Bahçeşehir Üniversitesi Ekonomik ve Toplumsal Araştırmalar Merkezi
Betam
Research Brief 12/135
BAHÇEŞEHİR ÜNİVERSİTESİ
24 July 2012

THE ROLE OF ECONOMIC SIZE AND DISTANCE IN TURKEY'S EXPORTS

Zümrüt İmamoğlu* and Barış Soybilgen†

Executive Summary

The high trade deficit stands out as one of the important problems of Turkey. Especially during the boom periods, trade deficit increases immensely and restricts the growth potential of the Turkish economy. Although a large share of the trade deficit is caused by energy related imports, still Turkey's exports have to cover its imports in order to prevent the current account deficit from reaching unsustainable levels. In this research brief, we analyze Turkey's export potential to its trading partners' with respect to economic size and distance during two time periods; before and after the global crisis.

Our analysis show that Turkey's exports to Japan, India, some North and East European countries as well as Greece are way below its potential. On the other hand, Turkey's exports to countries with which Turkey has a high trade deficit, such as Russia, China, US and Germany, are above its potential. Without any structural changes in the economy, exports to countries with a potential gap may be increased, but Turkey's export potential in new markets is smaller than anticipated. For a sizable increase in exports, Turkey needs to implement structural reforms that will strengthen its competitiveness and enhance the variety of its exports, without delay.

Countries with which Turkey has a high trade deficit

Turkey has the highest trade deficit with Russia, China and Germany followed by Iran based on average imports and exports over years 2002-2008. The primary reason for high trade deficit with Russia and Iran is imports of energy related products such as natural gas and oil. With China though, the share of energy imports within the total imports is low but still the trade deficit has been increasing since 2002, so much so that in 2011, Turkey's trade deficit with China exceeded the trade deficit with Russia and ranked number one. Lately, imports from USA have been increasing significantly as well. The size of Turkey's trade deficit with the US was ranked 10th on average during the pre-crisis period (2002-2008), but it jumped to 3rd place after the crisis (2010-2011) (Table 1 and Table 2).

It's not surprising that fast growing countries like China increase their shares in Turkey's total imports. Initially, Turkey's imports from China were mainly textile and textile related products. However as of 2011, Turkey mainly imports electronic goods from China. From the US, imports of metallic ores, metal scrap, sea and air travel vehicles and their parts increased significantly in 2011. Due to rapid development of air transportation in Turkey, a great

* Dr. Zümrüt İmamoğlu, Betam, Research Associate. zumrut.imamoglu@bahcesehir.edu.tr
† Barış Soybilgen, Betam, Research Assistant, baris.soybilgen@bahcesehir.edu.tr

number of airplanes have been bought by Turkish airline companies in the last years and this contributed significantly to the increasing trade deficit with the US.

Regardless of the source of imports, Turkey has to increase its exports to balance its growing trade deficit. One of the popular claims nowadays is that Turkey can increase its exports by exporting more to distant markets that it has been avoiding so far or has less connections with. In this research brief we ask the question whether there are such markets, i.e., large and unexplored or neglected by Turkish exporters and can exporting more to these countries help decrease Turkey's trade deficit.

Turkey's estimated export potential

Empirical studies on international trade show that trade between countries are positively correlated with economic size and negatively correlated with the distance between countries. Besides these two factors, trade between countries is affected by sharing a common border, being members of the same customs union, having free trade agreements and having similar economic structure. Studies also show that trade between countries can be affected by cultural factors such as speaking a common language, having similar religious beliefs or sharing similar cultural traits. In the literature all these factors are shown to explain the magnitude of trade between countries to some extent.[1] But, economic size and distance seem to be the most important factors.

In this research brief, we analyze exports of Turkey to its trading partners using a similar methodology. We factor in economic size, distance, having common borders and customs union membership with the EU. We run a regression where the dependent variable is average of Turkey's exports to each trading partner before crisis, over 2002-2008, and the independent variables are average GDP of Turkey's trading partners over the same period, and the distance between their capital and Ankara. Border and customs union dummies are also added but they turn out to be statistically insignificant.[2] The coefficients from this regression are used to calculate export potential for two time periods; the pre-crisis period, 2002-2008, and the post-crisis period, 2010-2011. There are two reasons for this partition of the time periods. First is to avoid the crisis period which could alter the results significantly, second is that after the global crisis, there was a compositional change in Turkey's export destinations. Share of Middle East and North Africa in Turkey's exports increased whereas share of European Union decreased. We calculate the model implied exports for the two periods separately and compare with actual imports before and after the crisis. We try to understand whether the change in composition of Turkey's export destinations stemmed from taking advantage of already existing potential gaps between actual exports and model implied exports.

Figures 1 and 2 compare the model implied exports (what we call potential exports) with actual exports. Figure 1 shows the countries (high-export group) to which Turkey's exports are more than $1 billion in value annually on average and Figure 2 shows countries (mid-export group) to which Turkey's exports are between $200 million and $1 billion annually on average. In Figures 3-6 Turkey's exports are classified by geographic regions (Middle East, Latin America, Asia and East Europe, respectively). The 45 degree lines in the figures show the points where potential and actual exports are exactly equal. The points above (below) the

[1] Related studies are listed in the reference section.
[2] Details of the model are shown in the Appendix. Customs union dummy and common border dummy are insignificant in our econometric model, so we use the regression coefficients that does not incorporate these in calculating potential exports.

45 degree line show the countries to which exports are more (less) than what the model predicts. Turkey's exports to countries that are more distant horizontally to the 45 degree line are the ones that the model fails to explain well. Factors other than economic size and distance must be important in accounting for exports to these countries such as political or cultural issues or lack of (or excess of) networking and connections.

Countries to which Turkey exports below its potential

To the high-export group (Figure 1), Turkey mainly exports more than what the model implies besides a few exceptions. The most interesting case is Greece. According to regression results, hypothetically Turkey's exports to a country which has the same economic size and same distance to Turkey as Greece should be 3.5 times greater than the actual exports to Greece. Turkey's exports to Greece are significantly lower than what's implied by our model for the pre-crisis period. Moreover, Turkey's exports to Greece after crisis on average did not increase much and remained almost at the same level as in the pre-crisis period. Therefore, the potential export gap with Greece is still large and important in magnitude (Figure 1b and Table 3).

In the mid-export group, there are many countries to which actual exports are below or above the model implied levels (Figure 2a, 2b). In this group, the most interesting cases are India and Japan. Regression results show that the model implied exports to India are 3 times higher than the actual exports and to Japan they are almost 4 times higher than the actual exports. Exports to some Eastern European countries are also significantly below potential such as Austria and Hungary. Estimated potential exports to Austria and Hungary are nearly 2 times higher than the actual. Exports to two Northern European countries, Norway and Finland are also below potential according to the model, but the model implied exports to both countries are quantitatively small (Table 3).

With some countries, there were potential export gaps in the pre-crisis period but closed after the crisis due to large increases in exports to these countries (Table 4). In the Middle East (Figure 3a, 3b), Lebanon and Israel were the leading countries in terms of potential export gap in the pre-crisis period, but after the crisis potential export gaps narrowed down significantly. Potential export gap with countries like Syria, Egypt and Iran disappeared completely after the crisis because exports to Syria and Iran increased threefold and exports to Egypt increased by about four times.[3] Part of these increases was due to exporters' shift in focus from the depressed European market towards the Middle Eastern market after the crisis. But, Turkey's so called "zero problems with neighbors" foreign policy which led to improvements in political relations during the AK party's second term in office also gave a push for more trade and helped increase exports. Among Turkey's Eastern European trade partners, potential exports with Poland were 2 times higher than actual during the pre-crisis period, but after the crisis, the potential export gap reduced to only 50 percent of actual exports.

The search for new export markets after the crisis led to increases in Turkey's exports to distant countries such as South Korea, Brazil and China as well. After the crisis, implied export gaps with these countries turned to surpluses (Table 3). However, during this period imports also increased and Turkey's trade deficit with China and South Korea surged (Table 1). It is clear that the trade deficit with these countries are not stemming from Turkey being unable to fill its export potential but rather from increasing demand for imports.

[3] Due to political instability in Syria, trade with this country has been severely impeded recently.

Countries to which Turkey exports above its potential

Exports to many of Turkey's top export destinations are already above those implied by the model. The leading countries in this group are Germany, United Kingdom, USA, United Arab Emirates (UAE) and Iraq. In 2010-2011, the potential surplus with these countries except Iraq did not change much. Potential exports to Iraq increased twofold from 2002-2008 to 2010-2011 whereas actual exports in the same time increased 2.8 times. Turkey's potential and actual exports to Iraq significantly increased after the crisis as political stability was regained after the war and Iraq's political and economical ties with Turkey started to improve.

The potential exports to Turkey's long term trading partners relative to actual exports were mostly stable for Spain, Netherlands, Italy, Russia and United Arab Emirates (Table 4).[4] We do not expect to see large changes in exports to these countries as long as there aren't any structural changes in the Turkish economy. Changes in potential exports relative to actual exports to other big trading partners, such as Germany and France, are not large either but because exports to these countries are large in quantity, even a small change in relative terms matters in absolute terms. Therefore, we can say that large export markets never lose their importance.

Export potential is limited in new markets

In this research brief, we analyzed Turkey's exports to its trading partners depending on economic size and distance. Besides economic size and distance, there can be other factors that affect Turkey's exports to other countries.[5] Potential export gap with some markets may be explained by lack of information and communication relating to these markets. On the other hand, extensive networks and high Turkish population in some countries can cause actual exports to exceed potential exports. Product mismatch, the difference between the types of goods that Turkey exports and what its partners demand, is another potential explanation for exports to remain below potential.

Regression results show that Turkey exports more than the potential implied by the model to countries with which Turkey has high trade deficit. Moreover, export surge to Iraq, Iran, Syria and Egypt in recent years pushed actual exports above potential exports to these countries in the period after the crisis. Exports to these countries may still increase more but one should not expect large changes. The leading countries with which Turkey still has a potential gap are Japan, India and some East European economies. However, these countries are either small or distant to Turkey so potential export gap is relatively small. In other words, there appears to be no sign of undiscovered distant export markets on the horizon.

Under current economic structure, Turkey has a lower export potential in new markets than anticipated. To increase its exports e.g. to meet its target of $500 billion of exports by 2023, Turkey needs to have a more competitive export sector that produces a greater variety of goods. Best way of doing that is increasing productivity and spending more on research and development. Implementation of structural reforms that will foster competitiveness in Turkey is crucial. Reforms that will lower down labor costs should be implemented without delay and

[4] Export volume to these countries is high. Therefore, relative small changes in exports to these countries make large differences in absolute numbers, but these large changes shouldn't be interpreted as structural shifts.
[5] Turkey's political and historical past with Greece might have some impact on trade.

educational reforms are needed to increase skills and productivity of the labor workforce which currently is highly undereducated by international standards.

Table 1. Top 10 countries with which Turkey has a trade deficit (thousand $)

Countries	Trade deficit (2002-2008, average)	Countries	Trade deficit (2010-2011, average)
Russia	-11.819.667	**Russia**	-17.466.344
China	-7.002.505	**China**	-17.069.325
Germany	-3.922.016	**USA**	-10.003.029
Iran	-3.074.792	**Germany**	-7.551.615
Switzerland	-3.015.310	**Iran**	-6.736.315
South Korea	-2.773.855	**South Korea**	-5.114.866
Japan	-2.654.567	**Italy**	-4.616.268
Italy	-2.170.120	**India**	-4.273.213
Ukraine	-2.031.743	**Japan**	-3.496.440
France	-1.969.493	**Ukraine**	-2.827.279

Source: Betam, Turkstat.

Table 2. Top 10 countries with which Turkey has a trade surplus (thousand $)

Countries	Trade deficit (2002-2008, average)	Countries	Trade deficit (2010-2011, average)
Iraq	2,353,929	**Iraq**	7,053,659
UAE	2,152,040	**England**	2,433,399
England	1,561,653	**UAE**	2,345,883
Greece	699,327	**Azerbaijan**	1,549,948
Saudi Arabia	594,382	**Egypt**	1,350,530
Israel	573,518	**Syria**	1,332,761
Azerbaijan	501,907	**Libya**	1,057,313
Syria	344,258	**Turkmenistan**	927,092
Morocco	303,363	**Saudi Arabia**	799,495
Libya	303,209	**Georgia**	628,292

Source: Betam, Turkstat.

Table 3. Countries that Turkey has a high potential export gap with (thousand $)[6]

	Exports		Estimated Potential		Exports-Estimated Potential Difference		Percent Difference (%)[7]	
Countries	**2002-2008**	**2010-2011**	**2002-2008**	**2010-2011**	**2002-2008**	**2010-2011**	**2002-2008**	**2010-2011**
Japan	221,581	284,319	824,915	1,002,168	-603,334	-717,849	-272	-252
India	230,497	681,075	729,447	1,230,723	-498,950	-549,648	-216	-81
Greece	1,443,411	1,504,474	3,999,090	4,689,047	-2,555,680	-3,184,573	-177	-212
Norway	252,211	361,717	681,755	916,648	-429,544	-554,931	-170	-153
Lebanon	294,949	668,291	755,459	1,128,251	-460,509	-459,960	-156	-69
Austria	657,917	943,733	1,596,950	1,946,401	-939,033	-1,002,668	-143	-106
Hungary	451,542	474,707	881,007	1,037,824	-429,465	-563,117	-95	-119
Poland	920,015	1,631,293	1,584,409	2,202,382	-664,394	-571,089	-72	-35

Source: Betam, Turkstat.

[6] In tables, 2010-2011 average and 2002-2008 average are used.
[7] Percent Difference = (Exports-Potential Exports)/Exports

Table 4. Countries for which the potential export gap closes down after the crisis (thousand $)[7]

	Exports		Estimated Potential		Exports-Estimated Potential Difference		Percent Difference (%)[8]	
Countries	**2002-2008**	**2010-2011**	**2002-2008**	**2010-2011**	**2002-2008**	**2010-2011**	**2002-2008**	**2010-2011**
South Korea	124,526	416,065	264,563	326,356	-140,037	89,710	-112	22
Egypt	695,874	2,504,872	1,235,218	2,265,917	-539,344	238,955	-78	10
Syria	592,305	1,727,331	857,159	1,403,064	-264,855	324,267	-45	19
Brazil	134,540	749,011	187,250	376,268	-52,710	372,743	-39	50
China	697,710	2,367,901	803,468	1,694,338	-105,758	673,563	-15	28
Iran	1,018,796	3,316,936	1,097,645	1,950,368	-78,849	1,366,568	-8	41

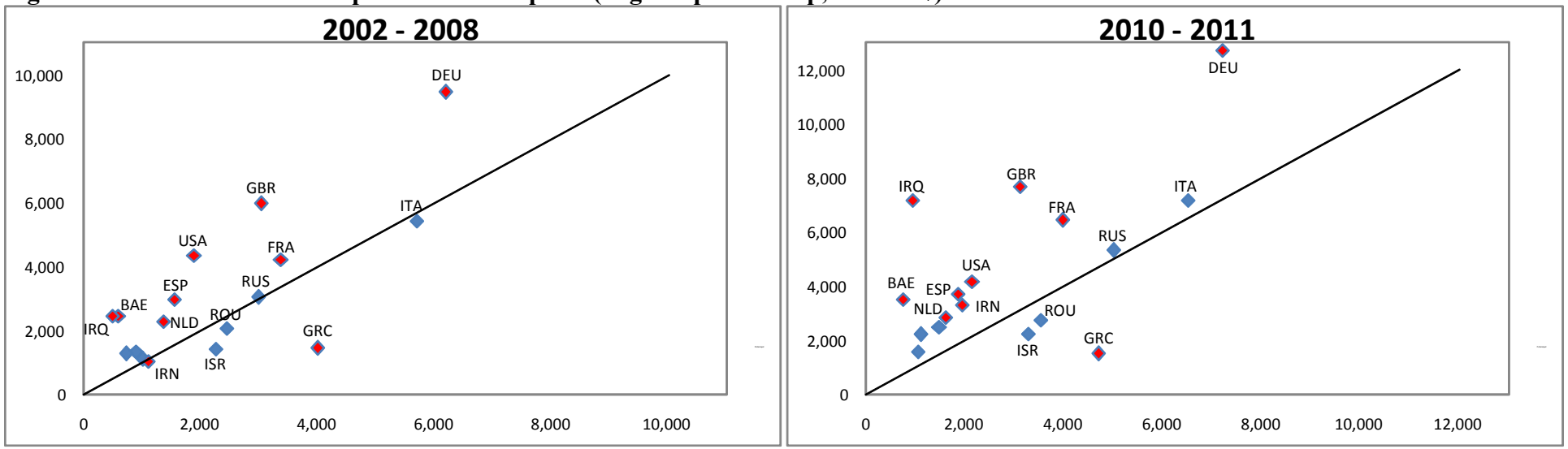
Source: Betam, Turkstat.

Table 5. Countries that Turkey has a high potential export surplus with (thousand $)[7]

	Exports		Estimated Potential		Exports-Estimated Potential Difference		Percentage Difference (%)[8]	
Countries	**2002-2008**	**2010-2011**	**2002-2008**	**2010-2011**	**2002-2008**	**2010-2011**	**2002-2008**	**2010-2011**
Iraq	2,458,457	7,174,091	595,434	941,816	1,863,023	6,232,275	76	87
UAE	2,454,455	3,519,823	486,408	738,301	1,968,048	2,781,522	80	79
USA	4,344,274	4,173,241	1,892,810	2,155,345	2,451,464	2,017,895	56	48
England	5,965,178	7,694,012	3,037,268	3,112,653	2,927,910	4,581,359	49	60
Spain	2,984,704	3,727,078	1,545,803	1,853,495	1,438,901	1,873,583	48	50
Netherlands	2,270,159	2,852,594	1,361,583	1,616,642	908,576	1,235,952	40	43
Germany	9,455,043	12,715,446	6,191,616	7,208,263	3,263,427	5,507,183	35	43
France	4,233,031	6,430,199	3,369,846	3,980,235	863,185	2,449,964	20	38

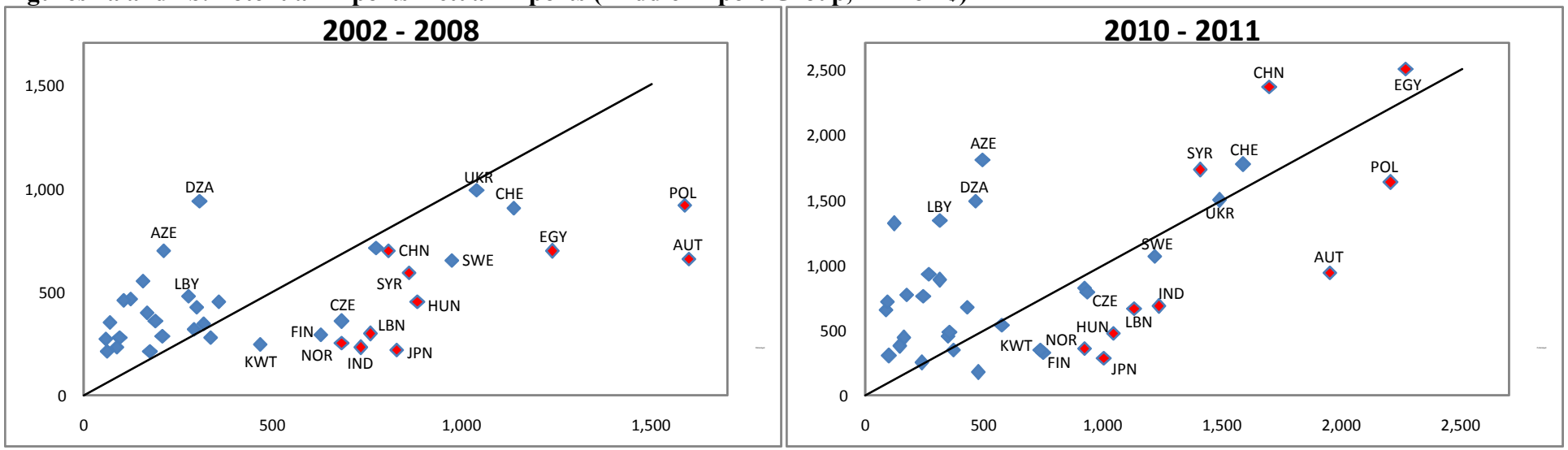
Source: Betam, Turkstat.

Figures 1a and 1b. Potential Exports-Actual Exports (High Export Group, Million $)



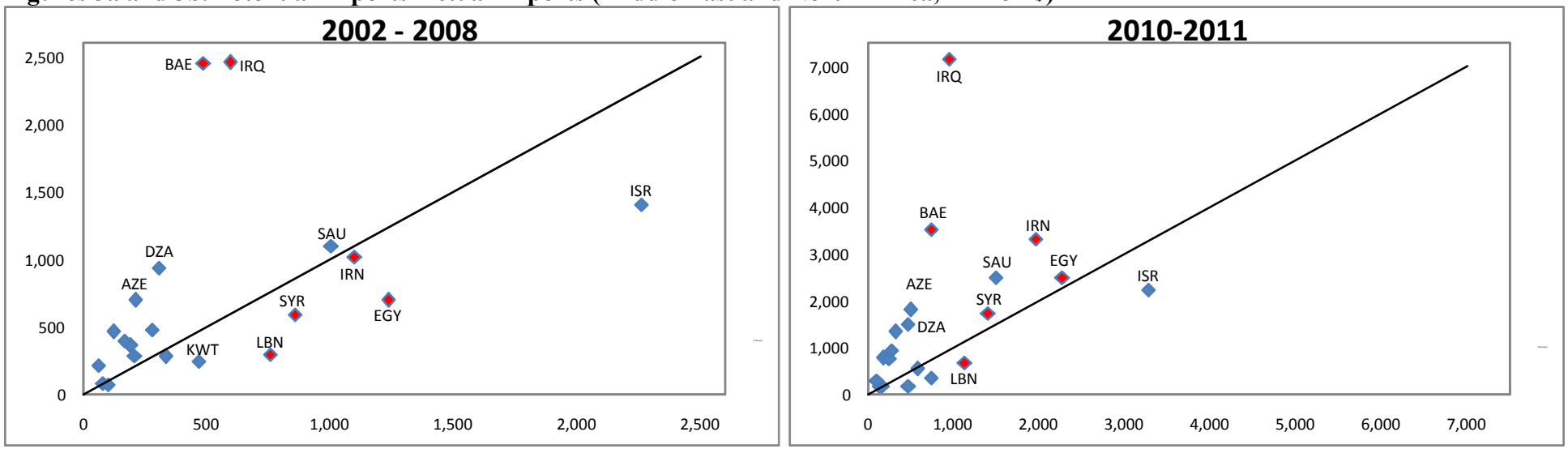
Source: Betam, Turkstat. Notes: The vertical (Y) axis shows actual exports and the horizontal axis (X) shows model implied exports. Countries to which exports are above $1 billion in 2002-2008. Country ISO Codes: Germany (DEU), Italy (ITA), Greece (GRC), Great Britain (GBR), France (FRA), United States of America (USA), Russia (RUS), Spain (ESP), Romania (ROU), Israel (ISR), Iraq (IRQ), United Arab Emirates (BAE), Iran (IRN), The Netherlands (NLD).

Figures 2a and 2b. Potential Exports-Actual Exports (Middle Export Group, Million $)



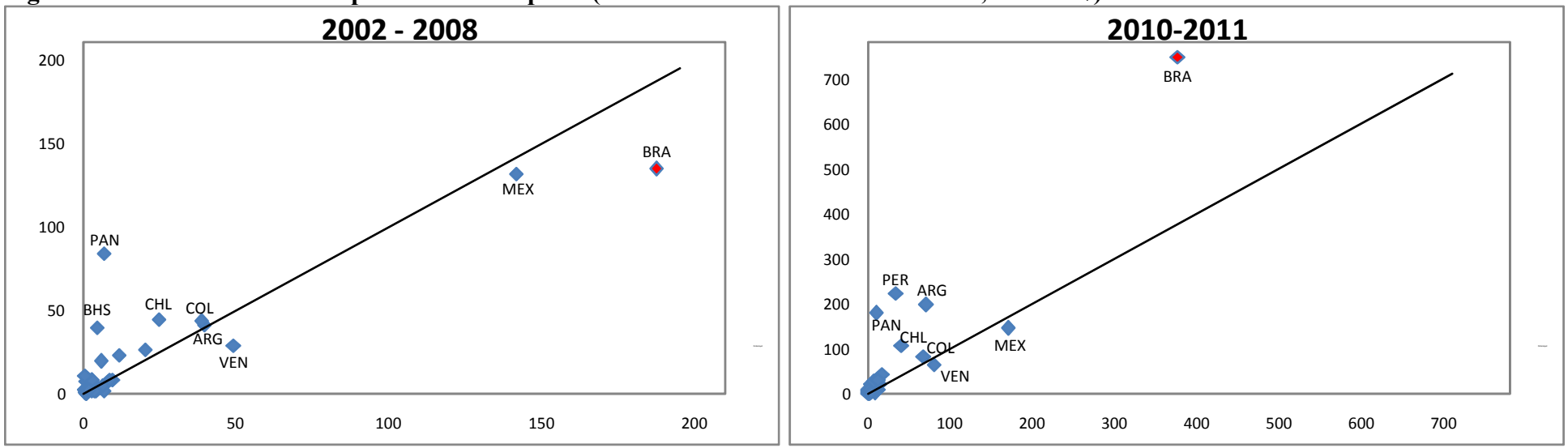
Source: Betam, Turkstat. Notes: Vertical (Y) axis shows actual exports and horizontal axis (X) shows model implied exports. Countries to which exports are between $1000-$200 million in 2002-2008. Country ISO Codes: Poland (POL), Austria (AUT), Egypt (EGY), Switzerland (CHE), Ukraine (UKR), Sweden (SWE), China (CHN), Syria (SRY), Hungary (HUN), Lebanon (LBN), Japan (JPN), India (IND), Norway (NOR), Finland (FIN), Czech Republic (CZE), Kuwait (KWT), Libya (LBY), Azerbaijan (AZE), Algeria (DZA), Turkmenistan (TKM).

Figures 3a and 3b. Potential Exports-Actual Exports (Middle East and North Africa, Million $)



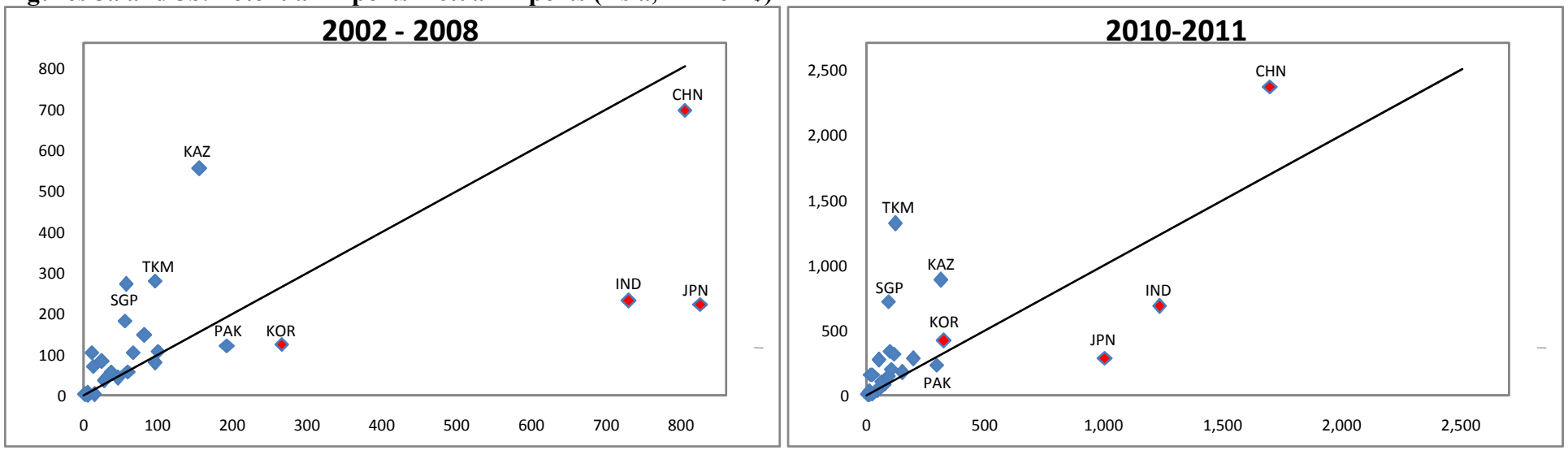
Source: Betam, Turkstat. Notes: Vertical (Y) axis shows actual exports and horizontal axis (X) shows model implied exports. Country ISO Codes: United Arab Emirates (BAE), Iraq (IRQ), Israel (ISR), Azerbaijan (AZE), Saudi Arabia (SAU), Iran (IRN), Egypt (EGY), Syria (SYR), Lebanon (LBN), Kuwait (KWT).

Figures 4a and 4b. Potential Exports-Actual Exports (South America and the Caribbean, Million $)



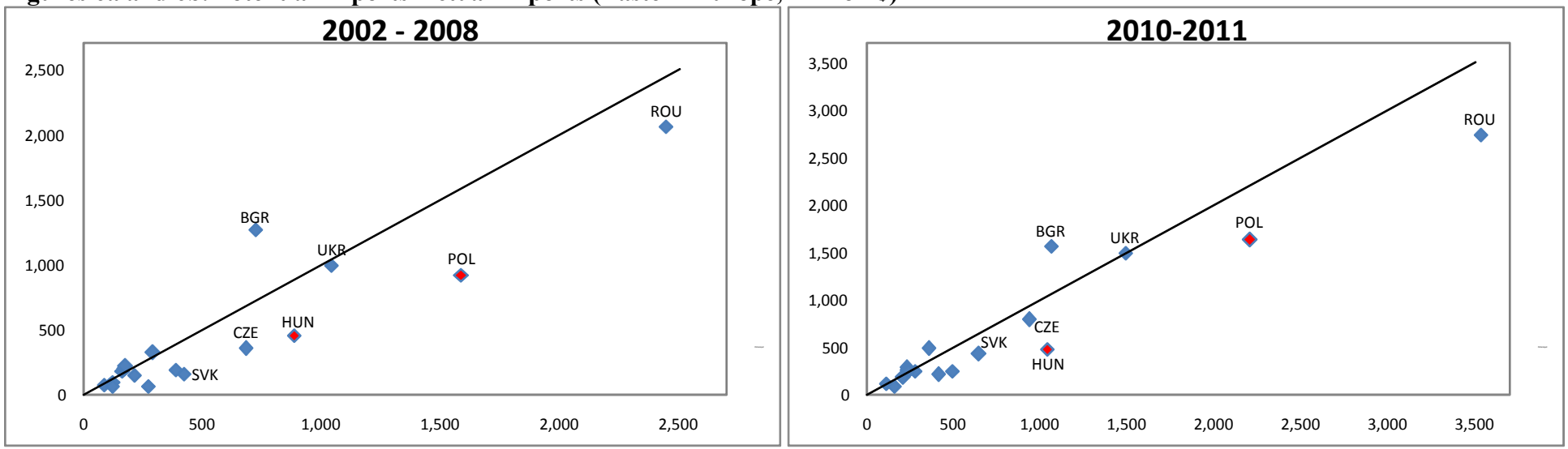
Source: Betam, Turkstat. Notes: Vertical (Y) axis shows actual exports and horizontal axis (X) shows model implied exports. Country ISO codes: Brazil (BRA), Mexico (MEX), Venezuela (VEN), Chile (CHL), Bahamas (BHS), Panama (PAN), Colombia (COL), Argentina (ARG), Peru (PER).

Figures 5a and 5b. Potential Exports-Actual Exports (Asia, Million $)



Source: Betam, Turkstat. Notes: Vertical (Y) axis shows actual exports and horizontal axis (X) shows model implied exports. China (CHN), Japan (JPN), India (IND), South Korea (KOR), Pakistan (PAK), Kazakhistan (KAZ), Turkmenistan (TKM), Singapore (SGP).

Figures 6a and 6b. Potential Exports-Actual Exports (Eastern Europe, Million $)



Source: Betam, Turkstat. Notes: Vertical (Y) axis shows actual exports and horizontal axis (X) shows model implied exports. Country ISO Codes: Romania (ROU), Poland (POL), Ukraine (UKR), Bulgaria (BGR), Hungary (HUN), Czech Republic (CZE), Slovakia (SVK).

Supplement: Regression details

$\ln(\text{exports}) = c + \beta_1 * \ln(\text{distance}) + \beta_2 * \ln(\text{GDP}) + \beta_3 * (\text{neighborhood dummy}) + \beta_4 * (\text{customs union dummy})$

In this research brief, we estimate a gravity equation that includes economic size and distance as the main independent variables. In our regression, our dependent variable is 2002-2008 average of Turkey's exports by country level. Our independent variables are 2002-2008 average of Turkey's trading partners' GDP, distance between their capital and Ankara, a neighborhood dummy and a customs union dummy. Exports, distance and GDP variables are in natural logs. We use two different databases for GDP data, one from IMF outlook database and another from the World Bank database. Because in World Bank database GDP data for 2011 is not yet available, we only use the regression with World Bank data for robustness check. Results of our model are shown below:

Tablo 6. Regression results (IMF outlook database)

ln(exports)	Coefficient	Standard Error*	t statistics	P-value
c	16.117	0.927	17.39	0.000
ln(distance)	-1.615	0.105	-15.43	0.000
ln(GDP)	0.799	0.043	18.62	0.000
neighborhood dummy	0.416	0.338	1.23	0.220
customs union dummy	-0.175	0.202	-0.87	0.388

* In this regression heteroscedasticity consistent standard errors are used.

$R^2 = 0.837$.
Number of countries = 166.

Tablo 7. Regression results (Worldbank database)

ln(exports)	Coefficient	Standard Error*	t statistics	P-value
c	14.368	1.158	12.41	0.000
ln(distance)	-1.406	0.143	-9.85	0.000
ln(GDP)	0.783	0.060	13.15	0.000
neighborhood dummy	0.717	0.368	1.95	0.053
customs union dummy	0.101	0.244	0.41	0.681

* In this regression heteroscedasticity consistent standard errors are used.

$R^2 = 0.774$.
Number of countries = 174.

In both of the regressions, coefficients of c, ln(distance) and ln(GDP) are very close and statistically significant at 5 percent significant level. Neighborhood dummy is statistically significant at 10 percent significant level when data for 2011 is not included in Table 7 (the World Bank data) but it is statistically insignificant in Table 6 (The IMF data). Finally, customs union dummy is insignificant in both of the regressions.

References

1. Anderson, James E, 1979. "A Theoretical Foundation for the Gravity Equation," American Economic Review, American Economic Association, vol. 69(1), pages 106-16.

2. Anderson, James E, & van Wincoop, Eric, 2003. "Gravity with Gravitas: A Solution to the Border Puzzle," American Economic Review, American Economic Association, vol. 93(1), pages 170-192.

3. Antonucci, Daniele, & Manzocchi, Stefano, 2006. "Does Turkey have a special trade relation with the EU?: A gravity model approach," Economic Systems, Elsevier, vol. 30(2), pages 157-169.

4. Bergstrand, Jeffrey H, 1985. "The Gravity Equation in International Trade: Some Microeconomic Foundations and Empirical Evidence," The Review of Economics and Statistics, MIT Press, vol. 67(3), pages 474-81.

5. Bilici, Ozgul, & Erdil, Erkan, & Yetkiner, I. Hakan, 2008. "The Determining Role of EU in Turkey's Trade Flows: A Gravity Model Approach," Working Papers 0806, Izmir University of Economics.

6. Karagöz, Kadir & Saray, M. Ozan, "Trade Potential of Turkey with Asia-Pacific Countries: Evidence from Panel Gravity Model," International Economic Studies, vol. 36(1), pages 19-26.

7. McCallum, John, 1995. "National Borders Matter: Canada-U.S. Regional Trade Patterns," American Economic Review, American Economic Association, vol. 85(3), pages 615-23.

8. Özdeşer, Hüseyin, & Ertac, Dizem, 2010. "Turkey's Trade Potential with Euro Zone Countries: A Gravity Study," European Journal of Scientific Research, EuroJournals Publishing, vol. 43(1), pages 15-23.