Local Risk, Local Factors, and Asset Prices

Selale Tuzel   Miao (Ben) Zhang

USC   UT Austin

USC-UCLA-UCI Finance Day
May 9, 2014

Motivation

- Most of the firm's factors of production are local:

Motivation

- Most of the firm's factors of production are local:
  - Firms hire employees from their local area
  - Significant parts of physical capital (land, structures) are immobile
  - Jointly account for more than 75% of economic output

Motivation

- Most of the firm's factors of production are local:
  - Firms hire employees from their local area
  - Significant parts of physical capital (land, structures) are immobile
  - Jointly account for more than 75% of economic output
- Local economic conditions affect local factor prices and firms using them

Motivation

- Most of the firm's factors of production are local:
  - Firms hire employees from their local area
  - Significant parts of physical capital (land, structures) are immobile
  - Jointly account for more than 75% of economic output
- Local economic conditions affect local factor prices and firms using them

Does the location of the firm affect its risk?

Motivation

- Systematic shocks can affect local factor prices:
  - Wages
  - Real estate rents / prices
- Effects will be bigger in areas with cyclical industries.
  $\rightarrow$ Procyclical wage and rent bills act as a hedge for the firm.
- Implications for firm risk and returns

Motivation

Accommodation (NAICS 721) is a cyclical industry (beta = 1.75), leading industry in

Las Vegas (#11), Norwich-New London (#12), Atlantic City (#16)

Motivation

Accommodation (NAICS 721) is a cyclical industry (beta = 1.75), leading industry in

Las Vegas (#11), Norwich-New London (#12), Atlantic City (#16)

In 2009 (Great recession):

	Wage growth				House price growth	Comm RE return	Rent growth
	Accommodation	Plastics &rubber	Nonmetallic mineral	Transport. equip.			
Nationwide	-4.2%	-2.6%	-5.3%	-2.9%	-3.8%	-14%	2.5%
Las Vegas	-7.0%	-6.3%	-9.2%	-12.0%	-25%	-26%	-8.4%
Norwich-New London	-8.3%	0.4%	-14.9%	-1.7%	-5.6%	NA	0.1%
Atlantic City	-10.7%	-7.5%	-4.1%	-4.1%	-8%	NA	0%

Motivation

Accommodation (NAICS 721) is a cyclical industry (beta = 1.75), leading industry in

Las Vegas (#11), Norwich-New London (#12), Atlantic City (#16)

In 2009 (Great recession):

	Wage growth				House price growth	Comm RE return	Rent growth
	Accommodation	Plastics &rubber	Nonmetallic mineral	Transport. equip.			
Nationwide	-4.2%	-2.6%	-5.3%	-2.9%	-3.8%	-14%	2.5%
Las Vegas	-7.0%	-6.3%	-9.2%	-12.0%	-25%	-26%	-8.4%
Norwich-New London	-8.3%	0.4%	-14.9%	-1.7%	-5.6%	NA	0.1%
Atlantic City	-10.7%	-7.5%	-4.1%	-4.1%	-8%	NA	0%

Motivation

Accommodation (NAICS 721) is a cyclical industry (beta = 1.75), leading industry in

Las Vegas (#11), Norwich-New London (#12), Atlantic City (#16)

In 2009 (Great recession):

	Wage growth				House price growth	Comm RE return	Rent growth
	Accommodation	Plastics &rubber	Nonmetallic mineral	Transport. equip.			
Nationwide	-4.2%	-2.6%	-5.3%	-2.9%	-3.8%	-14%	2.5%
Las Vegas	-7.0%	-6.3%	-9.2%	-12.0%	-25%	-26%	-8.4%
Norwich-New London	-8.3%	0.4%	-14.9%	-1.7%	-5.6%	NA	0.1%
Atlantic City	-10.7%	-7.5%	-4.1%	-4.1%	-8%	NA	0%

Motivation

Accommodation (NAICS 721) is a cyclical industry (beta = 1.75), leading industry in

Las Vegas (#11), Norwich-New London (#12), Atlantic City (#16)

In 2009 (Great recession):

	Wage growth				House price growth	Comm RE return	Rent growth
	Accommodation	Plastics &rubber	Nonmetallic mineral	Transport. equip.			
Nationwide	-4.2%	-2.6%	-5.3%	-2.9%	-3.8%	-14%	2.5%
Las Vegas	-7.0%	-6.3%	-9.2%	-12.0%	-25%	-26%	-8.4%
Norwich-New London	-8.3%	0.4%	-14.9%	-1.7%	-5.6%	NA	0.1%
Atlantic City	-10.7%	-7.5%	-4.1%	-4.1%	-8%	NA	0%

In this paper

- We construct a measure of how cyclical the local economy is: Local beta, β^{local}.

In this paper

- We construct a measure of how cyclical the local economy is: Local beta, β^{local}.
- We investigate:
  - How aggregate shocks affect local factor prices (wages, real estate returns), conditional on β^{local},

In this paper

- We construct a measure of how cyclical the local economy is: Local beta, β^{local}.
- We investigate:
  - How aggregate shocks affect local factor prices (wages, real estate returns), conditional on β^{local},
  - How these local price dynamics affect the firms' risk and returns,

In this paper

- We construct a measure of how cyclical the local economy is: Local beta, β^{local}.
- We investigate:
  - How aggregate shocks affect local factor prices (wages, real estate returns), conditional on β^{local},
  - How these local price dynamics affect the firms' risk and returns,
  - Whether a production based asset pricing model can account for these stylized facts.

Mechanism

- Sensitivity of wages and real estate prices to aggregate shocks increases in high β^{local} areas.

Mechanism

- Sensitivity of wages and real estate prices to aggregate shocks increases in high β^{local} areas.
- High wage sensitivity $\Rightarrow$ Wage bill acts as a natural hedge for the firms

Mechanism

- Sensitivity of wages and real estate prices to aggregate shocks increases in high β^{local} areas.
- High wage sensitivity $\Rightarrow$ Wage bill acts as a natural hedge for the firms
  - Risk and expected returns are lower in high β^{local} areas.

Mechanism

- Sensitivity of wages and real estate prices to aggregate shocks increases in high β^{local} areas.
- High wage sensitivity $\Rightarrow$ Wage bill acts as a natural hedge for the firms
  - Risk and expected returns are lower in high β^{local} areas.
- High sensitivity of real estate prices

Mechanism

- Sensitivity of wages and real estate prices to aggregate shocks increases in high β^{local} areas.
- High wage sensitivity $\Rightarrow$ Wage bill acts as a natural hedge for the firms
  - Risk and expected returns are lower in high β^{local} areas.
- High sensitivity of real estate prices
  - If real estate is leased, rent bill acts as a hedge, risk and expected returns potentially lower in high β^{local} areas.
  - If real estate is owned, risk and expected returns higher in high β^{local} areas.

Result preview

- Aggregate shocks have a more pronounced effect on local factor prices such as wages and real estate returns in high β^{local} areas.

Result preview

- Aggregate shocks have a more pronounced effect on local factor prices such as wages and real estate returns in high β^{local} areas.
- Due to competing mechanisms for returns:
  - Risk and expected returns of firms with low RE holdings (short RE) are lower in high β^{local} areas (wage and rent bills act as natural hedge).
  - Two effects cancel out for the firms with high RE holdings (long RE).

Result preview

- Aggregate shocks have a more pronounced effect on local factor prices such as wages and real estate returns in high β^{local} areas.
- Due to competing mechanisms for returns:
  - Risk and expected returns of firms with low RE holdings (short RE) are lower in high β^{local} areas (wage and rent bills act as natural hedge).
  - Two effects cancel out for the firms with high RE holdings (long RE).
- Theoretical model generates similar patterns in simulated data.

Related work

- Spatial equilibrium literature (Starting with Rosen, 1979; Roback, 1982).
- Agglomeration and industrial clustering (Starting with Marshall, 1920).
- The effect of firm's location on:
  - Real investments: Dougal, Parsons & Titman (2012), Chaney, Sraer & Thesmar (2012)
  - Firm returns: Pirinsky & Wang (2006), Korniotis & Kumar (2012), Garcia & Norli (2012)
- Production based asset pricing:
  - Labor market frictions: Bazdresch, Belo, & Lin (2012), Favilukis & Lin (2013), Kuehn, Petrosky-Nadeau, & Zhang (2013), Donangelo (2013), Berk & Walden (2013)
  - Capital heterogeneity: Eisfeldt & Papanikolaou (2011), Jones & Tuzel (2013), Tuzel (2010)

Simple setup ingredients

- An area has N firms and N employees
- Employees are immobile across areas
- Firms hire labor from their local labor markets (labor only factor of production; capital and land are included in the extended model)
- Local markets differ in their industry composition:
  - $s_m N$ firms belong to the high risk industry, $(1 - s_m)N$ firms to low risk industry
- Local labor markets clear, wages are endogenous

Simple setup ingredients

- An area has N firms and N employees
- Employees are immobile across areas
- Firms hire labor from their local labor markets (labor only factor of production; capital and land are included in the extended model)
- Local markets differ in their industry composition:
  - $s_m N$ firms belong to the high risk industry, $(1 - s_m)N$ firms to low risk industry
- Local labor markets clear, wages are endogenous

Simple setup ingredients

- An area has N firms and N employees
- Employees are immobile across areas
- Firms hire labor from their local labor markets (labor only factor of production; capital and land are included in the extended model)
- Local markets differ in their industry composition:
  - $s_m N$ firms belong to the high risk industry, $(1 - s_m)N$ firms to low risk industry
- Local labor markets clear, wages are endogenous

Simple setup ingredients

- An area has N firms and N employees
- Employees are immobile across areas
- Firms hire labor from their local labor markets (labor only factor of production; capital and land are included in the extended model)
- Local markets differ in their industry composition:
  - $s_m N$ firms belong to the high risk industry, $(1 - s_m)N$ firms to low risk industry
- Local labor markets clear, wages are endogenous

Simple setup ingredients

- An area has N firms and N employees
- Employees are immobile across areas
- Firms hire labor from their local labor markets (labor only factor of production; capital and land are included in the extended model)
- Local markets differ in their industry composition:
  - $s_m N$ firms belong to the high risk industry, $(1 - s_m)N$ firms to low risk industry
- Local labor markets clear, wages are endogenous

Firm

Many firms (i = 1, 2, 3, ... N) in an area

- belong to an industry (low or high risk)
- produce a homogeneous good
- hire labor
- take wages, optimize.

$$
\begin{aligned}
Y_{ijt} &= F(A_t, Z_{it}, I_j, L_{it}) \\
&= A_t^{I_j} Z_{it} L_{it}^{\alpha}
\end{aligned}
$$

Firm

Many firms (i = 1, 2, 3, ... N) in an area

- belong to an industry (low or high risk)
- produce a homogeneous good
- hire labor
- take wages, optimize.

$$
\begin{aligned}
Y_{ijt} &= F(A_t, Z_{it}, I_j, L_{it}) \\
&= A_t^{I_j} Z_{it} L_{it}^{\alpha}
\end{aligned}
$$

$$I_j \in \{I_{low}, I_{high}\} \quad where \quad I_{low} < 1 < I_{high}$$

Firm

Many firms (i = 1, 2, 3, ... N) in an area

- belong to an industry (low or high risk)
- produce a homogeneous good
- hire labor
- take wages, optimize.

$$\begin{aligned} Y_{ijt} &= F(A_t, Z_{it}, I_j, L_{it}) \\ &= A_t^{I_j} Z_{it} L_{it}^{\alpha} \\ I_j &\in \{I_{low}, I_{high}\} \;\; \textit{where} \;\; I_{low} < 1 < I_{high} \end{aligned}$$

$$\begin{aligned} a_t &= \log(A_t) \\ a_{t+1} &= \rho_a a_t + \varepsilon_{t+1}^{a} \end{aligned}$$

Firm

Many firms (i = 1, 2, 3, ... N) in an area

- belong to an industry (low or high risk)
- produce a homogeneous good
- hire labor
- take wages, optimize.

$$\begin{aligned} Y_{ijt} &= F(A_t, Z_{it}, I_j, L_{it}) \\ &= A_t^{I_j} Z_{it} L_{it}^{\alpha} \\ I_j &\in \{I_{low}, I_{high}\} \;\; where \;\; I_{low} < 1 < I_{high} \end{aligned}$$

$$\begin{aligned} a_t &= \log(A_t) \\ a_{t+1} &= \rho_a a_t + \varepsilon_{t+1}^{a} \end{aligned}$$

$$\begin{aligned} z_{it} &= \log(Z_{it}) \\ z_{i,t+1} &= \rho_z z_{it} + \varepsilon_{i,t+1}^{z} \end{aligned}$$

Labor choice and wages

- Firms choose labor, L_{it}, to maximize their operating profits:

$$\Pi_{ijt} = Y_{ijt} - W_t L_{it}$$

- The FOC wrt labor leads to the firms' labor choice:

$$\begin{aligned} W_t &= \alpha A_t^{l_j} Z_{it} L_{it}^{\alpha-1} \\ L_{it} &= Z_{it}^{\frac{1}{1-\alpha}} \left(\frac{\alpha A_t^{l_j}}{W_t} \right)^{\frac{1}{1-\alpha}} \end{aligned}$$

Labor choice and wages

- Firms choose labor, L_{it}, to maximize their operating profits:

$$\Pi_{ijt} = Y_{ijt} - W_t L_{it}$$

- The FOC wrt labor leads to the firms' labor choice:

$$W_t = \alpha A_t^{l_j} Z_{it} L_{it}^{\alpha-1}$$

$$L_{it} = Z_{it}^{\frac{1}{1-\alpha}} \left(\frac{\alpha A_t^{l_j}}{W_t} \right)^{\frac{1}{1-\alpha}}$$

- Local labor market clearing implies:

$$\sum_{i=1}^{s_m N} Z_{it}^{\frac{1}{1-\alpha}} \left(\frac{\alpha A_t^{l_{high}}}{W_t} \right)^{\frac{1}{1-\alpha}} + \sum_{i=s_m N+1}^{N} Z_{it}^{\frac{1}{1-\alpha}} \left(\frac{\alpha A_t^{l_{low}}}{W_t} \right)^{\frac{1}{1-\alpha}} = N$$

$$W_t = \alpha e^{\frac{\sigma_Z^2}{2(1-\rho^2)}} \left(s_m A_t^{\frac{l_{high}}{1-\alpha}} + (1 - s_m) A_t^{\frac{l_{low}}{1-\alpha}} \right)^{1-\alpha}$$

Wage cyclicality increases with s_m.

Firm profit and risk

- Replacing W_t and L_{it} in profits leads to:

$$\Pi^*_{ijt} = (1-\alpha) A_t^{\frac{l_j}{1-\alpha}} Z_{it}^{\frac{1}{1-\alpha}} e^{-\frac{\sigma_z^2 \alpha}{2(1-\alpha)(1-\rho^2)}} \left(s_m A_t^{\frac{l_{high}}{1-\alpha}} + (1-s_m) A_t^{\frac{l_{low}}{1-\alpha}} \right)^{-\alpha}$$

- Define β_{ijt}, elasticity of profits to aggregate productivity, as a measure of firm risk:

$$\beta_{ijt} = \frac{\frac{\partial \Pi^*_{ijt}}{\partial A_t}}{\frac{\Pi^*_{ijt}}{A_t}} = \frac{\left[s_m \left(\frac{l_j - \alpha l_{high}}{1-\alpha} \right) A_t^{\frac{l_{high}}{1-\alpha}} + (1-s_m) \left(\frac{l_j - \alpha l_{low}}{1-\alpha} \right) A_t^{\frac{l_{low}}{1-\alpha}} \right]}{\left(s_m A_t^{\frac{l_{high}}{1-\alpha}} + (1-s_m) A_t^{\frac{l_{low}}{1-\alpha}} \right)}$$

$\beta_{ijt} > l_{high}$ for firms with $l_j = l_{high}$
$\beta_{ijt} < l_{low}$ for firms with $l_j = l_{low}$

Firm profit and risk

- Replacing W_t and L_{it} in profits leads to:

$$\Pi^*_{ijt} = (1-\alpha)\, A_t^{\frac{l_j}{1-\alpha}}\, Z_{it}^{\frac{1}{1-\alpha}}\, e^{-\frac{\sigma_z^2 \alpha}{2(1-\alpha)(1-\rho^2)}} \left(s_m A_t^{\frac{l_{high}}{1-\alpha}} + (1-s_m)\, A_t^{\frac{l_{low}}{1-\alpha}} \right)^{-\alpha}$$

- Define β_{ijt}, elasticity of profits to aggregate productivity, as a measure of firm risk:

$$\beta_{ijt} = \frac{\frac{\partial \Pi^*_{ijt}}{\partial A_t}}{\frac{\Pi^*_{ijt}}{A_t}} = \frac{\left[s_m \left(\frac{l_j - \alpha l_{high}}{1-\alpha}\right) A_t^{\frac{l_{high}}{1-\alpha}} + (1-s_m)\left(\frac{l_j - \alpha l_{low}}{1-\alpha}\right) A_t^{\frac{l_{low}}{1-\alpha}} \right]}{\left(s_m A_t^{\frac{l_{high}}{1-\alpha}} + (1-s_m)\, A_t^{\frac{l_{low}}{1-\alpha}} \right)}$$

$\beta_{ijt} > l_{high}$ for firms with $l_j = l_{high}$
$\beta_{ijt} < l_{low}$ for firms with $l_j = l_{low}$

Firm profit and risk

- Replacing W_t and L_{it} in profits leads to:

$$\Pi^*_{ijt} = (1-\alpha)\, A_t^{\frac{l_j}{1-\alpha}}\, Z_{it}^{\frac{1}{1-\alpha}}\, e^{-\frac{\sigma_Z^2 \alpha}{2(1-\alpha)(1-\rho^2)}} \left(s_m A_t^{\frac{l_{high}}{1-\alpha}} + (1-s_m)\, A_t^{\frac{l_{low}}{1-\alpha}} \right)^{-\alpha}$$

- Define β_{ijt}, elasticity of profits to aggregate productivity, as a measure of firm risk:

$$\beta_{ijt} = \frac{\frac{\partial \Pi^*_{ijt}}{\partial A_t}}{\frac{\Pi^*_{ijt}}{A_t}} = \frac{\left[s_m \left(\frac{l_j - \alpha l_{high}}{1-\alpha} \right) A_t^{\frac{l_{high}}{1-\alpha}} + (1-s_m) \left(\frac{l_j - \alpha l_{low}}{1-\alpha} \right) A_t^{\frac{l_{low}}{1-\alpha}} \right]}{\left(s_m A_t^{\frac{l_{high}}{1-\alpha}} + (1-s_m)\, A_t^{\frac{l_{low}}{1-\alpha}} \right)}$$

$\beta_{ijt} > l_{high}$ for firms with $l_j = l_{high}$
$\beta_{ijt} < l_{low}$ for firms with $l_j = l_{low}$

Local markets and firm risk

- Sensitivity of β_{ijt} to s_m, the share of high risk industries in a local market:

$$\frac{\partial \beta_{ijt}}{\partial s_m} = \frac{\frac{\alpha}{1-\alpha}(I_{low} - I_{high}) A_t^{\frac{I_{low}+I_{high}}{1-\alpha}}}{\left(s_m A_t^{\frac{I_{high}}{1-\alpha}} + (1-s_m)\, A_t^{\frac{I_{low}}{1-\alpha}} \right)^2} < 0$$

In areas with higher share of high risk industries, the risk of the individual firms is lower.

In aggregate: $\partial \beta_{area,t} / \partial s_m > 0$ Dynamic Model

Local markets and firm risk

- Sensitivity of β_{ijt} to s_m, the share of high risk industries in a local market:

$$\frac{\partial \beta_{ijt}}{\partial s_m} = \frac{\frac{\alpha}{1-\alpha}\left(I_{low} - I_{high}\right) A_t^{\frac{I_{low}+I_{high}}{1-\alpha}}}{\left(s_m A_t^{\frac{I_{high}}{1-\alpha}} + \left(1 - s_m\right) A_t^{\frac{I_{low}}{1-\alpha}}\right)^2} < 0$$

In areas with higher share of high risk industries, the risk of the individual firms is lower.

In aggregate: $\partial \beta_{area,t} / \partial s_m > 0$ Dynamic Model

Data

- Industry/MSA employment : County Business Patterns, U.S. Census Bureau
  - County & MSA level, starting 1986
- Industry value added, GDP: Value added by industry, from BEA
  - 2-digit SIC level, starting 1947; 3-digit NAICS level, starting 1977
- Industry/MSA wages: Annual, Longitudinal Employer - Household Dynamics (LEHD), U.S. Census Bureau, starting 1990
- Occupation/MSA wages: Hourly, Occupational Employment Statistics (OES), Bureau of Labor Statistics, starting 1999
  - 22 major occupational groups, 854 detailed occupations
- Housing returns: FHFA, starting 1975
- Commercial real estate returns: NCREIF, starting 1978
- CRE rents: CoStar, starting 1982
- Compustat & CRSP

Local beta

β^{local} : Average GDP beta of the local industries, weighted by the employment share of industries.

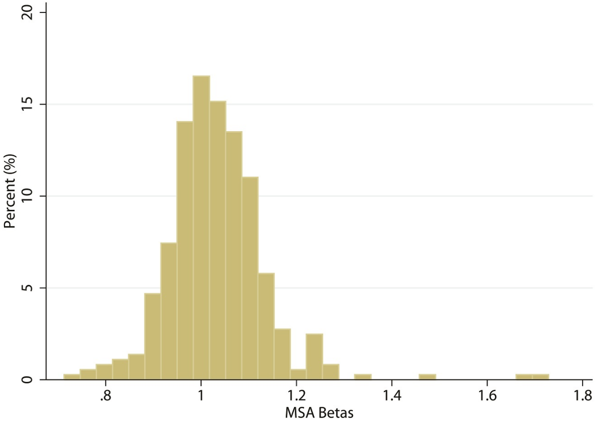
$$\beta^{local}_{a,t} = \sum_i s_{i,a,t} \beta^{ind}_{i,t}$$

$\beta^{ind}_{i,t}$: GDP beta of industry i in year t

$s_{i,a,t}$: employment share of industry i in area a, year t

MSA HHI for Industries | Industry HHI for MSAs | Industry Betas

Local beta, cont'd



Highest and Lowest β^{local} MSAs | GDP of MSAs | Time Series

Wage regression specification

$$\Delta wage_{ind,MSA,t} = b_0 + b_1 shock_t \times \beta^{local}_{MSA,t-1} + b_2 \beta^{local}_{MSA,t-1} + \text{MSA Dummies} + \text{Time} \times \text{Industry Dummies} + \epsilon_{ind,MSA,t}$$

Wage regression specification

$$\Delta wage_{ind,MSA,t} = b_0 + b_1 shock_t \times \beta^{local}_{MSA,t-1} + b_2 \beta^{local}_{MSA,t-1} + \text{MSA Dummies} + \text{Time} \times \text{Industry Dummies} + \epsilon_{ind,MSA,t}$$

$$b_1 > 0$$

Industry-MSA wage growth

	Annual Wage Growth (%)						Wage Level (1990 $)	
	All Industries		Non-Union Industries		Tradable Industries			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
β^{local}_{MSA}	-1.70***	-0.45	-1.82***	-0.23	-1.83***	-0.40	1276.13	2734.57***
	(0.29)	(0.76)	(0.35)	(0.90)	(0.31)	(0.81)	(999.47)	(480.78)
Shock $\times\, \beta^{local}_{MSA}$	0.24**	0.24*	0.34**	0.34**	0.30**	0.30**		
	(0.12)	(0.13)	(0.16)	(0.17)	(0.13)	(0.14)		
Ind. × Year FE	X	X	X	X	X	X	X	X
MSA FE		X		X		X		X
Observations	409294	409294	222549	222549	343477	343477	442591	442591
R^2	0.05	0.05	0.06	0.06	0.04	0.04	0.57	0.64

Industry-MSA wage growth

	Annual Wage Growth (%)						Wage Level	
	All Industries		Non-Union Industries		Tradable Industries		(1990 $)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
β_{MSA}^{local}	-1.70***	-0.45	-1.82***	-0.23	-1.83***	-0.40	1276.13	2734.57***
	(0.29)	(0.76)	(0.35)	(0.90)	(0.31)	(0.81)	(999.47)	(480.78)
Shock $\times\, \beta_{MSA}^{local}$	0.24**	0.24*	0.34**	0.34**	0.30**	0.30**		
	(0.12)	(0.13)	(0.16)	(0.17)	(0.13)	(0.14)		
Ind. $\times$ Year FE	X	X	X	X	X	X	X	X
MSA FE		X		X		X		X
Observations	409294	409294	222549	222549	343477	343477	442591	442591
R^2	0.05	0.05	0.06	0.06	0.04	0.04	0.57	0.64

Occupation-MSA wage growth

	Hourly Wage Growth (%)						Wage Level (1990 $)	
	Broad Occupations		Detailed Occupations		Detailed Non-Union Occ.			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
β_{MSA}^{local}	-1.30***	-1.12*	-1.22***	0.12	-1.25***	0.53	0.77**	0.47***
	(0.33)	(0.67)	(0.20)	(0.46)	(0.21)	(0.50)	(0.35)	(0.11)
$Shock \times \beta_{MSA}^{local}$	0.44***	0.38***	0.29***	0.24***	0.31***	0.27***		
	(0.14)	(0.13)	(0.07)	(0.06)	(0.08)	(0.08)		
Occ. × Year FE	X	X	X	X	X	X	X	X
MSA FE		X		X		X		X
Observations	76986	76986	1028541	1028541	758607	758607	1349174	1349174
R^2	0.08	0.09	0.04	0.05	0.04	0.04	0.83	0.86

Occupation-MSA wage growth

	Hourly Wage Growth (%)						Wage Level (1990 $)	
	Broad Occupations		Detailed Occupations		Detailed Non-Union Occ.			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
β_{MSA}^{local}	-1.30***	-1.12*	-1.22***	0.12	-1.25***	0.53	0.77**	0.47***
	(0.33)	(0.67)	(0.20)	(0.46)	(0.21)	(0.50)	(0.35)	(0.11)
$Shock \times \beta_{MSA}^{local}$	0.44***	0.38***	0.29***	0.24***	0.31***	0.27***		
	(0.14)	(0.13)	(0.07)	(0.06)	(0.08)	(0.08)		
Occ. × Year FE	X	X	X	X	X	X	X	X
MSA FE		X		X		X		X
Observations	76986	76986	1028541	1028541	758607	758607	1349174	1349174
R^2	0.08	0.09	0.04	0.05	0.04	0.04	0.83	0.86

Real estate regression specification

$$
\begin{aligned}
r^{re}_{MSA,t} &= b_0 + b_1 shock_t \times \beta^{local}_{MSA,t-1} + b_2 \beta^{local}_{MSA,t-1} \\
&\quad + \text{MSA Dummies} + \text{Time Dummies} + \epsilon_{MSA,t}
\end{aligned}
$$

Real estate regression specification

$$r^{re}_{MSA,t} = b_0 + b_1 shock_t \times \beta^{local}_{MSA,t-1} + b_2 \beta^{local}_{MSA,t-1} + \text{MSA Dummies} + \text{Time Dummies} + \epsilon_{MSA,t}$$

$$b_1 > 0$$

Real estate returns

	Housing Returns		Commercial RE Returns		Rent Growth	
	(1)	(2)	(3)	(4)	(5)	(6)
β^{local}_{MSA}	-1.87***	3.82***	-2.68	9.25	-4.36	0.18
	(0.56)	(1.18)	(4.38)	(6.17)	(2.77)	(7.54)
$Shock \times \beta^{local}_{MSA}$	1.16***	1.09***	4.16*	3.52*	2.72**	1.98*
	(0.25)	(0.26)	(2.14)	(2.08)	(1.13)	(1.14)
Time FE	X	X	X	X	X	X
MSA FE		X		X		X
Observations	36268	36268	10267	10267	5411	5411
R^2	0.45	0.46	0.52	0.53	0.18	0.21

Two-stage regressions

Real estate returns

	Housing Returns		Commercial RE Returns		Rent Growth	
	(1)	(2)	(3)	(4)	(5)	(6)
β_{MSA}^{local}	-1.87***	3.82***	-2.68	9.25	-4.36	0.18
	(0.56)	(1.18)	(4.38)	(6.17)	(2.77)	(7.54)
$Shock \times \beta_{MSA}^{local}$	1.16***	1.09***	4.16*	3.52*	2.72**	1.98*
	(0.25)	(0.26)	(2.14)	(2.08)	(1.13)	(1.14)
Time FE	X	X	X	X	X	X
MSA FE		X		X		X
Observations	36268	36268	10267	10267	5411	5411
R^2	0.45	0.46	0.52	0.53	0.18	0.21

Two-stage regressions

Firm risk, intuition

Within industry comparison:

		Local Markets		
		Low β^{local}	Benchmark (e.g.$\beta^{local} = 1$)	high β^{local}
Firm 1	long RE short labor			
Firm 2	short RE short labor			

Firm risk, intuition

Within industry comparison:

		Local Markets		
		Low β^{local}	Benchmark (e.g.$\beta^{local} = 1$)	high β^{local}
A bad shock leads to:		$\Delta p^{re} < 0$ $\Delta p^{labor} < 0$	$\Delta p^{re} \ll 0$ $\Delta p^{labor} \ll 0$	$\Delta p^{re} \lll 0$ $\Delta p^{labor} \lll 0$
Firm 1	long RE short labor			
Firm 2	short RE short labor			

Firm risk, intuition

Within industry comparison:

		Local Markets		
		Low β^{local}	Benchmark (e.g.$\beta^{local} = 1$)	high β^{local}
A bad shock leads to:		$\Delta p^{re} < 0$ $\Delta p^{labor} < 0$	$\Delta p^{re} \ll 0$ $\Delta p^{labor} \ll 0$	$\Delta p^{re} \lll 0$ $\Delta p^{labor} \lll 0$
Firm 1	long RE short labor	$\downarrow$		$\uparrow$
Firm 2	short RE short labor	$\downarrow$		$\uparrow$

Firm risk, intuition

Within industry comparison:

		Local Markets		
		Low β^{local}	Benchmark (e.g.$\beta^{local} = 1$)	high β^{local}
A bad shock leads to:		$\Delta p^{re} < 0$ $\Delta p^{labor} < 0$	$\Delta p^{re} \ll 0$ $\Delta p^{labor} \ll 0$	$\Delta p^{re} \lll 0$ $\Delta p^{labor} \lll 0$
Firm 1	long RE short labor	↑ ↓ moderate risk		↓ ↑ moderate risk
Firm 2	short RE short labor	↓		↑

Firm risk, intuition

Within industry comparison:

		Local Markets		
		Low β^{local}	Benchmark (e.g.$\beta^{local} = 1$)	high β^{local}
A bad shock leads to:		$\Delta p^{re} < 0$ $\Delta p^{labor} < 0$	$\Delta p^{re} \ll 0$ $\Delta p^{labor} \ll 0$	$\Delta p^{re} \lll 0$ $\Delta p^{labor} \lll 0$
Firm 1	long RE	$\uparrow$		$\downarrow$
	short labor	$\downarrow$		$\uparrow$
		moderate risk		moderate risk
Firm 2	short RE	$\downarrow$		$\uparrow$
	short labor	$\downarrow$		$\uparrow$
		high risk		low risk

Conditional beta regression specification

Firm risk: Conditional equity beta ($\beta^{cond}_{firm,t}$) as in Lewellen and Nagel (2006)
Short window regressions of monthly excess returns on market and lagged market excess returns

$$\beta^{cond}_{firm,t} = b_0 + b_1 \beta^{local}_{MSA,t-1} + \text{Time} \times \text{Industry Dummies} + \text{controls}_{firm,t} + \epsilon_{firm,t}$$

Conditional beta regression specification

Firm risk: Conditional equity beta ($\beta^{cond}_{firm,t}$) as in Lewellen and Nagel (2006)
Short window regressions of monthly excess returns on market and lagged market excess returns

$$\beta^{cond}_{firm,t} = b_0 + b_1 \beta^{local}_{MSA,t-1} + \text{Time} \times \text{Industry Dummies} + \text{controls}_{firm,t} + \epsilon_{firm,t}$$

$b_1 < 0$ if the firm shorts RE

Panel regressions of conditional equity betas

	All Firms		Low RER Firms		High RER Firms	
	(1)	(2)	(3)	(4)	(5)	(6)
β^{local}_{MSA}	-0.36***	-0.33**	-0.39**	-0.37**	-0.21	-0.16
	(0.14)	(0.14)	(0.18)	(0.18)	(0.22)	(0.22)
Log *Size*		-0.06***		-0.04***		-0.09***
		(0.01)		(0.01)		(0.01)
Log *BM*		-0.07***		-0.05**		-0.09***
		(0.02)		(0.02)		(0.03)
Ind.$\times$Time FE	X	X	X	X	X	X
Observations	97157	97157	41623	41623	48758	48758
R^2	0.08	0.08	0.11	0.11	0.08	0.08

Panel regressions of conditional equity betas

	All Firms		Low RER Firms		High RER Firms	
	(1)	(2)	(3)	(4)	(5)	(6)
β_{MSA}^{local}	-0.36***	-0.33**	-0.39**	-0.37**	-0.21	-0.16
	(0.14)	(0.14)	(0.18)	(0.18)	(0.22)	(0.22)
Log *Size*		-0.06***		-0.04***		-0.09***
		(0.01)		(0.01)		(0.01)
Log *BM*		-0.07***		-0.05**		-0.09***
		(0.02)		(0.02)		(0.03)
Ind.$\times$Time FE	X	X	X	X	X	X
Observations	97157	97157	41623	41623	48758	48758
R^2	0.08	0.08	0.11	0.11	0.08	0.08

Panel regressions of conditional equity betas

	All Firms		Low RER Industries		High RER Industries	
	(1)	(2)	(3)	(4)	(5)	(6)
β_{MSA}^{local}	-0.36***	-0.33**	-0.49***	-0.47***	-0.20	-0.13
	(0.14)	(0.14)	(0.16)	(0.16)	(0.24)	(0.23)
Log *Size*		-0.06***		-0.06***		-0.07***
		(0.01)		(0.01)		(0.02)
Log *BM*		-0.07***		-0.05**		-0.11***
		(0.02)		(0.02)		(0.03)
Ind. × Time FE	X	X	X	X	X	X
Observations	97157	97157	56570	56570	40587	40587
R^2	0.08	0.08	0.10	0.10	0.06	0.07

Panel regressions of conditional equity betas

	All Firms		Low RER Industries		High RER Industries	
	(1)	(2)	(3)	(4)	(5)	(6)
β^{local}_{MSA}	-0.36***	-0.33**	-0.49***	-0.47***	-0.20	-0.13
	(0.14)	(0.14)	(0.16)	(0.16)	(0.24)	(0.23)
Log *Size*		-0.06***		-0.06***		-0.07***
		(0.01)		(0.01)		(0.02)
Log *BM*		-0.07***		-0.05**		-0.11***
		(0.02)		(0.02)		(0.03)
Ind. × Time FE	X	X	X	X	X	X
Observations	97157	97157	56570	56570	40587	40587
R^2	0.08	0.08	0.10	0.10	0.06	0.07

Equity return regression specification

$$r^e_{firm,t+1} = b_0 + b_1 \beta^{local}_{MSA,t} + \text{Time} \times \text{Industry Dummies} + \text{controls}_{firm,t} + \epsilon_{firm,t}$$

Equity return regression specification

$$r^{e}_{firm,t+1} = b_0 + b_1 \beta^{local}_{MSA,t} + \text{Time} \times \text{Industry Dummies} + \text{controls}_{firm,t} + \epsilon_{firm,t}$$

$b_1 < 0$ if the firm shorts RE

Panel regressions of equity returns

	All Firms		Low RER Firms		High RER Firms	
	(1)	(2)	(3)	(4)	(5)	(6)
β_{MSA}^{local}	-4.98**	-4.31*	-10.46***	-9.13***	-0.55	-0.72
	(2.22)	(2.37)	(3.40)	(3.54)	(3.37)	(3.66)
Log *Size*		-1.14***		-1.33***		-1.19***
		(0.12)		(0.19)		(0.18)
Log *BM*		5.29***		5.99***		4.63***
		(0.30)		(0.48)		(0.42)
Ind.$\times$Time FE	X	X	X	X	X	X
Observations	1163237	1163237	498699	498699	583826	583826
R^2	0.15	0.15	0.16	0.16	0.17	0.17

Fama MacBeth Double Clustering

Panel regressions of equity returns

	All Firms		Low RER Firms		High RER Firms	
	(1)	(2)	(3)	(4)	(5)	(6)
β^{local}_{MSA}	-4.98**	-4.31*	-10.46***	-9.13***	-0.55	-0.72
	(2.22)	(2.37)	(3.40)	(3.54)	(3.37)	(3.66)
Log *Size*		-1.14***		-1.33***		-1.19***
		(0.12)		(0.19)		(0.18)
Log *BM*		5.29***		5.99***		4.63***
		(0.30)		(0.48)		(0.42)
Ind.$\times$Time FE	X	X	X	X	X	X
Observations	1163237	1163237	498699	498699	583826	583826
R^2	0.15	0.15	0.16	0.16	0.17	0.17

Fama MacBeth Double Clustering

Panel regressions of equity returns

	All Firms		Low RER Industries		High RER Industries	
	(1)	(2)	(3)	(4)	(5)	(6)
β^{local}_{MSA}	-4.98**	-4.31*	-8.23***	-7.05**	-0.81	-0.80
	(2.22)	(2.37)	(3.04)	(3.15)	(3.36)	(3.65)
Log *Size*		-1.14***		-1.36***		-0.86***
		(0.12)		(0.15)		(0.19)
Log *BM*		5.29***		5.64***		4.85***
		(0.30)		(0.40)		(0.45)
Ind.$\times$Time FE	X	X	X	X	X	X
Observations	1163237	1163237	677701	677701	485536	485536
R^2	0.15	0.15	0.15	0.15	0.15	0.15

Panel regressions of equity returns

	All Firms		Low RER Industries		High RER Industries	
	(1)	(2)	(3)	(4)	(5)	(6)
β^{local}_{MSA}	-4.98**	-4.31*	-8.23***	-7.05**	-0.81	-0.80
	(2.22)	(2.37)	(3.04)	(3.15)	(3.36)	(3.65)
Log *Size*		-1.14***		-1.36***		-0.86***
		(0.12)		(0.15)		(0.19)
Log *BM*		5.29***		5.64***		4.85***
		(0.30)		(0.40)		(0.45)
Ind. $\times$ Time FE	X	X	X	X	X	X
Observations	1163237	1163237	677701	677701	485536	485536
R^2	0.15	0.15	0.15	0.15	0.15	0.15

Panel regressions of equity returns, subsamples

	Tradable Industries				Tradable, Non-Union Industries			
	Low RER Firms		Low RER Industries		Low RER Firms		Low RER Industries	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
β_{MSA}^{local}	−11.57***	−10.42***	−8.82***	−7.70**	−14.67***	−13.89***	−10.74***	−9.75***
	(3.40)	(3.54)	(3.05)	(3.16)	(4.09)	(4.20)	(3.50)	(3.60)
Log Size		-1.39***		-1.40***		-1.52***		-1.58***
		(0.19)		(0.15)		(0.22)		(0.17)
Log BM		6.09***		5.63***		5.85***		5.54***
		(0.48)		(0.40)		(0.57)		(0.45)
Ind. × Time FE	X	X	X	X	X	X	X	X
Observations	484727	484727	664878	664878	369898	369898	542717	542717
R^2	0.16	0.16	0.15	0.15	0.16	0.16	0.15	0.15

Panel regressions of equity returns, subsamples

	Tradable Industries				Tradable, Non-Union Industries			
	Low RER Firms		Low RER Industries		Low RER Firms		Low RER Industries	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
β^{local}_{MSA}	−11.57***	−10.42***	−8.82***	−7.70**	−14.67***	−13.89***	−10.74***	−9.75***
	(3.40)	(3.54)	(3.05)	(3.16)	(4.09)	(4.20)	(3.50)	(3.60)
Log Size		-1.39***		-1.40***		-1.52***		-1.58***
		(0.19)		(0.15)		(0.22)		(0.17)
Log BM		6.09***		5.63***		5.85***		5.54***
		(0.48)		(0.40)		(0.57)		(0.45)
Ind. $\times$ Time FE	X	X	X	X	X	X	X	X
Observations	484727	484727	664878	664878	369898	369898	542717	542717
R^2	0.16	0.16	0.15	0.15	0.16	0.16	0.15	0.15

Panel regressions of equity returns, subsamples

	Tradable, Geographically Focused [1] ($\leq$ 5 States)				Tradable, Geographically Focused ($\leq$ 2 States)			
	Low RER Firms		Low RER Industries		Low RER Firms		Low RER Industries	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
β^{local}_{MSA}	-16.33**	-12.44*	-21.50***	-19.09***	-31.83*	-29.72	-24.50*	-23.58*
	(7.05)	(7.34)	(5.75)	(6.15)	(17.81)	(18.09)	(13.46)	(13.96)
Log Size		-2.68***		-2.86***		-3.43***		-2.59***
		(0.49)		(0.36)		(0.92)		(0.62)
Log BM		6.46***		6.46***		5.69***		7.94***
		(1.18)		(0.94)		(2.11)		(1.55)
Ind. $\times$ Time FE	X	X	X	X	X	X	X	X
Observations	118366	118366	173045	173045	42962	42962	60084	60084
R^2	0.21	0.21	0.19	0.19	0.27	0.27	0.22	0.22

[1] Garcia and Norli (2012)

Panel regressions of equity returns, subsamples

	Tradable, Geographically Focused[1] ($\leq$ 5 States)				Tradable, Geographically Focused ($\leq$ 2 States)			
	Low RER Firms		Low RER Industries		Low RER Firms		Low RER Industries	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
β_{MSA}^{local}	−16.33**	−12.44*	−21.50***	−19.09***	−31.83*	−29 .72	−24 .50*	−23.58*
	(7.05)	(7.34)	(5.75)	(6.15)	(17.81)	(18.09)	(13.46)	(13.96)
Log Size		-2.68***		-2.86***		-3.43***		-2.59***
		(0.49)		(0.36)		(0.92)		(0.62)
Log BM		6.46***		6.46***		5.69***		7.94***
		(1.18)		(0.94)		(2.11)		(1.55)
Ind.$\times$Time FE	X	X	X	X	X	X	X	X
Observations	118366	118366	173045	173045	42962	42962	60084	60084
R^2	0.21	0.21	0.19	0.19	0.27	0.27	0.22	0.22

[1] Garcia and Norli (2012)

Returns of local beta-sorted portfolios

		Low RER Firms					
		Low β_{MSA}^{local}	2	3	4	High β_{MSA}^{local}	Low − High
All firms	Ind-adjusted return	0.36 (0.93)	0.32 (0.91)	0.14 (0.73)	-0.39 (0.64)	-1.91** (0.75)	2.28* (1.26)
	FF 3-factor alpha	0.49 (0.92)	0.59 (0.86)	0.40 (0.64)	-0.50 (0.63)	-1.96*** (0.73)	2.45* (1.26)
Tradable firms	Ind-adjusted return	0.47 (0.91)	0.33 (0.92)	0.34 (0.76)	-0.28 (0.67)	-2.10*** (0.76)	2.57** (1.26)
	FF 3-factor alpha	0.57 (0.91)	0.62 (0.86)	0.59 (0.65)	-0.39 (0.66)	-2.18*** (0.73)	2.75** (1.26)
Tradable Non-union firms	Ind-adjusted return	0.87 (1.05)	0.57 (0.96)	0.32 (0.91)	-0.66 (0.78)	-2.60*** (0.89)	3.46** (1.50)
	FF 3-factor alpha	0.95 (1.04)	0.71 (0.92)	0.73 (0.79)	-0.75 (0.76)	-2.76*** (0.87)	3.71** (1.49)
Tradable Geog. focused firms	Ind-adjusted return	-0.22 (1.73)	2.00 (1.74)	0.41 (1.61)	0.61 (1.94)	-3.49*** (1.32)	3.27 (2.21)
	FF 3-factor alpha	0.16 (1.74)	2.41 (1.68)	0.89 (1.49)	0.22 (1.79)	-4.16*** (1.25)	4.32** (2.17)

Returns of local beta-sorted portfolios

		Low RER Firms					
		Low β^{local}_{MSA}	2	3	4	High β^{local}_{MSA}	Low−High
All firms	Ind-adjusted return	0.36	0.32	0.14	-0.39	-1.91**	2.28*
		(0.93)	(0.91)	(0.73)	(0.64)	(0.75)	(1.26)
	FF 3-factor alpha	0.49	0.59	0.40	-0.50	-1.96***	2.45*
		(0.92)	(0.86)	(0.64)	(0.63)	(0.73)	(1.26)
Tradable firms	Ind-adjusted return	0.47	0.33	0.34	-0.28	-2.10***	2.57**
		(0.91)	(0.92)	(0.76)	(0.67)	(0.76)	(1.26)
	FF 3-factor alpha	0.57	0.62	0.59	-0.39	-2.18***	2.75**
		(0.91)	(0.86)	(0.65)	(0.66)	(0.73)	(1.26)
Tradable Non-union firms	Ind-adjusted return	0.87	0.57	0.32	-0.66	-2.60***	3.46**
		(1.05)	(0.96)	(0.91)	(0.78)	(0.89)	(1.50)
	FF 3-factor alpha	0.95	0.71	0.73	-0.75	-2.76***	3.71**
		(1.04)	(0.92)	(0.79)	(0.76)	(0.87)	(1.49)
Tradable Geog. focused firms	Ind-adjusted return	-0.22	2.00	0.41	0.61	-3.49***	3.27
		(1.73)	(1.74)	(1.61)	(1.94)	(1.32)	(2.21)
	FF 3-factor alpha	0.16	2.41	0.89	0.22	-4.16***	4.32**
		(1.74)	(1.68)	(1.49)	(1.79)	(1.25)	(2.17)

Returns of local beta-sorted portfolios, cont'd.

		High RER Firms					
		Low β^{local}_{MSA}	2	3	4	High β^{local}_{MSA}	Low−High
All firms	Ind-adjusted return	-0.01	-0.01	0.91	1.06	-0.25	0.24
		(0.81)	(0.66)	(0.61)	(0.67)	(0.69)	(1.15)
	FF 3-factor alpha	-0.02	0.08	0.81	0.86	-0.53	0.51
		(0.80)	(0.65)	(0.58)	(0.65)	(0.63)	(1.13)
Tradable firms	Ind-adjusted return	-0.19	0.18	1.08*	0.77	-0.47	0.27
		(0.87)	(0.71)	(0.64)	(0.73)	(0.78)	(1.25)
	FF 3-factor alpha	-0.18	0.33	0.98	0.58	-0.86	0.67
		(0.86)	(0.70)	(0.61)	(0.71)	(0.70)	(1.23)
Tradable Non-union firms	Ind-adjusted return	0.35	1.06	1.19	0.90	-0.63	0.98
		(1.25)	(1.02)	(0.88)	(0.93)	(1.09)	(1.80)
	FF 3-factor alpha	0.19	0.92	1.10	0.84	-0.86	1.05
		(1.23)	(1.02)	(0.85)	(0.92)	(0.99)	(1.77)
Tradable Geog. focused firms	Ind-adjusted return	0.11	2.73	0.99	-1.24	-0.97	1.07
		(1.77)	(1.72)	(1.22)	(1.33)	(1.41)	(2.38)
	FF 3-factor alpha	0.73	2.69	1.06	-1.31	-1.34	2.07
		(1.66)	(1.66)	(1.18)	(1.31)	(1.20)	(2.23)

Returns of local beta-sorted portfolios, cont'd.

		High RER Firms					
		Low β_{MSA}^{local}	2	3	4	High β_{MSA}^{local}	Low—High
All firms	Ind-adjusted return	-0.01	-0.01	0.91	1.06	-0.25	0.24
		(0.81)	(0.66)	(0.61)	(0.67)	(0.69)	(1.15)
	FF 3-factor alpha	-0.02	0.08	0.81	0.86	-0.53	0.51
		(0.80)	(0.65)	(0.58)	(0.65)	(0.63)	(1.13)
Tradable firms	Ind-adjusted return	-0.19	0.18	1.08*	0.77	-0.47	0.27
		(0.87)	(0.71)	(0.64)	(0.73)	(0.78)	(1.25)
	FF 3-factor alpha	-0.18	0.33	0.98	0.58	-0.86	0.67
		(0.86)	(0.70)	(0.61)	(0.71)	(0.70)	(1.23)
Tradable Non-union firms	Ind-adjusted return	0.35	1.06	1.19	0.90	-0.63	0.98
		(1.25)	(1.02)	(0.88)	(0.93)	(1.09)	(1.80)
	FF 3-factor alpha	0.19	0.92	1.10	0.84	-0.86	1.05
		(1.23)	(1.02)	(0.85)	(0.92)	(0.99)	(1.77)
Tradable Geog. focused firms	Ind-adjusted return	0.11	2.73	0.99	-1.24	-0.97	1.07
		(1.77)	(1.72)	(1.22)	(1.33)	(1.41)	(2.38)
	FF 3-factor alpha	0.73	2.69	1.06	-1.31	-1.34	2.07
		(1.66)	(1.66)	(1.18)	(1.31)	(1.20)	(2.23)

Returns of local beta-sorted portfolios, cont'd.

		Low RER Industry					
		Low β^{local}_{MSA}	2	3	4	High β^{local}_{MSA}	Low−High
All firms	Ind-adjusted return	1.14	0.03	0.43	-0.07	-1.16*	2.31**
		(0.73)	(0.61)	(0.57)	(0.55)	(0.62)	(1.08)
	FF 3-factor alpha	1.08	0.08	0.64	-0.12	-1.36**	2.44**
		(0.72)	(0.60)	(0.52)	(0.54)	(0.57)	(1.06)
Tradable firms	Ind-adjusted return	1.04	0.08	0.61	-0.03	-1.36**	2.40**
		(0.74)	(0.62)	(0.58)	(0.56)	(0.64)	(1.10)
	FF 3-factor alpha	0.96	0.16	0.83	-0.06	-1.59***	2.55**
		(0.74)	(0.61)	(0.53)	(0.56)	(0.59)	(1.08)
Tradable Non-union firms	Ind-adjusted return	0.99	0.32	0.63	-0.12	-1.45**	2.44**
		(0.82)	(0.66)	(0.69)	(0.61)	(0.73)	(1.21)
	FF 3-factor alpha	0.96	0.37	0.89	-0.22	-1.66**	2.63**
		(0.81)	(0.66)	(0.64)	(0.61)	(0.68)	(1.20)
Tradable Geog. focused firms	Ind-adjusted return	1.42	2.15	-0.29	-0.06	-2.45**	3.88**
		(1.41)	(1.31)	(1.08)	(1.17)	(1.17)	(1.96)
	FF 3-factor alpha	1.85	2.21*	0.13	-0.15	-3.00***	4.85***
		(1.36)	(1.30)	(1.04)	(1.09)	(0.96)	(1.85)

Returns of local beta-sorted portfolios, cont'd.

		Low RER Industry					
		Low β^{local}_{MSA}	2	3	4	High β^{local}_{MSA}	Low—High
All firms	Ind-adjusted return	1.14	0.03	0.43	-0.07	-1.16*	2.31**
		(0.73)	(0.61)	(0.57)	(0.55)	(0.62)	(1.08)
	FF 3-factor alpha	1.08	0.08	0.64	-0.12	-1.36**	2.44**
		(0.72)	(0.60)	(0.52)	(0.54)	(0.57)	(1.06)
Tradable firms	Ind-adjusted return	1.04	0.08	0.61	-0.03	-1.36**	2.40**
		(0.74)	(0.62)	(0.58)	(0.56)	(0.64)	(1.10)
	FF 3-factor alpha	0.96	0.16	0.83	-0.06	-1.59***	2.55**
		(0.74)	(0.61)	(0.53)	(0.56)	(0.59)	(1.08)
Tradable Non-union firms	Ind-adjusted return	0.99	0.32	0.63	-0.12	-1.45**	2.44**
		(0.82)	(0.66)	(0.69)	(0.61)	(0.73)	(1.21)
	FF 3-factor alpha	0.96	0.37	0.89	-0.22	-1.66**	2.63**
		(0.81)	(0.66)	(0.64)	(0.61)	(0.68)	(1.20)
Tradable Geog. focused firms	Ind-adjusted return	1.42	2.15	-0.29	-0.06	-2.45**	3.88**
		(1.41)	(1.31)	(1.08)	(1.17)	(1.17)	(1.96)
	FF 3-factor alpha	1.85	2.21*	0.13	-0.15	-3.00***	4.85***
		(1.36)	(1.30)	(1.04)	(1.09)	(0.96)	(1.85)

Returns of local beta-sorted portfolios, cont'd.

		High RER Industry					
		Low β^{local}_{MSA}	2	3	4	High β^{local}_{MSA}	Low−High
All firms	Ind-adjusted return	-1.14	0.22	0.58	1.15*	-0.52	-0.62
		(0.84)	(0.87)	(0.59)	(0.62)	(0.71)	(1.16)
	FF 3-factor alpha	-0.97	0.54	0.49	0.87	-0.53	-0.44
		(0.83)	(0.79)	(0.59)	(0.60)	(0.70)	(1.16)
Tradable firms	Ind-adjusted return	-1.15	0.53	0.79	0.90	-0.69	-0.47
		(0.89)	(0.96)	(0.63)	(0.67)	(0.78)	(1.26)
	FF 3-factor alpha	-0.92	0.93	0.70	0.63	-0.80	-0.11
		(0.87)	(0.87)	(0.62)	(0.66)	(0.77)	(1.26)
Tradable Non-union firms	Ind-adjusted return	-0.82	2.29	1.77	0.72	-2.20	1.38
		(1.98)	(1.58)	(1.20)	(1.35)	(1.38)	(2.59)
	FF 3-factor alpha	-0.96	2.33	1.50	0.85	-2.12	1.16
		(1.96)	(1.51)	(1.19)	(1.34)	(1.35)	(2.59)
Tradable Geog. focused firms	Ind-adjusted return	-2.32	2.49	1.35	-0.75	-0.69	-1.63
		(2.08)	(2.22)	(1.43)	(1.56)	(1.56)	(2.92)
	FF 3-factor alpha	-1.79	2.72	1.37	-1.05	-0.95	-0.84
		(2.05)	(2.07)	(1.42)	(1.55)	(1.52)	(2.87)

Returns of local beta-sorted portfolios, cont'd.

		High RER Industry					
		Low β^{local}_{MSA}	2	3	4	High β^{local}_{MSA}	Low−High
All firms	Ind-adjusted return	-1.14	0.22	0.58	1.15*	-0.52	-0.62
		(0.84)	(0.87)	(0.59)	(0.62)	(0.71)	(1.16)
	FF 3-factor alpha	-0.97	0.54	0.49	0.87	-0.53	-0.44
		(0.83)	(0.79)	(0.59)	(0.60)	(0.70)	(1.16)
Tradable firms	Ind-adjusted return	-1.15	0.53	0.79	0.90	-0.69	-0.47
		(0.89)	(0.96)	(0.63)	(0.67)	(0.78)	(1.26)
	FF 3-factor alpha	-0.92	0.93	0.70	0.63	-0.80	-0.11
		(0.87)	(0.87)	(0.62)	(0.66)	(0.77)	(1.26)
Tradable Non-union firms	Ind-adjusted return	-0.82	2.29	1.77	0.72	-2.20	1.38
		(1.98)	(1.58)	(1.20)	(1.35)	(1.38)	(2.59)
	FF 3-factor alpha	-0.96	2.33	1.50	0.85	-2.12	1.16
		(1.96)	(1.51)	(1.19)	(1.34)	(1.35)	(2.59)
Tradable Geog. focused firms	Ind-adjusted return	-2.32	2.49	1.35	-0.75	-0.69	-1.63
		(2.08)	(2.22)	(1.43)	(1.56)	(1.56)	(2.92)
	FF 3-factor alpha	-1.79	2.72	1.37	-1.05	-0.95	-0.84
		(2.05)	(2.07)	(1.42)	(1.55)	(1.52)	(2.87)

Conclusion

- We compute local betas (β^{local}) for MSAs as a weighted average of the industry betas.
- Aggregate shocks have a bigger effect on local factor prices such as wages and real estate returns in high β^{local} areas, no effect in low β^{local} areas.
- Firms with low real estate, in high β^{local} areas are less risky, have lower expected returns; wage and real estate effects cancel out for the firms with high RE holdings (long RE).
- We present a production based asset pricing model that captures these stylized facts.

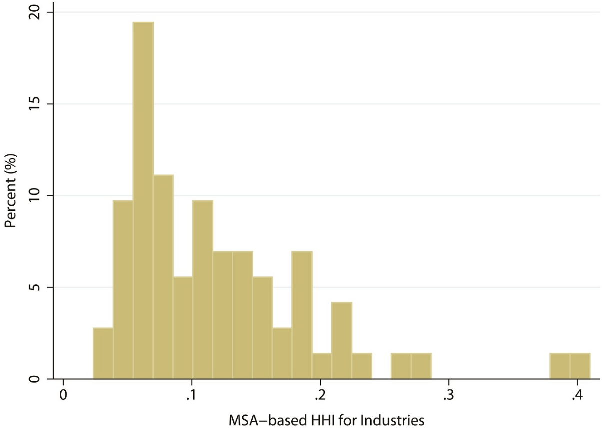
Appendix - Industry betas

Highest and Lowest Beta Industries

Rank	Industry Title	β^{ind}
	Lowest Beta Industries in 2011	
1	Oil and Gas Extraction	-0.76
2	Food Manufacturing	-0.71
3	Beverage and Tobacco Product Manufacturing	-0.71
4	Support Activities for Mining	-0.25
5	Hospitals	-0.07
	Highest Beta Industries in 2011	
1	Primary Metal Manufacturing	3.62
2	Funds, Trusts, and Other Financial Vehicles	3.48
3	Wood Product Manufacturing	3.26
4	Trans. Equip. Manufacturing	3.10
5	Nonmetallic Mineral Product Manufacturing	2.86

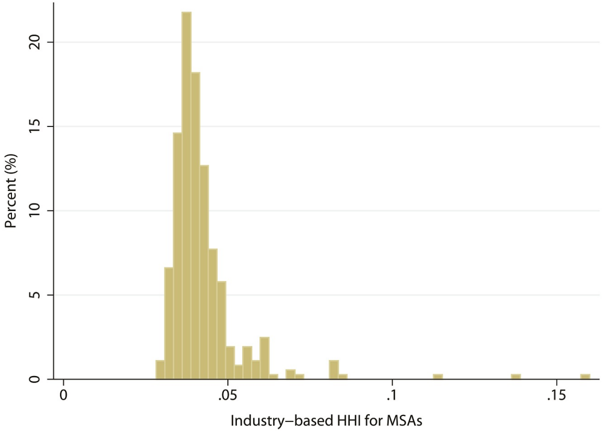
Go back

Appendix - HHI for industries



Go back

Appendix - HHI for MSAs



Go back

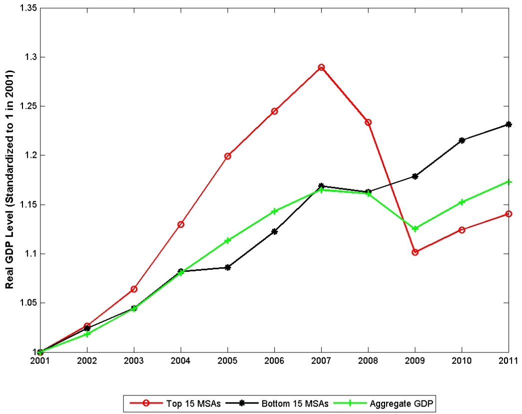
Appendix - Local beta, cont'd.

Highest and Lowest β^{local} MSAs

Rank	MSA Name	β^{local}	Representative Industry	Ind. Share	Emp.	Emp.Rank
			Lowest β^{local} MSAs in 2011			
1	St. Joseph, MO-KS	0.71	Food Manuf.	14.9%	48762	261
2	Merced, CA	0.75	Food Manuf.	15.8%	39914	302
4	Ithaca, NY	0.78	Educ. Service	37.6%	45545	281
7	Rochester, MN	0.82	Hospitals	21.6%	86211	178
8	Midland, TX	0.83	Supp. Mining	13.1%	65689	215
			Highest β^{local} MSAs in 2011			
1	Elkhart-Goshen, IN	1.73	Transp. Equip. Manuf.	24.9%	102109	160
2	Pascagoula, MS	1.48	Transp. Equip. Manuf.	34.2%	49793	253
9	Wichita, KS	1.24	Transp. Equip. Manuf.	10.6%	242354	76
10	Muskegon-Norton Shores, MI	1.23	Prim. Metal Manuf.	6.6%	49204	259
11	Las Vegas-Paradise, NV	1.23	Accommodation	23.3%	730747	34

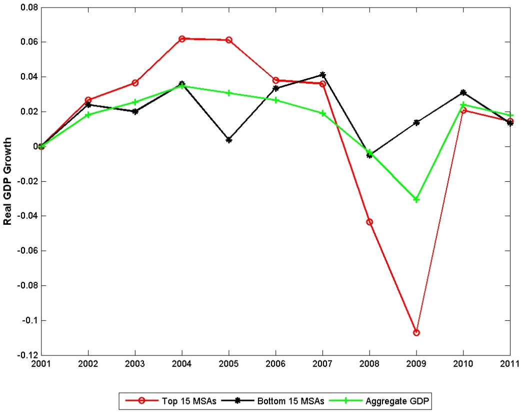
Go back

Appendix - GDP of high and low beta MSAs



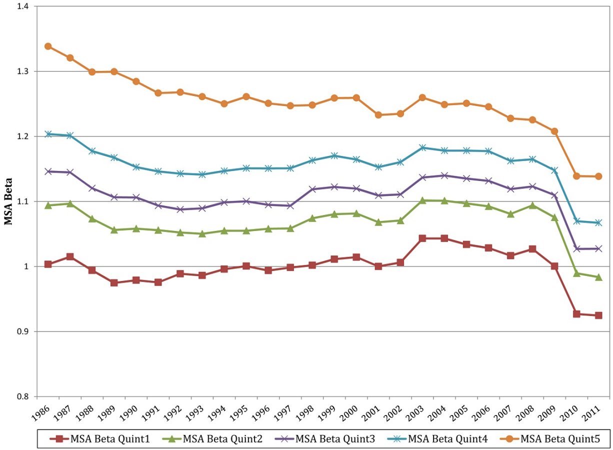
Go back

GDP of high and low beta MSAs, cont'd.



Go back

Appendix - Time series of MSA betas



Go back

Appendix - Transition probabilities

Transition Probability Matrix of β^{local} Quintiles

		Year t				
	β^{local}	1	2	3	4	5
	1	0.85	0.14	0.01	0.00	0.00
Year	2	0.14	0.67	0.17	0.02	0.00
$t-1$	3	0.01	0.17	0.66	0.15	0.01
	4	0.00	0.02	0.15	0.73	0.10
	5	0.00	0.00	0.01	0.10	0.89

Model

- Wages and real estate returns are more sensitive to aggregate shocks in high β^{local} areas.

Go back

Model

- Wages and real estate returns are more sensitive to aggregate shocks in high β^{local} areas.
- Firm risk and returns are lower in high β^{local} areas; and more so for low RE firms.

Go back

Model

- Wages and real estate returns are more sensitive to aggregate shocks in high β^{local} areas.
- Firm risk and returns are lower in high β^{local} areas; and more so for low RE firms.
- Can a production based asset pricing model with local markets capture these stylized facts?

Go back

Key model ingredients

- Aggregate and idiosyncratic productivity shocks
- Firms use labor, land (real estate) and equipment to produce
- Local markets differ in their industry composition (low versus high risk)
- Land and labor markets clear in local markets, prices endogenous

Go back

Firm

Many firms (i = 1, 2, 3, ...)

- belong to an industry (low or high risk),
- produce a homogeneous good,
- use equipment, land and labor,
- take land prices and wages, optimize.

Go back

Firm

Many firms (i = 1, 2, 3, ...)
belong to an industry (low or high risk),
produce a homogeneous good,
use equipment, land and labor,
take land prices and wages, optimize.

$$\begin{aligned} Y_{ijt} &= F(A_t, Z_{it}, I_j, L_{it}, S_{it}, K_{it}) \\ &= A_t^{I_j} Z_{it} L_{it}^{\alpha_l} S_{it}^{\alpha_s} K_{it}^{\alpha_k} \end{aligned}$$

Go back

Firm

Many firms (i = 1, 2, 3, ...)
belong to an industry (low or high risk),
produce a homogeneous good,
use equipment, land and labor,
take land prices and wages, optimize.

$$
\begin{aligned}
Y_{ijt} &= F(A_t, Z_{it}, I_j, L_{it}, S_{it}, K_{it}) \\
&= A_t^{I_j} Z_{it} L_{it}^{\alpha_l} S_{it}^{\alpha_s} K_{it}^{\alpha_k}
\end{aligned}
$$

$$I_j \in \{I_{low}, I_{high}\}$$

Go back

Firm

Many firms (i = 1, 2, 3, ...)
belong to an industry (low or high risk),
produce a homogeneous good,
use equipment, land and labor,
take land prices and wages, optimize.

$$\begin{aligned} Y_{ijt} &= F(A_t, Z_{it}, I_j, L_{it}, S_{it}, K_{it}) \\ &= A_t^{I_j} Z_{it} L_{it}^{\alpha_l} S_{it}^{\alpha_s} K_{it}^{\alpha_k} \end{aligned}$$

$$I_j \in \{I_{low}, I_{high}\}$$

$$\begin{aligned} a_t &= \log(A_t) \\ a_{t+1} &= \rho_a a_t + \varepsilon_{t+1}^a \end{aligned}$$

$$\begin{aligned} z_{it} &= \log(Z_{it}) \\ z_{i,t+1} &= \rho_z z_{it} + \varepsilon_{i,t+1}^z \end{aligned}$$

Go back

Firm

- Investment is subject to quadratic adjustment costs, land does not depreciate.

$$
\begin{aligned}
g^s\left(S_{i,t+1}, S_{it}\right) &= \frac{1}{2}\eta_s \frac{\left(S_{i,t+1} - S_{it}\right)^2}{S_{it}} \\
g^k\left(I_{it}, K_{it}\right) &= \frac{1}{2}\eta_k \left(\frac{I_{it}}{K_{it}} - \delta\right)^2 K_{it}
\end{aligned}
$$

Go back

Firm

- Investment is subject to quadratic adjustment costs, land does not depreciate.

$$g^s\left(S_{i,t+1}, S_{it}\right) = \frac{1}{2}\eta_s \frac{\left(S_{i,t+1} - S_{it}\right)^2}{S_{it}}$$

$$g^k\left(I_{it}, K_{it}\right) = \frac{1}{2}\eta_k \left(\frac{I_{it}}{K_{it}} - \delta\right)^2 K_{it}$$

- Dividends

$$D_{ijt} = Y_{ijt} - W_t L_{it} - P_t\left(S_{i,t+1} - S_{it}\right) - I_{it} - g^s_{it} - g^k_{it}$$

Go back

Firm

- Investment is subject to quadratic adjustment costs, land does not depreciate.

$$g^s\left(S_{i,t+1}, S_{it}\right) = \frac{1}{2}\eta_s \frac{\left(S_{i,t+1} - S_{it}\right)^2}{S_{it}}$$

$$g^k\left(I_{it}, K_{it}\right) = \frac{1}{2}\eta_k \left(\frac{I_{it}}{K_{it}} - \delta\right)^2 K_{it}$$

- Dividends

$$D_{ijt} = Y_{ijt} - W_t L_{it} - P_t\left(S_{i,t+1} - S_{it}\right) - I_{it} - g^s_{it} - g^k_{it}$$

- Firm's problem: Maximize NPV of expected dividend stream

$$V_{ijt} = \max_{\{I_{i,t+k}, S_{i,t+k+1}, L_{i,t+k}\}} E_t\left[\sum_{k=0}^{\infty} M_{t,t+k} D_{ij,t+k}\right]$$

Go back

Prices

- Wages and land markets clear. Prices are solved by aggregating at the local market level.

Go back

Prices

- Wages and land markets clear. Prices are solved by aggregating at the local market level.
- Stochastic discount factor: Berk, Green and Naik (1999), Zhang (2005), Jones and Tuzel (2012)

$$\begin{aligned} \log M_{t+1} &= \log \beta - \gamma_t \epsilon^a_{t+1} - \frac{1}{2}\gamma_t^2 \sigma_a^2 \\ \log \gamma_t &= \gamma_0 + \gamma_1 a_t \\ \gamma_0 &> 0, \gamma_1 < 0 \end{aligned}$$

Go back

First order conditions

$$
\begin{aligned}
1 &= E_t\left(M_{t+1} R^S_{i,t+1}\right) \\
1 &= E_t\left(M_{t+1} R^K_{i,t+1}\right)
\end{aligned}
$$

$$
\begin{aligned}
R^S_{i,t+1} &= \frac{F_{S_{i,t+1}} + q^s_{i,t+1} + \frac{1}{2}\eta_S\left(\frac{S_{i,t+1}-S_{it}}{S_{it}}\right)^2}{q^s_{it}} \\
R^K_{i,t+1} &= \frac{F_{K_{i,t+1}} + (1-\delta)q^k_{i,t+1} + \frac{1}{2}\eta_k\left(\left(\frac{I_{i,t+1}}{K_{i,t+1}}\right)^2 - \delta^2\right)}{q^k_{it}}
\end{aligned}
$$

$$
\begin{aligned}
F_{S_{it}} &= F_S(A_t, Z_{it}, I_j, L_{it}, S_{it}) \\
F_{K_{it}} &= F_K(A_t, Z_{it}, I_j, L_{it}, S_{it})
\end{aligned}
$$

Go back

First order conditions

$$\text{Tobin's } q \quad : \quad q_{it}^{s} = P_t + \eta_s \left(\frac{S_{i,t+1} - S_{it}}{S_{it}} \right)$$

$$: \quad q_{it}^{k} = 1 + \eta_k \left(\frac{I_{it}}{K_{it}} - \delta \right)$$

Firm return :

$$R_{i,t+1}^{F} = \frac{V_{ij,t+1}}{V_{ijt} - D_{ijt}}.$$

Go back

Model parameter values

Parameter	Description	Value
α_l	Labor share	0.60
α_s	Land share	0.12
α_k	Equipment share	0.18
I_{low}, I_{high}	Industry risk scalers	$e^{-0.4}, e^{0.4}$
β	Discount factor	0.99
γ_0	Constant price of risk parameter	3.2
γ_1	Time varying price of risk parameter	-13
η_k	Adjustment cost parameter for equipment	1
η_s	Adjustment cost parameter for land	1
δ	Equipment depreciation rate	0.08
ρ_a	Persistence of aggregate productivity	0.922
σ_a	Conditional volatility of aggregate productivity	0.014
ρ_z	Persistence of firm productivity	0.7
σ_z	Conditional volatility of firm productivity	0.27

Go back

Model-implied factor price regressions

Dependent variable:	$\Delta\log(W_{area,t})$	$\Delta\log(P_{area,t})$
const	0.00 (-0.12,0.09)	0.91 (-0.48,2.67)
$\Delta a_t \times \beta^{local}_{area}$	1.06 (1.04,1.08)	0.79 (0.72,0.86)
β^{local}_{area}	0.03 (-0.01,0.06)	0.15 (0.06,0.26)

Go back

Model-implied factor price regressions

Dependent variable:	$\Delta \log(W_{area,t})$	$\Delta \log(P_{area,t})$
const	0.00 (-0.12,0.09)	0.91 (-0.48,2.67)
$\Delta a_t \times \beta_{area}^{local}$	1.06 (1.04,1.08)	0.79 (0.72,0.86)
β_{area}^{local}	0.03 (-0.01,0.06)	0.15 (0.06,0.26)

Go back

Model-implied conditional beta regressions

	Dependent Variable: $\beta^{cond}_{firm,t}$		
	All Firms	Low Land/Emp	High Land/Emp
const	1.08	1.09	1.07
	(1.05,1.16)	(1.03,1.23)	(1.05,1.09)
β^{local}_{area}	-0.07	-0.08	-0.07
	(-0.15,-0.05)	(-0.15,-0.05)	(-0.13,-0.04)

Go back

Model-implied conditional beta regressions

	Dependent Variable: $\beta^{cond}_{firm,t}$		
	All Firms	Low Land/Emp	High Land/Emp
const	1.08	1.09	1.07
	(1.05,1.16)	(1.03,1.23)	(1.05,1.09)
β^{local}_{area}	-0.07	-0.08	-0.07
	(-0.15,-0.05)	(-0.15,-0.05)	(-0.13,-0.04)

Go back

Model-implied firm return regressions

	Dependent Variable: $r^{e}_{firm,t+1}$		
	All Firms	Low Land/Emp	High Land/Emp
const	6.21 (1.82,15.06)	5.74 (1.40,14.26)	6.76 (2.33,15.88)
β^{local}_{area}	-0.67 (-1.31,-0.26)	-0.75 (-1.35,-0.32)	-0.66 (-1.25,-0.32)

Go back

Model-implied firm return regressions

	Dependent Variable: $r^{e}_{firm,t+1}$		
	All Firms	Low Land/Emp	High Land/Emp
const	6.21	5.74	6.76
	(1.82,15.06)	(1.40,14.26)	(2.33,15.88)
β^{local}_{area}	-0.67	-0.75	-0.66
	(-1.31,-0.26)	(-1.35,-0.32)	(-1.25,-0.32)

Go back

Model-implied portfolio returns

	Industry-Adjusted Returns	
	Low Land/Emp	High Land/Emp
low β_{area}^{local}	0.06 (0.03,0.10)	0.05 (0.02,0.09)
high β_{area}^{local}	-0.06 (-0.10,-0.03)	-0.05 (-0.09,-0.02)
low-high	0.12 (0.05,0.21)	0.10 (0.05,0.20)

Go back

Model-implied portfolio returns

	Industry-Adjusted Returns	
	Low Land/Emp	High Land/Emp
low β_{area}^{local}	0.06 (0.03,0.10)	0.05 (0.02,0.09)
high β_{area}^{local}	-0.06 (-0.10,-0.03)	-0.05 (-0.09,-0.02)
low-high	0.12 (0.05,0.21)	0.10 (0.05,0.20)

Go back

Local markets and area risk

- The aggregate profits in a local market:

$$\Pi^*_{mt} = (1-\alpha)\left(s_m A_t^{\frac{I_{high}}{1-\alpha}} + (1-s_m)\, A_t^{\frac{I_{low}}{1-\alpha}}\right)^{1-\alpha}$$

- Sensitivity of β_{mt} to s_m:

$$\frac{\partial \beta_{ijt}}{\partial s_m} = \frac{(I_{high} - I_{low}) A_t^{\frac{I_{low}+I_{high}}{1-\alpha}}}{\left(s_m A_t^{\frac{I_{high}}{1-\alpha}} + (1-s_m)\, A_t^{\frac{I_{low}}{1-\alpha}}\right)^2} > 0$$

- In aggregate, local markets with higher share of high risk industries are still riskier.

Go back

Fama-MacBeth Regression

	All	Low RER Firms			Low RER Industries		
		All	Tradable	Non-Union	All	Tradable	Non-Union
β^{local}_{MSA}	-5.58*	-8.39*	-9.83**	-14.73**	-8.04**	-8.93**	-11.78**
	(3.07)	(4.47)	(4.50)	(6.82)	(3.93)	(3.99)	(5.15)
Log *BM*	4.93***	5.95***	5.99***	6.08***	5.47***	5.42***	5.87***
	(0.81)	(0.93)	(0.94)	(1.02)	(0.99)	(0.99)	(1.04)
Log *Size*	-1.11	-1.15	-1.23	-1.07	-1.20*	-1.25*	-1.15
	(0.70)	(0.75)	(0.75)	(0.78)	(0.72)	(0.72)	(0.75)
Leverage	-2.65	-5.11	-5.14	-5.96*	-3.56	-3.54	-4.13
	(2.80)	(3.18)	(3.21)	(3.44)	(2.77)	(2.80)	(2.93)
Profitability	9.07***	10.21***	10.28***	10.24***	12.46***	12.75***	12.83***
	(2.49)	(2.39)	(2.43)	(2.51)	(2.17)	(2.18)	(2.30)
Investment	-11.63*	-8.33	-9.38	-10.97	-8.15	-8.31	-8.21
	(6.23)	(7.99)	(7.98)	(9.89)	(7.75)	(7.82)	(9.41)
Constant	19.86*	49.89***	53.40***	52.25***	23.33*	31.44***	33.39**
	(11.09)	(17.31)	(13.83)	(17.45)	(12.15)	(12.13)	(13.45)
Ind. Dummies	X	X	X	X	X	X	X
Observations	1138028	484464	470862	358426	658523	646084	526201
R^2	0.07	0.10	0.09	0.08	0.07	0.07	0.06

Go back

Double Clustering Standard Errors

	All	Low RER Firms			Low RER Industries		
		All	Tradable	Non-Union	All	Tradable	Non-Union
β^{local}_{MSA}	-5.19*	-10.38***	-11.91***	-13.51***	-8.06**	-8.91**	-9.78**
	(2.81)	(3.64)	(3.67)	(5.09)	(3.54)	(3.60)	(4.25)
Log *BM*	5.92***	6.88***	6.97***	6.96***	6.84***	6.82***	7.06***
	(0.93)	(0.98)	(0.98)	(1.21)	(1.22)	(1.21)	(1.40)
Log *Size*	-1.22	-1.34*	-1.41*	-1.39	-1.30	-1.35*	-1.38
	(0.77)	(0.80)	(0.80)	(0.87)	(0.81)	(0.81)	(0.90)
Leverage	-1.85	-3.93	-4.06	-4.97	-2.30	-2.26	-3.33
	(2.89)	(3.08)	(3.13)	(3.15)	(2.74)	(2.76)	(2.82)
Profitability	9.76***	10.21***	10.20***	10.85***	15.27***	15.56***	15.68***
	(2.86)	(2.51)	(2.50)	(2.82)	(2.60)	(2.59)	(2.85)
Investment	-9.73	-4.81	-5.88	-7.20	-10.21	-9.77	-10.42
	(5.94)	(7.81)	(7.89)	(9.09)	(7.50)	(7.60)	(8.86)
Ind. Demeaned	X	X	X	X	X	X	X
Observations	1138028	484464	470862	358426	658523	646084	526201

Go back

Factor Price Sensitivity and Local Beta

- Time-series regressions for each MSA:

$$\Delta Factor\ Price_{MSA,t} = \alpha + \beta^{Factor}_{MSA} \Delta GDP_t$$

- Cross-sectional regression:

$$\beta^{Factor}_{MSA} = b_0 + b_1 \beta^{local}_{MSA}$$

	Annual Wage Betas			Housing	Commercial RE	Rent
	All	Non-Union	Tradable	Beta	Beta	Beta
β^{local}_{MSA}	0.28***	0.26***	0.34***	0.54**	0.35*	0.33**
	(0.07)	(0.10)	(0.09)	(0.26)	(0.21)	(0.16)
Constant	0.29***	0.30***	0.26***	0.55***	0.47**	-0.17
	(0.08)	(0.10)	(0.09)	(0.13)	(0.22)	(0.17)
Ind FE	X	X	X			
Observations	25534	14122	21344	363	408	380
R^2	0.04	0.04	0.04	0.01	0.24	0.01

Go back

Factor Price Sensitivity and Local Beta

- Time-series regressions for each MSA:

$$\Delta Factor\ Price_{MSA,t} = \alpha + \beta^{Factor}_{MSA} \Delta GDP_t$$

- Cross-sectional regression:

$$\beta^{Factor}_{MSA} = b_0 + b_1 \beta^{local}_{MSA}$$

	Annual Wage Betas			Housing	Commercial RE	Rent
	All	Non-Union	Tradable	Beta	Beta	Beta
β^{local}_{MSA}	0.28***	0.26***	0.34***	0.54**	0.35*	0.33**
	(0.07)	(0.10)	(0.09)	(0.26)	(0.21)	(0.16)
Constant	0.29***	0.30***	0.26***	0.55***	0.47**	-0.17
	(0.08)	(0.10)	(0.09)	(0.13)	(0.22)	(0.17)
Ind FE	X	X	X			
Observations	25534	14122	21344	363	408	380
R^2	0.04	0.04	0.04	0.01	0.24	0.01

Go back