.86*** (7.56)	.88*** (8.08)
Nearest MSA growth	.23*** (3.71)	.46*** (7.34)	.011 (0.78)	.019 (0.77)	.2*** (3.78)	.41*** (7.45)
Distance to nearest MSA	7.8e-03* (1.91)	3.1e-03 (0.77)	-2.1e-04 (-0.33)	-7.4e-04 (-0.41)	7.4e-03** (2.38)	4.7e-03 (1.51)
Nearest MSA growth*distance	1.3e-04 (0.34)	7.6e-04 (0.47)	-1.4e-05 (-0.21)	4.6e-04 (0.49)	1.4e-04 (0.36)	-4.0e-04 (-0.34)
Incremental distance to MSA of 250k	4.5e-03 (1.49)	3.7e-03 (1.14)	-4.3e-04 (-1.11)	-4.3e-04 (-1.13)	3.1e-03 (1.34)	2.3e-03 (0.91)
Incremental distance to MSA of 500k	-5.1e-03** (-2.34)	-6.6e-03*** (-2.96)	-9.3e-05 (-0.23)	-8.5e-05 (-0.21)	-3.0e-03* (-1.87)	-4.5e-03*** (-2.74)
Incremental distance to MSA of 1500k	-1.3e-03 (-1.02)	-2.0e-03 (-1.48)	-1.6e-05 (-0.05)	-2.6e-05 (-0.07)	-8.6e-04 (-0.96)	-1.6e-03 (-1.65)
Time period dummies	Yes		Yes		Yes	
R ²	0.241	0.245	0.194	0.195	0.174	0.179

Summary statistics for dependent and explanatory variables

Variable	Obs	Mean	Std. Dev.	Min	Max
Non-metro					
Δ TotEmp Growth	6,027	-4.70	17.44	-179.58	196.42
Δ Trade Growth	6,027	-0.06	2.95	-117.67	48.63
Δ NonTrade Growth	6,027	-3.95	12.94	-119.97	111.70
Industry Mix SE	6,027	1.16	7.19	-30.52	43.19
Industry Mix W&S	6,027	-0.57	0.75	-4.76	2.05
Δ Near MSA growth	6,027	-0.03	4.93	-28.04	25.27
Δ Near 1.5m MSA growth	6,027	1.50	3.61	-14.45	10.51
Distance to nearest MSA	6,027	97.644	59.088	17.011	408.185
Incr distance to 250k MSA	6,027	68.746	109.515	0.000	621.426
Incr distance to 500k MSA	6,027	42.851	65.672	0.000	426.359
Incr distance to 1.5m MSA	6,027	88.712	110.958	0.000	557.698
Metro					
Δ TotEmp Growth	3,180	-6.91	14.06	-260.97	89.10
Δ Trade Growth	3,180	-0.11	1.18	-26.00	17.72
Δ NonTrade Growth	3,180	-6.11	12.16	-220.91	81.76
Industry Mix SE	3,180	1.32	7.78	-17.35	25.06
Industry Mix W&S	3,180	-0.50	0.69	-4.16	0.78
Δ Near MSA growth	3,180	0.25	4.72	-28.04	25.27
Δ Near 1.5m MSA growth	3,180	1.23	3.85	-14.45	16.06
Distance to nearest MSA	3,180	24.434	19.971	0.000	96.869
Incr distance to 250k MSA	3,180	36.794	74.073	0.000	621.562
Incr distance to 500k MSA	3,180	36.680	68.043	0.000	490.535
Incr distance to 1.5m MSA	3,180	91.188	130.989	0.000	599.209

Summary statistics for control variables

Variable	Obs	Mean	Std. Dev.	Min	Max
Non-metro					
Proprietors share, 1990	6,027	0.28	0.11	0.05	0.74
Manufacturing share, 1990	6,027	14.24	11.27	0.26	61.80
Agriculture share, 1990	6,027	14.59	9.35	0.08	63.53
Share of adults w HS, 1990	6,027	34.99	5.95	13.54	52.56
Share of adults w BA, 1990	6,027	8.00	3.34	0.00	40.32
Share of adults w BA+, 1990	6,027	3.75	1.89	0.34	29.67
Population (ln), 1990	6,027	9.58	0.99	4.65	12.07
Nearby MSA population (ln), 1990	6,027	12.12	0.78	10.61	15.23
Metro					
Proprietors share, 1990	3,180	0.22	0.10	0.02	0.58
Manufacturing share, 1990	3,180	14.45	9.15	0.15	60.53
Agriculture share, 1990	3,180	7.27	7.31	0.01	40.90
Share of adults w HS, 1990	3,180	33.21	6.21	14.77	50.24
Share of adults w BA, 1990	3,180	10.79	4.90	2.51	28.90
Share of adults w BA+, 1990	3,180	5.72	3.32	1.15	23.97
Population 1990 (ln)	3,180	11.21	1.36	7.39	16.00
Nearby MSA population 1990 (ln)	3,180	13.19	1.33	10.61	16.64