

DEMAND & DEFECTIVE GROWTH PATTERNS: THE ROLE OF THE TRADABLE AND NON-TRADABLE SECTORS IN AN OPEN ECONOMY

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Online Appendix

Methodology

In order to proxy the tradability of an industry, we rely on Jensen and Kletzer's (2005) measures of geographical concentration of industries using locational Gini coefficients, which are based on employment measures. The intuition is as follows: non-tradable goods and services (e.g. dentists and cement suppliers) tend to be located everywhere, whereas tradable goods and services (e.g. financial services and manufacturing production) tend to be concentrated geographically. The latter's geographical concentration can be explained via a number of mechanisms, namely the gains from economies of scale in tradable industries (Helpman and Krugman 1985).

To avoid classifying non-tradable industries that are concentrated due to outsized, concentrated demand as tradable, Jensen and Kletzer allow for non-tradable industries that are inputs of downstream industries to follow the geographical distribution of said downstream industries (rather than relying on a measure of income for demand). The first component of the Gini measure is industry demand share, which measures the concentration of demand for industry i in region p and is calculated as follows:

$$\text{Industry Demand Share (IDS)}_{i,p} \equiv \sum_j \left(\frac{Y_{i,j}}{Y_i} \times \frac{\ln EMP_{j,p}}{\ln EMP_j} \right)$$

Where $Y_{i,j}$ is output of industry i used by industry j ; Y_i is total output of industry i ; $EMP_{j,p}$ is industry j employment in region p ; and EMP_j is total industry j employment.

The industry demand shares (IDSs) are then used as an input to calculate locational Gini coefficients by industry:

$$\text{Gini}(G)_i = \left| 1 - \sum_p \left(\sigma Y_{i,p-1} + \sigma Y_{i,p} \right) \times \left(\sigma IDS_{i,p-1} - \sigma IDS_{i,p} \right) \right|$$

Where p 's index regions, sorted by share of industry employment; $\sigma Y_{i,p-1}$ is the cumulative share of industry i employment in the region ($p-1$) with the next lowest share of industry employment; $\sigma Y_{i,p}$ is the cumulative share of industry i employment in region p ; $\sigma IDS_{i,p-1}$ is the cumulative share of industry i IDS in the region ($p-1$) with the next lowest share of industry IDS; and $\sigma IDS_{i,p}$ is the cumulative share of industry i IDS in the region p .

A low Gini corresponds to a highly non-tradable industry, while a high Gini corresponds to a highly tradable industry.¹ Admittedly, these measures pick up domestic tradability more than

¹ Using their continuous measure of tradability, we classed Gini class 1 (below .1) as non-tradable proportions and Gini class 2 and 3 (above .1) as tradable proportions. These measures were constructed using the 1999 input output use tables from the Bureau of Economic Analysis and the 2000 Decennial Census of Population Public Use Micro Sample (PUMS).

internationally tradability. To that end, we make some value judgments about the classifications of certain industries as internationally tradable.²

Applying the industry tradable/non-tradable splits, we then use seasonally-adjusted employment data by industry from the Bureau of Labor Statistics' Current Employment Statistics (supplemented with Bureau of Economic Analysis data for the agricultural industry) and value-added data by industry from the Bureau of Economic Analysis's data. The data for both employment and value added are at the two-digit level.

One weakness of this approach is that we assume tradability to be static overtime. For industries like manufacturing and agriculture that have always been wholly tradable, this point is not relevant. For industries that have benefitted greatly from the information technology and communication revolution (e.g. consulting, radiology, and payroll services), this outage is more worrying. However, most of these industries are classed as largely tradable already. Also, even among professional service industries that are increasing in tradability, only a small number of clientele are taking advantage of the ability to source services like architectural, computer systems design, and accounting services from abroad. Thus, in the aggregate, we feel our approach is robust. The industry splits are below.

Industry Splits

<i>Percent of Industry</i>	<u>Non-tradable</u>	<u>Tradable</u>
Accommodation and food services	100	0
Administrative and waste services	89.8	10.2
Agriculture, forestry, fishing, and hunting	0	100
Arts, entertainment, recreation	90	10
Construction	100	0
Educational services	98.89	1.11
Finance and insurance	32.05	67.95
Government	90	10
Health care and social assistance	97.8	2.2
Information	34.1	65.9
Manufacturing I	0	100
Manufacturing II	0	100
Manufacturing III	0	100
Mining	0	100
Other services	100	0
Professional Services	39.2	60.8
Real estate and rental and leasing	100	0
Retail trade	85.185	14.815
Transportation and warehousing	0	100
Utilities	40	60
Wholesale trade	100	0

² Legal services is once such example of an industry that appears domestically tradable, but tends to not be internationally tradable.

Drivers and Drags of the Post-Crisis Recovery with Industry Detail

Change in Employment, 2009 to 2012			Change in Real Value Added, 2009 to 2012		
<u>Gross 09-12 Gain: +6,092 thousand jobs</u>			<u>Gross 09-12 Gain: +1,045 billion 2005 USD</u>		
	<i>Gross Gain (in thousands of jobs)</i>	<i>% of Gross Gain</i>		<i>Gross Gain (in billions of 2005 USD)</i>	<i>% of Gross Gain</i>
Non-tradable	+4,260	70%	Non-tradable	+506	48%
Tradable	+1,832	30%	Tradable	+539	52%
<i>By industry:</i>			<i>By industry:</i>		
Health care and social assistance	Non-tradable	15%	Manufacturing III	Tradable	24%
Accommodation and food services	Non-tradable	14%	Professional services	Tradable	9%
Administrative and waste services	Non-tradable	14%	Wholesale trade	Non-tradable	7%
Retail trade	Non-tradable	9%	Retail trade	Non-tradable	7%
Manufacturing III	Tradable	9%	Real estate and rental and leasing	Non-tradable	7%
Professional Services	Tradable	7%	Professional services	Non-tradable	6%
<u>Gross 09-12 Loss: -707 thousand jobs</u>			<u>Gross 09-12 Loss: -51 billion 2005 USD</u>		
	<i>Gross Loss (in thousands)</i>	<i>% of Gross Loss</i>		<i>Gross Loss (in billions of 2005 USD)</i>	<i>% of Gross Loss</i>
Non-tradable	-568	80%	Non- tradable	-7	14%
Tradable	-139	20%	Tradable	-44	86%
<i>By industry:</i>			<i>By industry:</i>		
Government	Non-tradable	77%	Agriculture	Tradable	55%
Government	Tradable	9%	Mining	Tradable	29%
Information	Tradable	6%	Government	Non-tradable	13%
Information	Non-tradable	3%	Educational services	Non-tradable	1%
Manufacturing II	Tradable	5%	Government	Tradable	1%