

Inter-city Trade Networks in Turkey

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Outline

- ① Motivation and Introduction
- ② Related Literature
- ③ Data Summary
- ④ Network Analysis
 - General View
 - Central Cities
 - Communities
 - The Tale of Five Cities
- ⑤ Disussion and Further Research
- ⑥ Conclusion

THE DATA



T.C. Bilim, Sanayi ve Teknoloji Bakanlığı
Girişimci Bilgi Sistemi

 ANASAYFA

GBS Hakkında

Paydaşlar

Raporlar

Metaveri

Veri Paylaşımı

Duyurular

İletişim

Finansal Veriler

Bölgesel Veriler

Sektörler ve İller Arası Ticaret Verileri

İller Arası Ticaret

Sektörler Arası Ticaret (Kısım Düzeyinde)

Sektörler Arası Ticaret (İmalat Sanayi Alt Sektörler)

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Veri Paylaşımı

GBS verileri, Bakanlığımızca uygulamaya konulan “Girişimci Bilgi Sistemi Verilerine Erişim, Kullanım Ve Paylaşım Yönergesi” çerçevesinde paylaşılacaktır.

Bu kapsamda Bakanlığımız tarafından yayımlanması uygun görülen raporlar, GBS web sayfasında kamuoyu ile paylaşılacaktır.

Ayrıca, üniversite ve diğer yükseköğrenim kurumları ile araştırma amaçlı kurulmuş enstitü ve diğer kuruluşların araştırmacıları, meslek odaları/örgütleri, sivil toplum kuruluşları ile Türkiye'nin üyesi olduğu uluslararası kurum ve kuruluşlar, 2015 yılından itibaren firma bazında veri içermeyen toplulaştırılmış veri talebinde bulunabilirler.

GBS verilerinin paylaşımında, özel ve tüzel kişilere ait verilerin gizliliği hususunda 5429 sayılı Türkiye İstatistik Kanununda belirtilen gizlilik ilkeleri gözetilmektedir.

- Network approach
- Visualization
- Interesting questions
- New research agenda for Turkey

- The ideas could be applied to inter-city networks
- No work yet
- Modeling is the challenge (simulate the network)!

- About 3 million enterprises' declarations
- MIST collects
- Threshold of 5000 TL for reporting the transaction in Forms Ba and Forms Bs
- Place of Registry is critical

- Total inter-city trade flows amounted to 2.14 trillion TL in 2014
- There is substantial heterogeneity in trade flows.

Table: Total Sales in billion TL

	2013	2014
Min	0.086	0.10
Max	1050	1246
Median	3.94	4.30
Mean	26.8	31

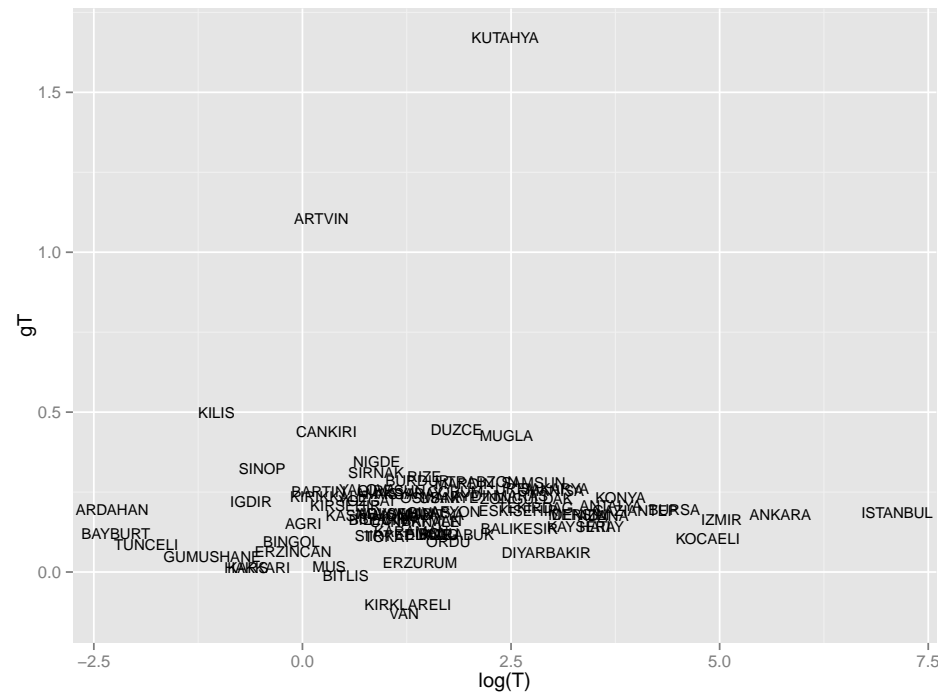
- Local city sales (loops) are very important.
- Biggest loop weight is for İstanbul, %68
- The out-sales turn out to be significantly lower.

Table: Total Out Sales in billion TL

	2013	2014
Min	0.066	0.07
Max	364	426
Median	2.44	2.84
Mean	12.92	15.12

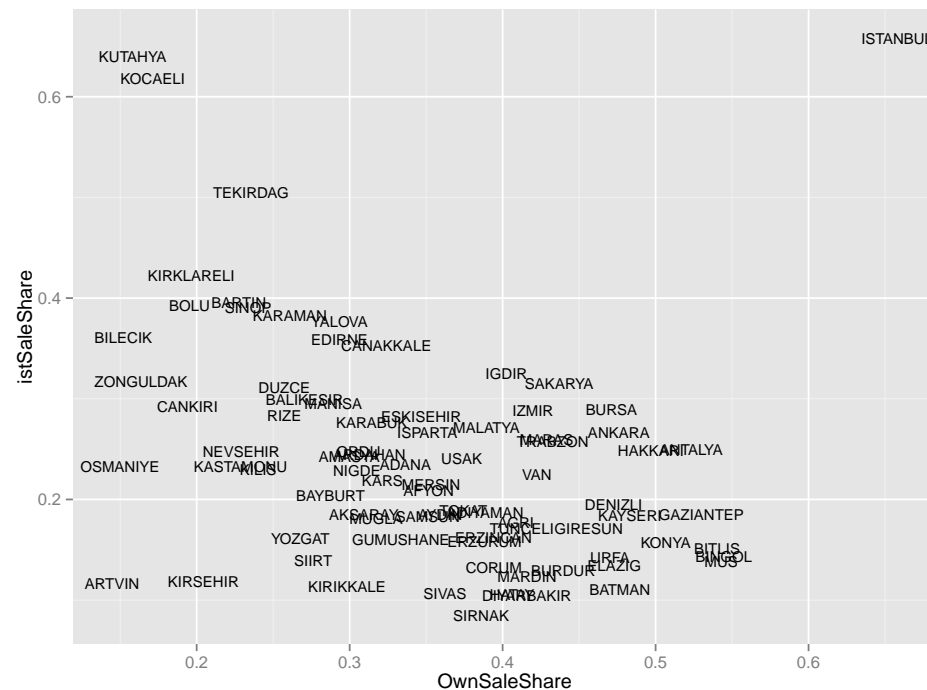
- The nominal growth in sales from 2013 to 2014 was about % 18
- The out-sales nominal growth turned out to be % 17
- Kütahya, Artvin and Kilis are among the star performers

Figure: Sales Growth

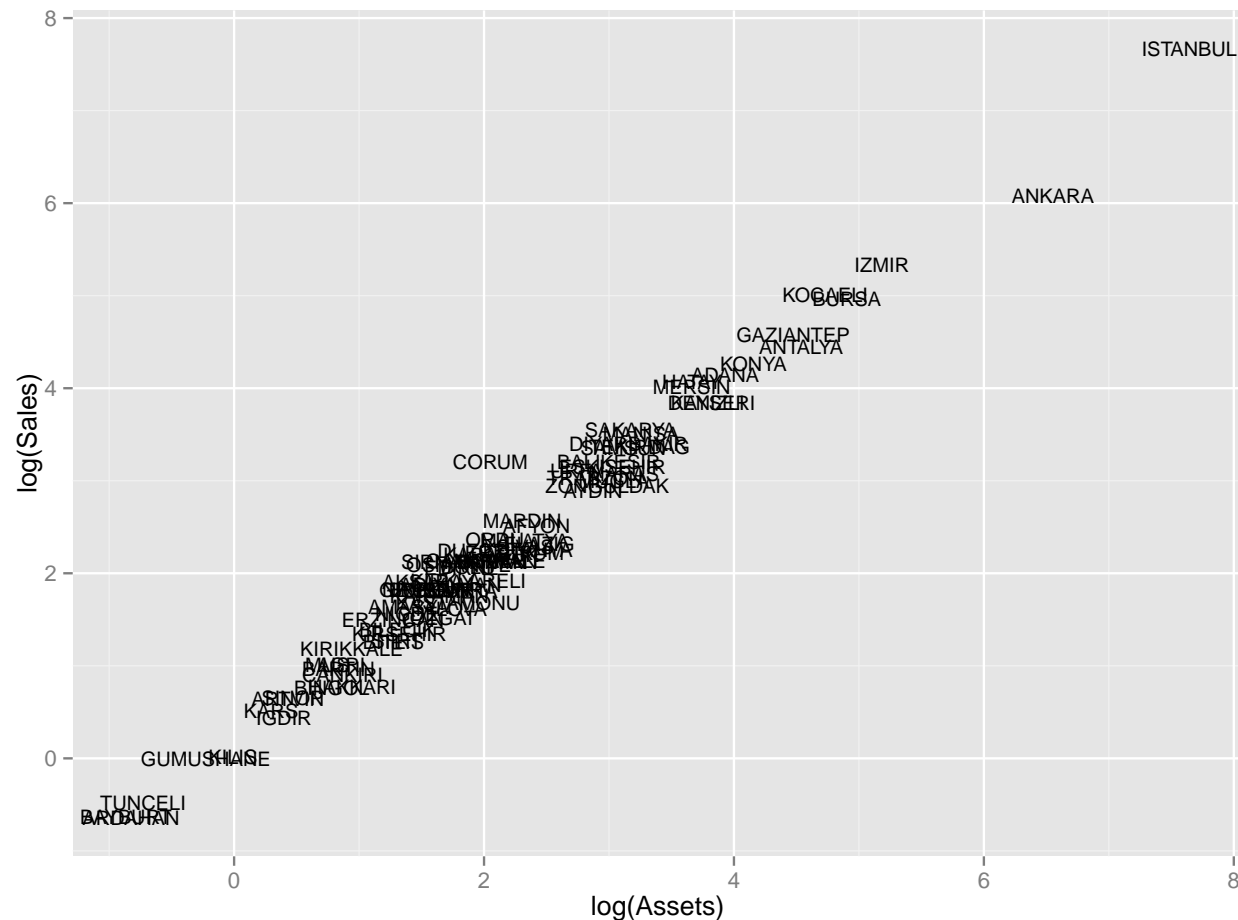


- İstanbul is also the biggest consumer
- İstanbul consumes more than % 10 of total sales of almost all cities
- A weak negative relationship between own-city sales and sales to İstanbul.

Figure: Own Sales and Sales to İstanbul



- Assets matter
- We should more detailed info on type of assets
- The relation between assets and city output.



In order to simply illustrate the network in the weighted adjacency matrix form we pick the inter-city trade flows of the biggest five cities.

Table: Inter-city Flows among 5 Cities, in Billion TL

	ANKARA	BURSA	ISTANBUL	İZMİR	KOCAELİ
ANKARA	146.39	3.79	81.97	7.44	7.11
BURSA	4.42	40.66	24.98	2.00	2.30
İSTANBUL	89.93	29.29	819.90	39.89	28.46
İZMİR	6.83	2.53	43.79	63.81	1.63
KOCAELİ	7.00	3.35	79.60	3.22	22.07

$$A_{i,j} = \begin{pmatrix} a_{1,1} & a_{1,2} & \cdots & a_{1,n} \\ a_{2,1} & a_{2,2} & \cdots & a_{2,n} \\ \vdots & \vdots & \ddots & \vdots \\ a_{n,1} & a_{n,2} & \cdots & a_{n,n} \end{pmatrix}$$

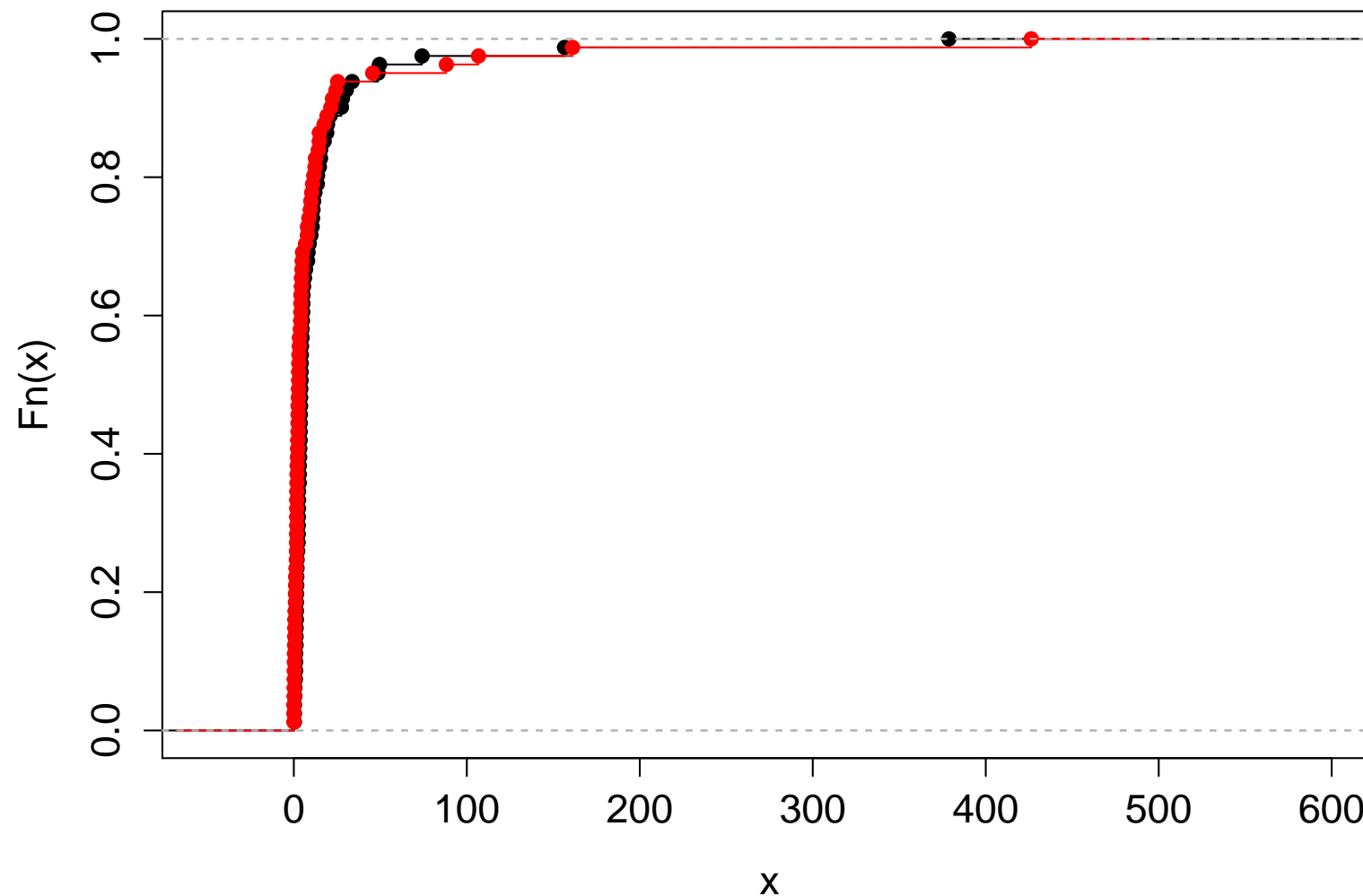
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- ## InterCity Trade Network, Cut 1 billion TL

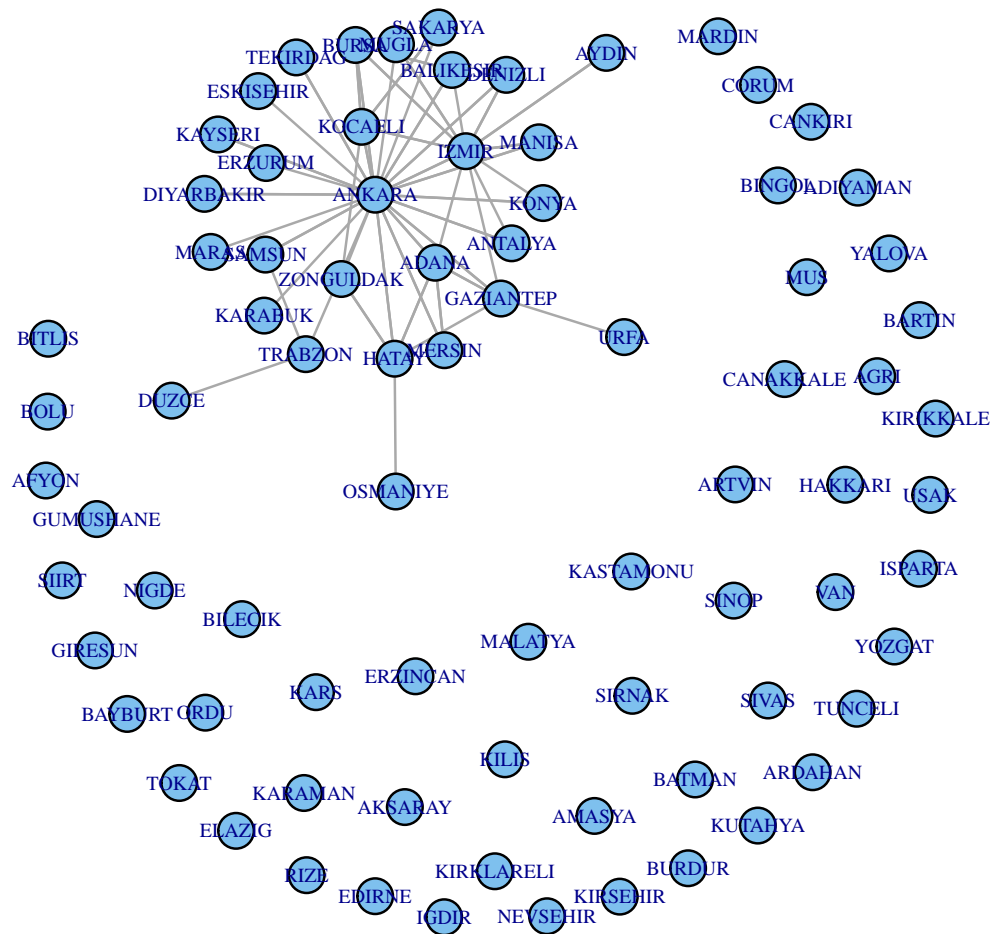


The weighted in-degree and out-degree distributions reveal the disparity among a few central cities and the rest.

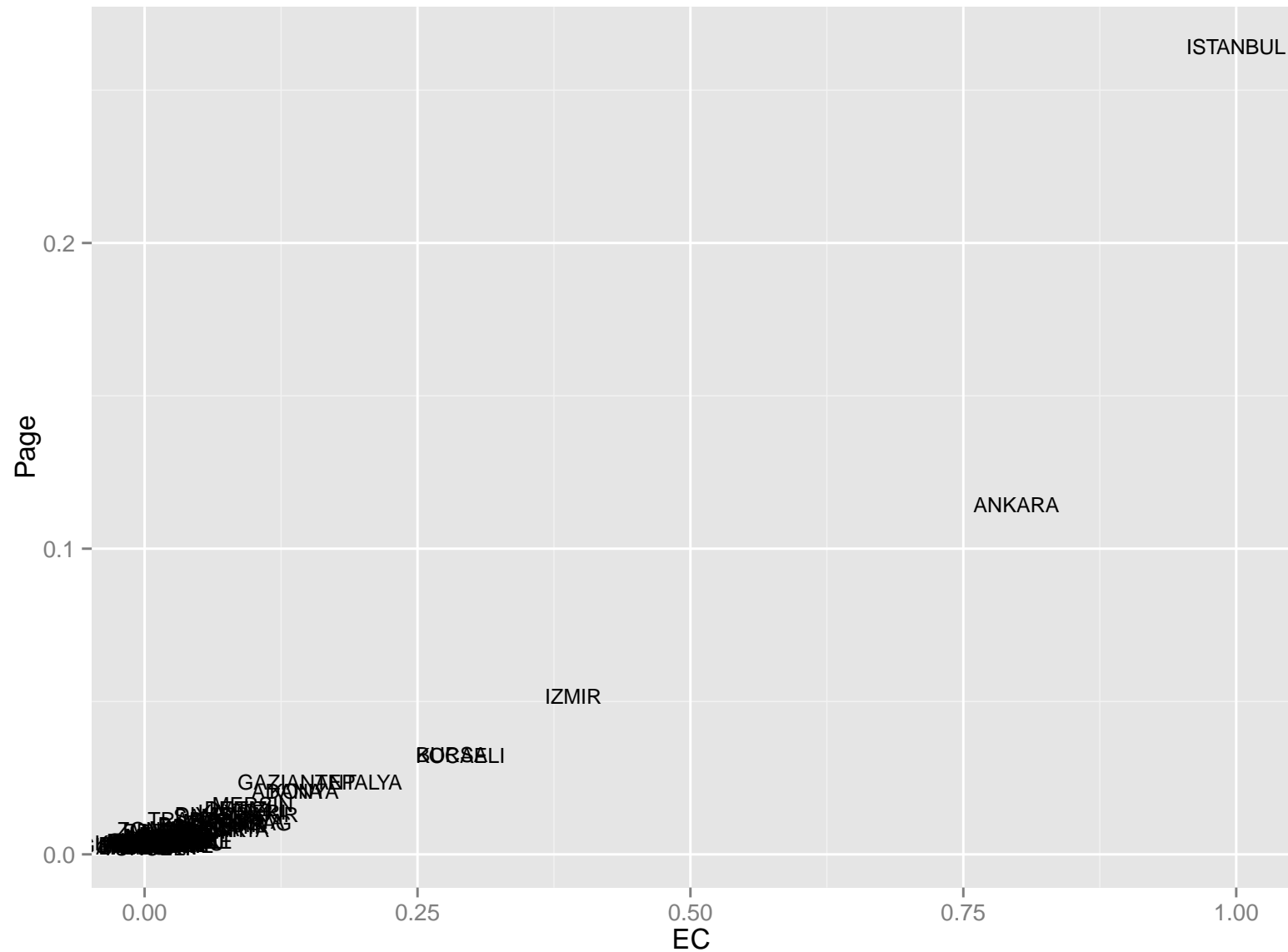
Cumulative Weighted Degree Distribution



Without Istanbul, Cutoff 1 Billion



Cities according to Eigenvector and Page Rank centralities.

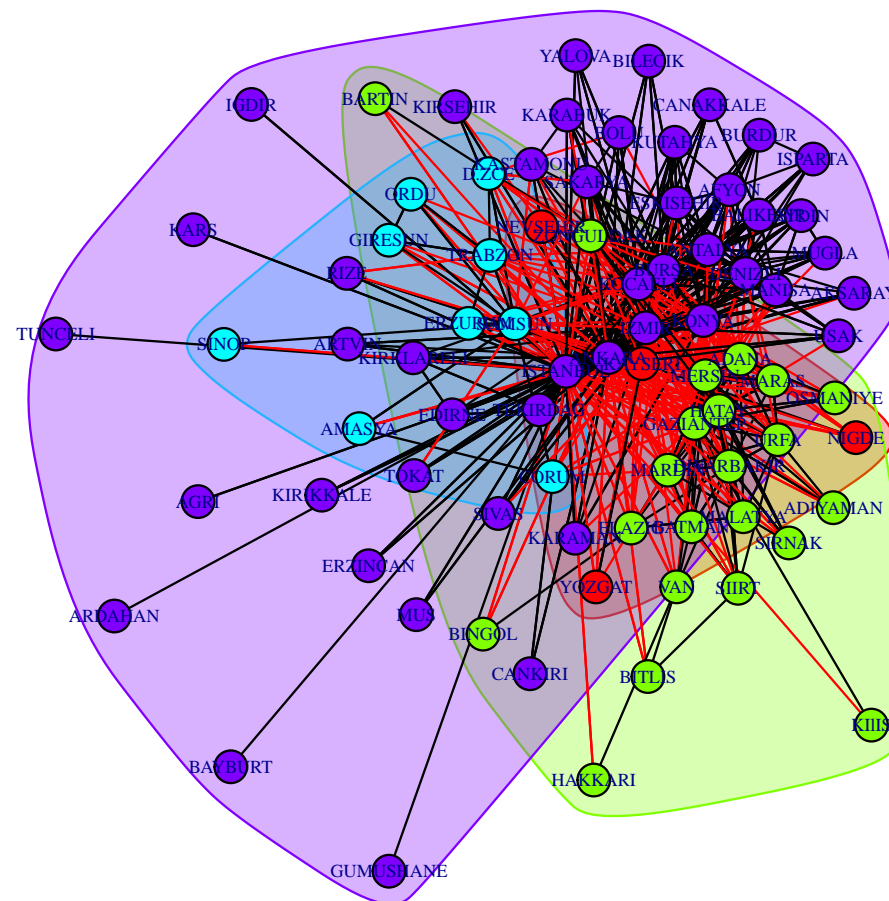


Centrality measures are closely linked to Leontieff inverse coefficients.

	Leontieff 2014	Leontieff 2013
ISTANBUL	8.86	4.58
ANKARA	2.13	1.58
KOCAELI	1.78	1.40
IZMIR	1.54	1.29
BURSA	1.30	1.16
GAZIANTEP	1.14	1.08

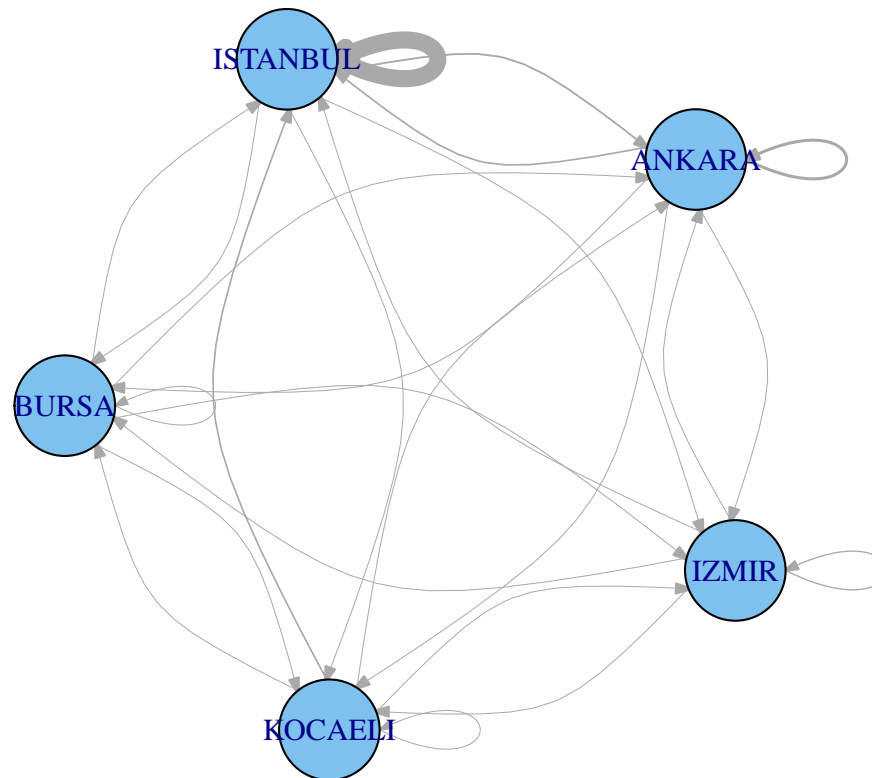
This is what we get if restrict trade links to those above 100 million TL and non-loops.

Spinglass Communities



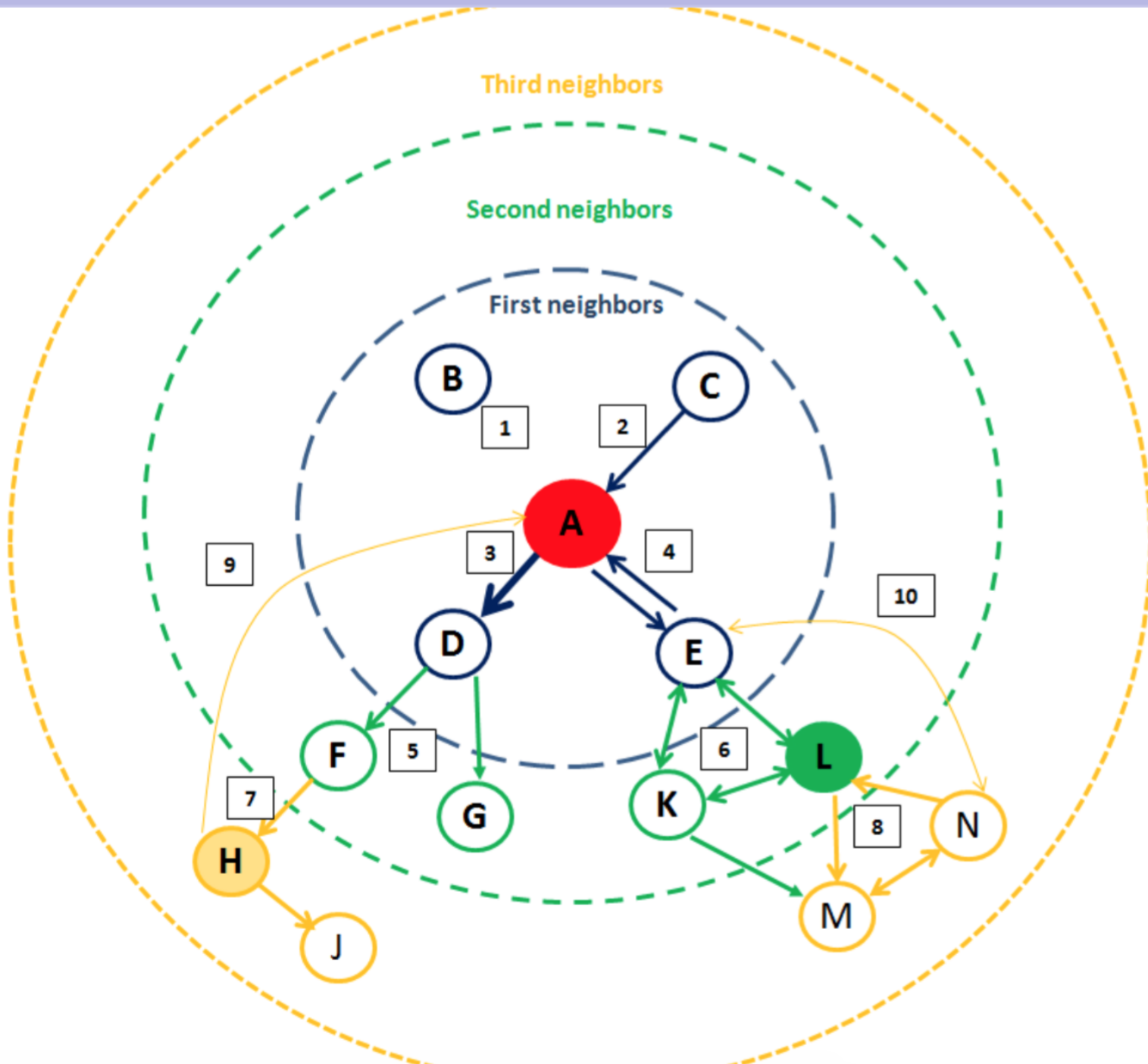
The dominance of İstanbul is very visible.

Five Big Cities



- The network with and without İstanbul?
- Peripheral cities are numerous
- Better data necessary

- Assume a negative shock on any city
- Its purchases will be affected negatively.
- The immediate neighbour cities will suffer
- Chain reaction



- Network analysis is challenging and interesting
- Highly important for policy
- Requires interdisciplinary research