Economic Complexity, Input-Output Linkages and Income Across Countries

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Introduction

The Holy Grail of the development economics is to explain the income differences across countries. Hidalgo and Hausmann (2009) and Hidalgo (2021) show that income differences are associated with the economic complexity of the countries. On the other hand, Bartelme and Gorodnichenko (2015) and Fadinger, Ghiglino, and Teteryatnikova (2022) demonstrate the importance of the linkages in input-output networks of countries in explaining the differences in GDP per capita across countries. In a related study Alper Duman (2015) find that economic growth is negatively associated with Gini indices of counting betwenness centrality measure in panel dataset of 33 countries in the period between 1995-2011. In this paper we gather both approaches together to test the relative significance of each approach.

Data and Analysis

The WIOD database offers a time-series of world input-output tables (WIOTs) for 35 sectors from 1995 to 2014. It covers 40 countries, including all 27 members of the EU and 13 other major economies: Australia, Brazil, Canada, China, India, Indonesia, Japan, Mexico, Russia, South Korea, Taiwan, Turkey and the USA . The countries covered by the database fulfill both the requirement of data availability of sufficient quality and the desire to cover a major part of the world economy.

We use counting betweenness centrality measures to derive the gini index of each country at each year. Gini index of centrality measures is computed as follows:

$$G = \frac{\sum\sum |x_i - x_j|}{2n^2\mu}$$

where μ is the mean of the Bonacich centrality measures for each country in the year 2000 and n is the number of the unordered observations of the Bonacich centrality measures.

We first demonstrate the negative relationship between the Gini of the I-O linkages and the income across countries. Income measure is GDP per capital in current dollars from World Development Indicators.

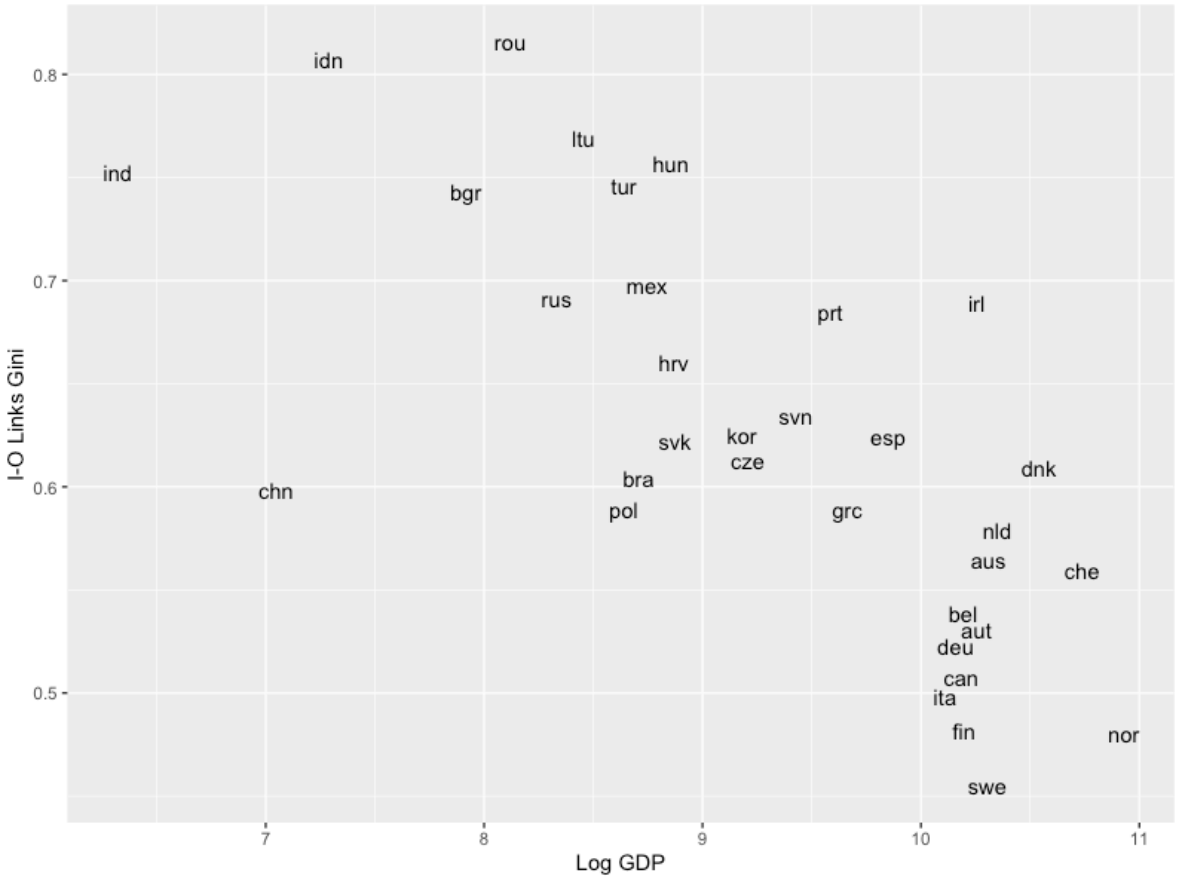

Figure 1: GDP per Capita and I-O Linkages Gini

Then we also demonstrate the relation between the ECI and the I-O links Gini.

Our simple econometric model explores the effects of ECI and I-O linkages Gini on GDP per capita.

Results and Discussion

Our simple econometric model explores the effects of ECI and I-O linkages Gini on GDP per capita.

In Table 1, the first and second columns we demonstrate the statistically significant relations between the I-O linkages and economic complexity with the GDP per capita across countries.

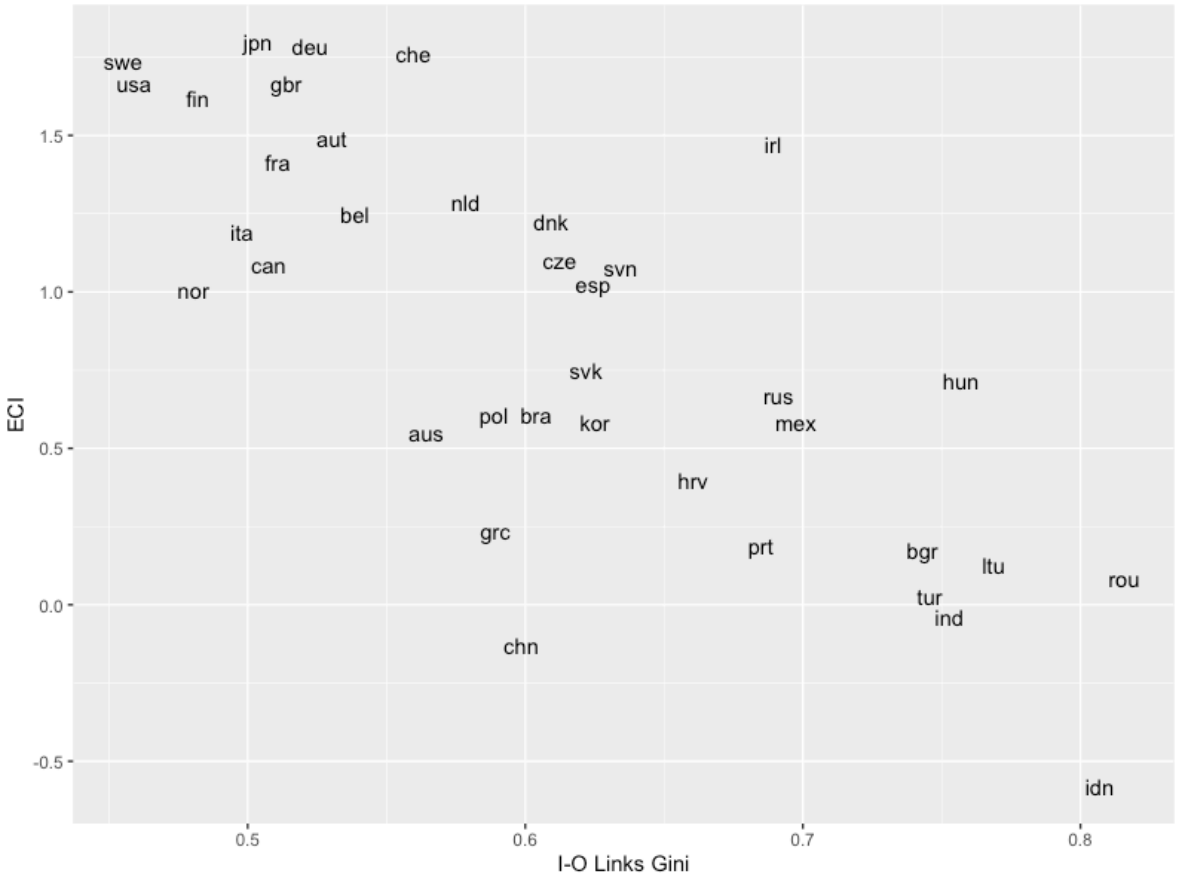

Figure 2: Economic Complexity and I-O Linkages

Table 1: Economic Complexity, I-O Linkages and Incomes

	Dependent variable:		
	log(value)		
	(1)	(2)	(3)
IO Links Gini	-8.042^{***}		-2.921^{*}
	(1.223)		(1.598)
ECI		1.413^{***}	1.053^{***}
		(0.166)	(0.254)
Constant	14.299^{***}	8.151^{***}	10.251^{***}
	(0.758)	(0.179)	(1.162)
Observations	37	37	37
R^2	0.553	0.673	0.703
Adjusted R^2	0.540	0.664	0.685
Residual Std. Error	0.747 (df = 35)	0.639 (df = 35)	0.618 (df = 34)
F Statistic	43.237^{***} (df = 1; 35)	72.146^{***} (df = 1; 35)	40.157^{***} (df = 2; 34)
Note:			*p<0.1; **p<0.05; ***p<0.01

Then in the third column once we control for economic complexity we show that the significance of I-O linkages disappears. Our results indicate that the capability features embedded in the economic complexity is far more important than the evenness of the sector level input-output linkages in explaining the income differences across countries.

We are aware of the limitations of our paper. First, a panel dataset with more control variables will be much more robust. Second, the mechanisms in which economic complexity dominates the I-O links unevenness should be explored in more detail.

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