
ARTICLES

Pakistan's Exports Demand: A Disaggregated Analysis

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Abstract: This study is an investigation of demand factors behind Pakistan's export performance at three digit level of Standard International Trade Classification (SITC). It applies generalized method of moments on annual data of nine categories for a period from 1988 to 2009. The study elicits variations in price and expenditure elasticities for different categories of export commodities which were masked in the aggregate studies.

JEL Classification: C13, F40

Keywords: demand function, export, SITC

1. Introduction

Global financial crisis has led to a substantial fall in world aggregated demand during 2009. This led to an abrupt fall in exports across the globe during the period. Magnitude of this fall, however, has been quite diversified across countries and sectors. For instance, although exports from both the advanced and emerging economies declined during the period, the fall was sharper in the former case.¹ Likewise, sector-wise data suggests that more than one half of the fall in world exports during 2009 was contributed by relatively high value added machinery & transport equipments and manufactured goods.

Following the world trend, Pakistan's exports also fell considerably (13.4 percent) during 2009. In the last two decades, this is the largest fall in Pakistan's exports in a year. It indicates the role of global demand in determination of Pakistan's exports. In this perspective, the study is an attempt to empirically evaluate the responsiveness of Pakistan's exports to world demand. In the view of varying

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¹ According to World Economic Outlook Update (July, 2010), advanced economies' exports fell by 11.7 percent while emerging & developing economies' exports declined by 8.2 percent during 2009.

impact of global demand on the sectoral exports, the estimation is conducted on the disaggregated exports at three digits level of Standard International Trade Classification (SITC). Moreover, absence of a study on Pakistan's disaggregated exports demand also necessitates this analysis.

The disaggregated analysis is important from policy perspective. For example, more targeted policies may be the better option if export behavior changes across categories. Specifically, promotion of exports by lowering price or exports subsidies may be suitable for the categories having greater than unitary price elasticity while in case of less than unitary price elasticity, non price factors have the greater role in stimulating exports.

The paper has been organized as follows: section 2 reviews the empirical studies on the subject followed by a section on a preliminary analysis of Pakistan's exports. The next section describes data aspects and the methodology and section 5 presents empirical results. The last section concludes the study.

2. Literature review

Literature on the subject can be categorized into aggregate and disaggregate export demand function. While a large number of studies are available on the former, literature on the latter is rare. Especially, literature on the disaggregate exports demand beyond one digit Standard International Trade Classification (SITC) is almost non-existent. Some of the studies available on the disaggregated exports and their main findings are reviewed as under.

Mukerjee (1992) estimates exports equation for India with a multi-sectoral Model. He finds a range of price and world demand (imports) elasticities that were obscured by aggregate analysis. For most of the sectors, price elasticities were less than unity and income elasticities were greater than unity. Indian exports have also been studied by Lucas (1988) who estimates world demand for 23 categories of manufactured exports from India. His study reveals that most of the categories have greater than unitary price and expenditure elasticity. Another study by Roy (2007), again on India concludes that demand factors have predominant role in explaining India's disaggregated export performance. Particularly, price responsiveness of demand is significant for chemical and machinery & transport equipments exports while most disaggregate exports are responsive to world demand.

In Pakistan's case, we could find only one study on the disaggregated exports. Afzal (2005) estimates demand and supply of exports in Pakistan for aggregate,

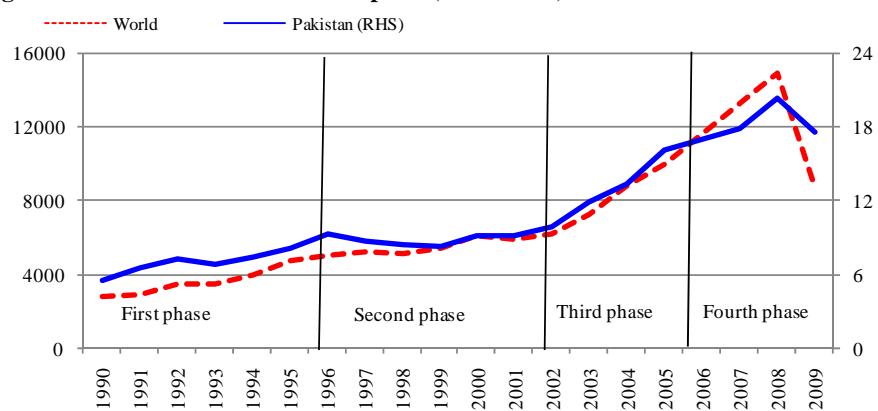
primary and manufactured exports. His results of disequilibrium model reveal that aggregate and primary export demand have less than unity price elasticity while for manufactured exports price elasticity is greater than unity. The income elasticity, on the other hand, was found less than unity for aggregate and manufactured exports and it has not correct sign in case of primary exports.

Most of the studies on aggregate export demand function for Pakistan show that expenditure elasticity is either close to or greater than unity whereas results for price elasticities are mix. For instance, Aftab and Aurangzeb (2002) and Bahmani-Oskooee (1998) conclude that expenditure elasticity is greater than unity, and Khan (1974) finds income elasticity close to unity (0.919). In contrast, price elasticity calculated by Aftab and Aurangzeb (2002) was considerably less than unity (-0.41), whereas Bahmani-Oskooee (1998) and Khan (1974) comes up with greater than unitary price elasticity.

3. Pakistan's export performance

During 1988-1990, Pakistan's exports grew largely in line with the global trend (Figure 1). As a result, Pakistan's share in the world exports remained almost stable around 0.2 percent (Table 1). During the period under review, Pakistan's exports growth trend can be categorized into four distinct phases. In first (1989-1994) and third (2000-2004) phases, exports grew relatively faster while in the second (1995-1999) and fourth (2005-09) phases exports growth remained considerably low. Poor performance of exports in the second phase may partly be attributed to economic sanctions following the atomic detonation while low exports growth in the last phase largely reflects phasing out of textile quota and global economic recession.

Figure 1. Pakistan's and World's Exports (US\$ billion)



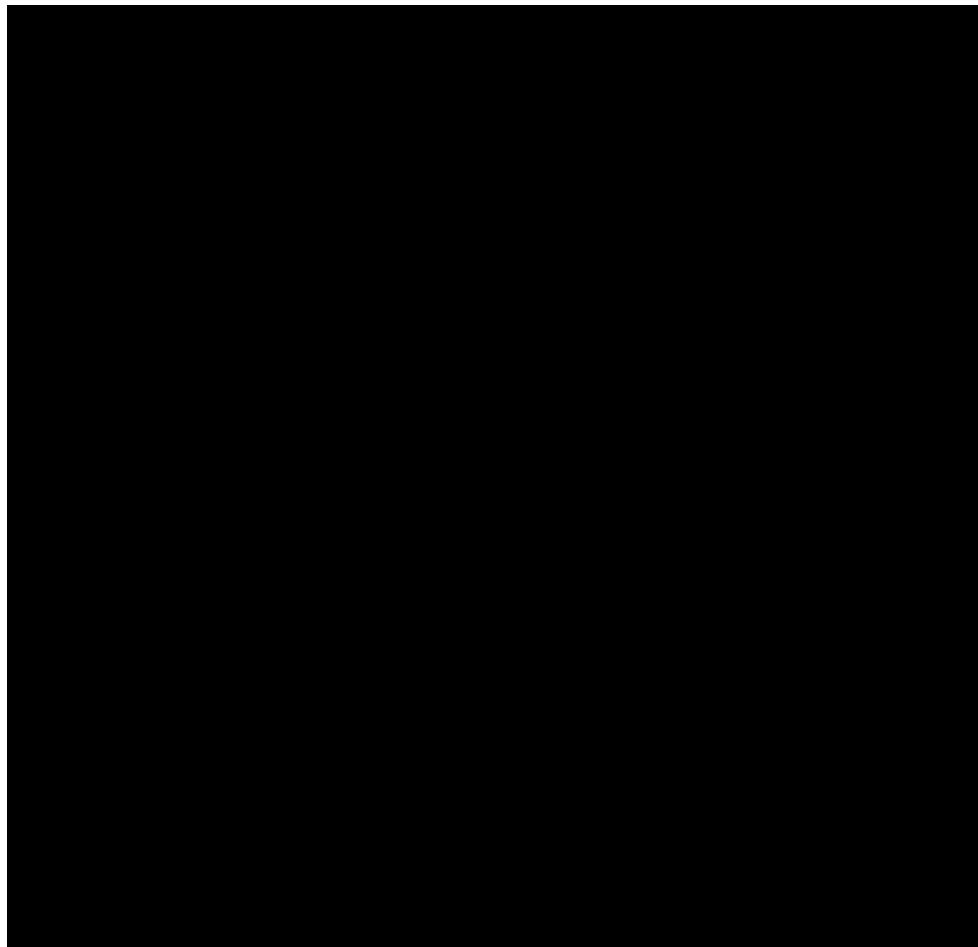
Unlike aggregate exports, disaggregated exports registered varying rates of exports growth across different sub periods. For example, category of food and live animal exports recorded the highest growth in the last phase. Given the considerable fall in demand for exports during the period, this growth (22 percent) appears surprising. However, as exports of this category mainly consists of rice, fishes, wheat, vegetables & fruits, live animals and meat & meat preparations, supply factors might have a greater role in the determination of these exports. Moreover, a considerable part of these exports is destined to Middle East countries, which are relatively less affected by world recession.

Table 1. Pakistan's Share in World's Exports

Category	1989-94	1995-99	2000-04	2005-09
Food and live animals	0.20	0.30	0.30	0.40
Beverages and tobacco	0.00	0.00	0.00	0.00
Crude materials, inedible, except fuels	0.30	0.20	0.10	0.10
Mineral fuels, lubricants and related materials	0.00	0.00	0.00	0.10
Animal and vegetable oils, fats and waxes	0.00	0.00	0.10	0.20
Chemicals and related products, n.e.s.	0.00	0.00	0.00	0.00
Manufactured goods classified chiefly by material	0.60	0.60	0.60	0.50
<i>Leather, leather manufactures</i>	<i>2.10</i>	<i>1.40</i>	<i>1.30</i>	<i>1.50</i>
<i>Textile yarn, fabrics, made-up articles,</i>	<i>2.60</i>	<i>3.00</i>	<i>3.10</i>	<i>3.40</i>
Machinery and transport equipment	0.00	0.00	0.00	0.00
Miscellaneous manufactured articles	0.30	0.40	0.40	0.40
<i>Articles of apparel and clothing accessories</i>	<i>1.00</i>	<i>1.00</i>	<i>1.10</i>	<i>1.20</i>
Commodities and transactions not classified elsewhere in the SITC	0.00	0.00	0.00	0.00
Total	0.20	0.20	0.20	0.20

In the same way, leather and leather manufactures export also varies across sub-periods. This category could register positive growth only in third phase (2000-2004). In all the other phases, exports of this category depicted negative growth. As a result, its share in Pakistan's overall exports has declined from 4.1 percent in the first phase to 2.1 percent in the last phase.

Detail data analysis suggests that except food & live animals most of the world exports categories witnessed highest growth in third phase followed by significant slowdown in the last phase (Table 2a). The highest growth in the former period may be explained by congenial domestic and international environment while



slowdown in the latter period might have stemmed from collapse of global demand and severe power shortages along with heightening security concerns at home. Moreover, amongst all the export categories of textile and clothing exports appear to be more in line with world exports trends. Thus one may argue that world demand has a greater role in export determination of this category.

Unlike the broad growth trends, however, composition of Pakistan's exports is quite different compared with that of world's exports. In Pakistan's case, exports are largely concentrated in low value added labor intensive products while world exports mainly consist of high-tech products (Table 2b). For instance, textile & clothing and rice constitute around 70 percent of overall Pakistan's exports whereas share of these items in the world exports is less than five percent.

Importantly, high-tech exports like machinery and transport equipments have not only the predominant share in world overall exports, but pace of world demand growth for these products is also faster compared with that of low-tech exports. Thus, the sooner Pakistan diversify its exports to high-tech products, the better it can benefit from fast growing world demand.

Encouragingly, there is some improvement in moving from low value added to high value added exports in Pakistan. For example, within the textile sectors there is gradual shift from exports of low value added yarn and fabrics to middle value added made-ups (bed wear and towels) and high value added clothing exports. Likewise, share of high value added machinery & transport equipments exports in Pakistan's overall exports has increased from 1.0 percent in 1990 to 4.5 in 2007 before falling to 2.3 percent in 2009. Nonetheless, pace of this diversification is very slow.

Thus, although Pakistan's export growth is broadly in line with the global trends, it could not increase its share in the world exports owing to low value added exports. Unlike Pakistan, most of the other Asian economies have increased their share in world exports by successfully diversifying their exports from low-tech to high-tech products. This structural change helped these regional economies to increase their share in the world exports by benefitting from the relatively fast growth of world demand for high-tech products.²

4. Data and methodology

Three digits SITC classification data on Pakistan's exports was collected from United Nations Comtrade database and Yearbook of International Trade Statistics. Keeping in view the availability of unit prices and share in overall exports, 9 exports categories were selected for analysis. These categories comprise more than 60 percent of Pakistan's overall exports during the sample period (1988-2009) (Annexure 1).

In order to determine Pakistan's exports competitors for these categories, top ten exporters of each category in the world were selected (Annexure 2). Export price indices of Pakistan and its main competitors for these categories were computed from quantum and value data of United Nations Comtrade database and Yearbook of International Trade Statistics. Weighted averages of price indices of

² Following exports oriented strategy; newly industrialized economies (NIEs) were able to attract multinational enterprises investment which helped in high-tech production.

competitors were computed by using average shares of competitors in the world exports during 2000-2009.

To compute nominal effective exchange rate for competitors, bilateral exchange rates were taken from International Financial Statistics. Weighted average exchange rate indices of the competitors were calculated by using the same weights as in export price indices. The rationale behind using competitors' weights rather than partners' weight is the assumption that developing countries exports compete more with the exports of other developing countries than with the industries of trading partners (mostly developed countries). As a scale variable, world total imports of each category were taken from UN data sources.

According to Bahmani-Oskooee & Ardalani (2006), the common practice to formulate export demand function is to relate volume of exports to a measure of expenditure and relative prices taking into account the exchange rate. Following the common practice, demand function for Pakistan's exports is supposed to be:

$$RX_{it} = \alpha_i + \beta_{1i}(WIR_{it}) - \beta_{2i}(UVIP_{it}/UVIW_{it}) - \beta_{3i}(ERIP_t/ERIC_{it}) + \varepsilon_t \quad (1)$$

Where: $i = 1, \dots, k$, denotes the category of exports, t is the time period, RX is real exports, WIR is the world real imports variable which captures the condition of demand in the world, $UVIP$ represents the price of exports goods from Pakistan, $UVIW$ is a measure of competitors' price, $ERIP$ is the exchange rate index for Pakistan and $ERIC$ is the weighted average exchange rate index for competitors, and ε is random term with usual properties. All the variables are in natural log form and expected signs of the parameters are: $\beta_1 > 0$, $\beta_2 < 0$ and $\beta_3 < 0$.

While all the studies on the subject have used the same definition of export prices of reporting country, there are differences on the definition of competitors' export price and scale variables. For instance, Goldstein and Khan (1978), Aspe and Giavazzi (1982), Riedel (1988), Marquez and McNelly (1988) have used trade weighted world income as the indicator for world demand, whereas Roy (2007), Lucas (1987), Mukerjee (1992), Muscatelli et al. (1994 and 1995) and Beena and Mallick (2010) have used world import as the scale variable. Likewise, some studies have used wholesale price index of destination countries as the indicators of competitors' price and others have used the index of world import prices.

This study has opted for the world import prices as the measure of competitors' price on the basis that exporting country is mainly competing with other imported goods, as opposed to domestic goods produced in the destination countries.

Moreover, following most of the studies on disaggregated (sectoral) exports demand, this study has used world real imports as the indicator of world demand.

Furthermore, to capture the exchange rate dynamics compared with main competitors, this study has used nominal effective exchange rate index (ERIP/ERIC) for competitors. As the rates in US dollar per unit of national currency, upward movement of the index means appreciation and downward movement as depreciation of exchange rate.

With the objective of estimating long run elasticities for exports at disaggregated level, the study has used generalized method of moments (GMM) that takes care of potential problems of endogeneity and heteroskedasticity in the models of exports.

5. Results

Table 3 represents a summary of the elasticity estimates of nine categories of exports obtained through GMM. Except textile yarn, the regression results showed correct sign for both the price and expenditure elasticities for all the export categories. However, the magnitude of the elasticities varies across categories. Sector-wise results of the exports demand function are discussed as under:

Low value added (rice, yarn and leather):

World demand appears to have a smaller role in the export promotion of low value added exports. For example, while rice exports are less elastic (showing price and expenditure elasticity around -0.5 and 0.3), cotton yarn equations have got incorrect expenditure elasticity (therefore dropped) sign. Thus it may be argued that supply side factors have a greater role in export determination of these categories. To check this, cotton production was introduced as an independent variable in cotton yarn equations. The result suggests that cotton production has a role in exports growth of cotton yarn.

So far as leather exports are concerned, its expenditure elasticity is also very low, suggesting greater role of supply side factors. Nonetheless, its price elasticity is closer to unity.

Middle value added (cotton fabrics and made-ups):

Pakistan is the world leading exporters of these categories. Specifically, it is the world second largest exporter of made-ups (7.6 percent share in the world exports) and fourth largest export of cotton fabrics (7.3 percent share in the world exports). The results show that amongst all the export categories, made-ups (bed-wear and

towels) benefit the most from world trade expansion and favorable changes in export prices. Both the price and income elasticity are greater than unity for this category. Price elastic export demand for made-ups also suggests that time to time imposition of antidumping duty on Pakistan bed-wear exports and subsequent changes in relative prices severely hurt Pakistan's exports of this category. Likewise, demand factors also play important role in the exports of cotton fabrics. The price elasticity for cotton fabrics is unity while its expenditure elasticity is also closer to unity.

Table 3. Estimated Export Demand Equations

<i>Equation for export demand of:</i>	α	β_1	β_2	β_3	cot*	AR(1)	R^2	J-stat
Rice	3.6 (4.6)	0.3 (3.3)	-0.5 (-3.0)	-1.2 (-7.8)			0.84	0.01
Leather	0.2 (0.2)	0.6 (5.4)	-0.9 (-12.0)	-0.2 (-4.5)		0.6 (5.5)	0.76	0.17
Textile yarn	7.0 (761.8)		-0.2 (-2.2)	-0.4 (-9.4)	0.4 (7.1)	0.3 (5.7)	0.5	0.19
Cotton fabrics	-0.4 (-0.6)	0.8 (12.8)	-1.0 (-15.6)	-1.1 (-5.7)			0.95	0.06
Artciles of textile (Made-ups)	-6.2 (-18.0)	1.4 (38.2)	-1.6 (-10.1)	-0.8 (-4.6)			0.93	0.08
Men and boys garments, not knitted	-3.4 (-2.9)	0.9 (8.3)	-0.5 (-3.3)	-0.5 (-4.1)			0.9	0.03
Men and boys garments, knitted	-0.7 (-0.9)	0.8 (8.7)	-0.4 (-3.6)	-0.7 (-4.3)			0.9	0
Cloth access	-4.2 (-3.2)	1.0 (6.7)	-0.6 (-1.8)	-0.4 (-2.0)			0.74	0.08
App and access (other than textile fabrics)	-3.2 (-5.1)	0.9 (13.8)	-1.3 (-13.3)	-1.1 (-4.1)	-0.2 (-1.7)		0.7	0.2

* cot is cotton production deviation from trend

High Value Added (Apparel and Clothing):

Although overall share of Pakistan's clothing exports in the world market is relatively low, some of its clothing categories are included in the top ten world exporters. For example, Pakistan is fourth world largest exporter of men and boys knitted garments exports while it is ninth world largest exporter of articles of apparel & clothing accessories (of other than textile fabrics).

In sharp contrast to low value added exports, expenditure elasticity of all the high value added categories is either unity or close to unity. However, estimates of the price elasticity are mixed.

In view of the above, it may be argued that low value added (primary) exports benefitted less from the growing world demand, while world demand has played its role in the exports promotion of middle and high value added exports. Conversely, in the world recession, the exports of the former categories were less affected whereas exports of the latter were significantly affected.

6. Conclusion

The paper has explored the role of international demand in determining exports from Pakistan at disaggregated level. The model was set out in terms of relative prices, relative exchange rate and world real import as a scale factor. To estimate the model generalized method of moments was used.

World demand factors are found important in explaining Pakistan's export performance at the disaggregated level. Most disaggregated exports are responsive to world demand and relative prices. The degree of this responsiveness is relatively high for value added exports than that of primary or low value added exports. Thus, diversifying its exports from primary and low value added categories to high value added categories appears to be the best strategy to benefit from world demand expansion.

The work on disaggregated exports demand function can further be improved by using the dual trade-weighted price and exchange rate indices. This will incorporate weights of both the partners as well as competitors countries.

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Annexure. 1**Analysis of Pakistan's Exports: Selected Categories at SITC-3**

SITC-3 Codes	1989-1994		1995-99		2000-04		2005-09	
	Share	Growth	Share	Growth	Share	Growth	Share	Growth
42	5.0	11.5	6.1	5.4	5.3	4.4	8.4	30.2
611	3.9	-10.3	2.6	-9.9	2.3	10.9	1.9	0.6
651	17.7	6.6	16.2	-9.1	10.3	0.7	7.7	4.3
652	11.6	12.0	14.2	3.4	12.2	9.3	11.3	0.2
658	9.0	10.1	11.4	13.8	17.2	14.8	17.6	5.1
841	4.4	11.5	5.3	6.5	5.1	2.4	4.7	10.5
843	2.6	11.9	4.4	13.5	5.5	10.1	4.7	0.3
846	1.5	24.3	1.7	-7.1	2.3	20.5	2.0	5.4
848	5.0	17.8	4.0	-0.6	3.6	7.8	3.4	4.6
Total	60.7	7.7	65.9	1.0	63.8	10.0	61.7	6.2

Code names: 042: Rice, 611: leather, 651: Textile yarn, 652: Cotton fabrics, 658: Made-up articles, 841: Men's or boys' coats, capes, jackets, suits, blazers, trousers, shorts, shirts, underwear, nightwear and similar articles of textile fabrics, not knitted or crocheted; 843: Men's or boys' coats, capes, jackets, suits, blazers, trousers, shorts, shirts, underwear, nightwear and similar articles of textile fabrics, knitted or crocheted; 846: Clothing accessories, of textile fabrics, whether or not knitted or crocheted; 848: Articles of apparel and clothing accessories of other than textile fabrics

Annexure. 2

Top Ten Exporters in the World (2008)					
Rice (042)		Leather (611)		Textile Yarn (651)	
	% share		% share		% share
Pakistan	11.4	Pakistan	1.7	Pakistan	2.8
Thailand	28.4	Italy	20.3	China	19.2
Viet Nam	13.5	Hong Kong	9	Hong Kong	7.2
India	13.2	Brazil	8.2	Germany	6.8
US	10.3	US	4	Italy	6.7
Italy	3.8	Argentina	3.9	India	6.7
UAE	2.4	Cape Verde	3.9	US	6.3
China	2.2	Germany	3.9	Indonesia	3.9
Uruguay	2.1	Korea	3.7	Korea	3.1
Uruguay	2.1	India	3.4	Turkey	2.8
Brazil	1.5	Nigeria	3	Japan	2.6
Cotton Fabrics (652)		Made-ups (658)		Men or boys garments not knitted (841)	
Pakistan	7.3	Pakistan	7.6	Pakistan	1.4
China	33.8	China	40.6	China	27.1
Italy	8.7	India	5.9	Italy	7.7
Hong Kong	8.7	Turkey	5.1	Germany	6.5
Germany	4.2	Germany	4.1	Bangladesh	5.2
Turkey	3.8	US	2.5	Hong Kong	5.1
India	3.6	Belgium	2.4	Turkey	3.4
Japan	2.8	France	1.8	Viet Nam	3.2
France	2.4	Poland	1.8	Mexico	3.1
Spain	2.4	Portugal	1.8	India	2.7
US	2.3	Italy	1.8	Belgium	2.7
Men or boys garments knitted (843)		Clothing Accessories of Textile Fabrics (846)		Articles Of App & Acess of other than textile fabrics (848)	
Pakistan	3.6	Pakistan	1.7	Pakistan	2.9
China	44.5	China	35.3	China	30.8
Hong Kong	5.2	Italy	12.3	Malaysia	9.5
India	3.8	Germany	4.4	Italy	8.5
Cambodia	3	Turkey	4	Hong Kong	6.2
Bangladesh	2.9	France	3.2	Germany	4.7
Viet Nam	2.7	US	3.1	France	3.4
Italy	2.6	Korea	3	US	3.3
Turkey	2.5	India	3	Thailand	3.2
Thailand	2.3	Hong Kong	2.7	India	3.2
Germany	2.1	Belgium	2.7	Belgium	2.3