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Changing Growth Drivers in the ASEAN+3 Region: An Import-Adjusted GDP Component Approach

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Abstract

Conventional method of analysing GDP by demand components typically allocates imports exclusively to exports—where total imports are deducted from total exports to get net exports as a measure of external demand. This simplistic approach underestimates the importance of exports and overestimates the importance of domestic demand, as it does not adequately capture the role of imports in the production and consumption process, resulting in a distorted picture of both export performance and domestic economic activity. This paper presents an import-adjusted GDP component approach, to give a better decomposition of the sources of economic growth in ASEAN+3 by demand components. The analytical framework, using input-output tables, involves a detailed analysis of the sectoral interactions and the contribution of imported inputs to domestic production and consumption. This framework allows effective separation of value-added by domestic production and consumption from the value derived from imported inputs. The results showed that since the mid-2000s, domestic demand has gained a bigger share in regional aggregate demand. Rapid urbanization and the emergence of a large middle class have contributed to the region's growth rebalancing, with domestic demand playing a key role in anchoring the region's resilient growth. Progress in regional integration—particularly between ASEAN and the Plus-3 economies—have provided the added impetus to growth while fostering closer cooperation between one another.

JEL classification: C67, F47, O40

Keywords: ASEAN+3, import-adjusted GDP, input-output analysis, regional economic analysis, cross-country comparison, growth drivers

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[2] The authors would like to thank Dr Hoe Ee Khor for useful comments. All remaining mistakes are the responsibility of the authors.

Abbreviations

AMRO	ASEAN+3 Macroeconomic Research Office
ASEAN	Association of South-East Asian Nations (Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand, Vietnam)
ASEAN-4 & VN	Indonesia, Malaysia, Philippines, Thailand and Vietnam
ASEAN+3	ASEAN plus China (including Hong Kong), Japan, Korea
COVID-19	Coronavirus disease 2019
GFC	Global Financial Crisis
I-O	Input-Output
MRIO I-O	Multiregional Input-Output
IMF	International Monetary Fund
OECD	Organization for Economic Co-operation and Development

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I. Introduction

The ASEAN+3 region, comprising 10 members of the Association of Southeast Asian Nations (ASEAN) and China; Hong Kong, China; Japan; and Korea represents one of the most economically vibrant and diverse regions in the world.[3] Over the past several decades, the region has experienced rapid economic growth, driven by a mix of export-oriented industrialization, increasing domestic consumption, and substantial foreign direct investment. However, this growth has not been evenly distributed across the region, with each country exhibiting distinct economic structures, different levels of development, and varying degrees of integration into the global economy.

Understanding the key drivers of economic growth in this diverse region is crucial for both national policymakers and international stakeholders. Traditional approaches to growth analysis often rely on gross domestic product (GDP) as a primary indicator. While GDP provides a broad measure of economic activity, it does not fully capture the complexities of modern economies, particularly in regions like ASEAN+3 where trade plays a pivotal role. One limitation of conventional GDP analysis, where gross values are used, is that it does not accurately capture the role of imports in the computation of sectoral value-added, potentially leading to its overestimation (Miller and Blair, 2009; Johnson and Noguera, 2012; Timmer and others, 2015).

To address these limitations, this paper introduces an import-adjusted GDP component approach to decompose the growth drivers in ASEAN+3. By adjusting GDP components for imports, this method allows for a more accurate analysis of each sector's contribution to economic growth. While the conventional approach to measuring GDP is useful for deriving the contribution of net trade, i.e., net exports to GDP growth, it leads to an overestimation of the contributions of domestic expenditure categories (private consumption, public consumption and investment) and an underestimation of external demand contribution. This can result in misinterpretations of the fundamental growth drivers because the imports in each expenditure component are not netted out.

By decomposing demand expenditures into its import-adjusted GDP components, the study aims to pinpoint which sectors and activities are the primary drivers of economic expansion. This involves analyzing how much of the growth of each sector can be attributed to domestic value-added versus imported inputs, allowing for a clearer identification of sectors that contribute most significantly to value-add in the economy. Understanding these sectoral growth patterns over time and their interdependence is crucial for informing policy decisions. This insight is particularly valuable in the face of rising structural challenges such as intensifying geostrategic competition among global superpowers, which can affect trade policies and economic stability. Additionally, shifting global and regional supply chains can impact domestic production and trade dynamics, while the rapid transformation in the digital space introduces new economic opportunities and disruptions. Addressing these challenges requires a nuanced understanding of how imports and domestic activities interact to shape overall economic performance, enabling policymakers to design strategies that harness growth drivers while mitigating risks associated with external and technological changes.

[3] For brevity, Hong Kong, China is referred to as Hong Kong, and Brunei Darussalam as Brunei.

This paper is structured as follows. Section II summarizes the literature on economic growth decomposition and the role of imports in growth accounting. Section III describes the analytical framework, methodology and data used in this study. Section IV discusses the major results and analysis, while Section V concludes.

II. Literature Review

A. Overview of GDP Measurement (Conventional Approach and its Criticisms)

Gross Domestic Product (GDP) measures the total value added of goods and services produced by an economy within a specific time period and has been used as a standard measure to assess the economic performance for over 70 years (Masterson, 2022). As an essential indicator of economic health and development, GDP is widely used to measure economic performance and growth prospects across countries. Accurate GDP measurement is crucial for effective economic assessment, resource allocation, and policymaking, as it provides the foundation for understanding the overall state of an economy.

The concept of GDP has evolved significantly since its inception. It was first introduced in 1937 by economist Simon Kuznets as a tool to assess the economic performance of countries and the impact of the Great Depression. Subsequently, GDP gained prominence during the 1944 Bretton Woods Conference, where the International Monetary Fund (IMF) and the World Bank were established (IMF 2024). Since then, GDP has become the global standard yardstick for measuring a country's economic output (Dickinson Elizabeth, 2011).

GDP is calculated using three different approaches: production, income, and expenditure. Among these, the expenditure approach is the most commonly used method for developed economies (Vanham Peter 2021). This method provides a straightforward way to analyze the net contribution of foreign trade to GDP growth by focusing on expenditures made by households, businesses, government, and net exports (exports minus imports). However, the exclusive attribution of imports solely to exports in this approach can lead to misinterpretations. It often results in an underestimation of exports' contributions to economic growth and an overestimation of domestic expenditure categories such as private consumption, public consumption, and investment (Kranendonk and Verbruggen, 2008). This misrepresentation can obscure the true drivers of economic growth, complicating effective policy design and decision-making.

The conventional practice of using GDP to measure economic performance has also been criticized for not comprehensively capturing the economic well-being, sparking ongoing debates among economists and policymakers. While GDP effectively captures the monetary value of goods and services produced, it does not account for the distribution of income, environmental degradation, or the overall quality of life within a country. For instance, GDP growth may occur alongside rising inequality or depletion of natural resources, leading to potentially misleading conclusions about a nation's prosperity. Alternative metrics, such as the Human Development Index (HDI) or measures of well-being and sustainability, have been proposed to complement GDP in offering a more comprehensive view of economic progress. These complementary measures help address the shortcomings of GDP by incorporating social, environmental, and equity considerations into the assessment of

economic performance, ensuring a more holistic approach to policymaking and resource allocation.

B. Methods for Adjusting Imports Across Demand Components

(I) Common Methodologies

A widely used methodology to address the limitations of the conventional GDP measures is input-output (I-O) analysis. This foundational approach, contributed by Leontief (1986), established the use of I-O tables for understanding inter-industry relationships and their impact on economic measurement. The framework provides a detailed account of the flow of goods and services between sectors, while effectively incorporating the effects of imports into the GDP adjustments. This approach helps to segregate the contribution of domestic production more accurately, thereby providing a useful analytical framework to estimate the import-adjusted sectoral value-added.

Empirical research using I-O analysis to gauge sectoral value-added showed significant variations in economic performance after adjusting for imports. At the country level, Radovan (2022) argued that the conventional approach to GDP measurement significantly distorts the actual contribution to economic activity in Slovenia by underestimating the contribution of exports to growth. Likewise, misleading aspects of net exports derived using the conventional method of national growth accounting were also discussed in a study by Khazanah Research Institute (2018), where the authors found that the importance of exports in Malaysia is understated because it only shows the net amount after deducting total imports, a large part of which are meant to satisfy both final consumption and investment, and as well as intermediate inputs used for further production. Study by Dietzenbacher and Los (2012) further emphasized that an import-adjusted GDP measure can provide more accurate information on the contribution of domestic industries to economic growth, which can be important for industrial policy.

At a regional level, AMRO (2020) provides a comprehensive analysis using the import-adjusted method for analyzing longer-term structural developments in the ASEAN+3 region in the context of growth rebalancing and shifts in global value chains. The study highlighted that China and the developing economies of ASEAN, which had historically relied on the United States and Europe as key export markets, experienced a collapse in external demand during the Global Financial Crisis (GFC) and the European sovereign debt crisis. A major rebalancing of growth towards domestic demand took place, as governments in these economies undertook expansionary macroeconomic policies to boost domestic investment and spur domestic consumption. However, in the more mature high-income ASEAN+3 economies with slower growth rates, aging populations, and relatively saturated consumer markets (Japan, Hong Kong, Singapore), the study found that the contribution of external demand to GDP was relatively stable in the 10 years from 2005 to 2015.

At the global level, the Global Value Chain (GVC) analysis extends the I-O framework to incorporate global trade dynamics, focusing on how different stages of production contribute to value-added in various countries. This method, as discussed by Gereffi and Fernandez-Stark (2016), examines the role of imports and exports in shaping domestic value-added and growth, offering a more nuanced understanding of economic contributions in a globalized context. Studies like those by Koopman, Wang, and Wei (2014) employ the GVC analysis using data from global I-O tables to decompose GDP into components that reflect both domestic and foreign contributions. The use of such methodologies has been critical in understanding the impact of global trade dynamics on national economies. For example, Timmer and others (2015) conducted an in-depth analysis of the World I-O Database to explore the role of imports in domestic value-added in global automotive production. Their findings emphasize the importance of using import-adjusted metrics to accurately assess sectoral contributions to economic growth.

Similarly, Kranendonk and Verbruggen (2008) argued that import adjustment plays an important role for economies which are highly integrated into global trades because it provides a clearer picture of the actual domestic contribution after netting out imports from all expenditure categories. This approach allows for a more accurate measurement of economic growth by distinguishing between domestic value-added and imported content.

(II) Limitations of I-O Analysis

The Input-Output (I-O) analysis method employed in this report is referred to as the 'quantity' model, also known as the 'Leontief' model. This model illustrates how shifts in one sector—specifically a demand shock in this context—can create ripple effects across other sectors within the economy (Leontief, 1936). While the model is valuable, it does have limitations from both theoretical and practical perspectives.

A major limitation is that I-O tables are typically compiled or published infrequently, often only once every five years, leading to significant time lags in the data (Oosterhaven, 1988). However, the frequency can vary depending on the country's statistical practices and resources. In some cases, annual I-O tables are produced, often as part of broader national accounts, but these may rely on estimates and extrapolations rather than new survey data (United Nations, 1999). The infrequent updating of I-O tables can lead to data that may not fully reflect recent economic changes, especially in rapidly evolving economies (Dietzenbacher and Los, 1998).

Other significant limitations stem from the underlying assumptions of the model and the constraints posed by the lack of sufficiently comprehensive and detailed data. The key assumptions are set out below.

***Fixed production structure*.** In many empirical studies, including the decomposition of real GDP using import-adjusted GDP components, a constant return to scale is typically assumed (Miller and Blair 2009). This implies that the ratio of inputs used in the production process remains fixed, regardless of the scale of production. This assumption is characteristic of a short-run model, which does not account for increasing or diminishing returns to scale, specialization, or technological advancements that could alter productivity as the scale of production changes.

***Perfectly elastic supply curve*.** Another key assumption is that the supply is assumed to respond perfectly to any demand shocks without any changes in price—meaning that if consumer demand for goods or services increases, producers can meet this demand without adjusting their prices (Dixon and Rimmer, 2002). This assumption aligns more closely with short-run market conditions, where price stickiness prevents any immediate price adjustments, i.e., it does not account for long-run adjustments in prices (Samuelson and Nordhaus 2010).

***Absence of a dynamic interconnectedness within industries*.** Each industry or sector in an input-output (I-O) table encompasses a range of economic activities that can vary in scale and connectivity. While the overall interlinkages within an industry or sector is not expected to be constant, it is assumed that the production patterns of individual economic activities will remain unchanged as the sector develops (Dietzenbacher 1992).

***Interdependencies across countries*.** I-O analyses typically fall short in capturing production interdependencies between sectors across different countries. Specifically, the analysis lacks a comprehensive and detailed depiction of global economic network structures (Inomata 2009).

III. Analytical Framework, Methodology and Data Sources

A. Analytical Framework

The analytical framework for the decomposition of regional growth drivers using import-adjusted GDP components involves a detailed analysis of the sectoral interactions, and the impact of imported inputs on domestic production. I-O tables, which are central to this analytical framework, capture how industries use inputs from other sectors of the economy to produce goods and services, including the role of imported intermediate goods. This allows effective separation of value-added by domestic production from the value derived from imported inputs.

B. Methodology

(I) Decomposition of real GDP

The conventional approach to the (demand-side) real GDP decomposition uses the basic expenditure components from the national accounts as illustrated in the following formula.

$$Y_t = C_t + G_t + I_t + (X_t - M_t) \quad (1)$$

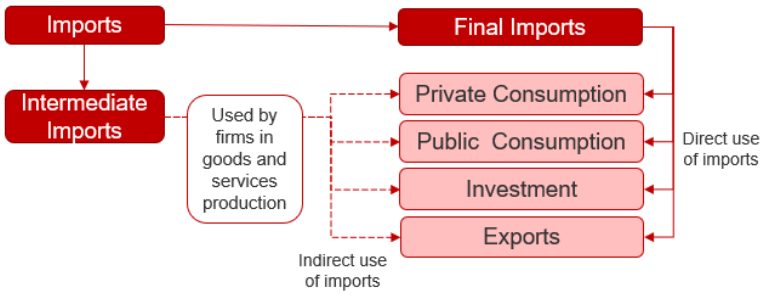
where, Y denotes GDP; C (private consumption); G (public consumption); I (investment); X (exports of goods and services); M (imports of goods and services); and t is the time subscript.

From Equation (1), it is clear what the (net) contribution of foreign trade (or net exports) has been to economic growth, as this approach allocates imports exclusively to exports. This method, however, overlooks the broader role that imports—both final goods ready for

consumption and intermediate goods used in production—play in satisfying domestic demand. As shown in Figure 1, imports are not solely tied to exports but are alsoused as inputs into various components of domestic consumption and investment.

In order to accurately capture the dynamics of economic growth, it is necessary to adjust imports across various demand-side expenditure categories such as household consumption, government spending, and investment (gross fixed capital formation). This adjustment provides a more nuanced understanding of the underlying growth drivers within the economy.

Figure 1. Direct and Indirect Use of Imports



Source: AMRO staff

The alternative method to decomposing real GDP that incorporates these import adjustments, initially proposed by Kranendonk and Verbruggen 2008, is known as the import-adjusted GDP component approach (Equation (2)).

$$GDP_t = \underbrace{(C_t - M_t^C)}_{\text{Private consumption, net of imports}} + \underbrace{(G_t - M_t^G)}_{\text{Public consumption, net of imports}} + \underbrace{(I_t - M_t^I)}_{\text{Investment, net of imports}} + \underbrace{(X_t - M_t^X)}_{\text{Export, net of imports}} \quad (2)$$

where,

M^C : final and intermediate goods imports for private consumption;
M^I : final and intermediate goods imports for investment;
M^G : final and intermediate goods imports for public consumption;
M^X : final and intermediate goods imports for exports.

The contributions of each expenditure category to real GDP growth can be derived, as shown in Equation (3).

$$\Delta y_t = \left(\frac{C_{t-1}}{Y_{t-1}}\Delta c_t - \frac{MC_{t-1}}{Y_{t-1}}\Delta mc_t\right) + \left(\frac{G_{t-1}}{Y_{t-1}}\Delta g_t - \frac{MG_{t-1}}{Y_{t-1}}\Delta mg_t\right) + \left(\frac{I_{t-1}}{Y_{t-1}}\Delta i_t - \frac{MI_{t-1}}{Y_{t-1}}\Delta mi_t\right) + \left(\frac{X_{t-1}}{Y_{t-1}}\Delta x_t - \frac{ME_{t-1}}{Y_{t-1}}\Delta mx_t\right) \quad (3)$$

where the delta and the corresponding lower cases y, c, g, i, x, m, mc, mg, mi, mx are the annual growth rates.

(II) Estimation of imports attributed to each demand components

The estimation of the imports attributed to each demand component demand relies on the symmetric I-O tables comprising the domestic output, imports and primary inputs tables. The domestic output table shows how each product (in industry i) is used either as an intermediate input in the production of other products, or to satisfy final demand. Similarly, the imports table shows how each product is used either as an intermediate input in the production of other products, or to satisfy direct final demand. Meanwhile, the primary inputs table shows how primary inputs (such as labor, capital) contribute to the production of goods and services in an economy (Table 2).

Table 2(a). Illustrative I-O Table Representation for Domestic Output and Imports

	Intermediate demand			Final demand				Output
	Industry i	…	Industry n	C	G	I	X	
Industry i ⋮ Industry n	$\boldsymbol{A}$			$\boldsymbol{F}$				
Industry i (imports) ⋮ Industry n (imports)	$\boldsymbol{M\_I}$			$\boldsymbol{M\_F}$				
⋮								
Value-added								
Output								

Source: AMRO staff

Table 2(b). Illustrative I-O Table Representation for Primary Inputs

	Industry i	…	Industry n
Primary input i	$\boldsymbol{P}$		
⋮			
Primary input p			

Source: AMRO staff

where,

$\boldsymbol{A}$: Matrix of domestically produced intermediate demand (or technical coefficient matrix), showing the direct input requirements needed from various industries to produce one unit of output in each industry.

$\boldsymbol{F}$: Matrix of domestically produced final demand, capturing the demand for goods and services that are not used as intermediate inputs in the production process but are instead consumed directly by final users, such as households, governments, and for export.

$\boldsymbol{M\_I}$: Matrix of intermediate imports, capturing the value of imported goods and services that are used as inputs in the production process of other goods and services within the domestic economy.

$\boldsymbol{M\_F}$: Matrix of final imports, showing the value of imported goods and services that are directly consumed as final demand rather than being used as intermediate inputs.

$\boldsymbol{P}$: Matrix of primary input matrix, showing the amounts of primary inputs required per unit of output across various industries.

The cumulative production structure (CPS) matrix is then estimated to determine the imports associated with each demand component within a given economy. The CPS matrix extends the I-O table by incorporating the cumulative effects of production processes across the entire supply chain. By doing so, it allows for the disaggregation of total imports into those that are directly linked to final demand components, and those that are indirectly required through inter-industry linkages.

In matrix form, the CPS matrix is shown in Equation (4), while a table form of the CPS matrix is shown in Table 3. See Appendix IV for detail technical derivation of the CPS matrix.

$$CPS = P\ (I - A)^{-1}.\ F \tag{4}$$

Table 3. CPS for a Representative Economy

	Private Consumption	Public Consumption	Investment	Exports
	Local Currency (Billions)			
Real GDP (import-adjusted)	$\mathrm{C} - \mathrm{M}^{\mathrm{C}}$	$\mathrm{G} - \mathrm{M}^{\mathrm{G}}$	$\mathrm{I} - \mathrm{M}^{\mathrm{I}}$	$\mathrm{X} - \mathrm{M}^{\mathrm{X}}$
Imports	M^{C}	M^{G}	M^{I}	M^{X}
- Intermediate	$M^{C,int}$	$M^{G,int}$	$M^{I,int}$	$M^{X,int}$
- Final	$M^{C,final}$	$M^{G,final}$	$M^{I,final}$	$M^{X,final}$
Total demand	$\mathbf{C} + \mathbf{M}^{\mathbf{C}}$	$\mathbf{G} + \mathbf{M}^{\mathbf{G}}$	$\mathbf{I} + \mathbf{M}^{\mathbf{I}}$	$\mathbf{X} + \mathbf{M}^{\mathbf{X}}$

Source: AMRO staff

C. Data

This section describes the database and data sources used to estimate the import-adjusted GDP components, covering 14 economies in ASEAN+3 economies. For purposes of consistency, this study uses the harmonized I-O tables, sourced from the OECD Structural Analysis (STAN) database, which are available from 1995 to 2018.[4] [5] Other relevant data, including real GDP, weights for computing regional (or sub-regional) GDP, are sourced from national authorities and other financial institutions, including the International Monetary Fund and World Bank.

This study uses both the 2018 and 2021 OECD STAN editions of I-O tables. While the 2021 edition provides a more comprehensive country coverage, it does not include the primary inputs matrix. The primary inputs matrix from the 2018 edition is used instead, as a basis for extrapolation for all economies, except Lao DPR and Myanmar, due to data unavailability.[6] For these two economies, the share of Cambodia's value-added components is used as a proxy. See Appendix VI for a description of the data availability.

[4] Using harmonized I-O tables offers three key advantages. First, it ensures that data across different economies are standardized according to a common framework. This consistency allows for accurate comparisons and aggregations, reducing discrepancies that can arise from different methodologies or definitions used by individual countries. Second, by aligning data formats and classifications, harmonized tables facilitate meaningful comparisons of economic structures, sectoral interactions, and trade relationships between countries. This is crucial for understanding how economies are interlinked in a global context. Third, harmonization allows for a more comprehensive analysis of global value chains and the flow of goods and services across borders. It helps identify how changes in one economy can impact others and provides insights into the global distribution of production and consumption.

[5] For individual country analysis, using nationally compiled I-O tables would be preferred, given the availability of detailed sectoral data and consistency with national accounts.

[6] The primary inputs matrix (or value-added components) is comprised of 1) compensation of employees; 2) other taxes less subsidies on production; and 3) gross operating surplus and mixed income.

Given the unavailability of more recent harmonized I-O tables, i.e., from 2019 to 2023, the import-adjusted GDP components are estimated by applying the growth rate of conventional GDP components in each corresponding year, as a means of approximation.

As the OECD I-O databases are compiled in nominal US dollar terms, there will be minor differences when the estimated results are compared with official data reported by national authorities, which is typically denominated in local currencies. To ensure consistency with the real GDP growth rates reported by national authorities, we use the authorities' aggregate real GDP and apply the nominal import shares derived using the CPS matrix across expenditure categories.

IV. Results and Analysis

This section compares and contrasts the results of the decomposition of real GDP using both the conventional and import-adjusted methods. The results showed significant differences between both approaches, highlighting contrasting narratives about the evolution of key growth drivers in ASEAN+3 over the past two decades.

Pre-Global Financial Crisis (GFC)

In Figure 3a (left panel), the conventional method of real GDP decomposition shows that the contribution to GDP growth from external demand is largely insignificant and is occasionally negative (as seen during the GFC and its subsequent recovery in 2008–2011). The import-adjusted method shows a different picture altogether. Figure 3a (right panel) shows that exports played a crucial role during pre-GFC years (1996–2007), contributing one-third of the region's overall growth. Focusing on ASEAN-4 (Indonesia, Malaysia, the Philippines, Thailand) and Vietnam, the results are even more striking. Figure 3b (right panel) shows that more than half of the growth during pre-GFC years came from exports, whereas the conventional approach only captured one-fifth of the contribution—a significant underestimation. These observations are consistent with the findings in AMRO (2020), clearly showing that the conventional method tends to underestimate the role of external demand in driving growth.

Figure 3a. ASEAN+3: Contribution to Real GDP Growth (Demand-Side)

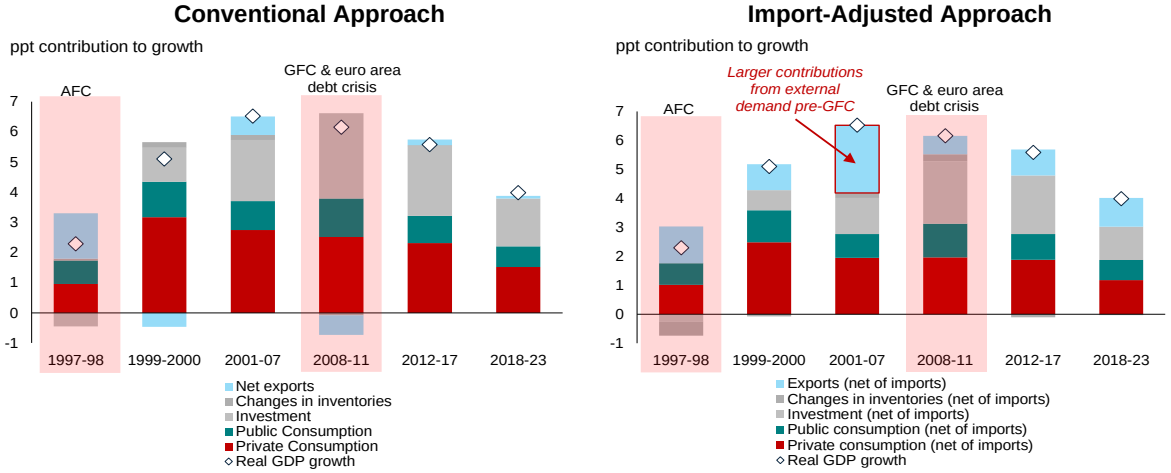
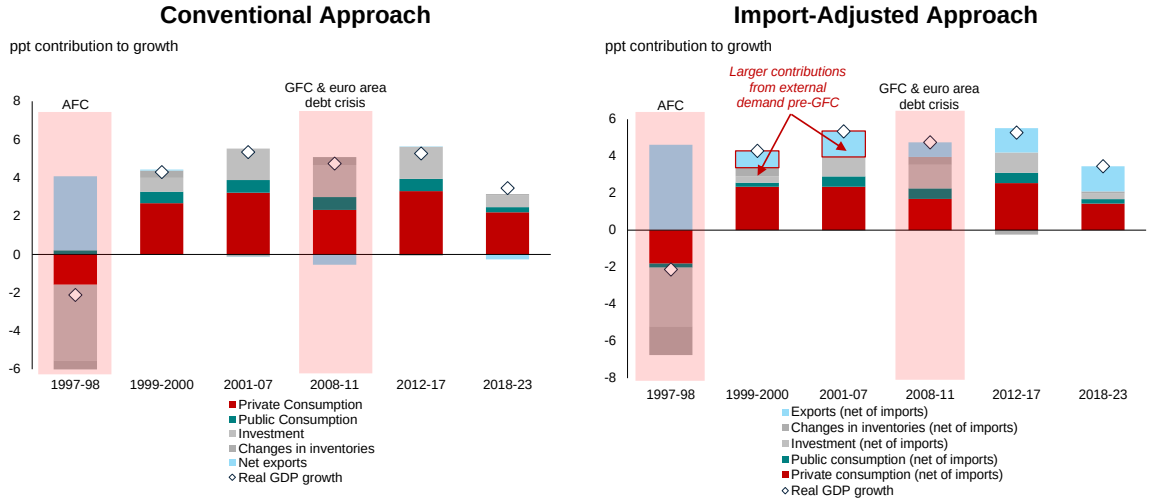


Figure 3b. ASEAN-4 and Vietnam: Contribution to Real GDP Growth (Demand-Side)



Source: National authorities; OECD; IMF; World Bank; AMRO staff estimates.
Note: Statistical discrepancies are not shown. AFC = Asian Financial Crisis; GFC = Global Financial Crisis; ASEAN-4 refers to Indonesia, Malaysia, the Philippines and Thailand. Growth is aggregated based on simple averages. See Appendix I for the results for individual economies.

Post-GFC (2012 to Present)

(I) Rebalancing of growth drivers towards regional domestic demand

The GFC was a historic milestone for the global economy. It marked a key turning point in the global macroeconomic landscape (Park and others 2013). The period since then was characterized by an era of diminished global growth expectations and more frequent financial market turbulence. Despite the adverse implications on global growth and financial stability, the crisis had a relatively limited short-term impact on regional economies.

During this period, domestic demand across most regional economies remained robust, mitigating the drag from sluggish global trade. Targeted fiscal packages undertaken by regional authorities were instrumental in boosting domestic investments especially in infrastructure and real estate, while monetary easing helped to spur domestic consumption. Of significance, the rapid growth of China—bolstered by its RMB4 trillion fiscal stimulus—had large positive spillovers to the region, which cushioned the impact of weak external demand from the US and the euro area. China's stimulus package was heavily focused on infrastructure development, which provided opportunities for ASEAN economies (namely Cambodia, Indonesia, Lao PDR, Malaysia and Vietnam) to participate in cross-border projects, thereby fostering investment within the region.[7]

[7] The continued increase in investment is in line with regional economies' efforts to ramp up their infrastructure investment to enhance competitiveness and connectivity. For example, Indonesia embarked on an ambitious infrastructure development plan (worth around USD303.1 billion to be carried out over the period 2016–2020), involving road and dam construction, train networks and airports, among others (AMRO 2018). In the Philippines, the ambitious program "Build, Build, Build" worth approximately USD160 billion had also been implemented from 2017–2022 to help tackle the country's infrastructure bottlenecks. Thailand's USD45 billion Eastern Economic Corridor, launched in 2017, will also provide impetus to growth.

At a time when growth in major advanced economies was weak, the region saw a fundamental rebalancing of growth drivers towards domestic demand, which anchored the region's robust growth over the past decade (Hinojales and others 2023; AMRO 2019; AMRO 2020). Table 4 compares the average contribution to growth of domestic demand and exports across two periods: 2001-07 (pre-GFC) to 2008-11 (GFC & euro area debt crisis) for ASEAN-4 and Vietnam. Clearly, the contribution of exports to growth dropped significantly, from an average of +1.4 percentage points during pre-GFC to just +0.8 percentage point in 2008-11, reflecting the impact on the region's export-driven economies.

Table 4. ASEAN-4 and Vietnam: Drivers of Growth (Domestic Demand vs Exports)

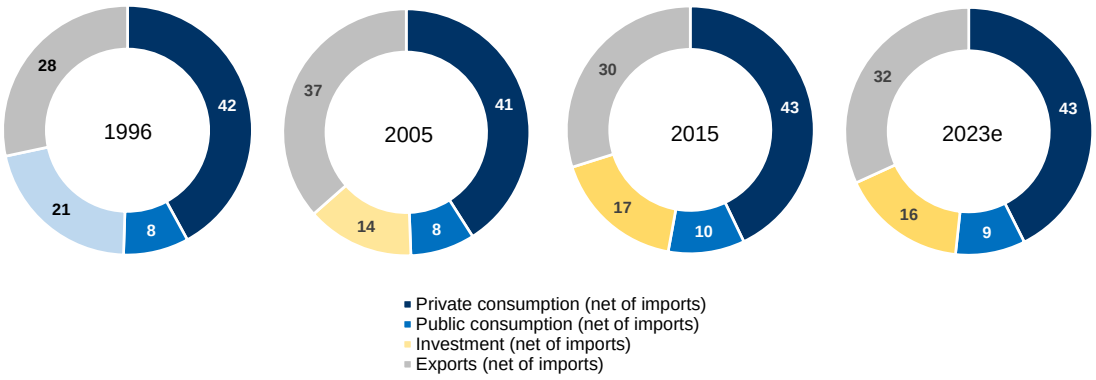
	Pre-GFC (2001–07)	GFC & euro area debt crisis (2008-11)
	Percent point contribution to growth	
Real GDP growth	**5.3**	**4.7**
Contributions from:		
- Domestic demand (net of imports)	3.9	4.0
- Exports (net of imports)	1.4	0.8

Source: AMRO staff.
Note: Data may not add up due to rounding.

The emerging strength of regional domestic demand is underpinned by several favorable fundamentals. The rapid pace of urbanization has spurred the growth of cities and the emergence of new economic hubs, boosting demand for housing, infrastructure, and services. A rising middle class, with greater disposable income, has driven higher consumption levels, especially in sectors like retail, healthcare, and education. Additionally, advancements in regional integration—via trade agreements, infrastructure connectivity, and financial cooperation—have bolstered intra-regional trade and investment flows, reducing ASEAN+3's reliance on external demand, particularly from major advanced economies such as the US and Europe.

This is corroborated in Figure 5, which shows that the shares of exports in real GDP rose from 28 percent in 1996 to a peak of 37 percent in 2005, and then shrank to an estimated 32 percent in 2023. To some extent, the declining exports reflect the "slowbalization" of global trade post-GFC, following the rise in protectionism, geopolitical tensions, and a shift towards regionalization and reshoring of production activities.

Figure 5. ASEAN-4 and Vietnam: Shares of Domestic Demand vs Exports in Real GDP (Import-Adjusted Approach)



Source: National authorities; OECD; AMRO staff estimates.
Note: The shares do not necessarily add-up, as changes in inventories and statistical discrepancies are not shown. Regional aggregations are based on simple averages. The results for each individual ASEAN+3 economies are shown in Appendix II.

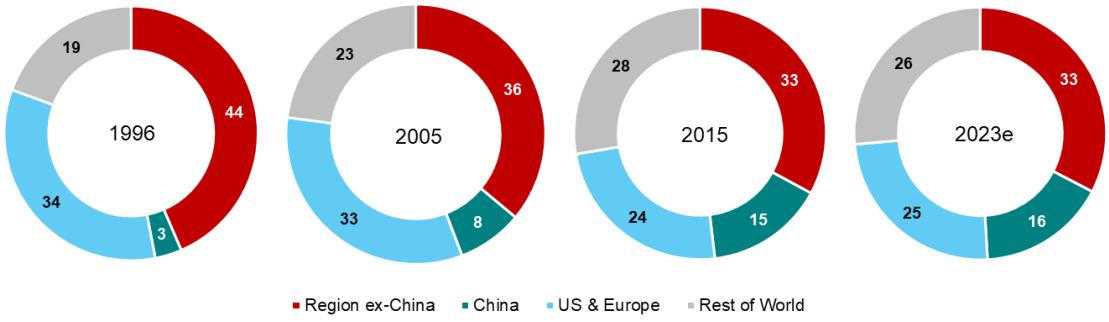
(II) Reorientation of exports to meet regional final demand

Even though the primary growth engine has shifted to domestic demand post-GFC, exports remain an important growth engine, particularly for trade-dependent regional economies. In Singapore, Korea, Vietnam and Cambodia, exports continue to make up a significant contribution to growth, unlike the more domestic-oriented economies such as Indonesia and the Philippines.

The growth rebalancing story also coincided with the transformation of the region's export sector, notably in ASEAN, as industries respond to the changing sources of demand. The pivot towards regional domestic demand over the past decade is reflected in a gradual decline in the share of goods exports from ASEAN that are bound for traditional markets such as the US and Europe (AMRO 2021) (Figures 6 & 7). Strengthening regional integration, particular between ASEAN and China suggests that bilateral trade is shifting, with both intermediate and final goods catering to meet final demand of Chinese consumers. Insourcing and the regionalization of supply chains have bolstered intra-regional investment, as producers/exporters in the larger ASEAN+3 increasingly turn to the region for growth.[8] This supports the region's growth rebalancing narrative (Kimura and Obashi 2016).

In 2023, it is estimated that 16 percent of ASEAN's total domestic value-added embodied in gross exports was absorbed by China alone (compared to only 8 percent in 2005), overtaking the US.[9] At the sectoral level, Figure 8 reveals that ASEAN manufacturers and exporters that benefited from the growth in China's final consumption and investment demand are notably in the food processing, wholesale and retail, consumer electronics/ machinery, wood products/furnishings and apparels industry.

Figure 6. ASEAN: Domestic Value-Added Embodied in Gross Exports (Selected Final Demand Destinations)



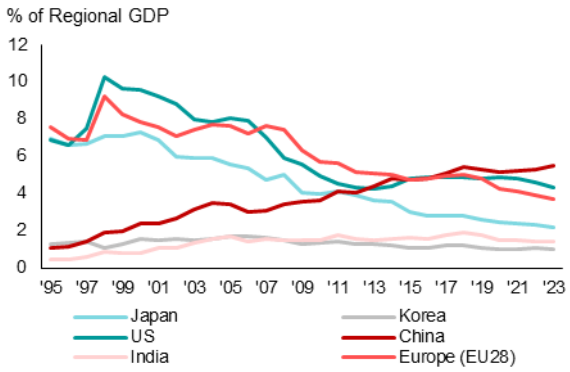
Source: OECD TiVA; AMRO staff estimates.
Note: Domestic value-added content of gross exports includes the value-added generated by the exporting industry during its production processes as well as any value-added coming from upstream domestic suppliers that is embodied in the exports. Region refers to ASEAN+3 economies, excluding Lao PDR and Myanmar due to data unavailability. Europe refers to EU28. The data points refer to the median shares.

[8] Intraregional investment remained resilient during the 2018-19 trade tensions between the US and China but dipped in 2020 as the COVID-19 pandemic hit, notably driven by a fall in outward Japanese investments to ASEAN. Nonetheless, the region's robust recovery post-pandemic has resumed the flow of intraregional FDI in 2023, particularly to sectors related to clean and renewable energy, digitalization, as well as "new economy" industries.

[9] Exceptions are Cambodia, Philippines and Vietnam, where the US remain the single largest consumer of their domestic value-added exports.

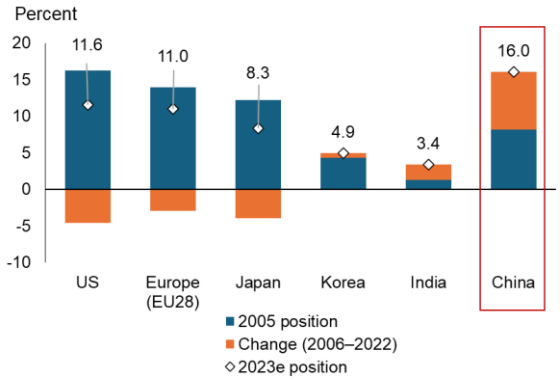
Figure 7. ASEAN: Domestic Value-Added Embodied in Gross Exports (Selected Final Demand Destinations)

Level



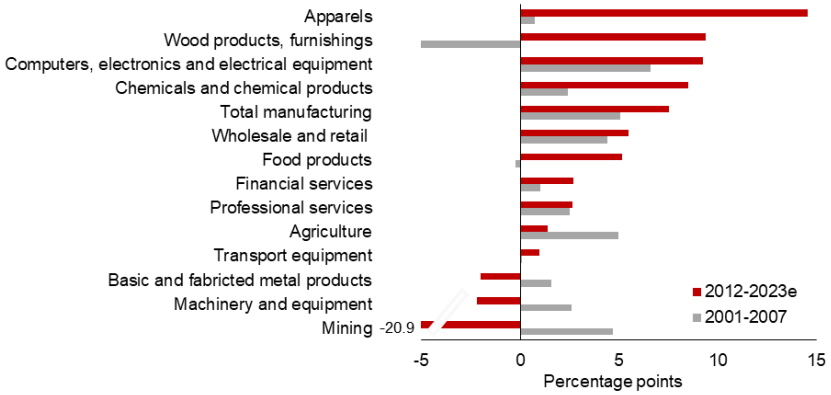
Source: TiVA database, OECD; World Development Indicators, World Bank; AMRO staff calculations.
Note: ASEAN excludes Lao PDR and Myanmar due to data unavailability.

Change in Share



Source: TiVA database, OECD; World Development Indicators, World Bank; AMRO staff calculations.
Note: ASEAN excludes Lao PDR and Myanmar due to data unavailability.

Figure 8. ASEAN: Change in the Share of Domestic Value-Added Embodied in Gross Exports to China (Selected Industries)



Source: OECD TiVA; AMRO staff estimates.

Scenario Analysis: Shifts in ASEAN's Value-Added Exports in Response to Changing Consumption Demand in China

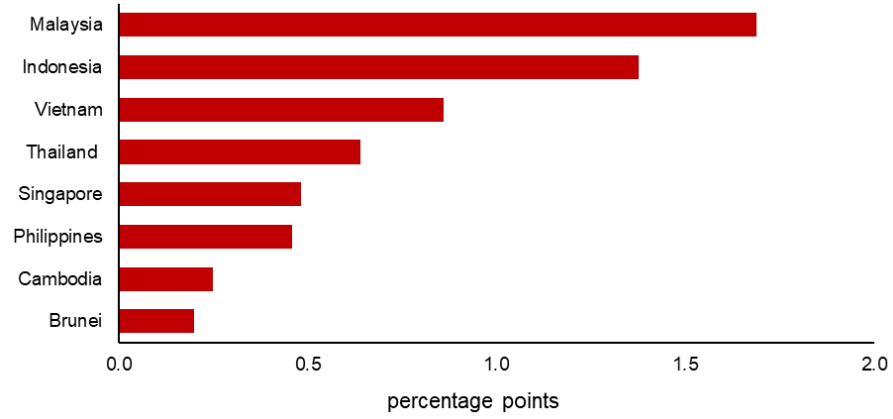
In an increasingly interconnected global economy, the dynamics of trade between ASEAN and China play a critical role in shaping the region's economic outlook. As China's consumption patterns evolve—driven by rising incomes and expanding middle class—the implications for ASEAN's exports can be significant.

This scenario analysis delves into the potential changes in ASEAN's value-added exports in response to an exogenous increase in China's consumption demand. By utilizing a Multi-Region Input-Output (MRIO) framework, this study traces how an increase in Chinese consumption translates into shifts in ASEAN's export sectors (see Appendix V for technical details). The analysis considers how these shifts impact not just gross exports, but more critically, the domestic value-added embedded in those exports. The scenario examines the effect of a hypothetical 5-percentage point increase in the share of China's private consumption in its real GDP, rising from 40 percent currently, to 45 percent. This increase is equivalent to USD 1.2 trillion in real terms. The results indicate significant economic interdependencies between China and ASEAN, with varying impacts across different ASEAN countries:

- **Malaysia** and **Indonesia** saw the largest increases in their domestic value-added exports to China.
  - Malaysia is deeply integrated into regional and global supply chains, particularly in the electronics and electrical (E&E) sector, which is a significant component of its manufacturing output. China is a major importer of intermediate goods from Malaysia, which are used in the production of high-tech goods and consumer electronics. Malaysia's focus on high-growth sectors like electronics, chemicals, and machinery aligns well with the increasing demand in China, especially as Chinese consumers shift towards higher-value products.
  - Indonesia is a major supplier of raw materials and intermediate goods to China, particularly in sectors like palm oil, coal, and other natural resources. As China's private consumption grows, so does the demand for these basic goods, which are integral to various consumer products. Additionally, Indonesia's growing manufacturing sector, particularly in automotive and consumer goods, benefits from increased Chinese demand.
- **Vietnam** stands to benefit from an increase in China's consumption due to its deep integration into regional-global supply chains, and competitive manufacturing sector. As Chinese consumers increase their spending, particularly on electronics, textiles, and food products, Vietnam's value-added exports to China are likely to grow substantially.
- **Singapore** will benefit indirectly through its roles in finance, logistics, and trade facilitation, as a service-oriented economy. While direct value-added exports might see limited growth, Singapore's position as a regional hub and its strength in high-tech and biomedical sectors ensure that it still gains from the overall increase in ASEAN-China trade, particularly through enhanced service demand and investment flows.

- **Thailand** is expected to benefit significantly from an increase in China's private consumption due to its strong manufacturing base, particularly in the automotive and electronics sectors. Additionally, Thailand's agricultural and processed food exports are well-positioned to meet the growing demand in China. The country's strategic trade agreements and its robust tourism sector, which attracts a large number of Chinese visitors, further enhance its potential gains from increased Chinese consumption.
- **The Philippines** is likely to see moderate benefits from an increase in China's private consumption, largely due to its growing manufacturing sector and strong service-oriented industries like business process outsourcing (BPO). While the Philippines is not as deeply integrated into regional supply chains as some of its ASEAN neighbors, it has a burgeoning electronics and semiconductor industry that could see increased demand from China. Additionally, the Philippines' agricultural exports, such as fruits and marine products, may benefit from rising Chinese consumer demand. However, the overall impact is likely to be more modest due to the country's relatively smaller export base and lower levels of industrial diversification compared to other ASEAN countries.
- **Cambodia and Brunei** show relatively smaller impacts, likely due to their lower levels of export integration with China compared to other ASEAN members. While Cambodia will see some positive impact, particularly in textiles and agriculture, the overall increase in its value-added exports to China will be more limited (Box Figure).

Box Figure:
Change in the Share of ASEAN's Domestic Value-Added Embodied in Gross Exports to China
(Given a 5-percentage points increase in the share of China's private consumption in GDP)



Source: OECE ADB MRIO; AMRO staff estimates.
Note: ASEAN excludes Lao PDR and Myanmar due to data unavailability.

V. Conclusion

The decomposition of growth drivers in the ASEAN+3 region using an import-adjusted GDP component approach offers a more nuanced understanding of the region's growth dynamics. By adjusting for the effects of imports across various expenditure categories, this method presents a clearer view of the true contributions of domestic and external demand to regional growth.

Using the import-adjusted method, the analysis reveals that more than half of the growth in ASEAN+3 during pre-GFC years came from exports, whereas the conventional approach only captured one-fifth of the contribution—a significant underestimation. Since 2012 however, there has been a notable shift towards domestic demand as the key growth driver in the region, consistent with the findings in AMRO (2020), reflecting the collapse in external demand in the United States and Europe. Favorable fundamentals, such as the rapid pace of urbanization and the emergence of a large middle class amid growing affluence, have also contributed significantly to the region's growth rebalancing.

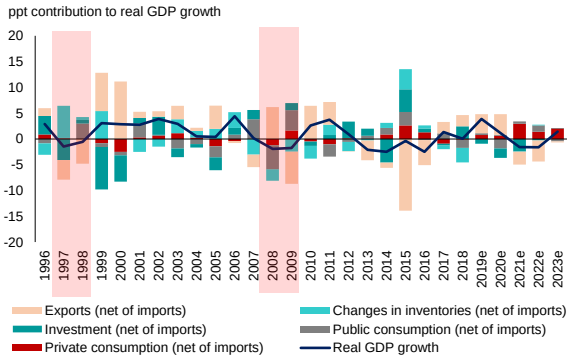
The evolving drivers of demand have also triggered significant transformation in ASEAN's export sector, as industries adapt to these changing sources of demand. As the region becomes an important source of final demand, the share of ASEAN goods exports destined for traditional markets like the US and Europe has gradually fallen post-GFC. Strengthening regional integration, particular between ASEAN and China suggests that bilateral trade is shifting towards meeting final demand in China. As a result, economic growth—especially in highly open and trade-dependent regional economies—has become inextricably linked with China's demand. The region's producers and exporters will increasingly be catering to this rapidly expanding market for consumer products and services. This reflects the broader trend of the emergence of "Shopper Asia." Instead of relying disproportionately on traditional export markets such as the US and Europe for growth, the region is now generating its own "internal" sources of demand. This comes at a critical juncture, given the potential setbacks to multilateral trading system amid rising trade protectionism in Western economies.

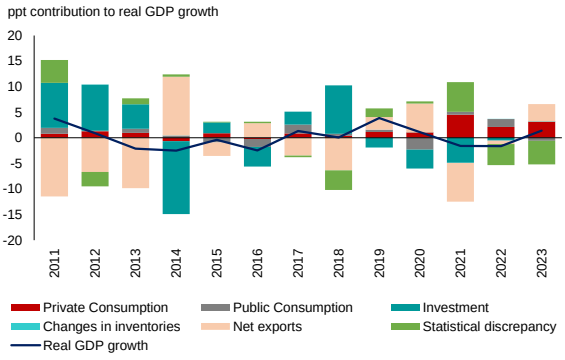
Further strengthening of regional economic linkages and cooperation has provided additional growth impetus, reflecting significant progress in trade, investment, and financial integration. This has led to enhanced intra-regional trade and investment flows, reducing ASEAN+3's reliance on external demand. As one of the world's most dynamic regions, ASEAN+3 has considerable potential to unlock future growth. The analysis in this paper shows that by leveraging private consumption—which in some economies such as China—still has significant room to grow, the region can drive substantial expansion. Looking ahead, with a rapidly growing middle class, ongoing urbanization, and continued structural transformation, domestic consumption and investment are set to become even more pivotal drivers of growth.

Appendix I. ASEAN+3: Demand-Side Decomposition of Real GDP (% yoy)

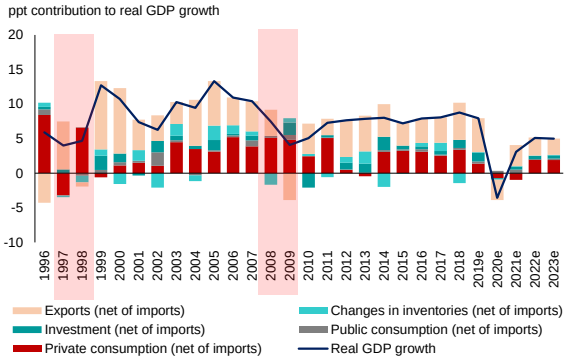
Import-Adjusted Method | **Conventional Method**

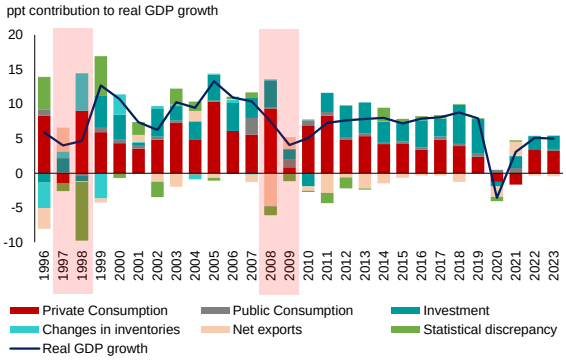
Brunei Darussalam



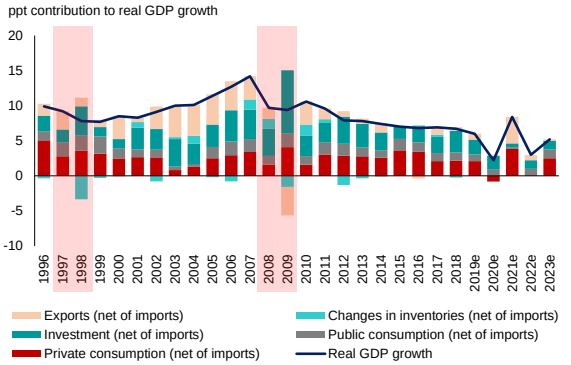


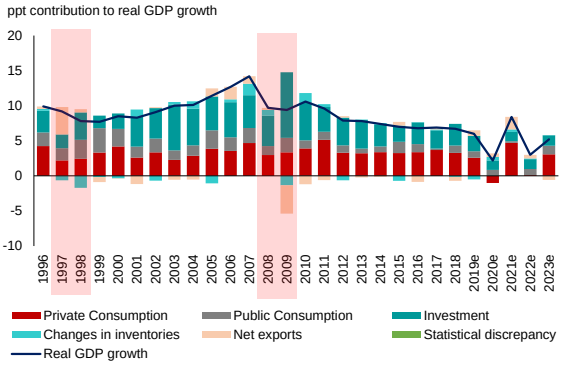
Cambodia



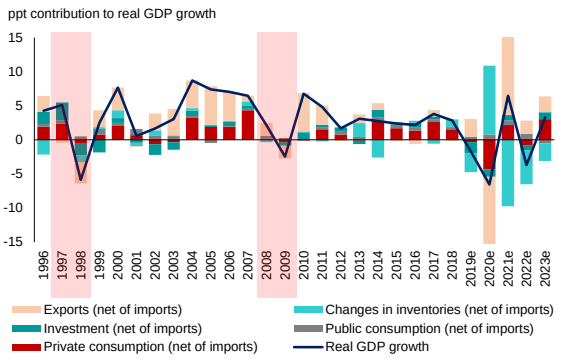


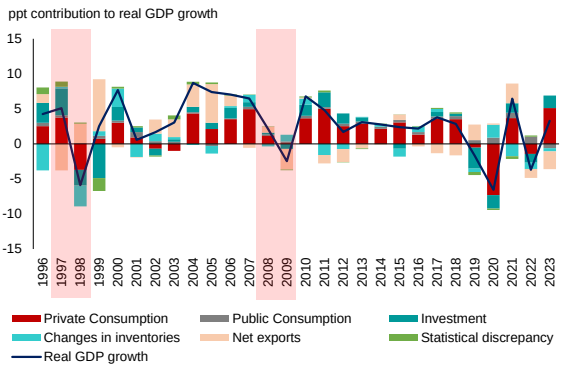
China





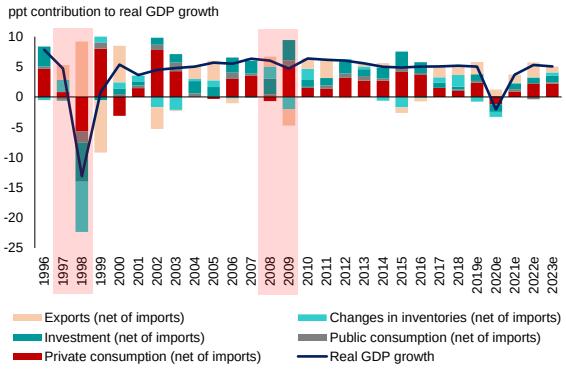
Hong Kong

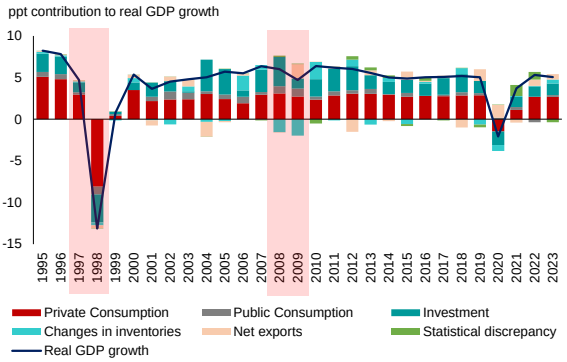




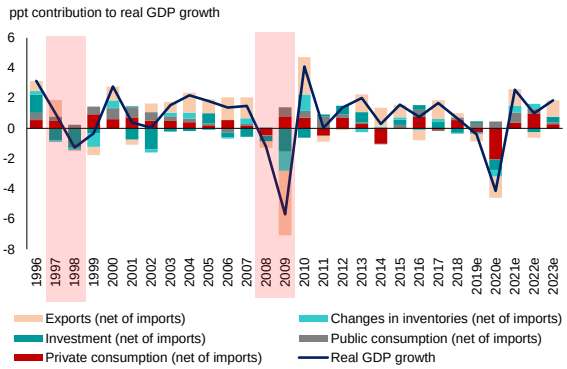
Import-Adjusted Method	Conventional Method

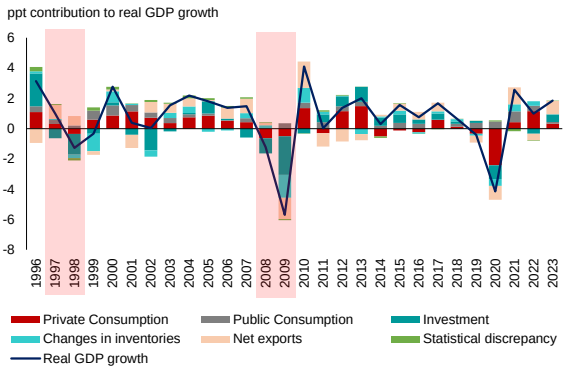
Indonesia



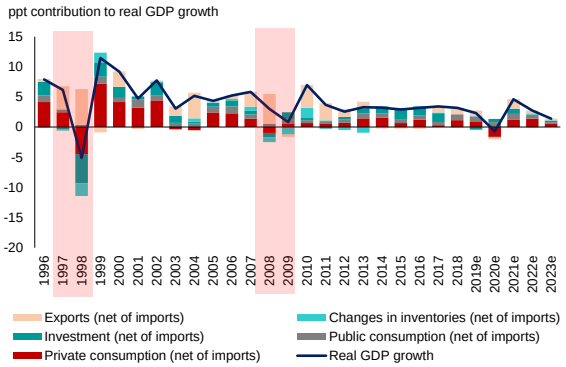


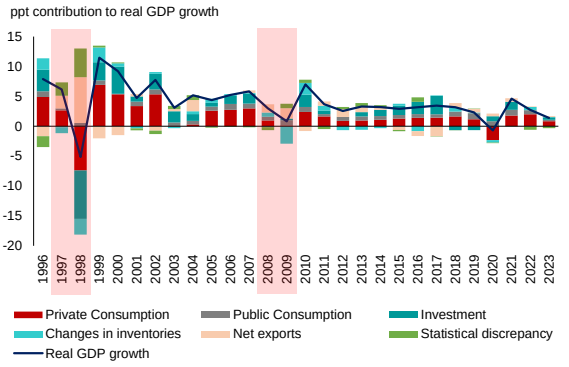
Japan



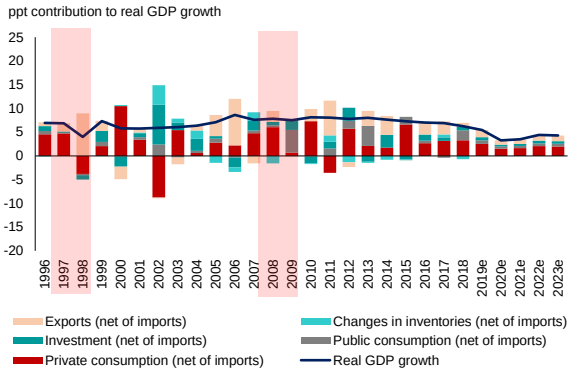


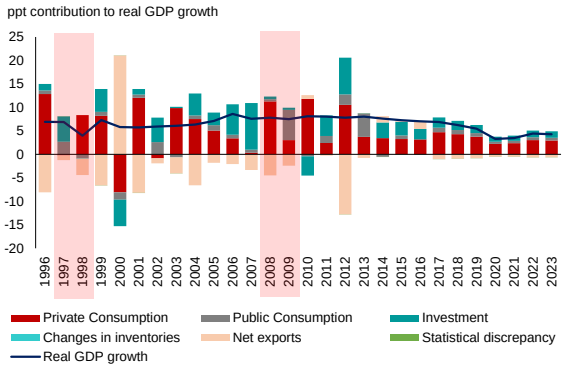
Korea





Lao PDR

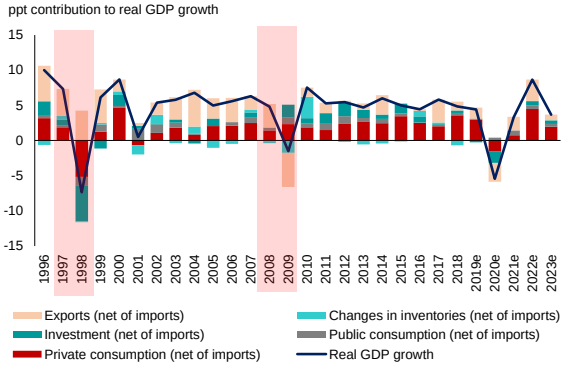


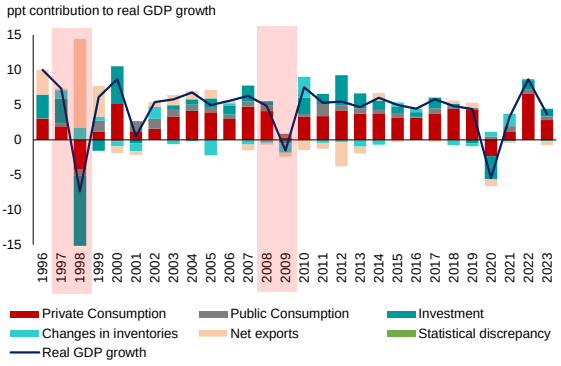


Import-Adjusted Method

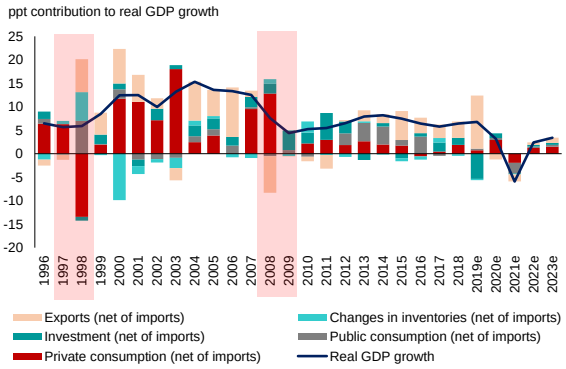
Conventional Method

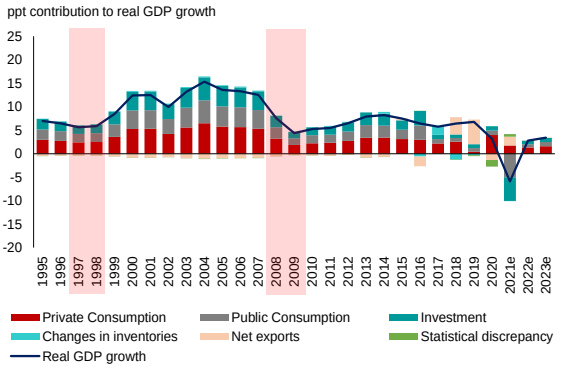
Malaysia



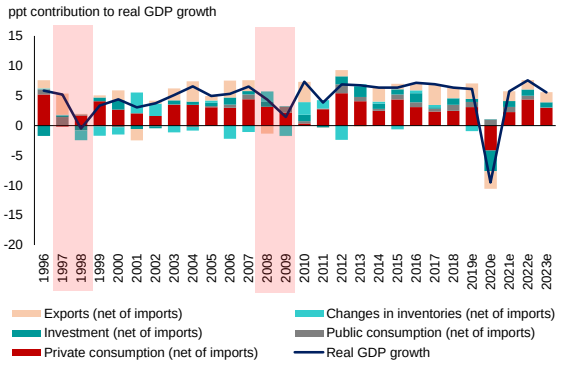


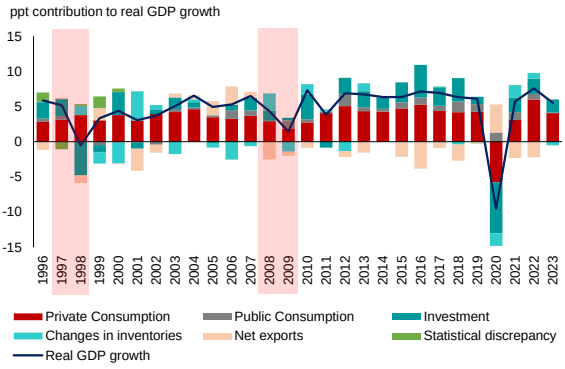
Myanmar



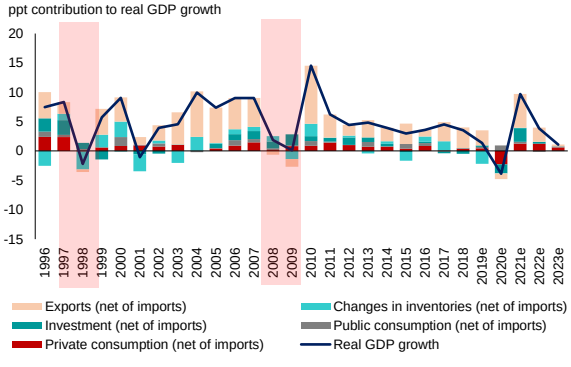


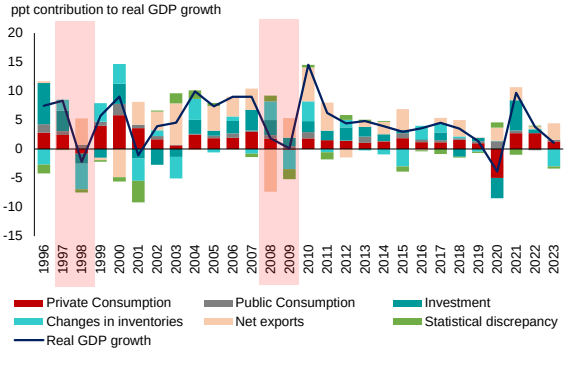
Philippines





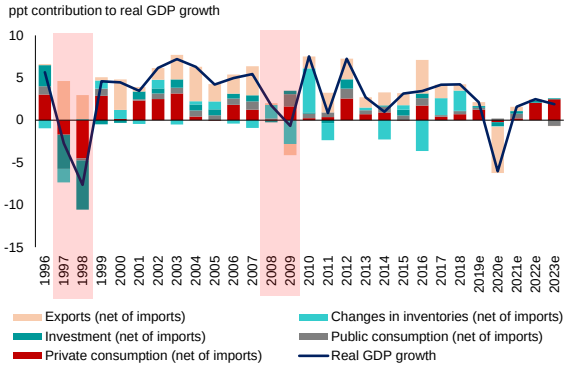
Singapore

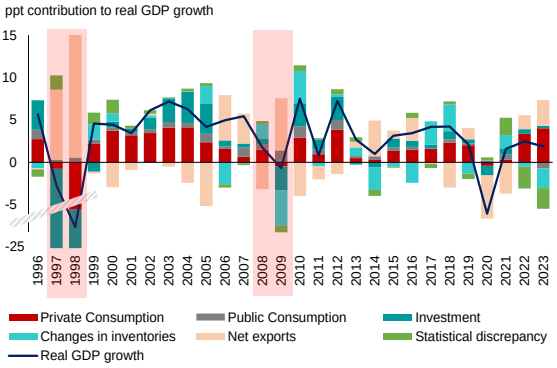




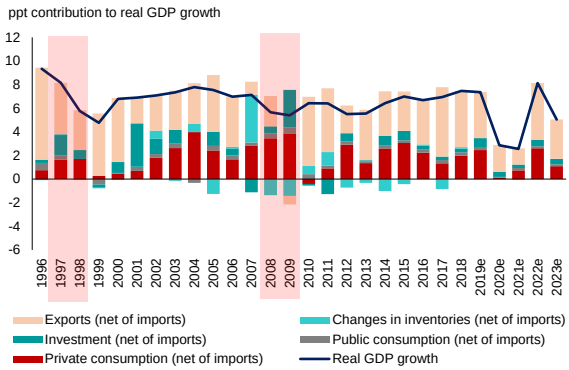
Import-Adjusted Method | **Conventional Method**

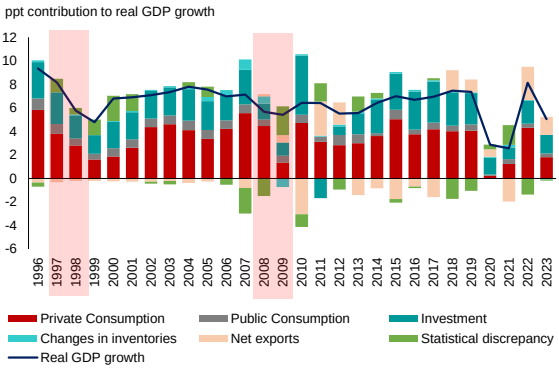
Thailand





Vietnam



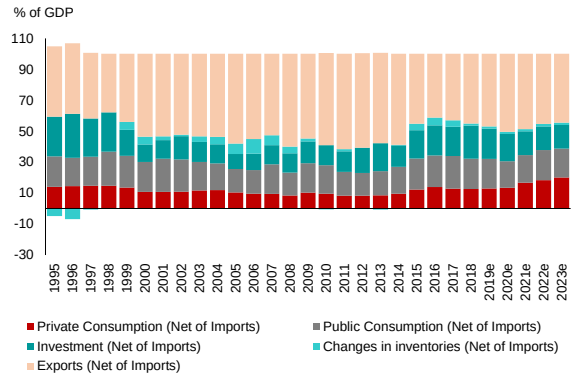


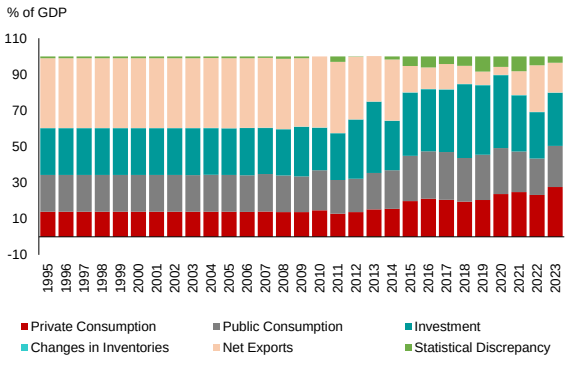
Source: National authorities; OECD; IMF; World Bank; AMRO staff estimates

Appendix II. ASEAN+3: Demand-Side Decomposition of Real GDP (% Share)

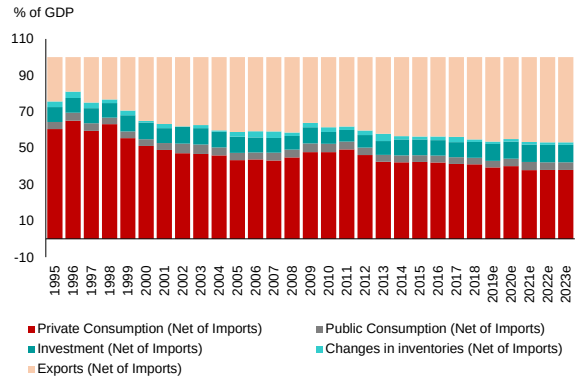
Import-Adjusted Method | **Conventional Method**

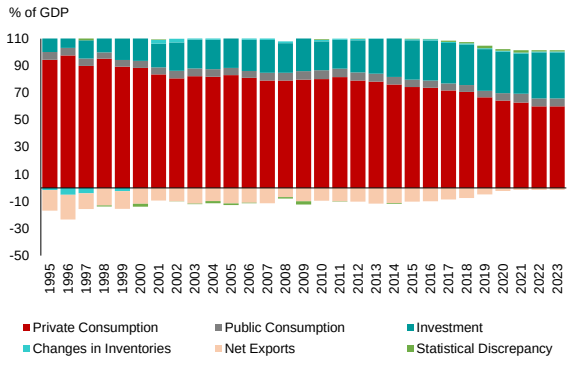
Brunei Darussalam



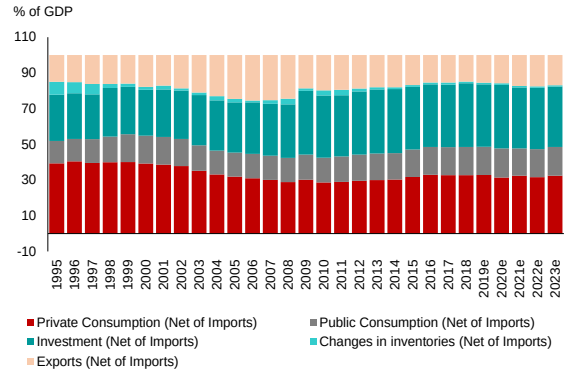


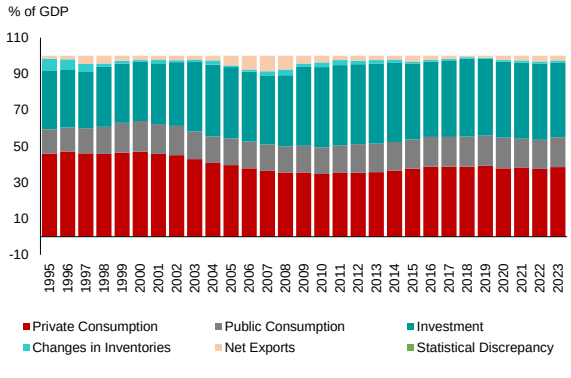
Cambodia



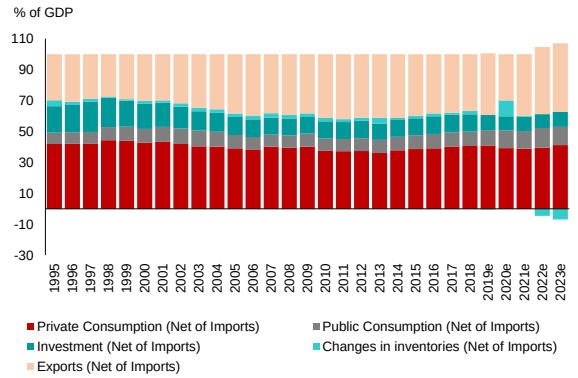


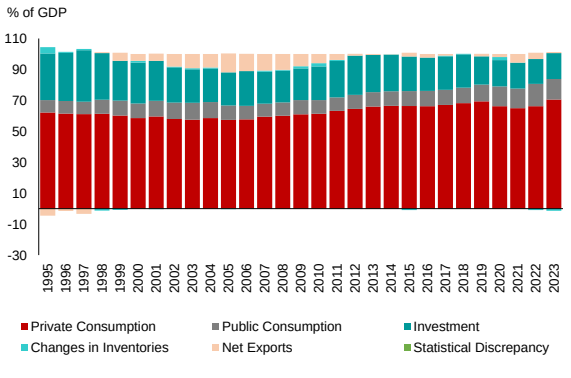
China





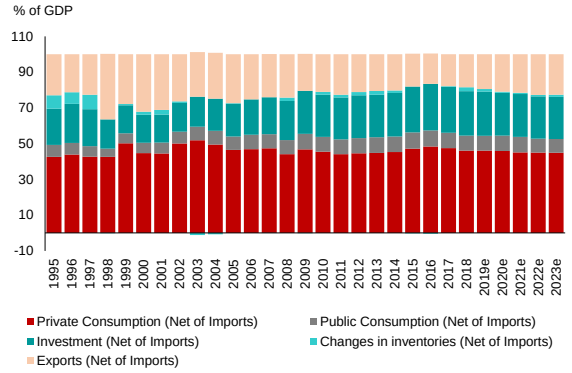
Hong Kong

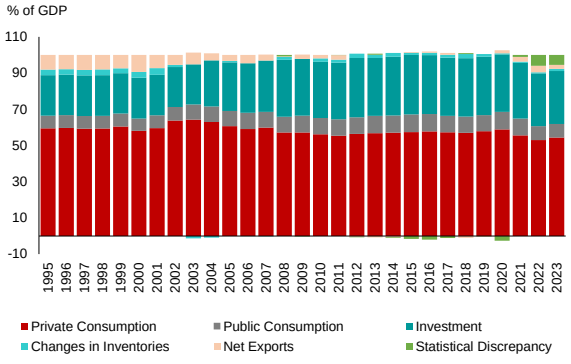




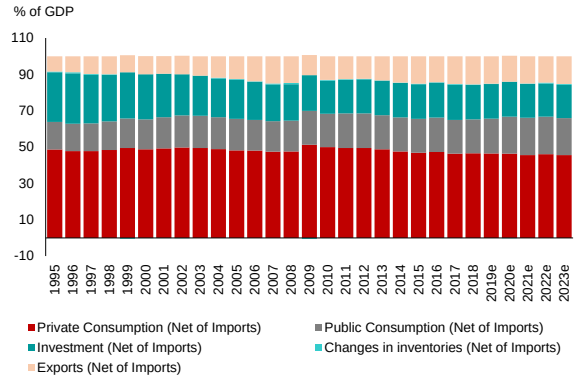
Import-Adjusted Method	Conventional Method

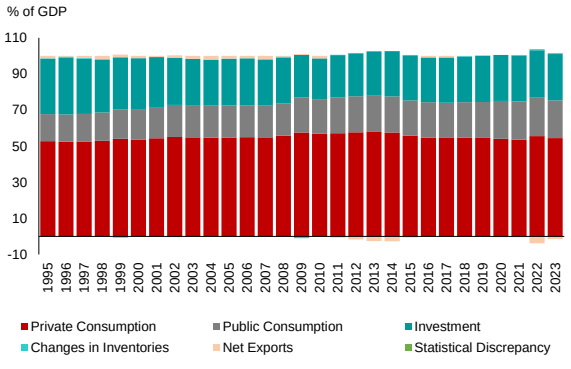
Indonesia





Japan





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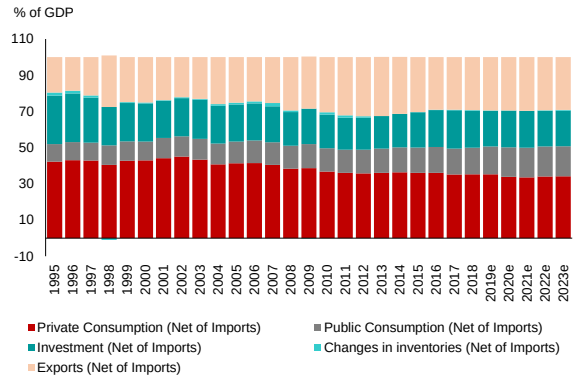

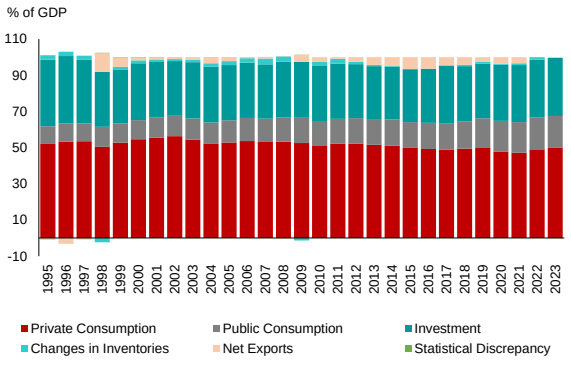

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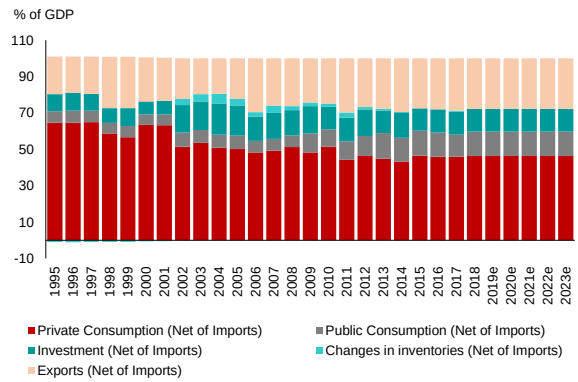
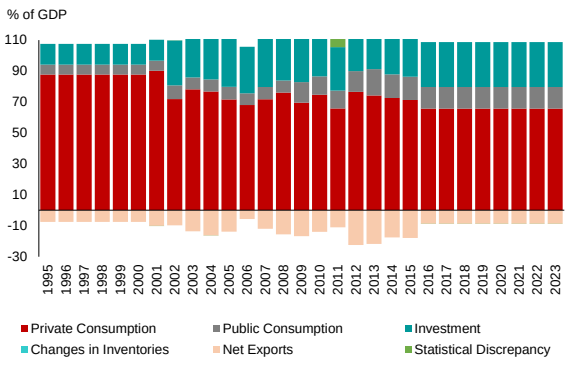
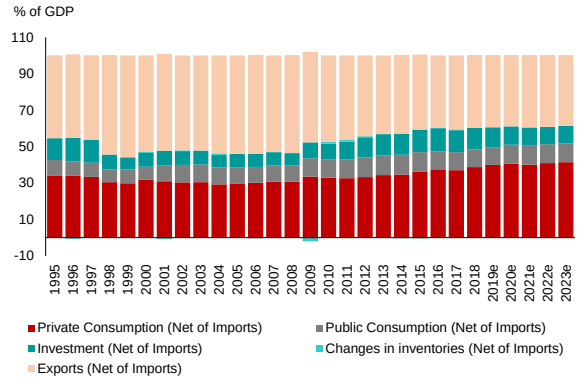
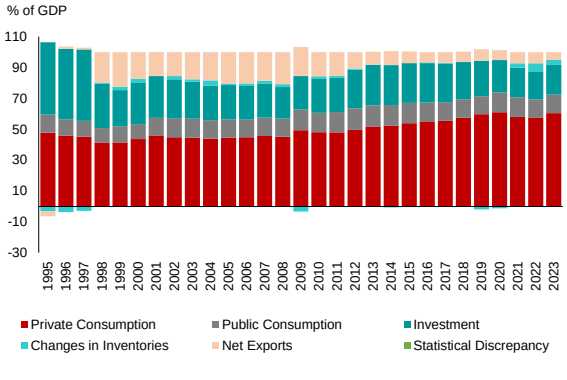




Import-Adjusted Method	Conventional Method

Malaysia





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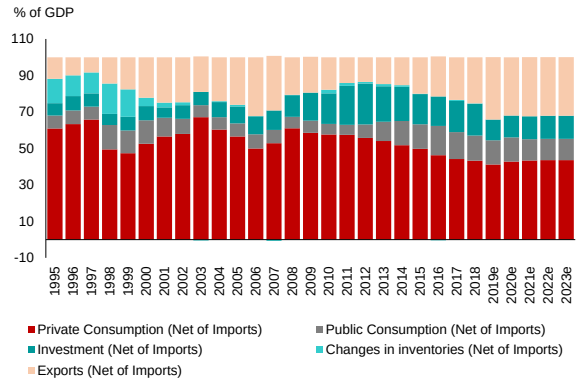

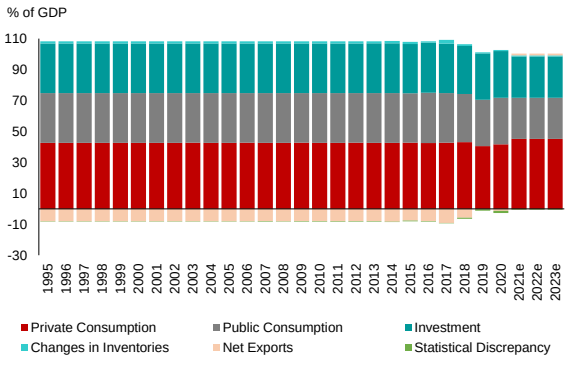

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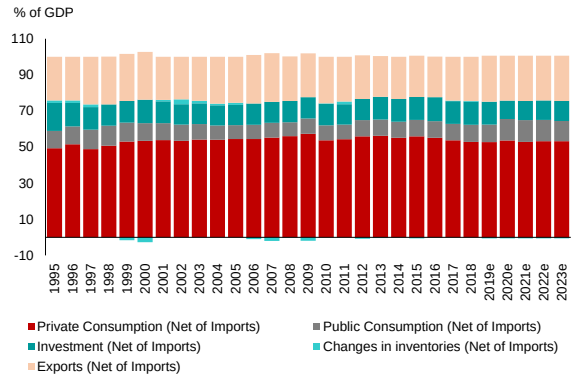
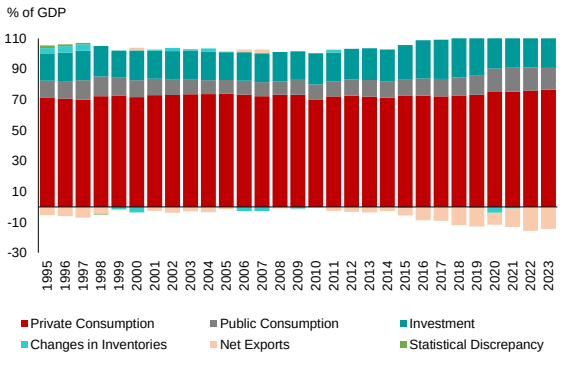
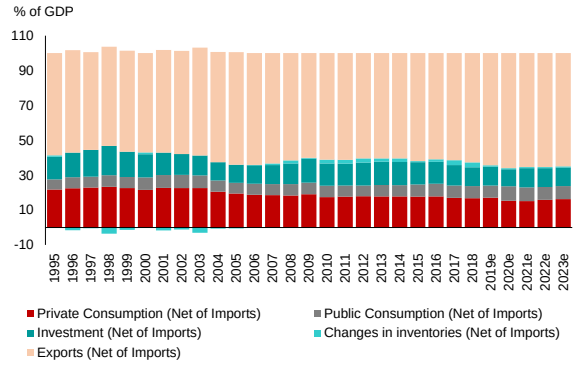
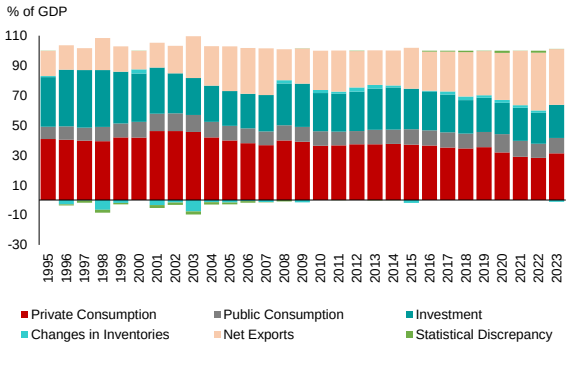




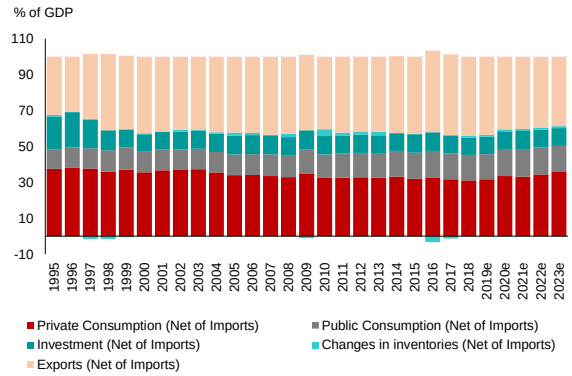
Singapore

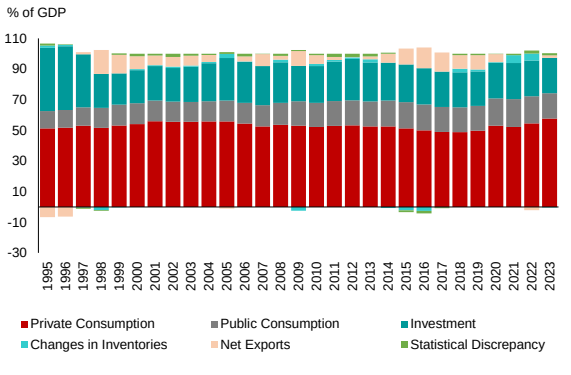




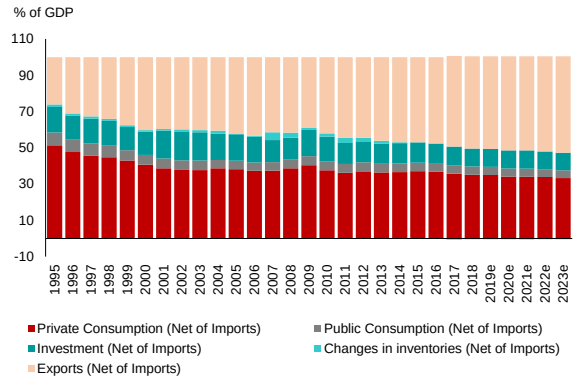
Import-Adjusted Method	Conventional Method

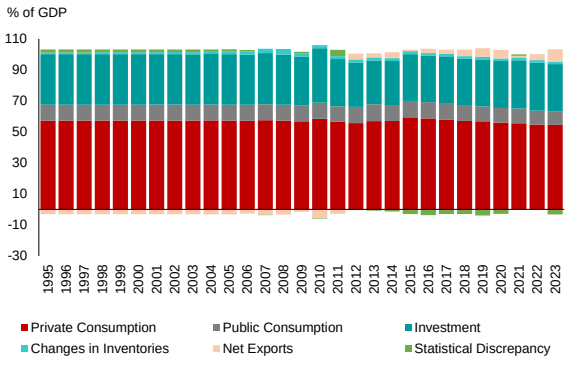
Thailand





Vietnam





Source: National authorities; OECD; IMF; World Bank; AMRO staff estimates

Appendix III. List of Industry (Defined by OECD's Harmonized I-O Tables)

1. Agriculture, hunting and forestry
2. Fishing and aquaculture
3. Mining and quarrying, energy-producing products
4. Mining and quarrying, non-energy producing products
5. Mining support service activities
6. Food products, beverages and tobacco
7. Textiles, textile products, leather and footwear
8. Wood and products of wood and cork
9. Paper products and printing
10. Coke and refined petroleum products
11. Chemical and chemical products
12. Pharmaceuticals, medicinal chemical and botanical products
13. Rubber and plastics products
14. Other non-metallic mineral products
15. Basic metals
16. Fabricated metal products
17. Computer, electronic and optical equipment
18. Electrical equipment
19. Machinery and equipment, nec
20. Motor vehicles, trailers and semi-trailers
21. Other transport equipment
22. Manufacturing nec; repair and installation of machinery and equipment
23. Electricity, gas, steam and air conditioning supply
24. Water supply; sewerage, waste management and remediation activities
25. Construction
26. Wholesale and retail trade; repair of motor vehicles
27. Land transport and transport via pipelines
28. Water transport
29. Air transport
30. Warehousing and support activities for transportation
31. Postal and courier activities
32. Accommodation and food service activities
33. Publishing, audiovisual and broadcasting activities
34. Telecommunications
35. IT and other information services
36. Financial and insurance activities
37. Real estate activities
38. Professional, scientific and technical activities
39. Administrative and support services
40. Public administration and defence; compulsory social security
41. Education
42. Human health and social work activities
43. Arts, entertainment and recreation
44. Other service activities
45. Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use

Appendix IV. Derivation of the CPS Matrix

The Cumulative Production Structure (CPS) matrix is designed to establish a direct connection between primary inputs and final demand. This matrix quantifies the amount of each primary input required—both directly and indirectly through the use of intermediates—to produce each category of final output. To construct this matrix, one can start by considering the following I-O table, following the approach of (Kranendonk and Verbruggen, 2008).

	(n)	(f)	(1)
(n)	A	F	z
(p)	P	W	x
(1)	z'	y'	

where,

A : n x n matrix of domestically produced intermediary demand
F : n x f matrix of domestically produced final demand
z : n x 1 vector of domestically produced total demand
P : p x n matrix of primary inputs used by domestic firms
W : p x f matrix of primary inputs that are the same time final demand
x : p x 1 vector of total primary inputs
y : f x 1 vector of total final demand
n : number of industries
f : number of categories of final demand
p : number of primary input of categories

Define the matrices A* and P* by dividing the column entries of A and P by the corresponding entry in z'. A* is the matrix of intermediary input coefficients, and P* is the matrix of primary input coefficients. The entries A_i^{*j} and P_i^{*j} indicate the amounts of intermediary input of industry i and of primary input of category i needed to produce one unit of gross output of industry j.

Define the n x f matrix $X(I - A^*)^{-1} F$, where each column in X is the vector of total demand (by industry) generated by the corresponding column vector of final demand in F.

Finally, form the p x f matrix CPS' as follows:

$$CPS' = P^* \cdot X$$
$$= P^*(I - A^*)^{-1} \cdot F$$

Each entry CPS' represents the total or cumulated amount of primary input of category i needed to produce the jth column vector of final demand in F.

Appendix V. Tracing the Impact on Regional Value-Added Exports Using Multi-Region Input-Output Table

This appendix outlines the methodology used to trace the impact of an exogenous shock to China's private consumption on the domestic value-added exports to China. The analysis leverages a Multi-Region Input-Output (MRIO) table, allowing for a detailed examination of the interdependencies between sectors and countries. The approach provides a comprehensive view of how a change in final demand in China affects the value-added exports of regional countries.

The MRIO table extends the traditional I-O framework to include multiple countries (or regions). It represents the economic transactions between industries within a country, as well as between industries in different countries. This enables the tracing of intermediate goods and services across borders, allowing for a detailed analysis of global value chains.

The key components of the MRIO table used in this analysis are:

$\boldsymbol{A}$: Matrix of technical coefficients, where each element a_{ij} represents the input from sector i required to produce one unit of output in sector j.

$\boldsymbol{F}$: The final demand matrix, capturing the demand for goods and services by households, governments, and exports.

$\boldsymbol{X}$: The total output vector, where each element x_i represents the output of sector i.

$\boldsymbol{V}$: The value-added coefficient matrix, where each diagonal element v_i represents value-added per unit of output in sector i.

To simulate the impact of an exogenous shock to China's private consumption, we assume an increase of USD1.2 trillion evenly distributed across all sectors in China. This shock is represented as a change in the final demand vector for China, $\Delta\, F_{China\ consumption}$.

The change in output in China due to the increase in private consumption is calculated using the Leontief inverse, $\Delta \boldsymbol{X} = (\boldsymbol{I} - \boldsymbol{A})^{-1}\, \Delta\, \boldsymbol{F}_{China\ consumption}$

The change in China's output ($\Delta \boldsymbol{X}$) affects ASEAN's exports to China. To determine the impact on ASEAN's exports, the following matrix is computed.

$$\Delta \boldsymbol{X}_{ASEAN \to China} = \boldsymbol{E}_{ASEAN \to China} \circ \Delta \boldsymbol{X}$$

where

$\Delta \boldsymbol{X}_{ASEAN \to China}$ is ASEAN's total exports to China;

$\boldsymbol{X}_{ASEAN \to China}$ is the export share vector showing the fraction of output from each ASEAN sector exported to China;

$\circ$ denotes the Hadamard product (element-wise multiplication).

To obtain the change in value-added exports, multiply the change in exports to China by the value-added coefficient matrix ($\boldsymbol{V}_{ASEAN}$).

$$\Delta \boldsymbol{VAX}_{ASEAN \to China} = \boldsymbol{V}_{ASEAN} \cdot \Delta \boldsymbol{X}_{ASEAN \to China}$$

Appendix VI: Data Sources and Description

<table>
<tr><th>Data</th><th>Description</th><th>Data Source</th></tr>
<tr><td>Headline GDP and demand-side GDP components</td><td>GDP in constant term (in local currency)</td><td>National authorities
(via Haver Analytics)</td></tr>
<tr><td>GDP weights</td><td>GDP in purchasing power parity terms</td><td>International Monetary Fund
(via Haver Analytics)</td></tr>
<tr><td>Regional and sub-region GDP</td><td>GDP in 1995 constant terms (U.S. dollar)</td><td>World Bank
(via Haver Analytics)</td></tr>
<tr><td>Industry classifications</td><td>International Standard Industrial Classification (ISIC revision 4)</td><td>United Nations</td></tr>
<tr><td>Multiregional I-O table</td><td>Domestic output, value-added tables (constant terms, in US dollar)</td><td>ADB</td></tr>
<tr><td>Harmonized I-O tables</td><td>Domestic output, imports, primary inputs tables (nominal terms, in US dollar)

<table>
<tr><th></th><th colspan="3">I-O Tables</th></tr>
<tr><th>List of economies included in analysis</th><th>Domestic output</th><th>Imports</th><th>Primary Inputs</th></tr>
<tr><td>ASEAN+3</td><td></td><td></td><td></td></tr>
<tr><td>Brunei</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>Cambodia</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>China</td><td>✓</td><td>✓</td><td>✓</td></tr>
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<tr><td>Japan</td><td>✓</td><td>✓</td><td>✓</td></tr>
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<tr><td>Lao PDR</td><td>✓</td><td>✓</td><td>Proxied using Cambodia</td></tr>
<tr><td>Malaysia</td><td>✓</td><td>✓</td><td>✓</td></tr>
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<tr><td>Vietnam</td><td>✓</td><td>✓</td><td>✓</td></tr>
</table>
</td><td>OECD</td></tr>
</table>

Source: Authors' compilation.

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