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# Effects of quotas on Turkish foreign trade: A gravity model

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# Project Team

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# Motivation

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- ▶ Given the important trade volume and rooted relations between Turkey and the EU, their trade and economic relations should be paid due attention and steps should be taken to further improve these relations.
  - ▶ The EU is Turkey's most important trading partner, even though its share of **Turkey's exports has fallen** from 56.4% in 2000 to 31.5% in 2012 (Trademap, 2014).
    - ▶ The decline in the EU's share is probably mostly a result of the relative decline of the EU economy compared with the more dynamic markets in the Middle East and other natural resource-rich countries
    - ▶ The operations between Turkey and EU countries are regulated by a set of bilateral and multilateral agreements that restrict quantity and capacity by limiting the number of permits available for a truck to make a journey
    - ▶ Francois (2005) underlines that Turkish manufacturing exports to the EU are subject to technical barriers.
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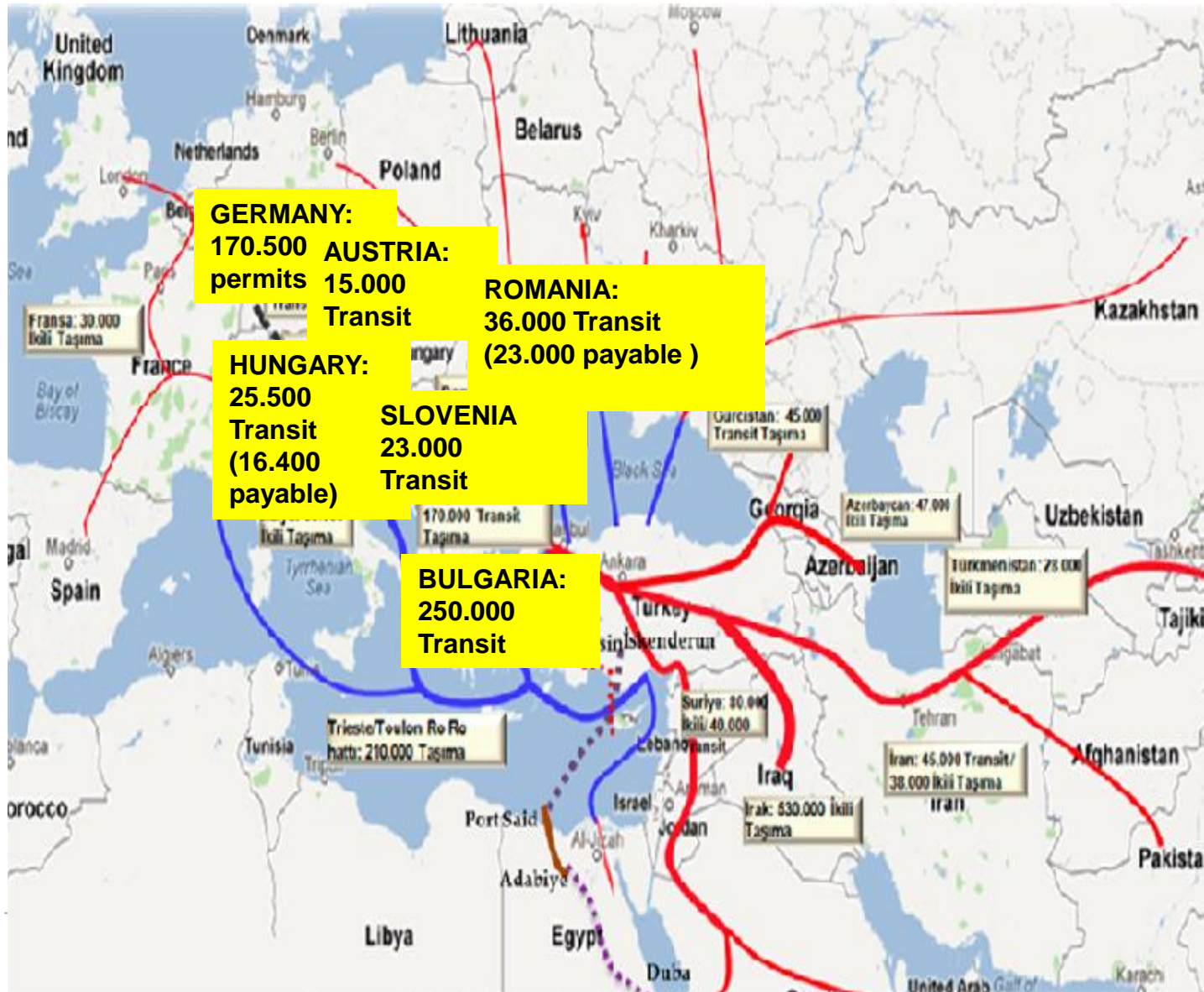
# Motivation

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- ▶ Turkey is the biggest economy in a Customs Union (CU) with EU but not in EU, along with Andorra, Monaco, and San Marino.
    - ▶ Therefore EU countries cannot apply **any trade quotas** to Turkish products according to **CU regulations**.
    - ▶ However EU countries **apply road transport** quota to Turkish trucks because Turkey is **not in EU**.
    - ▶ Turkey is the only country subject to “road transport quota” but not to “trade quota”.
    - ▶ According to CU regulations, practices resulting in unnecessary costs for the import or export of a commodity are considered charges, having equivalent effects as customs duties.
  - ▶ Turkey claims that **the road transport quota** limits submitted by some European countries provide important **barriers** to an increase in the **trade potential** that could emerge if these limits were cancelled.
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# Transport quotas applied by 24 of 27 EU member states



# Effects of Transit quotas: Transit Quota by Italy

## Mandatory Routes



The total transit permit quota allocated by Italy to Turkey, which allows for Turkish transporters to transit Italy from east to west by road is limited to 6.000 permits.

6001st truck that would arrive in Italy by Ro-Ro is obliged to use route Italy-Austria-Germany to France.

- 1000 km to northwards
  - Longer distance
  - More emissions
  - More pollution
  - 6000 quotas for France, Spain, Portugal destinations.



# Effects of Transit quotas: Transit Quota by Austria

**Austrian Transit Permit  
Quota : 15.000**  
**Road Transport Permits  
Needed (to transport to  
Germany): 120.000**



# Aim of the Study

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- ▶ In this study, we investigate **the effect of road transport quotas** on **Turkish foreign trade** with EU countries.
- ▶ A gravity model that is estimated with panel data from 18 selected EU countries between 2005 and 2012 is used for this purpose.
- ▶ Furthermore, as one of the leading sectors using road transportation for Turkey's export to EU countries, textile sector is analyzed as a case study.





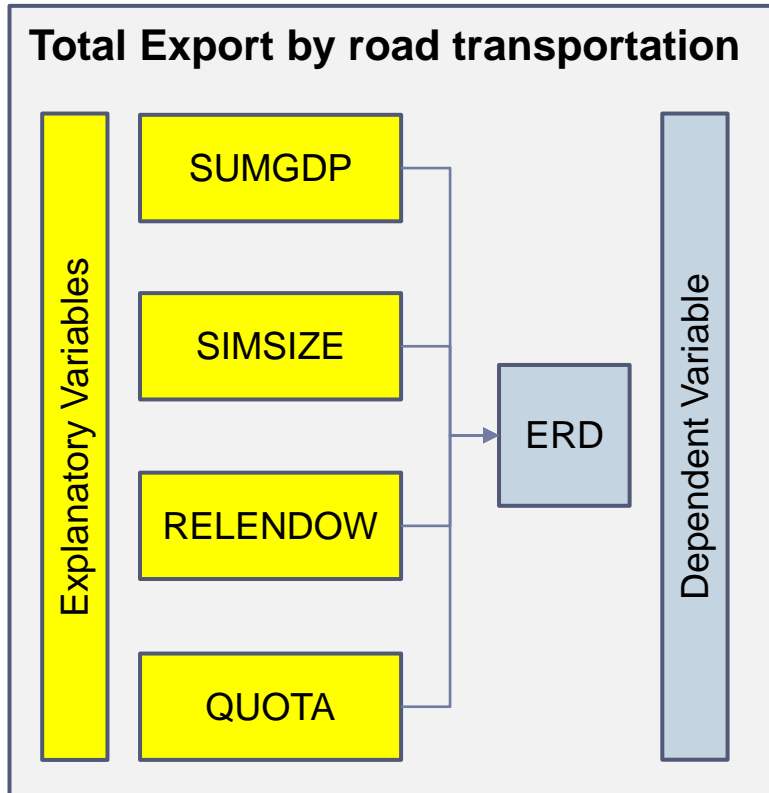
# The Gravity Model

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- ▶ The gravity model aims to analyze spatial interactions among different kinds of variables by using the general idea of **the gravity theory in physics**.
- ▶ The first application of this approach in the econometric domain is the seminal paper of Tinbergen (1962) on international trade relations.
- ▶ Gravity equations have been used as a basic tool to model international trade for many years (Brun et al., 2002; Redding and Venables, 2004; Liu and Xin, 2011; Novy, 2013).
- ▶ According to the gravity model, the flow between any two points increases in direct proportion to the population and/or the economic activity level between these points and in inverse proportion to the distance between the points.
- ▶ Generally, these models relate **bilateral trade flows** to country-specific characteristics of trading partners and analyze the impact of trade frictions, such as distance, geography, free trade agreements, and border effects (Soloaga and Winters, 2001; Antonucci and Manzocchi, 2006; Jayasinghe and Sarker, 2008; Okubo, 2004; Baier and Bergstrand, 2007).



# Framework of the Proposed Model



Variable	Definition
$ERD_{it}$	Turkey's exports by road transport to country $i$ in year $t$ (in US\$)
$SUMGDP_{it}$	A measure of the size of the economies of both Turkey and country $i$ in year $t$
$SIMSIZE_{it}$	A measure of size similarity between Turkey and country $i$ in year $t$
$RELENDOW_{it}$	A measure of relative factor endowments between Turkey and country $i$ in year $t$
$QUOTA_{it}$	The maximum number of Turkish trucks allowed by country $i$ in year $t$
$TED_{it}$	Turkey's textile exports to country $i$ in year $t$ (in US\$)

$$\ln ERD_{it} = \delta_i + \varphi_t + \delta_1 SUMGDP_{it} + \delta_2 SIMSIZE_{it}$$

$$+ \delta_3 RELENDOW_{it} + \delta_4 QUOTA_{it}^{-1} + \ln \varepsilon_{it}''$$

# The basic formulation of the gravity model

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$$\begin{aligned} \ln ERD_{it} = & \delta_i + \varphi_t + \delta_1 SUMGDP_{it} + \delta_2 SIMSIZE_{it} \\ & + \delta_3 RELENDOW_{it} + \delta_4 QUOTA_{it}^{-1} + \ln \varepsilon_{it}'' \end{aligned}$$

- ▶ where  $\varphi_t$  and  $\delta_i$  are time and country dummies



# Model Inputs

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- ▶ The analysis is based on panel data and covers a total of 18 countries ( $i=1, \dots, 18$ ) for the period between 2005 and 2012 ( $t=2005, \dots, 2012$ ).
- ▶ Therefore, the data set consists of 144 entries for each variable of the panel.
- ▶ The selected countries: Austria, Belgium, Bulgaria, Croatia, France, Germany, Greece, Hungary, Italy, Netherlands, Poland, Romania, Serbia, Slovak Republic, Spain, Switzerland, UK, and Ukraine.
- ▶ Source of the data:
  - ▶ Worldbank database,
  - ▶ Turkish Statistical Institute,
  - ▶ UND [*Uluslararası Nakliyeciler Derneği – International Transporter's Association*]



# Model Results

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## ▶ Turkish exports via road transport

	ERD
SUMGDP	<b>0.852</b> [3.139]
SIMSIZE	<b>-0.844</b> [-4.605]
RELENDOW	<b>0.250</b> [2.281]
QUOTA <sup>-1</sup>	<b>-1247.532</b> [-2.799]
Pseudo R-squared	0.989

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- ▶ This finding shows that **Turkey's road transportation is significantly negatively affected** by the reduced number of **quotas**.
  - ▶ It is clear that when the number of quotas decreases, the exports based on road transportation decreases significantly.
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# The quota effect on Turkey's exports via road transport

$$\ln ERD_{it} = \delta_i + \varphi_t + 0.852SUMGDP_{it} - 0.844SIMSIZE_{it} + 0.250RELENDOW_{it} - 1247.532QUOTA_{it}^{-1},$$

	$\delta_i$	Realized Exports (billions US\$)	Estimated Exports (billion US\$)	Estimated quota-free exports (billions US\$)	Difference (billions US\$)
France	-4.390	15.945	15.937	16.279	0.342
Netherlands	-3.746	10.250	10.252	10.706	0.454
Germany	-3.388	56.567	56.577	57.026	0.449
Italy	-4.060	17.005	17.004	17.637	0.633
UK	-4.054	19.036	19.186	20.586	1.400
Greece	-3.738	7.589	7.592	7.946	0.354
Spain	-3.956	9.482	9.482	12.968	<u>3.486</u>
Belgium	-4.397	4.903	4.903	4.927	0.024
Austria	-4.469	4.079	4.079	4.372	0.293
Switzerland	-4.999	2.834	2.870	2.870	0.000
Poland	-3.556	8.086	8.186	8.186	0.000
Slovak Republic	-5.031	1.994	2.003	3.011	1.009
Hungary	-4.680	3.188	3.192	3.298	0.106
Romania	-2.921	15.875	16.074	16.074	0.000
Bulgaria	-3.890	11.089	11.232	11.696	0.464
Ukraine	-4.136	2.518	2.519	3.729	1.210
Croatia	-6.281	1.045	1.045	1.073	0.028
Serbia	-5.338	2.578	2.712	3.108	0.396
<b>Grand Total</b>		<b>194.065</b>	<b>194.844</b>	<b>205.493</b>	<b>10.648</b>

**Total expected loss:  
10.65  
billion \$**

# Textile Industry

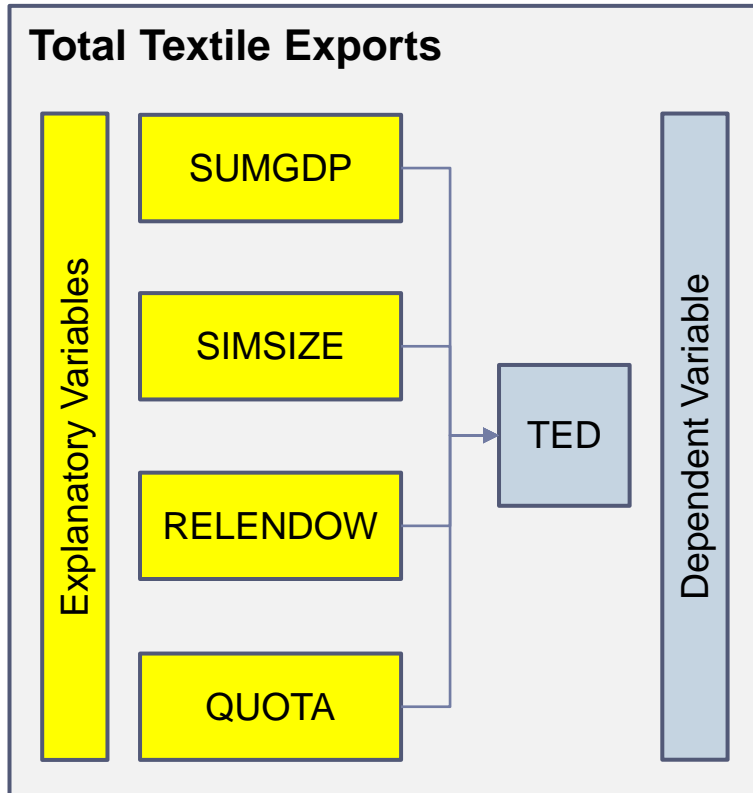
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- ▶ One of the important industries suffering from road transport quotas is the textile sector.
- ▶ As road transportation is faster than rail and sea as well as cheaper than air, trucking is the most preferred means of transport for goods in which customer demand can be fickle and efficient response time required.
- ▶ Turkey is chosen as one of the largest suppliers of the European apparel companies particularly for its ability to provide short response time and low costs.
- ▶ The country's competitive advantage in the textile sector lies in the use of trucks, for short transportation time.
- ▶ Therefore, quotas on road transportation are expected to primarily affect Turkish textile exports to European countries.
- ▶ The textile sector thus offers the opportunity to analyze the relationship between road transport quotas and exports through a case study of the Turkish textile sector.



# Model Results

## Turkish Textile Exports



	TED
SUMGDP	<b>0.531 [2.097]</b>
SIMSIZE	<b>-0.241 [-1.991]</b>
RELENDOW	0.104 [1.688]
QUOTA <sup>-1</sup>	<b>-933.530 [-2.500]</b>
Pseudo R-squared	0.990

- ▶ Road transport quotas have a relatively significant negative effect on total Turkish textile exports.

# The quota effect on Turkey's textile product exports

$$\ln TED_{it} = \beta_i + \varphi_t + 0.531 - 0.241SIMSIZE_{it} + 0.104RELENDOW_{it} - 933.53QUOTA_{it}^{-1}$$

	$\beta_i$	Realized Exports (billions US\$)	Estimated Exports (billion US\$)	Estimated quota-free exports (billions US\$)	Difference (billions US\$)
France	5.254	9.987	9.987	10.145	0.159
Netherlands	5.575	7.910	7.910	8.164	0.254
Germany	6.287	32.082	32.082	32.272	0.190
Italy	5.461	10.755	10.755	11.049	0.293
UK	6.007	19.431	19.571	20.540	0.969
Greece	4.718	2.690	2.690	2.785	0.095
Spain	5.749	9.528	9.528	12.023	<u>2.495</u>
Belgium	4.847	3.569	3.569	3.582	0.013
Austria	4.060	1.489	1.489	1.568	0.079
Switzerland	3.690	1.156	1.167	1.167	0.000
Poland	4.936	3.235	3.265	3.265	0.000
Slovak Republic	3.217	0.462	0.462	0.627	0.165
Hungary	3.824	1.055	1.055	1.081	0.026
Romania	5.146	3.823	3.859	3.859	0.000
Bulgaria	4.713	2.750	2.779	2.864	0.085
Ukraine	4.928	2.041	2.041	2.755	0.714
Croatia	2.358	0.274	0.274	0.280	0.006
Serbia	3.723	0.971	0.971	1.078	0.107
<b>Grand Total</b>		113.206	113.452	119.101	5.650

**Total expected loss:  
5.65 billion \$**

# Conclusions

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- ▶ According to the results, quotas have **a significantly negative effect** on Turkish exports via road transport and Turkish textile export
- ▶ The gravity model estimates that in the absence of quotas, Turkey's exports via road transportation could be increased by **US\$10.6 billion** in the period of analysis and to the selected European countries.
- ▶ Serious differences in the treatment of Turkish haulers among the member states show that the **EU should pay attention to coordinate national quotas** in order to respect its treaty obligations under the EU-Turkey Customs Union and to avoid bottlenecks, unnecessarily long waiting times, or deviations of direct transport to the destination.
- ▶ If trade increases, **the volume of the quotas must be enhanced proportionally**, even in advance if a further trade increase is expected for the following year.





# Further Study

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- ▶ This study is **the first attempt** to highlight the effect of quota on international trade relations.
- ▶ The basic limitation of the paper is **the small sample size** because of impossibility of getting quota data for other European countries.
- ▶ Therefore; as further suggestion a similar methodology can be applied considering the data of not only Turkey but also **the other countries** subject to European transport quota.
- ▶ This will increase the appropriateness of the gravity model which normally necessitates the use of bilateral trade matrices that are square, or close to it.



Thank you for listening

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