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for Asia-Pacific **Prosperity**

Services, Manufacturing and Productivity

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The views expressed in this paper are those of the authors and do not necessarily represent those of APEC Member Economies.

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Key Messages

- Services has an important role in manufacturing sector. While they were economically unrecognized and considered non-tradable previously, trend towards outsourcing of originally in-house activities have uncovered a whole host of service activities and their economic value.
- Business strategies employed by firms in manufacturing sector have also increasingly evolved towards more services offering as a way to differentiate and add value to their goods, besides helping build brand loyalty and product dependence.
- Measurement of exports in terms of value added indeed paints a very different picture of services share vis-à-vis that of primary products and most importantly manufacturing when compared to their relative exports in gross terms; while services only made up 23 percent of total world exports in gross terms, its share almost doubled to 45 percent when measured in value added terms.
- OECD Trade in Value Added (TiVA) database showed that typically a third of the value of global goods exports are composed of services that are either embedded in the product or formed part of the sale package of the product. For APEC as a whole, services' value added share in manufacturing export rose from 25.5 percent to 27.5 percent between 1995 and 2009. By sector, services' value added share rose between 1995 and 2009 across all manufacturing sectors except one.
- While foreign services' value added share has increased across all manufacturing sectors in 2009 relative to 1995, both as a percentage of gross exports and of total services value added, domestic services' value added share in 2009 remains significant at 65 percent for APEC as a whole.
- The importance of services is further complemented by backward linkage analysis of I-O tables obtained from OECD Structural Analysis (STAN) database. Looking at how growth in manufacturing sector leads to growth of services sector that supply it, one billion US dollars increase in a manufacturing output is shown to increase output of services sector by between 382 and 606 million depending on the manufacturing sector.
- Not all services sectors are equal. Business services appears to be the sector that matters the most for manufacturing as it has the highest value added share among the various services sector. The role played by business services is further enhanced if its direct export as well as indirect export through other services are taken into consideration.
- Among the motivation leading to manufacturing firms' decision to servicify is the role of services in improving manufacturing productivity. Correlation studies using various variables to represent services input, productivity and manufacturing output, by and large, show the positive correlations between them and support this idea.
- Numerous literature has attempted to answer the question on how services, in particular business services contribute to enhancing manufacturing productivity. Hypotheses and examples can be divided into two broad groups. Those that impact labor productivity directly

usually have to do with process improvements through the incorporation of new hardware modules and tweaking of existing steps for instance. Those that impact labor productivity indirectly do so by increasing the demand for firms' product and hence production by existing pool of labor. An example is data analytics or data services that help production of products that are targeted to specific revealed preferences, thus helping to minimize unsold inventories.

- Of the business services, 'other business activities' and 'research and development' are the most used activities. This has important implications for trade policy since 'other business activities' according to the classification are mostly made up of professional services where plenty of restrictions can be found. In fact, correlation plots between various OECD index of restrictiveness in professional services and manufacturing exports per capita show the negative relationships between these variables.
- Analysis of sectoral services trade restrictions index (STRI) for APEC shows variations in at least three dimensions: 1) across services sectors in general, 2) between services sectors that belong to the same group, and 3) within each services sector. These indicate that any efforts in reducing the variations among APEC economies should be carried out across the three fronts.
- Specifically for business services (accounting and auditing, computer, engineering, and legal), the main contributor to the scores appear to be restrictions on the movement of people, followed by restrictions on foreign ownership and other market entry conditions. The top restrictions on movement of people are usually policies which limit the ability of professionals to stay beyond a certain period of time and those that require professionals to meet certain requirements before they could qualify for full membership of the profession. Among the top restrictions on foreign ownership are policies restricting equity ownership and those requiring managers and/or directors to be nationals, residents and/or locally-licensed professionals.
- The complex and often cross-sectoral restrictions imply that efforts to support the ongoing servicification of manufacturing sector should be multi-pronged. These include a change in perspective when crafting trade policies that were for many years tailored only for goods trade and better coordination among agencies, including those with broader mandates. Various efforts to collect case studies that map out different manufacturing sector's value chain should also be encouraged in order to enrich our knowledge on the role of services in manufacturing.

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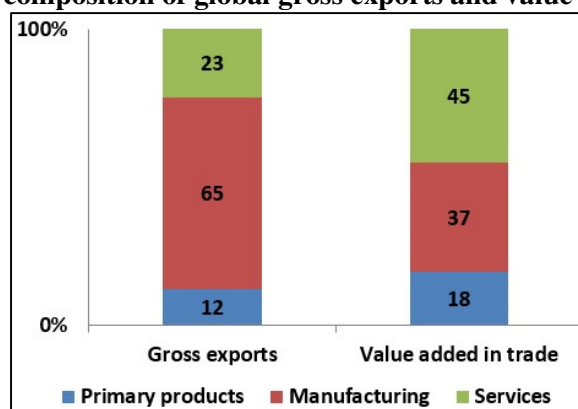
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1. INTRODUCTION

Since the WTO-OECD Trade in Value Added (TiVA) database was published, more is known about the important contribution of services in manufacturing exports. One-third of the value of global goods export are services that are either embodied in the product such as, for example, accounting services or engineering services (WTO and OECD, 2013). Other services that formed part of goods export are services that are part of the sale package of the product. Examples of this service export are maintenance and repair services or recycling services which are often bundled with the sale of the good. Research based on these value-added tables show total service exports to be, therefore, considerably higher at 45 percent of exports compared to traditional export measurement which put service exports at 23 percent.

Figure 1. Sector composition of global gross exports and value added trade, 2008



Source: OECD-WTO TiVA database

‘Servicification’, the term coined to refer to the intensification of service content of manufacturing, is attributed to several factors. Trend towards outsourcing of what were originally in-house activities contributed to the appearance in the data of certain significant economic activities. For example, while in the past, consumer financing of cars was done as part of a vertically integrated operations, the firm may now outsources it to a financing entity which may be either a subsidiary or an arms-length financial service supplier. The same may be said of R&D activities where whole departments may have been spun out into a separate entity providing research and development services to the rest of the company. Outsourcing activities uncovered a whole host of service activities that have been part and parcel of the manufacturing firm’s activity, erstwhile economically unrecognized and heretofore considered non-tradable.

Significantly, business strategies have also increasingly evolved towards more services offering as a way of generating added values. Globalization of manufacturing industries in pursuit of cheaper production threaten to turn almost all goods into commodities. To differentiate and to add value, manufacturing firms is increasingly extending services to every life cycle stage of the product (Tomiyama, 2001). Business strategies like package deal offerings (or all-in-one solutions) whereby manufacturers offer, along with the product, customer services like planning, financing, installation, operation maintenance, upgrading and recycling, have become more prevalent. Many services have become integral component of product offerings by manufacturing firms in order to differentiate, customize and create more value for their products. Likewise, they serve to build a stronger relationship with their customers over the product’s life cycle and in doing so, build brand loyalty and product dependence. This is perhaps one reason why services are less sensitive to market downturns and/or operate in cycles that are different relative to goods (Borchert and Mattoo, 2009).

The geographic dispersion of global value chains (GVCs) also add to the increased use of services. Logistics, communications, supply chain management, warehouse management and other services are necessary to serve entire global value chain operations.

This paper tries to tease out more detailed information from the TiVA database to understand how important services is in APEC economies by analyzing quantitatively the various aspects through which services could contribute to their economies' exports such as via direct exports as well as indirectly via manufacturing or other services sectors' exports. Specifically on services' role in manufacturing, the paper attempts to explore the link between services and manufacturing productivity. Business services, it appears, is a dominant services input in manufacturing and is discussed next in greater length, where regulations that are likely to affect the provision of these services negatively are identified. The issues paper concludes with implications for trade policy.

2. SERVICES VALUE ADDED TRADE IN APEC ECONOMIES

The TiVA database provides measures of services exports. One is through direct service exports, say, engineering services provided cross-border. TiVA also calculates indirect service exports through services value incorporated in manufacturing exports as well as re-imported domestic services embodied in imported intermediate goods. An example of the latter is design service provided to an intermediate good which undergoes further processing abroad and eventually re-imported.

Worldwide, exports of services, in gross terms, comprise about 23 percent of total world exports, manufacturing 65 percent and primary products 12 percent. But if services' value added contribution in manufacturing, as described above, is taken into account, services exports value added increase to 45 percent of world exports while manufacturing exports' share goes down to 37 percent, and primary products share increases to 18 percent².

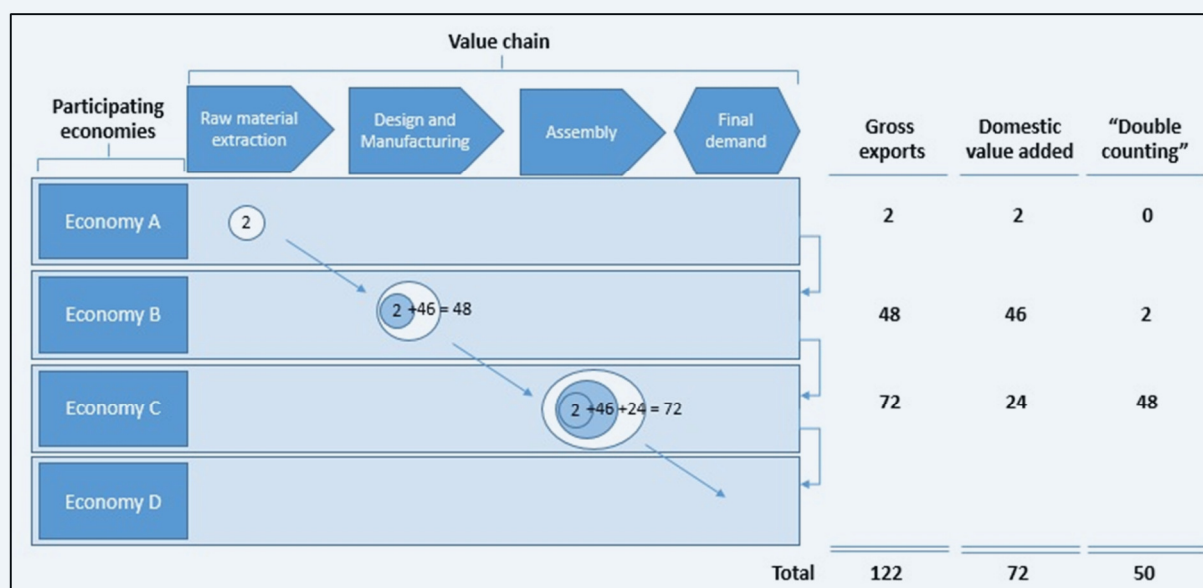
Box 1. The “double counting” of trade phenomenon

Fragmentation of production and dispersion of tasks by transnational corporations (TNCs) across multiple economies have led to the formation of global value chains (GVCs). A central feature of GVCs is the cross-border trade of production inputs, intermediates and outputs taking place between networks of affiliates, contractual partners and arm's length suppliers. As an illustration, raw material obtained from one economy may be exported to an affiliate in a second economy for processing before being exported to a manufacturing plant in a third economy, which may then export the final product to a fourth economy for consumption (Figure 2).

While the value of raw material should only be counted once throughout the entire value chain, traditional measurement by gross exports would have counted its value several times, resulting in what is referred to as “double counting” in trade. Indeed, 28 percent of global gross exports is shown to be goods and services that are first imported by economies only to be incorporated in other goods and services which are then exported again. Such “double counting” masks the actual distribution of economic gains from trade by individual economies. It also has a tendency to downplay the contribution of one sector such as services relative to another, with the consequent emphasis in favorable trade policy for goods over those for services.

Recent advances in trade statistics such as those underlying the TiVA database used in this issues paper aims to correct these deficiencies. As can be seen from Figure 2, it appears that most of the economic gains are obtained by economy C when measured in gross terms while it is actually economy B that gains the most from this trade when measured in value added terms.

² UNCTAD-Eora GVC database, which includes more economies shows that the share of services value-added in trade is 46 percent in 2010.

Figure 2. Illustration of gross exports and value added trade

Source: Authors and UNCTAD (2013)

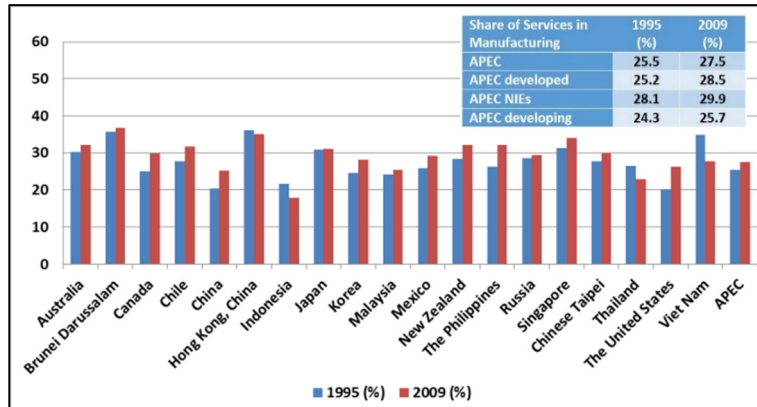
What the TiVA Tables show about APEC Services Trade

The OECD Trade in Value Added (TiVA) database shows that the share of services value added in manufacturing exports from 1995 to 2009 has increased across APEC economies with the exception of Hong Kong, China; Indonesia; Thailand; and Viet Nam (see Figure 3)³. The reason for the result in the latter three economies can be due to the relative dominance in the growth of manufacturing compared to services since these three are manufacturing hubs for many manufacturing MNEs in Asia. For APEC as a whole, services' value added share in manufacturing export rose from 25.5 percent in 1995 to 27.5 percent in 2009, an increase of 702 billion dollars over fourteen years (see inset Table). While growth rate of manufacturing exports in APEC grew by 131 percent over the period, services value added increased by 149 percent. The United States; The Philippines; and Canada post the highest increases of share of services value added. APEC developed economies as a group record a 3.4 percentage point increase in share of services value added compared to 1.9 and 1.3 percentage point increases for APEC Newly Industrialized Economies (NIEs) and APEC developing economies, respectively⁴.

³ Hong Kong, China has a very slight decrease in services share in manufacturing value added, from 36.1 percent to 35.2 percent. Viet Nam, in contrast, registered 7.0 percentage point decrease in services share.

⁴ APEC NIEs consist of the following economies: Hong Kong, China; Korea; Singapore; and Chinese Taipei. APEC developing economies are Brunei Darussalam; Chile; China; Indonesia; Malaysia; Mexico; The Philippines; Russia; Thailand; and Viet Nam. APEC developed economies are: Australia; Canada; Japan; New Zealand; and The United States.

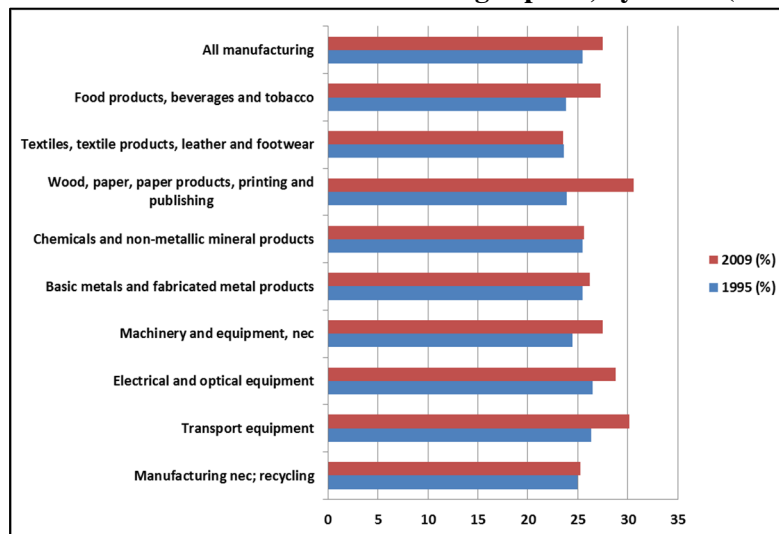
Figure 3. Share of services value added in manufacturing exports (1995 and 2009)



Source: APEC Policy Support Unit computation based on OECD-WTO Trade in Value Added (TiVA) database⁵.

Analysed by sector, the TiVA database indicates that services’ value added share has increased between 1995 and 2009 across all manufacturing sectors, except in textiles, textile products, leather and footwear (Figure 4). Services’ value added share in 2009 range from as low as 23.6 percent for the latter sector to 30.6 percent for wood, paper, paper products, printing and publishing. The top three manufacturing sectors that exhibit the largest increase in services value added shares are: wood, paper, paper products, printing and publishing; transport equipment; and food products, beverages and tobacco, posting 6.7, 3.8, and 3.5 percentage points increase, respectively.

Figure 4. Services’ contribution in manufacturing exports, by sector (1995 and 2009)



Source: APEC Policy Support Unit computation based on OECD-WTO TiVA database.

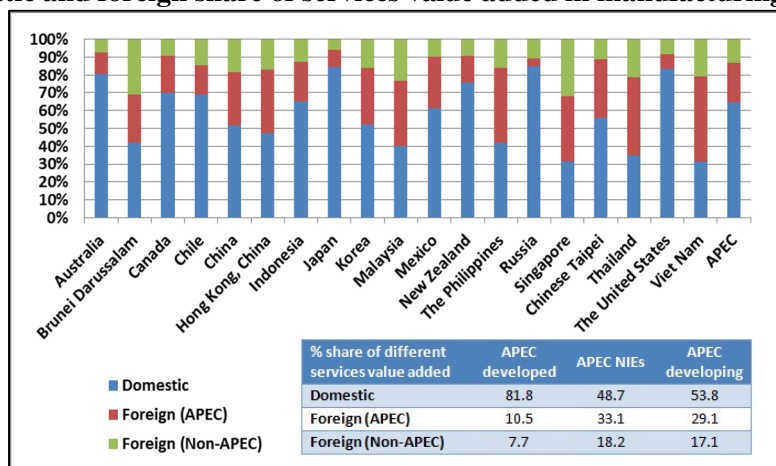
Foreign vs. domestic services

How much of services inputs in manufacturing exports are domestic and how much are from foreign sources? Figure 5 shows that indirect services inputs in manufacturing in APEC as a whole is 65 percent domestic and 35 percent foreign, of which 22 percent are from other APEC economies while 13 percent come from non-APEC economies. Russia has the largest domestic services input share (85.1 percent) while Singapore has the least domestic share (31.3 percent). APEC developed economies source 82 percent of indirect services value added share in manufacturing domestically which possibly reflects

⁵ Throughout this issues paper, analysis of APEC data from WTO-OECD TiVA database refers to 19 APEC economies excluding two which are not in the database, namely Papua New Guinea and Peru.

the strong competitiveness of these economies' service sectors. APEC NIEs use only half of services manufacturing inputs from domestic sources with the remaining half from abroad, of which about a third comes from other APEC economies. APEC developing economies' use of domestic services inputs for manufacturing are similar to that of APEC NIEs.

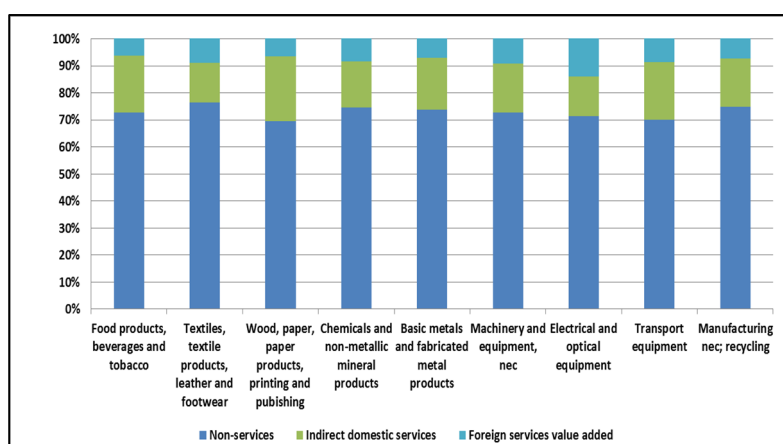
Figure 5. Domestic and foreign share of services value added in manufacturing exports in 2009



Source: APEC Policy Support Unit computation based on OECD-WTO TiVA database.

By sector, Figure 6 shows that wood, paper, paper products, printing and publishing contain the largest indirect domestic services value added with 24 percent share, while electrical and optical equipment sector has the largest foreign services value added with 14 percent share. Domestic services value added shares range from 15 percent (textiles, textile products, leather and footwear) to 24 percent (wood, paper, paper products, printing and publishing), while foreign services value added shares range from 6 percent (food products, beverages and tobacco) to 14 percent (electrical and optical equipment). Figure 5 also shows that even as services value added share in manufacturing exports had increased, the non-services inputs remain highly significant and range between 69 percent and 76 percent. Significantly, when compared with values in 1995, foreign services value added share increased across all manufacturing sectors, both as a percentage of gross exports and of total services value added.

Figure 6. Domestic services, foreign services and non-services share in APEC, by manufacturing sector in 2009



Source: APEC Policy Support Unit computation based on OECD-WTO TiVA database.

What Other Multi-Economy Data Tables Show about Services

The data on the importance of services provided using TiVA database is further complemented by that in the OECD Structural Analysis (STAN) database. Analysis of backward linkages show how the growth of one sector leads to the growth of other sectors that supply it. In this case, we analyze how growth in manufacturing leads to the growth of services (in so far as services provide inputs to manufacturing). Backward linkage⁶ analysis of input-output (I-O) tables indicates that for APEC as a whole, a unit increase in a manufacturing sector output would increase output of services sector by between 0.382 and 0.606 unit depending on the manufacturing sector (Table 1)⁷. Put differently, if a manufacturing sector – say, coke, petroleum, and refined product, and nuclear fuel’s output grows by one billion US dollars, services can grow by 382 million; if the sector growing by one billion is office, accounting and computing machinery, then the growth in services is 606 million. Any other manufacturing sector increasing its output by one billion will lead to an increase in services anywhere in between 382 million and 606 million.

Manufacturing’s total backward linkages range between 2.235 and 3.132, which means that a one billion increase in a manufacturing sector’s output causes an increase in all other sectors (both manufacturing and service sectors) supplying the growing sector by a total of anywhere between 2.235 billion (if the growing sector is pulp, paper, paper products, printing and publishing which has the least backward linkage) and 3.132 billion (if the growing sector is office, accounting and computing machinery which has the largest backward linkage). Of the total backward linkage, services made up between 15.0 and 23.3 percent. The top three manufacturing sectors where share of services in the total backward linkage are the highest are: medical, precision and optical instruments (23.3 percent); pulp, paper, paper products, printing and publishing (23.1 percent); and other non-metallic mineral products (21.4 percent).

Variations in the impact of different manufacturing sectors on services through backward linkage can also be seen when economies are categorized into whether they are part of APEC developed, APEC NIEs or APEC developing economies, signifying the varying importance of services at different stage of development⁸. In Table 1, services’ share in total backward linkage of food products, beverages and tobacco is 23.7 percent in APEC developed economies while it is only 12.8 percent in APEC developing economies.

⁶ APEC I-O table was constructed by adding the I-O tables of each member economy, which are available only for Australia; Canada; Chile; China; Indonesia; Japan; Korea; Mexico; Chinese Taipei; and The United States. Thus what we consider here as APEC I-O Table is just an approximation for purposes of roughly estimating the effects of manufacturing growth on services. The methodology for determining and interpreting the backward linkage based on this combined I-O table is described in details in http://unstats.un.org/unsd/publication/SeriesF/SeriesF_74E.pdf

⁷ For Table 1, APEC data from OECD STAN database refers to 10 APEC economies, namely Australia; Canada; Chile; China; Indonesia; Japan; Korea; Mexico; Chinese Taipei; and The United States.

⁸ APEC NIEs consist of Korea and Chinese Taipei. APEC developing economies are Chile; China; Indonesia; and Mexico. APEC developed economies are: Australia; Canada; Japan; and The United States.

Table 1. Services backward linkage for different manufacturing sectors in mid-2000s

	Increase in services sectors for a unit increase in manufacturing sector (unit)				Share of services in total backward linkage (%)			
	APEC	APEC developed	APEC NIEs	APEC developing	APEC	APEC developed	APEC NIEs	APEC developing
Food products, beverages and tobacco	0.501 (2.484)	0.587 (2.475)	0.424 (2.722)	0.326 (2.555)	20.2	23.7	15.6	12.8
Textiles, textile products, leather and footwear	0.479 (2.752)	0.512 (2.351)	0.519 (3.144)	0.407 (3.113)	17.4	21.8	16.5	13.1
Wood and products of wood and cork	0.473 (2.515)	0.492 (2.370)	0.494 (2.972)	0.435 (2.985)	18.8	20.8	16.6	14.6
Pulp, paper, paper products, printing and publishing	0.517 (2.235)	0.524 (2.062)	0.547 (2.743)	0.463 (3.084)	23.1	25.4	20.0	15.0
Coke, refined petroleum products and nuclear fuel	0.382 (2.545)	0.414 (2.481)	0.318 (2.775)	0.324 (2.765)	15.0	16.7	11.5	11.7
Chemicals and chemical products	0.540 (2.698)	0.596 (2.432)	0.487 (3.662)	0.419 (3.160)	20.0	24.5	13.3	13.3
Rubber and plastics products	0.512 (2.621)	0.524 (2.423)	0.472 (3.328)	0.492 (3.082)	19.5	21.6	14.2	16.0
Other non-metallic mineral products	0.479 (2.240)	0.510 (2.079)	0.522 (2.839)	0.389 (2.587)	21.4	24.5	18.4	15.1
Basic metals	0.479 (2.880)	0.520 (2.645)	0.475 (3.839)	0.402 (3.194)	16.6	19.7	12.4	12.6
Fabricated metal products except machinery and equipment	0.466 (2.538)	0.470 (2.266)	0.459 (3.312)	0.441 (3.245)	18.4	20.8	13.8	13.6
Machinery and equipment, nec	0.518 (2.694)	0.532 (2.383)	0.510 (3.363)	0.459 (3.314)	19.2	22.3	15.2	13.9
Office, accounting and computing machinery	0.606 (3.132)	0.668 (2.521)	0.606 (3.605)	0.512 (3.888)	19.4	26.5	16.8	13.2
Electrical machinery and apparatus nec	0.548 (2.724)	0.580 (2.415)	0.505 (3.430)	0.462 (3.415)	20.1	24.0	14.7	13.5
Radio, television and communication equipment	0.574 (2.752)	0.629 (2.374)	0.513 (3.322)	0.463 (3.483)	20.9	26.5	15.4	13.3
Medical, precision and optical instruments	0.572 (2.450)	0.596 (2.232)	0.560 (3.220)	0.438 (3.252)	23.3	26.7	17.4	13.5
Motor vehicles, trailers and semi-trailers	0.579 (3.113)	0.620 (3.017)	0.478 (3.687)	0.460 (3.301)	18.6	20.5	13.0	13.9
Other transport equipment	0.480 (2.636)	0.482 (2.352)	0.486 (3.373)	0.441 (3.332)	18.2	20.5	14.4	13.2
Manufacturing nec; recycling	0.476 (2.372)	0.502 (2.213)	0.512 (3.148)	0.368 (2.794)	20.1	22.7	16.3	13.2

Note: Actual figures refer to services backward linkage while figures in brackets refer to total backward linkage.

Source: APEC Policy Support Unit computation based on OECD STAN database.

Not all Services are Equal: Importance of Business Services

Which services sub-sectors ‘matter’ most for manufacturing? This is not to downplay the contribution of other services not ranked among the top because, ultimately, all of services have a role to play in ensuring the smooth functioning of global value chains. Rather, for purposes of prioritizing policy actions to spur manufacturing GVCs it is beneficial to know which services sub-sectors contribute the most value added to manufacturing exports.

Different services sub-sectors show varying growth in indirect exports through manufacturing. Table 2 indicates that they range from 5.8 percent for construction services to 8.1 percent for ‘other services’

sector (column 4)⁹. Business services is second to ‘Other Services’ in terms of growth rates. Among the service sectors, business services have the highest share amounting to 33 percent of total services value added share in manufacturing in 2009, of which 20 percent are domestic and 13 percent are foreign¹⁰, outpacing ‘wholesale and retail trade, hotels and restaurants’ sector which has a share of 30 percent. In contrast, it was business services that had a share of 30 percent while ‘wholesale and retail trade, hotels and restaurants’ had a share of 33 percent in 1995.

Table 2. Growth of indirect services exports and value added share

	Indirect exports through manufacturing			Services value added share in manufacturing	
	1995 (USD billion)	2009 (USD billion)	CAGR (%)	1995 (%)	2009 (%)
Construction	8.52	18.84	5.83	1.81	1.61
Wholesale and retail trade; hotels and restaurants	157.80	356.37	5.99	33.48	30.37
Transport and storage; post and telecommunication	82.01	195.78	6.41	17.40	16.68
Financial intermediation	58.68	150.99	6.98	12.45	12.87
Business services	142.62	387.32	7.40	30.26	33.00
Other services	21.70	64.24	8.06	4.60	5.47

Source: APEC Policy Support Unit computation based on OECD-WTO TiVA database.

The importance of business services is further substantiated by Table 3 which shows that it is the service subsector with the highest share of export value added in 6 out of 9 manufacturing sectors. Although ‘wholesale and retail trade; hotels and restaurants’ is also among the top two services sector in terms of value added, it should be noted that business services increased its value added share from 1995 to 2009 in all manufacturing sectors except in electrical and optical equipment.

Table 3. Top services sectors in APEC, by manufacturing sector in 2009

	Top three services sector in terms of value added			Increase in the value added share from 1995 to 2009	
	1st	2nd	3rd	Business services	Wholesale and retail trade; Hotels and restaurants
Food products, beverages and tobacco	Wholesale and retail trade; Hotels and restaurants	Business services	Transport and storage, post and telecommunications	✓	✗
Textiles, textile products, leather and footwear	Wholesale and retail trade; Hotels and restaurants	Business services	Financial intermediation	✓	✗
Wood, paper, paper products, printing and publishing	Business services	Wholesale and retail trade; Hotels and restaurants	Transport and storage, post and telecommunications	✓	✗
Chemicals and non-metallic mineral products	Business services	Wholesale and retail trade; Hotels and restaurants	Transport and storage, post and telecommunications	✓	✗

⁹ ‘Other services’, according to OECD-WTO TiVA database, comprise of public services, education, health and social work, other community, social and personal services.

¹⁰ Foreign and domestic shares are not shown in Table. Details are available from the authors upon request.

Basic metals and fabricated metal products	Wholesale and retail trade; Hotels and restaurants	Business services	Transport and storage, post and telecommunications	✓	✗
Machinery and equipment, nec	Business services	Wholesale and retail trade; Hotels and restaurants	Transport and storage, post and telecommunications	✓	✗
Electrical and optical equipment	Business services	Wholesale and retail trade; Hotels and restaurants	Transport and storage, post and telecommunications	✗	✓
Transport equipment	Business services	Wholesale and retail trade; Hotels and restaurants	Transport and storage, post and telecommunications	✓	✗
Manufacturing nec; recycling	Business services	Wholesale and retail trade; Hotels and restaurants	Transport and storage, post and telecommunications	✓	✗

Source: APEC Policy Support Unit computation based on OECD-WTO TiVA database.

What exactly are business services and what are its components? Accompanying notes on the TiVA database by the OECD-WTO indicate that the following sub-service sectors are within business services: a) real estate activities; b) renting activities for machines and equipment; c) computer related activities; d) research and development; and e) other business activities. In the latter are included all the professional services, namely legal, accounting, bookkeeping and auditing activities; tax consultancy; market research and public opinion polling; business management consultancy; architectural, engineering and other technical activities; advertising; and other business activities, not elsewhere classified.

While no further disaggregated information can be obtained from the TiVA database about business services, the OECD Structural Analysis (STAN)¹¹ input-output tables which gives the manufacturing sectors' usage of various inputs allows slightly more information about the sub-division within business services. Table 4 shows that 'other business activities' (presumably various professional services) and 'research and development' are the most used business services activities.

¹¹ The OECD Structural Analysis (STAN) (ISIC Rev. 3 version) database include measures of input-output in a standard industry list, allowing comparisons to be made across economies and also across related OECD databases such as the Trade in Value Added (TiVA) database.

Table 4. Detailed contribution of business services, by manufacturing sector in mid-2000s

Top business services inputs, by sector in mid-2000s				Business services with the highest increase in input share between mid-1990s and mid-2000s
	1st	2nd	3rd	
Food products, beverages and tobacco	Other Business Activities	Research and development	Renting of machinery and equipment	Research and development
Textiles, textile products, leather and footwear	Other Business Activities	Research and development	Real estate activities	Research and development
Wood and products of wood and cork	Other Business Activities	Research and development	Real estate activities	Research and development
Pulp, paper, paper products, printing and publishing	Other Business Activities	Research and development	Real estate activities	Research and development
Coke, refined petroleum products and nuclear fuel	Research and development	Other Business Activities	Renting of machinery and equipment	Research and development
Chemicals and chemical products	Other Business Activities	Research and development	Renting of machinery and equipment	Research and development
Rubber and plastics products	Other Business Activities	Research and development	Real estate activities	Research and development
Other non-metallic mineral products	Other Business Activities	Research and development	Renting of machinery and equipment	Research and development
Basic metals	Research and development	Other Business Activities	Computer and related activities	Research and development
Fabricated metal products except machinery and equipment	Other Business Activities	Research and development	Real estate activities	Research and development
Machinery and equipment not elsewhere classified (n.e.c)	Other Business Activities	Research and development	Renting of machinery and equipment	Research and development
Office, accounting and computing machinery	Other Business Activities	Research and development	Computer and related activities	Other Business Activities
Electrical machinery and apparatus n.e.c	Research and development	Other Business Activities	Renting of machinery and equipment	Research and development
Radio, television and communication equipment	Research and development	Other Business Activities	Renting of machinery and equipment	Other Business Activities
Medical, precision and optical instruments	Research and development	Other Business Activities	Computer and related activities	Research and development
Motor vehicles, trailers and semi-trailers	Research and development	Other Business Activities	Renting of machinery and equipment	Research and development
Other transport equipment	Research and development	Other Business Activities	Renting of machinery and equipment	Research and development
Manufacturing n.e.c; recycling	Other Business Activities	Research and development	Real estate activities	Research and development

Source: APEC Policy Support Unit computation based on OECD STAN database.

Of these two, research and development exhibit the highest growth in input share within business services¹², from 24.2 percent in mid-1990s to 37.1 percent in mid-2000s¹³. In contrast, the share of ‘other business activities’ has fallen by 2.9 percentage points over the same period, but its input share of 40.3 percent makes it the most important sector within business service¹⁴. This has important implications for trade policy considering that ‘other business activities’, according to the ISIC classification are mostly constituted by professional services such as accounting, legal services, engineering, architecture and other technical services (Table 5) and where plenty of restrictions can be found¹⁵. This is further discussed in a later section of the paper.

Table 5. Breakdown of business services by ISIC Rev.3 Code

OECD STAN	2-digit ISIC Rev.3 Code	3-digit ISIC Rev.3 Code
Real estate activities	70: Real estate activities	701 - Real estate activities with own or leased property 702 - Real estate activities on a fee or contract basis
Renting of machinery and equipment	71: Renting of machinery and equipment	711 - Renting of transport equipment 712 - Renting of other machinery and equipment 713 - Renting of personal and household goods n.e.c.
Computer and related activities	72: Computer and related activities	721 - Hardware consultancy 722 - Software consultancy and supply 723 - Data processing 724 - Data base activities 725 - Maintenance and repair of office, accounting and computing machinery 729 - Other computer related activities
Research and development	73: Research and development	731 - Research and experimental development on natural sciences and engineering (NSE) 732 - Research and experimental development on social sciences and humanities (SSH)
Other Business Activities	74: Other Business Activities	741 - Legal, accounting, book-keeping and auditing activities; tax consultancy; market research and public opinion polling; business and management consultancy 742 - Architectural, engineering and other technical activities 743 - Advertising 749 - Business activities n.e.c.

Source: APEC Policy Support Unit compilation from United Nations Statistics Division (UNSTATS).

Business Services and Direct and Indirect Service Exports

The role played by business services is further increased if its direct export as well as indirect export through other services are taken into consideration. An example of direct service exports could be the cross-border provision of maintenance and repair services (whether remotely or by sending personnel) to a manufacturing plant abroad. For indirect service export via other service sectors, an example could be the use of accounting services by a financial company that is providing services abroad.

Table 6 shows that business services exhibit the largest compounded annual growth of direct domestic export of 8.5 percent relative to other five services whose growth ranges from 2.3 percent for

¹² For the purpose of comparison of data in mid-1990s and mid-2000s, as we have done in Table 4, only 8 APEC economies have data for both periods in the OECD STAN database, namely: Australia; Canada; Chile; China; Indonesia; Japan; Chinese Taipei; and The United States. Therefore, APEC data in Table 4 refers to these economies only.

¹³ Authors’ computation, not shown in Table 5.

¹⁴ Ibid.

¹⁵ Please refer to Appendix B for a more complete breakdown of sectors beyond business services.

construction services to 7.4 percent for financial intermediation. While the growth of business services through value added share in services exports (6.3 percent, in column 7) is lower than that for ‘other services’¹⁶ (9.7 percent) and ‘transport and storage, post and telecommunication’ (7.0 percent), business services have the highest share amounting to 38 percent of total indirect services value added share in services sector in 2009, surpassing financial intermediation and ‘transport and storage, post and telecommunication’, which have shares of 18 and 17 percent, respectively.

Table 6. Growth of services via direct exports and indirect through other services

	Direct domestic exports			Indirect through other services			
	1995 (USD billion)	2009 (USD billion)	CAGR (%)	1995 (USD billion)	2009 (USD billion)	CAGR (%)	Services value added share in 2009
Construction	1.39	1.91	2.31	3.83	6.06	3.34	2.64
Wholesale and retail trade; hotels and restaurants	103.27	265.16	6.97	15.07	33.81	5.94	14.73
Transport and storage; post and telecommunication	102.31	197.21	4.80	15.32	39.50	7.00	17.21
Financial intermediation	26.94	73.50	7.43	17.21	42.36	6.65	18.45
Business services	55.77	173.85	8.46	36.75	86.18	6.28	37.54
Other services	10.95	28.63	7.10	5.89	21.66	9.75	9.43

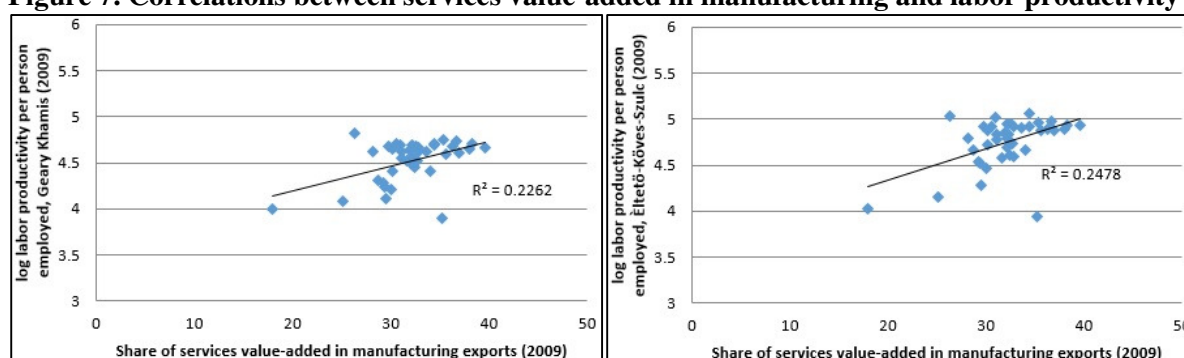
Source: APEC Policy Support Unit computation based on OECD-WTO TiVA database.

¹⁶ ‘Other services’, according to TiVA database, comprise of public services, education, health and social work, other community, social and personal services.

3. SERVICES AND MANUFACTURING PRODUCTIVITY

Servicification has been postulated to lead to an increase in manufacturing productivity and thus export capacity¹⁷. Scatter plots between various measures of labor productivity and share of services value-added in manufacturing exports for 40 economies including 11 APEC economies show the positive correlations (Figure 7). Likewise, scatter plot between the logarithm of manufacturing exports per capita and share of services value-added in manufacturing exports shows the same positive correlation (Figure 8).

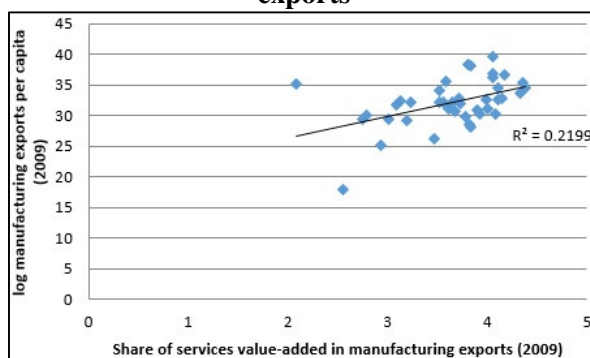
Figure 7. Correlations between services value-added in manufacturing and labor productivity



Note: The 2009 value of labor productivity per person employed on the left figure is converted at Geary Khamis PPPs and measured in 1990 US dollars while the 2009 value of labor productivity per person employed on the right figure is converted to 2013 price level with updated 2005 Éltető-Köves-Szulc PPPs and measured in 2013 US dollars.

Source: APEC Policy Support Unit computation based on The Conference Board Total Economy and OECD-WTO TiVA databases

Figure 8. Correlation between services value-added in manufacturing and corresponding exports

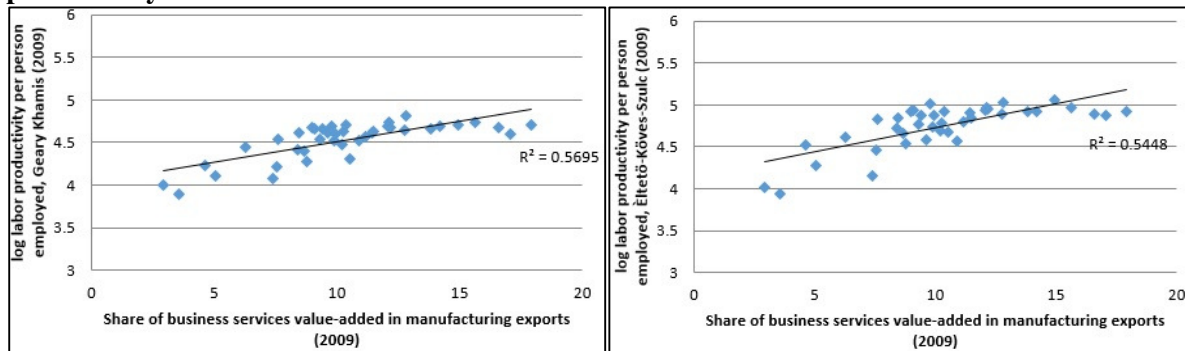


Source: APEC Policy Support Unit computation based on OECD-WTO TiVA database

Using business services value added share in manufacturing exports, we find the same positive correlations with labor productivity (Figure 9). In fact, the positive correlations here appear stronger than those seen in Figure 7. While correlation does not necessarily mean causation, these observations lend support to the idea on the importance of business services for the productivity of the manufacturing sector.

¹⁷ For example, see Tcha (2011) which shows that services have surpassed manufacturing as the largest source of productivity; or Arnold et.al (2008) which indicated that gains in service sector efficiency leads to productivity increases in manufacturing.

Figure 9. Correlations between business services value-added in manufacturing and labor productivity



Note: The 2009 value of labor productivity per person employed on the left figure is converted at Geary Khamis PPPs and measured in 1990 US dollars while the 2009 value of labor productivity per person employed on the right figure is converted to 2013 price level with updated 2005 Èltetö-Köves-Szalc PPPs and measured in 2013 US dollars.

Source: APEC Policy Support Unit computation based on The Conference Board Total Economy and OECD-WTO TIVA databases

Link between services and productivity

A natural question leading from the above observations is how services, in particular business services contribute to enhancing manufacturing productivity. Numerous literature including USITC (2013b) has attempted to answer this and it appears that services impact labor productivity both directly and indirectly. Often, services which have direct impact on labor productivity are those leading to process improvements. R&D and engineering services, for example, can result in better manufacturing process through the incorporation of new hardware modules which consequently lead to higher labor productivity either by cutting production time or making it possible to complete the same quantity of task with fewer number of labor. The same services may also allow for improved testing procedures, hence minimizing the possibility of hardware failure on the production floor and the consequent negative impact of downtime on productivity.

As a matter of fact, productivity can be improved without the need to install new hardware, but simply through tweaking of existing steps and/or removing unnecessary ones. Services providing their expertise on organizational paradigms such as lean manufacturing could contribute to this endeavor (SAP, 2008; IBS, 2010). More recently, innovations such as “big data” analytics and Internet of Things (IoT) have made it possible for firms to collect and decipher large amount of information on production floor and use them to continually improve production processes. These innovations can technically also ensure better quality management by allowing any deviation from certain standards to be detected early and therefore, minimize the time spent on producing products that are not within acceptable standards.

The role of accounting and legal services in boosting productivity should not be underestimated as well. Accountants have an important role of ensuring that scarce resources are allocated efficiently through the budgeting process and by providing checks and balances within firms. Legal services and in fact, accounting services ensure that firms adhere to certain regulatory standards and minimize the possibility of downtime brought about by, for instance, forced closure and lawsuits.

The positive contribution of business services to labor productivity can also be indirect, through its role in increasing demand for firms’ products and production by existing pool of labor¹⁸. For example,

¹⁸ This statement rests on several assumptions. First, the existing pool of labor is not used optimally and an increase in demand would lead to more products being produced without the need to hire more labor. Second, a fall in product demand would not lead to immediate downsizing of existing operations. While labor, in theory, can be varied to a larger extent than capital at least in the short run, there are also reasons why labor can be sticky.

business services can be employed in the form of data analytics services to look at trends and patterns relating to the purchases made by customers, allowing firms to respond accordingly. Firms can allocate production resources using data analytics, therefore reducing unsold inventories. In fact, if more information about the customers can be obtained, firms can also segment the market and tailor products for each market (McGuire et al, 2012). This strategy of using business services to gain valuable insights from the customers have actually been taken one step further by some firms which asked their customers to tell them directly what they really think about existing and upcoming products (USITC, 2013a). Besides allowing firms to have clearer understanding of what customers want, the strategy can potentially lead to improved customer loyalty.

Another way where business services can help increase demand is through the introduction of leasing, a type of services which allows access to the products without the need to purchase them. This is particularly useful for products like heavy machinery that are expensive and once purchased needs high maintenance costs. Besides overcoming the price factor, leasing allows customers to access more recent and larger variety of products that are perhaps more suited for the tasks at hand. In the absence of leasing, it is not difficult to imagine a situation where firms have to make do with existing machinery even if it is no longer the right piece of equipment, thus diminishing manufacturing productivity.

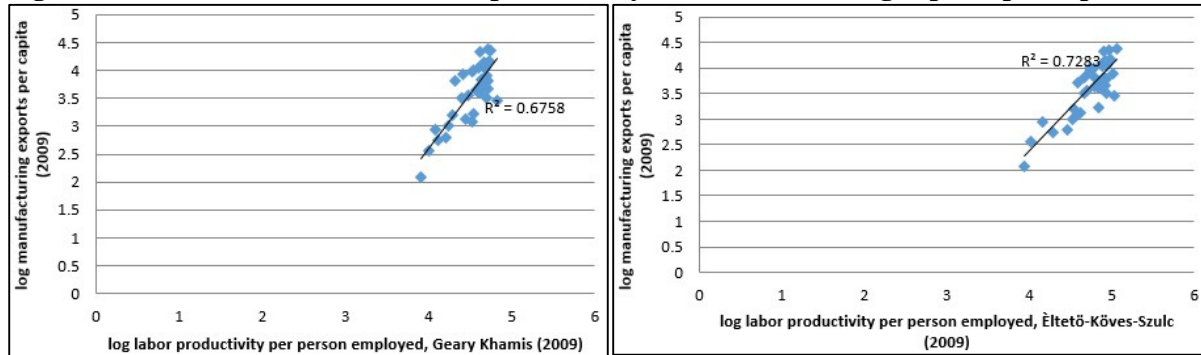
Related to the leasing services, maintenance and repair services, also a part of business services, can help boost demand through product bundling strategy, which gives better assurance to customers that the products would nearly always perform optimally. Training services can also be bundled in a package, to allow existing customers to use the products to its maximum potential and thereby lead to repeat purchases. By proactively sharing how the products can improve existing processes, training services can also lead to expansion of existing customer base. Last but not least, in a global economy where advertising is usually relied upon to open acceptance and create demand for products (Narayadou, 2006), it is hard to imagine the non-utilization of this business services by firms.

Services, productivity and exports

The importance of business services in improving manufacturing productivity is one factor for the servicification trend¹⁹. In turn, the increase in manufacturing productivity leads to an increase in manufacturing exports per capita, as indicated in Figure 10 which shows that economies with high productivity are highly correlated with higher manufacturing exports. This result is in line with other cross-country studies which show that the increasing use of services as inputs can promote exports at the industry level (Lodefalk, 2012).

These reasons include contract agreement, labor union rules, or regulatory difficulties in firing surplus labor when there is a downturn in demand. Another reason, as indicated by Kohpaiboon et al (2010), is the reluctance of firms to retrench trained labors.

¹⁹ It should be noted that despite the above portrayal of servicification as a deliberate strategy taken by manufacturing firms, servicification could also be a response to external factors like regulations imposed on the firms (Kommerskollegium, 2012). For example, regulations mandating regular inspection of exhaust pipes, for instance, provides a very clear example of how an external factor could influence firms' increased servicification in the form of inspection and potentially maintenance and repair services. Under such cases, it may be debatable whether servicification actually lead to an increase in manufacturing productivity (if cleaner and unclogged exhaust pipes result in more efficient production) or simply a process that is done to meet the regulatory requirements (if cleaner and unclogged exhaust pipes do not lead to improved production). However, it is also not true to say that all servicification made in response to external factors have no links to productivity improvement.

Figure 10. Correlations between labor productivity and manufacturing exports per capita

Note: The 2009 value of labor productivity per person employed on the left figure is converted at Geary Khamis PPPs and measured in 1990 US dollars while the 2009 value of labor productivity per person employed on the right figure is converted to 2013 price level with updated 2005 Éltető-Köves-Szulc PPPs and measured in 2013 US dollars.

Source: APEC Policy Support Unit computation based on The Conference Board Total Economy and OECD-WTO TiVA databases

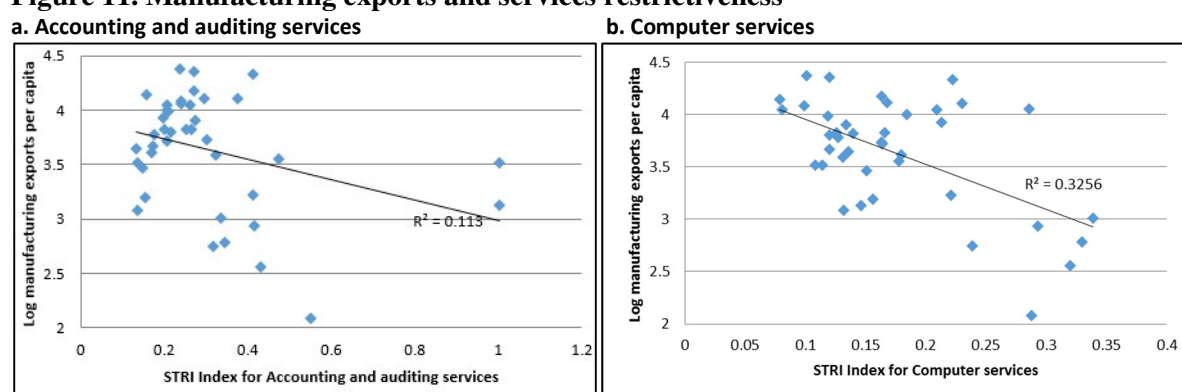
Although the section focused on the role of business services in enhancing labor productivity, it is by no means the only type of services that do aid productivity. The importance of other services such as ICT and logistics should not be understated because these service sectors have reduced the costs of coordinating the different aspects of GVCs over time (Nordas and Kim, 2013; USITC, 2013). Furthermore, Freund and Weinhold (2004) indicated that diffusion of internet plays an important role in the growth of goods trade internationally, and since exporting activity tends to be associated with high productivity, then, arguably, internet diffusion can be associated with productivity. On logistics, Arvis et al (2010) showed the positive correlations between logistics and trade in goods, particularly parts and components which is an integral part of any GVCs. More generally, Arnold et al (2012) found that improvements in services policies encompassing sectors such as telecommunications and transport are critical source of productivity gains in manufacturing.

4. RESTRICTIONS IN SERVICES

The discussions above have shown the important role of services in manufacturing and that its share in manufacturing exports value added has increased over time. It has also attempted to identify services that matter in manufacturing to allow policymakers to identify services subsectors for possible priority focus. In this regard, both business services as well as wholesale and retail distribution services have been determined as the top services sectors in terms of value added share in manufacturing. Specifically on business services, deeper analysis has indicated that ‘other business activities’ (where professional services are categorized) and ‘research and development’ are the two subcategories of business services that add the greatest value. Attempts have also been made to better understand how services, in particular business services, may contribute to enhancing manufacturing productivity and consequently manufacturing exports because these variables show strong positive correlations.

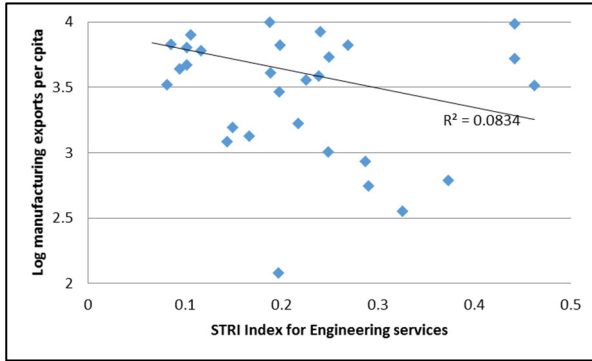
Considering the importance of services in manufacturing, will restrictions on services, particularly business services, then have adverse impact on economies’ capacity to export manufactured goods? The answer to this question seems to be ‘yes’ as Figure 11 shows. Scatter plots of gross manufacturing exports in 2009 (controlled for market size) and the various OECD index of restrictiveness for between 34 and 40 economies depending on the sector²⁰ show a robustly negative correlation, giving support to the idea that higher restrictions on services adversely affect the competitiveness of downstream sectors that make use of them. Moreover, to stress the importance of not downplaying the contribution of services other than business services, the scatter plot also shows the negative correlations of exports with services such as commercial banking and telecommunications.

Figure 11. Manufacturing exports and services restrictiveness

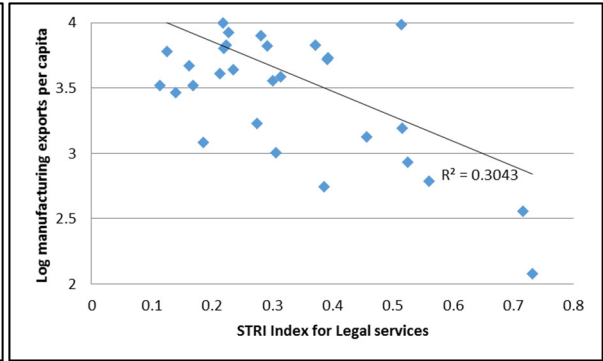


²⁰ The OECD has services trade restrictiveness indices covering 18 sectors in 40 economies. Specifically for APEC, it only has indices for the following member economies: Australia (AUS); Canada (CDA); Chile (CHL); Japan (JPN); Korea (ROK); Mexico (MEX); New Zealand (NZ); The United States (USA) (all OECD member economies) plus China (PRC); Indonesia (INA); and Russia (RUS). The indices take values between zero (least restrictive) and one (most restrictive). For more details, please refer to <http://www.oecd.org/tad/services-trade/services-trade-restrictiveness-index.htm>

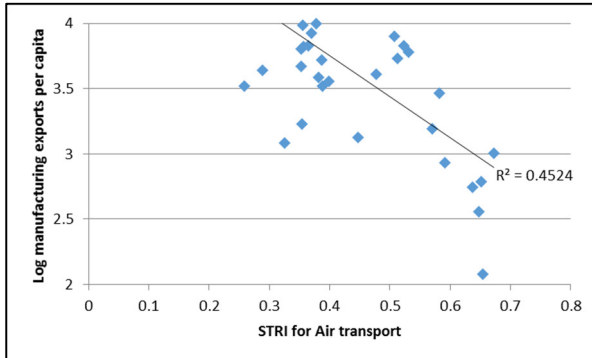
c. Engineering services



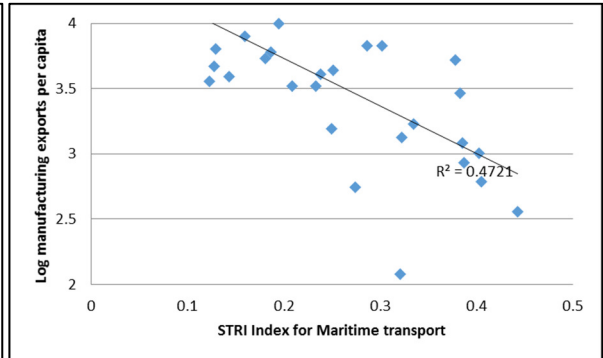
d. Legal services



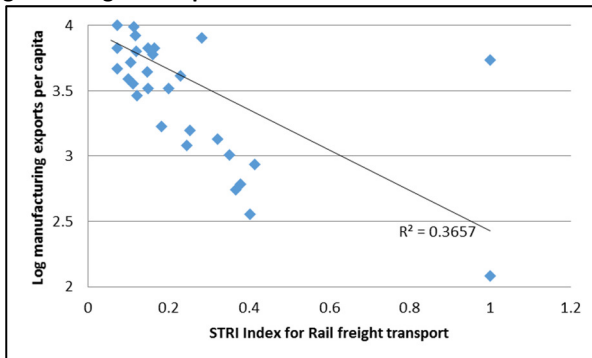
e. Air transport



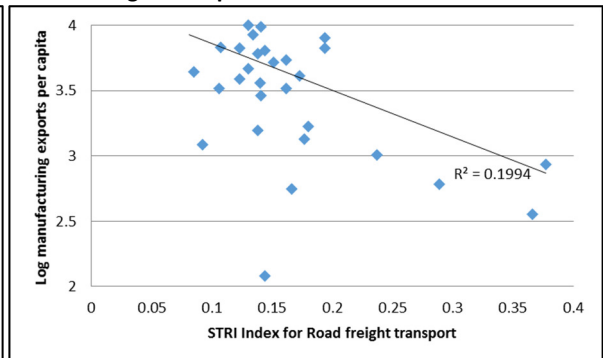
f. Maritime transport



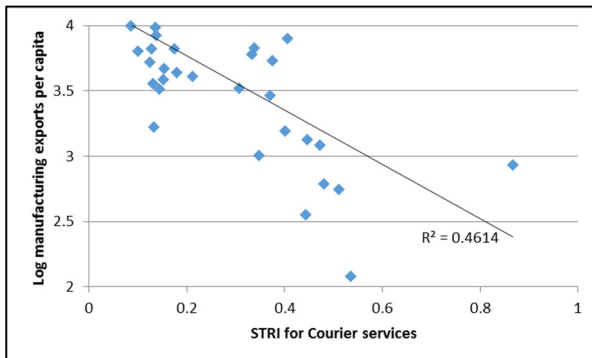
g. Rail freight transport



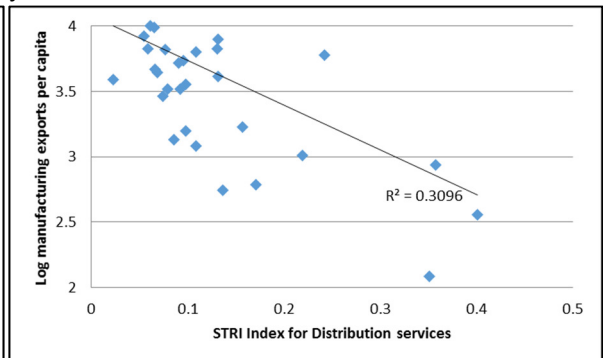
h. Road freight transport

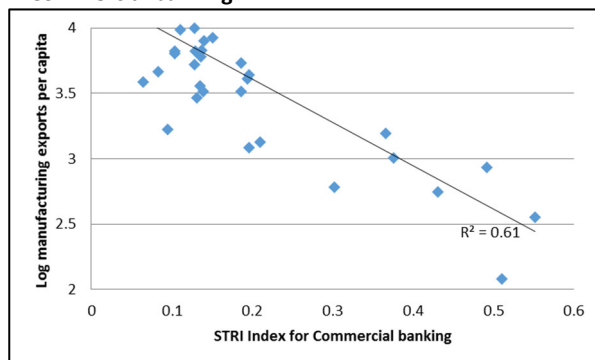
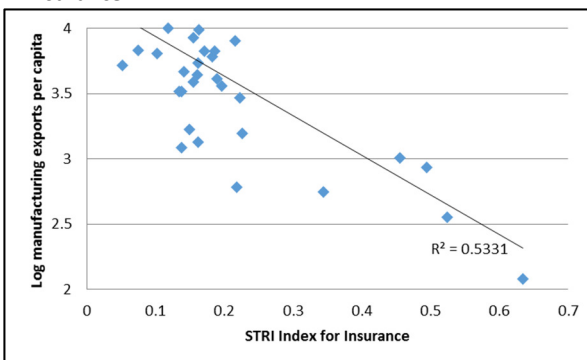
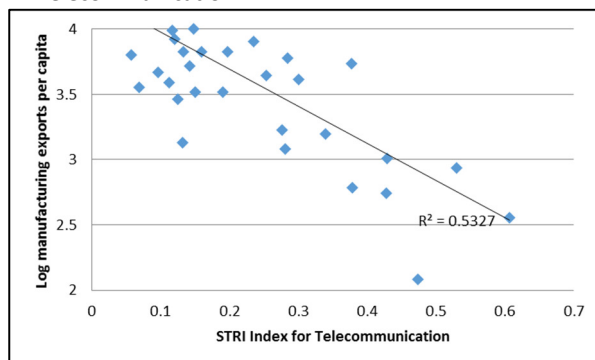
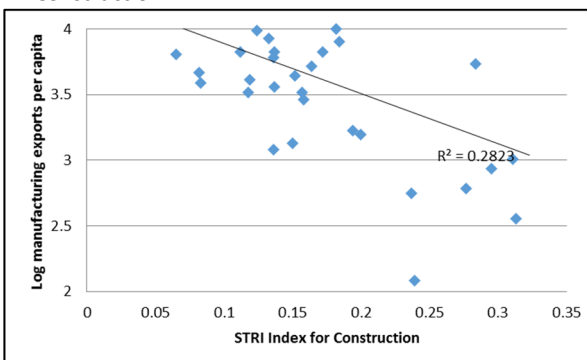


i. Courier services



j. Distribution services



k. Commercial banking**l. Insurance****m. Telecommunication****n. Construction**

Note: All manufacturing exports per capita figures refer to 2009 figures.

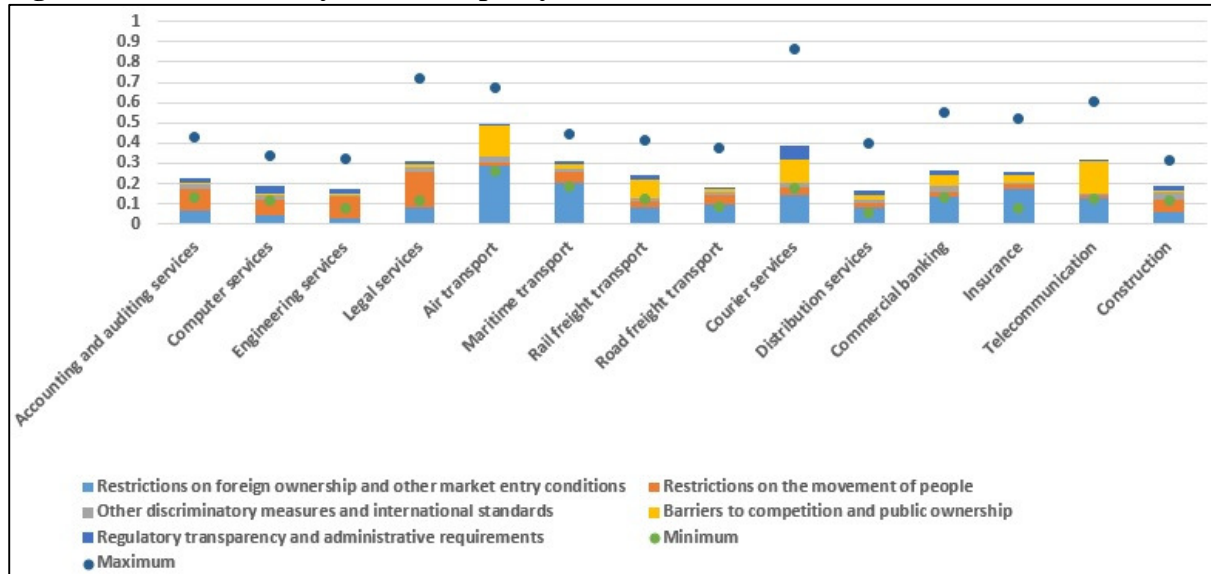
Source: APEC Policy Support Unit computation based on OECD-WTO TiVA, OECD Services Trade Restrictiveness Index (STRI) and World Bank World Development Indicators databases.

Interpreting STRI of APEC economies

Analysis of sectoral services trade restrictiveness index (STRI) for APEC shows variations in at least three dimensions. Firstly, across services sectors in general, STRI score for APEC as a group ranges between 0.167 for distribution services to 0.497 for air transport, clearly indicating that the level of trade restrictiveness varies between different services sectors (Figure 12). Secondly, comparisons of STRI score between sectors that belong to the same group indicates the presence of variations as well. For instance, differences in STRI score can be seen for accounting, computer, engineering and legal services, all of which are part of business services. Thirdly, there are variations in the STRI score obtained by each member economy for each services sector. As an example, the STRI score for accounting services ranges between 0.132 and 0.432. These observations indicate that any efforts in reducing the variations among APEC economies should be carried out across three fronts: within each services sector, among services sectors that belong to the same group and for services sector in general.

Each STRI score can be decomposed into five sub-scores, covering the following policy areas: 1) restrictions on foreign ownership and other market entry conditions; 2) restrictions on the movement of people; 3) other discriminatory measures and international standards; 4) barriers to competition and public ownership; and 5) regulatory transparency and administrative requirements. A good starting point in analyzing sectoral restrictions could be to see which of the five policy areas make the largest contributions to the total score. This section focuses on sectors that belong to business services (i.e. accounting and auditing, computer, engineering and legal), and shows that despite differences in their STRI score, the main contributor to the scores appear to be restrictions on the movement of people, followed by restrictions on foreign ownership and other market entry conditions.

Figure 12. APEC STRI by sector and policy area²¹



Source: APEC Policy Support Unit computation based on OECD Services Trade Restrictiveness Index (STRI) database.

Accounting and auditing services

APEC economies have STRI scores that range between 0.132 (New Zealand) and 0.432 (Indonesia) for accounting and auditing services. As with other services that made up business services, restrictions on the movement of people have the strongest impact on the total score, especially policies which limit the ability of accounting professionals to stay for 36 months and beyond and those which made limited or temporary licensing system not available generally (Table 7)²². Others include requiring foreign accountants and/or auditors to take local examinations and/or practice locally for at least one year before they qualify for full membership of the profession, necessitating some form of labor market tests before professionals can come in either as intra-corporate transferees, contractual services suppliers or independent services suppliers and also granting license to practice on the back of nationality/citizenship; prior/permanent residency; or domicile.

²¹ STRI score by sector and policy area for APEC as a whole is obtained by taking a simple average of the score obtained by each member economy, which are only available for Australia; Canada; Chile; China; Indonesia; Japan; Korea; Mexico; New Zealand; Russia; and The United States.

²² Only restrictions where share of APEC economies exhibiting it is above 50 percent have been shown in the tables. Please refer to Appendix D for a complete listing of items assessed under each of the five policy areas affecting provision of accounting and auditing services and the specific economies that have restrictions in each item.

Table 7. Top restrictions on the movement of people for provision of accounting and auditing services in APEC economies

Policies affecting movement of people	Share of APEC economies exhibiting the restriction (percent) ²³	Examples of how policies become restrictive
At least one limitation on stay (i.e. less than 36 months) on the following: intra-corporate transferees, contractual services suppliers and/or independent services suppliers	72.7	<ul style="list-style-type: none"> The duration of stay allowed under initial work permit/visa varies between economies but generally is shorter than 36 months. Contractual services suppliers is incompatible with existing migration and labor law.
Limited or temporary licensing system is not available	72.7	<ul style="list-style-type: none"> Mechanism for appointment of non-RCA (registered company auditor) can be considered only when it is not practical for company to obtain the services of an RCA. No such mechanisms exist currently.
Foreign accountants and auditors are required to do at least one of the following to qualify for full membership of the profession: take local examinations and/or practice locally for at least one year	54.5	<ul style="list-style-type: none"> Assessment requirement is made on a case by case basis. Minimum requirements for obtaining a certificate for carrying out audit activities are high professional degree from a state licensed/recognized university, 3 years of experience and passing of qualification exam.

Source: APEC Policy Support Unit compilation from OECD Services Trade Restrictiveness Index (STRI) database with modifications.

The next restrictions that appears to also have a strong impact on the total score are those affecting foreign ownership and other market entry conditions for accounting and auditing services, particularly requirements that a manager and/or majority or at least one of the directors in the board have to be nationals, residents or locally-licensed professionals as well as those restricting equity ownership beyond certain level only to locally-licensed professionals (Table 8).

Table 8. Top restrictions on foreign ownership for provision of accounting and auditing services in APEC economies

Policies affecting foreign ownership	Share of APEC economies exhibiting the restriction (percent)	Examples of how policies become restrictive
At least one restriction for managers (i.e. must be national, resident and/or locally-licensed professional)	63.6	<ul style="list-style-type: none"> An accounting firm has to include at least five Certified Public Accountants and only citizens can apply for attendance at a unified national examination for certified public accountants. Whether foreigners can practice is dealt on a reciprocal basis. A Public Accounting Firm must be managed by public accountants who are locals.
Equity restrictions apply to non-locally licensed professionals/firms	54.5	<ul style="list-style-type: none"> All shares must be owned by members of the profession and only-locally licensed accountants and auditors may use the name/title 'Accountant' or 'Auditor' There must be at least four local partners for each foreign partner in public accounting firms.

Source: APEC Policy Support Unit compilation from OECD Services Trade Restrictiveness Index (STRI) database with modifications.

²³ Note that only 11 APEC economies are represented in the OECD STRI database: Australia (AUS); Canada (CDA); Chile (CHL); China (PRC); Indonesia (INA); Japan (JPN); Korea (ROK); Mexico (MEX); New Zealand (NZ); Russia (RUS); and The United States (USA).

Though the OECD STRI database covers only about half of the APEC economies, another measure of services trade restrictions released by the World Bank and covers 16 APEC economies lead to fairly similar findings²⁴. Of the various policy measures analyzed in the World Bank database and could be aligned with those in the OECD STRI database, the top constraints related to movement of people are those pertaining to limitation on stay (81.3 percent) and those requiring foreign accountants and/or auditors to take local examinations and/or practice for a minimum period of time before they qualify for full membership of the profession (62.5 percent)²⁵. As for restrictions on foreign ownership and other market entry conditions, the top constraint indicated in the World Bank database is those impacting equity restrictions of non-locally licensed professionals/firms (62.5 percent). Unfortunately, the World Bank database has no policy measures that could accurately capture whether limited or temporary licensing system is available or whether there are requirements that managers must be national, resident or locally-licensed professional in each economy.

Beyond restrictions pertaining to movement of people and foreign ownership discussed above, other restrictions that are exhibited by more than half of APEC economies covered in the OECD STRI database include laws, regulations or relevant standard-setter not using/adopting international standards on auditing (54.5 percent) and number of official procedures for registering a company being more than 6.87, the cut-off number set by the OECD STRI database²⁶ (54.5 percent).

Computer services

The STRI score for APEC economies in the provision of computer services ranges between 0.114 (Australia) and 0.339 (Russia). Similar to accounting services, restrictions on the movement of people have the strongest impact on the average score for APEC as a group. As seen from Table 9, 72.7 percent of APEC economies have at least one policy which limit the stay of intra-corporate transferees, contractual or independent services suppliers to less than 36 months²⁷. Besides restricting the period of stay, some have even limited visas to only certain positions in the firms such as managerial, executive or someone with specialized knowledge on the firm's product. In addition, more than half of APEC economies also instituted labor market test in one form or another for professionals who come as intra-corporate transferees, contractual or independent services suppliers.

²⁴ The 16 APEC economies covered by World Bank Services Trade Restrictions database are: Australia (AUS); Canada (CDA); Chile (CHL); China (PRC); Indonesia (INA); Japan (JPN); Korea (ROK); Malaysia (MAS); Mexico (MEX); New Zealand (NZ); Peru (PE); Philippines (PHL); Russia (RUS); Thailand (THA); The United States (USA); and Viet Nam (VN).

²⁵ While the World Bank database allows for determination on whether an economy has stay limitation or not, in contrast to the OECD database, it is not possible to find out the allowable stay period for some economies. Therefore, in the context of World Bank database, it would only be interpreted as the economy having stay limitation. The same can be said for the number of years that foreign accountants and/or auditors need to practice. Instead of saying that foreign accountants and/or auditors need to practice locally for at least one year (as is the case in the OECD database), for the World Bank database, it would only be interpreted as the economy requiring a certain minimum period of practice before qualifying for full membership of the profession.

²⁶ According to OECD STRI methodology, the number 6.87 is value of the 25th percentile for 183 economies taking the average over 2004-2011 from the World Bank Doing Business Indicators – Starting a business.

²⁷ Only restrictions where share of APEC economies exhibiting it is above 50 percent have been shown in the tables. Please refer to Appendix E for a complete listing of items assessed under each of the five policy areas affecting provision of computer services and the specific economies that have restrictions in each item.

Table 9. Top restrictions on the movement of people for provision of computer services in APEC economies

Policies affecting movement of people	Share of APEC economies exhibiting the restriction (percent) ²⁸	Examples of how policies become restrictive
At least one limitation on stay (i.e. less than 36 months) on the following: intra-corporate transferees, contractual services suppliers and/or independent services suppliers	72.7	<ul style="list-style-type: none"> • The duration of stay allowed under initial work permit/visa varies between economies but generally is shorter than 36 months. • Limiting visas given to intra-corporate transferees only to certain positions such as managerial, executive or someone with specialized knowledge on the firm's product. • Contractual services suppliers is incompatible with existing migration and labor law.
At least one labor market test on the following: intra-corporate transferees, contractual services suppliers and/or independent services suppliers	54.5	<ul style="list-style-type: none"> • Independent services suppliers can apply for a short stay business visa which is limited to 3 months but a labor market test is needed. • In the absence of exemption of profession through agreements for instance, labor market opinions would be needed. • The position to be filled by foreigner should be of special need and/or cannot be filled by local candidates for the time being but at the same time, does not go against government regulations. • Labor market test would be conducted by the Ministry before a permit to employ foreigners is issued.

Source: APEC Policy Support Unit compilation from OECD Services Trade Restrictiveness Index (STRI) database with modifications.

Restrictions on foreign ownership also have significant impact on the average score for APEC. However, unlike the case for accounting services where there are more categories with a large share of economies having restrictions in them, the issue for computer services appears to be solely on screening, at least for the group level (Table 10). The motivations behind it are clustered on the need for foreign capital to benefit development of the national economy although the definition on what constitutes as economic development varies from economy to economy. Some are concerned on protecting their micro, small and medium-sized enterprises while some want to know the technological contribution of the possible investments. Consequently, the requirements also vary across economies such that while some only require notification before proceeding, others review investments on a case-by-case basis before approving them.

²⁸ Note that only 11 APEC economies are represented in the OECD STRI database: Australia (AUS); Canada (CDA); Chile (CHL); China (PRC); Indonesia (INA); Japan (JPN); Korea (ROK); Mexico (MEX); New Zealand (NZ); Russia (RUS); and The United States (USA).

Table 10. Top restrictions on foreign ownership for provision of computer services in APEC economies

Policies affecting foreign ownership	Share of APEC economies exhibiting the restriction (percent)	Examples of how policies become restrictive
At least one screening on the following: foreign investors must show net economic benefits; approval unless contrary to national interest; and/or notification	81.8	<ul style="list-style-type: none"> • Government reviews foreign investment proposals on a case-by-case basis if the foreign entity is acquiring an interest of 15 percent or more in the domestic business that is valued above a certain threshold or if it is a direct investment by foreign government or their related entities. • An enterprise to be established with foreign capital must benefit the development of the national economy. This could be but not restrictive to protection of micro, small and medium-sized enterprises, impact on employment and training, technological contribution and threat to national security. • Foreign investors must notify the relevant agencies to get approval for their activities.

Source: APEC Policy Support Unit compilation from OECD Services Trade Restrictiveness Index (STRI) database with modifications.

Likewise, it should be mentioned that while Tables 9 and 10 shown above have focused on restrictions in the movement of people and foreign ownership, it does not mean that APEC economies do not have restrictions in the other areas covered by STRI. Rather, the overall contributions of those areas are relatively smaller than the two areas discussed and if economies are serious about making the provision of computer services easier, these restrictions have to be tackled as well. These include regulations affecting public procurement and reducing the number of official procedures for registering a company among others.

Engineering services

APEC economies have STRI score that ranges between 0.082 (Australia) and 0.326 (Indonesia) for provision of engineering services. Restrictions on the movement of people and foreign ownership are again the top two contributors to the total score for APEC as a group (Table 11 and 12)²⁹. Specifically on movement of people, 72.7 percent of APEC economies have restrictions on staying for 36 months or more for intra-corporate transferees, contractual or independent services suppliers and 72.7 percent require professionals to have license or authorization to practice as an engineer. Other restrictions put in place by significant number of APEC economies are those requiring labor market test to be carried out for intra-corporate transferees, contractual or independent services suppliers and the unavailability of limited or temporary licensing system.

²⁹ Only restrictions where share of APEC economies exhibiting it is above 50 percent have been shown in the tables. Please refer to Appendix F for a complete listing of items assessed under each of the five policy areas affecting provision of engineering services and the specific economies that have restrictions in each item.

Table 11. Top restrictions on the movement of people for provision of engineering services in APEC economies

Policies affecting movement of people	Share of APEC economies exhibiting the restriction (percent) ³⁰	Examples of how policies become restrictive
At least one limitation on stay (i.e. less than 36 months) on the following: intra-corporate transferees, contractual services suppliers and/or independent services suppliers	72.7	<ul style="list-style-type: none"> The duration of stay allowed under initial work permit/visa varies between economies but generally is shorter than 36 months. Limiting visas given to intra-corporate transferees only to certain positions such as managerial, executive or someone with specialized knowledge on the firm's product. Contractual services suppliers is incompatible with existing migration and labor law.
License or authorization is required to practice as an engineer	72.7	<ul style="list-style-type: none"> Temporary license is generally required to practice. Licensing procedure is dependent on reciprocity unless treaties exist.

Source: APEC Policy Support Unit compilation from OECD Services Trade Restrictiveness Index (STRI) database with modifications.

On foreign ownership, a significant number of APEC economies appear to have prohibition or restriction on the acquisition of land and real estate by foreigners. Restrictions include granting use or lease for a maximum of 25 years with extension possibility and prohibiting the acquisition of land that are close to border areas. Other than the two areas discussed, more than half of APEC economies covered in the database also have official procedures for registering a company that is above 6.87, the OECD cut-off number.

Table 12. Top restrictions on foreign ownership for provision of engineering services in APEC economies

Policies affecting foreign ownership	Share of APEC economies exhibiting the restriction (percent)	Examples of how policies become restrictive
Acquisition of land and real estate by foreigners is either prohibited and/or restricted	63.6	<ul style="list-style-type: none"> Although acquisition is not prohibited, there are limitations such as a foreigner can only be granted right to use or lease for a maximum of 25 years with possibility of extension. Consent must be obtained for investment in land defined as "sensitive" and one of the criteria is that it must be beneficial to the economy. Restrictions apply to ownership of lands close to border areas.

Source: APEC Policy Support Unit compilation from OECD Services Trade Restrictiveness Index (STRI) database with modifications.

Legal services

Among the four services classified as business services, the average APEC score is the highest for legal services, indicating that legal services is perhaps among the most restricted business services. The range for individual APEC economies is between 0.114 (Australia) and 0.716 (Indonesia). There are several

³⁰ Note that only 11 APEC economies are represented in the OECD STRI database: Australia (AUS); Canada (CDA); Chile (CHL); China (PRC); Indonesia (INA); Japan (JPN); Korea (ROK); Mexico (MEX); New Zealand (NZ); Russia (RUS); and The United States (USA).

categories within restrictions on movement of people where APEC in general could improve on (Table 13)³¹. Similar to the other three business services subsector, 72.7 percent of APEC economies have stay limitations of less than 36 months for intra-corporate transferees, contractual or independent services suppliers and indeed, some even restrict the visa available only to certain positions such as managerial, executive or someone with specialized knowledge on the firm's product. 63.6 percent require either nationality/citizenship, prior/permanent residency and/or domicile before license to practice would be issued and in some cases, the same requirements are needed even for limited license. Specifically for legal services, the need for foreign lawyers to take local examinations and/or practice locally for at least one year before being granted full membership of the profession also seem to be a common restriction among APEC economies, as 63.6 percent have such requirements. Labor market test is also required by 45.5 percent of APEC economies if the professionals are coming as intra-corporate transferees, contractual or independent services suppliers.

Table 13. Top restrictions on the movement of people for provision of legal services in APEC economies

Policies affecting movement of people	Share of APEC economies exhibiting the restriction (percent) ³²	Examples of how policies become restrictive
At least one limitation on stay (i.e. less than 36 months) on the following: intra-corporate transferees, contractual services suppliers and/or independent services suppliers	72.7	<ul style="list-style-type: none"> The duration of stay allowed under initial work permit/visa varies between economies but generally is shorter than 36 months. Limiting visas given to intra-corporate transferees only to certain positions such as managerial, executive or someone with specialized knowledge on the firm's product. Contractual services suppliers is incompatible with existing migration and labor law.
At least one of the following must be met for license to practice including limited license: nationality/citizenship, prior/permanent residency and/or domicile	63.6	<ul style="list-style-type: none"> Citizenship is required and if not, full legal studies should have been taken in the economy. If eligible to practice, foreigners should be resident for not less than 6 months each year in the economy. The establishment of law offices should be within the district of the bar association in which the attorney belongs and an address in the economy is required for registration.
Foreign lawyers are required to do at least one of the following to qualify for full membership of the profession: take local examinations and/or practice locally for at least one year	63.6	<ul style="list-style-type: none"> Provincial bar exam is needed even if recognition of qualifications is granted at the federal level. Submission of foreign qualifications for equivalence determination and examination with the supreme court are needed.

Source: APEC Policy Support Unit compilation from OECD Services Trade Restrictiveness Index (STRI) database with modifications.

On foreign ownership, more than half of APEC economies have equity restrictions which are applicable to non-locally licensed professionals/firms and as indicated by some of the examples in Table 14, restrictions appear to be more indirect. For instance, instead of saying explicitly that foreign lawyers are not allowed to own equity, economies tend to say that all shares must be owned by licensed lawyers and only locally-licensed lawyers may use the name/title "lawyer". Another example is reserving the practice of local law only to locally-qualified lawyers and its own nationals. More than half of APEC

³¹ Only restrictions where share of APEC economies exhibiting it is above 50 percent have been shown in the tables. Please refer to Appendix G for a complete listing of items assessed under each of the five policy areas affecting provision of legal services and the specific economies that have restrictions in each item.

³² Note that only 11 APEC economies are represented in the OECD STRI database: Australia (AUS); Canada (CDA); Chile (CHL); China (PRC); Indonesia (INA); Japan (JPN); Korea (ROK); Mexico (MEX); New Zealand (NZ); Russia (RUS); and The United States (USA).

economies also require at least one member or majority of the board of directors to be nationals, residents or locally-licensed professionals.

Table 14. Top restrictions on foreign ownership for provision of legal services in APEC economies

Policies affecting foreign ownership	Share of APEC economies exhibiting the restriction (percent)	Examples of how policies become restrictive
Equity restrictions apply to non-locally licensed professionals/firms	54.5	<ul style="list-style-type: none"> All shares must be owned by licensed lawyers and only locally-licensed lawyers may use the name/title "lawyer". The practice of local law is reserved for locally-qualified lawyers and its own nationals. Directors, shareholders and partners in firms should be qualified and approved to practice on own account and must hold current practising certificates from the economy.
At least one restriction for board of directors (i.e majority or at least one must be nationals, residents and/or locally-licensed professionals)	54.5	<ul style="list-style-type: none"> At least one director (two in the case of public companies) should be resident. At least one director should also be a local legal practitioner holding an unrestricted practising certificate. At least 25% must be residents and if there are less than four directors, at least one must be resident. Equity and managing partners of firms which practice local law must be lawyers who are locally-qualified and nationals of the economy.

Source: APEC Policy Support Unit compilation from OECD Services Trade Restrictiveness Index (STRI) database with modifications.

Besides accounting and auditing services, the database released by World Bank which cover 16 APEC economies also look at restrictions in the provision of legal services. Results from the analysis of information provided here complement the findings from the OECD STRI database. On restrictions affecting the movement of people, the top ones appear to be the limitation on stay (75.0 percent) and the requirement that foreign lawyers take local examinations and/or practice for a minimum period of time before they could qualify for full membership of the profession (56.3 percent)³³. As for restrictions affecting foreign ownership and other market entry conditions, the main one is equity restrictions which apply to non-locally licensed professionals/firms (62.5 percent). No information in the World Bank database could capture accurately whether nationality/citizenship, prior/permanent residency, and/or domicile should be met for license to be issued. Likewise for whether the majority or at least one member of the board of directors must be nationals, resident or locally-licensed professional.

Besides the two areas discussed, restrictions in other areas that are exhibited by a significant share of APEC economies in the OECD STRI database include only locally-licensed lawyers being able to use the name/title 'lawyer' (63.6 percent) and the number of official procedures for registering a company being above the OECD cut-off number of 6.87 (54.5 percent).

³³ While the World Bank database allows for determination on whether an economy has stay limitation or not, in contrast to the OECD database, it is not possible to find out the allowable stay period for some economies. Therefore, in the context of World Bank database, it would only be interpreted as the economy having stay limitation. The same can be said for the number of years that foreign lawyers need to practice. Instead of saying that foreign lawyers need to practice locally for at least one year (as is the case in the OECD database), for the World Bank database, it would only be interpreted as the economy requiring a certain minimum period of practice before qualifying for full membership of the profession.

General comments on business services STRI database

Across different business services, restrictions exist for some items which on surface do not seem to be the case (as indicated by OECD) and such restrictions often come to light when one reads the comments on rules and regulations. For instance, in the item on whether prior or permanent residency is required for the license to practice law in this specific APEC economy, the answer provided by OECD in its regulatory database is “no”. However, one would quickly discover from the comments that it is only applicable if the applicant is a national of an economy that enjoys a relevant international trade agreement; or if there is no treaty, the issue is handled on a reciprocal basis. Another example can be found in the provision of computer services, specifically with regard restrictions on cross-border mergers and acquisitions in a specific APEC economy; while the answer provided in the OECD regulatory database is “no”, the comment section mentioned that cross-border mergers and acquisitions have to pass through a screening process.

Another observation is the interaction between policies. As an example, an economy which mandates that all shares must be owned by members of the profession does not appear to be restrictive on equity ownership by foreign accountants and/or auditor at first glance because arguably, an accountant would still be one regardless of whether he/she is local or foreigner. However, a deeper look would reveal that only locally-licensed accountants and auditors may actually use these titles. Another example is in legal service: the OECD STRI regulatory database indicated that there are no needs test requirement and hence no prohibition to establish legal practice in one particular economy. However, the small print shows that foreign lawyers can access the market only through the employment of local firms as advisers to foreign law.

Several restrictions appear to be applicable across different business services (Table 15)³⁴. On restrictions pertaining to foreign ownership for instance, the requirement that the majority or at least one member of the board of directors should be nationals, residents or locally-licensed professionals is applicable for all four services (i.e accounting, computer, engineering and legal) in three economies. Similarly, on restrictions related to movement of people, eight economies enforce the stay limitations across all four services. These observations suggest that such restrictions are most likely not implemented by agencies that oversee a specific services sector such as accounting or legal but rather by agencies with mandates covering broader areas such as labor development or immigration. Consequently, it implies that any attempts to improve the provision of services have to include policymakers beyond the specific services sector, because services policy do not work in silos.

³⁴ Please refer to Appendix H for a complete listing of APEC economies with same policies across at least 3 business services under all five policy areas.

Table 15. Listing of APEC economies with same policies across at least 3 specific business services

Policies	Economies with same policies across at least 3 business services
1. Restrictions on foreign ownership and other market entry conditions	
Equity restrictions apply to non-locally licensed professionals/firms	USA
Majority of shareholders must be locally-licensed	USA
At least one legal form (i.e sole proprietorship, corporation, partnership, commercial association between fully integrated practitioners and other professionals, and/or commercial association between fully integrated practitioners and fully integrated professionals) is prohibited	PRC
Establishment of foreign firms restricted by economic needs test	CDA; PRC
At least one restriction for board of directors (i.e. majority or at least one must be nationals, residents and/or locally-licensed professionals)	AUS; CDA; PRC
At least one restriction for managers (i.e must be national, resident and/or locally-licensed professional)	CDA; PRC; INA
2. Restrictions on the movement of people	
At least one quota on the following: intra-corporate transferees, contractual services suppliers and/or independent services suppliers	RUS; USA
At least one labor market test on the following: intra-corporate transferees, contractual services suppliers and/or independent services suppliers)	AUS; PRC; INA; RUS; USA
At least one limitation on stay (i.e less than 36 months) on the following: intra-corporate transferees, contractual services suppliers and/or independent services suppliers	CHL; INA; JPN; ROK; MEX; NZ; RUS; USA
At least one of the following must be met for license to practice: nationality/citizenship, prior/permanent residency and/or domicile	RUS
Foreign accountants and auditors/engineers/lawyers are required to do at least one of the following to qualify for full membership of the profession: take local examinations and/or practice locally for at least one year	CDA; NZ; USA
Limited or temporary licensing system is not available	MEX
Other restrictions on movement of people	INA; RUS

Source: APEC Policy Support Unit compilation from OECD Services Trade Restrictiveness Index (STRI) database with modifications.

5. IMPLICATIONS FOR TRADE POLICY AND BEYOND

This issues paper has shown the growing importance of services for manufacturing exports and finds that some service sectors like business services and distribution services have greater importance for manufacturing than other services sectors. Within business services, research and development as well as other business activities which includes professional services, have the most important contribution to value added. Business services also have strong correlations with manufacturing productivity. However, the paper also shows that the provision of these services in APEC as a whole is subjected to many regulations. The complex and often cross-sectoral restrictions imply that efforts to support the servicification of the manufacturing sector should be multi-faceted.

As a start, policymakers should be open to a change in perspective when crafting trade policies. In particular, goods and services trade policies could no longer be formulated in silos. Restrictions in services would affect manufacturing competitiveness, and restrictions on goods would likewise impact demand for services. One way of better understanding this complementarity is to understand more deeply how various manufacturing GVCs use and supply services and to what extent actual services restrictions affect their strategic options.

Some manufacturing firms themselves may not realize the role of services in their respective sectors and there is a discrepancy on what should be considered as services exactly. Indeed, Kommerskollegium (2012) mentioned that services that are embedded or bundled with the products are often viewed as part of the products and hence, restrictions affecting them may not be considered under services restrictions that require policy actions.

Deeper look at the policies affecting provision of services has indicated that they are likely to be enacted by agencies whose mandates cover areas such as labor and immigration. It is imperative that various agency officials get more engaged with services and be made aware of the effects of an apparently non-services related policies on the actual provision of services. Coordination among agencies is an important element for regulatory reforms that help both services and manufacturing.

Work on services has always been met with data challenges. The WTO-OECD work on Trade in Value Added database has contributed to enhancing knowledge about the role of services in manufacturing. However, the TiVA data cannot give further information on more disaggregated service sectors such as business services and its subsectors. Even if complemented by other economic tables like the input-output tables available in the OECD STAN database which are more disaggregated since industries are divided into 37 sectors instead of 18 sectors in TiVA, the picture we get remains aggregated. For example, we know that 'other business activities' are important for business services, but there is no further information on how 'other business activities' are further divided into contribution of the different professional services and other components of this sub-classification.

In this regard, various efforts to collect case studies that map out various manufacturing sector's value chain, thereby seeking to understand where and how various services come into play are a good complement to the WTO-OECD work on TiVA database. These research can enhance understanding of specialized services which might have evaded classification to date and will enrich our appreciation for the contribution of services in innovation and productivity.

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