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Influence of Subsidies on Exports Empirical Estimates, Policy Evidences and Regulatory Prospects

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Abstract

The positive influence of subsidies on merchandise exports is well known from trade theory literature. However, the empirical evidence on the relationship remains ambiguous. The current study conducts a panel data empirical analysis over 1990–2011 for 140 countries to understand the relationship between their overall budgetary subsidies and aggregate merchandise export inclination. The empirical results of this article lead to three major findings. Firstly, overall budgetary supports in all countries, irrespective of their income level, are positively related with aggregate merchandise export expressed as percentage of GDP. However, the low-income countries witness lesser success vis-à-vis their developed counterparts. Secondly, merchandise imports, FDI inward movement and contribution of the industrial sector in the economy positively influence merchandise export inclination, which partially explains the former result. Thirdly, the importance of government budgetary subsidy reporting procedure on merchandise exports is also emphasized. The findings underline the importance of concluding the Doha Round Negotiations of WTO in general and disciplining of subsidies in particular in no uncertain terms.

Keywords: budgetary subsidy, exports, trade policy, WTO

JEL Classification: F2, F10, F13, H 29

Influence of Subsidies on Exports
Empirical Estimates, Policy Evidences and Regulatory Prospects

1. Introduction

Provision of subsidies to local players can be explained by several underlying motivations from the perspective of national governments, namely, industrial development, facilitating innovation, supporting national champions, securing environment-related objectives, ensuring redistribution etc. (Collins-Williams and Salembier, 1996; Lester, 2011). Such subsidies can be provided to the domestic players through interventions both in the input as well as output markets. The efficacy of subsidy policy as a strategic trade instrument is however crucially linked with the local industry's learning capability and the extent to which the domestic and foreign goods are substitutable (Anderson, 2004; Melitz, 2005). The trade theoretic literature also acknowledges that in a scenario characterized by fast capital mobility, imposition of import tariffs leads to better welfare implication as compared to export subsidies (Potipiti, 2012). Nevertheless, presence of domestic distortions in and other compulsions result to frequent deployment of subsidy measures to further long-term goals, since under such circumstances they function as more efficient trade policy instrument vis-à-vis import tariffs (Bhagwati and Ramaswami, 1963).

Apart from the aforesaid determinants, promoting exports of domestic players who are in competition with their foreign counterparts for global market share is a major driving motive for providing subsidies (Brander and Spencer, 1985; Horlick, 2013). The standard trade theory observes that the subsidies provided by the national governments enable the domestic producers suffering from cost disadvantage to sell their products in the international markets at a relatively cheaper price, thereby causing a rise in their exports. The theoretical relationship between

subsidies and exports is clearly observed irrespective of market structure, as the policy is capable of delivering both in the presence of competitive as well as oligopolistic markets (Dixit, 1984; Van Beers *et al*., 2007). Several export subsidy programmes are operational in European countries and the US, which provides their firms greater advantage vis-à-vis the foreign competitors (ITC, 2011). The adoption of export subsidies as a strategic policy instrument has also evolved as an extensive area of research (Bagwell and Staiger, 2000; Lemon, 2003). For instance, production and export subsidies in home country may motivate multinational corporations from abroad to locate production facilities there (Chor, 2009).

The trade-distorting effects of subsidies in general and export subsidies in particular are widely acknowledged to be in conflict with core WTO principle of fair trade. The mandate of the ongoing WTO negotiations under the Agreement of Agriculture (AoA) and the Agreement on Subsidies and Countervailing Measures (ASCM) are to ensure better discipline on both direct (e.g. direct payment) as well as indirect (e.g. revenue foregone by preferential electricity and fuel price, lowered interest payment on restructured loans) financial transfers (WTO, 1994). As per AoA and ASCM provisions, subsidies are classified under two broad categories, namely, actionable (i.e. subsidies which are directly linked with production and hence trade-distorting) and non-actionable (i.e. subsidies which are not directly linked with production and hence cause lesser distortions on trade). The goal of the current WTO negotiations is to limit the actionable subsidies (e.g. certain forms of fisheries subsides, amber and blue box subsidies in agriculture) and discontinuation of all forms of agricultural export subsidies (Chakraborty et al., 2011; Fergusson, 2011). While the Doha Development Agenda (DDA) negotiations have been broadly successful in reforming the export subsidies scenario, the prevalence of domestic subsidies in several Member countries remains a major concern area (Soprano, 2010; Sykes, 2003).

In this context, the present analysis intends to contribute to the literature by exploring the relationship between government financial transfers (i.e., budgetary subsidies) and merchandise exports as a percentage of GDP in a cross-country framework. The aim is to provide some policy insights for the current WTO Doha Round negotiations. The paper is arranged along the following lines. First, a brief literature review on subsidies and their potential implications on exports are conducted. Secondly, the reflection of this relationship in the regulatory context provided by the WTO ASCM is analyzed through the countervailing actions. Third, the data sources are explained and macro trends of the principal variables are illustrated. A cross-country empirical analysis is undertaken next for understanding the influence of budgetary subsidies on export inclination. Finally on the basis of the empirical results, a few policy conclusions are drawn.

2. Understanding the economics of WTO rules on subsidies

Although subsidies specifically geared towards export promotion contributes more in boosting exports, even domestic subsidies may cause over-production and eventually lead to exports for releasing the downward pressure on prices in domestic market. The positive relationship between subsidies and exports (2.3) is observed both in case of agricultural and manufacturing sectors.

2.1. The agricultural sector

Agricultural export subsidies have emerged as a major policy instrument adopted in both developed and developing countries during the General Agreement on Tariffs and Trade (GATT) period and WTO days. Both agricultural input subsidies (e.g. fertilizer subsidy, irrigation subsidy in terms of free electricity) and output subsidies (e.g. per unit support at higher than market price) may lead to over-production, thereby fueling export opportunities. Agricultural export subsidies have been extensively used in the US during pre-WTO days. In 1993, the payments

under the Export Enhancement Program (EEP) crossed US $1 billion (Leathers, 2001). The support to US players in terms of export credit arrangements including deferred interest payment, government guarantees for securing loans at lower interest rates etc. have also played crucial roles (Ride, 2000). It has been noted that the primary sector in EU (e.g. dairy and poultry sector) received export subsidies in the order of €1 billion and €650 million in 2008 and 2009 respectively (te Velde *et al*., 2012). Moreover, the developing countries like Brazil, India, Mexico, South Africa, Thailand, Venezuela etc. also provide considerable volume of agricultural subsidies (Panagariya, 2005).

2.2. The industrial sector

The subsidies provided to the industrial sector and their implications for exports have been another major area of research. The positive influence of government subsidies in Japan for promotion of progressive industries and exports deserves particular mention (Meza, 1986). Apart from the direct subsidies, indirect subsidies like fuel subsidies can significantly lower the variable cost of production in capital-intensive sectors like iron and steel etc., which also provide them substantial edge in the export markets over competitors (der Heiden, 2011). Incidence of high volume of fuel subsidies both in developed (Victor, 2009) and emerging countries (UNEP, 2008) and their potential export implications has been reported in the literature.

2.3. The positive relationship as classic analysis

The literature on subsidy-exports interrelationship in the developed countries has generally showed a positive relationship between the two. Agricultural export subsidies have significantly boosted exports from the recipient countries (Hoekman *et al*., 2007). The evidence of subsidized wheat exports from the US displacing the same from competitor countries also deserves mentioning here (Brooks *et al*., 1990). Similarly, the dairy subsidies in both Canada and the US have enhanced their global

exports (Bailey, 2002). Empirical estimates for Portugal (Afonso and Silva, 2012) and West Germany (Girma *et al.*, 2009a) also confirm the positive relationship between subsidies and exports.

The positive relationship between subsidies and exports has been observed for several developing countries as well. In South Korea the implementation of preferential tax system and subsidy allocation for export activities led to a transformation of the export basket of the country towards more value-added manufacturing products (Hong, 1987). The spectacular export growth of China has caused several researchers to focus on its subsidy policy as an explanatory variable. The firm-level panel estimation results show that production subsidies facilitate exports, and the effect is more evident for profit-making firms as well as capital-intensive industries (Girma *et al.*, 2009b). The influence of subsidies on Chinese manufacturing exports has been established under heterogeneous firm structure as well (Defever and Riaño, 2012). In addition, panel regressions with Chinese provincial data reveal the strong influence of subsidies on state owned enterprises (SOEs) exports, as the government financial devolution helps them to overcome the high production costs (Eckaus, 2004). In the Malaysian context, the positive long-run relationship between subsidies and exports has been confirmed through a cointegration model (Mansor and Karim, 2012). Interestingly, while the positive influence of firm-specific subsidies on exports in Colombia has been observed, the impact is found to be diminishing in subsidy size (Helmers and Trofimenko, 2013).

Nevertheless, a section of the literature questions the influence of subsidies, in particular their quantum, on exports. For instance, in East German context, no relationship between subsidy and exports has been established (Girma *et al.*, 2009a). The weak influence of export subsidies on exports has been confirmed in Turkey (Arslan and van Wijnbergen, 1993) and Japan (Ohashi, 2005) as well. Empirical estimates with respect to US firms have also revealed that the effect of subsidies on exports is not statistically significant (Bernard and Bradford, 2004). Similarly, the

firm-specific analysis on interrelationship between subsidies and export decisions in Ireland fail to find any significant relationship between the two (Görg *et al*., 2008). Use of export subsidies has turned out to be a suboptimal policy instrument in Latin American countries like Argentina, Mexico and Costa Rica as well (Hoffmaister, 1991; Nogués, 1990).

The absence of statistically significant relationship between subsidies and export in several developing countries and LDCs can be explained by the poor implementation performance by the national governments. Kenya had been a prominent example of this phenomenon (Low, 1982). The underlying reason of the failure to promote exports even after adopting the subsidization strategy in Bolivia has been accorded to the decision of non-discretionary implementation of the policy. Conversely, South Korea and Brazil has succeeded in their attempt by following discretion and selectivity (Rodrik, 1993).

3. Exploring the WTO regulatory framework on Subsidies

Provision of export-promoting and other subsidies to producers in some countries may divert trade away from their competitors, who can otherwise be efficient producers. Such development may lead to subsidy and countervailing duty wars for reversing that advantage (Bagwell and Staiger, 2002; Boudreaux, 2011; Sharp and Sumaila, 2009; Tallontire, 2004). Subsidies also distort the 'fair trade' principle, as firms from developing countries and LDCs do not receive the same level of supports received by their developed country counterparts, which significantly constrain their market access both in home and foreign markets (Supper, 2001). This is reflected in the negotiations and the text of the ASCM. The compromise at the heart of the WTO regulation of subsidies resulted in an agreement which required the WTO DSB to clarify a number of concepts in the case law. It has been noted that the export subsidies are quite susceptible to abuse (Nogués, 1990).

3.1. The Subsidy Provisions and the Debate

The evolution of subsidy regulations in international trade system started with the Havana Charter which became the basis for future agreements on subsidies, viz., the GATT, Subsidies Code of the Tokyo Round and the ASCM of the Uruguay Round (Horlick and Clarke, 1993). The ASCM provision defines the term 'subsidy' in detail in Article 1 (Horlick, 2013). Moreover, it classifies subsidies into three broad categories: i) prohibited; ii) actionable; and iii) non-actionable subsidies. This categorisation is sometimes referred to as a 'traffic light' approach. Prohibited subsidies are 'red light' subsidies which are harmful to trade per se. Non-actionable subsidies are 'green light' subsidies which are considered to be permitted on the grounds of an explicit reference in the legal text.[i] Lastly, actionable subsidies are 'yellow light' subsidies which are open to be challenged only if they are considered to cause adverse effects on international trade.[ii]

In the present ASCM some uncertainties remain as to the meaning and legal implications of some basic concepts. In this connection, the ASCM architecture has been challenged at times from the perspective of efficiency. The lack of purpose in the agreement itself has come under heavy criticism on the ground that the countries may be forced to remove socially beneficial subsidies as well (Bagwell and Staiger, 2006). In particular, the sensitivity of the agreement with economic considerations is strongly questioned (Mavroidis *et al*., 2008). Questions have also been raised on the optimality of disciplining subsidies beyond the non-violation doctrine (Sykes, 2010). In addition, it is held that WTO's subsidy rules would have yielded greater result only after substantial tariff reductions under GATT (Remer, 2011).

Hence in recent period international trade governance has been characterised by a progressive regulation on subsidies, tightening disciplines over time in order to avoid such distortions. These rules essentially seek to balance the need for redistribution and implementation

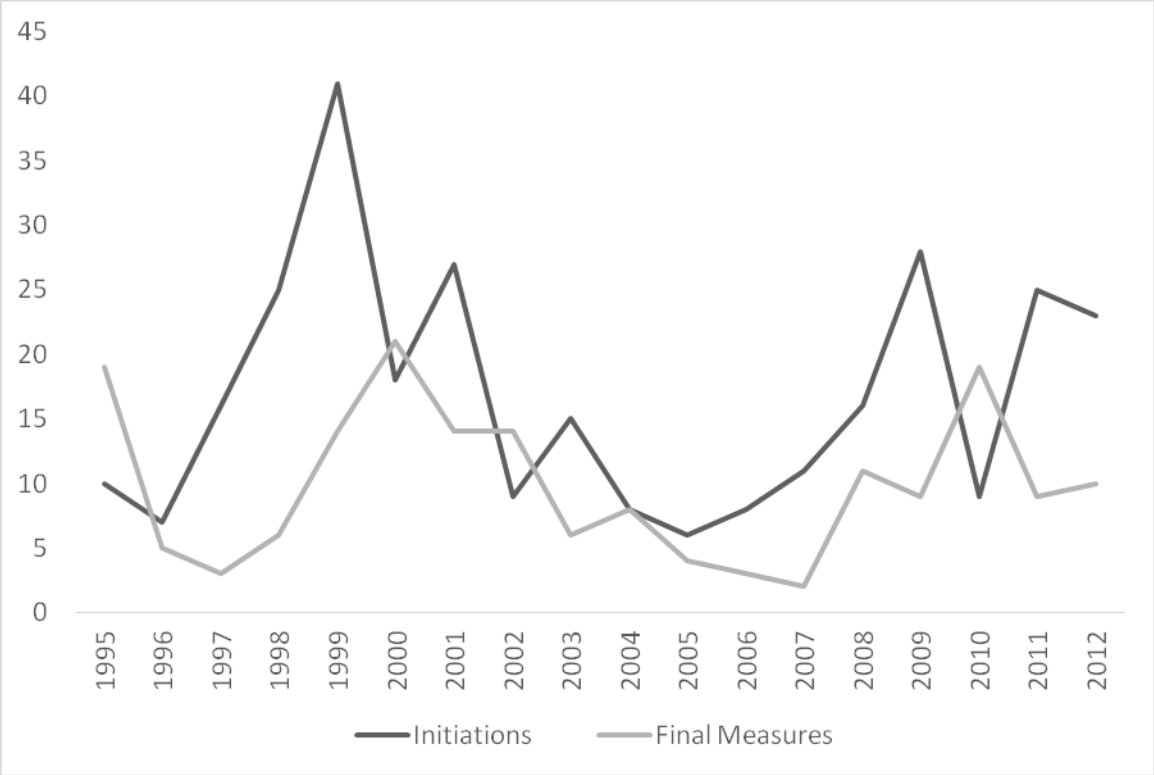
of legitimate policy goals and to avoid protectionism and unnecessary distortions of conditions of competition on domestic markets.

It is argued that the subsidies are often sector-specific and their 'narrowly tailored' nature as well as government legal arrangements pertaining to data dissemination may prohibit circulation of full information on them in the public domain (Pew, undated). The problem gets further compounded in case of indirect subsidies (i.e., income foregone rather than budgetary transfers). The subsidies data reporting also suffers from a 'forum bias', as several countries have reported relatively higher fisheries subsidies figures to the OECD and APEC as compared to the corresponding figures reported to WTO (WWF, 2001). The massive under-reporting makes 'disciplining' of subsidies through the multilateral negotiations all the more difficult (WTO, 2006).

3.2. The practice of countervailing duty

The perceived continuations of subsidies in foreign countries have often led countries to take recourse to remedial measures. It is observed from **Figure 1** that the number of global Countervailing Duty (CVD) initiations and CVD measures has shown a fluctuating trend during 1995-2012. The number of CVD initiations exhibited a continuous increasing trend from 1996 to 1999 and was at its peak in 1999 with 41 initiations during that year. Since 1999 however a cyclical pattern is being observed. The scenario improved considerably in 2005, when the number of initiations reached a minimum figure of 6. However SCM imitations have increased ever since and reached 28 and 25 initiations during 2009 and 2011 respectively. The trend indicates that CVD activism has been influenced strongly by the global recession, with increase in initiation during crisis years. The imposition of CVD measures has also shown a similar cyclical pattern. While during 1996-2000 an increasing trend has been observed in CVD measures, an overall decreasing trend was noticed during 2001-2007 with minor fluctuations. However, the number of measures increased to 11 in 2008 and further to 19 in 2010.

Figure 1: Countervailing Duty investigations initiated from 1995 to 2012 (December), worldwide



Source: Constructed by the authors from WTO SCM database

In order to understand the SCM activism across major countries with respect to each other during the aforesaid period, **Table 1** has been constructed from WTO data. While the countries facing the SCM measures are noted row-wise, the countries initiating the same are reported column-wise. A total of 302 SCM actions have been cumulatively initiated during this period. United Stated topped the list by accounting for 39.40 percent of the total CVD initiations, followed by the EU (22.18 percent). Interestingly, a significant proportion of the initiations made by the US have taken place against major Asian economies like China (27.73 percent) and India (11.76 percent). On the other hand, only 15 SCM initiations has been undertaken against the US of which 3 were initiated by Canada and the EU each and 4 by China respectively.

A similar trend has been noticed in case of the EU as well. Among the 67 SCM cases initiated by it, 28.35 percent of the total numbers of cases have been lodged against India. The other countries suffering from the EU SCM initiations include South Korea (10.44 percent) and Taiwan (8.95 percent), which are not reported in the table. On the contrary, the EU has faced only 13 initiations on SCM ground against its exports. The lower SCM activism against the EU or US does not signify lesser devolution of subsidies within their territories.

Table 1: Subsidy and Countervailing Duty initiation and measure matrix for major countries (1.1.95 – 31.12.12)

Exporting Country	Reporting Country										
	Argentina	Brazil	Canada	China, P.R.	European Community	India	South Africa	Turkey	United States	Venezuela	Total
Argentina	-	0	0	0	1	0	0	0	4 (2)	0	**8 (4)**
Brazil	0	-	2 (1)	0	0	0	0	0	4 (3)	0	**7 (8)**
Canada	0	0	-	0	0	0	0	0	8 (3)	0	**8 (3)**
China, P.R.	0	0	14 (12)	-	5 (1)	1 (0)	1 (0)	0	33 (25)	0	**62 (42)**
European Community	2 (3)	0	1 (1)	2 (1)	-	0	0	0	0	1 (1)	**13 (11)**
India	0	4 (2)	6 (5)	0	19 (12)	-	9 (4)	1 (1)	14 (8)	0	**55 (33)**
South Africa	0	0	0	0	1 (0)	0	-	0	2 (2)	0	**6 (4)**
Turkey	0	0	0	0	0	0	0	-	2 (1)	0	**2 (1)**
United States	0	0	3	4 (3)	3 (0)	0	0	0	-	0	**15 (7)**
Venezuela	0	0	0	0	0	0	0	0	2 (0)	-	**2 (3)**
Total	**3 (4)**	**7 (7)**	**33 (15)**	**6 (4)**	**67 (30)**	**1 (0)**	**13 (5)**	**1 (1)**	**119 (75)**	**2 (1)**	**302 (177)**

Source: Constructed by the authors from WTO SCM database

* - the figures in the parenthesis show the final measures.

An analysis of the countries suffering from SCM initiations reveals that China presently tops the list (20.53 percent of the total cumulative initiations), followed by India (18.21 percent) and South Korea (6.29 percent). Canada, the EU and the US jointly initiate 83.87 and 70.90 percent of all the SCM initiations against China and India respectively. However, other developing countries like South Africa have also targeted Indian exports on SCM grounds. On the whole an interesting picture emerges from the analysis; while Canada, the EU and the US account for 72.51 percent of all SCM initiations, China, India and South Korea jointly account for 45.03 percent of the initiated cases. If Indonesia and Thailand are also added to the list of the affected developing countries, the corresponding figure reaches 54.30 percent. The data indicates that the low cost economies of Asia are emerging as the major targets of SCM activism in major developed countries.

The SCM measures of respective countries are reported in the parenthesis of the same table and a similar conclusion emerges from the analysis. It is observed that Canada, the EU and the US jointly account for 71.18 percent of all SCM measures during the study period. On the other hand among the target economies, China, India and South Korea account for 46.89 percent of the total SCM measures.

The observation underlines the need to have a closer analysis of the SCM policy followed by Canada, the EU and the US, which is noted at HS sectional level in **Table 2**. Section XV which consists of Base Metals and articles of Base Metals is found to attract most of the SCM initiations for these three players. It deserves mention that the sector is recipient of subsidies in several countries, especially through fuel subsidies. The triad has jointly initiated 89.07 percent of the total SCM initiations and 84.14 percent of the total measures in this sector. The SCM activism for Base Metals is particularly high in the US. The other major sectors facing SCM challenges in the triad include low-tech products in Section VII (Plastics and articles thereof; Rubber and articles

thereof), Section VI (Products of Chemical or allied industries) and Section IV (prepared foodstuff etc.). However, a relatively sophisticated product group like Machinery and electrical appliances (Section XVI) has also been subject to SCM actions. While the EU has adopted several SCM actions on plastic and rubber products and textile products, US actions on chemical products are significant.

Table 3 looks at the other side of the coin, i.e., the distribution of the sectors affected by SCM actions in exporting countries. The detailed account for six countries, namely, Brazil, China, EU, India, Indonesia and South Korea are reported here. China and India have suffered most by SCM actions and in both cases a major proportion of the initiations have been related to Section XV (Base Metal and articles of Base Metal). The other affected sectors include Section VI (Products of Chemical or allied industries) and Section VII (Plastics and articles thereof; Rubber and articles thereof). It is observed that the Base Metal sector in Brazil, Indonesia and South Korea are also suffering heavily from the SCM initiations and measures in manufacturing products. Interestingly the EU has faced no SCM initiation or measure against its Base Metal products, but rather witnessed initiations against its Section III (Animal or Vegetable Fats and Oils) and Section IV (Prepared Foodstuffs) exports. The differing perspective perhaps can be explained in line with the subsidy provisions under Common Agricultural Policy (CAP).

Table 2: Canadian, EU and US Countervailing Initiations / Measures by product type – A Comparative Analysis (1.1.95 – 31.12.12)*

HS Section	Product Description	Canada	EU	US
I	Live Animals; Animal Products	0	1 (1)	4 (1)
II	Vegetable Products	2 (0)	0	3 (1)
IV	Prepared Foodstuffs; Beverages, Spirits and Vinegar; Tobacco and Manufactured Tobacco Substitutes	3 (1)	0	3 (2)
V	Mineral Products	0	4 (1)	4 (4)
VI	Products of the Chemical or Allied Industries	1 0	6 (2)	10 (6)
VII	Plastics and Articles Thereof; Rubber and Articles Thereof	0	16 (8)	7 (3)
XIX	Wood and Articles of Wood; Wood Charcoal; Cork and Articles of Cork; Manufactures of Straw, of Esparto or of Other Plaiting Materials; Basketware and Wickerwork	1 (1)	0	4 (2)
X	Pulp Of Wood or of Other Fibrous Cellulosic Material; Recovered (Waste and Scrap) Paper or Paperboard; Paper and Paperboard and Articles Thereof	0	1 0	8 (5)
XI	Textiles and Textile Articles	0	10 (5)	2 (2)
XII	Footwear, headgear etc.	0	2 (0)	0
XIII	Articles of Stone, Plaster, Cement, Asbestos, Mica or Similar Materials; Ceramic Products; Glass and Glassware	0	0	1 (1)
XV	Base Metals and Articles of Base Metal	25 (18)	19 (8)	62 (43)
XVI	Machinery and Mechanical Appliances; Electrical Equipment; Parts Thereof; Sound Recorders and Reproducers, Television Image and Sound Recorders and Reproducers, and Parts and Accessories of Such Articles	1 (1)	7 (4)	10 (5)
XVII	Vehicles, Aircraft, Vessels and Associated Transport Equipment	0	1	1
Total		**33 (21)**	**67 (30)**	**119 (75)**

Source: Constructed by the authors from WTO SCM database

* - the figures in the parenthesis show the final measures.

Table 3: Countervailing Measures by product type – A Comparative Analysis of major affected countries (1.1.95 – 31.12.12)

HS Section	Product Description	Brazil	China	EU	India	Indonesia	South Korea
I	Live Animals; Animal Products	0	0	1 (1)	0	0	0
II	Vegetable Products	0	0	2 (2)	0	0 (1)	0
III	Animal or Vegetable Fats and Oils and Their Cleavage Products etc.; Animal or Vegetable Waxes	0	0	3 (3)	0	0	0
IV	Prepared Foodstuffs; Beverages, Spirits and Vinegar; Tobacco and Manufactured Tobacco Substitutes	0	0	6 (5)	0	0	0
V	Mineral Products	0	0	0	0	1 (0)	0
VI	Products of the Chemical or Allied Industries	0	5 (4)	1(0)	12 (6)	0	0
VII	Plastics and Articles Thereof; Rubber and Articles Thereof	0	1 (1)	0	10 (6)	2 (0)	1 (0)
XIX	Wood and Articles of Wood; Wood Charcoal; Cork and Articles of Cork; Manufactures of Straw, of Esparto or of Other Plaiting Materials; Basketware and Wickerwork	0	3 (2)	0	0	0	0
X	Pulp Of Wood or of Other Fibrous Cellulosic Material; Paper or Paperboard; Paper and Paperboard and Articles Thereof	0	5 (3)	0	1 (1)	4 (2)	1 (0)
XI	Textiles and Textile Articles	0	2 (2)	0	4 (2)	4 (1)	2 (0)
XII	Footwear, headgear etc.	0	0	0	1 (0)		0
XIII	Articles of Stone, Plaster, Cement, Asbestos, Mica or Similar Materials; Ceramic Products; Glass and Glassware	0	1 (1)	0	0		0
XV	Base Metals and Articles of Base Metal	6 (8)	34 (23)	0	21 (16)	5 (4)	8 (4)
XVI	Machinery and Mechanical Appliances; Electrical Equipment; Parts Thereof; Sound Recorders and Reproducers etc.	1 (0)	8 (5)	0	6 (2)	0	7 (4)
XVII	Vehicles, Aircraft, Vessels and Associated Transport Equipment		3 (1)				
Total		**7 (8)**	**62 (42)**	**13 (11)**	**55 (33)**	**12 (8)**	**19 (8)**

Source: Constructed by the authors from WTO SCM database

* - the figures in the parenthesis show the final measures.

Despite the fact that it passed more than half a century since multilateral negotiations on subsidies started for regulating their abuse, there exist ample room for further disciplining them. The Dispute Settlement Body (DSB) of WTO has so far played a significant role in curbing the adverse effects of subsidies on foreign countries, and the number of such disputes demonstrates their adverse effects on international trade. For instance, successive appeals by the EU, the US and other member countries at the WTO has forced China to scrap several export support programs and preferential treatment for its exporters (Defever and Riaño, 2012). The proven WTO-incompatibility of the US system for taxing foreign export earnings (Hufbauer, 2002) and modifications in Export Credit Guarantee Programme for Cotton (Baffes, 2011) in light of DSB ruling also demonstrate the necessity to improve the regulation on subsidies at the multilateral level.

4. The analytical framework

The influence of government subsidies on export performance is estimated in the current analysis for 140 countries over 1990-2011. Subsidies included in the present analysis include only direct budgetary transfers reported by the government of a country. The indirect or implicit subsidies (i.e., income foregone in terms of tax rebate, fuel subsidy etc.) are not included in the analysis due to non-availability of consistent cross-country data.

4.1. Empirical Model for the cross-country analysis

The following panel data regression models is estimated for analyzing the effect of budgetary subsidies on export performance. Several control variables are included in the analysis. With growing size of the economy, the relative importance of trade is expected to decrease. In addition, the contribution of various sectors in GDP may show interesting dynamics with exports in presence of subsidies in the model.

Inward FDI stock is generally favourable for enhancing exports from the recipient country (Ito, 2012). In addition, merchandise imports (both raw materials and semi-processed products) can boost exports of a country, through deepening of the production networks (Dumitru *et al.*, 2008; Mukhtar and Rasheed, 2010; Nag and Mukherjee, 2012). Finally, political freedom leads to economic efficiency, which in turn may enhance exports (Liebenberg, 2012). The advantage of using the log-linear model in the current context is that the estimated coefficients can be interpreted as the elasticity between budgetary subsidy and exports.

$$LMERX_{it} = \alpha + \beta_1 LPCGDP_{it} + \beta_2 LPCGDP_{it}^2 + \beta_3 LSUBSIDY_{it} + \beta_4 LMERM_{it} + \beta_5 LGDPIND_{it} + \beta_6 LGDPSER_{it} + \beta_7 LGDPAGRI_{it} + \beta_8 LFDIINSTK_{it} + \beta_9 LFHIPR_{it} + GOVDUM + Non\text{-}Cash + Dum1999 + T_t + \varepsilon_{it} \quad \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

where,

α represents the constant term

βs *are coefficients*

$LMERX_{it}$ represents log of Merchandise Export (expressed as percentage of GDP) of country *i* for year *t*

$LPCGDP_{it}$ represents log of Per Capita Gross Domestic Product (PPP, current international $) of country *i* for year *t*

$LSUBSIDY_{it}$ represents log of budgetary subsidy (as percentage of GDP) of country *i* for year *t*

$LMERM_{it}$ represents the log of Merchandise Import (expressed as percentage of GDP) of country *i* for year *t*

$LGDPIND_{it}$ represents the log of share of industry in GDP (expressed as percentage of GDP) of country *i* for year *t*

$LGDPSER_{it}$ represents the log of share of services in GDP (expressed as percentage of GDP) of country *i* for year *t*

$LGDPAGRI_{it}$ represents the log of share of agriculture and allied activities in GDP (expressed as percentage of GDP) of country *i* for year *t*

$LFDIINSTK_{it}$ represents the log of inward stock of Foreign Direct Investment (expressed as percentage of GDP) of country *i* for year *t*

$LFHIPR_{it}$ represents the log of Freedom House Index of Political Rights of country *i* for year *t*

GOVDUM represents government dummy, of which

GG represents a dummy for countries, when the subsidy data is reported by the general government

CG represents a dummy for countries, when the subsidy data is reported by the central government

BCG represents a dummy for countries, when the subsidy data is reported by the budgetary central government

Cash represents a dummy when countries practice cash accounting standards for budgetary reporting

Non-Cash represent a dummy when countries practice accrual accounting standards for budgetary reporting

Dum1999 is a dummy whose value is 0 before 1999 and 1 from 1999 onwards

T_t represents the time dummies (i.e., T_1=1 for 1990 and 0 otherwise)

ε_{it} represents the disturbance term

4.2. The economic data

The current analysis considers subsidies provided by a country expressed as percentage of its GDP for ensuring comparability of data across countries, which is accessed from Government Finance Statistics (GFS) of IMF (IMF, 2013). As per GFS Manual 2001, the IMF reported data on subsidies are, ".. current transfers that government units pay to enterprises either on the basis of the levels of their production activities or on the basis of the quantities or values of the goods or services that they produce, sell, or import. Included are transfers to public corporations and other enterprises that are intended to compensate for

operating losses" (IMF, 2005). Such subsidies can include actionable transfers and may significantly influence exports. Moreover, even de-linked subsidies, which are provided solely based on domestic considerations rather than external motivations, may end up boosting exports through indirect effects.

It is observed that GFS compiles the government subsidy figures for countries from different sources as per the reporting practice. Three types of government reporting have been observed in the GFS subsidies data. First, the *General Government* (GG) includes all the Central Government (CG) transfers plus budgetary expenses of all the Central Ministries / Departments and the same for the State Governments (SG) (including supports provided by provincial or regional entities) and Local Governments. The *Central Government* (CG) transfers on the other hand represent the consolidated transfers of the Central Government (including transfers of Central Ministries / departments). Finally, subsidies reported under *Budgetary Central Government* (BCG) covers "Any central government entity that is fully covered by the central government budget" (IMF, 2005). In addition, the GFS data generally reports the budgetary statistics for countries adopting cash accounting standards, but for several countries accrual (non-cash) accounting standards for extra-budgetary units and social security funds has been reported. In order to understand the differential effects of the data reporting differences, suitable dummy variables have been included in the empirical model.

Merchandise exports and imports in a country is considered in the current analysis by expressing them as a percentage of its GDP, where all variables (at level) are measured in US Dollars at current prices and current exchange rates in millions. The data for the same is accessed from UNCTAD Statistics (UNCTAD, 2013). Gross GDP figures in current prices and current exchange rates are obtained from UNCTAD Statistics as well. The share of the three sectors in GDP of a country has been obtained from World Bank (2013). The data on political freedom is

obtained from Freedom House (2013), where the country scores range over 1 to 7 (where 1 represents the highest and 7 the lowest level of freedom).

In addition, the analysis incorporates a number of constructed dummy variables, namely - financial system reporting dummies, a dummy for the year 1999 and the year dummies, to capture their effects on the proposed relationship.[iii] However, to avoid perfect multicollinearity, only any two of the government dummies (GG, CG and BCG) have been simultaneously used at a time in the estimated models. Similarly, cash and non-cash dummies have not been used in the regression models together. To understand the export implications of subsidies in countries situated at different levels of economic achievements, four country group dummies are considered separately in the model on the basis of Per Capita Gross National Income (PCGNI, atlas method, in current US$). The four country groups are as follows: low-income economies (LIE) (PCGNI: US$1,005 or less), lower-middle-income economies (LMIE) (PCGNI: US$ 1,006 - 3,975), upper-middle-income economies (UMIE) (PCGNI US$3,976-12,275) and high-income economies (HIE) (PCGNI US$12,276 or more).[iv] To avoid perfect multicollinearity, UMIE has been dropped from the analysis.

4.3. Macro Trends in Data

The macro scenario in the two key series considered in the current analysis, namely – budgetary subsidies and merchandise exports are illustrated with the help of Figures 2-3. The movements in the data series reveals that the average allocation of budgetary subsidies (expressed as percentage of GDP) has been higher in UMIE and HIE countries as compared to their LIE and LMIE counterparts during study period. An annual time trend reported in Figure 2 reveal that from 1999 onwards the annual proportion of subsidy devolution in proportional terms has intensified in the developed countries (HIE and UMIE). A similar upward trend is noted in their relatively poorer counterparts (LIE and

LMIE) from 2000 onwards. The trend line drawn for both series (not shown in figure) reveals a clear upward trend from 1999 onwards for both groups of countries. Only after the recession in 1999, a downward trend has been noted.

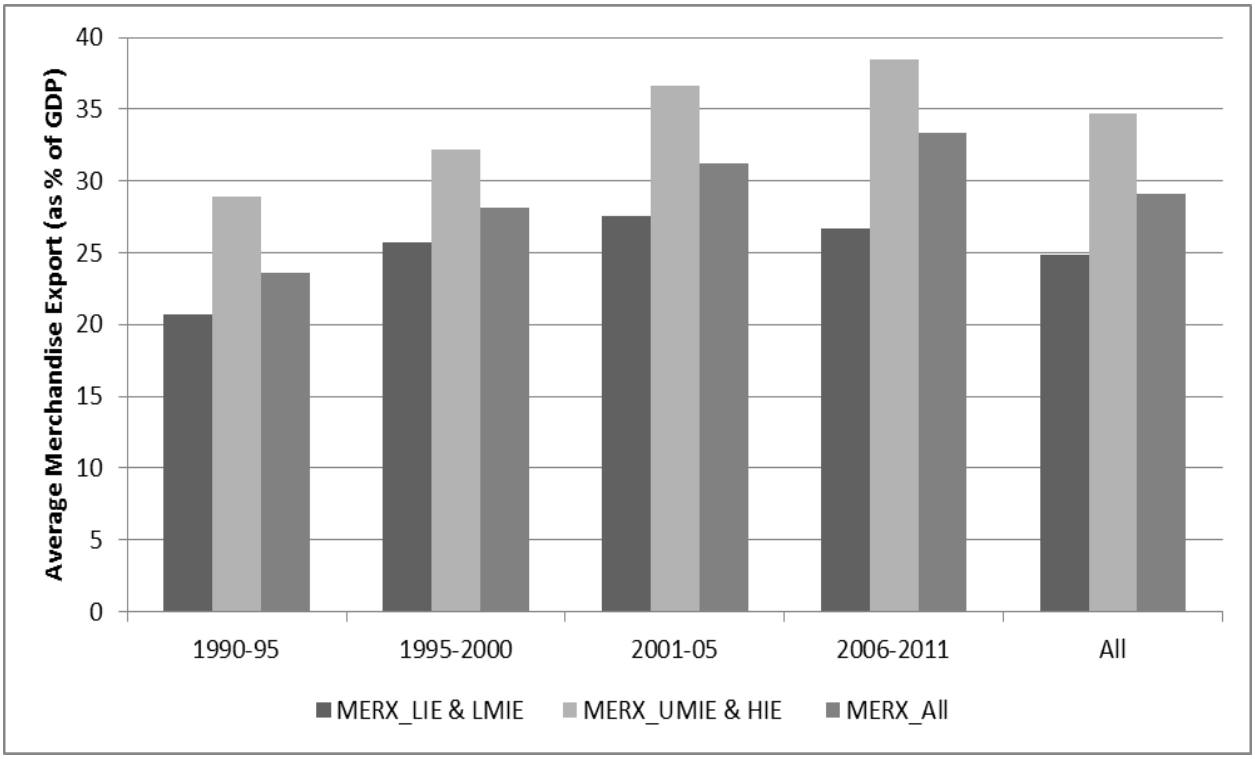
Figure 2: Time trend in Subsidy Figures across Country Groups by Income

Source: Constructed by authors from GFS data

Figure 3 reveals the average merchandise export scenario (expressed as percentage of GDP) for the two groups of countries. The time period is divided into four equal segments for understanding the temporal perspective. The proportional importance of exports in GDP has been higher in UMIE and HIEs as compared to their LIE and LMIE counterparts during all four periods reported in the figure. The ratio have increased for UMIE and HIEs for all the four periods. However, there has been a marginal decline in proportional importance of exports for LIE and LMIEs during the last reported period, i.e., 2006-2011.

Finally, Table 4 illustrates the data availability for the present analysis as per the government data reporting practices (i.e., GG, CG or BCG). The first three columns segregate the total observations as per the cash and non-cash (accrual) reporting practices, while the next three columns summarize the average subsidy scenario (as percentage of GDP) as per the country groupings. The last three columns represent the average export figures expressed as percentage of GDP. It is observed that the subsidies and export inclination figures are generally higher for countries reporting GG data as compared to corresponding figures for countries following CG and BCG reporting practices, barring the exception of UMIE and HIE countries in case of BCG data.

Figure 3: Merchandise Export Scenario in Countries under Different Income Group



Source: Constructed by authors from UNCTAD data

Table 4: Description of Data by availability

Level of Government	Data reporting Types (Number of Observations)			Average Subsidy (% of GDP)			Average Merchandise Export (% of GDP)		
	Cash	Noncash	Total	LIE & LMIE	UMIE & HIE	All	LIE & LMIE	UMIE & HIE	All
General Government	309	554	863	1.68	1.64	1.65	28.35	36.01	33.85
Central Government	659	37	696	1.28	1.56	1.40	26.94	34.04	30.00
Budgetary Central Government	508	102	610	1.12	2.28	1.47	22.85	33.59	26.13
All	1476	693	2169	1.31	1.73	1.52	24.88	34.72	29.10

Source: prepared by the authors from the constructed dataset

5. Empirical Results

A panel data regression analysis has been undertaken with help of the STATA software (version 10.1). To understand the working of the model for the proposed relationship in equation (1), Hausman specification test is first conducted. It is observed that the Chi-square test statistic of 125.13(0.0000) is statistically significant. The Hausman test suggests the presence of a fixed effect model. Next Wooldridge test is conducted for checking autocorrelation in panel data and the test statistics is 78.815 (0.0000), which implies the presence of autocorrelation of first order. Breusch-Pagan / Cook-Weisberg test is conducted next and the test statistic of 109.67 (0.0000) points to the presence of heteroskedasticity. The mean Variation Inflation factor (VIF) is 2.88, which indicate that the variables included in the model are within the tolerance level of multicollinearity.

The estimation results both from the Fixed Effect (FE) and Feasible Generalized Least Square (FGLS) regression models summarized in **Table 5** clearly indicate the positive and significant influence of logarithmic transformation of government subsidies on export performance across country groups. It is observed that both in case of

lower and higher income countries, the devolution of subsidies are helping them to promote exports, in line with the theoretical predictions. The LIE, LMIE and HIE dummies included in most of the regression models are all found to be positive and significant, implying that all countries, irrespective of their income levels, benefit from the provision of subsidies. However, the coefficient for the LIE dummy is found to be smaller as compared to the corresponding figures for LMIE and HIE country group. In other words, greater devolution of subsidies in higher income group countries leads to greater export orientation. The result can be explained by the structural bottlenecks and scale disadvantages prevalent in LDCs and other poorer economies.

Among the control variables, log of per capita GDP of a country is found to be negatively related with log of export inclination, while the square term is positively significant. The result implies that the growth rate of exports declines with rise in growth rate of PCGDP, which is higher for the low income countries starting from a lower base. The result clearly signifies that higher economic size is more favourable for outward orientation. MERM bear a positive coefficient with the dependent variable, indicating that higher import growth rate leads to higher merchandise exports. The relationship can be explained by the fact that deeper association with integrated production networks with trade partners lead to higher import of quality raw material and semi-processed inputs, which contributes to rise in value-added final exports.

The independent variable GDPIND is positively related with export inclination, as generation of greater manufacturing output leads to higher export orientation. Share of agriculture is however not significant in any of the regression models. As per expectation, FDI inward stock variable is positively related to export inclination, signifying presence of 'export-platform' FDI in the cross-country framework. Finally, political freedom variable is found to be non-significant, owing to the fact that both countries characterized by deeper democratic practices (e.g. US) and

more stringent regimes (e.g. China) demonstrate higher export inclination.

As discussed earlier, capturing the influence of the level of government that provides budgetary subsidy for a particular country is crucial. Following the GFS reporting principle, in absence of information on GG budgetary subsidy for a country, the current analysis considers CG or BCG in the estimated model. It is observed that in all reported models the coefficient of both CG and BCG bear a negative sign. The result strongly underlines the significance of the reported layer of government subsidies on exports, as CG and BCG subsidies are associated with differential intercept shifts. The dummies represent the information at a more disaggregated level of government, which are associated with lesser export inclination. Moreover, the coefficient of the non-cash dummy is found to be positive in sign. The coefficient of both the set of dummies strongly indicate that the layer of government data reporting system and their accounting technique considerably influence the subsidy-exports relationship. Finally, the 1999 dummy has been found to be positive and significant, indicating that subsidy-export relationship received a boost in the post 1999 period. Finally, the reported coefficients of the time dummies are also significant.

Table 5: Estimation Results on the Relationship between Subsidy and Exports

Independent Variables	Dependent Variable: LMERX				
	Fixed Effect	***Feasible Generalized Least Square (FGLS)***			
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**
Constant	1.4188 **	0.8255	2.1654 ***	0.6783	0.7779
	(0.5793)	(0.6103)	(0.7556)	(0.6282)	(0.6634)
lpcgdp	-0.1894 ***	-0.5537 ***	-0.3933 **	-0.8073 ***	-0.518 ***
	(0.0514)	(0.1478)	(0.1753)	(0.1456)	(0.1593)
lpcgdp2		0.0395 ***	0.0303 ***	0.0509 ***	0.0374 ***
		(0.0082)	(0.0096)	(0.0083)	(0.0088)
lsubsidy	0.0173 ***	0.0069 *	0.0093 **	0.0067 *	0.0088 **
	(0.0048)	(0.0036)	(0.0039)	(0.0037)	(0.0037)

lmerm	0.6772	***	0.7222	***	0.7163	***	0.7036	***	0.6768	***
	(0.0304)		(0.0159)		(0.017)		(0.0168)		(0.0174)	
lgdpind	0.5435	***	0.7816	***	0.5601	***	0.9097	***	0.7859	***
	(0.0575)		(0.0425)		(0.0534)		(0.0315)		(0.0457)	
lgdpser	-0.2284	***	-0.2913	***	-0.5681	***			-0.284	***
	(0.076)		(0.0609)		(0.0778)				(0.0636)	
lgdpagri							-0.025			
							(0.0156)			
lfdiinstk	0.0208	**	0.0436	***	0.0262	***	0.0367	***	0.0415	***
	(0.0092)		(0.0062)		(0.0051)		(0.0061)		(0.0064)	
lfhipr									0.0105	
									(0.0139)	
cg	-0.0692	***	0.0201		0.0132		0.0182		0.0188	
	(0.0212)		(0.0138)		(0.0137)		(0.0149)		(0.0139)	
bcg	-0.0529	*	-0.0293		-0.0074		-0.0105		-0.0196	
	(0.0287)		(0.0192)		(0.0189)		(0.0197)		(0.0193)	
noncash	0.0182		0.0363	**	0.0246	*	0.0312	**	0.027	*
	(0.0214)		(0.0146)		(0.0142)		(0.0153)		(0.0148)	
lie	0.0021		0.0765	***	0.0429		0.0691	**	0.0639	**
	(0.0407)		(0.0295)		(0.0332)		(0.0309)		(0.0302)	
lmie	0.0611	***	0.0451	***	0.0418	**	0.0449	***	0.0445	***
	(0.0233)		(0.0157)		(0.0164)		(0.0171)		(0.0158)	
hie	0.0472	*	0.0352	*	0.0139		0.023		0.0272	
	(0.0259)		(0.019)		(0.0181)		(0.0187)		(0.019)	
dum1999	0.1102	***	0.0638	***	0.0598	***	0.064	***	0.0763	***
	(0.0397)		(0.0227)		(0.0223)		(0.0244)		(0.0242)	
Time Effects	Yes		Yes		Yes		Yes		Yes	
No. of Obs	1792		1788		1573		1773		1764	
No. of Grs	139		135		120		134		133	
Wald Chi2	44.67	#	4846.05		3517.11		4194.69		3807.22	
Prob(Wald chi2)	0.0000	@	0.0000		0.0000		0.0000		0.0000	

Notes: # - implies F-Stat (instead of Wald chi2 for Model 1)

@ - implies Prob (F-Stat) (instead of Prob (Wald chi2) for Model1)

Figure in the parenthesis shows the heteroskedasticity and first order autocorrelation [AR(1)] corrected standard error of the estimated coefficient

***, ** and * implies estimated coefficient is significant at 0.01, 0.05 and 0.10 level respectively.

6. Concluding remarks: Lessons for the current WTO negotiations

The waves of globalization during the last decade has led to deepening of international trade flows in general and manufacturing products in particular. On one hand, the evolving trade dynamics has created an urge in developing countries and LDCs to enable the domestic players to enjoy a level-playing field in the international markets and also to actively attract production-related foreign investment. On the other hand, declining competitiveness have forced their developed counterparts to continue subsidy policies within their territories. In addition to the direct export subsidies, the indirect subsidies may also positively influence export pattern. The empirically observed subsidy-exports interrelationship in the current analysis needs to be viewed in this wider context.

The objective of establishing the WTO in 1995 has been to enhance international trade flows through elimination or reduction of various unfair trade practices. While the WTO negotiations has been able to phase out the traditional trade barriers like import quota and broadly successful in reducing the tariff barriers, limiting the trade distortions arising from subsidies still remains an area of concern. The present analysis contributes to understanding of the relationship between overall government financial transfers (i.e., budgetary subsidies) as a percentage of GDP and aggregate merchandise exports as a percentage of GDP in two ways: first, it shows that the ASCM needs to bring more clarification in the negotiating tables and second, developing countries and LDCs should realize that a subsidy-based trade war is more likely to put them in a disadvantageous position vis-à-vis their developed counterparts.

Firstly, the number of instances can be cited where granting of subsidies by a country leads to serious adverse effects on export potential of other countries. This situation strongly underlines the necessity to improve the regulation on subsidies at the multilateral level. So far the CVD activism effect has been felt more severely by the middle countries developing countries and the emerging economies (e.g. low-cost Asian countries), who have also witnessed an increasing share of manufacturing sector in their respective GDP. Therefore the current WTO negotiations on rules should attempt to prevent such misuse through relevant modification of the ASCM text.

In particular, the data reporting practices across countries differ widely, often providing WTO Member countries the flexibility to hide the quantum of subsidies provided to the local players. The negotiation on fisheries subsidies is a case in point, where such data reporting mismatch largely contributes to the delay in curbing the 'Article 1' subsidies (Chakraborty *et al*., 2011), which harm the developing countries more severely vis-à-vis their developed counterparts. Hence, the subsidies data reporting framework of the countries needs to be harmonized. The empirical observations of the current analysis, underlining the importance of data reporting framework in determining the 'export-effect' of the subsidies, is of crucial policy relevance in that context.

Secondly, supporting the domestic players through subsidy policy has been a traditional policy tool adopted by both developed and developing countries. The developed countries, with their greater financial strength, has enabled the local players to have an edge vis-à-vis the foreign players not only in the domestic market but also in the third markets. Such policies have been practiced in Australia, Canada, EU and the US, i.e., the *Quad*, and other developed countries for a long period of time. The positive coefficient for HIE group is a proof of that. These developments have motivated several developing and emerging countries since seventies onwards to mimic the subsidy-led export

success of their developed counterparts. The empirical results indicate a successful adoption of the subsidy-led export growth policy in these economies as well, as reflected from the positive sign of the LMIE and LIE dummies.

The empirical results indicate that continuing subsidies makes economic sense from the selfish standpoint of an individual country, irrespective of its development status. However, given the economic discrepancy between developed and developing country exports, a subsidy-based trade war is more likely to put the latter group in a disadvantageous position vis-à-vis their developed counterparts. In particular, continuation of subsidy policies in developing countries and LDCs end up only providing moral justification for the higher SCM activism in their developed counterparts, as confirmed from Tables 2 and 3. The evidence presented from the base metal sector is a case in point. This is despite the fact that subsidy orientation is greater in the higher income countries (Figure 3). Moreover, provision of subsidies create diverging influence on exports of countries belonging to different income groups, as evident from the difference in the country dummy coefficients, adds further to the disadvantages of the poorer economies. The empirical findings of the current paper therefore underlines the importance of concluding the Doha Round Negotiations of WTO in general and the need for disciplining subsidies in particular in no uncertain terms.

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Endnotes:

[i] This category unfortunately was applied only for a period of five years beginning with the entry into force of the WTO, since developing countries were afraid it would be excessively used by industrialised countries. Today efforts are under way to put it back, as the category is important for the promotion of small and medium-sized enterprises (SMEs) in developing countries as well. See, Kim (1999), for details.

[ii] The definition of a subsidy within the meaning of Articles 1 and 3 of the SCM Agreement (prohibited subsidies) was addressed by the Appellate Body in various cases, most prominently in *US – Tax Treatment for 'Foreign Sales Corporations'* (WT/DS108/AB/R) as well as in Canada – Certain Measures Affecting the Automotive Industry, Report of the Appellate Body, 31 May 2000, WT/DS139/AB/R, WT/DS142/AB/R 994.

[iii] The reason of taking a 1999 dummy can be explained with the help of Figure 2, which indicates an upward trend from 1999 onwards.

[iv] Income brackets are in line with the World Bank classification. For details, see http://wdronline.worldbank.org/worldbank/a/incomelevel (last accessed on November 19, 2013).