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Unexplored Export Potential of Medical, Surgical and Veterinary Instruments of Pakistan: A Comparative Econometric Analysis

Muhammad Saif ur Rehman[*]
Zafar Mahmood[**]
Atiq-ur-Rehman[***]

Abstract

Current study quantifies the Unexplored Export Potential (UEP) of Medical, Surgical and Veterinary Instruments of Pakistan, to selected countries. It confronts and resolves the issue of missing values, which is common at disaggregate level research. To serve the purpose of quantification, this study comparatively employs the Out-of-Sample projection approach, the In-Sample projection approach and the Empirical Bayes (EB) method. Results obtained through the Out-of-Sample projection approach indicate the respective presence of more than US$1 million UEP to 10 importing partners including Singapore, Netherlands, Saudi Arabia, Spain, Sweden, Poland, Austria, Denmark, Kuwait, and Finland. The results obtained through In-Sample projection approach indicate the respective presence of more than US$1 million UEP to 4 importing countries i.e. Germany, Mexico, USA, and Singapore. Similarly, the results obtained from EB method indicate the respective presence of more than US$1 million UEP to Singapore, Netherlands, Saudi Arabia, Spain, Sweden, Poland, Austria, Denmark, Kuwait, and Finland. The Out-of-Sample and In-Sample projection approaches are based upon OLS method. These estimates are not in line with economic theory, in most of the selected countries' cases. On the other hand,

[*] Muhammad Saif ur Rehman <maliksaif@gmail.com> is PhD student in School of Economic Sciences, Federal Urdu University of Arts, Science and Technology (FUUAST), Islamabad.
[**] Zafar Mahmood is Professor of Economics & HOD Research, School of Social Sciences and Humanities, National University of Sciences and Technology, Islamabad.
[***] Atiq-ur-Rehman is Assistant Professor in International Institute of Islamic Economics, International Islamic University Islamabad.

EB estimates are consistent with economic theory for all selected countries' cases. Thus, UEPs that have been quantified through EB method are more valuable to be trusted. This study is expected to assist the policy makers and especially the Pakistani exporters in identifying the top important destinations for export of selected instruments.

Keywords: Gravity Model, Unexplored Export Potential, Empirical Bayes Method

1. Introduction

Pakistan is one of the major producers of Medical, Surgical and Veterinary Instruments (MSVI).[1] It exports more than 80 percent of the total production of these instruments. However, Pakistan's share in world market of these instruments is small, out of a total world import of US $ 70 billion in 2011; Pakistan exported MSVI worth US$236 million.[2] During the 2000s, the average per annum size of export of Medical, Surgical and Veterinary Instruments of Pakistan (MSVIP) remained around US$200 million.

This paper estimates the Unexplored Export Potential (UEP) of (MSVIP)[3] to selected countries.[4] The related trade literature is enriched with studies that quantify the unexplored trade or export potential of country/countries at the aggregate level.[5] Nonetheless, limited research work has been carried out at the disaggregate level.[6] An apparent reason for the limited research work at the disaggregate level is the irregular availability of

[1]Sialkot and its nearby areas keep a history of 100 years for producing these instruments.
[2]Observed from data obtained from www.comtrade.com for the year 2011, as reported by importing countries.
[3]Standard International Trade Classification Code (SITC Rev. 2, Code: 87202).
[4]The selected 42 countries are top importers of MSVIP and required data are mostly available for them.
[5]At the aggregate level, some worth mentioning studies are of Ogunkola (1998); Kalbasi (2001); Rehman (2003); Batra (2004); Benedicts and Vicarelli (2005); Pradhan (2006); Ram and Prasad (2007); Rahman (2009); Ozdeser and Ertac (2010); Simkawa (2010); Huseyin and Dizem (2010); Karagöz and Saray (2010); Kamal, *et al*. (2011) and Gul and Yasin (2011).
[6]At disaggregate level, worth mentioning studies are of Helmers and Pasteels (2006); Eita and Jordaan (2007); Butt (2008); Shepotylo (2009) and Hermawan (2011).

disaggregated data.

Both, the aggregate and the disaggregate level studies commonly use Gravity Model of Trade (GMT), for the quantification of UEP. The GMT resembles Newton's Gravity[7] Model (GM). However, unlike masses of the objects that Newton used in his famous GM, the GMT uses Gross Domestic Products (GDPs) of trading partners. Tinbergen (1962) introduces the idea of using GDPs in GMT. He explains that the level of trade between trading partners is directly proportional to the product of their GDPs and inversely proportional to the distance between them.

Historically, the empirical soundness of GMT was never denied. However, it always faced the criticism of not having the theoretical underpinnings. To redress this limitation of GMT, the studies of Anderson (1979); Bergstrand (1985); Helpman and Krugman (1985) and Anderson and Wincoop (2003) are remarkable.

To quantify the UEP from GMT, two types of empirical approaches are commonly used. Egger (2002) terms these approaches as the Out-of-Sample projection approach and the In-Sample projection approach. The Out-of-Sample projection approach could only be considered as reasonable, if the development levels of the selected countries are alike. While, the use of In-Sample projection approach is questionable because of the fact that correctly specified econometric model could never have systematic variations in residuals. Thus, the researches that employ In-Sample projection approach and predict systematic UEPs undoubtedly use misspecified econometric models.[8]

This paper employs the Out-of-Sample, the In-Sample Projection approaches and the Empirical Bayes (EB) method for the quantification of UEP of MSVIP. The EB method is particularly useful for the data with the

[7]The gravitational pull between any two objects in Newton's gravity model is directly proportional to the product of their masses and inversely proportional to the square of the distance between them.
[8]For details see, Egger (2002).

short time series dimension. It is free from the objections that are faced by the Out-of-Sample and the In-Sample Projection approaches. Moreover, the use of prior distribution (estimated from the available data) makes EB method superior to the other two projection approaches.

Besides the use of appropriate empirical approach, the use of appropriate proxies in GMT is also important. The use of GDPs (as independent variables) in GMT seems appropriate in case of aggregate level research. However, at commodity or disaggregate level, it is more appropriate to use the production and consumption data of a selected specific sector. Unfortunately, such data are rarely available.

At the commodity level research, in the GMT, Helmers and Pasteels (2006) use values of Mongolian exports of specific selected commodities to the world (as a replacement for GDP of Mongolia) and values of China's imports of the same selected commodities (from the world) instead of the GDP of China. Taking lead from this insight, we utilize the dollar value of imports of MSVIP,[9] reported by rest of the world[10] (as a proxy for production of MSVIP) and dollar value of imports of MSVI, reported by trading partners from rest of the world[11] (as proxy for consumption of MSVI in a partner country). Whereas, the dependent variable in the present case is the dollar value of imports[12] of MSVIP, reported by the partner country.[13]

Current study utilizes the data reported by importing partners. The importing partners report CIF values[14] for their imports. The CIF values include aggregate trade costs that include the transportation costs. The transportation costs are part of GMT, in the form of geographical distance. Thus, it is better to use CIF values instead of using the geographical distance

[9]The exported and imported quantity of MSVIP is the same. However, exporting country reports it at FOB values and importing country at CIF values.
[10]Imported by the world (excluding trading partner country).
[11]Imported from world (excluding Pakistan).
[12]This proxy has been Preferred over the Pakistan's reported dollar value of exports of MSVIP.
[13]Comtrade <*comtrade.un.org*> used as main data source.
[14]Values that include cost, insurance and freight.

(the time invariant component of GMT), especially in the panel data studies. Moreover, the export data reported by Pakistani exporters could not be considered as correct.[15] Mahmood and Azhar (2001) verify that the Pakistani exporters over-invoice their export products to receive export incentives like; duty drawbacks, concessional export finance and income tax rebate.

In the above perspective, this paper introduces appropriate proxies in GMT in place of GDPs and takes care of missing values problem (using the Tobit model). In addition, it comparatively quantifies the UEP of MSVIP by employing the EB method along with the commonly used Out-of-Sample and In-Sample projection approaches.

In following sections; methodological issues are discussed in section 2 and results are reported in section 3. Finally, section 4 concludes the paper and draws some policy implications.

2. Methodological Issues

This section discusses the methodological issues involved in the quantification of UEP of the MSVIP.

2.1 Data Levels and Missing Values

The aggregate and disaggregate data level is usually used for the quantification of Unexplored Trade Potential or Unexplored Export Potential (UTP/UEP). Perceptibly, disaggregate level data (as opposed to aggregate level data) preserve the minute details about events. This characteristic of disaggregate level data especially increases the importance of its use.

Nonetheless, the major problem in disaggregate level data is the occurrence of missing values. Polasek and Sellner (2010) explains that missing data in disaggregated flow models occur quite often since detailed measurements are often not possible at all observation points in time and

[15]The data provided by Comtrade confirm this fact.

space. The occurrence of missing values at disaggregate level analysis is the apparent reason for limited research at this level. Current study confronts this problem and tries to solve the issue of missing values.

2.2 Handling the Missing Values

Traditionally the easiest way of dealing with the missing values is to exclude those partner countries from the analysis, where dependent variable involves missing values. However, current study deals (where required) with the missing values through the Tobit model. Taking into account the dependent[16] variable and the two core independent[17] variables, regression analyses have been performed (separately for all those countries where dependent variable includes missing values), using the Tobit model. The obtained values of parameters are then used to calculate the missing values.

2.3 Unit Root and Co-integration

Time series data (in general) show the non-stationary behavior that could lead to spurious results. Therefore, ADF unit root test has been applied to test for unit root. Whereas, Engle and Granger (1987), 2-Step procedure has been adopted to test for co-integration.

Appendix Table A.1 presents the unit root and co-integration tests results. The co-integration results confirm the long run relationship between the dependent variable and all the independent variables, in case of all 42 countries.

2.4. Selection between Fixed and Random Effects

Hausman test decides the use of Fixed or Random Effects. Appendix Table A.5 shows that this test recommends the use of Fixed Effects model, in

[16]The dollar value of import of MSVIP (reported by the partner country).
[17]First core independent variable is WIP, which indicates rest of the world's import of MSVIP. Second core independent variable is VIW, which indicate partner country's import of MSVI from the rest of the world, i.e., excluding Pakistan.

the present case. Thus, it is utilized to calculate UEP for the Out-of-Sample estimation of UEP.

2.5 Quantification of Unexplored Export Potential (UEP)

The UEP of MSVIP is quanitfied using three methods. The first two methods that are termed as Out of Sample Projection approach and In-Sample Projection approach are commonly used for the quantification of UEP. While using Out of Sample Projection Approach the OLS estimates are calculated (for the finally employed augmented[18] GMT) for the top 9 importing partners of MSVIP. These estimates are then used in separate cases of 33 remaining importing partners. The difference between the predicted values and the actual values is then presented as UEP of MSVIP. In case of In-Sample Projection Approach the OLS estimates for all sample countries are calculated using finally retained augmented GMT and the difference between the predicted and the actual values is presented as UEP.

As a third option, the EB method is employed for the quantification of UEP of MSVIP. The use of this method is a fresh attempt and the idea of using EB method for the panel data analysis is also supported by Koop (1999).

In other words, EB estimates the priors from in hand data (Zaman, 1996) and the regression coefficients estimated through EB method are called posterior estimates.[19] Whereas, the quantified UEPs of MSVIP (in the current study) are the differences between posterior predictions and the actual values of imports of MSVIP, reported by partner countries.[20]

2.6. The Employed Model

The following specific form of the GMT is taken:

18Augmented version of GMT includes other important variables that may affect the dependent variable. Moreover, it takes care of missing variable bias.
19For details see, APPENDIX B.
20EB computations have been carried out in Microsoft Excel 2007.

$$\ln (VIP_{i,\ MSVIP}) = a + b_1 \ln(WIP_{MSVIP}) + b_2 \ln(VIW_{i,\ MSVI}) + z\ln(Dist) + ui \quad (1)$$

where, $VIP_{i,MSVIP}$ is the dollar value of imports of MSVIP (reported by the partner country). Subscript i represent the partner country that imports MSVIP.

WIP_{MSVIP} represent the dollar value of imports of MSVIP by rest of the world, i.e., excluding the under analysis importing partner of Pakistan.

$VIW_{i,MSVIP}$ represent the dollar value of imports of MSVI by partner countries from rest of the world, i.e., excluding imports of MSVIP.

Dist represent the aerial distance between Sialkot (Pakistan) and the importing partner's capital city. However, as we consider the CIF values of used data that include[21] aggregate cost, the proxy of transport cost (Dist) has been excluded from the analysis.

Equation (1) is augmented with the control variables to avoid the missing variable bias. Thus, the functional form of the general model is as follows:

$$VIP_{i,MSVIP} = f\ (WIP_{MSVIP},\ VIW_{i,MSVI},\ YPC_i,\ TR_i,\ PPA_i,\ CSE,\ CSI,\ HE_i,\ INF_i) \quad (2)$$

where, $VIP_{i,MSVIP}$, WIP_{MSVIP} and $VIW_{i,MSVI}$ are same as defined for equation (1).

The details of other[22] variables that are included in equation (2) are as follows:

YPC_i: GDP Per Capita of importing partner country, PPP (current

[21]For details see, Pomfret and Sourdin (2010).
[22]Definitions for these (other variables) are available at http://data.worldbank.org/indicator.

international dollars)

TR_i : Total reserves of importing partner country (includes gold, current US$)

PPA_i: Population of ages 15-64 of importing partner country (% of total population)

CSE : Computer, communications and other services (% of commercial service exports)

CSI : Computer, communications and other services (% of commercial service imports)

HE_i : Total Health expenditure of importing partner country (% of GDP)

INF_i : Inflation in importing partner country, GDP deflator (annual %)

Based on the availability of required data, a total of 9 independent variables are included in equation (2). Initial regression analysis (Table 1) shows that CSE is insignificant, for all the selected countries.

Thus, we employ the following augmented gravity model of trade that is comprised of the retained significant variables only.

The Model

$$\ln(VIP_{i,t.MSVIP}) = \alpha + ß_1 \ln(WIP_{t,MSVIP}) + ß_2\ln(VIW_{i,t,MSVI}) + ß_3\ln(YPC_{i,t}) + ß_4\ln(TR_{i,t}) + ß_5(PPA_{i,t}) + ß_6(CSI_t) + ß_7(HE_{i,t}) + ß_8(INF_{i,t}) + \mu_i \quad (3)$$

Subscript t in equation (3) represents time. The signs for parameters $ß_1$, $ß_2$, $ß_3$, $ß_4$, $ß_6$ and $ß_7$ are expected to be positive, economically. Whereas, the sign of $ß_5$ could either be positive or negative. Finally, the negative sign is expected for $ß_8$ on theoretical basis.

Table 1
Significance of Included Independent Variables

Sr. No.	Country	Significance of Variables by OLS Method									
		C	LWIP	LVIW	LYPC	PPA	LTR	CSE	CSI	HE	INF
1	Indonesia	-	+	+	+	+	-	-	-	-	-,s
2	Malaysia	-,s	+,s	-	+	+	-	-	+	-	-
3	Philippines	+	+	+	-	+	-	+	+	+	-
4	Singapore	+	+,s	-	+,s	-,s	-	+	+	+,s	+
5	Thailand	+	-	+,s	-	-	+	+	+	-	-
6	Bangladesh	+	-	-	-	+	+	+	+	-	+,s
7	India	-,s	+	-	-	+	-	-	+	-	-
8	Sri Lanka	+	-	+	+	-	+	-	+	+	+
9	Turkey	-	+	+	-	+	-	+	+	+	+
10	Bahrain	-	+	+,s	+	-	-	-	+	+	+
11	Kuwait	-	+	+	-	-	-	+	-	+	-
12	Oman	-	+	+	+	-	-	-	+	-	-
13	Saudi-Arabia	-	+	+,s	-	-	+	-	+	+	+
14	Austria	-	+	-	-	+	+	+	-	+	+
15	Bulgaria	-	-	+	+,s	-	-,s	+	-,s	+	-
16	Cyprus	-	+	+	+	-	+	+	-	+	+
17	CZRP	-,s	+,s	-,s	-,s	+,s	+,s	+	-	-	+
18	Denmark	-,s	+	-	+,s	+,s	-	-	+	+,s	-
19	Finland	+	+	+	-	-	-	-	-	+	+
20	Greece	-	+	-	+	+	+	-	+	-	+
21	Hungry	-	+	-	-	+	-,s	-	-	-	-
22	Ireland	+	-	+	+	+	-	-	-	+,s	+
23	Latvia	-,s	+	-	-	+,s	-	+	+	-	-
24	Lithuania	-	+	-	-	-	+	+	-	-	+
25	Malta	-	+	-	-	-	+	-	+	+	-
26	Netherland	-,s	-,s	+	+,s	+,s	+,s	-	+,s	-	-
27	Poland	-	-	-	+	+	-	+	+	+	+
28	Portugal	-	+	-	+	+	+	-	-	-	+
29	Romania	+	-,s	-	+,s	+	-	-	+,s	-	+
30	Slovakia	-	+	-	-	+	-	+	-	-	-
31	Slovenia	-	+,s	-	-	+	+	+	-	-	-
32	Spain	+	-	-	+,s	-	+	+	-	+	+,s
33	Sweden	+,s	+	+	+	-,s	+	+	-	-	+
34	Australia	-	-,s	+,s	-	+	-	-	+	+	-
35	Brazil	+	-	+	+	-	+,s	-	+	+,s	-,s
36	France	-,s	+	+,s	+	+	+,s	-	+	-	-

37	Germany	-	-	+	+	+	+	+	-	-	-
38	Italy	-	-	+	+,s	-	-	+	-,s	-	+,s
39	Japan	+	-	+,s	-	-	+	+	-	-	-
40	Mexico	-	-	-	+	+,s	+	+	-	-	-,s
41	UK	+	+	+	+	-	-	-	+	+	+
42	USA	-	+,s	+	-	+	+	-	-	-	-

At 5% level of significance, +,s and -,s represents significance and + and - signs represents insignificance.
Source: Authors' estimates.

Economic reasons for the above mentioned expected signs of parameters could be briefly explained as follows:

If the dollar value of imports of MSVIP increases for rest of the world, then this value is expected to increase in case of the importing partner of MSVIP. Thus, the sign for $ß_1$ is expected to turn up as positive. Similarly, if dollar value of imports of a partner country increases for MSVIP from rest of the world, it is expected that the dollar value of imports of MSVIP for that country would also increase. Thus, the sign for $ß_2$ is expected to be positive.

The partner countries that have higher level of GDP per capita or Total Reserves are more likely to spend on health care facilities of their people. Thus, the signs for $ß_3$ and $ß_4$ are expected to be positive.

The population that belongs to 15 to 64 years of age group (in a partner country) is more vulnerable to injuries. This is because the people in this age group are considered as more dynamic in their day-to-day activities. However, if a partner country ensures specific safety measures for its working class then the chance of mishaps decrease. Hence, the sign for $ß_5$ is ambiguous, i.e., it may be positive or negative.

Liang and Reichert (2010) confirm that CSI boosts economic growth by increasing productivity and lowering operating costs. Higher CSI value is an indication of lower operating costs. A technologically advanced importing partner country could avoid the extraordinary deferment in receiving the shipment. Thus, the sign for ß6 is expected to be positive.

If the partner country allocates a higher portion of its budget for the health sector, it is expected that it would allow greater import of MSVIP. Hence, the sign for ß7 is expected to be positive. Finally, as inflation reduces the purchasing power, the partner country with higher rate of inflation is expected to import less of MSVIP. Therefore, the expected sign for ß8is negative.

3. Data

The data for VIP, WIFP and VIRW (available at http://comtrade.un.org/) is not available for most of the selected countries, prior to the 1990. However, with missing values in some cases data is available from 1990 onwards. On the other hand, in case of some selected countries these required data are available only up to the year 2010. Thus, the current study has been constrained to use the data from 1990 to 2010. The data for other variables (YPC, PPA, TR, CSE, CSI, HE, and INF) are available at World Bank's website (http://data.worldbank.org/).

Besides the above stated data limitations, this study (for quantification of UEP of MSVIP) considers same structure and production scale of the industry of MSVIP and same import pattern of importing partners in the future. This may be treated as a limitation of the analysis.

4. Results

4.1 Unit Root Testing

Panel data for the years 1990 to 2010 is used. Appendix table A1 presents the unit root and the co-integration results of all the utilized data series. The results show that all employed variables are co-integrated with the dependent variable, in all countries' cases. Thus, the regression results could safely be considered as meaningful and reliable.

4.2 OLS versus EB Estimates

Appendix table A2 shows that the sign of OLS estimates (for different

employed independent variables) do not comply with economic theory. This happens in case of many of the sample countries. This observation is not very strange when the time series length is very short. However, the inaccuracy of a small sample could be overcome by EB approach, which utilizes the prior information, as well. Appendix Table A3 shows that the signs of EB estimates are in accordance with economic theory, for all the variables, and for all the selected countries.

4.3 Quantified UEP

Table 2 presents the estimated values of UEP, obtained through the three employed methodologies. In this table countries with maximum presence of UEP (quantified through EB method) have been placed at the top. The Out-of-Sample projection approach indicates the respective presence of more than US$1 million UEP to the 10 importing partners. These are Singapore, Netherlands, Saudi Arabia, Span, Sweden, Poland, Austria, Denmark, Kuwait and Finland. The results further show that the remaining importing partners with the exception of Sri Lanka, Bangladesh and India that are already overtraded have less than US$1 million UEP for MSVIP.

The results obtained through In-Sample projection approach indicate the respective presence of more than US$1 million UEP to 4 importing countries. These are Germany, Mexico, USA, and Singapore. The remaining countries (except for Slovak Republic, Thailand, Indonesia, Romania, Bulgaria, France, Japan, Turkey, India, Czech Republic (CZRP) that are already overtraded) have less than US$1 million UEP for MSVIP.

Similarly, the results obtained from EB method indicate the respective presence of more than US$1 million UEP to Singapore, Netherlands, Saudi Arabia, Span, Sweden, Poland, Austria, Denmark, Kuwait, and Finland. The remaining countries (except for Sri Lanka, Bangladesh, Thailand, Turkey, France, Japan, CZRP, India, Brazil, Australia, Mexico, United Kingdom, Germany, United States of America that already overtrade) have less than US$1 million UEP for MSVIP.

Table 2
UEP of MSVIP to Selected Countries (US$ Million)

Serial No.	Country	Unexplored Export Potential (Million $)		
		Out-Of-Sample Method	In-Sample Method	EB Method
1	Denmark	2.18	0.05	9.62
2	Netherland	10.28	0.05	3.96
3	Spain	4.61	0.17	2.62
4	Saudia	5.39	0.00	2.51
5	Sweden	2.92	0.02	2.43
6	Italy	---	0.41	1.68
7	Austria	2.33	0.04	1.65
8	Greece	0.69	0.01	1.41
9	Portugal	0.41	0.00	1.38
10	Ireland	0.96	0.01	1.18
11	Finland	1.24	0.01	0.92
12	Hungry	0.84	0.33	0.63
13	Slovenia	0.21	0.00	0.55
14	Slovakia	0.33	-0.01	0.54
15	Singapore	11.59	1.30	0.51
16	Poland	2.79	0.01	0.36
17	Cyprus	0.25	0.01	0.34
18	Latvia	0.19	0.00	0.29
19	Lithuania	0.27	0.03	0.26
20	Kuwait	2.02	0.01	0.25
21	Malta	0.07	0.00	0.22
22	Oman	0.52	0.00	0.18
23	Bulgaria	0.03	-0.07	0.17
24	Bahrain	0.33	0.00	0.14
25	Romania	0.70	-0.06	0.14
26	Philippines	0.00	0.00	0.08
27	Indonesia	0.19	-0.04	0.04
28	Malaysia	0.75	0.00	0.01
29	Sri Lanka	-0.13	0.00	-0.13
30	Bangladesh	-0.39	0.07	-0.31
31	Thailand	0.44	-0.01	-0.68
32	Turkey	0.92	-0.61	-0.84
33	France	-	-0.17	-1.01
34	Japan	-	-0.52	-1.08
35	CZRP	0.46	-1.10	-1.40
36	India	-1.16	-0.78	-1.61
37	Brazil	-	0.90	-3.49

38	Australia	-	0.05	-3.63
39	Mexico	-	1.74	-11.71
40	Uk	-	0.43	-18.86
41	Germany	-	3.56	-22.74
42	Usa	-	1.60	-35.77

Source: Authors' estimates.

Table 3 presents UEP in the form of ratios. The results obtained from Out-of-Sample projection approach indicate the presence of UEP (i.e., more than 10 times of the actual value of VIP in the year 2010) of MSVIP to Bahrain, Cyprus, Kuwait, Oman, Slovenia, Latvia, Finland, Sweden, Lithuania, Hungry, and Austria. The remaining countries (except India, Sri Lanka, Bangladesh, Australia, Brazil, France, Germany, Italy, Japan, Mexico, United Kingdom, United States of America that are already overtraded) have UEP less than 10 times of actual value of VIP in the year 2010.

Table 3
UEP of MSVIP to Selected Countries (Ratio)

S.No.	Country	Unexplored Export Potential (Ratio)		
		Out-Of-Sample Method	In-Sample Method	EB Method
1	Bahrain	1182.54	7.49	507.65
2	Cyprus	132.55	5.67	179.15
3	Slovenia	54.49	0.87	143.49
4	Latvia	37.45	1.78	57.12
5	Malta	9.20	0.89	26.68
6	Oman	72.99	1.10	25.58
7	Finland	24.12	1.14	18.27
8	Greece	8.72	1.12	16.74
9	Sweden	18.14	1.09	15.31
10	Lithuania	14.64	2.45	14.32
11	Denmark	3.75	1.07	13.16
12	Kuwait	95.20	1.45	12.82
13	Slovakia	7.60	0.84	11.62
14	Hungry	10.98	4.91	8.54
15	Austria	10.18	1.16	7.51
16	Ireland	5.10	1.05	6.01
17	Spain	8.84	1.29	5.45
18	Saudia	9.42	1.01	4.93
19	Nehterland	8.57	1.04	3.92

20	Portugal	1.83	0.99	3.78
21	Romania	6.29	0.56	2.08
22	Bulgaria	1.14	0.68	1.76
23	Italy	-	1.18	1.74
24	Phillipines	1.00	1.02	1.62
25	Polnad	5.29	1.02	1.55
26	Singapore	5.87	1.55	1.22
27	Indonesia	1.81	0.84	1.20
28	Malaysia	2.41	0.99	1.01
29	France	-	0.98	0.90
30	Japan	-	0.86	0.71
31	Turkey	1.51	0.66	0.53
32	Czrp	1.20	0.51	0.38
33	Thailand	1.43	0.99	0.34
34	Brazil	-	1.17	0.32
35	Usa	-	1.03	0.31
36	Sri Lanka	0.33	0.98	0.30
37	Bangladesh	0.06	1.16	0.26
38	India	0.44	0.62	0.22
39	Germany	-	1.13	0.15
40	Uk	-	1.02	0.15
41	Mexico	-	1.13	0.13
42	Australia	-	1.01	0.02

Source: Authors' estimates.

Similarly, in the case of In-Sample projection approach, no country indicates the presence of UEP more than 10 times of the actual value of VIP in the year 2010. However, the presence of less than 10 times of the actual value of VIP in 2010 quantified in all countries' cases except the already overtraded countries are; Malaysia, Portugal, Thailand, France, Sri Lanka, Malta, Slovenia, Japan, Slovak Republic, Indonesia, Bulgaria, Turkey, India, Romania, and CZRP.

Finally, in case of the EB method presence of UEP of MSVIP for more than 10 times of the actual value of VIP in the year 2010 was found for Bahrain, Cyprus, Slovenia, Latvia, Malta, Oman, Finland, Greece, Sweden, Lithuania, Denmark, Kuwait, and Slovakia. The remaining countries have presence of UEP of MSVIP less than 10 times of the actual value of VIP (recorded in 2010) except the already overtraded countries that are; France,

Japan, Turkey, CZRP, Thailand, Brazil, United States of America, Sri Lanka, Bangladesh, India, Germany, United Kingdom, Mexico, and Australia.

5. Conclusion & Policy Recommendations

The analysis presented in this study is an addition to disaggregate level researches on international trade. It quantifies UEP of MSVIP through three comparative econometric techniques. It employs the GMT and incorporates in it the most suitable proxies for production and consumption of MSVIP, instead of GDPs of partner countries. The study also provides solution to the missing values problem through the Tobit model.

The results obtained through EB method seem to be appropriate as EB estimates (unlike OLS estimates) are in line with economic theory in case of all the countries. These results show that Denmark, Netherlands, Spain, Saudi Arabia, Sweden, Italy, Austria, Greece, Portugal, and Ireland have the maximum presence of UEP, respectively. All these countries have more than US$1 million UEP for MSVIP. Moreover, results show that Finland, Hungry, Slovenia, Slovak Republic, Singapore, Poland, Cyprus, Latvia, Lithuania, Kuwait, Malta, Oman, Bulgaria, Bahrain, Romania, Philippines, Indonesia, and Malaysia have the UEP for MSVIP, below US$1 million and above US$0.01 million, respectively. The remaining countries are overtraded.

The study focuses on quantification of UEP of MSVIP for selected countries. Nonetheless, it helps the policy makers beyond prioritizing the partner countries. Thus, all exogenous variables that are part of finally employed GMT are uncontrolled except “WIP” which is used as a proxy for the production of MSVIP. “WIP” has a positive relationship with the dependent variable “VIP”, in case of all the countries. Thus, more and more production of MSVIP is suggested. On the other side, except for inflation (very minute negative impact, in all cases), all the remaining exogenous variables are positively related with “VIP”.

Along with Out-of-Sample and the In-Sample Projection approaches, current study uses EB methodology (as a fresh attempt), for the

quantification of UEP. Based on the overall results of the study, the EB methodology seems to be more useful for the quantification of UEP of MSVIP. We suggest that future research should prefer EB methodology to the Out-of-Sample and the In-Sample Projection approaches.

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