An Update on the Construction of North American Regional Supply-Use and Input-Output Tables, and Resulting TiVA Statistics

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Introduction

The second White Paper on North American Trade-in-Value-Added (NA-TiVA) Initiative[1] details the methodology, as well as the results and analysis that is current as of December 2019.[2] This white paper is a living document, as is the nature of the NA-TiVA Initiative itself. In fact, global efforts to calculate and analyze trade in value added statistics— whether undertaken by Asia Pacific Economic Cooperation (APEC), or the Organization for Economic Co-operation and Development (OECD)—are constantly evolving. With the culmination of this round of NA-TiVA statistics, the next phase of the initiative will focus on sharing the methodology with peers engaged in this work internationally. In addition to contributing to the international discussion on TiVA best practices, the merchandise trade reconciliation work of the NA-TiVA team benefitted from previous work done under the APEC TiVA Initiative in the form of input data, and will itself serve as an input to the OECD's Balanced Trade Database. Nevertheless, the information from the reconciliation of trade data is not official but complementary, and is derived from experimental methods to provide more elements with which to better understand the phenomena of globalization, GVCs, and how countries are immersed in them.

[1] A Memorandum of Cooperation (MOC) establishing the NA-TiVA Initiative was signed by Statistics Canada, the National Institute of Statistics and Geography (INEGI), the United States Bureau of Economic Analysis (BEA), the Unites States Census Bureau, and the United States Trade Representative (USTR). The United States International Trade Commission (USITC) is participating at the request of USTR.

[2] For background regarding this trilateral and multiyear cooperative venture between Canada, Mexico and the United States, see the first NA-TiVA White Paper, "An Overview on the Construction of North American Regional Supply-Use and Input-Output Tables and their Applications in Policy Analysis" (2018).

Chapter 1: Methodology for Compiling North American Regional Supply-Use Table with Rest of World Treated Endogenously

I. Developing Initial tables for Partner Countries

Prior to developing the North American regional supply-use tables (SUTs), the individual country submissions received minor adjustments to put them all on a uniform basis. These adjustments were made primarily to ensure a consistent set of industries and commodities across all three countries, equivalent treatment within final uses, and conceptual consistency across datasets provided by each country. Updated statistics from both Mexico and the United States, additional supplementary data from Canada, and new data on Rest-of-World (ROW) provided by the Organisation for Economic Co-operation and Development (OECD) were included in this set of North America SUTs and represent a notable improvement over the previous set of tables produced by the U.S. Bureau of Economic Analysis (BEA) for this project in the spring of 2018. Notable adjustments to datasets from each partner country as well as the ROW matrix provided by the OECD are identified in the sections below.

Canada

The treatment of Domestic Purchases by Non-Residents (DOM) and Direct Purchases Abroad by Residents (DIR) provided in the Canadian submission was altered to be consistent with the treatment for Mexico and the United States. Canada provided DOM and DIR data by commodity while only total values were available for Mexico and the United States. The approach requiring the fewest additional assumptions was to adjust the Canadian dataset to align with the data from Mexico and the United States for DIR, this entailed subtracting DIR by commodity from both the PCE and import columns and adding offsetting total values to a separate DIR commodity within both PCE and imports, thereby keeping Canadian PCE and import totals unchanged. For the original submission, Canadian DOM was included as a part of exports but was not explicitly estimated. However, DOM by commodity and by country was included in the supplemental data provided by Canada for this iteration of the estimates, allowing us to identify these values explicitly. To align the Canadian data with the Mexican and U.S. data, DOM by commodity was added to PCE by commodity and subtracted from exports by country and by commodity. Offsetting adjustments were added to both PCE and exports as a separate DOM commodity to ensure column totals remained the same. Additionally, for this second estimate of the regional SUTs, Canada provided additional details on trade and transportation margin offsets which allowed the margin matrices by column to sum to zero,[3] a notable improvement from the previous estimation where those offsets were imputed by BEA. Finally, the IMF exchange rate (0.999188309722613) was applied to convert the tables into millions of U.S. dollars.

[3] Notably, there were some very small positive values in the U.S. ($3M) and Other Exports ($13M) columns of the Canadian trade matrix for commodity 4A0000- Retail Trade (except Motor Vehicle and Parts Dealers and Food and Beverage Stores and General Merchandise Stores). These records represent used cars, which were mapped to the retail commodity 4A0000 when converting the Canadian SUT to the NA-TiVA coding structure. Conceptually, this value is being recorded as margin output, which is why these values appear in the trade matrix rather than in the domestic or basic price matrices.

Mexico

This second iteration of the North America SUTs incorporated a new data submission from Mexico, which placed the estimates on a fully consistent North American Trade in Value Added (NA-TiVA) coding structure and updated the distribution between private and government industries for several notable commodities, resulting in significant improvements to the estimates. The only adjustments required to the newly submitted data were to estimate DOM and DIR for Mexico and convert the estimates into millions of U.S. dollars. Using data from the Mexican submission to the Asia Pacific Economic Cooperation (APEC) TiVA project, an estimate of the total value of DIR was added to imports and PCE as a separate DIR commodity. Similarly, an estimate of the total value of DOM was added to exports and PCE as a separate DOM commodity. Finally, the IMF exchange rate (13.1694583) was applied and the estimates divided by 1,000 (as submissions were in thousands of Mexican pesos) to put the tables into millions of U.S. dollars.

United States

The United States updated its initial submission to incorporate BEA's 2012 benchmark SUTs and associated improvements incorporated as part of the 2018 comprehensive update of BEA's industry accounts, including improved estimates of taxes and subsidies. Additionally, the latest U.S. submission has refined the allocation of the "other" commodity to various NA-TiVA codes including DOM and DIR to ensure a set of commodities that is definitionally consistent with submissions from partner countries. In the U.S. use tables, DIR is allocated to both intermediate industries (as business travel) and to PCE. Finally, the CIF/FOB column unique to the U.S. submission was eliminated through adjustments to the domestic and import matrices. [4]

II. Developing Initial Rest-of-World Use Table

The most notable improvement to this iteration of the North America regional SUTs is the inclusion of an endogenous Rest-of-World (ROW) into the model through the addition of a set of ROW SUTs. The basis for the ROW data is a ROW make table and a partial two region ROW and North America (ROW-NA) use table at a 75-industry level of detail provided by the OECD, as well as a two region ROW-NA input-output table (IOT) at a 36-industry level of detail on an ISIC basis. This information was used to build a use table in basic prices for ROW at the 75-industry level of detail, as well as an initial import matrix for ROW in basic prices at the 75-industry level of detail. The table at the 36-industry level of detail was used to fill in gaps in the data provided at the 75-industry level, which was then concorded to the 100-industry level of detail found in the NA-TiVA coding structure.

Creating a 75-industry ROW Use table through Balancing

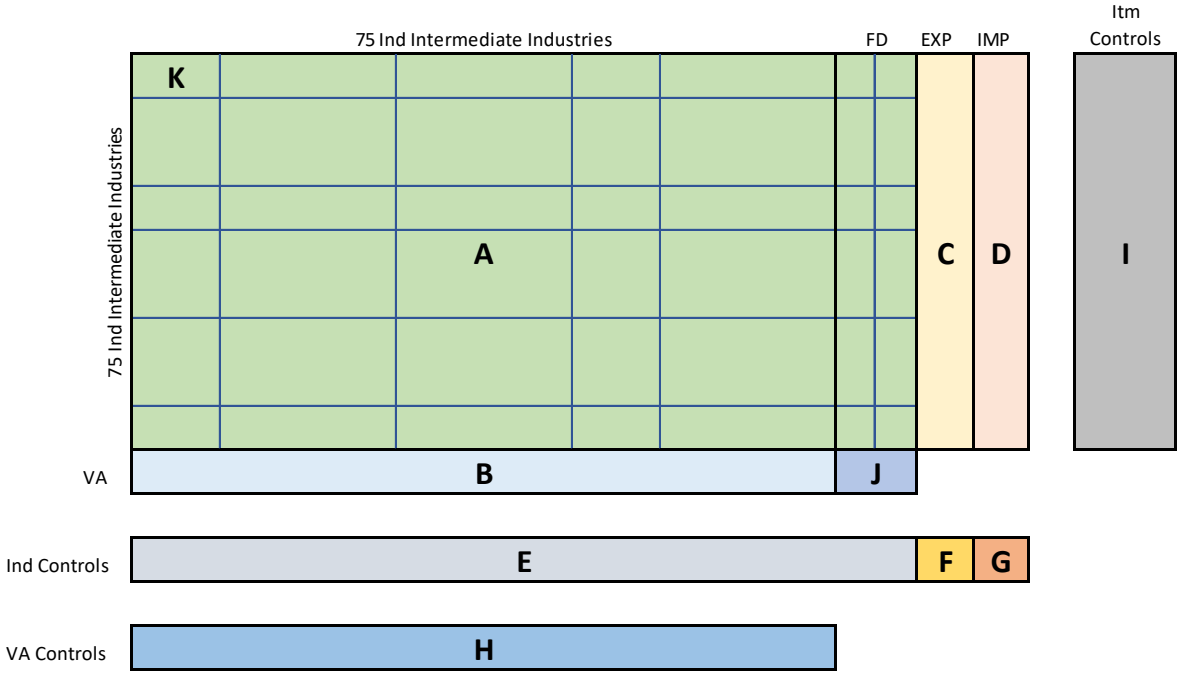
A 75-industry, single-region ROW use table valued at basic prices was prepared using a modified iterative scaling method (RAS) designed to balance and reconcile the data under conflicting external information and inconsistent constraints. Initial values used in balancing were drawn from the partial, two-region

[4] To eliminate this adjustment column, the DOM and IMP matrices needed to be reconfigured to align with the supply table output sums and unadjusted import column by commodity by eliminating the adjustment value proportionally in the following commodities of the DOM matrix: 481000,482000,483000,484000,492000, and 524000. The reciprocal of those adjustments was then allocated to the goods commodities in the import matrix as offsets, leaving the industry dimension of the basic and purchaser price use tables unchanged.

ROW-NA use table provided by the OECD at the 75-industry level. This partial use table did not include ROW consumption of output produced elsewhere within ROW, so the initial values were set as ROW consumption of North American production. These initial values were supplemented with information from the 36-industry IOT to account for potential areas where there was ROW consumption but no imports from North America. Additionally, imports by commodity were added as an extra column in the table and taxes on products added as a single row to account for relevant make-use identities.

Row and column controls for intermediate industries and products were drawn from the 75-industry make table totals. Final use column controls were drawn from the 36-industry IOT table. Value added controls by industry were drawn from the 75-industry value added data provided by the OECD. In addition to row and column controls and value added by industry controls, the balancing process utilized controls for exports and imports at the 75-product level of detail based on the partial two-region ROW-NA use table provided. Another set of soft controls was initially imposed for internal elements of the use table based on the 36-industry IOT. These internal controls were imposed during early balancing iterations but were ultimately relaxed in order to allow the table to fully balance.

Figure I.I Basic Price Rest-of-World Use Table Balancing Framework



Populating Initial Unbalanced Table

A	75-Ind, NA:ROW Use Table, with services adjusted up to account for the conceptual difference between Imports and Domestic Use
B	75-Ind, Value Added, Purchaser Value
C	75-Ind, ROW:NA Use Table
D	75-Ind, NA:ROW Use Table

Populating Controls

E	75-Ind, Gross Output, Basic Value

F	75-Ind, ROW:NA Use Table SUM
G	75-Ind, NA:ROW Use Table SUM
H	75-Ind, Value Added, Purchaser Value
I	75-Ind, NA:ROW Use Table ROW SUM scaled to sum to Gross Output, Basic Value
J	Final Use Col from 36-Ind, ROW:ROW Use Table SUM + 75-Ind, ROW:NA Use Table SUM (Exports) + 75-Ind, NA:ROW Use Table SUM (Imports)
K	36-Ind, ROW:ROW Use Table + NA:ROW Use Table

Concordance of ISIC-based 75-industry ROW to NA-TiVA structure

After the ROW table was balanced, the framework was then concorded from a 75-industry ISIC coding framework into the NA-TiVA coding framework. The concordance was developed based on an initial concordance provided to BEA with the OECD ROW data and vetted for accurate linkages. Weights were then developed for areas where an ISIC industry flowed to multiple NA-TiVA codes. The proportion of Mexican and Canadian output for the relevant commodities was used as the starting point for these weights.

III. Initializing the Regional Use Table

The adjusted initial submissions for each of the three countries and for ROW were used to populate the main diagonal (Mexican purchases of Mexican production, Canadian purchases of Canadian production, etc..) of the regional use table for each value type (basic price, trade margins, transport margins, and net taxes).[5] Next, initial values for the off-diagonal elements section of the table were populated, which represent bilateral trade between countries within the region and with ROW. Reconciled trade data from the APEC project was used to parse the import matrices for each country into bilateral trade components. ROW's participation as an exporter was estimated with a residual methodology unchanged from the previous set of North America SUTs. However, to accommodate an endogenous ROW, additional work was done to distribute ROW imports *from* the partner countries, since ROW was not explicitly included in the reconciled trade data used. This was accomplished by merging the information on trade relationships between the four regions laid out in the reconciled trade data with the imports data provided in the OECD submission for ROW.

After the imports matrix was split bilaterally, the Cost-Insurance-Freight (CIF) value of imports was parsed out by value type. Specifically, the portion of the CIF value representing margins charged between the point of production and the port of exit from the exporting country were identified as well as export taxes applied by the exporting country. Subtracting these values from the total CIF value leaves the "factory gate" basic price of the import that is embedded in the total CIF value. This was accomplished by utilizing the purchaser price export decomposition into basic price, margins, and net taxes provided by each partner country, which were then applied to the appropriate bilateral trade matrices. Freight and insurance charges associated with transporting merchandise between ports were not accounted for. As ROW did not provide information on margins or net taxes, this valuation split does not exist on ROW exports and is implicitly embedded in the domestic value of those exports.

[5] Only basic price, import, and export tables were developed for ROW.

Bilateral Splits

As mentioned above, the approach to splitting the import matrices bilaterally into the partner countries and ROW was largely unchanged from the previous set of results. Reconciled trade data provided with the initial submission by the OECD on a NA-TiVA basis articulated a version of each country's exports reconciled with the amount of imports reported by partner country and by commodity. The reconciled trade data were available for both merchandise and services trade.[6] The general approach was to use the reconciled trade data directly, with bilateral ROW trade calculated as a residual. In situations where the bilateral ROW trade residual was negative or fell below a minimum of 5% of total imports the reconciled trade data were scaled to equal the remainder, while maintaining the relative proportions that existed between those exporting countries in the original data.

Notably, we were able to enhance the work done on bilateral splits by leveraging more detailed information included in the reconciled trade data that was not incorporated in the previous set of results. Specifically, for merchandise trade, we leveraged total exports broken out by partner country and commodity (as in the previous set of estimates) and were also able to leverage an additional break out by type of purchase (intermediate, consumption expenditure, and investment). Unfortunately, this was not possible for the services trade data, so we classified all services trade with the exception of DIR/DOM as intermediates. These shares by type of purchase and product were then used to allocate the relevant import matrix sections bilaterally.

As ROW was not an explicit participant in the reconciled trade work, the reconciled trade data needed to be extended to incorporate ROW imports. The OECD ROW import matrix was concorded to a NA-TiVA coding structure and then split bilaterally as well. To develop bilateral splits between ROW and each North American country, the reconciled trade data were used as a mirror. The proportions of exports to ROW from each country were used to estimate the proportion of each commodity imported by ROW. Those splits were then applied to the ROW import matrix to create bilateral versions of the ROW import matrix.

In the process of applying the reconciled trade data to the imports and exports reported by each partner country, we identified minor disparities between the reconciled trade data and the trade reported by each partner country. In cases where an import value was reported in the supply-use data provided by each partner country but was absent in the reconciled APEC data, these were treated as imports from ROW.[7] For cases where the export value reported in each partner country's SUTs was zero but the APEC reconciled data was not zero, the reconciled APEC data were not used.[8] Finally, for cases where partner countries reported exports in their SUTs, but there was no corresponding value in the reconciled APEC

[6] For the case of Mexico, OECD will provide the trade in servies figures, which are estimations based on official information that Bank of Mexico publishes.

[7] U.S. commodities with ROW share of 1: 813000, GFGD, GFGN. Canadian commodities with ROW share of 1: 4A0000, 624000, 713000, 721000, 812000, 813000, GSLG. No discrepancy with Mexico from this direction.

[8] The disagreements were largely centered around Mexican exports, with one item not reported by Canada. By eliminating these records from the bilaterally split data, Canadian imports were lowered by $221M, ROW imports were lowered by $3,411M, Mexican Imports were lowered by less than $1M and U.S. imports were lowered by $3,954M. It is important to note that these levels were lowered for the initial, unbalanced population of the table but were still controlled to the import and export controls reported by each country.

data, these were considered exports to ROW.[9] As mentioned previously in this section, the data provided by the OECD to incorporate an endogenous ROW supplied additional information on the trade interactions between North America and ROW. This provided the opportunity to compare the explicit OECD ROW export data to North America against our residual approach to ROW designed to ensure zero net trade by commodity and perform some anecdotal validity checks.

Valuation Splits

As noted above, the purchaser price exports decomposed into basic prices, trade and transportation margins, and net taxes submitted by each partner country were used to set proportions of each value type by commodity for each exporting country.[10] These proportions were then applied by export country to the bilaterally split trade data developed above to split trade out by valuation type as well as by country.

Travel Matrix

The travel matrix is a reconciliation of the DOM and DIR lump sum estimates provided by each country as the two represent conceptual reciprocals of one another. DOM is the purchases made in-country by non-residents and which can be considered imports by the country of residence and exports by the country of purchase whereas DIR is the purchase of foreign goods abroad and classified as exports by the country of purchase and imports by the country of residence. In other words, what is DOM in one country is simultaneously DIR in another. As this is a closed model accounting for the entire universe of trade, total DOM must necessarily equal total DIR. We were provided estimates of DOM for each partner country (excluding ROW) and DIR for each partner country as well as ROW. This allowed us to estimate ROW DOM as the difference between DIR and the DOM reported by the partner countries. The next step was to reconcile how much of each country's DOM (exports) was DIR (imports) for each partner country. Canada had provided this information explicitly for both DOM and DIR in their original submission, so their values were accepted without adjustment (orange in Fig 2). The splits for the "other" commodity provided in the reconciled trade data were used to estimate initial values for the other transactions (blue in Figure I.II).

Figure I.II Balanced DOM/DIR Reconciliation Table

FINAL TABLE, CAN FRZN		Imp Country (DIR)				
		CAN	**MEX**	**USA**	**ROW**	
exp Country (DOM)	**CAN**		282.58	8,025.63	12,382.68	20,690.88
	MEX	1,810.19		4,702.25	6,206.45	12,718.89
	USA	23,392.04	6,133.90		135,061.25	164,587.20
	ROW	12,870.29	2,230.72	89,806.50	517,989.83	622,897.33
		38,072.52	8,647.20	102,534.38	671,640.20	

Notably, the sum of ROW DIR was significantly larger than the sum of Canadian, Mexican, and U.S. DOM, which we assumed to imply that the ROW DIR reported was inclusive of DIR within ROW. In other words, the ROW DIR value was assumed to include countries trading DOM/DIR within the ROW umbrella. The

[9] A total of $4,928M added to ROW imports

[10] As basic price was the only one of these tables developed for ROW, valuation splits were not performed on the ROW estimates.

DOM/DIR estimated initial values by importing and exporting country were balanced using a RAS approach in order to reconcile the DOM and DIR estimates by country, and the balanced set of values were then incorporated back into the regional SUT framework. This involved placing the DOM total values as negatives along the main diagonal (blue in Fig 3) with the positive DIR values in the off-diagonal cells. This leads to a net zero value across the commodity (what is exported is also imported) with the trade balance (i.e. the DOM less DIR reported by each country) as the sum of each column.[11] Note that this methodology was generally unchanged from the previous iteration excepting minor adaptations to incorporate an endogenous ROW.

Figure I.III Travel Matrix

TRAVEL MATRIX		Industry			
		CAN_FCH	MEX_PCE	USA_PCE*	ROW_HFCE
Commodity	CAN_TRAVEL	(20,690.88)	282.58	8,025.63	12,382.68
	MEX_TRAVEL	1,810.19	(12,718.89)	4,702.25	6,206.45
	USA_TRAVEL	23,392.04	6,133.90	(164,587.20)	135,061.25
	ROW_TRAVEL	12,870.29	2,230.72	89,806.50	(104,907.50)
		17,381.64	(4,071.69)	(62,052.81)	48,742.87

IV. Balancing the Regional Table

Once the initial values in the North America regional use table were estimated, the next step was to place the data into the balancing framework to enforce supply-use accounting identities and to ensure consistency with GDP by product and value added by industry data provided by each partner country. Unchanged from the first set of results, we employed a "stacked matrices" approach which allowed us to balance all of the value types (basic price, trade margins, transportation margins, and net taxes) simultaneously. Consistent with balancing the first set of results, we utilized column (industry and final demand) controls, row (commodity and value added) controls (stacked matrices implemented on the commodity dimension), import and export controls by commodity, final use controls by commodity, and value added controls by industry. Naturally, the inclusion of an endogenous ROW led to more constraints than in the previous iteration. In addition to the increase in the number of controls, incorporation of an endogenous ROW required a final reconciliation of net trade by commodity controls among the countries to ensure that total imports were equal to total exports in aggregate. This was in contrast to the previous iteration where ROW was unconstrained, allowing differences in net trade to be vented into ROW.

Developing Controls

As noted above, the regional balancing framework employed a "stacked matrices" approach and included six dimensions: column (industry and final use), row (commodity and value added), imports, exports, final uses, and value added. Column controls corresponded to basic price output derived from the supply tables and purchaser price final use totals from the use table. Commodity controls are also relatively straightforward. In order to implement a "stacked matrices" approach, value-type distinctions (basic,

[11] Notably, the U.S. DIR was split between PCE in final uses and various intermediate industries. The reconciliation of the travel matrix was completed regardless of type of consumption, but when placed into the model, the records for the U.S. DIR was parsed out into PCE and the relevant intermediate industries in order to preserve what would be considered "business travel abroad."

trade, transportation, and net taxes) were implemented on the commodity dimension as derived from the supply table. The controls were formed by commodity and by value type from the supply table (e.g. U.S. basic price output for commodity 312000 formed one control, U.S. reported trade and transportation margins associated with commodity 312000 formed two additional controls, and the taxes associated with commodity 312000 formed a final control associated with this commodity). In addition, value added row controls were drawn from each country's purchaser price use table.

Beyond the final use total controls established on the industry dimension, final use controls were also implemented by commodity within each final use column to ensure that the composition of GDP by country closely resembled each country's initial submission . Similarly, value added by industry controls were also added to ensure consistency with submitted value added and value-added subcomponent estimates. Finally, controls for exports and imports by commodity and by country were implemented to ensure trade values matched those in each partner country's SUTs.

Reconciling Net Trade

As mentioned earlier in this section, an endogenous ROW required some final reconciliation of net trade to ensure that total net trade and net trade by commodity were equal to zero. To accomplish this, reported imports and exports by partner country and by commodity were aligned with reconciled ROW imports and exports resulting from the work done to split the imports matrixes bilaterally. We relied on our ROW results from the bilateral split work because it was already closer to alignment than the original submission from OECD. Where possible, ROW imports or ROW exports were lowered in order to balance the system; however, ROW imports or exports had to be raised in a small number of cases. In addition, import value for ROW had to be created where none had existed previously in four commodities (511000, 512000, 611000, 722000) in order to balance.

V. Comparing Regional and National Supply-Use Tables

A natural check on the North America regional SUTs is to compare them against the national-level tables that provided a starting point for the estimation process. In order to effectively make these comparisons, it is important to understand how the regional and national SUTs are related. In the regional SUTs, foreign trade data are included in the table implicitly rather than existing in explicitly identified columns. In particular, the regional supply table does not contain import information because this would entail double counting of supply. Similarly, the regional use table does not include an explicit column showing overall exports by country. Instead, total exports by country are accounted for through intermediate and final purchases of a country's production by other countries. Finally, imports are accounted for in the regional use table through intermediate and final purchases by one country of products produced in other countries.

Chapter 2: North American Trade Reconciliation Approach

I. Introduction

As explained in the International Merchandise Trade Statistics (2010), "International trade asymmetries are generated as a result of the inconsistencies of the data reported by importers and exporters, (i.e., the reported exports from country A to country B do not match the reported imports to country B from country A)" (UN, 2015). Sources of asymmetries can vary, but they include things such as differences in source data, the treatment of re-exports, different valuation, the treatment of geographic coverage, and confidentiality, among others (Chesson, 2017).

In this regard, the Trade Reconciliation Workstream of the NA-TiVA initiative has worked to develop a methodology for eliminating the trade asymmetries that exist between the three North American countries, Canada, Mexico, and the United States. Nevertheless, the information resulting from the reconciliation of trade data is not official but complementary, and is derived from experimental methods.[12]

Also, it is important to highlight that this document does not aim to identify the causes of trade asymmetries among the three North American countries; some reasons for the asymmetries were explained in the first version of the White Paper. The objective of this document is to provide an update to the method for reconciling the merchandise trade by using the country of consignment approach, in order to be consistent with other TiVA initiatives (APEC-TiVA and OECD-TiVA), and to provide information about reconciling services trade statistics.

Therefore, this chapter is divided as it follows: the section II concerns the methodology followed to reconcile the merchandise trade data in North America; whilst, section III discusses the reconciliation of services trade statistics. As with merchandise trade statistics, the final balancing of the services trade statistics will be carried out by the OECD. Finally, in Annex II, the nomenclature used and some results of the merchandise trade reconciliation process are presented.

II. Merchandise trade reconciliation

This section explains the methodology followed to reconcile the merchandise trade statistics in North America. The application of this methodology can be identified in four major steps which represent the NA-TiVA merchandise trade data reconciliation process:

I. The first step is to compare the reported data of each country, in order to identify the original asymmetries.
II. The NGM is applied by adjusting the imports side. The country of consignment approach is used to make a reattribution of the imports value, depending on the country where goods were dispatched.

[12] The trade in services reconciled data will be provided by the OECD, since it has dissagregated information based on own estimations by using as main source the Bank of Mexico published figures.

III. The Manual Methods are carried out with the aim to improve the adjustment on each trade flow, according to additional available data of each country and the methodologies developed for each of the following Manual Methods:
    a) Use of freight and re-imports data
    b) Special adjustments for locomotive products and electrical energy
    c) Manual Inductive Method based on the Item Classification (MIMIC)
    d) Manual Adjustment due to Classification Updating (MACUp)
    e) Negative Imports Adjustment Manual Method (NIAMM)

IV. A mechanical method is used for removing the remaining asymmetries to obtain the data used for the development of the regional SUTs and IOTs.

The last step of the merchandise trade reconciliation process considers the application of a mechanical procedure to eliminate all remaining asymmetries to prepare the data for use in the Regional SUT tables, and will final balancing will be carried out by the OECD, in order to generate a homogeneous data set in concordance with other TiVA initiatives.

In this sense, Subsection II.I of this chapter explains the New General Method (NGM) following the country of consignment approach by modifying the imports side, which replaces the former General Method (country of origin approach).

Subsection II.II presents the Manual Methods which take place after the application of the NGM, for further reducing the remaining asymmetries in the most relevant items.

In Subsection II.III, a numerical example is presented with the resulting figures of the first three steps of the merchandise trade reconciliation process.

II.I New General Method

Framework

The New General Method (NGM) for reducing the merchandise trade asymmetries between the North American countries relies on the country of consignment approach. This approach uses the data provided by each country about the first attribution country (country of origin/country of destination) and also, the second attribution country (country of consignment/country of shipment/seller or purchaser country), when available, in order to obtain information on the direct transactions of the international trade between the three countries.

The adjustment is made to the import data in each bilateral trade flow, considering that the modification implies a simultaneous adjustment to the imports from the rest of the participant countries and ROW. Thus, the adjusted figures are the result of a reattribution of the imports that each country carries out with its partner countries in the region and ROW.

Consequently, one of the advantages of using this new approach is that the total trade values are not altered. Additionally, by using this approach, the data reconciliation exercise of the NA-TiVA initiative is

similar to other trade reconciliation exercises that tackle issues caused by the treatment of re-exports[13] and solved by means of using the country of consignment approach.

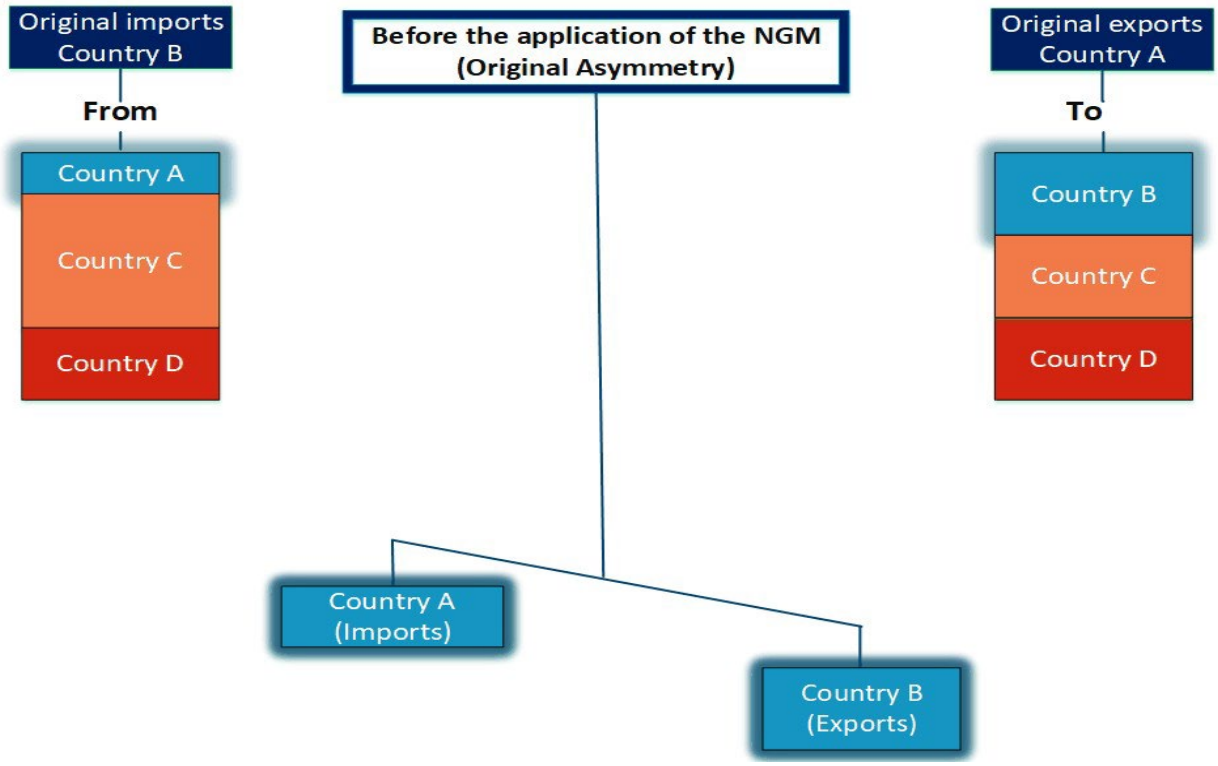
Moreover, Fortanier and Sarrazin (2016) and Markhonko (2014) mention some of the benefits of using the country of consignment approach for the trade reconciliation: providing consistent statistics and better comparability since it promotes the recording of the same transactions by importing and exporting countries; and identifying the role of the entrepôts in the value chain, making it feasible to register the country that is incorporating value added that may exist considering the distribution and logistics hubs. It is important to point out that the country that is sending goods (country of consignment, exporting country, reporting country, i.e. not the country of origin) can be identified through exports data or through the final importer statistics.

The trade via third country intermediaries as a cause of asymmetries, is one of the main issues that the North American region presents for the reconciliation of the international trade figures. Therefore, to address the asymmetries generated via re-exports and their incorporation in the reconciled figures, it is important to remark that the information on the importing country is relevant to detect indirectly the re-exports of any country. In the absence of additional data, the country of probable origin can be identified from the inverse asymmetries in the final importer statistics (Fortanier F. , Towards merchandise trade statistics without asymmetries, 2016). Therefore, as previously mentioned, the information provided by each country on the imports of origin and consignment country will be required for doing estimations.

The next figures show an illustration of the data comparison between the mirror statistics in the bilateral trade flow of Country A and Country B, before and after the application of the NGM. As described above, step I of the data reconciliation process takes place before the application of the NGM. For this step, the comparison exercise uses the original reported information between two countries. Then, the original asymmetry is obtained by comparing the mirror statistics of the trade flow (for example, Country B imports from Country A and Country A exports to Country B). The resulting original asymmetry is illustrated with the difference between the blue boxes and the disequilibrium showed in the balance. Moreover, it is important to consider that the tricolor rectangles represent the total imports/exports of Country B/A from/to three different partner countries which symbolize the total trade (imports or exports) of each country.

[13] Re-exports are foreign goods exported in the same state as previously imported, from the free circulation area, premises for inward processing or industrial free zones, directly to the rest of the world and from premises for customs warehousing or commercial free zones, to the rest of the world (UN, 2010). Re-exports are illustrated later in this paper, in Figure II.III.

Figure II.I Step I of the Data Reconciliation Process
(Country B imports from Country A/Country A exports to Country B)

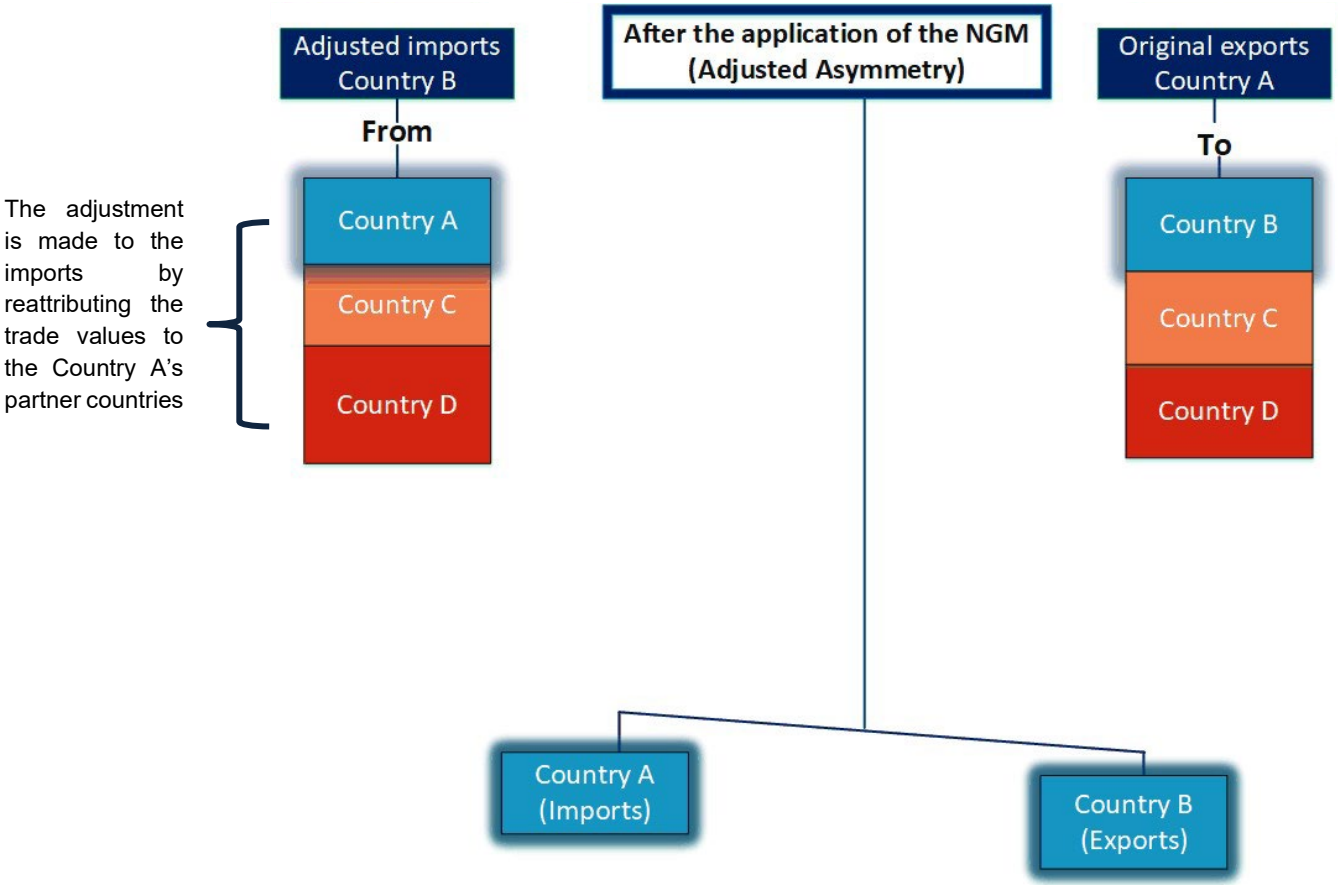


The second figure shows the results of applying the NGM, which represents step II of the data reconciliation process. Following the previous sequence of the Figure II.I explanation, the adjusted asymmetry is the consequence of the comparison between the adjusted imports of Country B from Country A, with the original exports of Country A to Country B. This adjusted asymmetry is illustrated with the correction of the difference between the blue boxes and the less disequilibrium in the balance than the first showed in the Figure II.I.

Now, after the application of the NGM, the tricolor rectangles represent the total adjusted imports of Country A and the total original exports of Country B from/to the three different partner countries, which symbolize the total trade (imports or exports) of each country. It is important to highlight that the size of the combined rectangles does not change from one figure to another, i.e. the total trade value for each country remains the same. However, the composition of the imports is changing (represented by the colors inside the rectangle), due to the reallocation of the partner country attribution aligned with the country of consignment approach.

Figure II.II Step II of the Data Reconciliation Process

(Country B imports from Country A/Country A exports to Country B)



Data availability

The NA-TiVA initiative uses a common trinational platform to compile all the information and exercises on the ongoing work of the Initiative for the purposes of knowledge management and knowledge sharing (UN, 2010).

Each country has provided the available data for the reconciliation exercises.[14] Table II.I summarizes the disaggregation of the data figures that each country has:

[14] As it was mentioned in the White Paper 1, the United States reports exports on free alongside (FAS) value basis, and imports at customs value plus information on freight and insurance. Canada reports both exports and imports on free on board, or FOB basis. Mexico reports exports at FOB basis while imports are on cost, freight, and insurance, or CIF basis, with an adjustment at the aggregate level to FOB basis.

Table II.I Merchandise trade data availability by country

TRADE FLOW/COUNTRY	CANADA	MEXICO	UNITED STATES
EXPORTS	By Partner Country: Mexico, United States and Rest of the World	By Partner Country: Canada, United States and Rest of the World By Purchaser Country: Canada, United States and Rest of the World	By Partner Country: Mexico, Canada and Rest of the World
IMPORTS	By Partner Country: Mexico, United States and Rest of the World By Country of Consignment: Mexico, United States and Rest of the World	By Partner Country: Canada, United States and Rest of the World By Seller Country: Canada, United States and Rest of the World	By Partner Country: Mexico, Canada and Rest of the World
RE-EXPORTS	By Partner Country: Mexico and United States Estimations by Country of Origin: Mexico, Canada and Rest of the World [15]	Not Available	By Partner Country: Mexico and Canada Estimations by Country of Origin: Mexico, Canada and Rest of the World [16]
RE-IMPORTS	By Partner Country: Mexico, United States and Rest of the World	Not Available	By Partner Country: Mexico, United States and Rest of the World

BEA Method for estimating re-exports

Various data series related to re-exports are needed to reconcile merchandise trade statistics between the United States, Canada, and Mexico under the country-of-consignment approach. For example, goods re-exported from the United States to Mexico after being originally imported from Canada need to be identified separately to adjust component trade flows between the three countries. In the case of U.S. re-exports, there is generally no information collected directly about the country of origin. To fill this gap and provide information for the NA-TiVa trade reconciliation process, BEA developed an indirect method,

[15] Canada uses the BEA´s method, described in the next section, to estimate the country of origin for Canadian re-exports.

[16] This set of data is the result of the BEA's method to impute by proportional allocation the country of origin for all U.S. re-exports, described in the next section.

described below, to provide default estimated values for those re-export component series about which no collected data or more-informed estimation methods exist.

A summary of the imputation method for U.S. re-exports is as follows:

- First, U.S. re-exports by country of destination are matched at the 10-digit Harmonized System (HS) level (using the U.S. Census Bureau's Schedule B export codes) to the corresponding 10-digit code from the HS covering U.S. imports. If the 10-digit exports code exists exactly as a 10-digit imports code, the associated re-exports are assumed to have the same proportions of country of origin as the matched imports code in the same year.

- If the same exports code does not exist as an imports code at the 10-digit level, a match at higher groupings is attempted by identifying a higher-level HS code (of which the 10-digit exports code is a part) that is the same code as a corresponding imports code at the same level. These matches are attempted successively at the 8-digit subheading level, at the 6-digit subheading level, at the 4-digit heading level, and finally at 2-digit chapter level, until a match is found. In the case of a higher-level match, the re-exports associated with the 10-digit exports code are assumed to have the same proportions of country of origin as the aggregate of all commodities in the first successfully-matched higher-level grouping.

- The result of this process is an estimation of re-exports by country of destination by country of origin for all 10-digit HS codes. This result is consistent with published totals for U.S. re-exports by country of destination.

Table II.II shows the top 10 trade paths that resulted from applying the method to U.S. re-exports for 2012.

Table II.II Top 10 trade paths for U.S. re-exports, 2012

Rank	Trade Path	Billions of U.S. dollars	Top HS6	Top HS6 Description
1	China -> U.S. -> Mexico	13.4	8473.30	Computer parts
2	China -> U.S. -> Canada	12.8	8471.30	Laptops and tablets
3	Mexico -> U.S. -> Canada	7.8	8471.50	Non-system computer units
4	Mexico -> U.S. -> Mexico	5.4	8528.71	Set-top boxes
5	Japan -> U.S. -> Canada	3.7	8429.52	Mechanical shovels and excavators
6	Canada -> U.S. -> Canada	3.6	8800.00	Civilian aircraft, parts, and engines
7	Japan -> U.S. -> Mexico	3.2	8443.99	Printer parts

8	Germany -> U.S. -> Canada	2.8	2710.12	Light petroleum oils
9	Canada -> U.S. -> Mexico	2.5	8473.30	Computer parts
10	China -> U.S. -> China	2.2	8517.12	Cell phones

There are three main assumptions of this method:

1) That using the HS hierarchies for exports and imports starting at the most detailed level available and moving up the structure until an identical code is found provides a good match of re-export commodities to their original import commodity (comparability assumption);

2) That re-exported goods have a similar distribution of source countries as do all imports for the same commodity (proportionality assumption); and

3) That re-exports can be matched with their corresponding imports by grouping all trade in the same year with no time lag between import and re-export (co-temporality assumption).

Further analysis will seek to validate these assumptions, for instance, by comparing the estimates from this imputation method to collected data where they are available.

Reconciliation of the North American trade flows in a multilateral view

In a multilateral view, the concepts which are used to calculate the adjusted imports of any country are considered as elements that reallocate the partner country attribution of the total imports. More specifically, the concept that is added/subtracted to adjust the imports from a bilateral trade flow is at the same time, subtracted/added to adjust the imports from another bilateral trade flow. For example, by applying the NGM to Mexican imports, Mexican imports from the United States are adjusted by adding U.S. re-exports where the country of origin is ROW and the country of destination is Mexico. Simultaneously, the same concept is subtracted from Mexican imports from ROW. These adjustment modes are taking the country of consignment approach into account, which is applying the reattribution of imports value according to the country that is sending the product.

In the following tables, the adjustment on the imports side of each of the three countries is described using specific data that each country provided. Additionally, the mathematical operations needed for the adjustment are specified in the middle column. Such operations must be done to the trade flow that is showed in the third column. For example, in table II.III, the Canadian adjusted imports are obtained through the reallocation of the total imports coming from the United States, Mexico and ROW. In line D, U.S. re-exports where the country of origin is Mexico and the country of destination is Canada are added to the Canadian imports from the United States, and at the same time, they are subtracted from the Canadian imports from Mexico. Both operations are elements that are used to obtain the Canadian adjusted imports from Mexico (line J) and the Canadian adjusted imports from the United States (line N), respectively.

The main purpose of presenting this picture is to see how the adjustment works under a multilateral view: while an adjustment is adding value to one trade flow, another adjustment is subtracting the same amount of value from another trade flow. This adjustment guarantees that the totals of the trade values are not altered.

Table II.III Canadian adjusted imports from Mexico, United States, and Rest of the World

Canadian adjusted imports		
Concept	**Operation**	**Canada Imports from**
A. Mexico reports exports to Canada	**-**	**-**
B. ROW reports exports to Canada	**-**	**-**
C. U.S. reports exports to Canada	**-**	**-**
D. Canadian imports of Mexican origin and country of consignment the United States	***Add***	***U.S.***
	Subtract	***MEX***
E. Canadian imports of ROW origin and country of consignment the United States	***Add***	***U.S.***
	Subtract	***ROW***
F. Canadian imports of U.S. origin and country of consignment Mexico	***Add***	***MEX***
	Subtract	***U.S.***
G. Canadian imports of ROW origin and country of consignment Mexico	***Add***	***MEX***
	Subtract	***ROW***
H. Canadian imports of U.S. origin and country of consignment ROW	***Add***	***ROW***
	Subtract	***U.S.***
I. Canadian imports of Mexican origin and country of consignment ROW	***Add***	***ROW***
	Subtract	***MEX***
J. Canada reports imports from Mexico	**-**	**-**
K. Canada adjusted imports from Mexico	***J - D - I + G + F***	***Adjusted Imports***
L. Canada reports imports from ROW	**-**	**-**
M. Canada adjusted imports from ROW	***L - E - G + I + H***	***Adjusted Imports***
N. Canada reports imports from the United States	**-**	**-**
O. Canada adjusted imports from the United States	***N - F - H + D + E***	***Adjusted Imports***
MEX-CAN Asymmetry	***J - A***	***Original Asymmetry***
MEX-CAN Adjusted Asymmetry	***K - A***	***Adjusted Asymmetry***
ROW-CAN Asymmetry	***L - B***	***Original Asymmetry***
ROW-CAN Adjusted Asymmetry	***M - B***	***Adjusted Asymmetry***
U.S.-CAN Asymmetry	***N - C***	***Original Asymmetry***

U.S.-CAN Adjusted Asymmetry	***O - C***	***Adjusted Asymmetry***

Table II.IV Mexican adjusted imports from Canada, United States and Rest of the World

Mexico adjusted imports		
Concept	**Operation**	**Mexico imports from**
A. U.S. reports exports to Mexico	**-**	**-**
B. ROW reports exports to Mexico	**-**	**-**
C. Canada reports exports to Mexico	**-**	**-**
D. U.S. re-exports to Mexico of ROW origin	***Add***	***U.S.***
	Subtract	***ROW***
E. U.S. re-exports to Mexico of Canadian origin	***Add***	***U.S.***
	Subtract	***CAN***
F. Canadian re-exports to Mexico of U.S. origin	***Add***	**CAN**
	Subtract	**U.S.**
G. Canadian re-exports to Mexico of ROW origin	***Add***	***CAN***
	Subtract	***ROW***
H. Mexican imports of U.S. origin and country of consignment ROW	***Add***	***ROW***
	Subtract	***U.S.***
I. Mexican imports of Canadian origin and country of consignment ROW	***Add***	***ROW***
	Subtract	***CAN***
J. Mexico reports imports from the United States	**-**	**-**
K. Mexico adjusted imports from the United States	***J - F - H + D + E***	***Adjusted Imports***
L. Mexico reports imports from ROW	**-**	**-**
M. Mexico adjusted imports from ROW	***L - D - G + H + I***	***Adjusted Imports***
N. Mexico reports imports from Canada	**-**	**-**
O. Mexico adjusted imports from Canada	***N - E - I + F + G***	***Adjusted Imports***
U.S.-MEX Asymmetry	***J - A***	***Original Asymmetry***
U.S.-MEX Adjusted Asymmetry	***K - A***	***Adjusted Asymmetry***
ROW-MEX Asymmetry	***L - B***	***Original Asymmetry***
ROW-MEX Adjusted Asymmetry	***M - B***	***Adjusted Asymmetry***
CAN-MEX Asymmetry	***N - C***	***Original Asymmetry***
CAN-MEX Adjusted Asymmetry	***O - C***	***Adjusted Asymmetry***

Table II.V U.S. adjusted imports from Canada, Mexico and Rest of the World

United States adjusted imports		
Concept	**Operation**	**U.S. imports from**
A. Mexico reports exports to the United States	-	-
B. ROW reports exports to the United States	-	-
C. Canada reports exports to the United States	-	-
D. U.S. imports of Mexican origin and country of consignment Canada	***Add***	***CAN***
	Subtract	***MEX***
E. U.S. imports of ROW origin and country of consignment Canada	***Add***	***CAN***
	Subtract	***ROW***
F. U.S. imports of Canadian origin and country of consignment Mexico	***Add***	***MEX***
	Subtract	***CAN***
G. U.S. imports of ROW origin and country of consignment Mexico	***Add***	***MEX***
	Subtract	***ROW***
H. U.S. imports of Mexican origin and country of consignment ROW	***Add***	***ROW***
	Subtract	***MEX***
I. U.S. imports of Canadian origin and country of consignment ROW	***Add***	***ROW***
	Subtract	***CAN***
J. U.S. reports imports from Mexico	-	-
K. U.S. adjusted imports from Mexico	***J - D - H + F + G***	***Adjusted Imports***
L. U.S. reports imports from ROW	-	-
M. U.S. adjusted imports from ROW	***L - E - G + I + H***	***Adjusted Imports***
N. U.S. reports imports from Canada	-	-
O. U.S. adjusted imports from Canada	***N - I - F + D + E***	***Adjusted Imports***
MEX-U.S. Asymmetry	***J - A***	***Original Asymmetry***
MEX-U.S. Adjusted Asymmetry	***K - A***	***Adjusted Asymmetry***
ROW-U.S. Asymmetry	***L - B***	***Original Asymmetry***
ROW-U.S. Adjusted Asymmetry	***M - B***	***Adjusted Asymmetry***
CAN-U.S. Asymmetry	***N - C***	***Original Asymmetry***
CAN-U.S. Adjusted Asymmetry	***O - C***	***Adjusted Asymmetry***

Legend for Tables II.III-V

	Information reported by Mexico
	Information reported by the United States
	Information reported by Canada
	Information of ROW
	Asymmetries results

The data related to the merchandise trade provided by each country are, with a few exceptions, the officially reported data,[17] although the resulting information of the trade reconciliation process is complementary, coming through experimental methods used to reduce the trade asymmetries. In case of the absence of the country of consignment and country of origin breakdown (for re-exports) in the reported data, it is possible to use mirror statistics of the partner country that is involved in the analyzed bilateral trade flow (e.g., the country of origin of the re-exports of any country can be identified by using the mirror data of the final importer statistics).

Reconciliation of the bilateral trade flows

The application of the NGM is consistent with keeping the country of consignment approach in all the trade flows. However, since the data availability is different in each country, the adjustment will consider different elements for each bilateral trade flow. In order to see the effects of the NGM on each of the bilateral trade flows, the following tables have the detailed information of the elements that are used; as well as the mathematical operations needed for the final adjustment. Also, a figure accompanies each table to illustrate the relevant trade flows.

Table II.VI U.S. Exports to Canada/Canadian Imports from the United States

Line	Operation	Concept
1	Initial	Canadian imports from the United States
2	Subtract	Canadian imports of U.S. origin and country of consignment ROW
3	Subtract	Canadian imports of U.S. origin and country of consignment Mexico
4	Add	Canadian imports of Mexican origin and country of consignment the United States
5	Add	Canadian imports of ROW origin and country of consignment the United States
6	Final	Canadian adjusted imports from the United States

To obtain the Canadian adjusted imports from the United States (Line 6), it is necessary to subtract from the Canadian imports from the United States (Line 1), the Canadian imports of U.S. origin and country of consignment ROW (Line 2), as well as the Canadian imports of U.S. origin and country of consignment Mexico (Line 3). Finally, it is necessary to add the Canadian imports of Mexican origin and country of consignment the United States (Line 4) and the Canadian imports of ROW origin and country of consignment the United States (Line 5). The line numbers also correspond to the numbered trade flows in Figure II.III, below.

[17] One exception is the data for U.S. re-exports by country of origin, which are estimated from official statistics using the method described earlier.

Figure II.III Relevant flows for adjusting Canadian imports from the United States

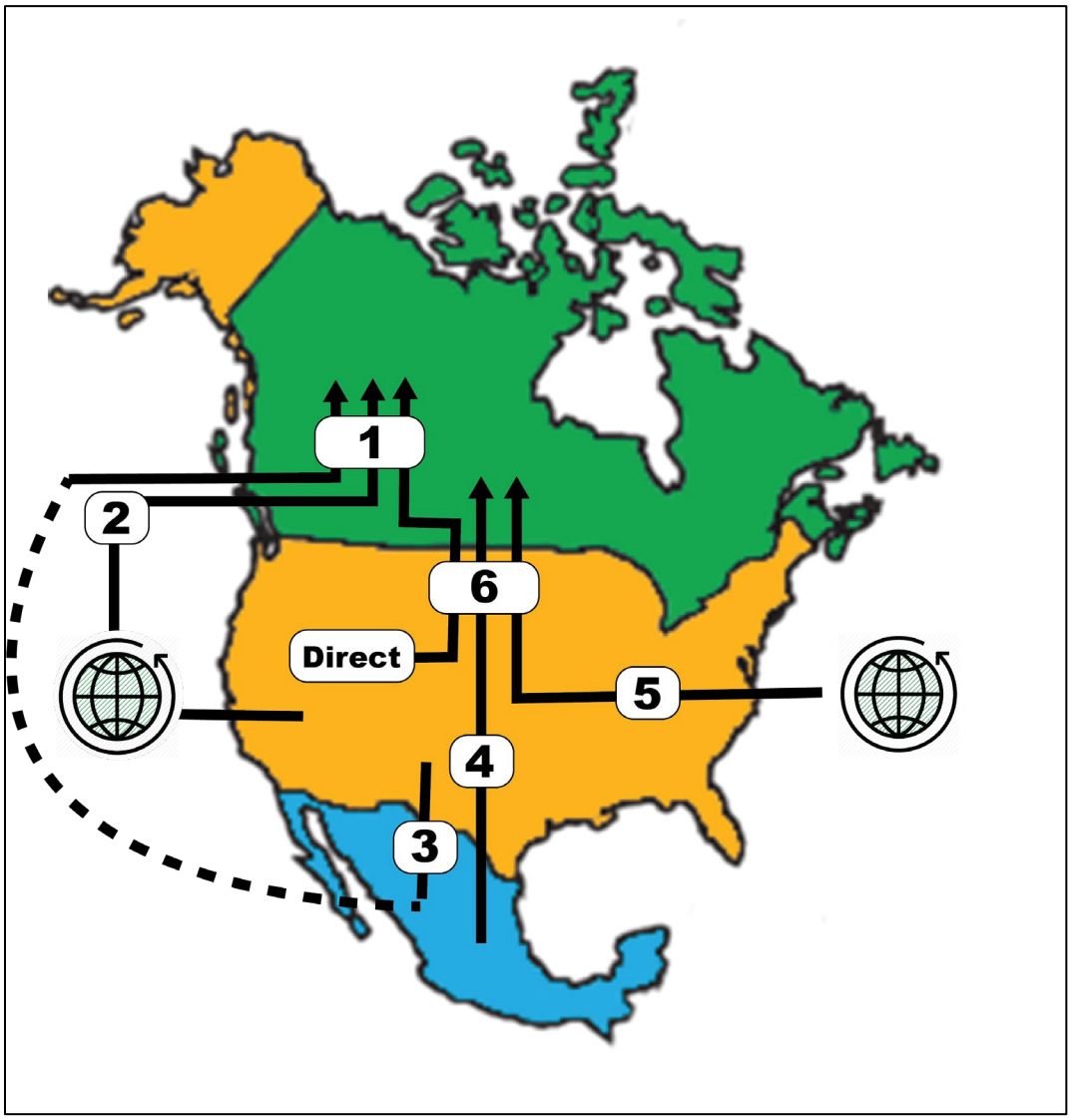


Table II.VII Canadian Exports to the United States/U.S. Imports from Canada

Line	Operation	Concept
1	Initial	U.S. imports from Canada
2	Subtract	U.S. imports of Canadian origin and country of consignment Mexico
3	Subtract	U.S. imports of Canadian origin and country of consignment ROW
4	Add	U.S. imports of Mexican origin and country of consignment Canada

5	Add	U.S. imports of ROW origin and country of consignment Canada
6	Final	U.S. adjusted imports from Canada

To obtain the U.S. adjusted imports from Canada (Line 6), it is necessary to subtract from U.S. imports from Canada (Line 1) the U.S. imports of Canadian origin and country of consignment Mexico (Line 2), as well as the U.S. imports of Canadian origin and country of consignment ROW (Line 3). Finally, it is necessary to add U.S. imports of Mexican origin and country of consignment Canada (Line 4), and the U.S. imports of ROW origin and the country of consignment Canada (Line 5). The line numbers also correspond to the numbered trade flows in Figure II.IV, below.

Figure II.IV Relevant flows for adjusting U.S. imports from Canada

Table II.VIII Canadian Exports to Mexico/Mexican Imports from Canada

Line	Operation	Concept
1	Initial	Mexican imports from Canada
2	Subtract	U.S. re-exports to Mexico of Canadian origin
3	Subtract	Mexican imports from ROW of Canadian origin
4	Add	Canadian re-exports to Mexico of ROW origin
5	Add	Canadian re-exports to Mexico of U.S. origin
6	Final	Mexican adjusted imports from Canada

To obtain the Mexican adjusted imports from Canada (Line 6), it is necessary to subtract from the Mexican imports from Canada (Line 1), the U.S. re-exports to Mexico of Canadian origin (Line 2) and the Mexican imports from ROW of Canadian origin (Line 3). Finally, it is necessary to add the Canadian re-exports to Mexico of ROW origin (Line 4) and the Canadian re-exports to Mexico of U.S. origin (Line 5). The line numbers also correspond to the numbered trade flows in Figure II.V, below.

Figure II.V Relevant flows for adjusting Mexican imports from Canada

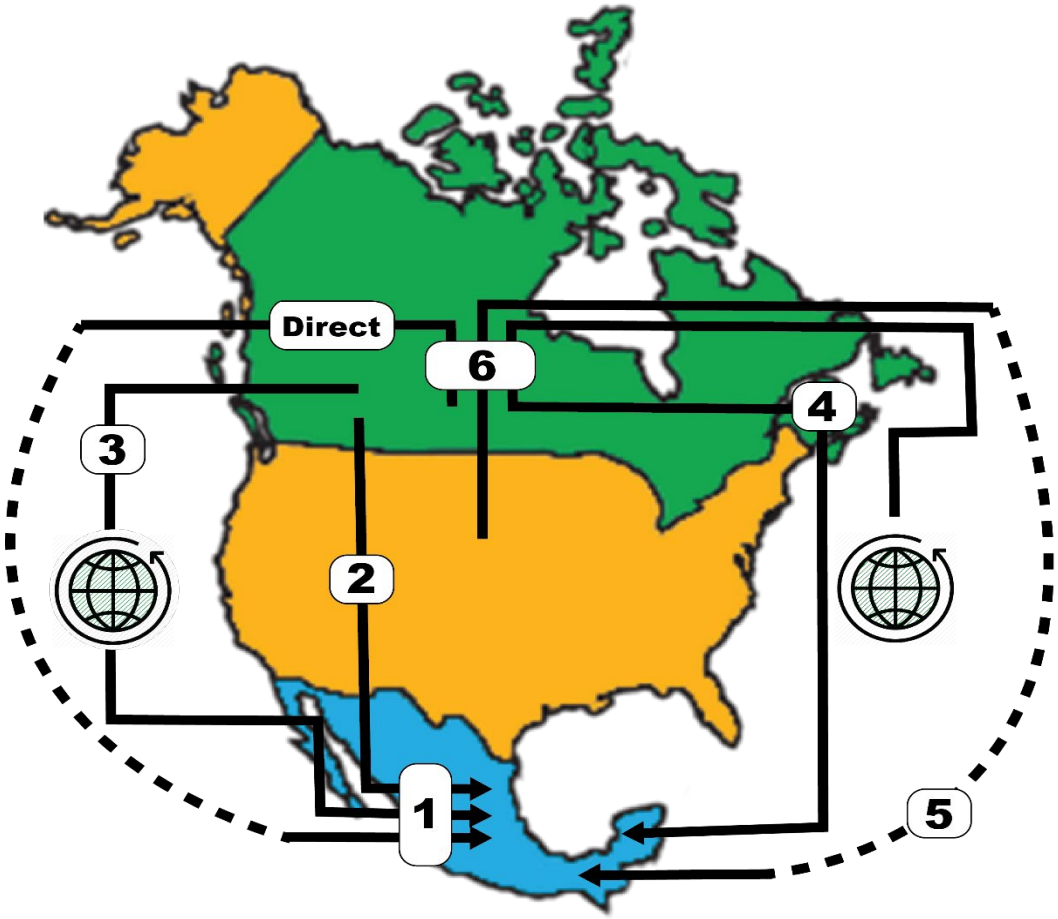


Table II.IX Mexican Exports to Canada/Canadian Imports from Mexico

Line	Operation	Concept
1	Initial	Canadian imports from Mexico
2	Subtract	Canadian imports of Mexican origin and country of consignment the United States
3	Subtract	Canadian imports of Mexican origin and country of consignment ROW
4	Add	Canadian imports of U.S. origin and country of consignment Mexico
5	Add	Canadian imports of ROW origin and country of consignment Mexico
6	Final	Canadian adjusted imports from Mexico

To obtain the Canadian adjusted imports from Mexico (Line 6), it is necessary to subtract from the Canadian imports from Mexico (Line 1) the Canadian imports of Mexican origin and country of consignment the United States (Line 2), as well as the Canadian imports of Mexican origin and country of consignment ROW (Line 3). Finally, it is necessary to add the Canadian imports of U.S. origin and country of consignment Mexico (Line 4) and the Canadian imports of ROW origin and country of consignment Mexico (Line 5). The line numbers also correspond to the numbered trade flows in Figure II.VI, below.

Figure II.VI Relevant flows for adjusting Canadian imports from Mexico

Table II.X U.S. Exports to Mexico/Mexican Imports from the United States

Line	Operation	Concept
1	Initial	Mexican imports from the United States

2	Subtract	Mexican imports of U.S. origin and country of consignment ROW
3	Subtract	Canadian re-exports to Mexico of U.S. origin
4	Add	U.S. re-exports to Mexico of ROW origin
5	Add	U.S. re-exports to Mexico of Canadian origin
6	Final	Mexican adjusted imports from the United States

To obtain the Mexican adjusted imports from the United States (Line 6), it is necessary to subtract from the Mexican imports from the United States (Line 1), the Mexican imports of U.S. origin and country of consignment ROW (Line 2), as well as the Canadian re-exports to Mexico of U.S. origin (Line 3). Finally, it is necessary to add the U.S. re-exports to Mexico of ROW origin (Line 4) and the U.S. re-exports to Mexico of Canadian origin (Line 5). The line numbers also correspond to the numbered trade flows in Figure II.VII, below.

Figure II.VII Relevant flows for adjusting Mexican imports from the United States

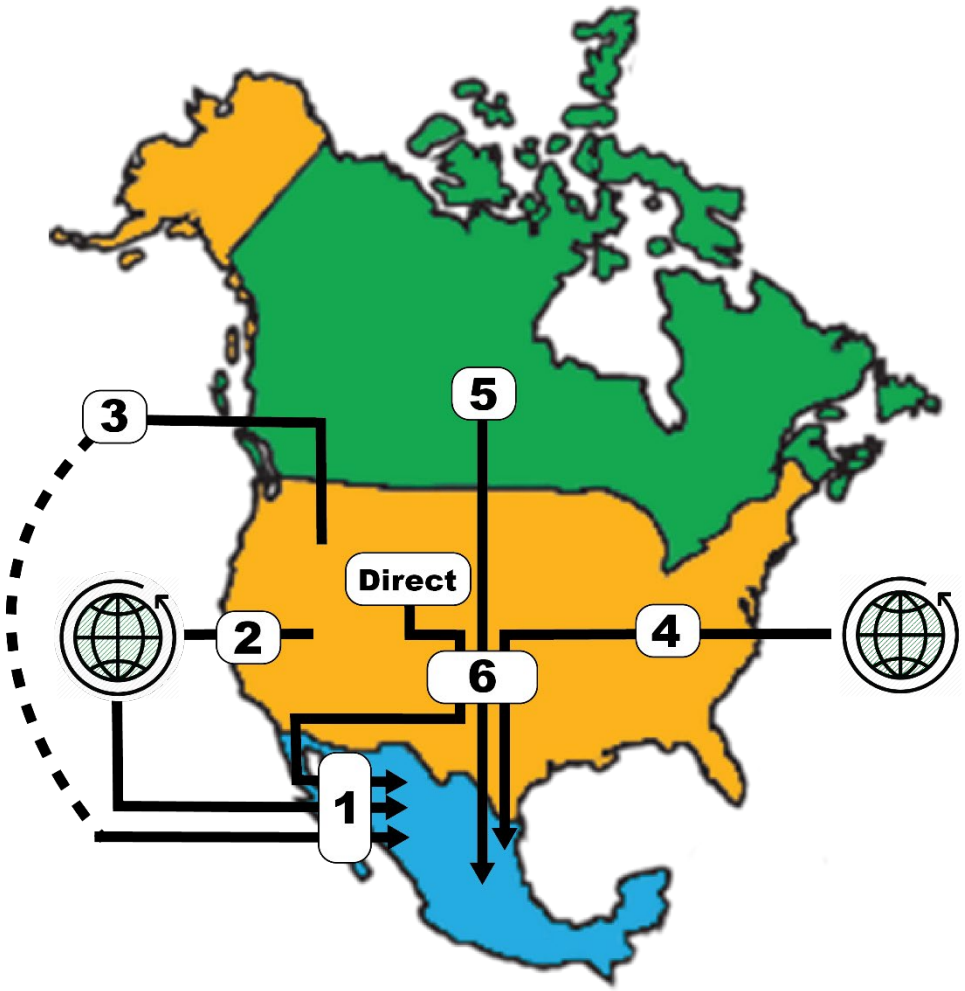
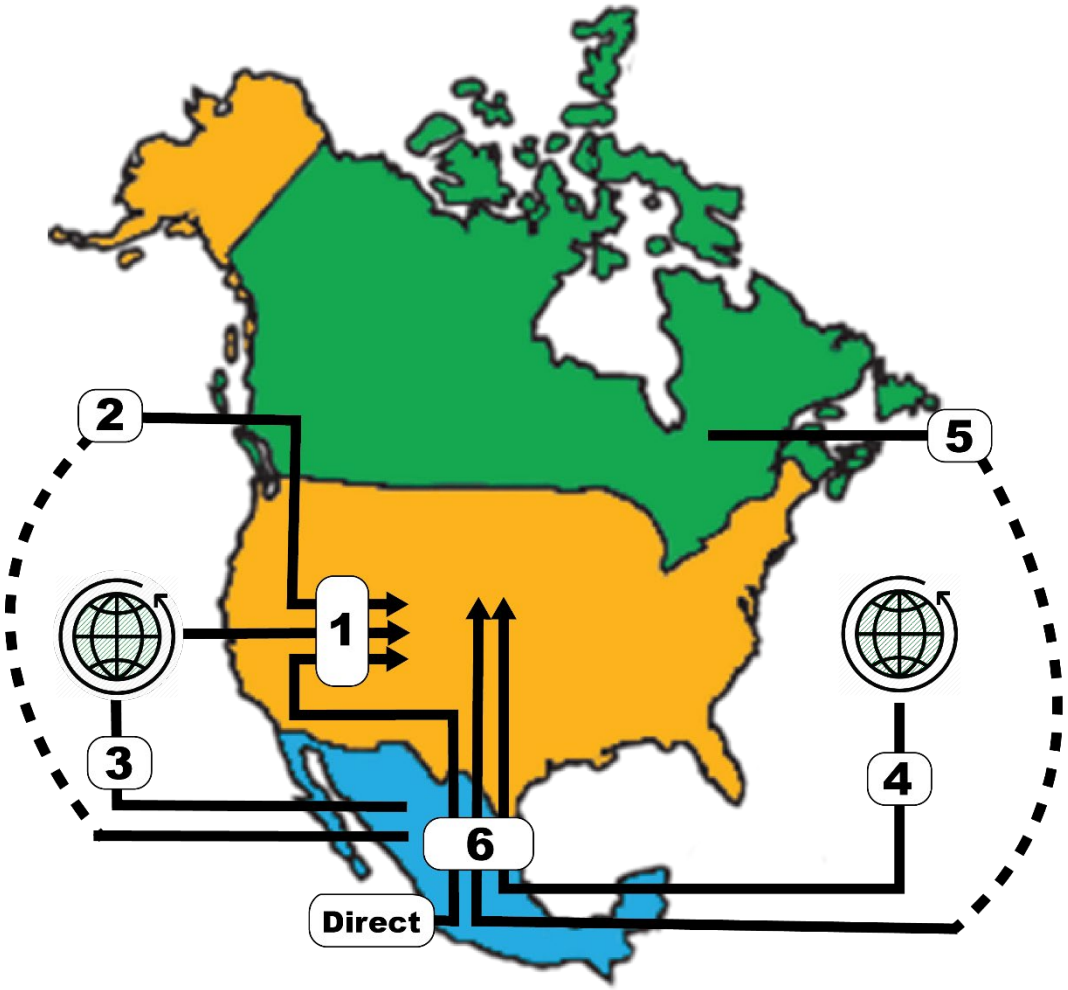


Table II.XI Mexican Exports to the United States/U.S. Imports from Mexico

Line	Operation	Concept
1	Initial	U.S. imports from Mexico
2	Subtract	U.S. imports of Mexican origin and country of consignment Canada
3	Subtract	U.S. imports of Mexican origin and country of consignment ROW
4	Add	U.S. imports of ROW origin and country of consignment Mexico
5	Add	U.S. imports of Canadian origin and country of consignment Mexico
6	Final	U.S. adjusted imports from Mexico

To obtain the U.S. adjusted imports from Mexico (Line 6), it is necessary to subtract from U.S. imports from Mexico (Line 1), the U.S. imports of Mexican origin and country of consignment Canada (Line 2), as well as the U.S. imports of Mexican origin and country of consignment ROW (Line 3). Finally, it is necessary to add U.S. imports of ROW origin and country of consignment Mexico (Line 4) and U.S. imports of Canadian origin and country of consignment Mexico (Line 5). The line numbers also correspond to the numbered trade flows in Figure II.VIII, below.

Figure II.VIII Relevant flows for adjusting U.S. imports from Mexico



II.II Manual Methods

The third phase of the trade reconciliation process considers the application of Manual Methods, which improve the reconciled figures after the application of the NGM. The Manual Methods also take advantage of the information available from each country and represent additional adjustments to the

homogenous methodology incorporated in the NGM. It is important to point out that the total values of trade may change with the incorporation of Manual Methods adjustments.

The Manual Methods used in the North American merchandise trade reconciliation encompass three different types: 1) the use of re-imports (for the countries that have this information available) and the use of freight data to adjust U.S.-Canadian and U.S.-Mexican trade; 2) special adjustments for locomotive products and electrical energy; and 3) the Manual Inductive Method based on the Item Classification (MIMIC), which aims to reduce asymmetries that might simply be caused by differences in classification between countries.

a) Re-imports and freight data

After the application of the NGM, additional information on re-imports and freight is used to construct a more detailed adjustment of the bilateral flows. These adjustments can result in more comparable figures, even after the reallocation of imports (NGM results). Re-imports are defined as exported goods that are subsequently returned.[18]

For example, Canada has information about the country of origin and country of consignment of its imports; therefore, Canada can identify imports where the country of consignment is any country (United States, Mexico, or ROW) and the country of origin is Canada. These imports are added to the adjusted imports. In this sense, the operations from Table II.IX are modified as follows:

Table II.XII Mexican Exports to Canada/Canadian Imports from Mexico

Line	Operation	Concept
1	Initial	Canadian imports from Mexico
2	Subtract	Canadian imports of Mexican origin and country of consignment the United States
3	Subtract	Canadian imports of Mexican origin and country of consignment ROW
4	Add	Canadian imports of ROW origin and country of consignment Mexico
5	**Add**	**Canadian imports of Canadian origin and country of consignment Mexico**
6	Add	Canadian imports of U.S. origin and country of consignment Mexico
7	Final	Canadian adjusted imports from Mexico

[18] IMTS 2010 P. 42

Similar adjustments are made to Canadian imports from the United States and from ROW.[19]

Next, adjustments can be made for disparate valuation related to freight charges in the bilateral trade flows. For comparison with partner country statistics, imports of goods should be valued at the foreign port of export. For countries that share a land border, however, imports may be reported without including inland freight charges, or the costs of transportation to the border from the point of origin within the exporting country. IMTS 2010 states that it is desirable to have a separate collection of data on freight and insurance in order to improve data quality.[20] Both Canada and the United States have information on freight that can be used to bring the bilateral flows onto a consistent valuation.[21] For example, for the adjustment to Canadian imports from the United States, the freight up to the U.S.-Canadian border on Canadian imports of goods exported from the United States, regardless of origin, is also added to the adjusted imports of the Canada–U.S. northbound trade flow. Consequently, the bilateral adjustments for both trade flows (Table II.VI and II.VII) change in the following way:

Table II.XIII U.S. Exports to Canada/Canadian Imports from the United States

Line	Operation	Concept
1	Initial	Canadian imports from the United States
2	Subtract	Canadian imports of U.S. origin and country of consignment ROW
3	Subtract	Canadian imports of U.S. origin and country of consignment Mexico
4	**Add**	**Inland freight to U.S.-Canada border for Canadian imports of all countries origin, exported from the United States**
5	Add	Canadian imports of Mexican origin and country of consignment the United States
6	**Add**	**Canadian imports of Canadian origin and country of consignment the United States**
7	Add	Canadian imports of ROW origin and country of consignment the United States
6	Final	Canadian adjusted imports from the United States

[19] Re-imports are already included in U.S. import statistics and, therefore, no adjustment is necessary. Likewise, re-imports are included in the official Mexican import statistics, although they are not identified separately. Therefore, Mexican imports are not modified further.
[20] IMTS 2010 P.40
[21] Mexico does not identify freight data separately.

Table II.XIV Canadian Exports to the United States/U.S. Imports from Canada

Line	Operation	Concept
1	Initial	U.S. imports from Canada
2	Subtract	U.S. imports of Canadian origin and country of consignment Mexico
3	Subtract	U.S. imports of Canadian origin and country of consignment ROW
4	Add	U.S. imports of Mexican origin and the country of consignment Canada
5	Add	U.S. imports of ROW origin and the country of consignment Canada
6	**Add**	**Inland freight to Canada-U.S. border for Canadian exports of all countries origin**
7	Final	U.S. adjusted imports from Canada

Notice that in Table II.XIII (U.S. exports to Canada/Canadian imports from the United States), both re-imports and freight data are used to improve the adjustment. Likewise, information on freight from the U.S. statistics can also be used to adjust U.S. imports from Mexico (Table II.XI), as follows:

Table II.XV Mexican Exports to the United States/U.S. Imports from Mexico

Line	Operation	Concept
1	Initial	U.S. imports from Mexico
2	Subtract	U.S. imports of Mexican origin and country of consignment Canada
3	Subtract	U.S. imports of Mexican origin and country of consignment ROW
4	Add	U.S. imports of ROW origin and country of consignment Mexico
5	Add	U.S. imports of Canadian origin and country of consignment Mexico
6	**Add**	**Inland freight to Mexico-U.S. border for Mexican exports of all countries origin**
7	Final	U.S. adjusted imports from Mexico

After the application of the NGM and these additional adjustments for re-imports and freight, the next step of the data reconciliation process is the application of several targeted adjustments.

b) Targeted adjustments for locomotives and electrical energy

Following the enactment of the North American Free Trade Agreement (NAFTA), U.S. foreign trade regulations were revised to eliminate the requirement for U.S. importers of locomotives and railcars to

report all of their Chapter 86 imports on the Customs Entry Summary.[22] Therefore, U.S. imports of locomotives from Canada and Mexico are not captured in U.S. customs data and require a special adjustment. BEA already adjusts the customs basis trade data for this gap as part of its standard procedures for deriving the balance-of-payments basis trade statistics, using information from the partner countries. Therefore, BEA's balance-of-payments adjustments can be used to adjust the data for this merchandise trade reconciliation exercise.

Similarly, U.S. exports and imports to and from Mexico do not reflect complete coverage of electrical energy.[23] Therefore, BEA adjusts the customs basis trade data for calculating balance-of-payments basis trade. Thus, a similar approach will be taken here, to use the BEA adjustments (which, again, are based on the partner country data) to adjust the trade data for the NA-TiVA merchandise trade reconciliation exercise. In this case, positive adjustments will be made to both U.S. exports to Mexico and U.S. imports from Mexico, to add the missing trade in electrical energy.

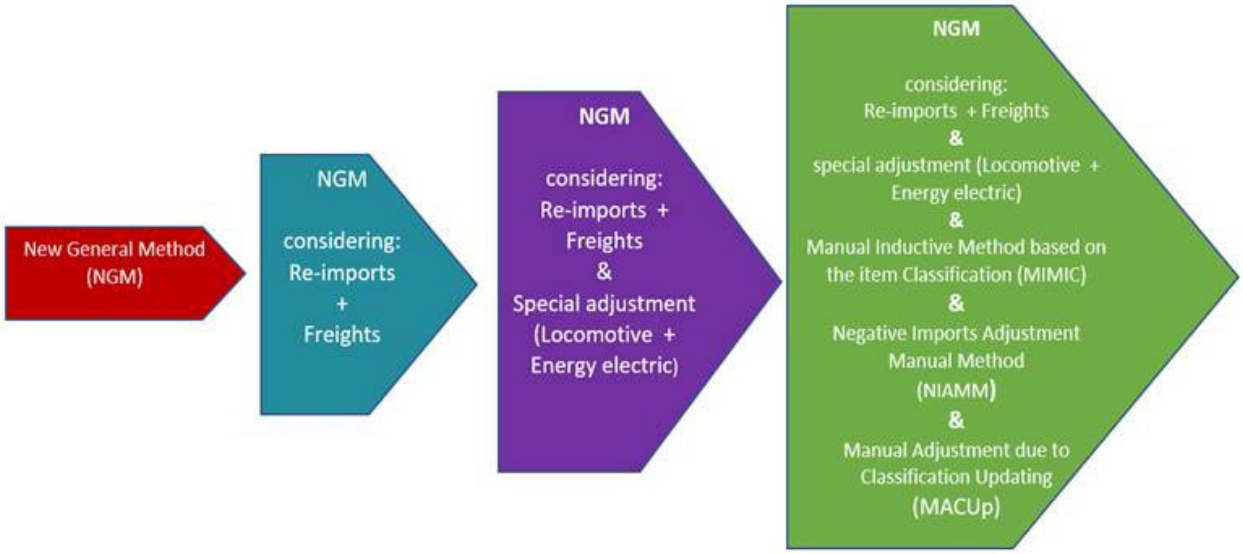
Together, these adjustments reduce the bilateral asymmetries for locomotives and electrical energy, as well as the overall asymmetries for total trade in goods.

Figure II.IX illustrates the evolution of these adjustments. First, the NGM is applied; second, the additional data on re-imports and freights is considered; third, the special adjustments for locomotives and electrical energy are carried out; fourth, MIMIC takes place to readjust the most important remaining discrepancies; and fifth, MACUp is performed to deal with the classification updates issues and, finally, NIAMM corrects negative values to the adjusted imports that emerge from the application of NGM.

[22] As described in the Harmonized Tariff Schedule of the United States, Chapter 86: "Railway locomotives (provided for in headings 8601 and 8602) and railway freight cars (provided for in heading 8606) on which no duty is owed are not subject to the entry or release requirements for imported merchandise set forth in Sections 448 and 484 of the Tariff Act of 1930."

[23] As described in the Harmonized Tariff Schedule of the United States, Chapter 27: "Electrical energy shall not be subject to the entry requirements for imported merchandise set forth in section n484 of the Tariff Act of 1930, as amended (19 U.S.C. 1484), but shall be entered on a periodic basis in accordance with regulations to be prescribed by the Secretary of the Treasury."

Figure II.IX Evolution of the multistep adjustment



c) Manual Inductive Method based on the Item Classification (MIMIC)

The Manual Inductive Method based on the Item Classification (MIMIC) uses the HS classification descriptions to correct the remaining asymmetries after the application of the NGM, due to some possible inconsistencies in the classification carried out by different customs offices among the three countries.

The objective is to reduce trade asymmetries using the available data at HS6 level that is reported by each country, through reviewing the description in some of the most relevant products to see the consistency of the traded items.

It is important to take into account that this method does not reduce the total remaining asymmetry and it only fix asymmetries that are visible at subheading (HS6) level and not at heading level.

The application of MIMIC must consider the following assumptions:

- The description of the analyzed products must be similar
- The products must belong to the same heading of the HS (HS4)
- The products must belong to the same ISIC industry code (4-digit)
- The products must belong to the same NAIC industry group (4-digit)
- The asymmetry must be consistent, i.e., one should be positive and the discrepancy of the second one should be negative
- The products must have the same tariff rate

For the northbound and southbound U.S. – Mexico trade, the first step is to identify the items (HS6) with larger asymmetries (in absolute terms). Then, the second step is to verify if these items accomplish the assumptions mentioned above.

The following example is one of the most important cases found for the year 2012 in the U.S.–Mexico trade (values are expressed in U.S. dollars).

In table II.XVI, each of the products HS 847149 and HS 847150 represents 8% of the total adjusted asymmetry for 2012 in absolute terms. After the application of the method, the adjusted asymmetry for the HS 847150 disappears. On the other hand, the asymmetry for HS 847149 diminished from -7,210.6 to -46.1 million of USD. Finally, table II.XVII specifies the NAICS code that belongs to these two items with its corresponding description.

Table II.XVI Northbound trade. Mexican exports – U.S. imports (Millions of U.S. dollars)

	Clasification	Participation in the total Adj. Asym.	New General Method (NGM) data		NGM results	
	HS	%	Total Exports	Adjusted Imports	Adjusted Asymmetry	
2012	847149	8%	8,771.02	1,560.45	-7,210.57	
	847150	8%	3,891.58	11,056.01	7,164.43	
			12,662.60	12,616.46	-46.14	
					Results comparison	
			Applying the method		NGM results	MIMIC New results
			Total Exports	Adjusted Imports	Adjusted Asymmetry	Re-Adjusted Asymmetry
	847149	8%	8,771.02	8,724.88	- 7,210.57	- 46.14
	847150	8%	3,891.58	3,891.58	7,164.43	-
			12,662.60	12,616.46	- 46.14	- 46.14

Table II.XVII HS descriptions

NAICS code	HS 2012 code	Description HS 2012
3341	847149	Automatic data processing machines; presented in the form of systems, n.e.c. in item no. 8471.30 or 8471.41
	847150	Units of automatic data processing machines; processing units other than those of item no. 8471.41 or 8471.49, whether or not containing in the same housing one or two of the following types of unit: storage units, input units or output units

By applying the Manual Method presented above, the joint asymmetry at HS6 level is reduced.

It is important to consider that the total asymmetry remains unchanged (after the application of the NGM) and the improvement in the asymmetries reduction methods is just seen in disaggregated data (after distributing the asymmetry values).

Additionally, this method should be strengthened through the use and knowledge of the international trade records of each country.

Finally, the manual method presented is effective to distribute the asymmetries in all trade flows, consequently, it will be used as a previous step to the application of the Mechanical Method.

d) Manual Adjustment due to Classification Updating (MACUp)

The U.S. and Canada has implemented the classification HS-2012 since January 2012; however, Mexico used the classification HS-2007 during the first semester of 2012 and has updated the classification to HS-2012 until the second semester of this year. This lag has caused some discrepancies in the international

trade in goods of Mexico with respect its counterparts. Therefore, the Manual Adjustment due to Classification Updating (MACUp) seeks to fix the classification of some relevant products that have this problem for the year 2012.

It is important to take into account that this method does not attempt to reduce the total remaining asymmetry and it only fixes those asymmetries that are visible at Subheading (HS6) level and not at Heading level (HS4).

One example that presents this issue corresponds to two of the most important items according to its relevance in the international trade of goods between Mexico and the U.S., which belong to the Heading 2710. According to the UN Comtrade their descriptions are:

Heading 2710 (HS-2012)

Name: Petroleum oils and oils from bituminous minerals, not crude; preparations n.e.c, containing by weight 70% or more of petroleum oils or oils from bituminous minerals; these being the basic constituents of the preparations; waste oils.

Description: Petroleum oils and oils obtained from bituminous minerals, other than crude; preparations not elsewhere specified or included, containing by weight 70 % or more of petroleum oils or of oils obtained from bituminous minerals, these oils being the basic constituents of the preparations; waste oils.

Subheading 2710 and 271011

H3-HS 2007 (271011) description: Petroleum oils and oils from bituminous minerals, not crude or waste oils; preparations n.e.c. with 70% or more (weight), of petroleum oils or oils from bituminous minerals; being the basic constituents of the preparations: light oils and preparations.

H4-HS 2012 (271012) description: Petroleum oils and oils from bituminous minerals, not containing biodiesel, not crude, not waste oils; preparations n.e.c, containing by weight 70% or more of petroleum oils or oils from bituminous minerals; light oils and preparations.

Moreover, the UNSTATS correspondence table shows a correlation from HS-2007 to HS-2012.

H2: HS 2002
H3: HS 2007
} Subheading 271011 is only available in these classifications

H4: HS 2012
H5: HS 2017
} Subheading 271012 is only available in these classifications

The following tables present the values of the items mentioned above for the Northbound and Southbound Trade between Mexico and the U.S.

Table II.XVIII Northbound Trade, U.S. imports – Mexico exports (US Dollars)

Year	HS	Total Imports	Total Exports	Original Asymmetry	Adjusted Asymmetry	Participation in the total Adj. Asym.
2010	271011	1,458,888,006	1,433,938,379	24,949,627	24,949,627	0.03%
	271012	-	-	-	-	-
	Totals	**1,458,888,006**	**1,433,938,379**	**24,949,627**	**24,949,627**	**0.03%**
2011	271011	-	1,772,831,668	- 1,772,831,668	- 1,772,831,668	0.3%
	271012	-	-	-	-	-
	Totals	**-**	**1,772,831,668**	**- 1,772,831,668**	**- 1,772,831,668**	**0.33%**
2012	271011	-	529,927,899	- 529,927,899	- 529,927,899	0.5%
	271012	857,232,325	298,495,970	558,736,355	558,736,355	0.6%
	Totals	**857,232,325**	**828,423,869**	**28,808,456**	**28,808,456**	**1%**
2013	271011	-	-	-	-	-
	271012	1,200,669,515	1,308,404,198	- 107,734,683	- 131,657,851	0.1%
	Totals	**1,200,669,515**	**1,308,404,198**	**- 107,734,683**	**- 131,657,851**	**0.1%**
2014	271011	-	-	-	-	-
	271012	725,332,292	1,081,023,145	- 355,690,853	- 355,690,853	0.3%
	Totals	**725,332,292**	**1,081,023,145**	**- 355,690,853**	**- 355,690,853**	**0.3%**

* The values are expressed in US Dollars

Table II.XIX Southbound Trade, Mexico imports – U.S. exports (US Dollars)

Year	HS	Total Imports	Total Exports	Original Asymmetry	Adjusted Asymmetry	Participation in the total Adj. Asym.
2010	271011	8,535,113,371	7,336,721,336	1,198,392,035	1,199,634,580	2.00%
	271012	-	-	-	-	
	Totals	**8,535,113,371**	**7,336,721,336**	**1,198,392,035**	**1,199,634,580**	**2.00%**
2011	271011	14,576,685,367	13,714,981,413	861,703,954	862,498,562	1.0%
	271012	-	-	-	-	
	Totals	**14,576,685,367.0**	**13,714,981,413**	**861,703,954**	**862,498,562**	**1.00%**
2012	271011	7,931,301,040	-	7,931,301,040	7,931,243,033	11.0%
	271012	5,888,625,038	11,604,260,882	- 5,715,635,844	- 5,710,507,043	8.0%
	Totals	**13,819,926,078**	**11,604,260,882**	**2,215,665,196**	**2,220,735,990**	**19%**
2013	271011	4,176,686	-	4,176,686	4,176,686	-
	271012	12,803,199,426	11,449,896,183	1,353,303,243	1,357,691,013	2.0%
	Totals	**12,807,376,112**	**11,449,896,183**	**1,357,479,929**	**1,361,867,699**	**2.0%**
2014	271011	5,491,966	-	5,491,966	5,491,966	-
	271012	12,406,863,989	11,286,107,776	1,120,756,213	1,122,203,181	2.0%
	Totals	**12,412,355,955**	**11,286,107,776**	**1,126,248,179**	**1,127,695,147**	**2.0%**

For 2010 and 2011 *US re-exports are estimated with Mexico imports data

It is important to take into account that in some cases (as in the Southbound trade Mexico – U.S.), there are values from the HS 2007 in 2012 and subsequent years, due to some merchandises are subject to revisions in the customs offices, and when a product is dispatched it keeps the code that was assigned when got into the country.

By classifying the items from HS-2007 to HS-2012, the joint adjusted asymmetry in absolute terms from these products (271011 and 271012) for 2012 is $28,808,456 for the southbound trade while $2,220,735,990 for the northbound one.

e) Negative Imports Adjustment Manual Method (NIAMM)

After the implementation of the New General Method (NGM), some products with negative import values were identified. This is mainly due to estimates of re-exports from the country of origin to Mexico (estimated U.S. re-exports and estimated Canada re-exports) inflate the adjustment factor well above the original import values reported. Therefore, a manual method is proposed to eliminate this negative value by adjusting it to zero.

The Negative Imports Adjustment Manual Method (NIAMM) permits to redistribute a share of the value of origin from the U.S. and Canadian re-exports to Rest of the World as country of origin, resulting in a value of zero to the adjusted imports that present this issue.

The trade flows affected by the negative adjusted imports are:

Southbound trade flow: Mexico imports – Canada exports
Southbound trade flow: Mexico imports – The United States exports

To apply this manual method, it is necessary to consider the following re-export values:

- Canada re-exports to Mexico with the U.S. as country of origin
- U.S. re-exports to Mexico with Canada as country of origin

Before to the application of NAIMM, it is important to indicate that the New General Method (NGM) uses re-export values for the adjustment in both trade flows, as follows:

- Southbound trade flow: Mexico imports – Canada exports: the re-exports from Canada to Mexico of the U.S. origin (cx_m_u), are added to adjust Mexican imports from Canada.
- Southbound trade flow: Mexico imports – The United States exports: the re-exports from Canada to Mexico of the U.S. origin (cx_m_u), are subtracted to adjust Mexican imports of U.S.

The following schemes describe the steps for implementing the NIAMM, using the case of adjustment in the southbound trade flow: Mexico imports – The United States exports, as an example of analysis:

Step 1. Obtain the **adjustment factor**: Adjusted imports are calculated according to the NGM, without considering the value of re-exports (cx_m_u)[24], as shown in the following diagram.

Step 2. Calculation of the **re-export residual**: The adjustment factor obtained in step 1 and the original re-export value are used to obtain the re-export residual (from the trade flow where a negative value exists).

Step 3. **New re-exports value**: The original re-exports value and the re-export residual of the step 2 are used for obtaining the new-re-exports value.

Step 4. **Adjusted imports become "zero":** By considering the new re-export value, the NGM is applied to adjust to zero the former adjusted imports value.

Step 5. The **new re-exports values are also replaced** in the other trade flow: The new re-export value is replaced in the original re-exports value used in the Southbound trade flow Mexico imports – Canada exports, which also considers the re-exports concept as part of the adjustment in the NGM.

Step 6. **The re-export residual value is reallocated to re-exports from Canada to Mexico of the Rest of the World origin value (cx_m_o).**

[24] See Annex II for nomenclature of these codes.

In the next lines, it is presented a numerical example with the NAIMM adjustment for the same trade flow.

As a first step, both trade flows (Southbound trade: Mexico imports – Canada exports and Southbound trade Mexico imports – US exports) flows are analyzed for any item that present the negative value issue at the HS6 level during the process of the application of the NGM, and identified the re-exports value that will be modified, as shown in the following tables for the HS 848630:

Table II.XX Southbound trade flow: Mexico imports - United States exports

YEAR	HS	cx_m_u	MEX_M_from_USA	USA_X_to_MEX	ADJ_MEX__M_USA	Original_Asymmetry_SB_MEX_USA	NGM_Adjusted_Asymmetry_SB_MEX_USA
2014	848630	12,522	440	0	-12,082	440	12,082

Table II.XXI Southbound trade flow: Mexico imports - Canada exports

YEAR	HS	cx_m_u	MEX_M_from_CAN	CAN_X_to_MEX	ADJ_MEX__M_CAN	Original_Asymmetry_SB_MEX_CAN	NGM_Adjusted_Asymmetry_SB_MEX_CAN
2014	848630	12,522	0	29,250	29,206	-29,250	-44

Subsequently, the adjustment factor is calculated by applying the NGM, but without considering the value of re-exports, as shown in the following diagram:

Then, the re-export residual is calculated:

Next, the new re-export value is obtained:

This new re-export value is substituted to calculate the adjusted imports, resulting in a value of zero and not a negative value:

Table II.XXII Southbound trade flow: Mexico imports - United States exports

YEAR	HS	USA_X_to_MEX	cx_m_u	ADJ_MEX_M_USA	NATiVA_Asymmetry_SB_MEX_CAN	NATiVA_Asymmetry_SB_MEX_USA
2014	848630	0	440	0	440	0

However, the new re-export value (440) must also be replaced by the original re-export value (cx_m_u) of the other trade flow (Southbound trade: Mexico imports – Canada exports), due to it is an adjustment factor that is used for the conciliation of this bilateral trade flow and, since it is part of the original reported value, the reallocation keep the total trade reported unaltered.

Table II.XXIII Southbound trade flow: Mexico imports - Canada exports

YEAR	HS	CAN_X_to_MEX	cx_m_u	ADJ_MEX_M_CAN	Original_Asymmetry_SB_MEX_CAN	OECD_NATiVA_ADJ_Asymmetry_SB_MEX_CAN
2014	848630	29,250	440	17,124	-29,250	-12,126

As it can be seen, the value of the adjusted imports is modified based on the new value of re-exports.

Finally, the value of the re-export residual is reallocated to the reported re-exports from Canada to Mexico with ROW as country of origin (cx_m_o). This residual obtained from the last steps has to be added to the re-exports from Canada to Mexico with Rest of the World as a country of origin for each HS (in this case, the example is based on the data reported by Canada related to the HS 848630):

cx_m_o + re-exports residual = **Canada re-exports to Mexico with ROW origin**

16,684 + 12,082 = **28,766**

II.III Numerical example of the resulting adjusted values from the merchandise trade reconciliation process

In order to illustrate the first three steps of the merchandise trade reconciliation process, the next figure contains a numerical example corresponding to the northbound trade between Mexico (exports) and the United States (imports) for the year 2012. The figures are expressed in millions of U.S. dollars and the items selected are related to the Automatic Data Processing Machines and Units Heading of the HS.

In the first step, the original data are compared to obtain the original asymmetry. Next, in the second step, the NGM is applied to both items and the adjusted imports are obtained and used for setting the resulting adjusted asymmetry. Then, since the Manual Methods also modify the imports side, the re-adjusted imports are obtained and compared with the original exports, resulting in the re-adjusted asymmetry.

Figure II.X Numerical example of the first three steps of the Trade Reconciliation Process (Millions of U.S. dollars)

I

	Original data before the NGM	
	Imports	Exports
HS: 847149	1,552	8,771
HS: 847150	11,053	3,892
	12,605	12,663

=

	Original Asymmetry
HS: 847149	-7,219
HS: 847150	7,161

II

	Application of the NGM	
	Imports	Exports
HS: 847149	1,560	8,771
HS: 847150	11,056	3,892
	12,616	12,663

=

	Adjusted Asymmetry
HS: 847149	-7,211
HS: 847150	7,164

III

	Application of Manual Methods	
	Re-adjusted Imports	Exports
HS: 847149	8,731.5	8,771.0
HS: 847150	3,891.6	3,891.6
	12,623	12,663

=

	Re-adjusted Asymmety
HS: 847149	-40
HS: 847150	-

Finally, the reconciled trade figures resulting from these three steps will be balanced by the OECD using a mechanical approach, in order to obtain the data that will be used by the Supply and Use Table NA-TiVA Workstream[25].

In Annex III, the results of the merchandise trade reconciliaton process are illustrated by comparing the original asymmetry with the adjusted asymmetry (considering the NGM and Manual Methods) for each of the six bilateral trade flows.

OECD contribution to the final balancing

The last step of the merchandise trade reconciliation process consists in the application of a mechanical balancing (Fortanier and Sarrazin, 2016) to remove any remaining discrepancies. In this sense, the NA-TiVA group shared with the OECD the reconciled figures resulting from the previous steps. The OECD analyzed the adjusted data from the NA-TiVA trade reconciliation and ran it through this mechanical balancing procedure.

In preparation for submission to the OECD mechanical balancing procedure, selected Harmonized System subheadings in the reconciled data related to aircraft or certain special transactions were recoded in order to avoid potential double-counting of trade flows. U.S. export data related to aircraft are routinely published under HS6 pseudo-subheading 8800.00 despite being collected under other subheadings. Without accounting for this reporting difference, the rebalancing procedure would have yielded

[25] See Annex III.

substantial double-counting of aircraft-related trade flows. All HS6 subheadings (a total of 27) for which least 25% of the 2012-2014 U.S. export value is reported under subheading 8800.00 were therefore recoded as 8800.00 across all NA-TiVA trade flows. Similarly, all transactions in Harmonized System chapters 98 and 99 (reserved by the World Customs Organization for national use on special transactions) were recoded as pseudo-subheading 9800.00 to avoid double-counting in cases that trading partners used different subheadings for the same transactions. By recoding these aircraft-related and special transactions, 99% of the trade value otherwise unmatched by partner country data was assigned to matching pseudo-subheadings, dramatically reducing the effect of potential double-counting in the reconciled trade flows.

The final reconciliation procedure consists in obtaining a weighted average between the reported value and the mirror statistics. By constructing an asymmetry index, the balanced bilateral trade value is obtained for each of the trade flows in the North America region.

Moreover, these reconciled data will serve as the trade inputs for use by the SUT NA-TiVA Workstream and it is intended to be incorporated in future OECD-TiVA balanced trade datasets.

Table II.XXIV Example of Mechanical Adjustment

2012 Trade in HS 260800: Zinc Ores and Concentrates
(Trade values in millions of U.S. dollars)

Reporter	Partner	Reporter's Imports	Partner's Exports	Trade Asymmetry	Reporter's Symmetry Index	Partner's Symmetry Index	Balanced Trade
CAN	MEX	55.6	56.3	0.7	99%	94%	56.0
CAN	USA	200.1	200.1	0.0	99%	100%	200.1
MEX	CAN	6.5	8.3	1.8	74%	48%	7.2
MEX	USA	0.0	0.2	0.2	74%	100%	0.1
USA	CAN	10.7	0.8	9.9	25%	48%	4.2
USA	**MEX**	**3.7**	**4.9**	**1.2**	**25%**	**94%**	**4.6**

USA imports differ from partner exports, so the symmetry index is low.

MEX exports align with partner imports, so the symmetry index is high.

Balanced Trade =
$$\frac{3.7\times25\% + 4.9\times94\%}{25\% + 94\%} = 4.6$$

III. Services trade reconciliation

Data availability

Since the publication of the first white paper, the NA-TIVA trade reconciliation has also exchanged

available data on trade in services to support the reconciliation exercise. Table II.XXV summarizes the disaggregation of the data figures that each country has.

Table II.XXV Services trade data availability by country

TRADE DETAIL/COUNTRY	CANADA	MEXICO	UNITED STATES
TRADE WITH WORLD	Total services exports and imports 11 major service categories, exports and imports	Total services exports and imports 10 major service categories, exports and imports	Total services exports and imports 10 major service categories, exports and imports
TRADE BY NORTH AMERICAN PARTNER COUNTRY	Total services exports and imports 3 major categories, exports and imports: • Travel • Commercial services • Transport and government services	Travel exports and imports	Total services exports and imports 10 major services categories, exports and imports: • Maintenance and repair services • Travel • Transport • Insurance services • Financial services • Charges for the use of intellectual property • Telecommunications, computer, and information services • Other business services • Construction • Government goods and services

Method

As with the merchandise trade statistics, the first step for the services trade statistics was to compare the reported data of each country, in order to identify the original asymmetries. However, because Mexico does not report total services trade by partner country, the asymmetries could not be evaluated in total. Initial study found that Mexican-reported services exports to all countries are less than the corresponding imports reported by the United States and Canada. Given the constraints, the group agreed that the OECD would balance the trade in services statistics and the results would be used as input in to the SUTs.

Chapter 3: TiVA Analysis and Comparisons

I. Introduction

This chapter presents a comparison between the work of the OECD and APEC initiatives, to discuss the robustness of the TiVA indicators elaborated with the information provided by the members of the NA-TiVA initiative. Moreover, it aims to identify the differences and determine their origin and impacts associated to possible methodological issues or specific treatments of information.

The above mentioned comparison is of high relevance due to the intrinsic differences among the initiatives. This is because, due to their own nature and the availability of information sources used, differences are generated from the coding that affects the number of economic activities, the treatments given to trade transactions, the treatment of the Rest of the World (ROW), among others.

For example, the OECD produced TiVA indicators for 65 economies (including the ROW as an economy) and 36 industries, meanwhile, APEC developed the calculation of the indicators for 22 economies and the rest of the world and 34 sectors, while the NA initiative calculates for only the North America region, by including ROW and considering 100 economic activities.

II. Coverage

This comparison will focus on 2 aspects, the first one related to the total results obtained by each of the aforementioned initiatives for the North American region and the second one focused on the results, but at the 22 sectors of economic activity level, in such a way that differentiated treatments had to be carried out for each initiative to make comparability feasible.

In the case of the APEC initiative, the information was collected from their Regional Supply and Use Tables (RSUT) and then processed to obtain the TiVA indicators, i.e. the RSUT transformed into Regional Input Output Tables (RIOT) and subsequently the pertinent TiVA indicators were constructed considering the format previously agreed upon within the NA initiative.

Regarding the results of the NA-TiVA Working Group that built the database of the regional SUTs with the information of each member country, the information was analyzed to develop the symmetry of such tables and replicate Model D, "Product with Structure of Fixed Sales (Industry by Industry) described in the Eurostat manual called “Manual of Supply, Use and Input-Output Tables” for their transformation into RIOT.

Once the regional SUTs have been transformed to regional IOTs, the initial matrices, such as coefficients and Leontief inverse and the vectors of value added, are constructed. Additionally, exports and imports are determined for the calculation of the indicators, considering as the main reference the methodological guide of the OECD, which is described below for the calculation methodology.

To carry out all this process, this work has been done considering, as a methodological framework, the document "TiVA2018_Indicators_Guide" published by the OECD, for the development of TiVA indicators.[26]

In the case of the OECD, the "Inter-Country Input-Output" (ICIO) tables provide detailed information about the interrelationships and interdependencies among industries and countries as trading partners. By considering this, the calculation of TiVA indicators takes place, which are published on the OECD website by industry, reporting country, partner country and for comparing the indicators, the results of NA-TiVA and APEC are considered.

III. Comparative analysis

At the beginning, an analysis was made with the results that the NA Group worked to standardize the information for comparative analysis for 22 sectors per initiative.

Comparison of main macroeconomic aggregates

In this first stage, it was compared the basic data from NA, INEGI, OECD, and APEC. In table III.I, a comparison of production by initiative and country is presented.

Table III.I Gross Output by TiVA Initiative and country, 2012

2012	*Gross output*[27] *(Millions of dollars)*			
	NA	INEGI	OECD	APEC
CAN	3,243,564	3,243,566	3,231,115	3,223,650
MEX	1,997,779	1,997,779	2,069,529	2,008,892
USA	28,614,016	28,614,014	28,155,968	27,749,147
ROW	111,132,369	111,132,369	111,132,365	146,144,533
TOTALS	**144,987,728**	**144,987,728**	**144,588,977**	**179,825,758**
	Percentage differences between initiatives with respect to NA			
CAN		0.0%	-0.4%	-0.6%
MEX		0.0%	3.6%	0.6%
USA		0.0%	-1.6%	-3.0%
ROW		0.0%	0.0%	31.5%
TOTALS		**0.0%**	**-0.3%**	**24.0%**

This first comparative analysis shows that the APEC initiative considers higher production levels than those of the other two initiatives; particularly in ROW which is higher by 31.5% compared to data from ROW of

[26] Guide to OECD's Trade in Value Added (TiVA) Indicators, 2018 edition. Consulted in April 2021 at https://www.oecd.org/sti/ind/tiva/TiVA2018_Indicators_Guide.pdf.

[27] In order to standardize the values according to the figures provided by the NA initiative, this concept does not include taxes. Likewise, the "wld cif" value provided by the APEC initiative is not considered, which is part of the total gross production.

NA and the OECD. Therefore, these discrepancies will have an impact on the results of the indicators, which are mainly explained by methodological issues and/or by the number of countries that make up ROW.

Table III.II Domestic final demand and Value Added by TiVA Initiative and country, 2012

2012	*Domestic final demand (Millions of dollars)*				*Value added. (Millions of dollars)*			
	NA	INEGI	OECD	APEC	NA	INEGI	OECD	APEC
CAN	1,613,363	1,613,363	1,504,258	1,727,080	1,707,422	1,707,422	1,736,286	1,706,036
MEX	1,081,941	1,081,941	1,021,971	1,144,294	1,147,075	1,147,075	1,174,034	1,147,839
USA	15,651,641	15,651,641	15,181,349	16,069,815	15,624,175	15,624,175	15,752,579	15,748,442
ROW	51,175,470	51,175,470	51,901,998	45,932,360	50,988,716	50,988,716	53,291,473	44,975,241
TOTAL	**69,522,415**	**69,522,415**	**69,609,576**	**64,873,549**	**69,467,388**	**69,467,388**	**71,954,372**	**63,577,559**
	Percentage differences between initiatives with respect to NA							
CAN		0.0%	-6.8%	7.0%		0.0%	1.7%	-0.1%
MEX		0.0%	-5.5%	5.8%		0.0%	2.4%	0.1%
USA		0.0%	-3.0%	2.7%		0.0%	0.8%	0.8%
ROW		0.0%	1.4%	-10.2%		0.0%	4.5%	-11.8%
Differences%		**0.0%**	**0.1%**	**6.7%**		**0.0%**	**3.6%**	**-8.5%**

Comparing other macroeconomic variables, such as domestic final demand, discrepancies by country are observed for both OECD and APEC compared to NA; however, it is assumed that the treatment of ROW solves these differences, leaving APEC as the initiative with the largest differences, i.e. APEC shows a considerable decrease in ROW compared to the other initiatives, and this difference is corrected with an increase in intermediate demand. Likewise, Value Added in ROW leads the differences both in OECD and APEC compared to NA. This is assumed to be due to the composition of the countries that comprise ROW.

Starting from the previous analysis of macroeconomic figures, it is assumed that the main causes of differences among the initiatives are the methodology used to transform the RSUT to RIOT, the classification applied by each initiative, and the composition of ROW.

It is important to mention that, since the results obtained in the transformation from RSUT to RIOT are the same between NA-TiVA and INEGI, from now on only the information provided by NA will be compared for the total comparisons and the data estimated by INEGI will be used to compare 22 sectors of economic activity.

Considering the data sent by the NA initiative, the following table shows the GDP, final domestic demand, total exports and imports.

Table III.III GDP, Imported final use, Total exports and imports by TiVA Initiative and country, 2012

2012	*GDP (Millions of dollars)*			*Imported final use. (Millions of dollars)*			*Total exports of goods & services (Millions of dollars)*			*Total imports of goods & services (Millions of dollars)*		
	NA	OECD	APEC	NA	OECD	APEC	NA	OECD	APEC	NA	OECD	APEC
CAN	1,860,226	1,736,286	1,723,373	246,864	283,415	136,279	531,613	512,675	531,914	548,507	564,062	505,588
MEX	1,197,011	1,174,034	1,142,225	115,070	169,802	65,756	374,584	373,213	393,935	391,694	390,952	383,681
USA	16,765,653	15,752,579	16,155,242	1,114,012	1,119,218	287,277	1,797,661	1,988,088	2,600,537	2,431,199	2,536,076	1,866,576
ROW	51,781,264	53,291,473	45,935,388	605,794	772,362	957,353	2,511,637	2,393,143	1,755,502	1,844,094	1,776,030	2,535,044
TOTALS	**71,604,155**	**71,954,372**	**64,956,229**	**2,081,740**	**2,344,797**	**1,446,665**	**5,215,494**	**5,267,119**	**5,290,889**	**5,215,494**	**5,267,119**	**5,290,889**
	Percentage differences between initiatives with respect to NA											
		NA/OECD	NA/APEC		NA/OECD	NA/APEC		NA/OECD	NA/APEC		NA/OECD	NA/APEC
CAN		-6.7%	-7.4%		14.8%	-44.8%		-3.6%	1.7%		2.8%	-8.5%
MEX		-1.9%	-4.6%		47.6%	-42.9%		-0.4%	5.2%		-0.2%	-2.1%
USA		-6.0%	-3.6%		0.5%	-74.2%		10.6%	44.7%		4.1%	-30.2%
ROW		2.9%	-11.3%		27.5%	58.0%		-4.7%	-30.1%		-3.8%	27.3%
TOTALS		**0.5%**	**-9.3%**		**12.6%**	**-30.5%**		**-4.6%**	**-4.1%**		**0.7%**	**-3.4%**

In the previous table, it is observed that, in general, APEC's GDP is lower compared to the NA, for all countries and ROW, while the OECD is marginally above the NA data, which is attributed to a larger value in ROW. The relevant data of the comparison is shown in the final imported demand, the APEC exposes a significant decrease compared to the NA data, which is supposed to be due to the trade adjustment method, in that sense, total exports and imports show a difference between the initiatives, considering it is derived to the reconciliation of the method.

Comparison of TiVA indicators

In this section, the results of the TiVA Indicators are analyzed, where it is possible to observe discrepancies assumed to be mainly attributed to the current methodology. It should be noted that the analysis is carried out in total nominal values (see the full breakdown in Annex IV).

Table III.IV TiVA indicator comparison by TiVA Initiative and country, 2012

2012	*Domestic value added embodied in foreign final demand. (Millions of dollars)*			*Foreign value added embodied in domestic final demand. (Millions of dollars)*			*share of domestic value added in gross exports. (%)*			*Trade balance of value added in final demand. (Millions of dollars)*		
	NA	OECD	APEC	NA	OECD	APEC	NA	OECD	APEC	NA	OECD	APEC
CAN	380,518	395,027	337,009	397,412	446,413	434,471	72	78	71	-16,894	-51,386	- 97,462
MEX	225,841	243,966	215,025	242,951	261,704	312,204	61	66	60	-17,110	-17,739	- 97,179
USA	1,436,691	1,635,152	1,561,376	2,070,230	2,183,140	2,136,892	86	88	82	-633,539	-547,988	- 575,516
ROW	2,185,061	2,367,260	2,321,845	1,517,518	2,517,490	1,551,688	96	88	93	667,543	617,113	770,157
TOTALS	**4,228,111**	**4,641,405**	**4,435,255**	**4,228,111**	**5,408,747**	**4,435,255**	**79**	**80**	**77**	**0**	**0**	**0**
	Percentage differences between initiatives with respect to NA											

	NA/OECD	NA/APEC	NA/OECD	NA/APEC	NA/OECD	NA/APEC	NA/OECD	NA/APEC
CAN	4%	-11%	12%	9%	9%	-1%	204%	477%
MEX	8%	-5%	8%	29%	10%	0%	4%	468%
USA	14%	9%	5%	3%	10%	3%	-14%	-9%
ROW	8%	6%	66%	2%	1%	7%	-8%	15%
TOTALS	**10%**	**5%**	**28%**	**5%**	**7%**	**3%**		

The table above shows the behavior of the OECD and APEC indicators compared to NA. In this analysis, the OECD figures present important differences, as in the case of the foreign value added contained in the final domestic demand. This shows a total value larger than 28% compared to NA, which is attributed to the behavior and conformation of ROW, where a variation of 66% is observed, as defined by the OECD.[28]

Regarding to APEC, it shows small relevant differences, however, in each country there are differences that may be due to the data of origin, that is, from the conformation of the regional IOT.

Considering the aforementioned, the calculation of the TiVA indicators for 22 sectors was carried out with the information estimated by INEGI. As in the comparison of the results of the basic macroeconomic variables between NA and OECD and APEC, there are no significant differences. The three initiatives were standardized for 22 economic activity sectors for comparative purposes, as is described in the following sections.

IV. Development of Tiva Indicators

The comparative analysis is carried out for the six indicators proposed by NA initiative. In this section the basic measures of international trade in value added are presented, considering the economic model of Wassily W. Leontief as the basis for the calculation of the following indicators:

A. Domestic value added content of gross exports, DVA.
B. Share of domestic value added in gross exports, DVASH.
C. Domestic value added embodied in gross imports, DVAM.
D. Trade balance in value added, BALVA.
E. Domestic value added embodied in foreign final demand, FFD_DVA.
F. Foreign value added embodied in domestic final demand, DFD_FVA.

Connotations of general variables (according to the manual):

The calculations of the TiVA indicators are carried out with the following notations:

- **GR EXGR**, Gross Exports.
- **GR IMGR**, Gross Imports.
- **PROD**, Total Production[29] at basic prices.

[28] Within the methodology for calculating the TiVA indicators of the OECD ("TiVA2018_Indicators_Guide"), it is not described which countries make up ROW.

[29] In order to standardize the values according to the figures provided by the NA initiative, this concept does not include taxes. Likewise, the "wld cif" value provided by the APEC initiative is not considered, which is part of the total gross production.

- **VALU**, Value Added.
- **CI**, bilateral trade in intermediate products.
- **CF**, bilateral trade in final products.
- $\mathbf{B} = (\mathbf{I} - \mathbf{A}) - \mathbf{1}$, is Leontief's global inverse matrix with dimensions NK x NK.
- **A** is the global matrix of global I- O coefficients with dimensions NK x NK.
- **Bc, c** (Leontief matrix) is a diagonal block matrix ***K*** x ***K*** of ***B*** that represents the total gross domestic product required for a unit increase in demand for country ***c***.
- **Bp, c**, is also a Leontief matrix of blocks ***K x K,*** and represents the total gross output of country p required for an increase of one unit in demand from country ***c***.
- The matrix **diagBc** consists of the diagonal elements of the Leontief inverse, that is, those matrix entries that show the necessary requirements of the same industry to carry out the increase in the new production.

Calculation methodology

4.1.1 Domestic value added content of gross exports, DVA

One of the most important indicators is the domestic value added content of gross exports (DVA), which includes the value added of the exporting industry and any value from domestic suppliers that are incorporated into exports.

DVA: Domestic value added content of gross exports and gross imports describe the amount of value added from the origin economy "c" that is consumed by economy "p".

$$EXGR\_DVA_{c,i,p} = V_c B_{c,c} EXGR_{c,i,p}$$

Where EXGR, are the gross exports defined as a Kx1 vector with all entries equal to zero, except the one corresponding to industry "i".

4.1.2 Share of domestic value added in gross exports, DVASH

DVASH: share of domestic value added in gross exports by industry for each business partner:

$$EXGR_{DVASH\ c,i} = \frac{\Sigma_p\ EXGR\_DVA_{c,i,p}}{\Sigma_p EXGR_{c,i,p}}\ x100$$

4.1.3 Domestic value added embodied in gross imports, DVAM

This indicator measures the content of domestic value added embodied in gross imports, and shows the value added generated in country "c" that returns to country "c" incorporated in gross imports from industry "I" in partner country "p":

$$IMGR\_DVA_{c,i,p} = \widehat{V}_c B_{c,i,p} EXGR_{c,i,p}$$

IMGR$_{c,\ i,\ p}$, are the gross imports defined as a diagonal matrix KxK with the imports of country "c" from the export industries of partner country "p".

4.1.4 Trade balance in value added, BALVA

BALVA: The balance is calculated as the difference between the domestic value added incorporated in gross exports and the domestic value added contained in gross imports and is defined as:

$$BALVA_{c,i,p} = EXGR\_DVA_{c,i,p} - IMGR\_DVA_{c,i,p}$$

4.1.5 Domestic value added embodied in foreign final demand, FFD DVA

FFD_DVA: The indicator illustrates therefore the full impact of final demand in foreign markets on domestic output, and it is defined as:

$$FFD\_DVA_{c,p} = \left(\hat{V}\ B\ FD\right)_{c,p}$$

This shows how the national industries are linked with the consumers in other countries, even if there is not a direct trade relationship.

4.1.6 Foreign value added embodied in domestic final demand, DFD_FVA

DFD_FVA: Amount of foreign value added present in the final goods or services purchased by households, the government, non-profit institutions that serve households, or as investments, and is defined as:

$$DFD\_FVA_{p,c} = \left(\hat{V}\ B\ FD\right)_{p,c}$$

V. Results of trade in value added indicators

By using the methodology described in accordance with the OECD guide,[30] five value added indicators were developed, which are presented by economy and ROW, to show the differences among initiatives.

A comparative summary of the results of the six indicators calculated is shown in the following RIOT developed by the NA, OECD and APEC initiative. The data presented below is the percentage share of discrepancies of the indicator results, which compares the OECD and APEC with respect to the NA initiative.

TiVA indicators of Canada

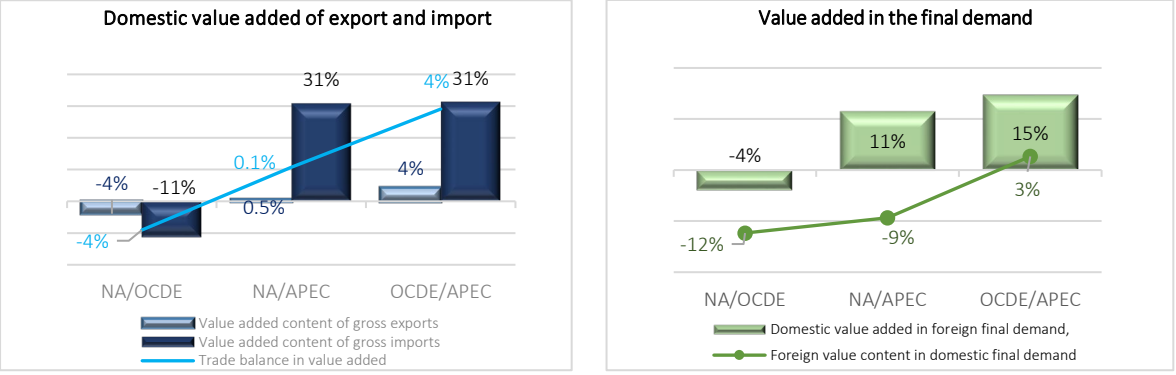
The next table shows the domestic value added content of gross exports and imports, as well as the final domestic and foreign demand of Canada with the aim to analyze the differences that each initiative present.

[30] Guide to OECD's Trade in Value Added (TiVA) Indicators, 2018 edition. Consulted in April 2021 of https://www.oecd.org/sti/ind/tiva/TiVA2018_Indicators_Guide.pdf.

Table III.V TiVA indicator comparison by TiVA Initiative, Canada, 2012

Initiative	Domestic value added content of gross exports	Share of domestic value added in gross exports	Domestic value added embodied in gross imports	Trade balance in value added	Domestic value added embodied in foreign final demand	Foreign value added embodied in domestic final demand
	Millions of dollars	%	Millions of dollars	Millions of dollars	Millions of dollars	Millions of dollars
NA	386,221	72	5,703	380,518	380,518	397,412
OECD	401,369	78	6,342	395,027	395,027	446,413
APEC	384,329	71	4,366	379,963	337,009	434,471

Figure III.I Differences in total terms of initiatives with respect to Canada



The above figures show the differences in the results of the indicators between the initiatives, i.e., the export value-added data recorded by NA for Canada is 4% lower than the data by the OECD, while APEC records a value of 0.5% lower than NA.

In the same way, the value added of imports reflects relevant discrepancies such as the case of NA that presents a lower result of the indicator in 11% compared to the OECD. Therefore, the balance reflects these calculation discrepancies that are considered a cause due to the methodology used; while APEC records a 30% higher result compared to NA.

Regarding Canada´s value added demanded by its partner countries in final products, the OECD records a lower value of 4% compared to NA, while APEC records a higher figure of 11%. The figure recorded by APEC compared to the OECD is 15% higher.

In the case of the initiatives in the development of TiVA indicators, it is well-known that the statistics of international trade in goods and/or services produced by national authorities are not consistent worldwide among countries, so that total global gross exports are not equal to total global gross imports, hence the trade adjustments particularly of each initiative.

Table III.VI Sum of the matrix of direct coefficients, Canada, 2012

Initiative	NA	OECD	APEC

Coefficient matrix	34.6104	13.7085	11.8930

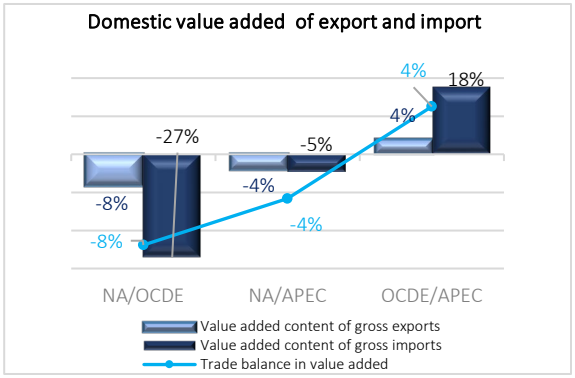
TiVA indicators of Mexico

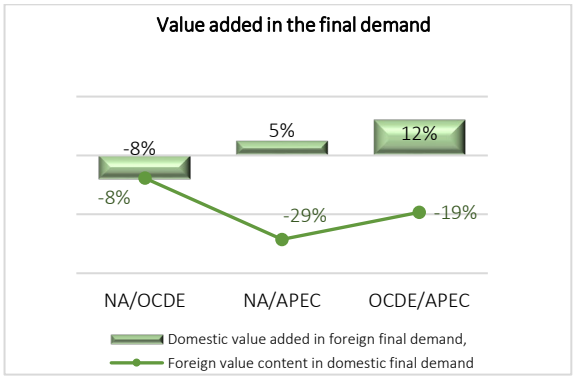
The next table shows the domestic value added content of gross exports and imports, as well as the final domestic and foreign demand of Mexico with the aim to analyze the differences that each initiative present.

Table III.VII TiVA indicator comparison by TiVA Initiative, Mexico, 2012

Initiative	*Domestic value added content of gross exports*	*Share of domestic value added in gross exports*	*Domestic value added embodied in gross imports*	*Trade balance in value added*	*Domestic value added embodied in foreign final demand*	*Foreign value added embodied in domestic final demand*
	Millions of dollars	%	Millions of dollars	Millions of dollars	Millions of dollars	Millions of dollars
NA	228,341	61	2501	225,840	225,841	242,951
OECD	247,143	66	3,177	243,966	243,966	261,704
APEC	237,773	60	2,620	235,153	215,025	312,204

Figure III.II Differences in total terms of the initiatives with respect to Mexico





The domestic value added of Mexico in its exports among the initiatives shows that the NA results are slightly lower with respect to the OECD and APEC by 8% and 4% respectively. It is assumed that these discrepancies are due to the construction of the regional matrices, since when determining the matrix direct coefficients to obtain the inverse of Leontief it shows the following behavior.

Table III.VIII Sum of the matrix of direct coefficients, Mexico, 2012

Initiative	*NA*	*OECD*	*APEC*
Coefficient matrix	27.9210	13.2190	8.5802

According to the previous table, it is assumed that many of the discrepancies are due to this factor that plays an important role in the calculation of the indicators.

However, as far as the domestic value added Mexico contributes with its exports of final products to its partner countries, the OECD records a lower figure compared to NA by 4%, while APEC shows a result of this indicator that is 11% higher than that of the OECD.

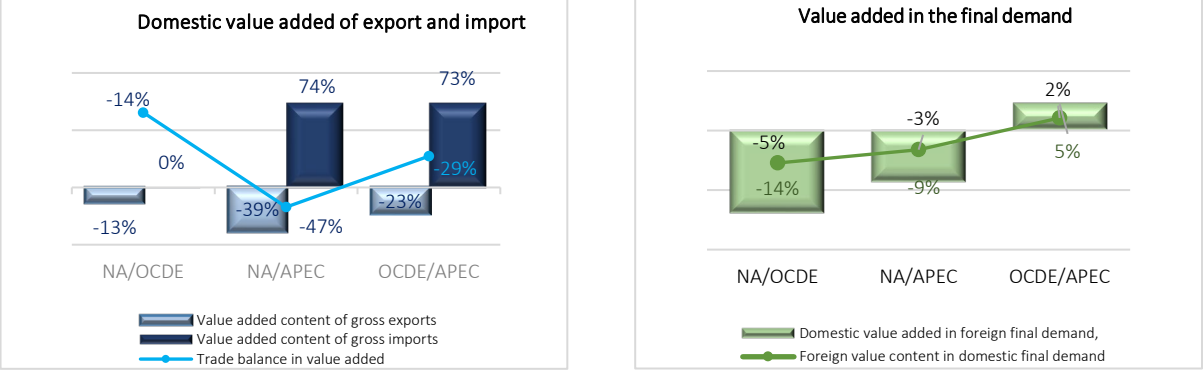
TiVA indicators of the United States

The next table shows the domestic value added content of gross exports and imports, as well as the final domestic and foreign demand of the United States with the aim to analyze the differences that each initiative present.

Table III.IX TiVA indicator comparison by TiVA Initiative, the United States, 2012

Initiative	*Domestic value added content of gross exports*	*Share of domestic value added in gross exports*	*Domestic value added embodied in gross imports*	*Trade balance in value added*	*Domestic value added embodied in foreign final demand*	*Foreign value added embodied in domestic final demand*
	Millions of dollars	%	Millions of dollars	Millions of dollars	Millions of dollars	Millions of dollars
NA	1,543,285	86	106,594	1,436,691	1,436,691	2,070,230
OECD	1,741,368	87	106,216	1,635,152	1,635,152	2,183,140
APEC	2,138,041	82	28,160	2,109,881	1,561,376	2,136,892

Figure III.III Differences in total terms of the initiatives with respect to the United States



The domestic value added contributed by the United States to its partner countries in the OECD initiative is 13% less than that of NA, while APEC contributes 39%. This is reflected in the balance where the domestic value added content of gross export less the domestic value added content of gross import is 47% higher in APEC compared to NA, while the OECD records a balance -14% higher than the NA balance.

Regarding the domestic value added of the United States contained in final demand exports to Mexico, Canada and the rest of the world, NA registers a value of less than 14% and 9% in comparison with OECD and APEC, respectively. It is assumed that this behavior is due to the classification between initiatives, especially in the service industries.

Table X Sum of the matrix of direct coefficients, the United States, 2012

Initiative	*NA*	*OECD*	*APEC*
Coefficient matrix	42.0603	15.1714	13.5941

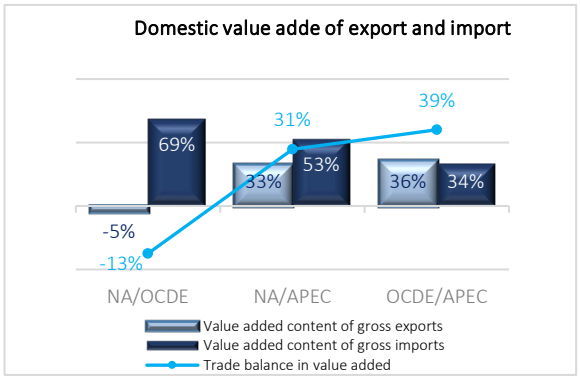
TiVA indicators of the Rest of the World

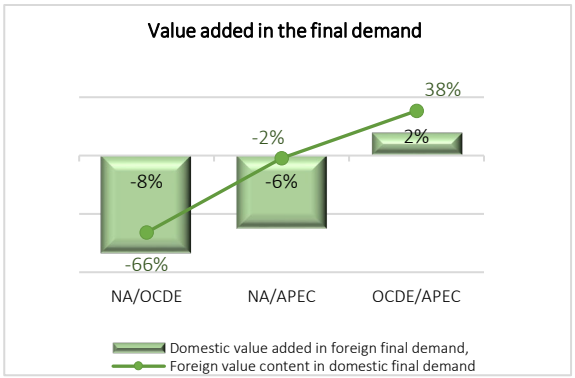
The next table shows the domestic value added content of gross exports and imports, as well as the final domestic and foreign demand of the Rest of the World with the aim to analyze the differences that each initiative present.

Table III.XI TiVA indicator comparison by TiVA Initiative, Rest of the World, 2012

Initiative	*Domestic value added content of gross exports*	*Share of domestic value added in gross exports*	*Domestic value added embodied in gross imports*	*Trade balance in value added*	*Domestic value added embodied in foreign final demand*	*Foreign value added embodied in domestic final demand*
	Millions of dollars	%	Millions of dollars	Millions of dollars	Millions of dollars	Millions of dollars
NA	2,426,919	96	241,858	2,221,061	2,185,061	1,517,518
OECD	2,551,207	90	75,830	2,475,377	2,367,260	2,517,490
APEC	1,631,514	93	4,167	1,627,347	2,321,845	1,551,688

Figure III.IV Differences in total terms of the initiatives with respect to the Rest of the World





The behavior of ROW shows relevant discrepancies between the OECD and NA, where the OECD registers a higher domestic value added content of gross imports in 69% in comparison with NA, as a consequence of the composition of countries that compose it. Likewise, the domestic value added of the Rest of the World contained in foreign final demand, shows that the OECD and APEC reflect a lower result compared to NA by 8% and 6% respectively.

VI. Comparison of TiVA indicators to 22 sectors

In this section, a comparative analysis of the TiVA indicators is presented, where the results were developed by NA, OECD, and APEC for each partner country in North America at the industry level and for each indicator.

- The following comparison illustrates the distance of the indicator's results among initiatives, i.e., it quantifies the percentage difference in results between the OECD and APEC initiatives versus NA, both discrepancies were added to achieve 100% and highlight how much of this total corresponds to the OECD and how much to APEC versus NA results. For example, in Canada´s value added of export, sector 11_Corp production shows that the results of the indicator of the OECD and APEC initiatives are higher versus NA results by 18% and 82%, respectively.

- It is important to emphasize that this kind of analysis was chosen to address the differences because, as it can be seen in Annex IV, the variations in some cases are too large and therefore the graphs were not optimally appreciated.

- Likewise, in some sectors of countries, the NA initiative has no registered data, in this sense the difference in the results display that the OECD and APEC are 50% higher than NA.

A. Domestic value added content of gross exports

The following graphs show the results of the indicator that measures the content of the value added placed on the products and services exported from the local country to its partner countries.

Figure III.V Domestic value added content of gross exports of Canada

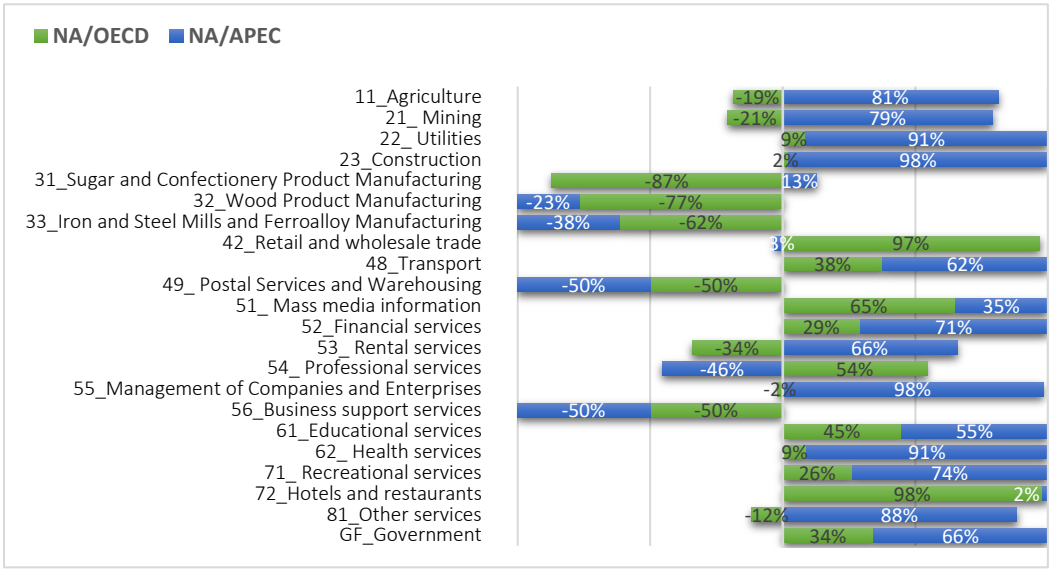


Figure III.V shows the total difference between OECD and APEC with respect to NA, for example, that the domestic value added content of gross exports in the Crop production sector 11, reported by the OECD, is 19% different than that of the NA figures, while the value shown by APEC is 81% lower. On the other hand, in the case of Postal services and Warehousing sector 49, it shows the same difference between OECD and APEC with respect to NA, because both initiatives do not register data, while NA does.

In general, we can expect that a part of the differences that are observed in this analysis of 22 sectors can be explained because of the classification process applied by each initiative.

Figure III.VI Domestic value added content of gross exports of Mexico

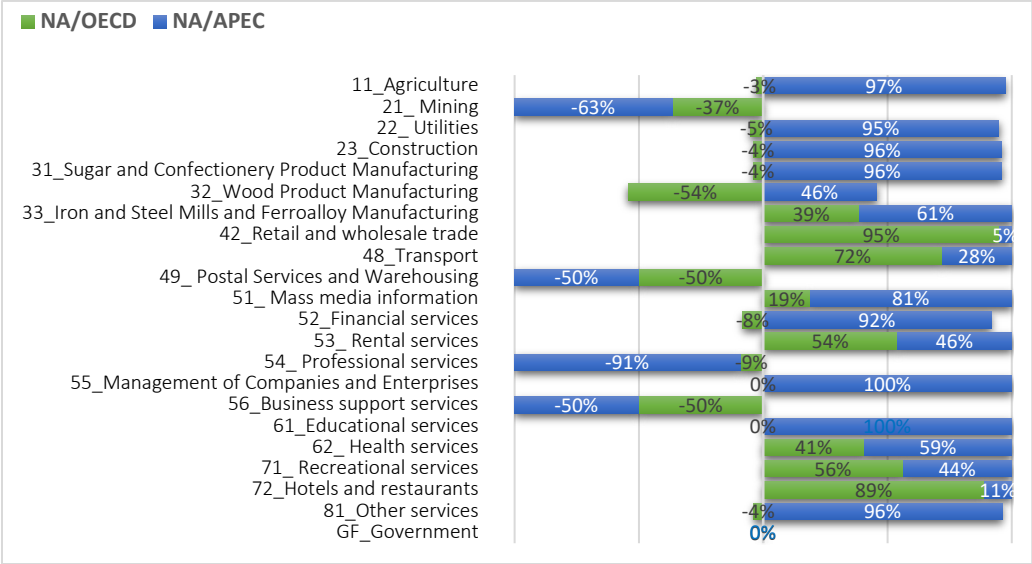
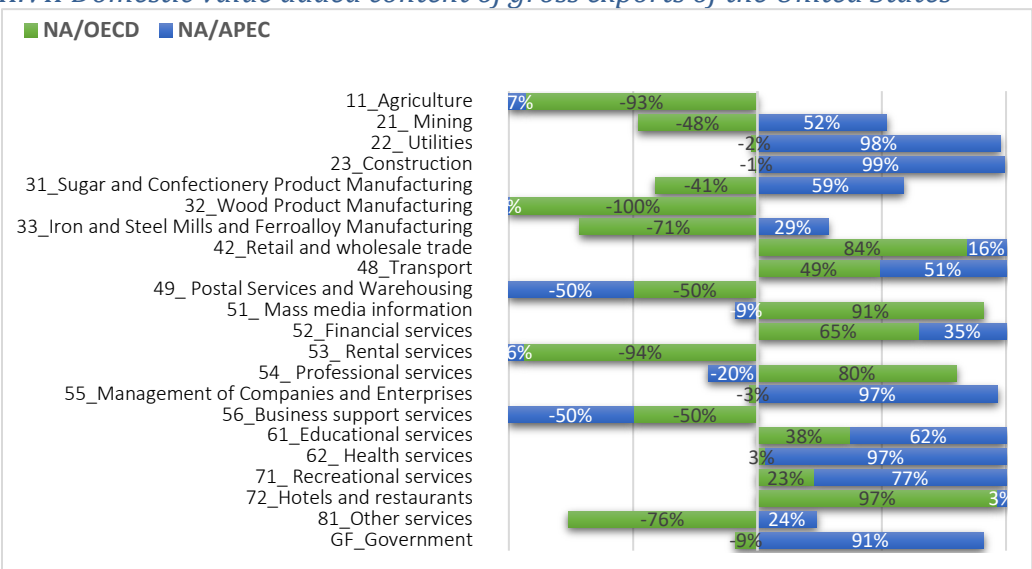


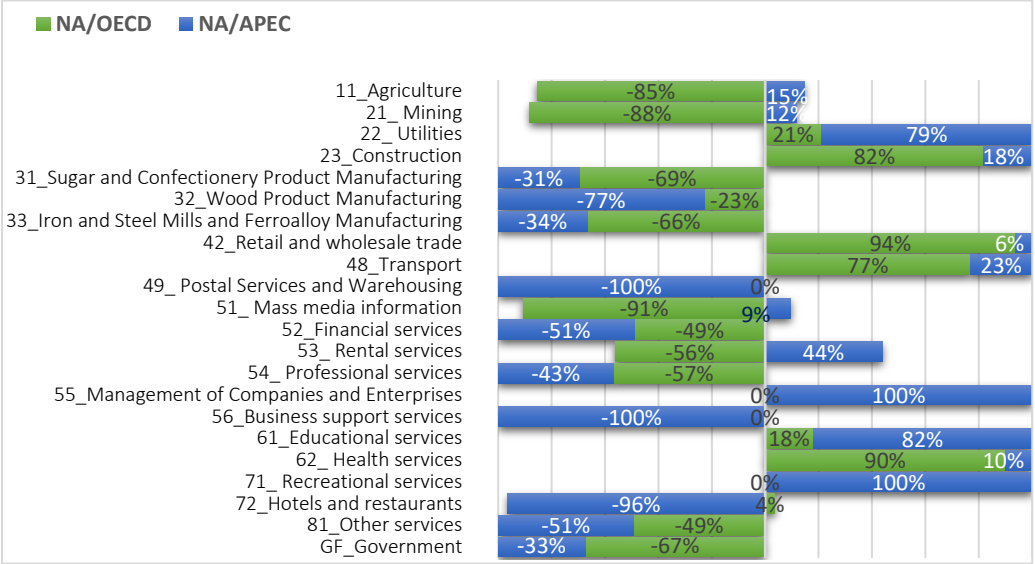
Figure III.VI represents the total difference of Mexico between initiatives, in the same way as Canada, this shows discrepancies that are assumed to be due to the classification, this is again the case for sector 49, where NA records data while OECD and APEC do not. Likewise, in the case of the Utilities sector 22 where is observed that OECD shows a result of less than 5% compared to NA while APEC reports a result of 95% lower than NA.

Figure III.VII Domestic value added content of gross exports of the United States



Regarding the domestic value added content of gross exports from the United States to its partner countries, the main differences between initiatives are reflected as in the case of the Construction sector 23 where the OECD barely shows a difference of 1% compared to NA. Meanwhile, APEC in sectors such as 11_Agriculture, 49_ Postal Services and Warehousing, 51_ Mass media information, 53_ Rental services, 54_ Professional services and 56_ Business support services, registered lower results compared to NA.

Figure III.VIII Domestic value added content of gross exports of the Rest of the World



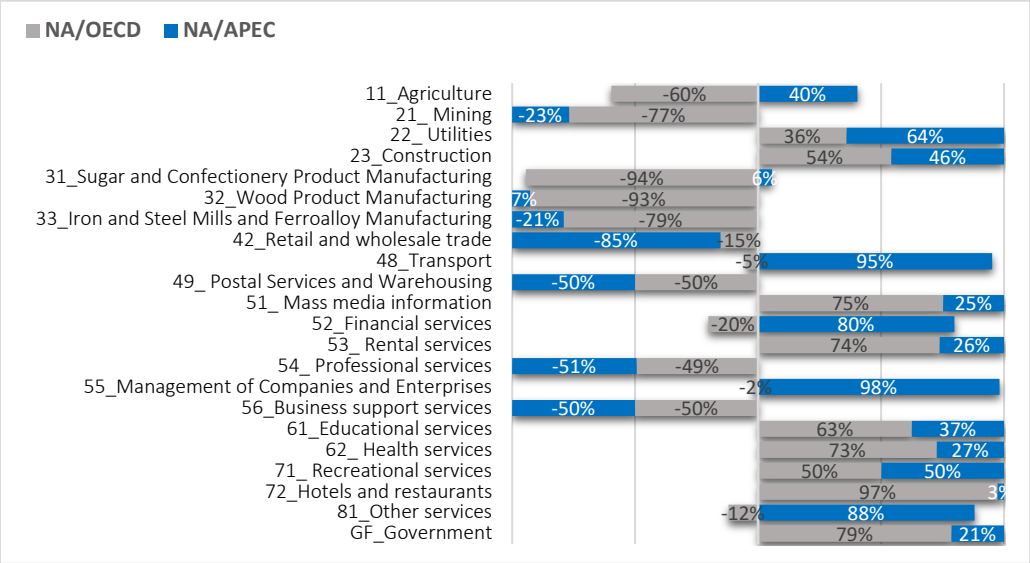
The results of this indicator for the Rest of the World between the initiatives show that the OECD maintains its indicator unchanged versus NA in the sectors of 49_ Postal Services and Warehousing, 55_ Management of Companies and Enterprises, 56_ Business support services and 71_ Recreational Services, while APEC registers minor differences in sectors 51_ Mass media information, 11_ Agriculture and 21_ Mining.

The results in the case of Rest of the World, in this and other indicators, are assumed to be a consequence of the grouping of countries that make up the initiatives.

B. Share of domestic value added in gross exports

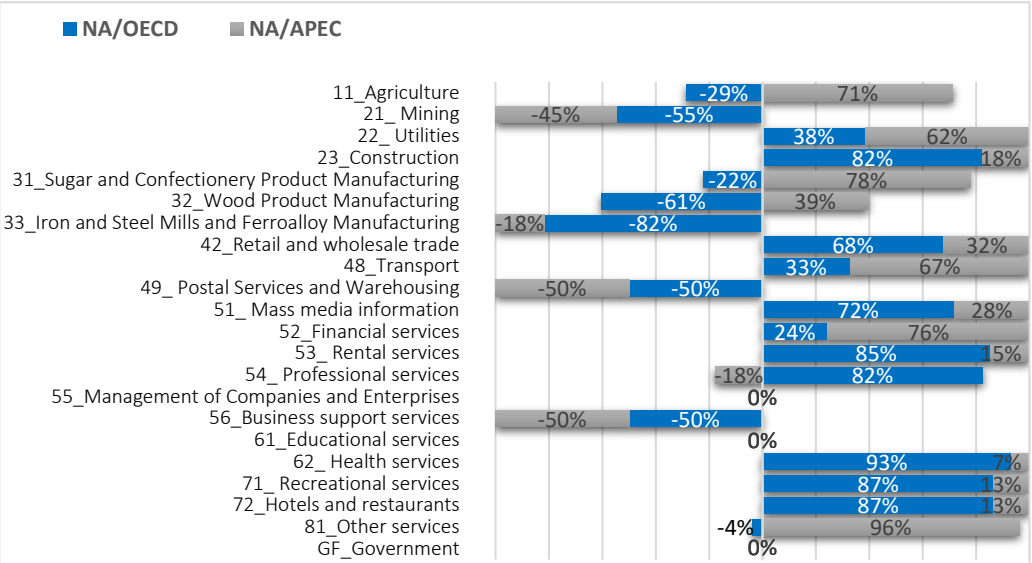
The following figures illustrate trade trends in gross and value-added terms, providing a measure of bilateral relations in exports, imports, where the general trade balances differ when these are measured in a value-added perspective.

Figure III.IX Share of domestic value added in gross exports of Canada



This indicator shows the participation that Canada has with its partner countries in terms of export value added, where the OECD registers the largest differences in the results of the indicator compared to NA in sectors of the manufacturing industries mainly, followed by the sector 72_ Hotels and restaurants, while APEC shows the largest differences with respect to NA in sectors such as 48_Transport and 55_ Management of Companies and Enterprises and 81_Other services.

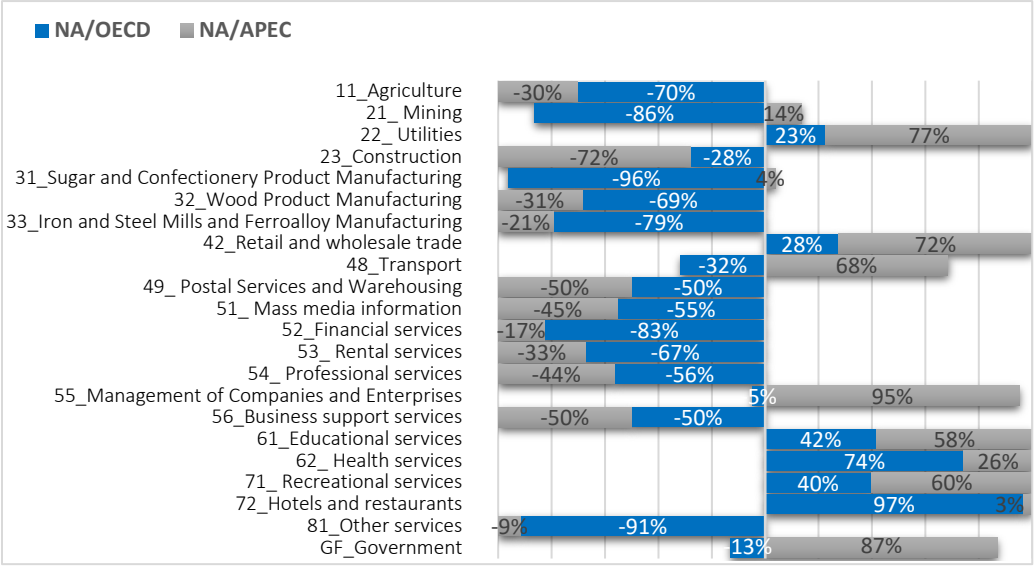
Figure III.X Share of domestic value added in gross exports of Mexico



As to the participation of domestic value added content of gross exports by industry for Mexico´s trading partners, it shows the differences in the results where APEC registers smaller differences in the sectors of 62_Ambulatory Health Care Services, 71_Recreational services and 72_Hotels and restaraunts, while the

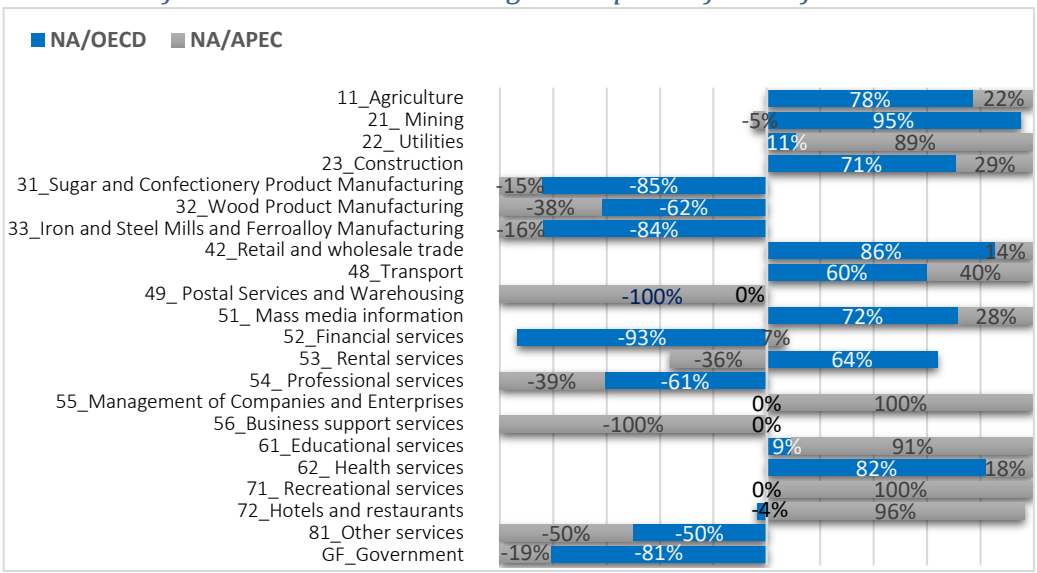
OECD shows a lower result compared to NA in sectors such as 81_ Other services, 31_ Sugar and Confectionery Product Manufacturing and 11_ Agriculture.

Figure III.XI Share of domestic value added in gross exports of the United States



Regarding the share of the United States value added in gross exports, it is observed that the OECD records a lower result in most sectors compared to NA, while APEC does so in 50% of the sectors with a lower result versus NA's.

Figure III.XII Share of domestic value added in gross exports of Rest of the World



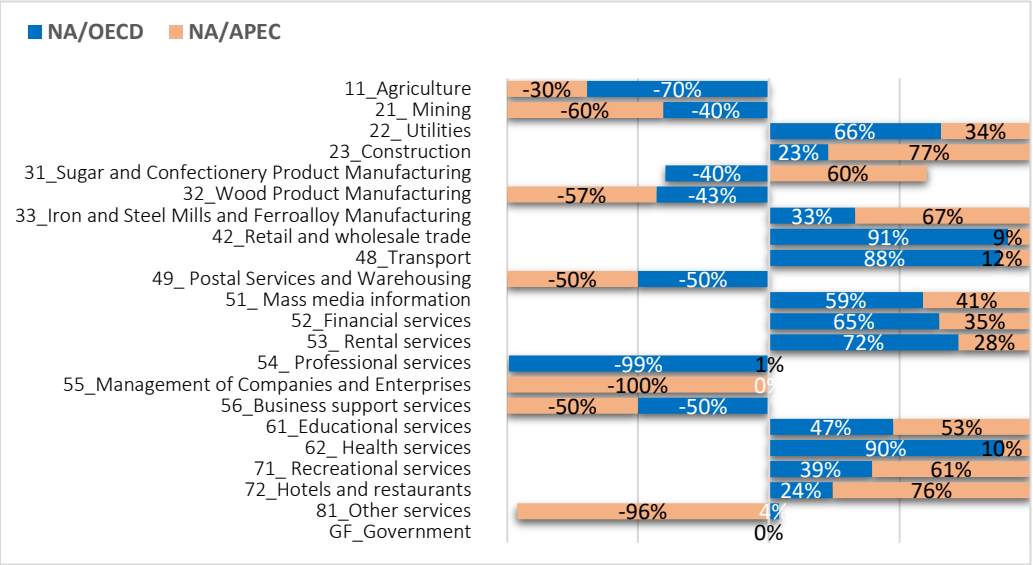
When considering ROW, the behaviour of differences in the indicator results are more homogeneous between OECD and APEC initiatives versus NA results. It should be noted that the OECD does not record data in the sectors of 49_ Postal Services and Warehousing, 55_ Management of Companies and

Enterprises, 56_Business support services and 71_ Recreational Services, therefore, the difference with respect to NA is fully absorbed by APEC.

C. Domestic value added embodied in gross imports

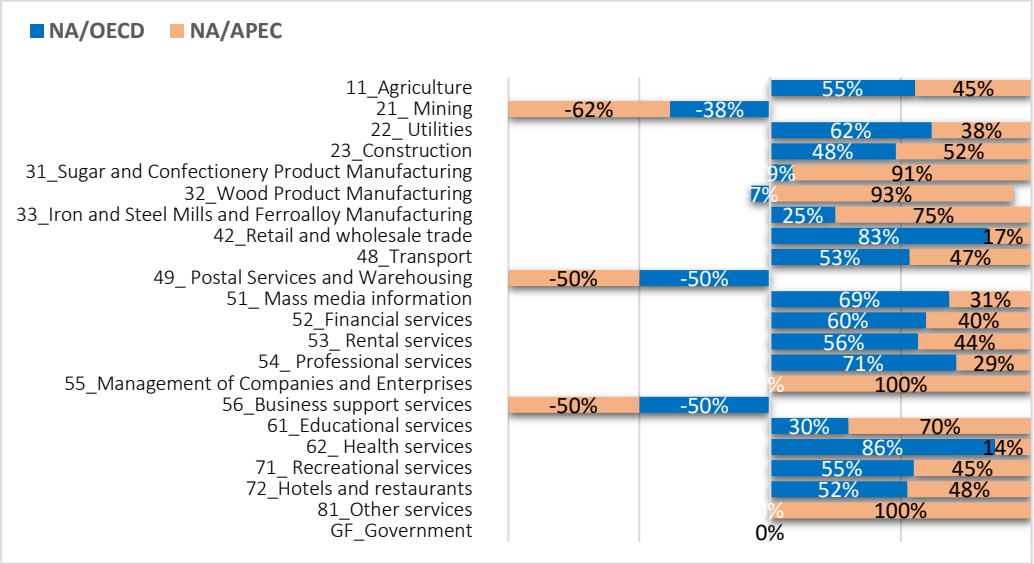
The following figures show the content of the domestic value added acquired in the products and services imported by the countries of the North America region and the Rest of the World. The percentage differences between initiatives versus NA at the sector level are shown as follows.

Figure III.XIII Domestic value added embodied in gross imports of Canada



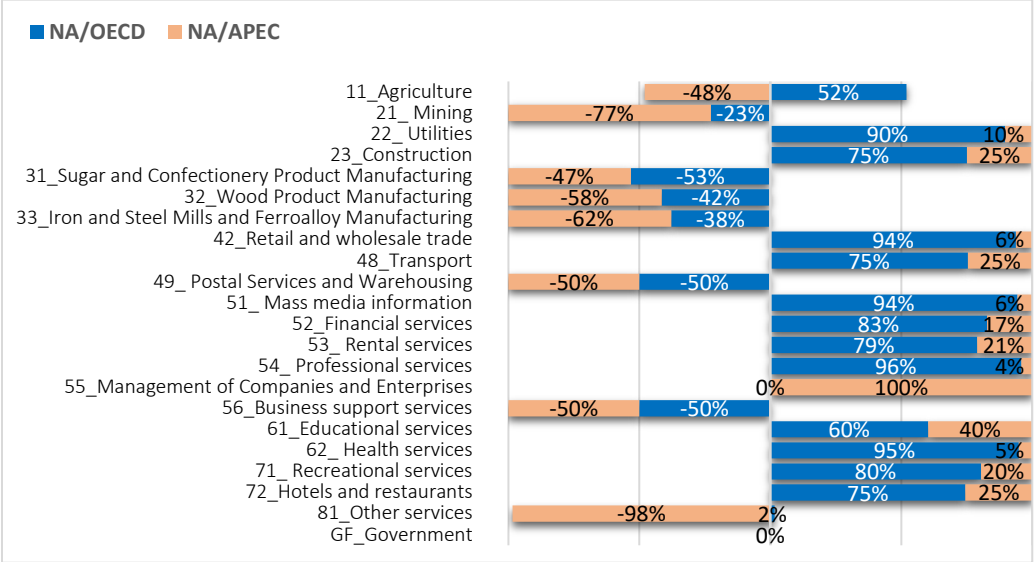
The domestic value added of Canada's gross imports shows the OECD with larger differences in sectors such as 42_ Retail and wholesale trade, 48_ Transport and 62_ Health services with respect to NA, while APEC reflects lower results in sectors such as 55_ Management of Companies and Enterprises and 81_Other services against NA.

Figure III.XIV Domestic value added embodied in gross imports of Mexico



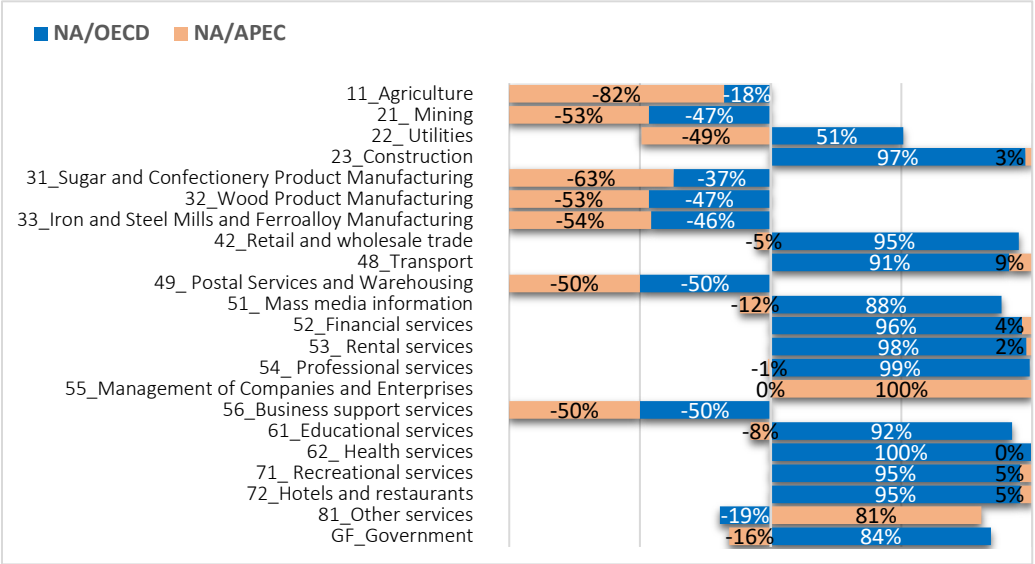
While in Mexico, it shows that in 3 sectors the OECD and APEC register a lower result compared to that of NA, these are: sector 21_Mining, 49_Postal Services and Warehousing and 56_ Business support services, while in the rest of the sectors both initiatives show a higher result compared to NA.

Figure III.XV Domestic value added embodied in gross imports of the United States



The United States also reflects a behavior as in Canada and Mexico, with similar differences between the OECD and APEC initiatives, the latter showing a smaller difference with respect to NA in the sectors of 51 Mass Services Information, 54 Professional Services and 62_ Health Services.

Figure III.XVI Domestic value added embodied in gross imports of the Rest of the World



For the ROW, the total differences among initiatives show that the OECD and APEC have the smallest discrepancies with respect to the NA results, only in sector 11_Agriculture and 81_Other services, showing discrepancies above 80%.

Finally, it is possible to conclude that the value added incorporated in gross imports shows a very similar behavior between the three countries and ROW. This is because of the similarities in the classification and adjustment to international trade determined and applied by each initiative.

D. Trade balance in value added

Bilateral relationships are determined based on the country of origin of domestic value added and the country of destination of the final demand (that is, the country where the value added is finally consumed). Inconsistencies become relevant when considering bilateral trade flows and even more when these flows are analyzed at the product level. Even if the gross exports of final demand (or total) from country A are equal to those imported by country B, there may still be differences when these flows are observed at product level. As is shown in the next balance charts.

Figure III.XVII Trade balance in value added of Canada

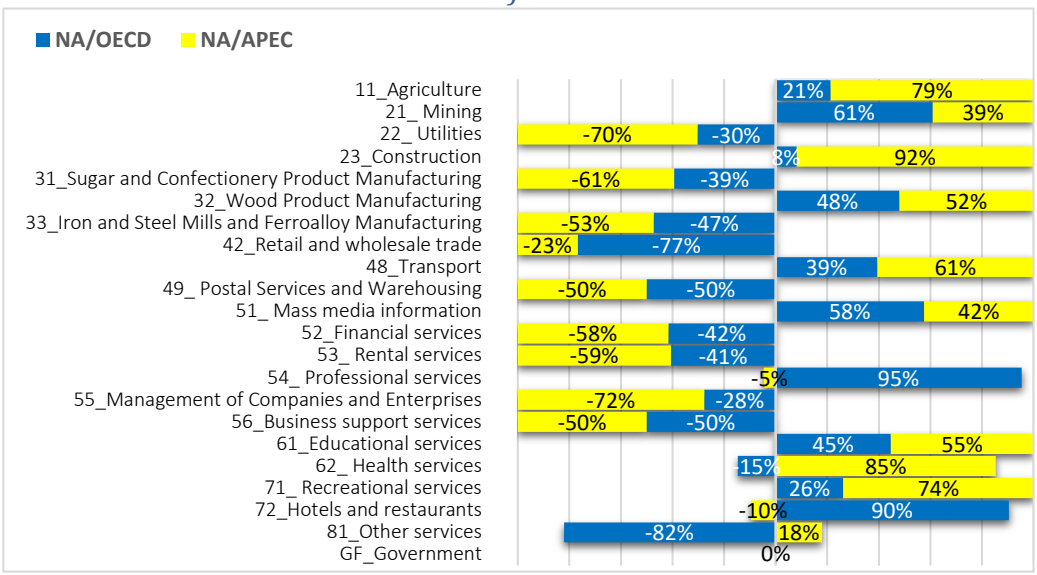
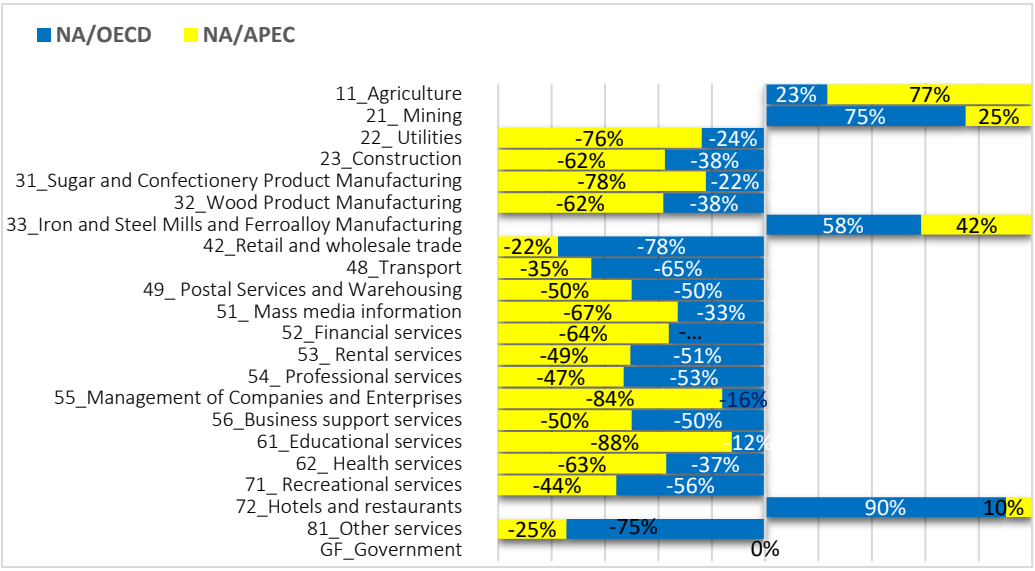


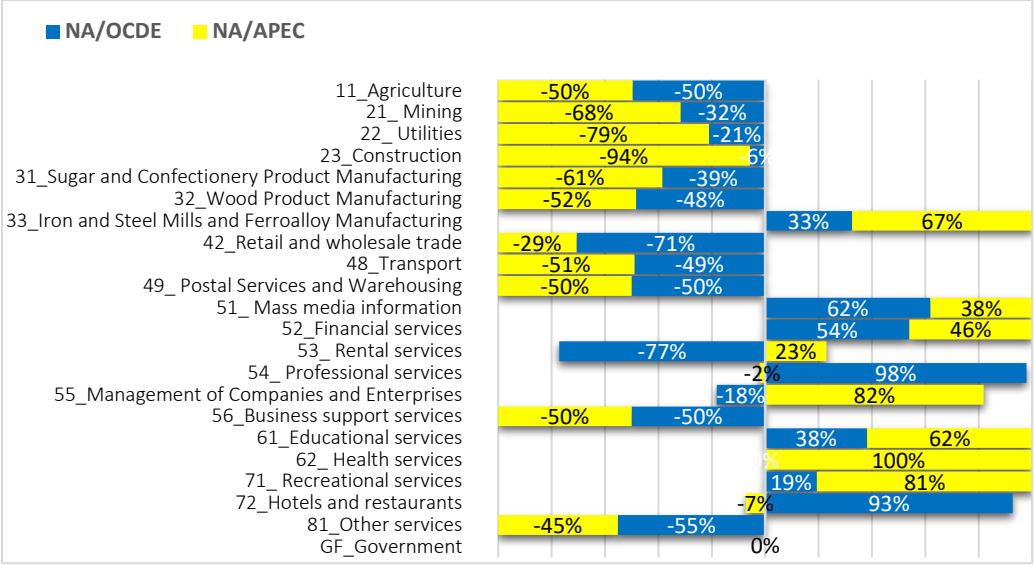
Figure III.XVII illustrates the results of Canada's value added trade balance, which reflect the discrepancies domestic value added content of gross export and gross import. Thus, it is observed that APEC registers a smaller discrepancy compared to NA results in sectors 54_Professional services, 72_Hotels and restaurants and 81_Other services, while the OECD does so in sectors such as 23_Construction and 62_Health services.

Figure III.XVIII Trade balance in value added of Mexico



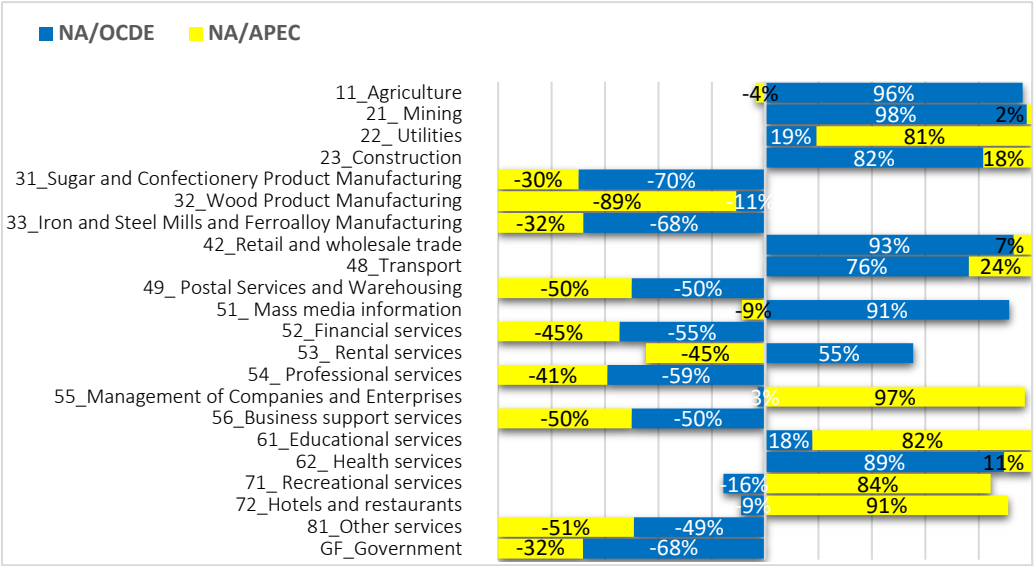
The results show that in Mexico the indicator reflects homogeneous discrepancies in both initiatives compared to those registered by NA, the OECD and APEC, with a higher result in only 4 indicators, 21_Mining, 22_Utilities, 33_ Iron and steel and ferro-alloy manufacturing and 72_Hotels and restaurants.

Figure III.XIX Trade balance in value added of the United States



In relation to figure III.XIX, it is seen that in the United States the trade balance of value added shows that in the case of APEC in 12 sectors there is a lower result than NA, while the OECD registers a higher result in 54_ Professional services and 72_ Hotels and restaurants.

Figure III.XX Trade balance in value added of the Rest of the World



Lastly, figure III.XX illustrates the behavior of the Rest of the World, where it is possible to observe a similar behavior in the results between initiatives, as the OECD registers in some sectors, such as 55_

Management of Companies and Enterprises and 72_ Hotels and restaurants, a smaller divergence compared to NA, while APEC does so in sectors such as 11_Agriculture and 21_ Mining, with respect to NA.

The differences between domestic value added content of gross export and gross import are the result of the balance between both. Therefore, it is considered that the differences are mainly due to trade adjustments, especially in the service sectors carried out by each initiative and to the values of the same variables for the calculation. Another factor considered important to be mentioned is the conformation of the RoW applied by each initiative.

E. Domestic value added embodied in foreign final demand

The following indicators that show the foreign content of specific activities, reinforce the comments at the beginning of the comparative analysis, where the indicators provide a good measure of the degree of integration within global value chains and their changes, therefore, the general importance about imports of all intermediate suppliers used for exports of final consumption of products or services in the three initiatives. It is important to point out, that the charts show different balances but net, that is, in zeros.

Figure III.XXI Domestic value added of Canada embodied in foreign final demand

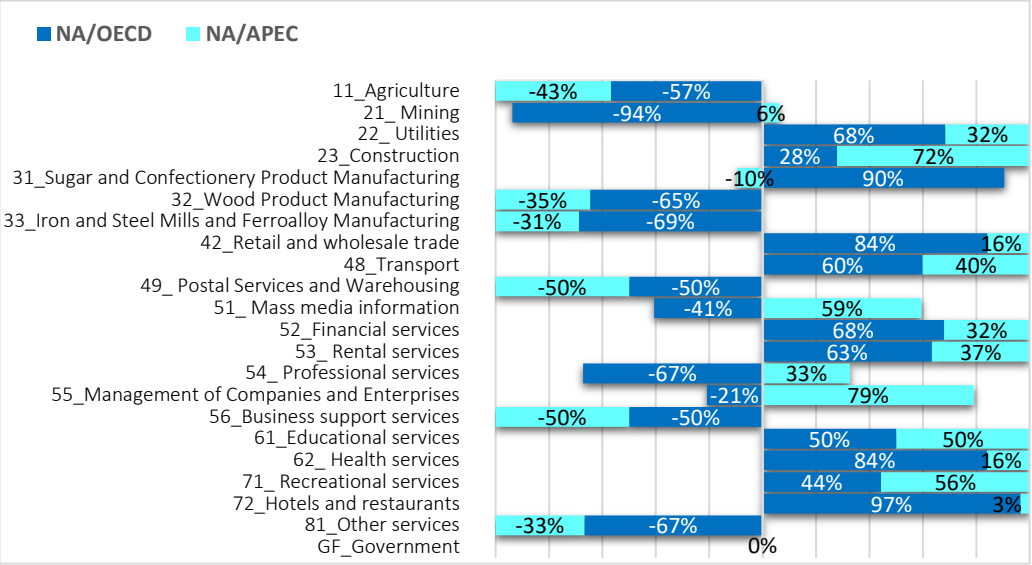
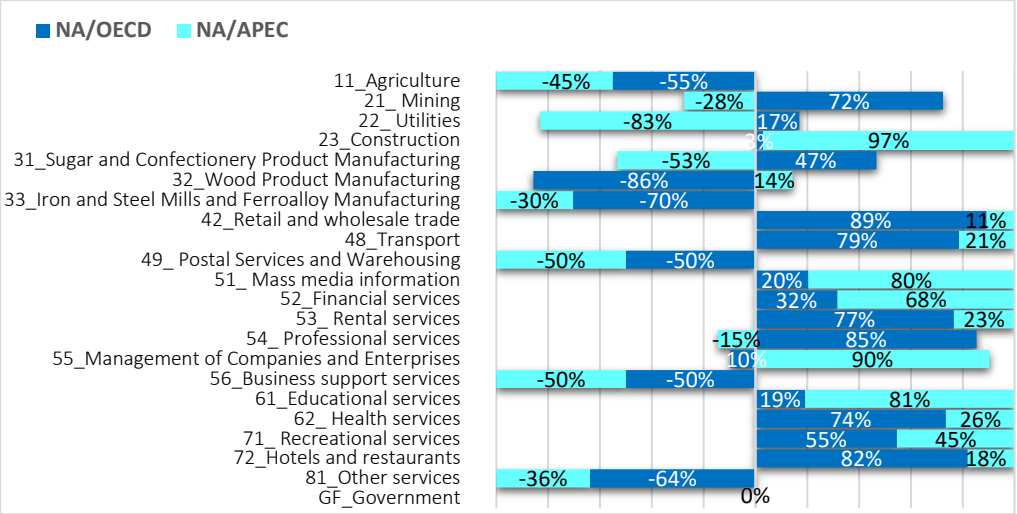


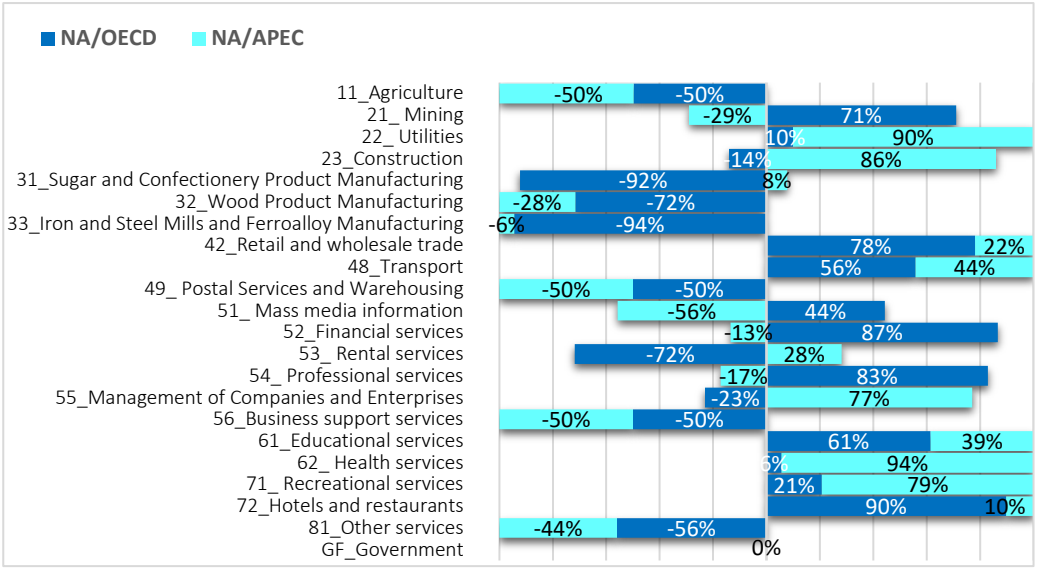
Figure III.XXI shows the behavior that Canada has with respect to the value added incorporated into the final demand of its trading partners. It is important to highlight that the oppositions in the results between the OECD and APEC initiatives reflect a similar behavior compared to the results of NA.

Figure III.XXII Domestic value added of Mexico embodied in foreign final demand



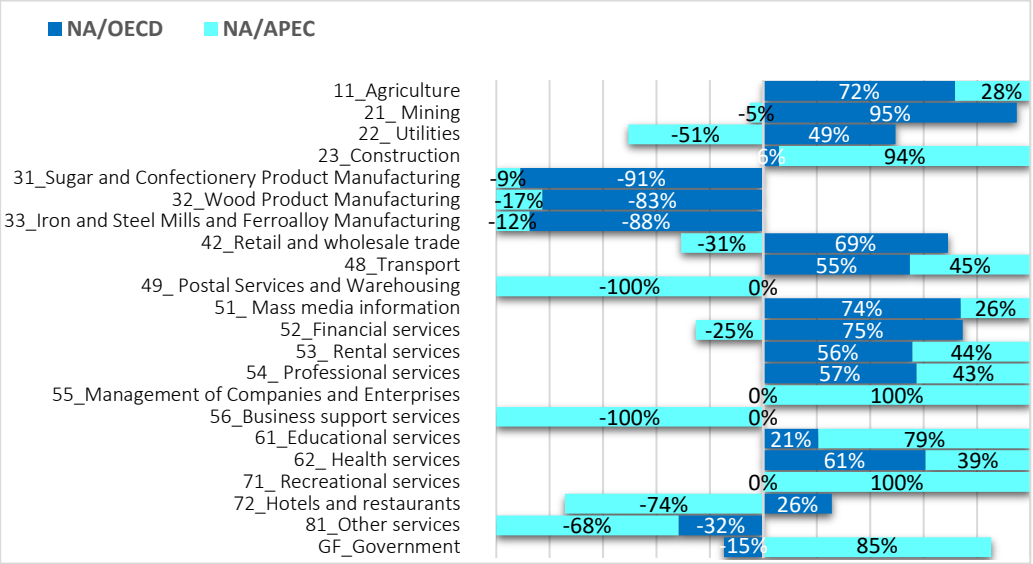
The differences in the results of this indicator in Mexico show a similar behavior since, on average, both initiatives sustain neutral discrepancies in most sectors.

Figure III.XXIII Domestic value added of the United States embodied in foreign final demand



The result of the indicator in the case of the United States shows a homogeneous behavior between sectors and initiatives. The OECD reflects that the result of the domestic value added in the final demand in the Manufacturing sectors is lower compared to the result of NA, while APEC does so in some services such as Health, Recreation and Utilities, as well as in the sector of the Construction.

Figure III.XXIV Domestic value added of the Rest of the World embodied in foreign final demand



The Rest of the World is similar to the behavior of the United States, since the results of this indicator reflect the same behavior in the initiatives of the OECD and APEC, it should be noted that the OECD does not record data in some sectors whose difference is 0% as observed in the sector 49_ Postal Services and Warehousing, 55_ Management of Companies and Enterprises, 56_ Business support services and 71_ Recreational services.

It is worth mentioning that the Leontief inverse plays an important role in the calculation of all the indicators, therefore, it is assumed that the differences in the previous indicator and the following are due to the fact that this Leontief inverse is different among the initiatives.

Table III.XII Total value of Leontief Inverse per initiative

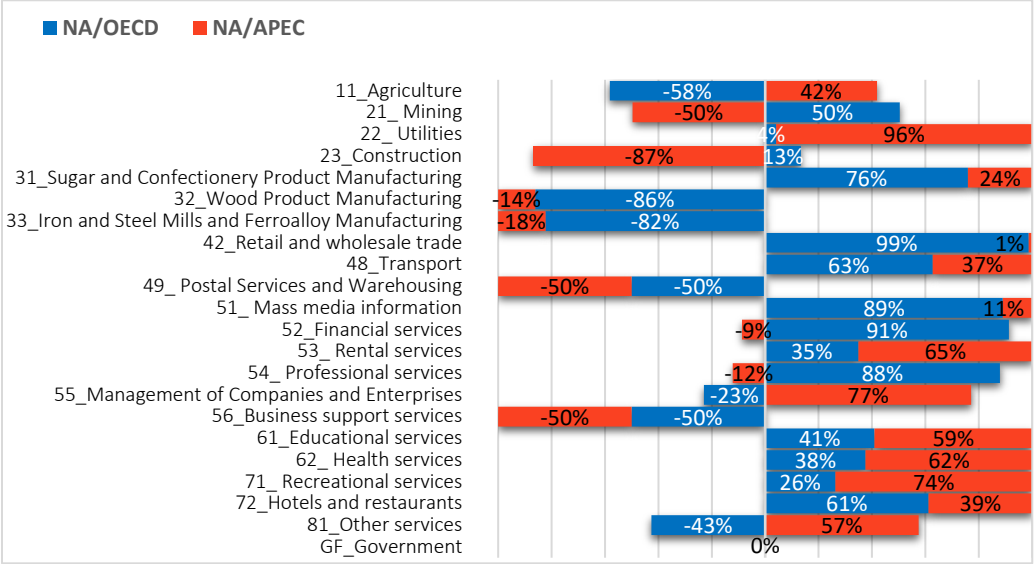
	NA	*OECD*	*APEC*
Leontief inverse	841.9	300.6	331.9
Difference %		64%	61%

It is observed that NA maintains a higher value of the Leontief inverse by 64% and 61% than OECD and APEC, respectively, therefore, these differences are reflected in the results of the indicators.

F. Foreign value added embodied in domestic final demand

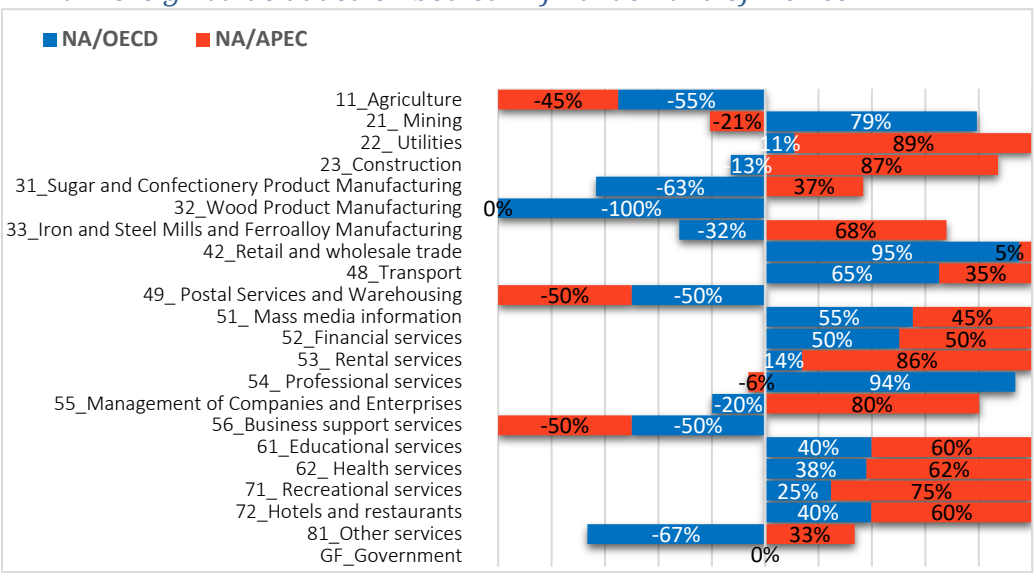
The behavior observed in the following figures provides the degree of integration within global value chains and changes over time, however, these differences are assumed to be due to the classification among initiatives.

Figure III.XXV Foreign value added embodied in final demand of Canada



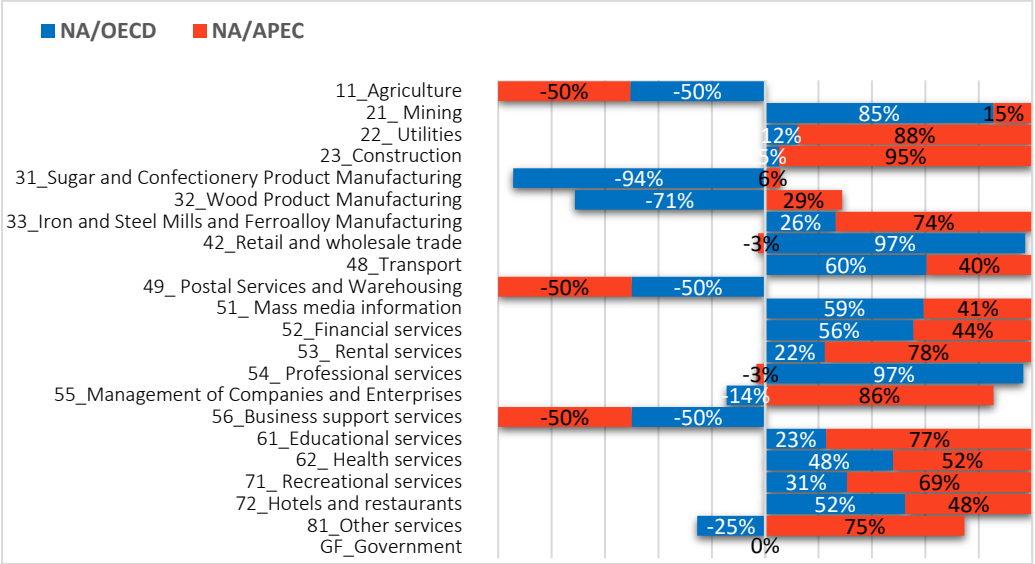
The result of foreign value added demanded by Canada in final products continues to show similar contrasts between the OECD and APEC initiatives, that is, the OECD shows that in the manufacturing sectors the foreign value added is lower compared to the results of NA, while APEC records a result of the indicator larger than NA in most Service sectors.

Figure III.XXVI Foreign value added embodied in final demand of Mexico



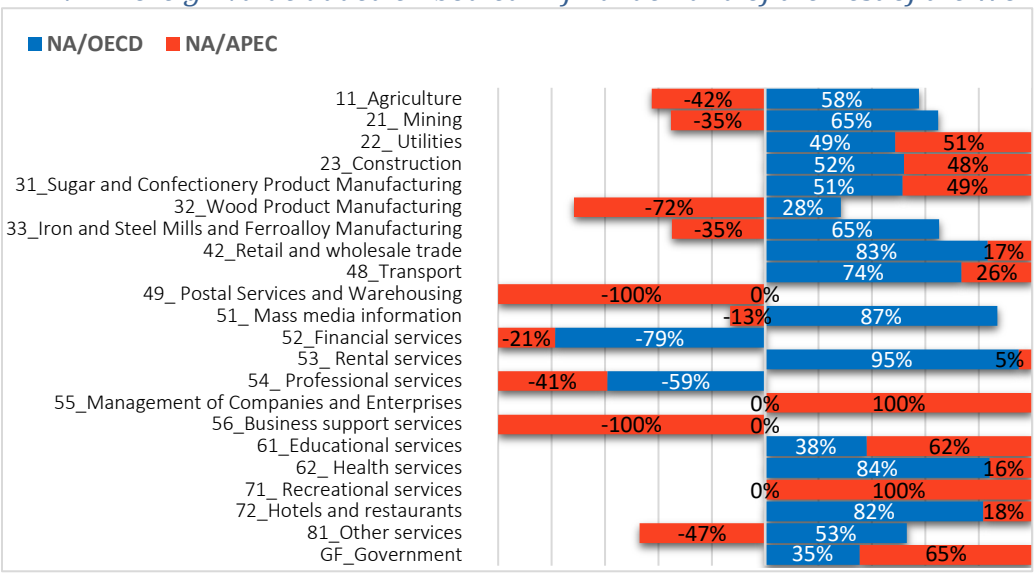
The total differences in the indicator result for Mexico show that their OECD and APEC results are similar. APEC continues with a lower result in the Services sectors compared to the result of NA.

Figure III.XXVII Foreign value added embodied in final demand of the United States



The trend of the result of the initiatives of this indicator continues in the United States. It is observed that the OECD maintains a lower result differential in 31_ Manufacture of sugar and confectionery products and 32 Manufacture of wood products. Likewise, APEC reflects a higher result mainly in 5 of 22 sectors, continuing with a larger data value in the Services sectors compared to the results of NA.

Figure III.XXVIII Foreign value added embodied in final demand of the Rest of the World



The results of the indicator in the Rest of the World can be seen that the OECD records only in two sectors 52_ Financial services and 53_ Rental services a lower result than NA and in sectors such as 49_ Postal Services and Warehousing, 55_ Management of Companies and Enterprises, 56_ Business support services does not record data, so it is seen that APEC absorbs all the discrepancy.

Finally, it is relevant to point out that this kind of indicator demonstrates the importance of imports from all intermediate suppliers towards exports from any industry dedicated to producing goods for final demand.

VII. Conclusions

The differences observed in the results of the six indicators are related mainly to the classification of industries or sectors. As consequence, a key task must be to carry out regional works as those presented in this chapter, by taking advantage of national data (which are different due to the characteristics and origin of the data). Another factor that contributes to the differences is the international trade adjustments, which for these indicators are the key variables to measure their impact on global value chains. Moreover, the scope of countries comprised in Rest of the World (which varies among initiatives) represents another factor that generates discrepancies.

It is considered that the differences observed at the sector level (see Annex IV) are due to the lack of data between initiatives in some sectors, and when a comparative analysis is performed between initiatives, the difference may be significant.

In general, it is concluded that the comparison does not introduce any directional or structural bias, but, clearly, the quality of the TiVA results will improve significantly as the inconsistencies between initiatives are reduced, under the line of improving the work of the group.

Finally, there is no significant impact on the general estimates of the foreign content broken down by industry, but on the bilateral trade of value added estimates. For this reason, the emphasis is on strengthening the analysis and updating work in the processes of classification and elaboration of global matrices for their better development.

Chapter 4: Sectoral TiVA Analysis

I. Introduction

In addition to the aggregate level comparison of TiVA indicators across the OECD, APEC and NA initiatives provided in chapter 3, it is necessary to analyze the results of the NA-TiVA indicators at the detailed sectoral level. Indeed, the unique value of the NA-TiVA initiative is its unmatched 100 industry disaggregation, made possible by the shared industry and product classification systems of the three North American countries.

This chapter is organized by country, with each country profile consisting of two major sections focusing on (1) the destination of industry value added and (2) the original sources of final uses. Both sections report the foreign and domestic shares of value added in final demand and sources of final use, first at the aggregate country level, and then across six major sectors. The foreign and domestic, as well as the NA trade partner shares of value added are analyzed at the 100-industry level, highlighting the top 10 manufacturing and services industries. Finally, value added exports and imports are described at the

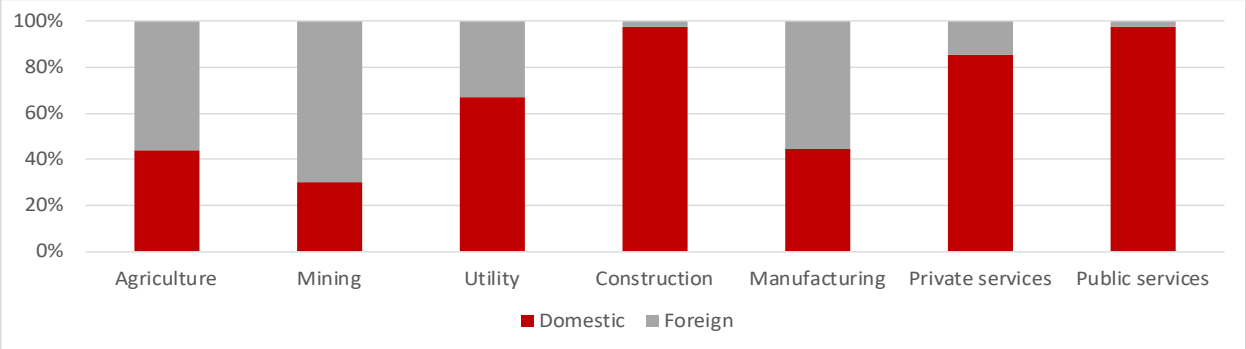
aggregated sector level, and the manufacturing and services industries with the highest values of each are identified.

II. Canada

The destination of industry value added

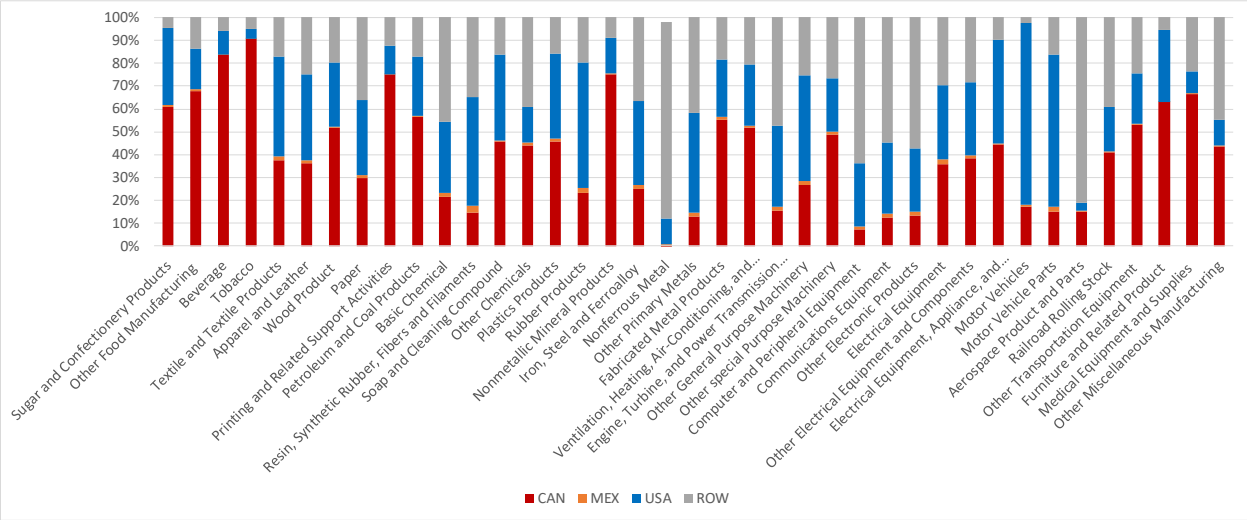
In 2012, Canadian total industry value added was $1.7 trillion. About 78 percent of Canadian value added was to meet domestic final demand and absorbed domestically; and 22 percent was to meet foreign final demand and absorbed abroad. There were significant sectoral differences. For instance, about 70 percent of Canadian value added from the mining industry were absorbed abroad, while only 2 percent of Canadian value added from the construction industry were absorbed abroad (figure IV.I).

Figure IV.I Final destinations of industry value added, by major sector, 2012, Canada



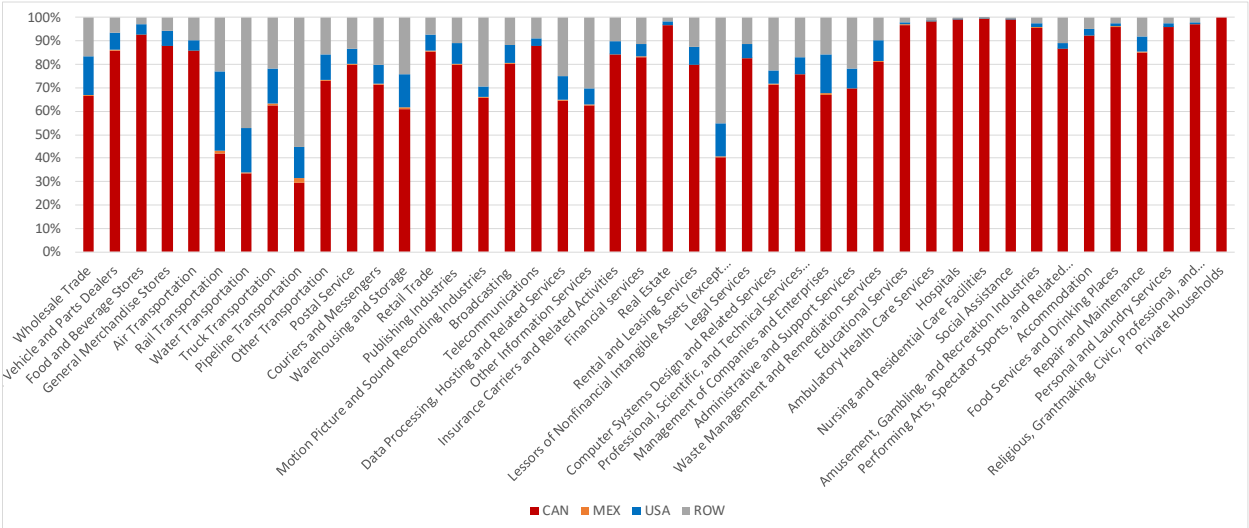
There were also significant differences among manufacturing industries. In some industries, such as motor vehicles, motor vehicle parts, aerospace product and parts, and other primary metals, foreign destination accounted for more than 80 percent of the respective Canadian industry value added. Yet, in other industries, such as beverage and tobaccos, foreign destination accounted for less than 20 percent of the respective Canadian industry value added. The United States had the largest share in several manufacturing industries, including motor vehicles, motor vehicle parts, rubber products, resin, synthetic rubber, fibers and filaments, other general purpose machinery, and textile and textile products (figure IV.II).

Figure IV.II Final destinations of industry value added, by manufacturing industry, 2012, Canada



Overall, the majority of the value added of private services industries was to meet domestic final demand. However, there were also notable differences among private services industries. In some services industries, such as lessors of nonfinancial intangible assets (excluding copyrighted work), pipeline transportation, and water transportation, foreign destinations accounted for more than 50 percent of industry value added. In other services industries, such as real estate and educational services, foreign destinations accounted for less than 5 percent of industry value added. The United States had the largest share of rail transportation (figure IV.III).

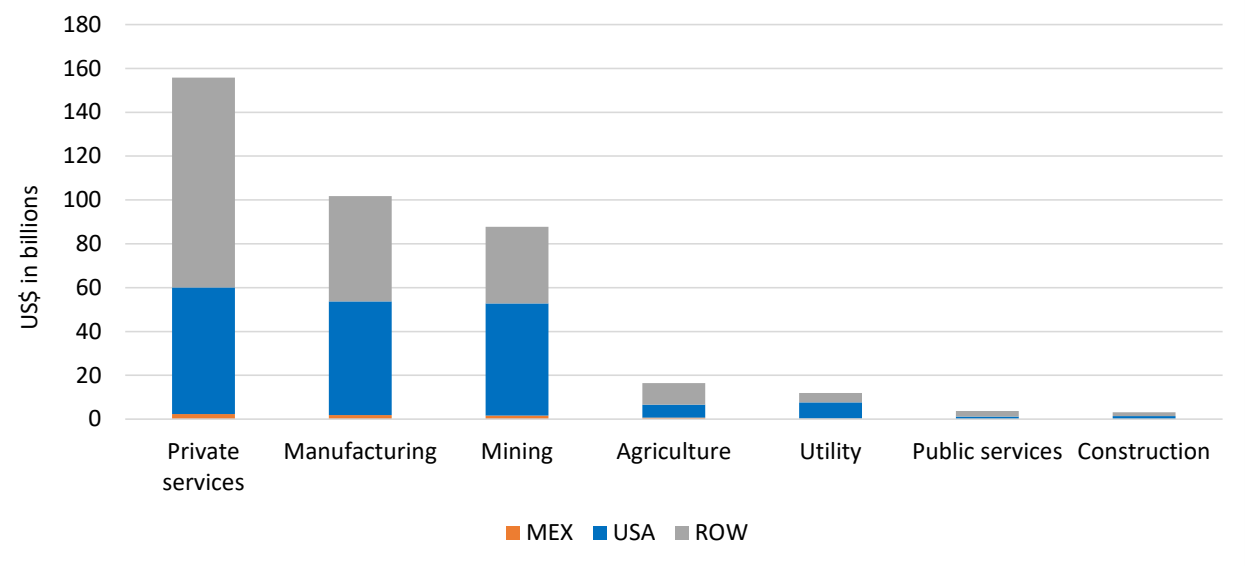
Figure IV.III Final destinations of industry value added, by private services industry, 2012, Canada



Value added exports[31]

In 2012, Canadian value added exports were valued at $380.5 billion, compared to gross exports of $1.7 trillion. The United States and Mexico accounted for 46 percent and 2 percent of Canadian value added exports, respectively. At the sector level, oil and gas extraction had the largest value added exports of $56.5 billion.

Figure IV.IV Value added exports, by major sector and destination, 2012, Canada



Of 39 manufacturing industries, fabricated metal products, motor vehicle parts, other food manufacturing, and aerospace products and parts had the largest value added exports (figure IV.V). Of 44 private services industries, wholesale trade, professional, science, and technical services, financial services, and administrative and support services had the largest value added exports (figure IV.VI).

[31] Value Added exports refers to the value added from a given country-industry pair is defined as domestic VA embodied in foreign final demand and absorbed abroad.

Figure IV.V Value added exports, by top 10 highest value manufacturing industries and major destination, 2012, Canada

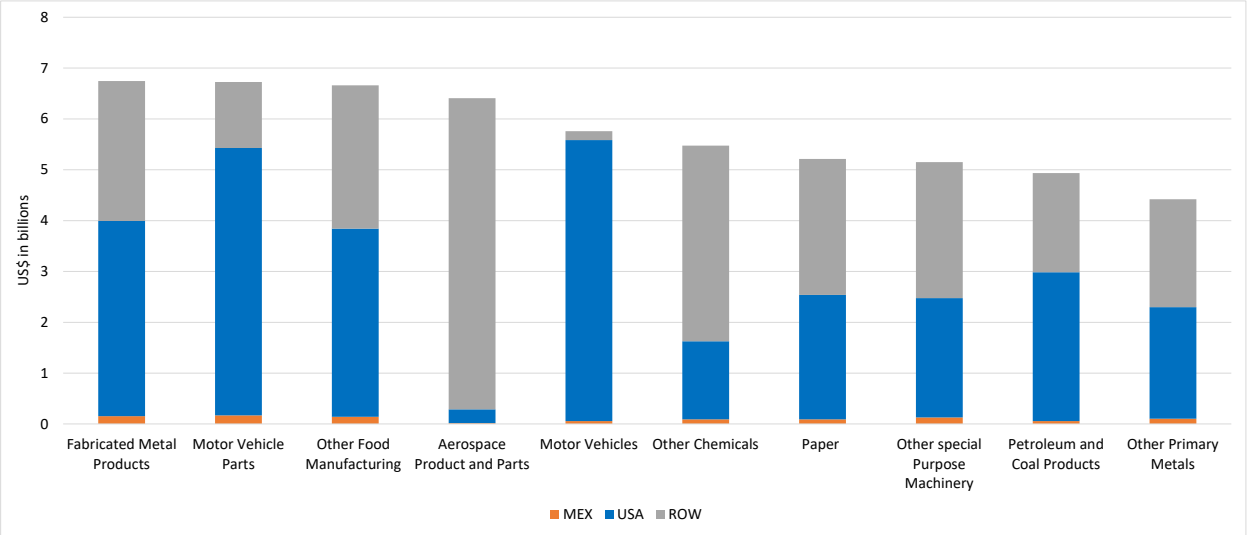
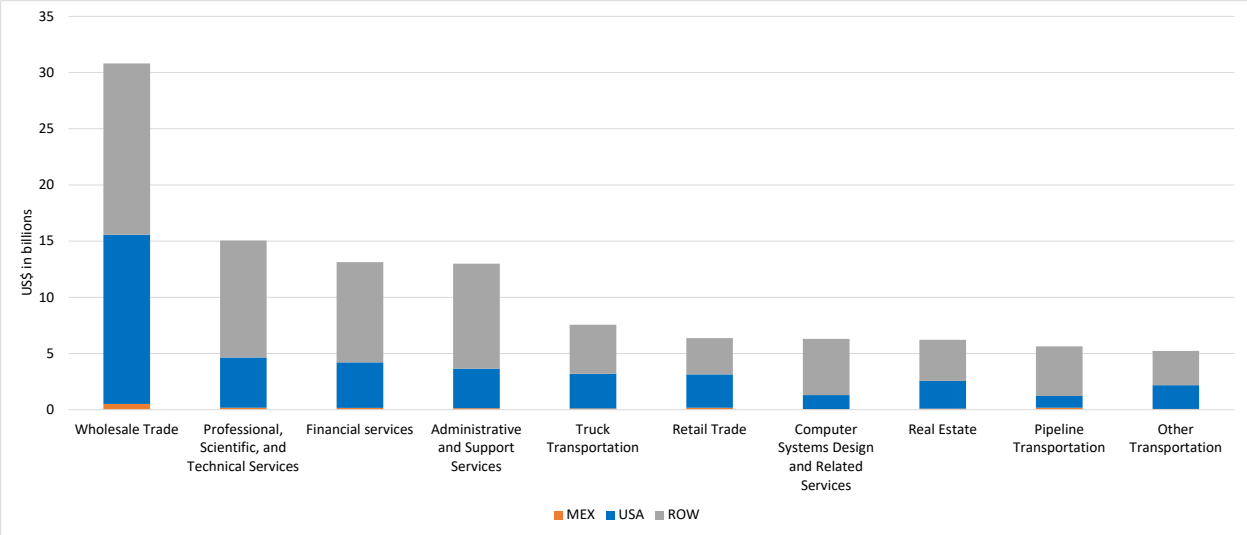


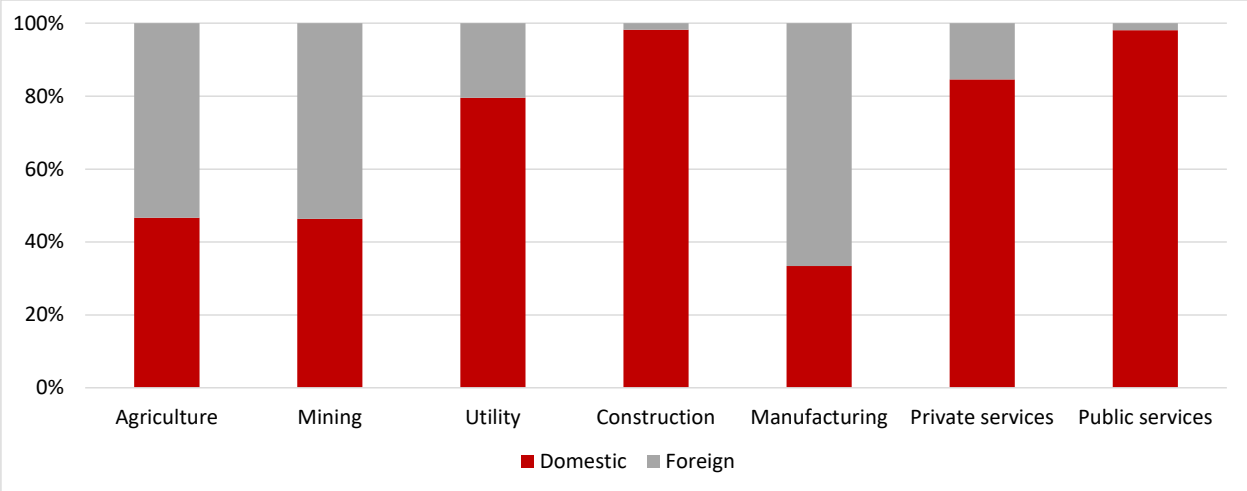
Figure IV.VI Value added exports, by top 10 highest value private services industries and major destination, 2012, Canada



The original source of final uses

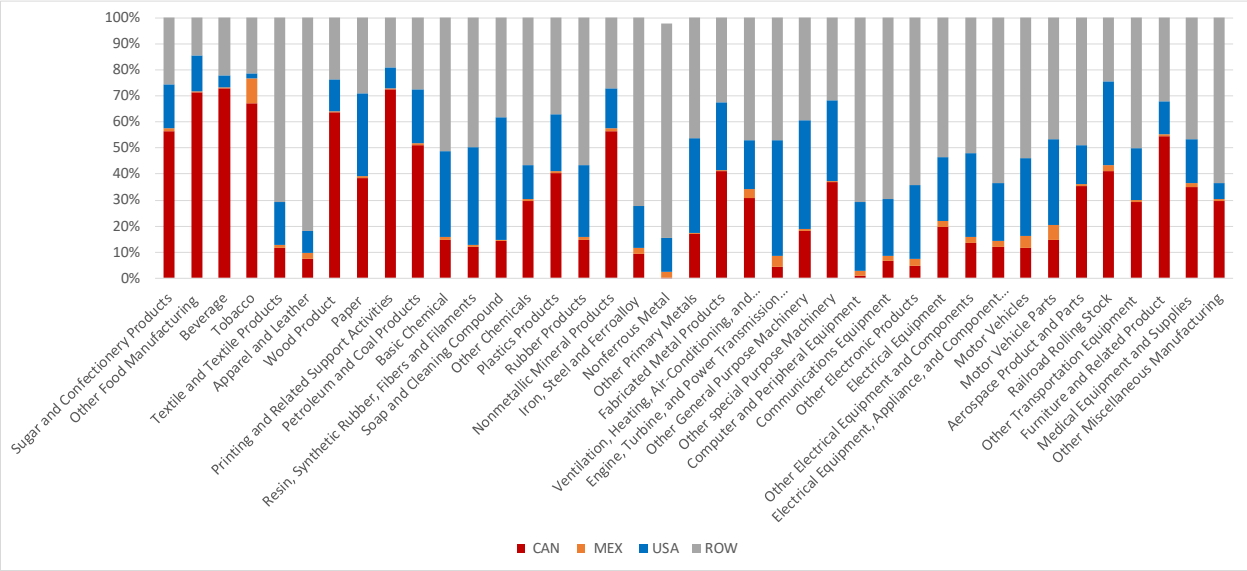
In 2012, Canadian final uses were valued at $1.7 trillion. In value added term, foreign sources accounted for 23 percent of Canadian final uses. There were significant sectoral differences. For instance, foreign sources accounted for 67 percent of Canadian final uses in manufacturing sector, but only 2 percent for construction (figure IV.VII).

Figure IV.VII Original source of final uses, by major sector, 2012, Canada



There were also significant differences among manufacturing industries. In some industries, such as nonferrous metal, computer and peripheral equipment, and engine, turbine, and power transmission equipment, foreign sources accounted for more than 95 percent of Canadian final uses. Yet, in other industries, such as beverage, printing and related activities, and other food manufacturing, foreign sources accounted for less than 30 percent of Canadian final uses. The United States was the largest source in two manufacturing industries, including soap and cleaning compound, and other general purpose machinery (figure IV.VIII).

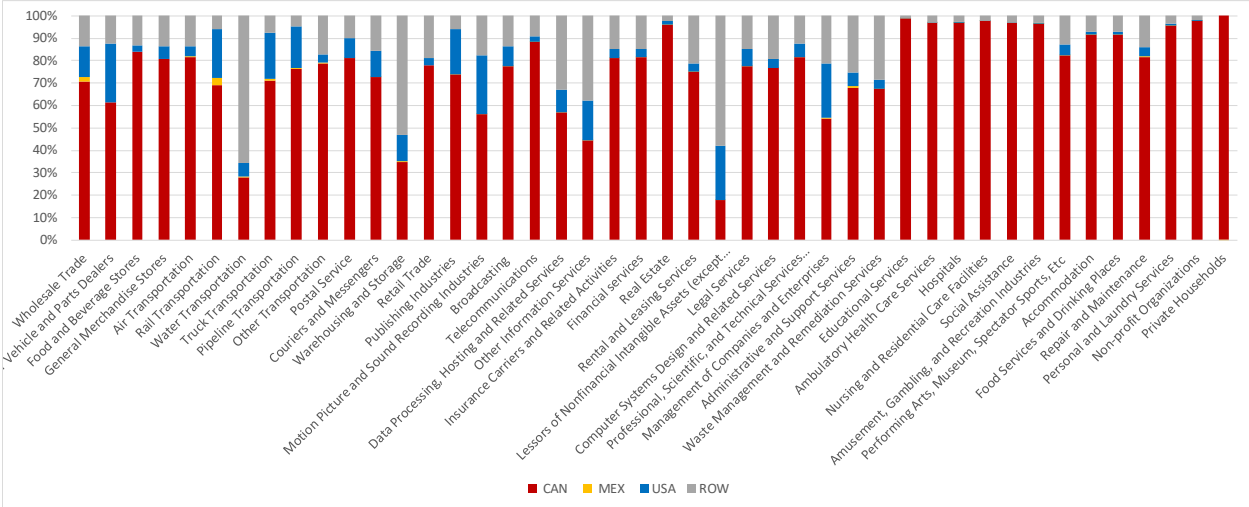
Figure IV.VIII Original source of final uses, by manufacturing industry, 2012, Canada



The final uses of private services relied less on foreign sources. However, there were also notable differences among services industries. In some services industries, such as lessors of nonfinancial intangible assets (excluding copyrighted work), water transportation, and warehousing and storage, foreign sources accounted for more than 60 percent of Canadian final uses. In other services industries,

such as education services, foreign sources accounted for less than 5 percent of Canadian final uses (figure IV.IX).

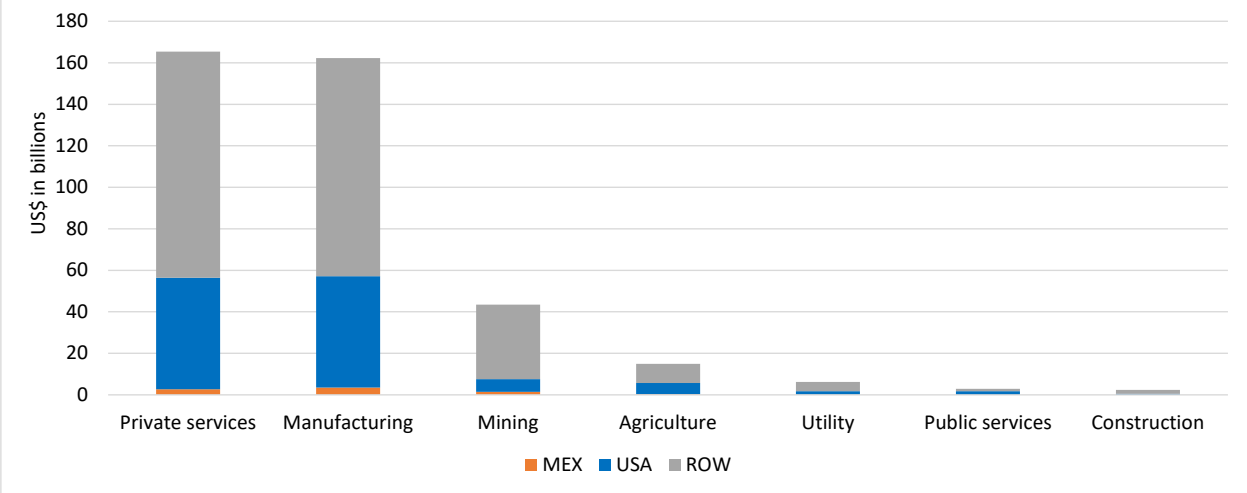
Figure IV.IX Original source of final uses, by private services industry, 2012, Canada



Value added imports

In 2012, Canadian value added imports were valued at $397.4 billion. The United States and Mexico accounted for 31 percent and 2 percent of Canadian value added imports, respectively. Oil and gas extraction had the largest value added imports of $31.6 billion.

Figure IV.X Value added imports, by major sector and source, 2012, Canada



Of 39 manufacturing industries, fabricated metal products, other electronic products, and other chemicals had the largest value added imports (figure IV.XI). Of 44 private services industries, wholesale trade, financial services, and administrative and support services had the largest value added imports (figure IV.XII).

Figure IV.XI Value added imports, by top 10 highest value manufacturing industries and source, 2012, Canada

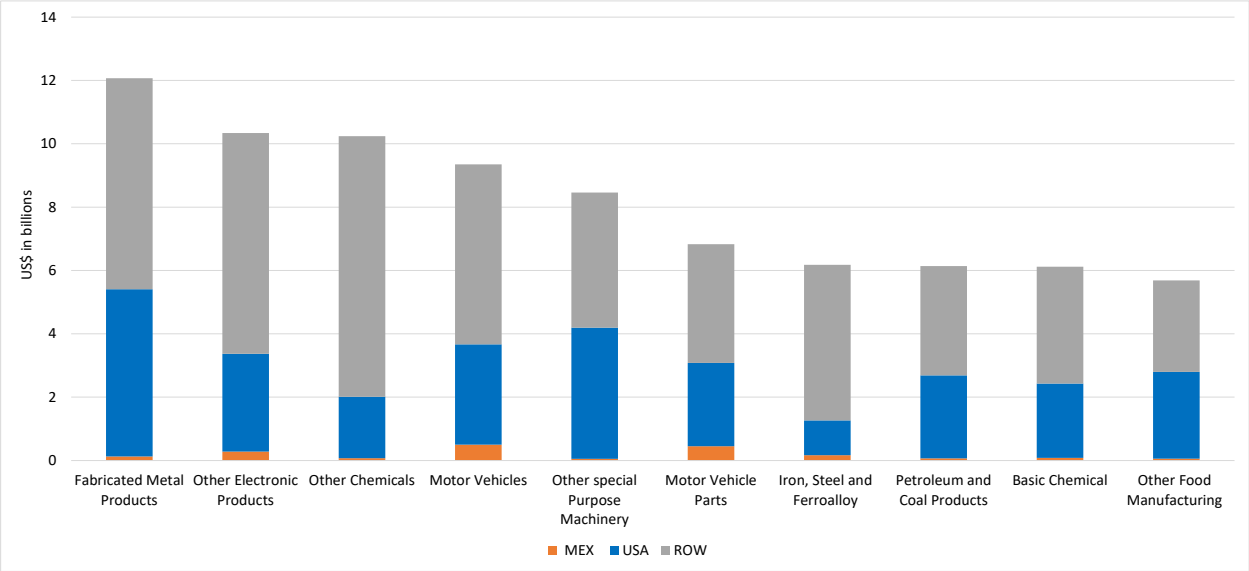
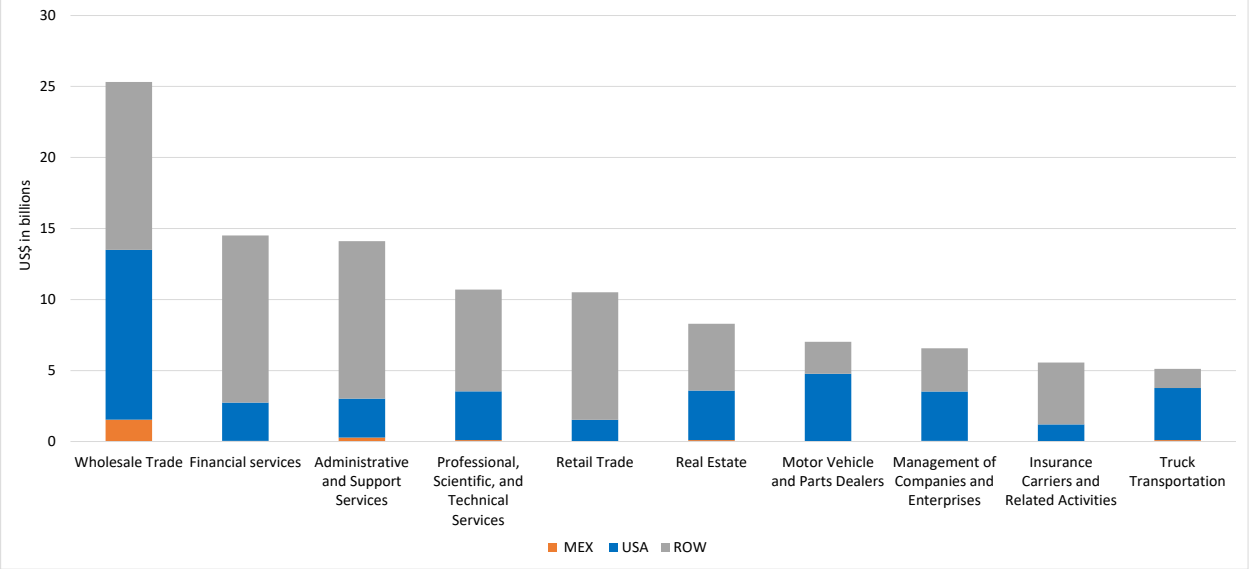


Figure IV.XII Value added imports, by top 10 highest value private services industries and source, 2012, Canada

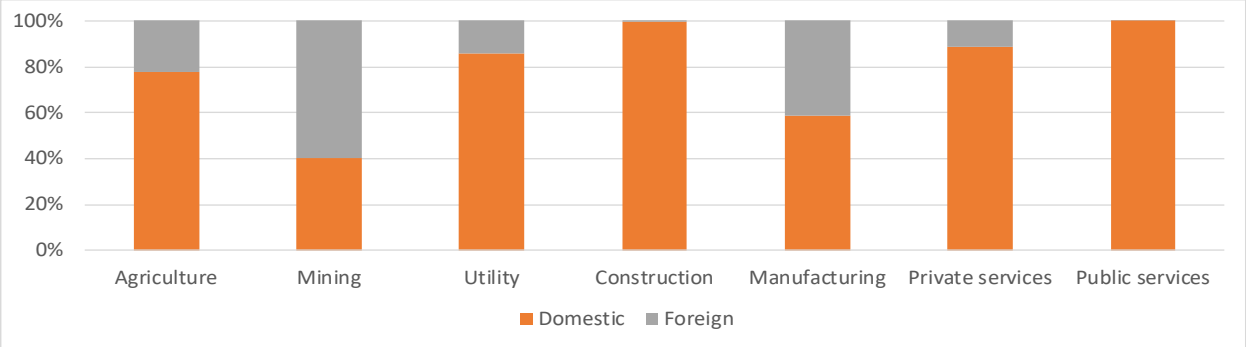


III. Mexico

The destination of industry value added

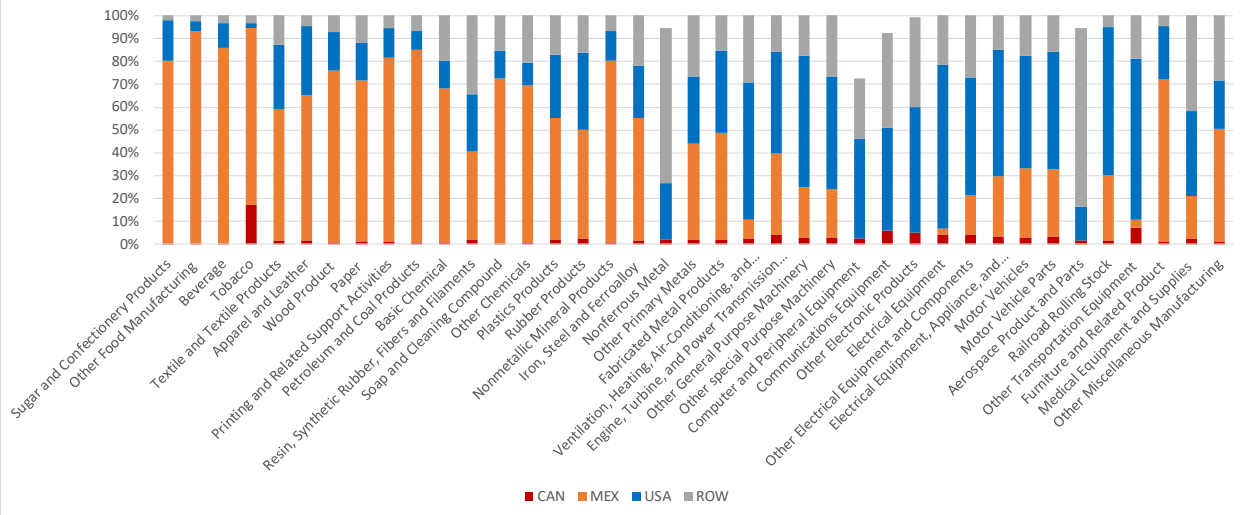
In 2012, Mexican total industry value added was $1.1 trillion. About 80 percent of Mexican value added was to meet domestic final demand and absorbed domestically; and 20 percent was to meet foreign final demand and absorbed abroad. There were significant sectoral differences. For instance, about 60 percent of Mexican value added from the mining industry were absorbed abroad, while less than one percent of Mexican value added from the construction and public services industries were absorbed abroad (figure IV.XIII).

Figure IV.XIII Final destinations of industry value added, by major sector, 2012, Mexico



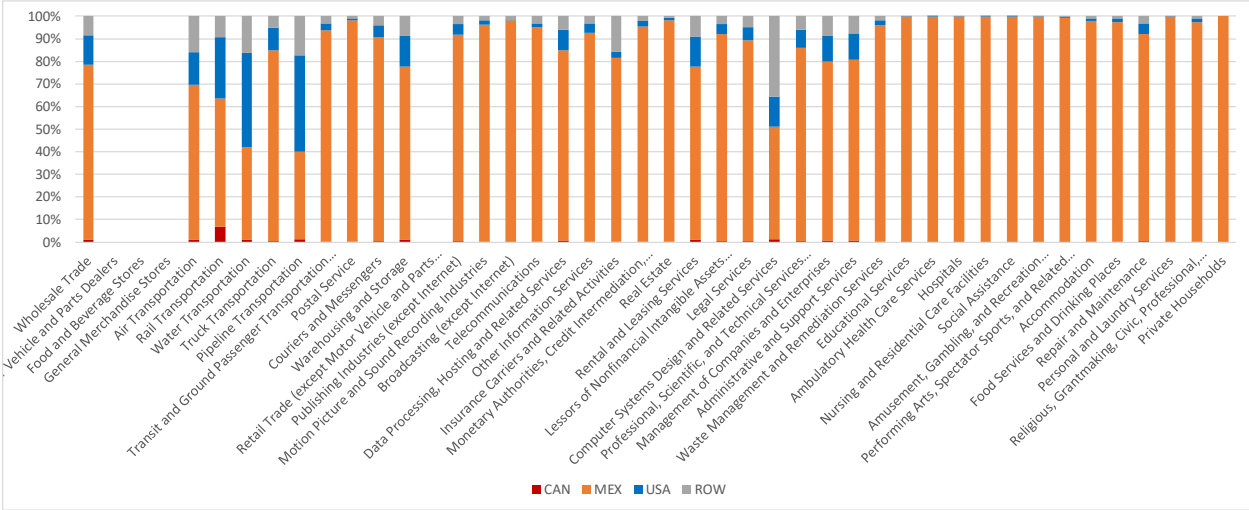
There were also significant differences among manufacturing industries. In some industries, such as nonferrous metal, and other electronic products, foreign destination accounted for more than 95 percent of the respective Mexican industry value added. Yet, in other industries, such as other food manufacturing, beverage, and petroleum and coal products, foreign destination accounted for less than 20 percent of the respective Mexican industry value added. The United States had the largest share in a number of manufacturing industries, including motor vehicles, motor vehicle parts, and other electronic products (figure IV.XIV).

Figure IV.XIV Final destinations of industry value added, by manufacturing industry, 2012, Mexico



Overall, most of the value added of private services industries was to meet domestic final demand. However, there were also notable differences among private services industries. In some services industries, such as pipeline transportation, water transportation, and computer systems design and related services, foreign destinations accounted for more than 40 percent of industry value added. In other services industries, such as real estate, foreign destinations accounted for less than 5 percent of industry value added. The United States had the largest share of water transportation and pipeline transportation (figure IV.XV).

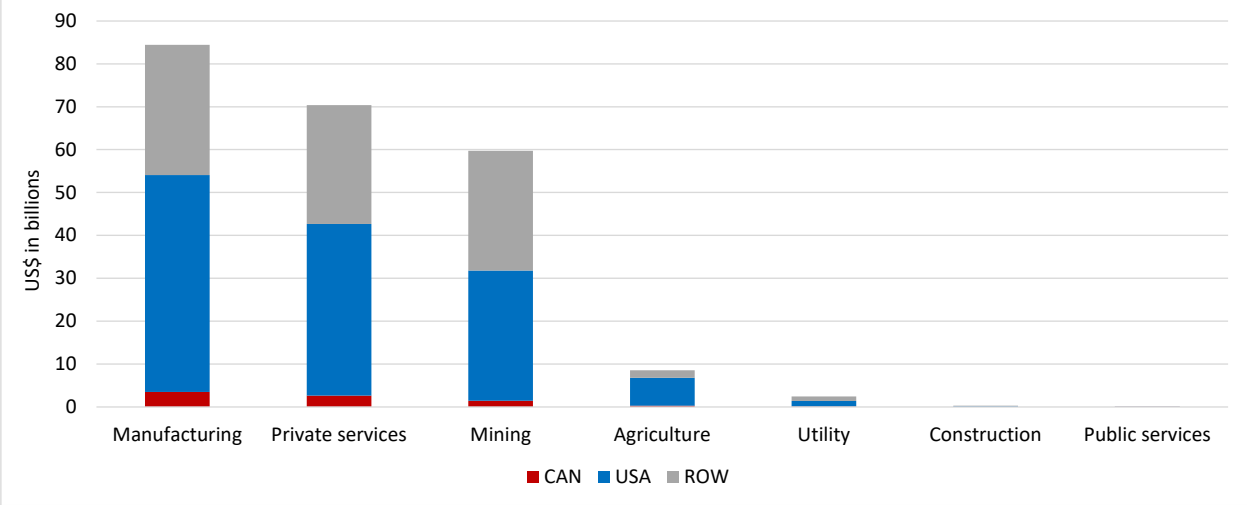
Figure IV.XV Final destinations of industry value added, by private services industry, 2012, Mexico



Value added exports[32]

In 2012, Mexican value added exports were valued at $225.8 billion, compared to gross exports of $1.1 trillion. The United States and Canada accounted for 57 percent and 3 percent of Mexican value added exports, respectively. Oil and gas extraction had the largest value added exports of $46.7 billion.

Figure IV.XVI Value added exports, by major sector and destination, 2012, Mexico



Of 39 manufacturing industries, motor vehicles, motor vehicle parts, other electronic products, iron, steel and ferroalloy, and nonferrous metal, had the largest value added exports (figure IV.XVII). Of 44 private services industries, wholesale trade, administrative and support services, truck transportation,

[32] Value Added exports refers to the value added from a given country-industry pair is defined as domestic VA embodied in foreign final demand and absorbed abroad.

professional, science, and technical services, and real estate had the largest value added exports (figure IV.XVIII).

Figure IV.XVII Value added exports, by top 10 highest value manufacturing industries and major destination, 2012, Mexico

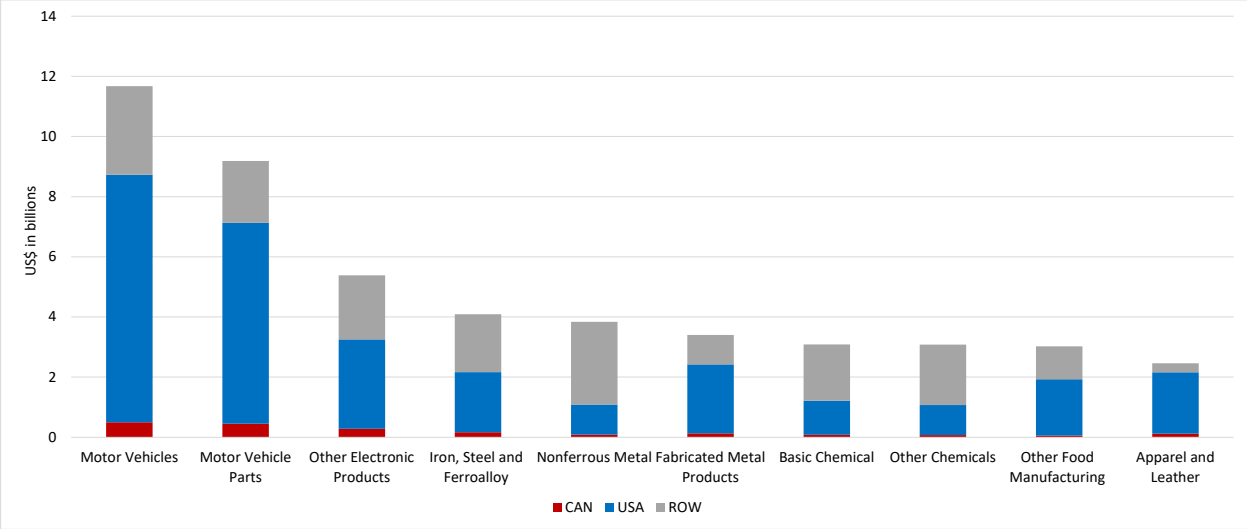
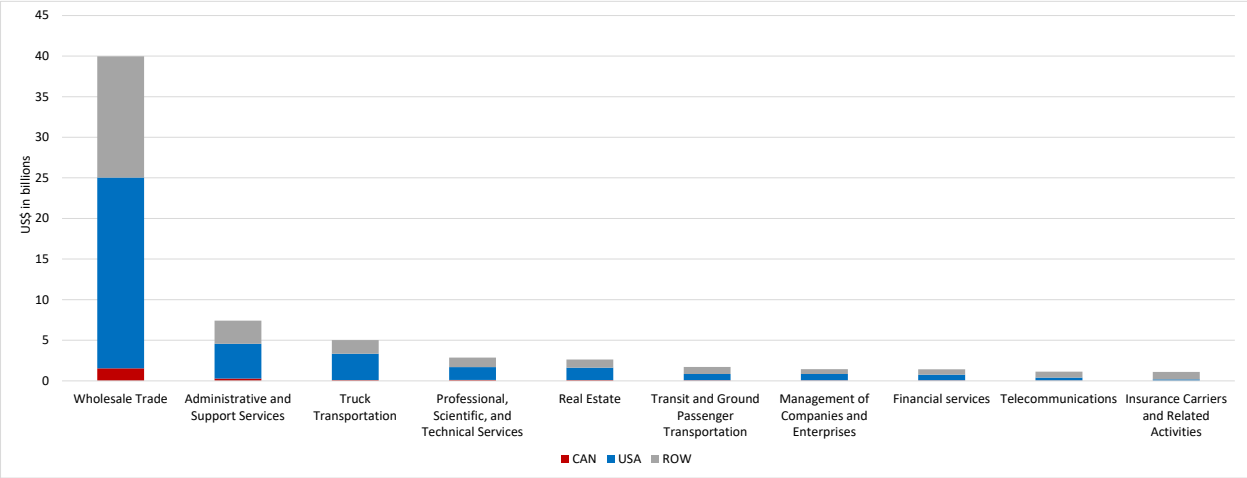


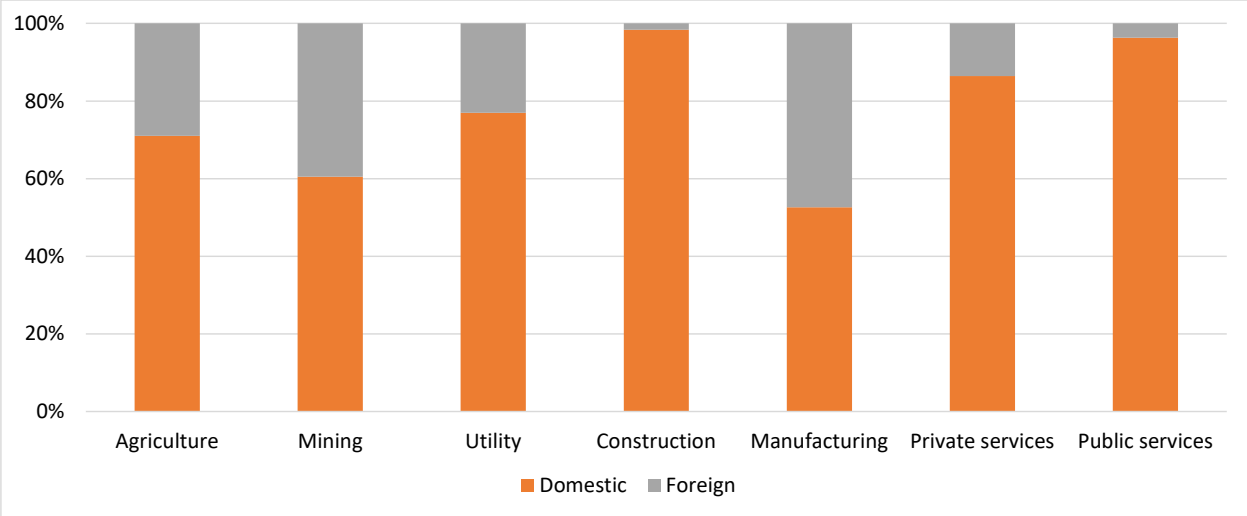
Figure IV.XVIII Value added exports, by top 10 highest value private services industries and major destination, 2012, Mexico



The original source of final uses

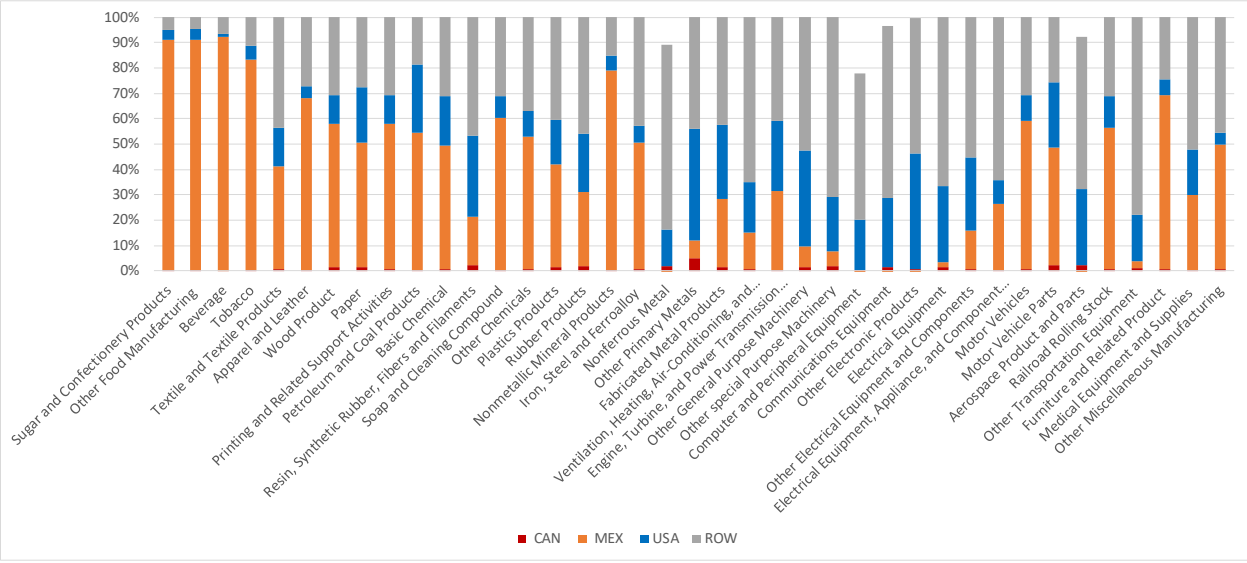
In 2012, Mexican final uses were valued at $1.2 trillion. In value added term, foreign sources accounted for 21 percent of Mexican final uses. There were significant sectoral differences. For instance, foreign sources accounted for 47 percent of Mexican final uses in manufacturing sector, but only 2 percent for construction (figure IV.XIX).

Figure IV.XIX Original source of final uses, by major sector, 2012, Mexico



There were also significant differences among manufacturing industries. In some industries, such as computer and peripheral equipment, nonferrous metal, and aerospace products and parts, foreign sources accounted for more than 95 percent of Mexican final uses. Yet, in other industries, such as beverage, other food manufacturing, and sugar and confectionery products, foreign sources accounted for less than 10 percent of Mexican final uses. The United States was the largest foreign source in other primary metals (figure IV.XX).

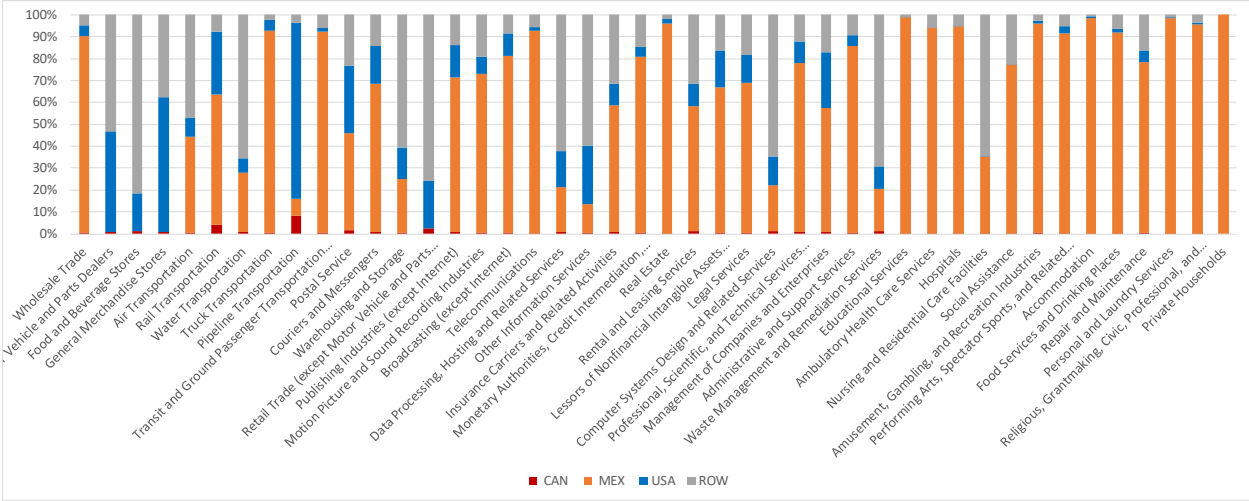
Figure IV.XX Original source of final uses, by manufacturing industry, 2012, Mexico



Overall, the final uses of private services relied less on foreign sources. However, there were also notable differences among services industries. In some services industries, such as motor vehicle and parts dealers, food and beverage stores, general merchandise stores, and retail trade (except motor vehicle and parts dealers and food and beverage stores and general merchandise stores), foreign sources accounted for more than 90 percent of Mexican final uses. In other services industries, such as education services,

accommodation, and personal and laundry services, foreign sources accounted for less than 5 percent of Mexican final uses (figure IV.XXI).

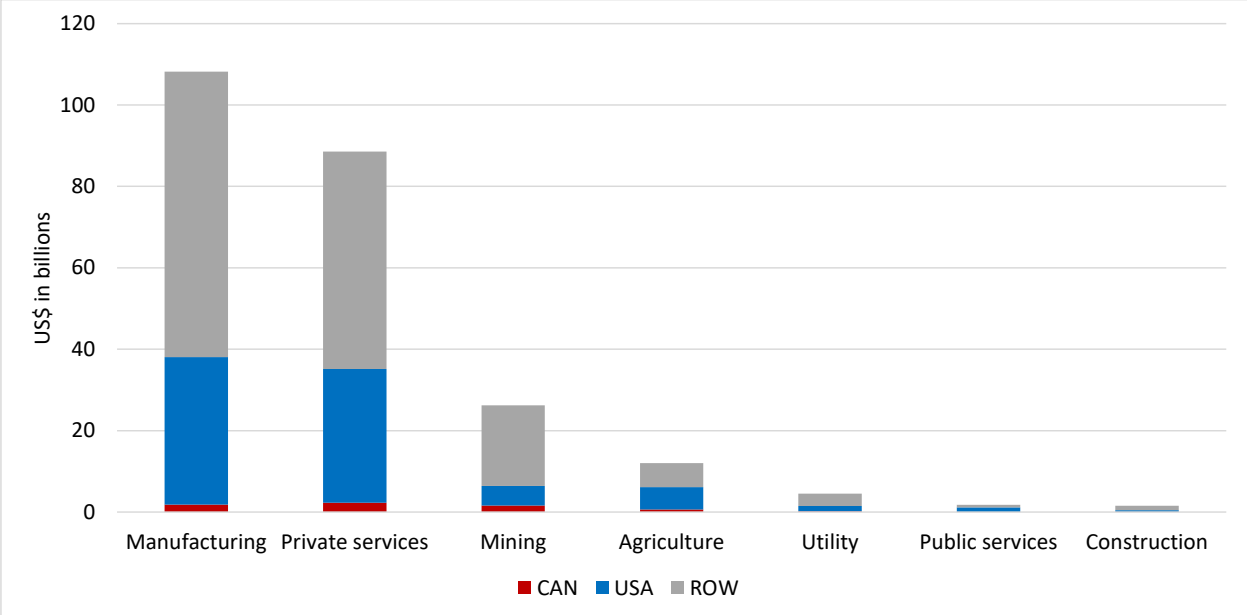
Figure IV.XXI Original source of final uses, by private services industry, 2012, Mexico



Value added imports

In 2012, Mexican value added imports were valued at $243.0 billion. The United States and Canada accounted for 34 percent and 3 percent of Canadian value added imports, respectively. Oil and gas extraction had the largest value added imports of $18.2 billion (figure IV.XXII).

Figure IV.XXII Value added imports, by major sector and source, 2012, Mexico



Of 39 manufacturing industries, other electronic products, fabricated metal products, petroleum and coal products, and basic chemicals had the largest value added imports (figure IV.XXIII). Of 44 private services industries, wholesale trade, monetary authorities, credit intermediation, and financial investments and

vehicles, and retail trade (except motor vehicle and parts dealers and food and beverage stores and general merchandise stores) had the largest value added imports (figure IV.XXIV).

Figure IV.XXIII Value added imports, by top 10 highest value manufacturing industries and source, 2012, Mexico

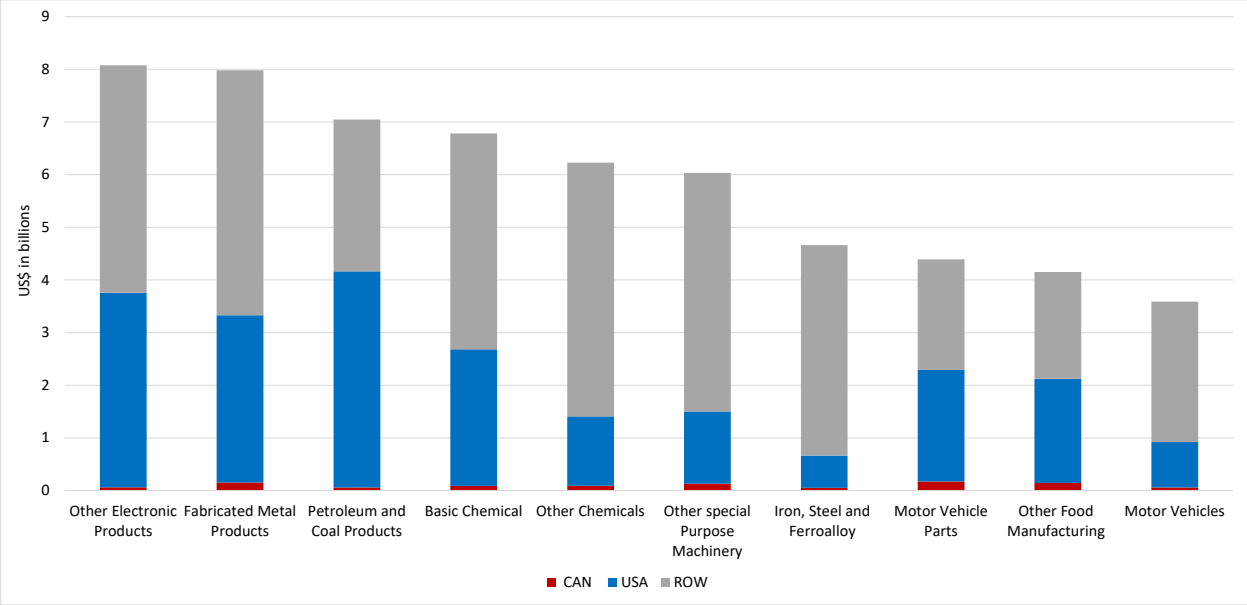
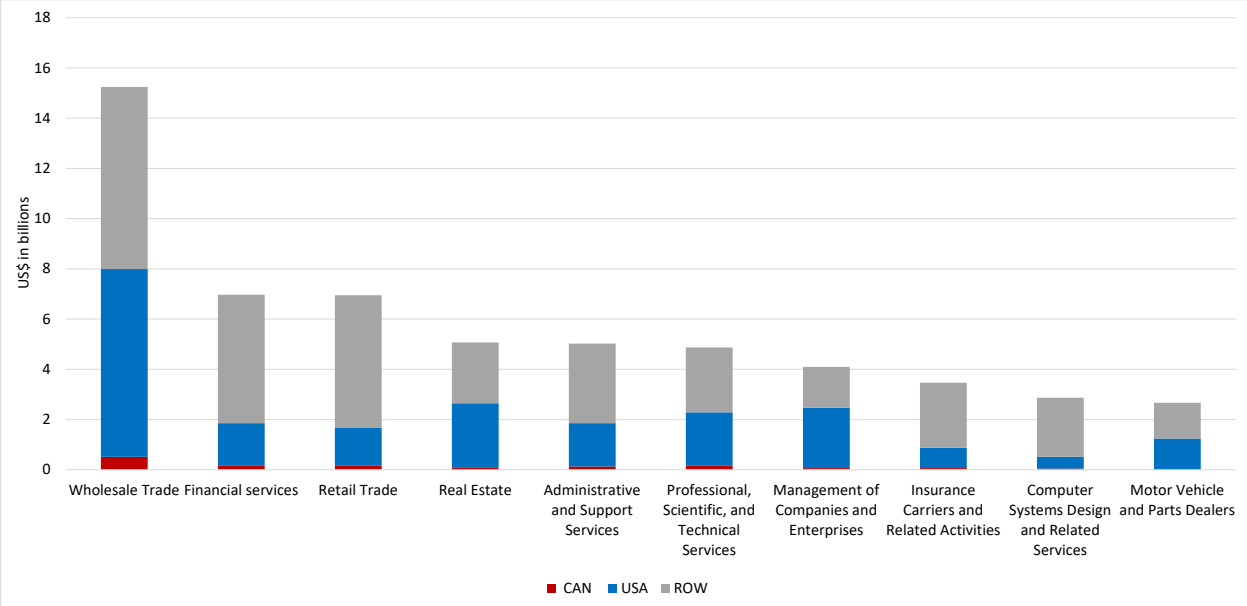


Figure IV.XXIV Value added imports, by top 10 highest value private services industries and source, 2012, Mexico

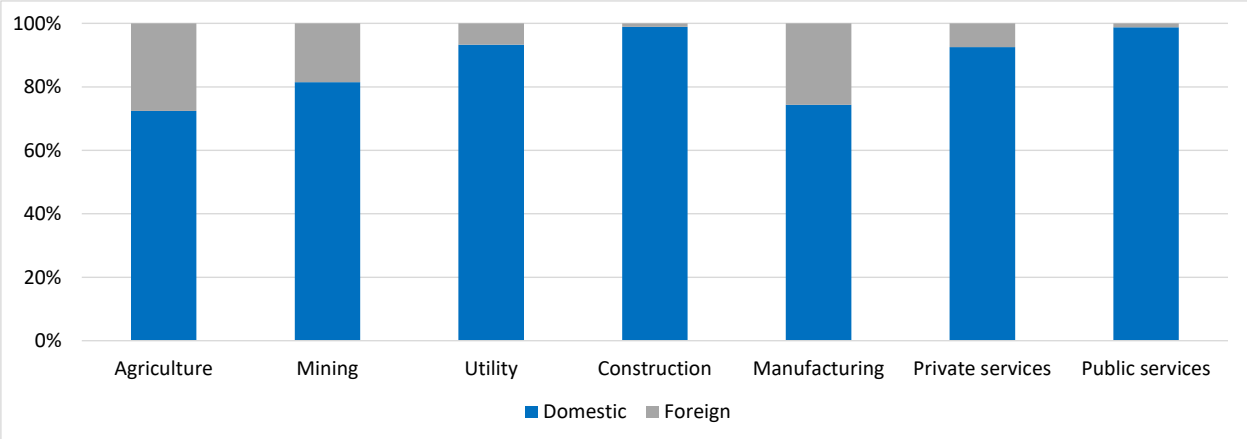


IV. The United States

The destination of industry value added

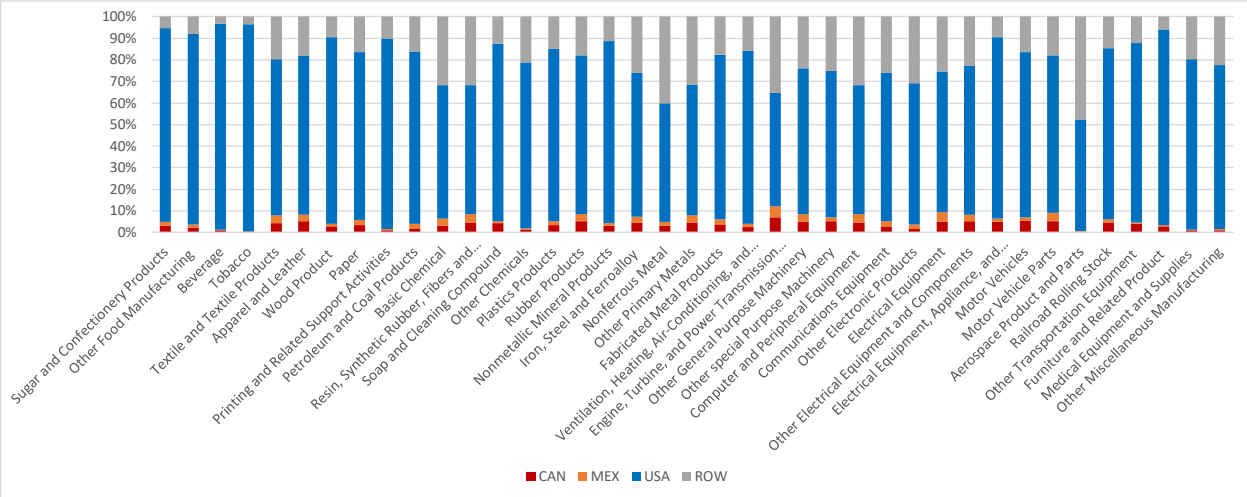
In 2012, U.S total industry value added was $15.8 trillion. About 91 percent of U.S. value added was to meet domestic final demand and absorbed domestically; and 9 percent was to meet foreign final demand and absorbed abroad. There were significant sectoral differences. For instance, about 28 percent of U.S. value added from the agriculture industry were absorbed abroad, while only 1 percent of U.S. value added from the construction industry were absorbed abroad (figure IV.XXV).

Figure IV.XXV Final destinations of industry value added, by major sector, 2012, the United States



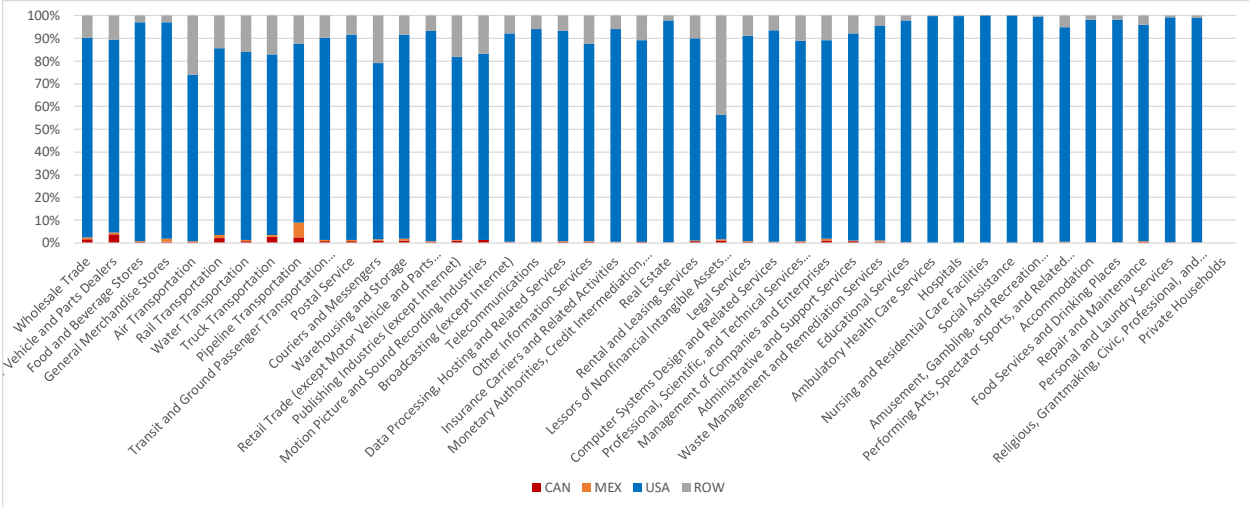
Overall, the majority of value added of manufacturing industries was to meet domestic final demand, although there were also significant differences among these industries. In some manufacturing industries, such as aerospace product and parts, nonferrous metal, resin, synthetic rubber, fibers and filaments, and basic chemicals, foreign destination accounted for more than 35 percent of the respective U.S. industry value added. Yet in other industries, such as tobacco, beverage, and furniture and related product foreign destination accounted for less than 10 percent of the respective U.S. industry value added (figure IV.XXVI).

Figure IV.XXVI Final destinations of industry value added, by manufacturing industry, 2012, the United States



Similarly, the majority of value added of private services industries was to meet domestic final demand, despite notable differences among private services industries. In some services industries, such as lessors of nonfinancial intangible assets (excluding copyrighted work) and air transportation, foreign destinations accounted for more than 25 percent of industry value added. In other services industries, such as retail trade (except motor vehicles and parts dealers and food and beverage stores and general merchandise stores), real estate, and administrative and support services, foreign destinations accounted for less than 10 percent of industry value added (figure IV.XXVII).

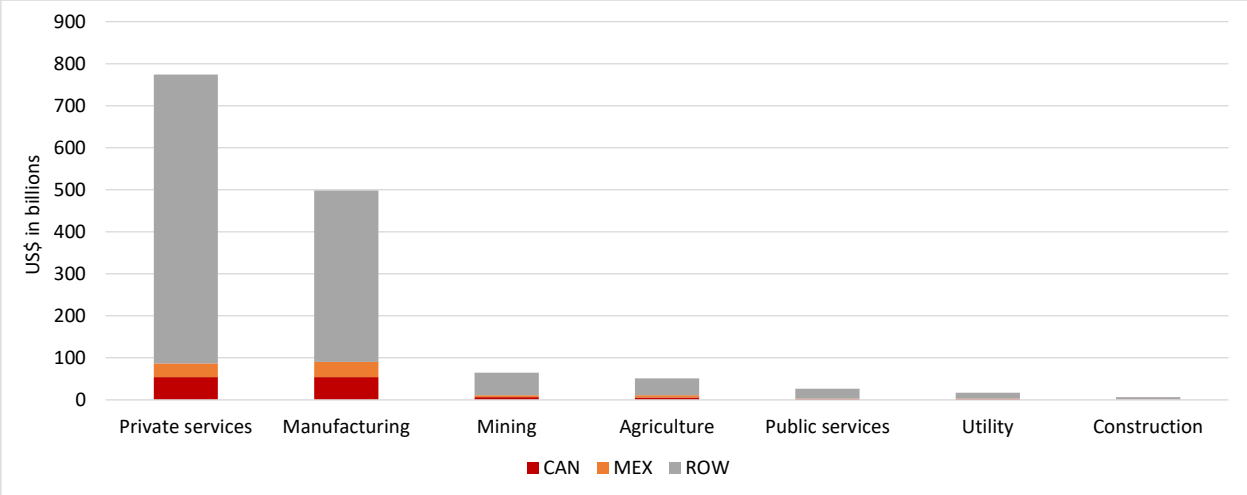
Figure IV.XXVII Final destinations of industry value added, by private services industry, 2012, the United States



Value added exports[33]

In 2012, U.S. value added exports were valued at $1.4 trillion, compared to gross exports of $15.8 trillion. Canada and Mexico accounted for 9 percent and 6 percent of U.S. value added exports, respectively. Wholesale trade had the largest value added exports of $98.5 billion (figure IV.XXVIII).

Figure IV.XXVIII Value added exports, by major sector and destination, 2012, the United States



Of 39 manufacturing industries, other electronic equipment, aerospace products and parts, other chemicals, and petroleum and coal products had the largest value added exports (figure IV.XXIX). Of 44 private services industries, wholesale trade, financial services, professional, scientific, and technical services (except legal services and computer systems design and related services), and real estate had the largest value added exports (figure IV.XXX).

[33] Value Added exports refers to the value added from a given country-industry pair is defined as domestic VA embodied in foreign final demand and absorbed abroad.

Figure IV.XXIX Value added exports, by top 10 highest value manufacturing industries and major destination, 2012, the United States

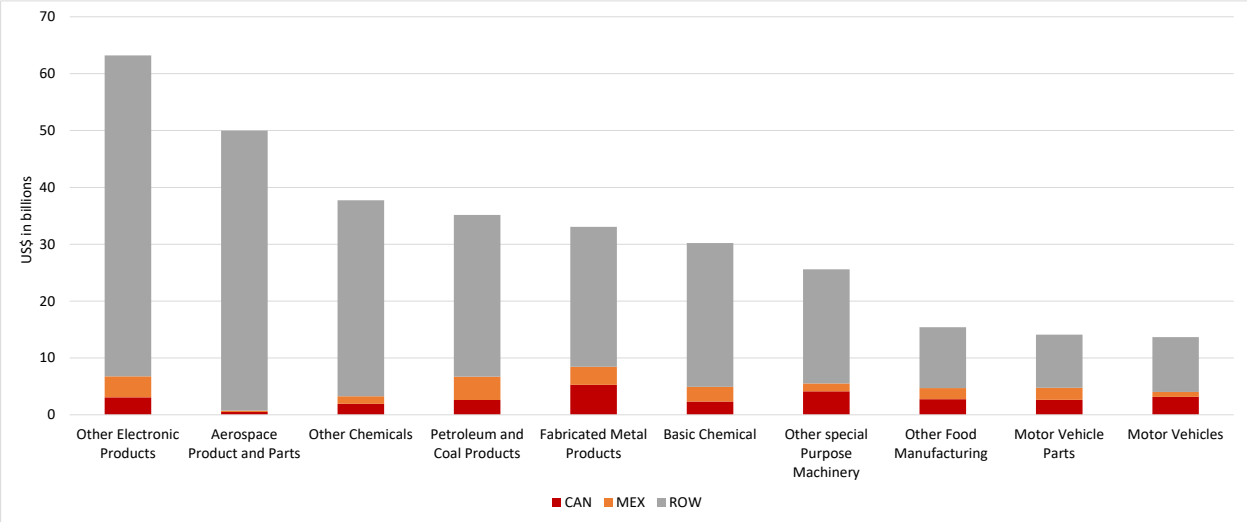
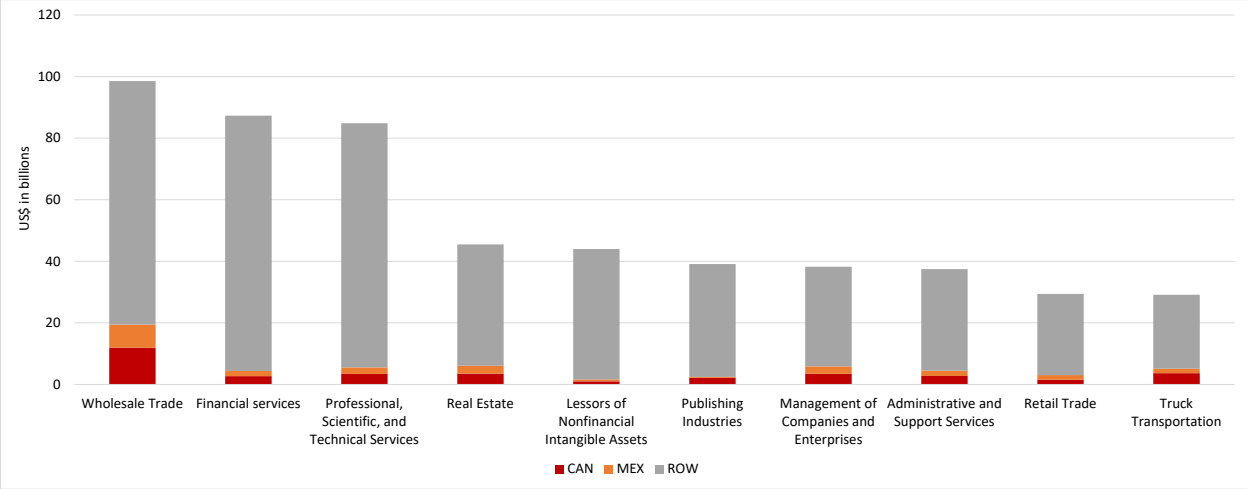


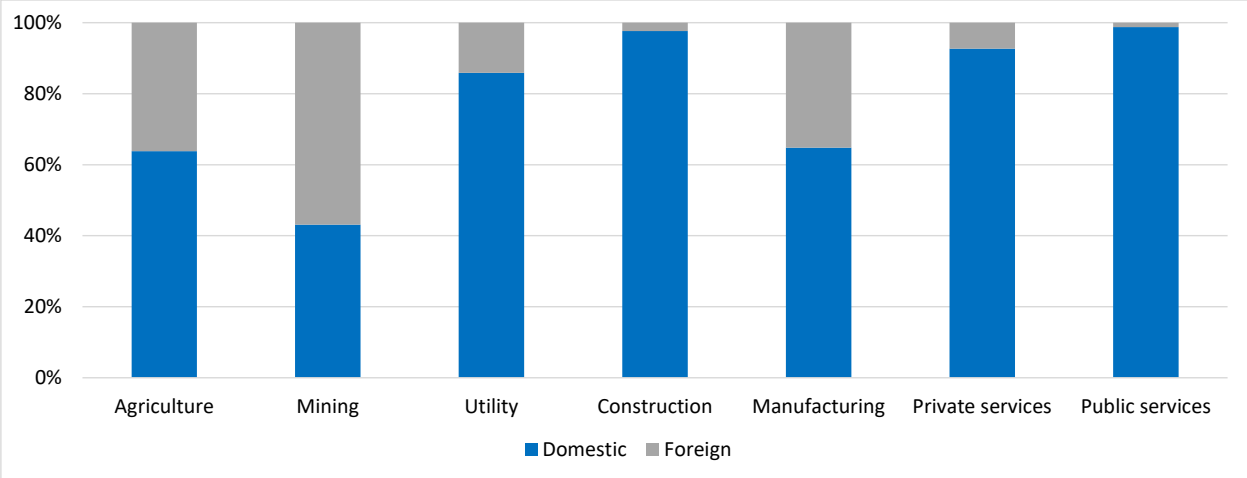
Figure IV.XXX Value added exports, by top 10 highest value private services industries and major destination, 2012, the United States



The original source of final uses

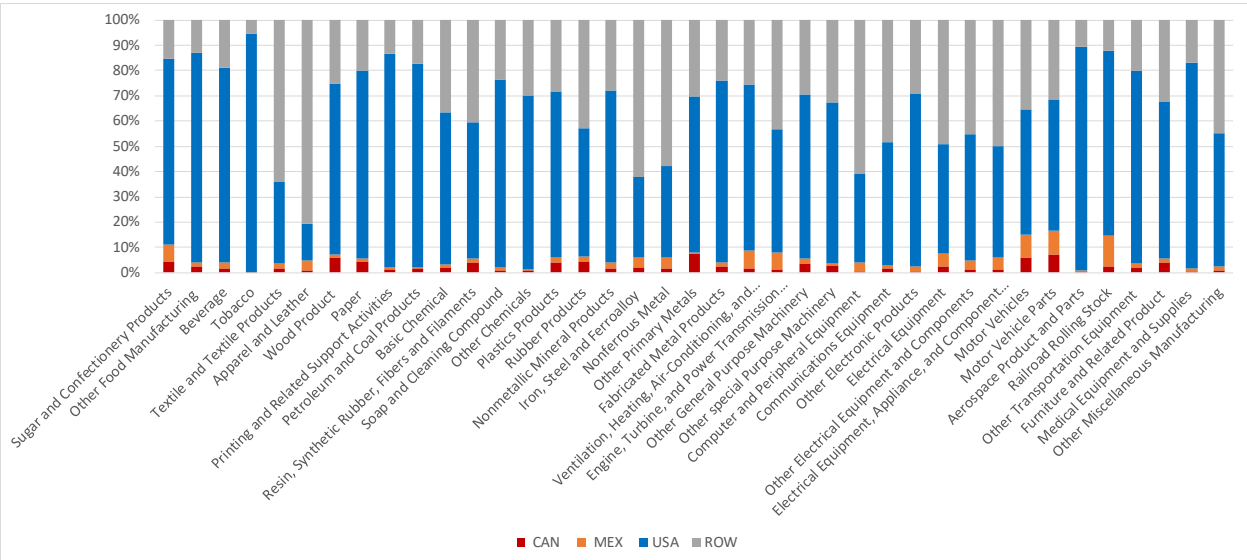
In 2012, U.S. final uses were valued at $16.5 trillion. In value added term, foreign sources accounted for 13 percent of U.S. final uses. There were significant sectoral differences, for instance, foreign sources accounted for 57 percent of U.S. final uses in the mining sector, but only 2 percent for construction (figure IV.XXXI).

Figure IV.XXXI Original source of final uses, by major sector, 2012, the United States



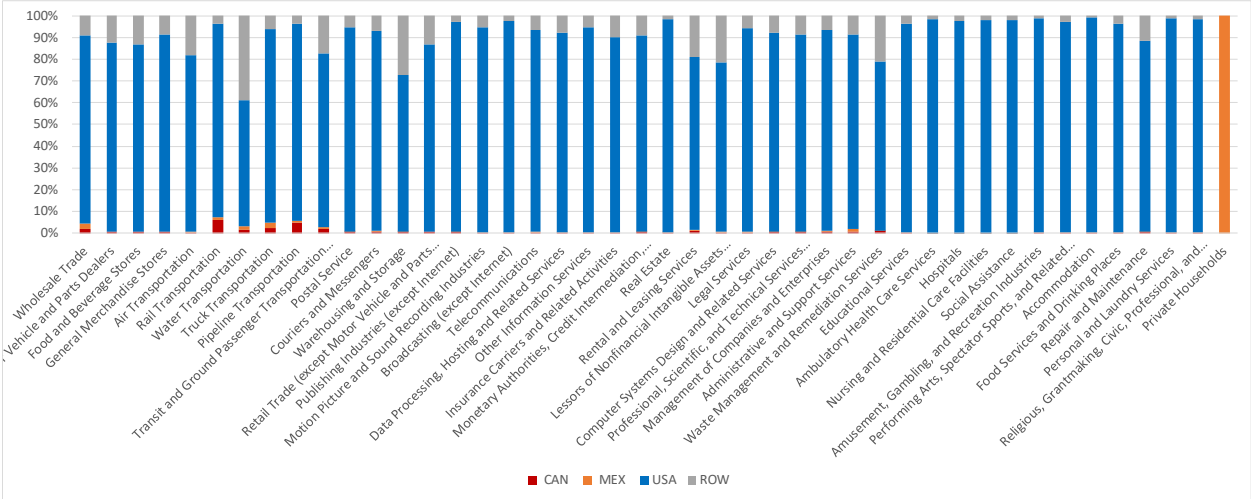
There were also significant differences among manufacturing industries. In some industries, such as apparel and leather, textile and textile products, and iron, steel and ferroalloy, foreign sources accounted for more than 65 percent of U.S. final uses. Yet in other industries, such as tobacco, aerospace products and parts, printing and related support activities, and other food manufacturing, foreign sources accounted for less than 20 percent of U.S. final uses (figure IV.XXXII).

Figure IV.XXXII Original source of final uses, by manufacturing industry, 2012, the United States



Overall, the final uses of private services relied less on foreign sources. However, there were also notable differences among services industries. In some services industries, such as water transportation, and warehousing and storage, foreign sources accounted for more than 25 percent of U.S. final uses. In other services industries, such as amusement, gambling, and recreation industries, accommodation, and personal and laundry services, foreign sources accounted for less than 5 percent of U.S. final uses (figure IV.XXXIII).

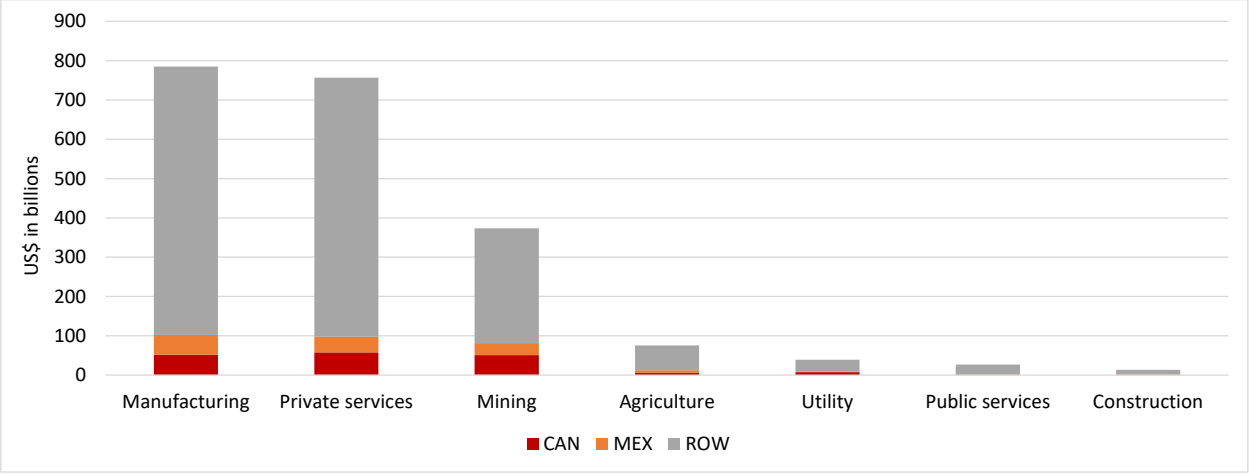
Figure IV.XXXIII Original source of final uses, by private services industry, 2012, the United States



Value added imports

In 2012, U.S. value added imports were valued at $2.1 trillion. Canada and Mexico accounted for 9 percent and 6 percent of U.S. value added imports, respectively. Oil and gas extraction had the largest value added imports of $300.5 billion (figure IV.XXXIV).

Figure IV.XXXIV Value added imports, by major sector and source, 2012, the United States



Of 39 manufacturing industries, other chemicals, other electronic products, and motor vehicles had the largest value added imports (figure IV.XXXV). Of 44 private services industries, wholesale trade, financial services, and professional, scientific, and technical services (except legal services and computer systems design and related services) had the largest value added imports (figure IV.XXXVI).

Figure IV.XXXV Value added imports, by top 10 highest value manufacturing industries and source, 2012, the United States

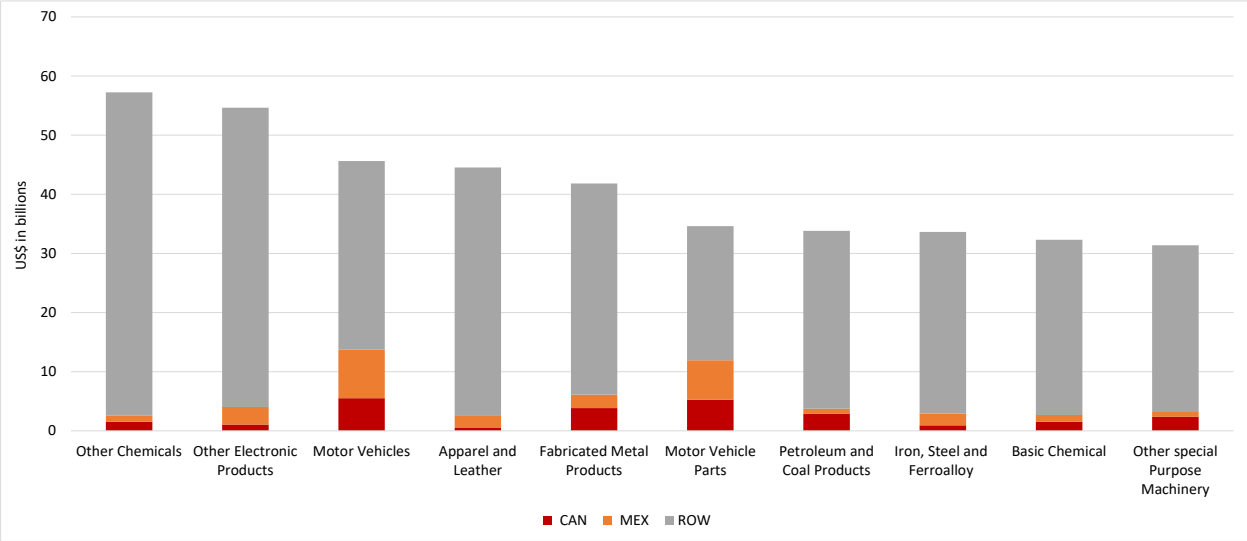
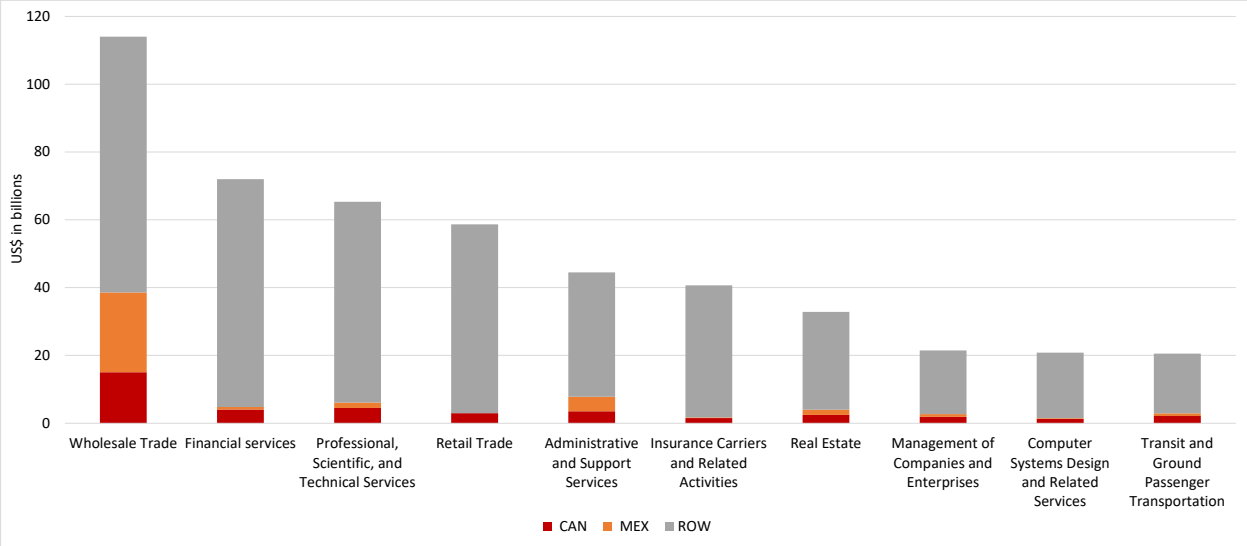


Figure IV.XXXVI Value added imports, by top 10 highest value private services industries and source, 2012, the United States



V. Conclusion

The NA TiVA results provide valuable, detailed sectoral information on the GVC linkages in the NA region. Across the NA economies, industry value added is largely destined for domestic final demand (upwards of 75%), though sectoral differences persist in each country. For example, the industry value added of highly integrated manufacturing industries, such as motor vehicles, motor vehicle parts, other primary metals, and nonferrous metals is largely absorbed abroad. On the other hand, the industry value added of other manufacturing industries—including beverages, and tobacco—as well as the majority of private services sectors—such as real estate and educational services—is absorbed mostly domestically. The United States held the largest share in terms of the destination for industry value added in a number of manufacturing

industries, including motor vehicles, motor vehicle parts, electrical equipment, and other electronic products. The rest of world accounted for a substantial share of value-added trade with the NA countries, especially the United States.

Across the NA region, foreign sources accounted for less than 25% of final uses in terms of value added. The final uses of manufacturing industries relied most on foreign sources, owing to the relatively higher level of GVC integration as compared to other sectors, such as construction. Even within the manufacturing sector there is significant variation in the sourcing of final uses. For example, foreign sources of industries such as nonferrous metal, computer and peripheral equipment was greater than 60% of industry final uses, while other manufacturing industries like other food manufacturing relied more on domestic sources (more than 70% of industry final uses). Conversely, the final uses of most private services industries, including educational services, accommodation, and personal laundry services is sourced domestically (more than 90% of industry final uses). Some exceptions to this trend are the private service industries of water transportation and warehousing and storage—the final uses of which were sourced by more than 25% from abroad.

The NA TiVA initiative complements other TiVA initiatives, though different compilation methodologies and TiVA calculations could affect the consistency between the results. As stated earlier in this white paper, the inputs of these TiVA results are being shared with the OECD, with the aim of improving balanced trade data and TiVA statistics for the NA region.

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Annex I

Main NGM results for 2012

Table A.I.I Canadian adjusted imports from Mexico, United States and Rest of the World

Canadian adjusted imports 2012 (Billions of USD)		
Concept	**Original**	**Adjusted**
A. Mexico reports exports to Canada	*10.9*	
B. ROW reports exports to Canada	*137.7*	
C. U.S. reports exports to Canada	*292.5*	
D. Canadian imports of Mexican origin goods re-exported from the United States	*10.6*	
E. Canadian imports of ROW origin goods re-exported from the United States	*41.0*	
F. Canadian imports where the country of origin is the United Statesand the country of consignment is Mexico	*0.3*	
G. Canadian imports where the country of origin is ROW and the country of consignment is Mexico	*0.5*	
H. Canadian imports where the country of origin is the United Statesand the country of consignment is ROW	*1.6*	
I. Canadian imports where the country of origin is Mexico and the country of consignment is ROW	*0.1*	
J. Canada reports imports from Mexico	*25.5*	
K. Canada adjusted imports from Mexico		*15.6*
L. Canada reports imports from ROW	*199.4*	
M. Canada adjusted imports from ROW		*159.6*
N. Canada reports imports from the United States	*232.5*	
O. Canada adjusted imports from the United States		*282.2*
MEX-CAN Asymmetry	*14.6*	
MEX-CAN Adjusted Asymmetry		*4.7*
ROW-CAN Asymmetry	*61.7*	
ROW-CAN Adjusted Asymmetry		*22.0*
U.S.-CAN Asymmetry	*-60.0*	
U.S.-CAN Adjusted Asymmetry		*-10.3*

Table A.I.II Mexican adjusted imports from Canada, United States and Rest of the World

Mexican adjusted imports 2012 (Billions of USD)		
Concept	**Original**	**Adjusted**
A. U.S. reports exports to Mexico	***215.4***	
B. U.S. re-exports where the country of origin is ROW and the country of destination is Mexico	***33.1***	
C. U.S. re-exports where the country of origin is Canada and the country of destination is Mexico	***2.5***	
D. ROW reports exports to Mexico	**109.8**	
E. Mexican imports where the country of origin is the United Statesand the country of consignment is ROW	***6.5***	
F. Mexican imports where the country of origin is Canada and the country of consignment is ROW	***0.3***	
G. Canada reports exports to Mexico	***5.4***	
H. Canadian re-exports where the country of origin is the United States and the country of destination is Mexico	**0.2**	
I. Canadian re-exports where the country of origin is ROW and the country of destination is Mexico	***0.3***	
J. Mexico reports imports from the United States	***185.1***	
K. Mexico adjusted imports from the United States		***214.0***
L. Mexico reports imports from ROW	***175.8***	
M. Mexico adjusted imports from ROW		***149.2***
N. Mexico reports imports from Canada	***9.9***	
O. Mexico adjusted imports from Canada		***7.5***
U.S.-MEX Asymmetry	***-30.3***	
U.S.-MEX Adjusted Asymmetry		***-1.4***
ROW-MEX Asymmetry	***66.0***	
ROW-MEX Adjusted Asymmetry		***39.5***
CAN-MEX Asymmetry	***4.5***	

CAN-MEX Adjusted Asymmetry		***2.1***

Table A.I.III U.S. adjusted imports from Canada, Mexico and Rest of the World

U.S. adjusted imports 2012 (Billions of USD)		
Concept	**Original**	**Adjusted**
A. Mexico reports exports to U.S.	***287.8***	
B. ROW reports exports to U.S.	**1433.1**	
C. Canada reports exports to U.S.	***338.6***	
D. U.S. imports where the country of origin is Mexico and the country of consignment is Canada	***0.7***	
E. U.S. imports where the country of origin is ROW and the country of consignment is Canada	***16.6***	
F. U.S. imports where the country of origin is Canada and the country of consignment is Mexico	***0.4***	
G. U.S. imports where the country of origin is ROW and the country of consignment is Mexico	***10.8***	
H. U.S. imports where the country of origin is Mexico and the country of consignment is ROW	***3.5***	
I. U.S. imports where the country of origin is Canada and the country of consignment is ROW	***2.0***	
J. U.S. reports imports from Mexico	***277.3***	
K. U.S. adjusted imports from Mexico		***284.2***
L. U.S. reports imports from ROW	***1647.5***	
M. U.S. adjusted imports from ROW		***1625.7***
N. U.S. reports imports from Canada	***323.4***	
O. U.S. adjusted imports from Canada		***338.3***
MEX-U.S. Asymmetry	***-10.6***	
MEX-U.S. Adjusted Asymmetry		***-3.6***
ROW-U.S. Asymmetry	***214.5***	

ROW-U.S. Adjusted Asymmetry		***192.6***
CAN-U.S. Asymmetry	***-15.2***	
CAN-U.S. Adjusted Asymmetry		***-0.3***

Annex II

Nomenclature

cx_m_o: Canadian re-exports to Mexico of ROW origin

cx_m_u: Canadian re-exports to Mexico of U.S. origin

ux_m_c: U.S. re-exports to Mexico of Canadian origin

ux_m_o: U.S. re-exports to Mexico of ROW origin

mm_c_o: Mexican imports of Canadian origin and country of consignment ROW

mm_u_o: Mexican imports of U.S. origin and country of consignment ROW

ADJ_MEX_M_CAN: Mexico adjusted imports from Canada

ADJ_MEX_M_USA: Mexico adjusted imports from the United States

MEX_M_from_CAN: Mexico reports imports from Canada

MEX_M_from_USA: Mexico reports imports from the United States

CAN_X_to_MEX: Canada reports exports to Mexico

USA_X_to_MEX: U.S. reports exports to Mexico

Original_Asymmetry_SB_MEX_CAN: Southbound Trade Canada-Mexico original asymmetry

Original_Asymmetry_SB_MEX_USA: Southbound Trade U.S.-Mexico original asymmetry

NGM_Adjusted_Asymmetry_SB_MEX_CAN: Southbound Trade Canada-Mexico New General Method adjusted asymmetry

NGM_Adjusted_Asymmetry_SB_MEX_USA: Southbound Trade U.S.-Mexico New General Method adjusted asymmetry

NATiVA_Asymmetry_SB_MEX_CAN: Southbound Trade NA-TiVA adjusted Asymmetry Canada-Mexico

NATiVA_Asymmetry_SB_MEX_USA: Southbound Trade NA-TiVA adjusted Asymmetry U.S.-Mexico

OECD_NATiVA_ADJ_Asymmetry_SB_MEX_CAN: Southbound Trade NA-TiVA adjusted Asymmetry Canada-Mexico (includes manual methods)

Annex III

NA-TiVA Outcomes

The following graphs show the main outcomes of the merchandise trade reconciliation process followed in NA-TiVA, for each of the six bilateral trade flows in the North America region. In each year, it is showed with a red chart the percentage of asymmetry reduction, considering absolute terms. Finally, a summary of the items and value adjusted after the application of NIAMM is showed.

Figure A.III.I Southbound trade Mexico imports – Canada exports (Millions of USD)

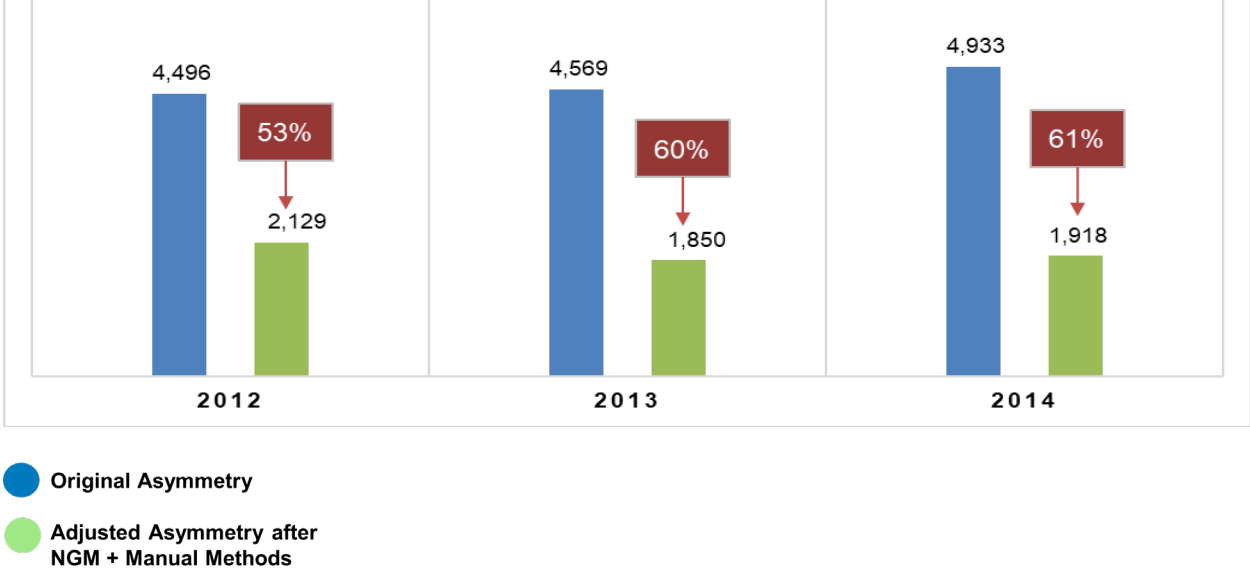


Figure A.III.II Southbound trade Mexico imports – U.S. exports (Millions of USD)

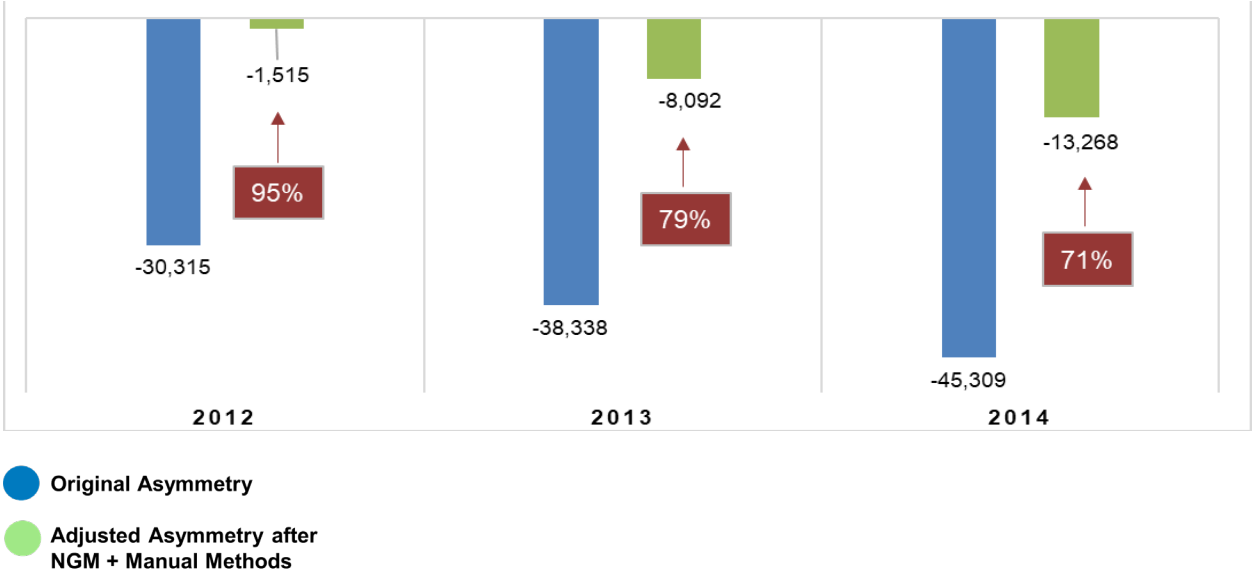


Figure A.III.III Southbound trade USA imports – Canada exports (Millions of USD)

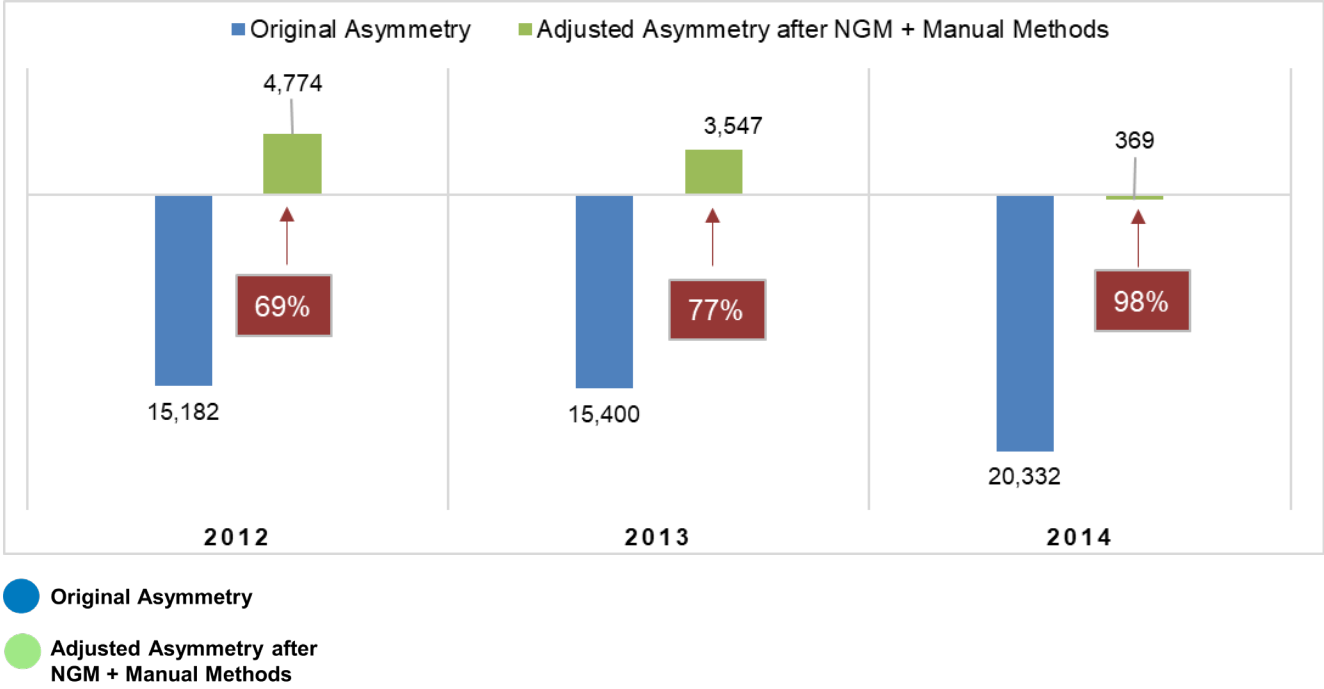


Figure A.III.IV Northbound trade U.S. imports – Mexico exports (Millions of USD)

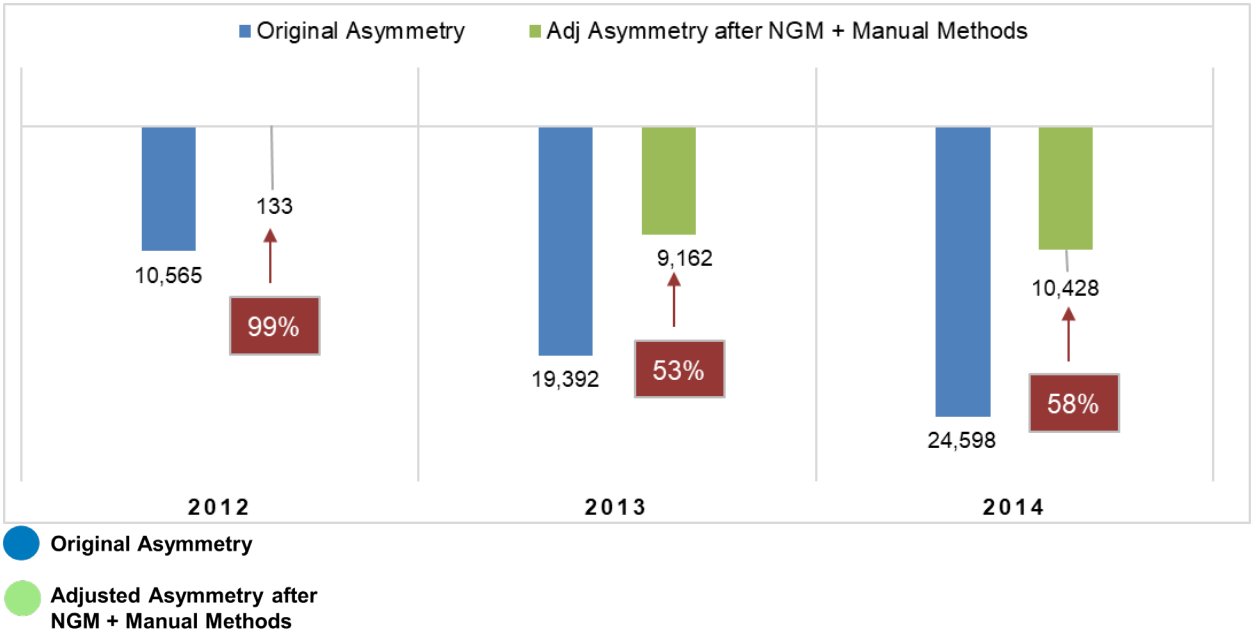


Figure A.III.VI Northbound trade Canada imports – Mexico exports (Millions of USD)

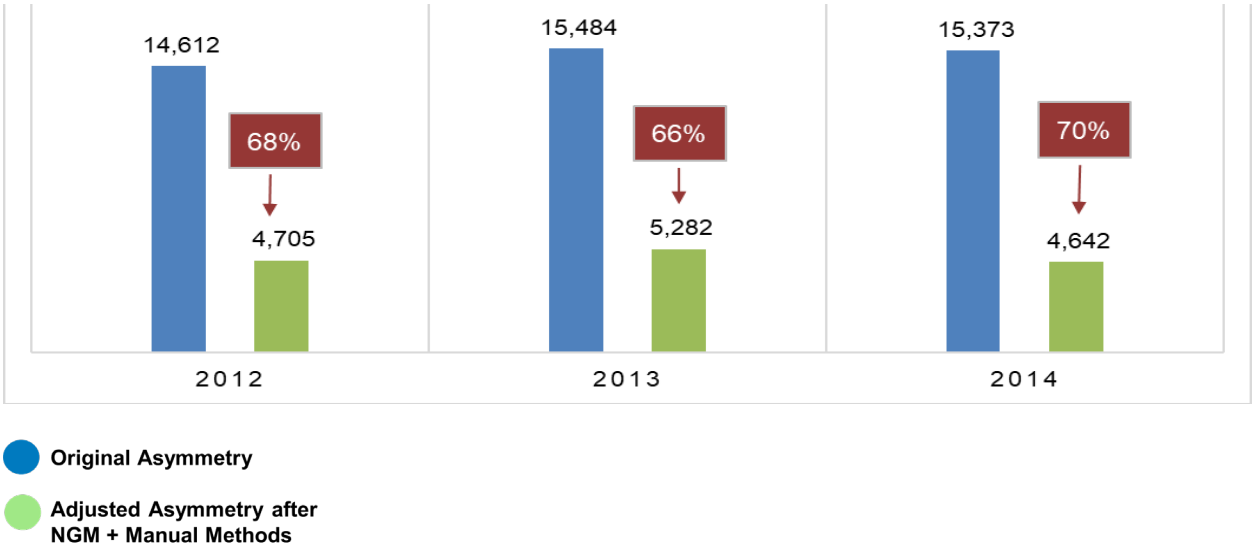
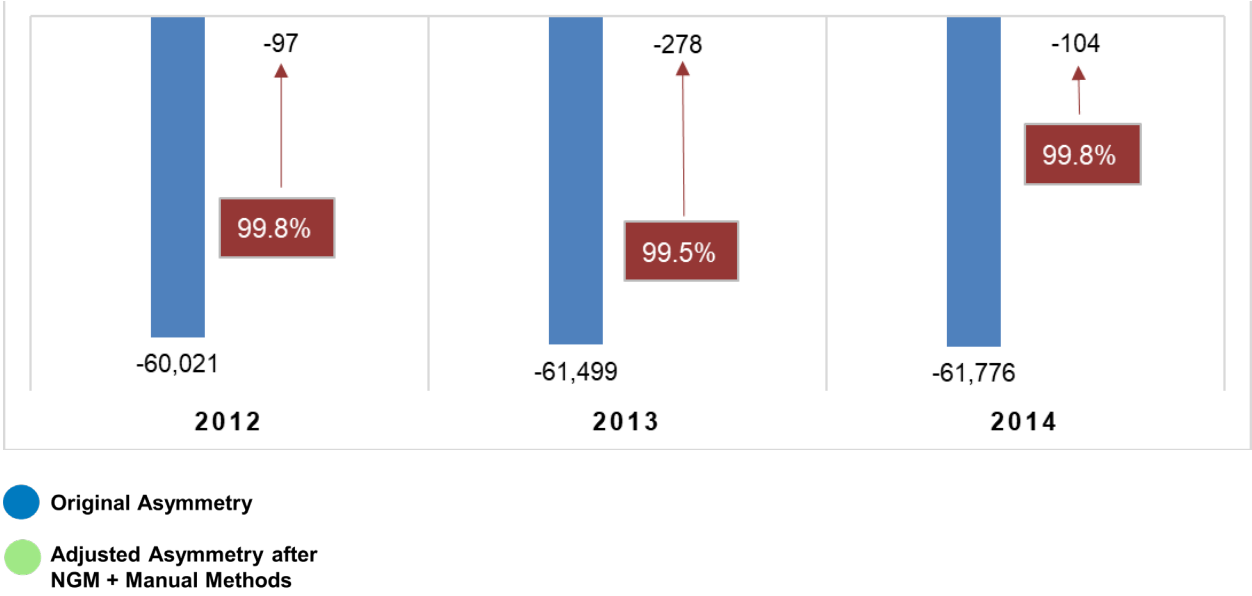


Figure A.III.VII Northbound trade Canada imports – U.S. exports (Millions of USD)



General Results of NIAMM

Table A.III.I Mexico imports – Canada exports (USD dollars)

USD dollars	Total value of negative adjusted imports	Number of negatives HS6 items
2012	-613,580,850	1587
2013	-736,555,428	1530
2014	-762,148,678	1665

Figure A.III.VIII Share of the value of negative adjusted imports related to the value of total imports

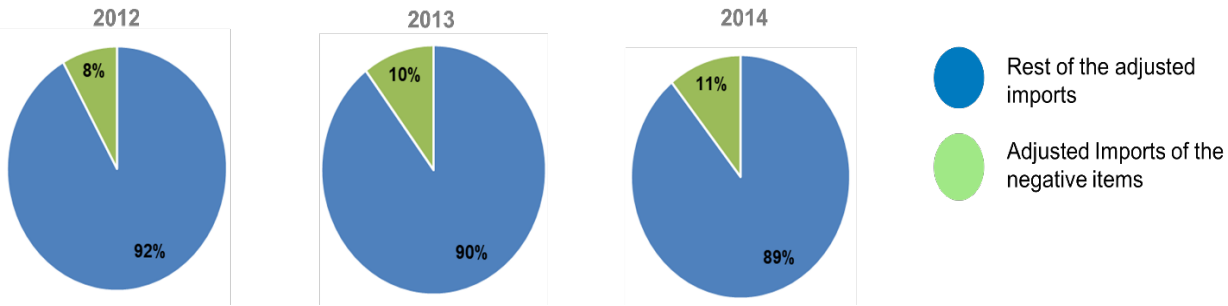
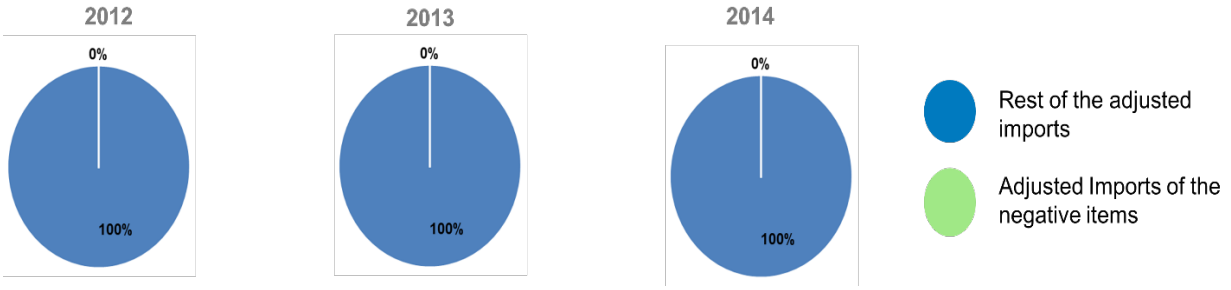


Table A.III.II Mexico imports – U.S. exports (USD dollars)

USD dollars	Total value of negative adjusted imports	Number of negative HS6 items
2012	-21,963	7
2013	-61,306	3
2014	-18,293	5

Figure A.III.IX Share of the value of negative adjusted imports related to the value of total imports



Annex IV

Comparative of TiVA indicators by initiative.

2012	Domestic value added embodied in foreign final demand				Foreign value added embodied in domestic final demand				Gross exports				Share of domestic value added in gross exports				Gross trade balance				Balance of value added contained in final demand			
	NA	DIP	OECD	APEC	NA	DIP	OECD	APEC	NA	DIP	OECD	APEC	NA	DIP	OECD	APEC	NA	DIP	OECD	APEC	NA	DIP	OECD	APEC
CAN	380,518	334,953	395,027	337,009	397,412	434,066	446,413	434,471	531,613	551,182	512,675	540,914	0.73	65	78	71	-16,895	-35,940	-51,386	82,651	-16,894	-99,113	-51,386	-97,462
MEX	225,841	196,040	243,966	215,025	242,951	297,774	261,704	312,204	374,584	387,303	373,213	393,935	0.61	54	66	60	-17,110	-13,334	-17,739	54,291	-17,110	-101,733	-17,739	-97,179
USA	1,436,691	1,352,167	1,635,152	1,561,376	2,070,230	2,258,900	2,183,140	2,136,892	1,797,661	1,964,815	1,988,088	2,600,537	0.86	74	88	82	-633,538	-568,644	-547,988	740,734	-633,539	-906,733	-547,988	-575,516
ROW	2,185,061	2,469,506	2,367,260	2,321,845	1,517,518	1,361,927	2,517,490	1,551,688	2,511,637	2,616,544	2,393,143	1,755,502	0.97	88	88	93	667,543	617,918	617,408	-419,181	667,543	1,107,579	-150,230	770,157
CAN-MEX	6,705	7,487	14,909	7,195	7,892	7,657	8,624	8,868	6,616	6,875	25,025	8,090	0.71	62	2	60	-7,889	-9,440	15,286	-3,019	-1,187	-170	6,285	-1,673
CAN-USA	176,673	155,758	208,912	174,400	122,946	135,516	230,458	139,896	276,989	284,740	285,952	288,759	0.71	64	64	70	87,118	70,934	-49,742	58,647	53,727	20,243	-21,546	34,503
CAN-ROW	197,139	171,708	171,206	155,415	266,574	290,893	207,332	285,707	248,008	259,568	201,698	244,065	0.75	67	82	72	-96,124	-97,434	-16,930	27,024	-69,434	-119,186	-36,125	-130,292
MEX-CAN	7,892	7,853	8,624	8,868	6,705	6,987	14,909	7,195	14,504	16,315	9,739	14,167	0.54	43	6	45	7,889	9,440	-15,286	2,445	1,187	866	-6,285	1,673
MEX-USA	128,988	119,682	116,422	102,785	82,328	95,788	152,043	128,578	230,164	234,866	190,327	188,780	0.60	54	68	56	88,545	86,795	-60,883	3,506	46,660	23,894	-35,621	-25,794
MEX_ROW	88,961	68,505	118,920	103,372	153,918	194,998	94,753	176,431	129,915	136,122	173,148	190,989	0.63	55	83	66	-113,544	-109,568	58,431	48,340	-64,957	-126,493	24,168	-73,059
USA-CAN	122,946	129,770	230,458	139,896	176,673	152,919	208,912	174,400	189,871	213,806	335,694	259,955	0.83	69	14	78	-87,118	-85,853	49,742	- 3,296	-53,727	-23,149	21,546	-34,503
USA-MEX	82,328	95,788	152,043	128,578	128,988	119,682	116,422	102,785	141,619	148,072	251,210	240,592	0.81	73	9	78	-88,545	-88,226	60,883	60,800	-46,660	-23,894	35,621	25,794
USA-ROW	1,231,417	1,126,609	1,252,651	1,292,901	1,764,569	1,986,299	1,857,806	1,859,708	1,466,171	1,602,937	1,401,183	2,099,990	0.87	75	61	83	-457,876	-456,170	-658,614	683,229	-533,152	-859,690	-605,156	-566,806
ROW-CAN	266,574	288,208	224,451	285,707	197,139	176,809	156,350	155,415	344,132	357,002	287,561	231,466	0.97	89	2	93	96,124	-70,934	88,168	12,461	69,434	111,399	68,101	130,292
ROW-MEX	153,918	194,998	136,659	176,431	88,961	68,505	75,555	103,372	243,459	2,013,853	189,702	134,999	0.96	87	1	93	113,544	-86,795	93,823	- 20,098	64,957	126,493	61,104	73,059
ROW_USA	1,764,569	1,986,299	1,805,798	1,859,708	1,231,417	1,126,609	1,313,777	1,292,901	1,924,046	245,690	2,205,515	1,389,037	0.97	91	17	93	457,876	-410,915	435,417	-411,544	533,152	849,692	492,021	566,806
Total-country by initiative	**4,228,111**	**4,352,666**	**4,641,405**	**4,435,255**	**4,228,111**	**4,352,666**	**5,408,747**	**4,435,255**	**5,215,494**	**5,519,844**	**5,267,119**	**5,290,889**	**75**	**70**	80	**77**	-	-	**295**	-	-	-	**-767,343**	

Note: The results of the indicators are calculated with a gross production that includes taxes.

Domestic value added content of gross exports

	CANADA					MEXICO					UNITED STATES					REST OF THE WORLD				
Initiative Industry	NA	OECD	DIF. OECD/NA	APEC	DIF. APEC/NA	NA	OECD	DIF. OECD/NA	APEC	DIF. APEC/NA	NA	OECD	DIF. OECD/NA	APEC	DIF. APEC/NA	NA	OECD	DIF. OECD/NA	APEC	DIF. APEC/NA
11_Agriculture	20,308	17,675	-13%	31,697	56%	6,807	6,552	-4%	16,065	136%	64,183	53,637	-16%	63,412	-1%	46,725	89,131	91%	39,477	-16%
21_ Mining	90,904	96,627	-6%	69,049	-24%	77,624	46,362	40%	23,343	-70%	48,096	29,082	40%	68,697	43%	325,942	1,278,036	-292%	197,673	-39%
22_ Utilities	1,967	2,489	-27%	7,522	282%	507	239	53%	5,337	952%	1,951	287	85%	73,611	3674%	2,764	9,708	-251%	28,900	946%
23_Construction	456	534	-17%	3,804	735%	39	9	76%	757	1822%	427	5	99%	57,972	13486%	3,872	39,390	-917%	11,718	203%
31_Sugar and Confectionery Product Manufacturing	30,680	17,647	42%	32,587	6%	11,183	10,160	9%	35,645	219%	95,750	63,281	34%	142,259	49%	189,166	6,889	96%	108,756	-43%
32_Wood Product Manufacturing	60,136	54,100	10%	58,309	-3%	27,875	14,599	48%	39,017	40%	269,697	254,201	6%	269,687	0%	440,364	389,666	12%	267,585	-39%
33_Iron and Steel Mills and Ferroalloy Manufacturing	133,199	91,793	31%	107,298	-19%	100,209	109,278	-9%	85,853	-14%	681,162	453,557	33%	772,224	13%	1,034,143	193,085	81%	609,091	-41%
42_Retail and wholesale trade	5,195	47,930	-823%	3,827	-26%	5	34,620	-735097%	1,799	38100%	6,729	238,071	-3438%	49,553	636%	16,090	146,106	-808%	24,570	53%
48_Transport	5,377	14,169	-164%	19,850	269%	791	14,914	-1786%	6,283	694%	37,383	118,948	-218%	121,218	224%	33,243	134,692	-305%	63,878	92%
49_ Postal Services and Warehousing	849	0	100%	0	-100%	1	0	100%	0	-100%	7,667	0	100%	0	-100%	2,363	-	0%	0	-100%
51_ Mass media information	5,145	11,056	-115%	8,322	62%	314	1,252	-299%	4,345	1285%	84,812	99,391	-17%	83,376	-2%	30,295	58,319	-93%	27,356	-10%
52_Financial services	7,244	10,969	-51%	16,288	125%	2,272	1,886	17%	6,556	189%	84,690	117,169	-38%	102,163	21%	97,566	71,152	27%	69,936	-28%
53_ Rental services	1,491	796	47%	2,825	90%	19	807	-4094%	688	3477%	59,887	11,770	80%	56,825	-5%	42,802	68,174	-59%	22,990	-46%

54_ Professional services	12,509	21,644	-73%	4,872	-61%	689	626	9%	70	-90%	81,400	224,176	-175%	45,957	-44%	87,760	3,275	96%	23,202	-74%
55_Management of Companies and Enterprises	51	0	100%	2,806	5400%	0	0	0%	6,915	#¡DIV/0!	3,157	0	100%	96,265	2949%	1,610	-	0%	57,526	3473%
56_Business support services	6,613	0	100%	0	-100%	0	0	100%	0	-100%	2,551	0	100%	0	-100%	16,429	-	0%	0	-100%
61_Educational services	1,171	3,151	-169%	3,605	208%	0	261	0%	2,109	#¡DIV/0!	3,025	21,574	-613%	33,775	1017%	3,531	9,312	-164%	29,979	749%
62_ Health services	338	517	-53%	2,124	529%	0	183	-4628775%	264	6706522%	2,024	2,322	-15%	10,464	417%	2,837	49,048	-1629%	8,023	183%
71_ Recreational services	643	2,154	-235%	4,917	664%	0	733	-3689706%	569	2865808%	2,034	12,100	-495%	35,929	1667%	2,489	-	0%	15,884	538%
72_Hotels and restaurants	456	6,291	-1279%	581	27%	0	4,662	-776060156%	571	94990659%	1,549	41,798	-2598%	3,006	94%	2,860	2,655	7%	8,384	193%
81_Other services	204	0	100%	1,724	747%	4	0	100%	111	2564%	521	0	100%	684	31%	13,956	525	96%	112	-99%
GF_Government	1,288	1,828	-42%	2,321	80%	0	0	0%	1,476	0%	4,590	0	100%	50,963	1010%	30,110	2,042	93%	16,474	-45%

Share of domestic value added in gross exports

	CANADA					MEXICO					UNITED STATES					REST OF THE WORLD				
Initiative Industry	NA	OECD	DIF. OECD/NA	APEC	DIF. APEC/NA	NA	OECD	DIF. OECD/NA	APEC	DIF. APEC/NA	NA	OECD	DIF. OECD/NA	APEC	DIF. APEC/NA	NA	OECD	DIF. OECD/NA	APEC	DIF. APEC/NA
11_Agriculture	4	1	-79%	6	53%	2	1	-50%	4	124%	4	1	-75%	2	-32%	2	3	72%	2	21%
21_ Mining	17	3	-84%	13	-25%	21	3	-87%	6	-71%	3	3	8%	3	-1%	13	45	249%	11	-13%
22_ Utilities	0	1	155%	1	276%	0	1	561%	1	901%	0	1	738%	3	2509%	0	0	173%	2	1396%
23_Construction	0	1	854%	1	720%	0	1	8052%	0	1728%	0	1	3615%	2	9292%	0	1	808%	1	333%

31_Sugar and Confectionery Product Manufacturing	6	2	-74%	6	4%	3	1	-58%	9	203%	5	2	-68%	5	3%	8	0	-97%	6	-18%
32_Wood Product Manufacturing	11	4	-61%	11	-5%	7	4	-51%	10	33%	15	5	-67%	10	-31%	18	14	-21%	15	-13%
33_Iron and Steel Mills and Ferroalloy Manufacturing	25	5	-78%	20	-21%	27	5	-83%	22	-19%	38	7	-83%	30	-22%	41	7	-83%	35	-16%
42_Retail and wholesale trade	1	1	-5%	1	-28%	0	1	76639%	0	36223%	0	1	156%	2	409%	1	5	712%	1	118%
48_Transport	1	1	-13%	4	263%	0	1	320%	2	655%	2	1	-57%	5	124%	1	5	263%	4	175%
49_ Postal Services and Warehousing	0	0	-100%	0	-100%	0	0	-100%	0	-100%	0	0	-100%	0	-100%	0	-	100%	0	0%
51_ Mass media information	1	3	180%	2	59%	0	3	3085%	1	1217%	5	3	-40%	3	-32%	1	2	74%	2	29%
52_Financial services	1	1	-31%	3	121%	1	1	56%	2	174%	5	1	-79%	4	-17%	4	3	-36%	4	3%
53_ Rental services	0	1	243%	1	86%	0	1	19053%	0	3302%	3	1	-70%	2	-34%	2	2	41%	1	-23%
54_ Professional services	2	1	-60%	1	-62%	0	1	422%	0	-90%	5	1	-79%	2	-61%	3	0	-97%	1	-62%
55_Management of Companies and Enterprises	0	0	-100%	1	5306%	0	0	0%	2	-100%	0	0	-100%	4	2008%	0	-	100%	3	-100%
56_Business support services	1	0	-100%	0	-100%	0	0	-100%	0	-100%	0	0	-100%	0	-100%	1	-	100%	-	0%
61_Educational services	0	1	338%	1	203%	0	1	-100%	1	-100%	0	1	479%	1	672%	0	0	113%	2	1115%
62_ Health services	0	1	1376%	0	518%	0	1	872746166%	0	6377067%	0	1	744%	0	257%	0	2	1405%	0	305%
71_ Recreational services	0	1	656%	1	651%	0	1	17687538%	0	2725023%	0	1	739%	1	1121%	0	-	100%	1	813%
72_Hotels and restaurants	0	1	933%	0	25%	0	1	585215262%	0	90324347%	0	1	985%	0	34%	0	0	-12%	0	319%
81_Other services	0	0	-100%	0	733%	0	0	-100%	0	2433%	0	0	-100%	0	-9%	1	-	0%	0	0%

GF_Government	0	1	283%	0	77%	0	0	0%	0	-100%	0	0	-100%	2	667%	1	0	-100%	1	-100%

Domestic value added embodied in gross imports

	CANADA					MEXICO					UNITED STATES					REST OF THE WORLD				
Initiative Industry	NA	OECD	DIF. OECD/NA	APEC	DIF. APEC/NA	NA	OECD	DIF. OECD/NA	APEC	DIF. APEC/NA	NA	OECD	DIF. OECD/NA	APEC	DIF. APEC/NA	NA	OECD	DIF. OECD/NA	APEC	DIF. APEC/NA
11_Agriculture	12,488	3,721	-70%	8,882	-29%	2,278	-1,767	-178%	6,494	185%	-720,790	-25,729	-96%	38,949	-105%	-4,385	34,200	-880%	86,138	-2064%
21_ Mining	20,379	46,023	126%	5,076	-75%	11,796	30,812	161%	2,002	-83%	-74,553	-306,898	312%	31,693	-143%	103,577	944,923	812%	71,946	-31%
22_ Utilities	-1,500	4,624	-408%	20,141	-1443%	-2,171	-3,340	54%	24,472	-1227%	-30,757	-32,256	5%	69,741	-327%	29,938	-38,273	-228%	144,215	382%
23_Construction	210	2,235	965%	53,936	25606%	-1,145	-412	-64%	37,292	-3358%	-4,920	-12,247	149%	234,148	-4859%	9,509	-17,386	-283%	360,649	3693%
31_Sugar and Confectionery Product Manufacturing	-9,692	-6,912	-29%	81,953	-946%	-83	-1,746	2003%	82,094	-98991%	-70,122	-77,462	10%	451,972	-745%	105,141	-14,588	-114%	595,057	466%
32_Wood Product Manufacturing	1,871	-10,210	-646%	15,026	703%	-24,759	-21,368	-14%	9,086	-137%	-22,621	-58,278	158%	90,941	-502%	97,116	-129,625	-233%	116,280	20%
33_Iron and Steel Mills and Ferroalloy Manufacturing	-38,487	-43,787	14%	17,427	-145%	26,341	-9,841	-137%	5,553	-79%	129,410	-144,525	-212%	86,321	-33%	219,403	-443,790	-302%	115,175	-48%
42_Retail and wholesale trade	-14,958	-15,478	3%	0	-100%	-11,472	14,633	-228%	0	-100%	-77,772	-53,891	-31%	0	-100%	125,538	-204,521	-263%	0	-100%
48_Transport	2,605	-3,610	-239%	4,892	88%	-3,777	-1,885	-50%	2,803	-174%	-4,342	-29,793	586%	49,547	-1241%	15,223	-63,546	-517%	67,088	341%
49_ Postal Services and Warehousing	-1,319	0	-100%	18,807	-1526%	-1,522	0	-100%	4,569	-400%	-2,172	0	-100%	77,677	-3676%	10,432	0!	0%	109,279	0%

51_ Mass media information	638	-18,493	-2997%	6,540	924%	-1,742	-5,979	243%	2,507	-244%	59,166	29,770	-50%	71,995	22%	-41,646	-96,564	132%	91,891	-321%
52_Financial services	-2,264	-842	-63%	5,180	-329%	-4,391	-7,851	79%	86	-102%	36,331	34,686	-5%	41,772	15%	-15,816	33,992	-315%	34,536	-318%
53_ Rental services	-3,837	-4,205	10%	14,616	-481%	-3,984	-428	-89%	6,791	-270%	45,863	22,741	-50%	120,515	163%	-17,748	-122,841	592%	79,633	-549%
54_ Professional services	5,624	-6,236	-211%	0	-100%	-3,369	-4,680	39%	0	-100%	49,323	104,426	112%	0	-100%	-3,819	-2,765	-28%	0	-100%
55_Management of Companies and Enterprises	-1,695	0	-100%	3,031	-279%	-1,620	0	-100%	1,454	-190%	17,307	0	-100%	23,100	33%	-9,941	0	0%	48,787	-100%
56_Business support services	7,893	0	-100%	2,119	-73%	2,422	0	-100%	169	-93%	21,803	0	-100%	7,271	-67%	12,860	0	0%	30,930	0%
61_Educational services	1,238	-3,317	-368%	4,870	293%	-49	-2,001	3946%	574	-1260%	1,681	24,402	1351%	28,890	1618%	-40	-2,004	4864%	43,130	-1069%
62_ Health services	746	5,259	605%	1,631	119%	-23	-1,098	4734%	977	-4403%	1,026	-21,077	-2155%	8,976	775%	16,653	-936	-106%	37,356	124%
71_ Recreational services	632	821	30%	861	36%	-58	-570	880%	156	-367%	3,649	-4,706	-229%	877	-76%	-1,036	0	100%	3,663	-453%
72_Hotels and restaurants	1,119	-1,693	-251%	2,364	111%	58	1,005	1628%	1,079	1756%	5,704	-4,633	-181%	32,088	463%	5,956	-9,101	-253%	40,043	572%
81_Other services	1,414	0	-100%	337,009	23729%	159	0	-100%	215,025	135295%	3,248	0	-100%	15,613 7	47976%	11,283	1,302	100%	2,321,845	100%
GF_Government	0	716	0	0	0	0	-1,224	0%	0	0%	0	7,483	0	0	0	-7,556	-18,707	148%	0	-100%

Trade balance in value added.

	CANADA					MEXICO					UNITED STATES					REST OF THE WORLD				
Initiative / Industry	NA	OECD	DIF. OECD/NA	APEC	DIF. APEC/NA	NA	OECD	DIF. OECD/NA	APEC	DIF. APEC/NA	NA	OECD	DIF. OECD/NA	APEC	DIF. APEC/NA	NA	OECD	DIF. OECD/NA	APEC	DIF. APEC/NA
11_Agriculture	18,813	17,666	-6%	31,635	68%	11,405	6,434	-44%	15,961	40%	58,458	51,855	-11%	62,450	7%	26,569	84,559	218%	39,062	47%

21_ Mining	93,414	95,647	2%	68,822	-26%	53,092	45,439	-14%	22,972	-57%	43,146	-10,548	-124%	63,042	46%	253,924	1,258,734	396%	197,137	-22%
22_ Utilities	1,887	2,410	28%	7,467	296%	461	165	-64%	5,289	1048%	2,159	-3,078	-243%	72,901	3276%	2,814	8,463	201%	28,848	925%
23_Construction	547	524	-4%	3,774	590%	49	-22	-145%	723	1386%	267	-1,122	-520%	57,585	21435%	3,413	38,686	1033%	11,650	241%
31_Sugar and Confectionery Product Manufacturing	21,738	17,572	-19%	32,383	49%	16,109	10,125	-37%	35,563	121%	78,343	62,554	-20%	141,349	80%	214,767	5,934	-97%	108,534	-49%
32_Wood Product Manufacturing	60,972	53,573	-12%	57,936	-5%	21,852	14,343	-34%	38,650	77%	274,131	245,779	-10%	264,390	-4%	416,096	384,411	-8%	266,901	-36%
33_Iron and Steel Mills and Ferroalloy Manufacturing	104,136	89,367	-14%	104,277	0%	100,859	108,736	8%	84,879	-16%	554,407	435,942	-21%	764,006	38%	1,044,348	185,236	-82%	608,463	-42%
42_Retail and wholesale trade	4,731	46,641	886%	3,689	-22%	3	34,115	1319962%	1,693	65407%	6,252	225,868	3513%	48,442	675%	15,557	137,093	781%	24,405	57%
48_Transport	6,038	13,785	128%	19,800	228%	691	14,768	2038%	6,155	791%	44,031	115,163	162%	119,987	173%	34,205	130,723	282%	63,490	86%
49_ Postal Services and Warehousing	1,031	0	-100%	0	-100%	1	0	-100%	0	-100%	8,907	0	-100%	0	-100%	2,112	0	0%	0	0%
51_ Mass media information	5,983	11,027	84%	8,300	39%	255	1,219	379%	4,329	1601%	94,327	98,190	4%	83,235	-12%	28,129	56,455	101%	27,207	-3%
52_Financial services	8,812	10,910	24%	16,256	84%	1,926	1,745	-9%	6,460	235%	96,133	112,176	17%	101,119	5%	82,254	64,087	-22%	69,594	-15%
53_ Rental services	1,780	683	-62%	2,782	56%	16	755	4760%	649	4073%	67,675	10,349	-85%	56,435	-17%	35,394	66,762	89%	22,919	-35%
54_ Professional services	15,151	21,304	41%	4,871	-68%	562	410	-27%	-18	-103%	92,024	217,350	136%	45,611	-50%	89,629	-5,291	-106%	23,102	-74%
55_Management of Companies and Enterprises	49	0	-100%	2,728	5507%	-0	0	-100%	6,813	-43365919%	3,562	0	-100%	95,146	2571%	1,712	0	0%	57,313	-100%
56_Business support services	7,927	0	-100%	0	-100%	0	0	-100%	0	-100%	2,854	0	-100%	0	-100%	12,784	0	0%	0	0%
61_Educational services	1,406	3,148	124%	3,602	156%	-0	257	-1529401%	2,101	-12478628%	3,366	21,450	537%	33,693	901%	3,543	9,169	159%	29,967	746%
62_ Health services	328	508	55%	2,123	548%	-0	142	-1229117%	258	-2226254%	1,537	1,004	-35%	10,389	576%	3,705	47,090	1171%	8,005	116%
71_ Recreational services	712	2,151	202%	4,912	590%	-0	707	-1911148%	548	-1481241%	2,290	11,363	396%	35,747	1461%	2,333	0	100%	15,840	579%
72_Hotels and restaurants	371	6,287	1593%	568	53%	-0	4,649	-302355386%	559	-36374829%	1,730	41,465	2297%	2,891	67%	2,221	2,306	4%	8,365	277%

81_Other services	173	0	-100%	1,723	897%	4	0	-100%	104	2236%	389	0	-100%	610	57%	11,831	525	100%	97	100%
GF_Government	945	1,826	100%	2,315	-100%	0	-21	-100%	1,465	100%	4,397	-607	100%	50,852	-100%	8,642	1,201	-86%	16,448	90%

Domestic value added embodied in foreign final demand.

	CANADA					MEXICO					UNITED STATES					REST OF THE WORLD				
Initiative / Industry	NA	OECD	DIF. OECD/NA	APEC	DIF. APEC/NA	NA	OECD	DIF. OECD/NA	APEC	DIF. APEC/NA	NA	OECD	DIF. OECD/NA	APEC	DIF. APEC/NA	NA	OECD	DIF. OECD/NA	APEC	DIF. APEC/NA
11_Agriculture	20,985	15,363	-27%	18,227	-13%	10,582	6,685	-37%	10,697	1%	43,113	41,424	-4%	40,997	-5%	41,424	123,178	197%	84,375	104%
21_ Mining	38,895	91,103	134%	51,429	32%	18,566	56,781	206%	16,168	-13%	28,743	91,643	219%	53,906	88%	91,643	1,129,363	1132%	161,673	76%
22_ Utilities	5,150	12,261	138%	8,882	72%	112	1,783	1492%	6,494	5697%	9,964	16,824	69%	38,949	291%	16,824	6,103	-64%	86,138	412%
23_Construction	2,244	3,623	61%	5,076	126%	2,295	441	-81%	2,002	-13%	1,454	444	-69%	31,693	2079%	444	19,290	4249%	71,946	16119%
31_Sugar and Confectionery Product Manufacturing	17,015	9,619	-43%	20,141	18%	13,904	6,976	-50%	24,472	76%	52,385	25,346	-52%	69,741	33%	25,346	63,337	150%	144,215	469%
32_Wood Product Manufacturing	73,793	32,278	-56%	53,936	-27%	28,752	13,611	-53%	37,292	30%	306,990	162,535	-47%	234,148	-24%	162,535	207,967	28%	360,649	122%
33_Iron and Steel Mills and Ferroalloy Manufacturing	102,762	49,191	-52%	81,953	-20%	108,963	52,924	-51%	82,094	-25%	485,268	273,994	-44%	451,972	-7%	273,994	116,226	-58%	595,057	117%
42_Retail and wholesale trade	5,132	54,667	965%	15,026	193%	1,125	58,168	5073%	9,086	708%	30,894	243,161	687%	90,941	194%	243,161	191,941	-21%	116,280	-52%
48_Transport	9,383	20,538	119%	17,427	86%	695	17,164	2369%	5,553	699%	25,766	99,703	287%	86,321	235%	99,703	127,637	28%	115,175	16%
49_ Postal Services and Warehousing	1,727	-	-100%	-	-100%	586	-	-100%	-	-100%	7,383	-	-100%	-	-100%	-	-	0%	-	0%
51_ Mass media information	10,101	12,125	20%	4,892	-52%	911	1,405	54%	2,803	208%	70,448	98,748	40%	49,547	-30%	98,748	126,790	28%	67,088	-32%

52_Financial services	11,016	24,434	122%	18,807	71%	1,023	3,381	231%	4,569	347%	9,149	141,670	1448%	77,677	749%	141,670	58,341	-59%	109,279	-23%
53_ Rental services	4,995	7,385	48%	6,540	31%	1,861	5,559	199%	2,507	35%	87,389	60,960	-30%	71,995	-18%	60,960	103,963	71%	91,891	51%
54_ Professional services	14,220	38,479	171%	5,180	-64%	649	14,055	2067%	86	-87%	53,597	287,244	436%	41,772	-22%	287,244	14,380	-95%	34,536	-88%
55_Management of Companies and Enterprises	2,630	-	-100%	14,616	456%	1,448	-	-100%	6,791	369%	9,289	-	-100%	120,515	1197%	-	-	0%	79,633	-100%
56_Business support services	8,929	-	-100%	-	-100%	3,767	-	-100%	-	-100%	81,945	-	-100%	-	-100%	-	-	0%	-	0%
61_Educational services	1,263	3,040	141%	3,031	140%	101	353	250%	1,454	1342%	24,025	35,646	48%	23,100	-4%	35,646	16,107	-55%	48,787	37%
62_ Health services	740	7,834	959%	2,119	187%	9	468	5364%	169	1877%	8,698	1,687	-81%	7,271	-16%	1,687	37,723	2136%	30,930	1734%
71_ Recreational services	1,176	4,038	243%	4,870	314%	0	689	262106%	574	218173%	7	10,384	142632%	28,890	397009%	10,384	-	-100%	43,130	315%
72_Hotels and restaurants	1,308	6,094	366%	1,631	25%	93	3,452	3617%	977	952%	4,484	29,408	556%	8,976	100%	29,408	5,617	-81%	37,356	27%
81_Other services	1,490	-	-100%	861	-42%	600	-	-100%	156	-74%	11,176	-	-100%	877	-92%	-	10,380	100%	3,663	-100%
GF_Government	-	2,956	-100%	2,364	-100%	-	70	100%	1,079	100%	-	14,331	100%	32,088	100%	14,331	8,917	-38%	40,043	179%

Foreign value added embodied in domestic final demand

	CANADA					MEXICO					UNITED STATES					REST OF THE WORLD				
Initiative / Industry	NA	OECD	DIF. OECD/NA	APEC	DIF. APEC/NA	NA	OECD	DIF. OECD/NA	APEC	DIF. APEC/NA	NA	OECD	DIF. OECD/NA	APEC	DIF. APEC/NA	NA	OECD	DIF. OECD/NA	APEC	DIF. APEC/NA
11_Agriculture	12,375	11,643	-6%	16,943	37%	10,979	8,452	-23%	11,652	6%	179,954	67,153	-63%	80,859	-55%	67,153	88,978	32%	44,841	-33%

21_ Mining	19,156	45,081	135%	22,138	16%	7,019	25,970	270%	12,860	83%	124,733	398,541	220%	183,541	47%	398,541	184,440	-54%	64,637	-84%
22_ Utilities	4,404	7,637	73%	11,186	154%	2,688	5,123	91%	7,762	189%	18,688	49,080	163%	75,634	305%	49,080	44,376	-10%	45,881	-7%
23_Construction	2,870	1,388	-52%	9,653	236%	2,169	853	-61%	6,191	185%	18,076	12,691	-30%	60,554	235%	12,691	36,676	189%	34,319	170%
31_Sugar and Confectionery Product Manufacturing	28,530	16,531	-42%	24,916	-13%	18,792	8,721	-54%	18,990	1%	165,530	102,807	-38%	138,447	-16%	102,807	77,925	-24%	76,216	-26%
32_Wood Product Manufacturing	76,760	42,488	-45%	72,605	-5%	63,552	34,979	-45%	58,656	-8%	397,329	220,812	-44%	337,539	-15%	220,812	337,592	53%	217,224	-2%
33_Iron and Steel Mills and Ferroalloy Manufacturing	174,796	92,979	-47%	135,914	-22%	129,871	62,765	-52%	106,664	-18%	782,142	418,519	-46%	570,232	-27%	418,519	560,016	34%	398,265	-5%
42_Retail and wholesale trade	15,495	70,145	353%	21,537	39%	9,395	43,535	363%	15,244	62%	77,770	297,052	282%	104,195	34%	297,052	396,462	33%	90,357	-70%
48_Transport	9,374	24,148	158%	17,801	90%	6,604	19,049	188%	12,515	90%	64,860	129,496	100%	98,373	52%	129,496	191,183	48%	95,787	-26%
49_ Postal Services and Warehousing	4,426	0	-100%	0	-100%	2,531	0	-100%	0	-100%	23,827	0	-100%	0	-100%	0	-	0%	0	0%
51_ Mass media information	16,479	30,619	86%	11,275	-32%	8,577	7,384	-14%	6,475	-25%	84,863	68,978	-19%	52,742	-38%	68,978	223,354	224%	53,838	-22%
52_Financial services	9,122	25,276	177%	15,127	66%	2,167	11,232	418%	11,180	416%	21,762	106,984	392%	95,610	339%	106,984	24,349	-77%	88,417	-17%
53_ Rental services	11,556	11,589	0%	13,653	18%	8,286	5,987	-28%	10,391	25%	64,529	38,220	-41%	75,969	18%	38,220	226,804	493%	72,920	91%
54_ Professional services	8,740	44,715	412%	5,720	-35%	4,285	18,734	337%	4,607	8%	63,255	182,817	189%	29,413	-54%	182,817	17,145	-91%	41,834	-77%
55_Management of Companies and Enterprises	1,925	0	-100%	20,736	977%	1,094	0	-100%	11,478	950%	10,781	0	-100%	72,244	570%	0	-	0%	117,097	100%
56_Business support services	14,590	0	-100%	0	-100%	7,839	0	-100%	0	-100%	52,193	0	-100%	0	-100%	0	-	0%	0	0%
61_Educational services	3,944	6,357	61%	9,151	132%	2,430	2,354	-3%	3,522	45%	15,671	11,244	-28%	37,067	137%	11,244	18,111	61%	26,632	137%
62_ Health services	11,377	2,576	-77%	4,253	-63%	5,186	1,566	-70%	2,554	-51%	49,963	22,764	-54%	24,814	-50%	22,764	38,659	70%	8,869	-61%

71_ Recreational services	1,697	3,217	90%	8,773	417%	980	1,260	29%	3,725	280%	10,624	15,090	42%	34,030	220%	15,090	-	-100%	30,936	105%
72_Hotels and restaurants	732	7,786	964%	5,062	592%	332	2,448	638%	3,607	988%	3,014	34,041	1029%	30,912	926%	34,041	14,718	-57%	9,359	-73%
81_Other services	5,719	0	-100%	700	-88%	2,999	0	-100%	302	-90%	29,337	0	-100%	3,342	-89%	0	9,078	100%	1,213	100%
GF_Government	0	2,240	100%	7,325	100%	0	1,294	100%	3,828	100%	0	6,848	100%	31,376	100%	6,848	27,624	303%	33,044	383%