

Economy-wide impacts of zero-rated VAT on exports of business services in Indonesia: A CGE analysis

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Abstract

The Indonesian government expanded the zero-rated VAT regime on exports of services to include information and technology services, research and development services, professional services, and a number of other activities as stipulated in the Minister of Finance Regulation Number 32 Year 2019. This research projects the economy-wide impacts of the policy with respect to information and technology services, research and development services, and professional services using the Global Trade Analysis Project (GTAP) model. Both short-run (i.e., fixed labour and capital) and longer-run (fixed labour with variable capital) economic environment is set to compare the results derived from two scenarios: elasticity scenario (i.e., rebating input VAT by 1%) and policy scenario (i.e., rebating input VAT by 4.57%). The main findings are that, although a majority of sectors are likely to contract in the short run due to the relocation of some resources in favour of business services, there is a likely long-run national economic benefit reflected by projected increases in export volume of business services, real wages, particularly for skilled labour, and real income

Key words: zero-rated Value Added Tax; exports of business services; CGE analysis; GTAP model

JEL Classification: E620, F470, H250

1. INTRODUCTION

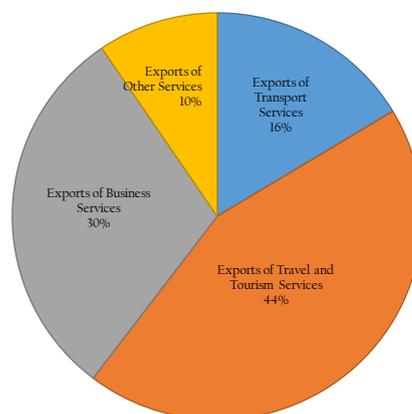
In March 2019, the Government of Indonesia expanded the scope of the services sector eligible for zero-rated Value Added Tax (VAT) on export activity. Information and technology services, research and development services, and professional services are included in the total of seven additional services granted zero-rated VAT by the new policy. This research intends to project the economy-wide impacts of the introduction of zero-rated VAT on exports of those three services using a computable general equilibrium (CGE) analysis.

The zero-rated VAT on exports means that not only exports are not taxed (i.e., no output VAT is collected from exports), but also exporters can credit and refund their input VAT from their taxable purchases (Organisation for Economic Co-operation and Development [OECD], 2017, p. 16). The application of zero-rated VAT on exports of goods is practicable due to the existence of border controls and customs processes ensuring imports are taxed (OECD, 2017, p. 17) and exports are recorded or verified hence a fraud to claim a refund of input VAT for manipulated exports can be overcome. However, the application of zero-rated VAT on exports of services may impose the risks of unlawful VAT refund for exporting country due to the absence of border controls. Therefore, the application of zero-rated VAT on exports of services has not been as popular as its application on exports of goods, as evident in Indonesia, which had considered the difficulties in monitoring the compliance of services exporters as the reason why the government is selective in determining which service that can be eligible for zero-rated VAT regime (Suwiknyo, 2018).

In Indonesia, while exports of goods have been subjected to zero-rated VAT since the first VAT Law in 1983, there were only three services sectors granted zero-rated VAT before March 2019 regulated by the Minister of Finance Regulation Number 70 Year 2010: toll manufacturing services, repair and maintenance services, and construction services. Meanwhile, there was the recent development in March 2019 when the government released the Minister of Finance Regulation Number 32 Year 2019 (hereafter called the new regulation). Under this new regulation, there are seven additional services sectors granted zero-rated VAT regime: information and technology (IT) services; research and development (R&D) services; professional services; freight forwarding services; air and sea charter services; trade intermediary services; and interconnection, satellite, communication/data connectivity services (Ernst & Young, 2019).

This research focuses on three services sectors – IT services, R&D services, and professional services – and combines them into one group: business services. This grouping accords with the World Trade Organization Services Sectoral Classification List category groups (World Trade Organization, 1991) (see Appendix A). The share of business services exports to total exports of all services from Indonesia during 2004 – 2018 was around 30%, as presented in figure 1.

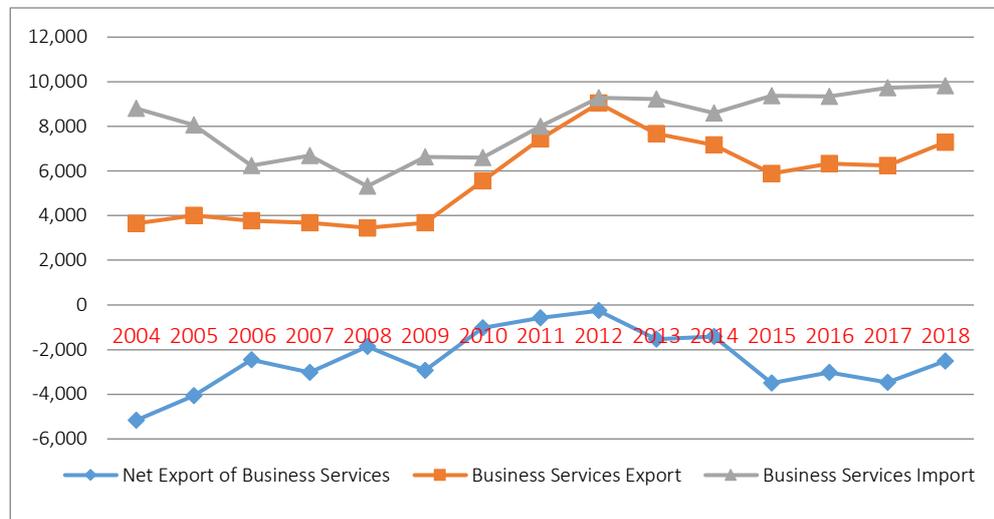
FIGURE-1: Structure of services exports in Indonesia, 2004-2018



Source: Indonesian Central Bank (2019), calculated.

Meanwhile, figure 2 delivers the trend of exports and imports of business services in Indonesia during the same period. From figure 2, it can be inferred that the country imported more business services than it exported in almost every year under consideration.

FIGURE-2: Trend of exports and imports of business services in Indonesia, 2004-2018 (in USD million)



Source: Indonesian Central Bank (2019), calculated.

The purpose of the new regulation is to enhance the export performance and competitiveness of the services sectors. Government officials and business associations within the country further claimed that the policy would ultimately reduce the already worrying current account deficit (Herdiyan, 2018; Kontan, 2018). An empirical study based on econometric methods would be appropriate to investigate the ex-post effects of tax policy on export performance over time.

However, the economy-wide impacts of individual tax policy on the domestic economy may vary, and the future effects of a new policy may be difficult to isolate from an ex-post analysis. To consider the future effects of a new policy, theoretically based projections methods either in partial or general equilibrium form are needed. In this paper, a CGE analysis is adopted because a change in government tax policy in export will affect not only export performance and trade balance of the industry in focus, but also flow through to affect the domestic economy (Hertel, 1997, p. 4). The Global Trade Analysis Project (GTAP) model as one form of CGE analysis is suitable to project economy-wide impacts of trade-related tax policy (Hertel, 1997, p. 5) and is used in this research.

The purpose of this research is to project the economy-wide impacts of the introduction of zero-rated VAT on exports of business services in Indonesia. Economy-wide impacts projected include price and volume of exports and imports and the resulting trade balance for both the business services sector and the economy as a whole, terms of trade, industry output, GDP, real wages of skilled and unskilled labour, capital stock, and real regional income. This research has two contributions. First, it is intended to inform the policymakers of the degree of responsiveness of key aforesaid economic variables due to the new regulation with respect to the business services sector. Second, it is intended to contribute to the limited literature concerning the economy-wide impacts of introducing zero-rated VAT on exports of services.

The rest of this paper is organised as follows. Section 2 discusses the theoretical background and provides a literature review. Methodology and data are explained in section 3. Results are presented and analysed in section 4. Section 5 concludes.

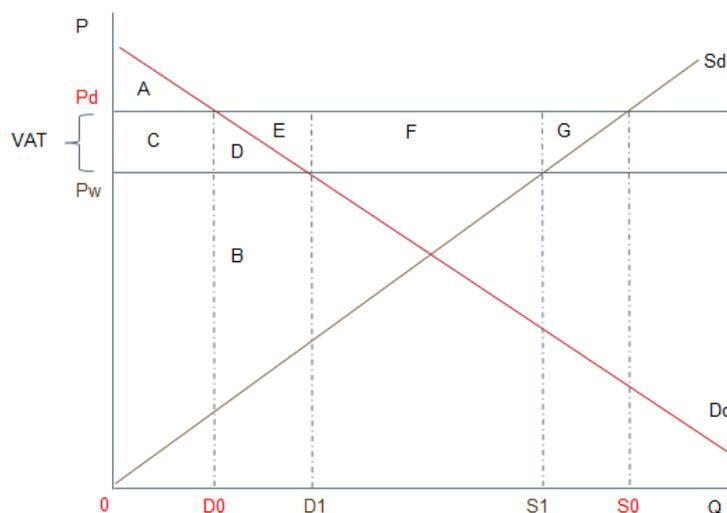
2. THEORETICAL BACKGROUND AND LITERATURE REVIEW

2.1. Theoretical Background

There are two strands found in the literature for the preference to apply zero-rated VAT on exports. The first strand is from a tax perspective that is the introduction of zero-rated VAT on exports is to be consistent with the destination principle as the international norm for the application of VAT for cross-border trade (OECD, 2017, p. 16). Under this principle, exports are free from any VAT due to the refund of input VAT, while imports are subject to VAT with the same rates as domestic supplies (OECD, 2017, p. 16). This principle delivers neutrality in international trade because supplies are taxed based on the rules applicable in the jurisdiction where consumption occurs, and tax revenues are accrued to that jurisdiction (OECD, 2017, p. 16). If the destination principle is not applied perfectly, that is, there is the absence of zero-rated VAT on exports, there may be double VAT because exporters may pass through the input VAT burden to foreign customers whom will be obliged to pay VAT for their import activity. Hence, the introduction of zero-rated VAT is to avoid double taxation under the destination principle.

The second strand is from an economic perspective, which is the focus of this research. Under this perspective, the introduction of zero-rated VAT on exports removes protectionist policy because the absence of zero-rated VAT is equivalent to an export tax and an import tariff (Feldstein & Krugman, 1990, p. 264). In a partial equilibrium analysis, the introduction of zero-rated VAT would be equivalent to the removal of an export tax that brings the market back to its efficient outcome: it increases the export quantity and eliminates the deadweight losses of the tax. Figure 3 delivers the relevant diagram for a price-taker country. For this comparative static analysis to work, two assumptions hold: the product in question is a single homogeneous product, and no imports are made to that product.

FIGURE-3: A partial equilibrium analysis of the introduction of zero-rated VAT in a price-taker country



Source: Adapted from Feldstein and Krugman (1990).

When the zero-rated VAT rule is in place, there is a wedge between the domestic price (P_d) and the world price (P_w) as much as the rate of domestic VAT because at that level of domestic price, producers are indifferent to export or sell domestically. Hence, the absence of zero-rated VAT decreases the domestic price to be at the same level as the world price to make producers still indifferent due to the price-taker country context. As the results, the export volume decreases from D_0-S_0 to D_1-S_1 , the domestic supply increases from $0-D_0$ to $0-D_1$, consumer surplus increases from A to ACD , producer surplus decreases from $BCDEFG$ to B , new

government tax revenue of F arises, but there are deadweight losses as much E and G. The introduction of zero-rated VAT would then bring the market into its efficient outcome: the export volume increases to D0-S0, and the deadweight losses are eliminated by the increase in producer surplus (from B to BCDEFG) that is larger than the decrease in consumer surplus (from ACD to A) plus the disappearing government tax revenue as much F.

Hence, the winners are the domestic producers through the increase in export quantity and the rise in domestic price, while the losers are the domestic consumers facing the decrease in domestic supply to be 0-D0 and the higher domestic price at Pd and the government through a loss in its revenue from input VAT previously not refunded to exporters. Table 1 presents a summary of those partial equilibrium effects.

TABLE-1: A summary of the partial equilibrium effects of the introduction of zero-rated VAT

Item	Effect
Domestic price	Increases
Domestic supply	Decreases
Export volume	Increases
Government VAT revenue	Decreases
Consumer surplus	Decreases
Producer surplus	Increases

Source: Author.

2.2. Literature Review

Few econometric studies investigated the effects of export incentives on export performance, and this shortfall was primarily attributed to the methodology's difficulties in establishing a reliable statistical relationship between the two variables (Balassa, 1978, p. 33). Meanwhile, the practice of giving export incentives including exemption of indirect taxes on outputs and inputs for both exporters of manufactured goods and domestic producers of inputs used in export production in Korea during the period of 1966-1973 (Balassa, 1978, p. 27) is believed to stimulate an increase in the share of exports of manufactured goods in that country from 13.9% in 1966 to 40.5% in 1973 (Balassa, 1978, p. 37). Likewise, the study of the economics of export taxes has been greatly missed attention from public and academic circles, partly due to the lack of substantive discipline enforced by the WTO to the application of export taxes (Bouet & Debucquet, 2010, p. 61). Furthermore, empirical studies on the effects of zero-rated VAT on export performance are even less common.

Meanwhile, several empirical studies investigate the effects of changes in VAT rebate rates on export performance in China. This development is partly motivated by China's rebate policy for exports that apply the rebate rates ranging from 0% to 100%. This seemingly disadvantageous policy for exports was utilised in a period of the severe economic downturn by increasing the rebate rate to improve export performance (Chen, Mai & Yu, 2006, p. 227; Gourdon, Hering, Monjon & Poncet, 2014, pp. 2-3). Chen et al. (2006) utilised national-level, time-series data of total export tax rebates and total exports in China over the period 1985 to 2002 and using Spearman rank correlation coefficient to find that a rise in export tax rebate has significantly positive effects on export quantity, final domestic consumption, and foreign exchange reserve. However, the sample size of their study is only 18 observations.

Chandra and Long (2013) used firm-level panel data for the period 2004 to 2006 obtained from the National Bureau of Statistics of China covering all state-owned enterprises and all other manufacturing firms having an annual turnover exceeding 5 RMB million and altogether accounting for nearly 90% of the total industrial output of China. The largest industry in their sample in terms of both exports and total outputs for every year is the electronics and

communication industry. Their results show a significant and substantial effect: one percentage point increase in VAT rebate rate was associated with a 13% increase in export volume, which is translated into an increase of 4.7 USD of exports for every 1 USD tax rebate.

Another empirical study in China was conducted by Gourdon et al. (2014) by using city-specific and HS6-product-level data for 2003 – 2012, yielding a combination of 3,142 HS6 products and 327 cities in the sample. Trade flows represented in the sample contribute to more than 80% of the country's total exports that are both eligible and not eligible for the VAT refund. Their results show that a one percentage point increase in VAT rebate rate was associated with a 6.5% increase in the export quantity of eligible trade for VAT refund, and an application of full VAT refund nationally was expected to raise the country's export volume eligible for VAT refund by 41%.

However, a study in a specific industry may yield a different insight. Wang and Anwar (2019) did an empirical study in China using province-level monthly panel data from September 2012 to April 2017, focusing on the mechanical goods industry involving data from 27 provinces and four cities. The industry accounted for almost 50% of the country's total export value over the sample period. Their study was intended to support their theoretical model that an increase in VAT rebate rate when foreign demand is stable, and the exporting country is a price-taker in the international market would reduce export price and, in turn, decrease export value. By using a quasi-natural experiment of a policy change in China when the government increased the VAT rebate rate for the mechanical goods industry from 15% to 17% (a full refund) on 1 January 2015, their findings suggest a significant negative effect of an increase in VAT rebate rate on the export value of the industry.

Meanwhile, CGE analyses regarding the economic effects of zero-rated VAT on exports are also scarce. As discussed, Feldstein and Krugman (1990) propose that moving from incomplete VAT refund to complete refund on exports would increase export quantity and raise import quantity since the absence of zero-rated VAT on exports is akin to an export tax and an import tariff. Chao, Chou and Yu (2001) utilised a simple three-sector, general-equilibrium model to conclude that, for a country suffering from sector-specific unemployment, export tax rebates on imported intermediate inputs would increase the outputs of related domestic upstream and downstream industries, hence promoting exports. However, the tax rebates could also decrease welfare due to a rising unemployment ratio since labour moving from contracting sectors may not find jobs, a consequent decrease in tax receipts, and a reduction in consumer surplus since domestic consumers face higher domestic prices (Chao et al., 2001).

In contributing to the limited literature concerning the economic effects of zero-rated VAT on exports of services, this research applies the GTAP model to project economy-wide impacts of zero-rated VAT on exports of business services in Indonesia.

3. METHODOLOGY AND DATA

3.1. Model Structure and Key Assumptions

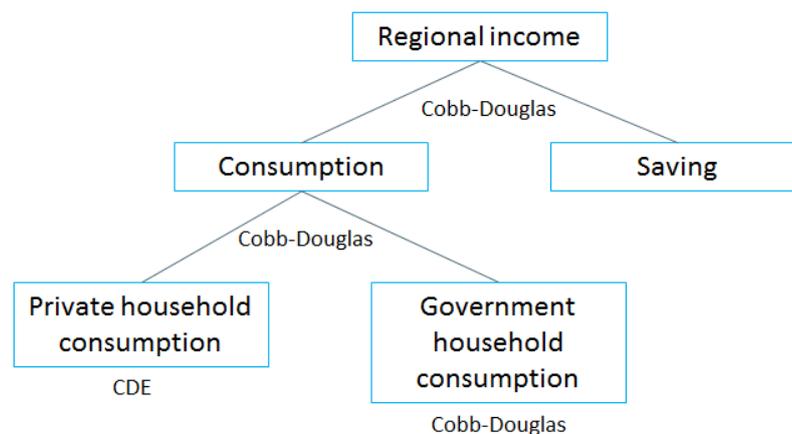
The GTAP model is a model that can be used to 'conduct quantitative analyses of international economic issues' in a multi-country, multi-sector, economy-wide framework (Hertel, 1997, pp. 3-4). Due to the regional and sectoral detail embodied, the model is particularly useful to project a policy's effects on different sectors and different countries (Australian Productivity Commission [APC], 2010, p. 3). While econometric methods often suffer from potential endogeneity, CGE methods ensure that the projected changes are attributable to the modeled shock by isolating the model from any other influences and, therefore, can be said as 'the projected contribution of the modeled policy changes given the modeling assumptions' (APC, 2010, p. 3). Overview of the model structure and inherent key assumptions are as follow.

Regional household expenditures (i.e., equivalent to a region's income) are shared among three broad branches, namely private, government, and savings expenditures. In the standard closure, the budget share among branches is constant following the Cobb-Douglas utility

function, meaning that an increase in regional income is followed by a proportional increase in each branch's expenditures according to its constant budget share (Hertel & Tsigas, 1997, p. 15).

Within the government consumption branch, the combination of composite goods from domestic supplies and imports is also governed by the Cobb-Douglas utility function, or in this context is equivalent to the constant elasticity of substitution (CES), meaning that the combination follows a constant share or constant elasticity among available composite goods (Hertel & Tsigas, 1997, pp. 48-49). However, the combination of composite goods within the private consumption branch is arranged by the constant difference of elasticities (CDE) assumption allowing price and income elasticities of private demand to vary with the changes in relative prices and expenditure shares (Hertel & Tsigas, 1997, pp. 49-50). Figure 4 delivers the structure of the allocation of regional income with relevant key assumptions.

FIGURE-4: Distribution of regional income in the GTAP model

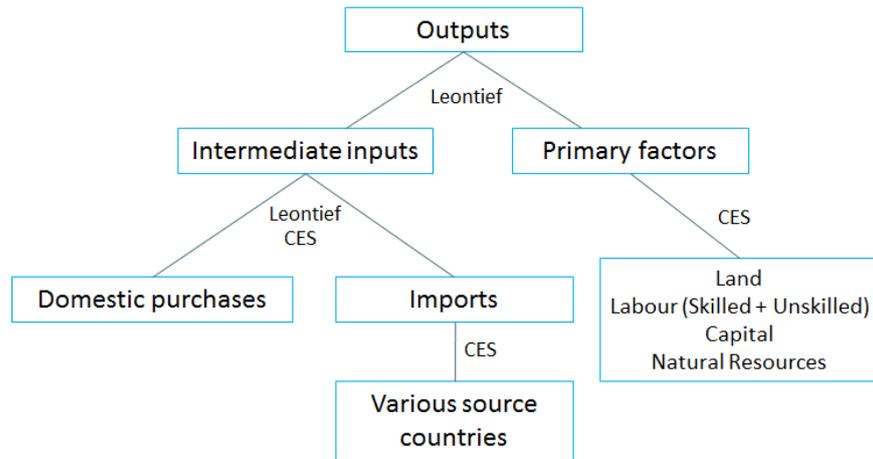


Source: Adapted from Hertel and Tsigas (1997).

Inputs for firms' production are categorised into primary factors and intermediate inputs where each category is separable and independent from the other and has constant returns-to-scale (Hertel & Tsigas, 1997, p. 38). Firms are allowed to combine among individual primary factors independently of the prices of intermediate inputs, and equivalently, they are also allowed to combine among imports and domestic purchases independently of the prices of primary factors (Hertel & Tsigas, 1997, p. 40). However, the model applies strictly non-substitution between primary factors and intermediate inputs based on the Leontief function, meaning that there is a pre-determined proportion between primary factors and intermediate inputs for producing outputs (Hertel & Tsigas, 1997, p. 40).

Within the primary factor branch, elasticity among any individual primary factor (i.e., land, labour, capital, and natural resources) is constant, based on the CES assumption (Hertel & Tsigas, 1997, p. 40). This assumption is commonly found in those sectors employing merely two factors – labour and capital (Hertel & Tsigas, 1997, p. 40), which is also the case for the business services sector that has no inputs of land and natural resources based on the GTAP database (see Appendix C). Within the intermediate input nest, the Armington approach is used, meaning that firms are firstly allowed to choose an optimal mix among the source of imports based on the CES assumption (i.e., there are constant elasticities among composite imported goods and among various source countries); then, they choose an optimal mix between domestic supplies and imports based on the CES assumption, too (Hertel & Tsigas, 1997, pp. 40-41). However, because there is assumed separability between domestic supplies and imports, and relevant CES parameters are set to zero (Hertel & Tsigas, 1997, p. 40), the Leontief function is also in place in choosing a bundle of domestically supplied and imported goods. Figure 5 presents the production 'tree' for typical firms in the model.

FIGURE-5: Production ‘tree’ of typical firms in the GTAP model



Source: Adapted from Hertel and Tsigas (1997).

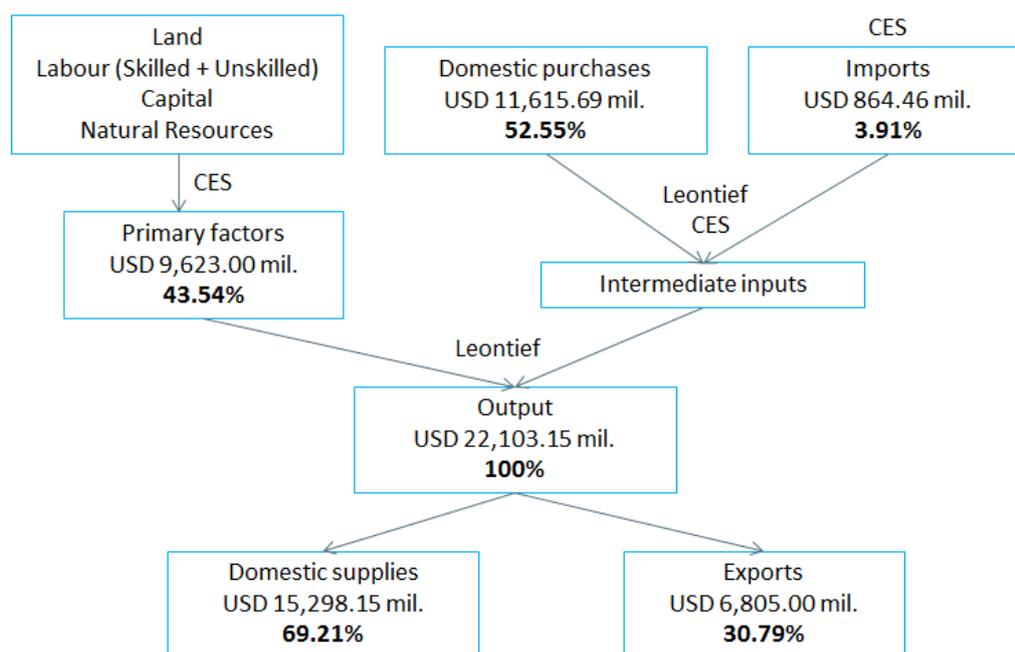
However, like any other economic modeling, this model has several limitations. First, every sector is assumed to produce a single output; hence while there is a one-to-one relationship between the sector and product/commodity (Hertel & Tsigas, 1997, p. 17), the model does not capture the heterogeneity in products (APC, 2010, p. 5). Second, the GTAP model used in this research is a comparative-static model comparing Indonesian domestic economy with and without the designed shock by allowing for full adjustments involving labour and capital across all sectors within the country. Because the model is comparative-static, one cannot trace the details occurring along the course of time in which adjustments take place, or be sure of the length of the adjustment period (APC, 2010, pp. 6-7). Third, this model is a deterministic model hence producing point estimates. Although the estimates are subject to uncertainty, there is no estimation of confidence intervals made (APC, 2010, p. 3).

3.2. Modeling Approach and Data

This research utilises the GTAP model of the global economy with the version of 9A and the reference year of 2011. The simulation uses the GEMPACK economic modeling software (Harrison et al., 2016). The simulation is designed in two model closures: short-run and longer-run environments, further discussed in section 3.3.

The standard GTAP database is aggregated from 140 database regions to 14 study-specific regions in which the region of ‘Indonesia’ is the main interest of the simulation. The database is also aggregated from 57 database sectors to 11 study-specific sectors in which the sector of ‘Business_Ser’ for business services is the main interest of the simulation hence separately identified (see Appendix B). Figure 6 delivers the structure of input and output of the business services sector in Indonesia based on the model database.

FIGURE-6: Input-output structure and data of business services sector for Indonesia



Source: GTAP database, calculated.

As discussed in section 1, the introduction of zero-rated VAT on exports of a sector is equivalent to removing the export tax in that sector. In the GTAP model, there is an exogenous variable allowing a change in an export tax rate that is the variable 'tx'. Hence, this variable can be justified to be used to simulate the hypothetical introduction of zero-rated VAT on exports. Because the variable 'tx' is defined as an export subsidy or negative export tax, the designed shock will be an addition to 'tx'. Two simulations are done in this research: elasticity scenario and policy scenario.

3.2.1. Elasticity Scenario

The first scenario is shocking the variable 'tx' for 'Business_Ser' by 1% to get the elasticity interpretation. Elasticity scenario provides the impacts of every 1% rebate of input VAT on exports of business services on determined economic variables. The command used to deliver the shock is: Shock tx("Business_Ser", "Indonesia") = 1.0;.

3.2.2. Policy Scenario

After getting the results from the elasticity scenario, the research then seeks to calibrate the scenario to actual industry costs to provide a more realistic estimate of the potential impacts of the introduction of zero-rated VAT on exports of business services. The calibration process is done by estimating the proportion of input VAT in exports of business services involving three steps.

The first step is to extract data of input for the business service sector from the GTAP database. The database distinguishes input for a sector from three sources: domestic purchases (i.e., the coefficient of 'VDFA'), import purchases (i.e., the coefficient of 'VIFA'), and primary factors of production (i.e., the coefficient of 'EVFA') (Hertel & Tsigas, 1997, pp. 20-21). The data of those coefficients are recorded at prices that include VAT if subject to VAT (Hertel & Tsigas, 1997, p. 21). Data of domestic purchases ('VDFA') and import purchases ('VIFA') are presented

in a way that separately identifies purchases by the business services sector from 11 sectors that include the business services sector itself.

The second step is determining which purchase is subject to VAT (i.e., taxable purchases) hence already including VAT 10% in the purchase price because that is the single VAT rate applied in Indonesia, and which purchase is not subject to VAT (i.e., non-taxable purchases) hence no VAT contained in the purchase price, by using the Indonesian VAT Law Number 42 Year 2009, as the lastly amended Indonesian VAT Law available when the simulation was done, as the legal basis. By matching the article 4A of that law (i.e., the list of goods and services not subject to VAT) with the list of sectors used in this research (Appendix B), products in the sector of grains and crops, the sector of livestock and meat products, and the sector of mining and extraction are largely not subject to VAT; hence this research assumes that no VAT is included in the purchase price from these sectors. Likewise, most of the services within the sector of other services (i.e., financial services, insurance services, public administration services including government-provided defence services, health, and education services) are not subject to VAT based on the law; hence this research assumes that 100% of purchases from this sector are non-taxable purchases. Also, unskilled and skilled labour purchases are non-taxable because labour services are not subject to VAT based on the law.

The last step is to calculate the estimated total input VAT on inputs to the business services sector and the proportion of that input VAT in total business services industry costs. Table 2 delivers the calibration process' key results, resulting in the proportion of input VAT from total purchases in the business service sector as much as 4.57%. The complete process is presented in Appendix C. By assuming that this estimated proportion applies equally either in the purchases for domestic sales or in the purchases for exports, this research assumes that the input VAT expense burdened by Indonesian exporters of business services before the new regulation is in place was 4.57% of export sales, on average. Because this input VAT is now removed under the new regulation, the second scenario is to shock the variable 'tx' by 4.57% with the command to deliver the shock is: Shock tx("Business_Ser", "Indonesia") = 4.57.

TABLE-2: Key results of the calibration process for policy scenario (in USD million)

Item	Value including VAT	Value excluding VAT	VAT
Domestic purchases – VDFA	11,615.69	11,144.70	470.99
Import purchases – VIFA	864.46	800.83	63.63
Primary factors – EVFA	9,623.00	9,147.64	475.36
Total Purchases	22,103.15	21,093.16	1,009.98
Proportion	100.00%	95.43%	4.57%

Source: GTAP database, calculated.

3.3. Economic Environment Modeled

This research does each scenario in two model environments/closures: short-run environment and longer-run environment. The short-run environment modeled is set by fixing the amount of labour and capital stock within the domestic economy, allowing the real wages and returns on capital to vary. In this environment, labour and capital may move from one sector to another sector within the domestic economy to seek the highest return, but not across national borders (APC, 2010, p. 8).

In the longer-run environment, the amount of labour within the domestic economy is still fixed within the country but allowing capital to move across national borders while letting the global stock of capital adjust to its region-specific long-run equilibrium rate of return, 'implicitly capturing the effects of the increased savings and investment' stimulated by the modeled shock

(APC, 2010, p. 7). Hence, the longer-run model closure is designed 'to capture some of the flexibility in the mobility of capital stocks' that might occur over a longer term, as being consistent with growth theory where there is a constant ratio of capital to investment in the long run or allowing capital stock to adjust to back to its initial long-run rates of return (APC, 2010, p. 8).

The fixed labour condition is set for both model closures to provide comparable per-capita interpretations between the two environments. The amount of population is set in the model database, and the model allows a change in the rate of population growth that can adjust the resulting per capita private utility (Hertel & Tsigas, 1997, p. 49) and per capita welfare (Hertel & Tsigas, 1997, p. 61). Allowing labour to move across national borders would change the amount of domestic labour but is not captured in the change in population within the model, hence will lead to misleading per capita measures.

4. RESULTS AND ANALYSIS

4.1. Results of Elasticity Scenario

The summary of the results of the elasticity scenario is delivered in table 3 for macroeconomic results and in table 4 for the business services industry results. Both are presented for the short-run and longer-run model closures. All variables are measured at percentage change, except for the change in trade balance which is measured at USD million (2011 values). Because the results for some variables can be only seen in five decimal numbers, all variables measured at percentage change are written in such decimals to enable comparison.

The elasticity scenario aims to deliver the elasticity interpretation that is the impacts on determined economic variables for every 1% rebate in input VAT on exports of business services. Table 3 shows that for every 1% reduction in the input VAT, GDP is projected to increase by 0.00146% in the longer run. With the economic response in the short run is limited by the assumption of a fixed supply of capital, the projected change is less. Real wages are projected to increase in the short run with that increase grows in the longer run as the demand for a fixed supply of labour increases.

TABLE-3: Summary of macroeconomic results of elasticity scenario
(rebating input VAT by 1%)

Variables	Unit	National	
		Short Run	Long Run
<u>Welfare projections</u>			
GDP	% change	0.00003	0.00146
Real wages:			
Unskilled labour	% change	0.00024	0.00105
Skilled labour	% change	0.00545	0.00603
Capital stock	% change	0.00000	0.00300
Real regional income	% change	-0.00021	0.00079
<u>Trade projections</u>			
Price of exports	% change	-0.00119	-0.00164
Volume of exports	% change	0.00104	0.00382
Price of imports	% change	-0.00002	-0.00001
Volume of imports	% change	0.00335	0.00358
Terms of trade	% change	-0.00117	-0.00163
Trade balance	USD mil.	-6.95	-2.62

Source: GTAP model simulation.

The projected change for capital stock follows the treatment of capital in each model closure; hence, it fixes in the short run but increases in the longer run. Real regional income is projected to decrease in the short run following a consequent reduction in the government VAT revenue but is projected to increase in the longer run by 0.00079% due to the projected rising commodity taxes from increases in national exports and domestic transactions. The terms of trade are projected to decrease in both time frames due to the projected decrease in the national export price larger than the projected decrease in the national import price. Similarly, the national trade balance is also projected to decrease in the short run because of the projected increase in import expenditure exceeding the projected increase in export revenue, while this gap is projected to be smaller in the longer run.

Table 4 shows that the industry output of the business services is projected to increase following the projected increase in the industry's export volume. Both increases grow in the longer run as additional capital would be installed in the expanding sector of business services. Meanwhile, the industry's trade balance is projected to increase by almost 16 USD million in both the short and longer run because the projected increase in the sector's export volume far outweighs the projected increase in its import volume.

TABLE-4: Summary of the business services industry results of elasticity scenario (rebating input VAT by 1%)

Variables	Unit	Business Services	
		Short Run	Long Run
Industry output	% change	0.10107	0.10299
Price of exports	% change	-0.99071	-0.99188
Volume of exports	% change	3.80522	3.80981
Price of imports	% change	-0.00007	-0.00006
Volume of imports	% change	0.00790	0.00778
Trade balance	USD mil.	15.96	15.99

Source: GTAP model simulation.

4.2. Results of Policy Scenario

When calibrated to the estimated rebate of 4.57% of the input VAT of exporting business services, the direction of change of all variables under the policy scenario is consistent with that of the elasticity scenario, with the magnitude of the projected changes is approximately linear to the multiplication of the results of elasticity scenario by 4.57. Macroeconomic results, business services industry results, and general industry results are discussed in order.

4.2.1. Macroeconomic Results

Table 5 presents the summary of the macroeconomic results of the policy scenario. The following analysis discusses in turn each macroeconomic variable presented in the table.

TABLE-5: Summary of macroeconomic results of policy scenario
(rebating input VAT by 4.57%)

Variables	Unit	National	
		Short Run	Long Run
<u>Welfare projections</u>			
GDP	% change	0.00002	0.00668
Real wages:			
Unskilled labour	% change	0.00111	0.00486
Skilled labour	% change	0.02545	0.02814
Capital stock	% change	0.00000	0.01399
Real regional income	% change	-0.00110	0.00360
<u>Trade projections</u>			
Price of exports	% change	-0.00547	-0.00761
Volume of exports	% change	0.00466	0.01760
Price of imports	% change	-0.00009	-0.00007
Volume of imports	% change	0.01557	0.01664
Terms of trade	% change	-0.00538	-0.00755
Trade balance	USD mil.	-32.58	-12.42

Source: GTAP model simulation.

Gross Domestic Product (GDP)

As commonly known, GDP is comprised of private consumption (C), business investment (I), government consumption (G), and net exports (X) minus imports (M). Hence, it is often to see the formulation to calculate GDP as: $GDP = C + I + G + X - M$.

GDP quantity index is projected to experience nearly zero change – a very small increase of 0.00002% – in the short run because of trade-off effects between the projected increase in regional investment (I), as can be seen in table 12 and the projected decrease in net export (X – M) or the national trade balance, while private (C) and government (G) consumption experience only a small decrease due to the decrease in real regional income. However, in the longer run where real regional income is projected to increase, and the reduction in the national trade balance is projected to be smaller, it is projected that GDP would increase by 0.00668%.

Real wages

The expanding sector of business services would attract some labour from other sectors as a response to differences in wages. This event implicates that real wages in the sector should increase to make such attraction. However, the increase in real wages between skilled and unskilled labour may be different in size depending on the structure of labour needs in that sector. The business service sector is reasonably a sector which employs and relies more on skilled than unskilled labour. Consequently, to attract more skilled labour, this sector has to offer an increase in real wages that is larger for skilled labour than for unskilled labour. The results show that the real wages of skilled labour are projected to increase by 0.02545%, while unskilled labour increases by 0.00111% in the short run.

In the longer-run environment, where additional capital is allowed to be installed in the business services sector hence increasing the capital rate of return, the real wages of skilled and unskilled labour are expected to increase more in order to raise the labour rate of return, hence achieving the constant ratio of capital to labour rate of return. The results project the real wages

of skilled labour to increase more by 0.02814% and of unskilled labour by 0.00486% in the longer run.c

Capital stock

The projected change in capital stock is determined by the model closure used. In the short-run model closure, where capital is fixed within the country, capital stock is projected unchanged.

In the longer-run environment where capital can move across national borders and global capital stock can adjust to its long-run equilibrium rate of return, it is projected that additional capital would come to the country to be invested in the expanding sector of business services. The results show that the capital stock is projected to increase by 0.01399% in the longer run.

Real regional income

Real regional income is measured as being equal to private consumption, government consumption, and saving, after subtracted by the GTAP index of consumer price. In the GTAP model where the setting is an open economy with government intervention consisting of tax and subsidy is in place, the source of change to regional income can be traced to the payments to primary factors of production (i.e., land, natural resources, labour, and capital) plus the change in indirect tax revenue or subsidy expenditure (Hertel & Tsigas, 1997, pp. 23-24).

As discussed, the introduction of zero-rated VAT on exports of business services would immediately remove the potential revenue from the input VAT of exporters of those services since the exporters can now refund all their input VAT related to their exports. Real regional income is projected to decrease by 0.00110% in the short run, implicating that the projected reduction in VAT revenue would not be offset by the increase in returns to primary factors. However, in the longer-run environment where all sectors are projected to experience additional outputs and demand for primary factors, additional primary factor payment and tax revenue from higher exports and domestic sales is projected to outweigh the short-run negative impact on the government tax revenue. The results show that real regional income is projected to increase by 0.00360% in the longer run.

National price and volume of exports

The national export price index is projected to decrease by 0.00547% in the short run, while the national export volume is projected to increase by 0.00466%. These changes can be explained by the share-weighted sum of export value of each sector because in the GTAP model, a percentage change in export value is formed by the percentage change in export volume added by the percentage change in export price. Table 6 presents the calculation to acquire the projected change in the export value of each sector. The share-weighted sum is delivered in table 7. The total post-share shown in table 7 is not at the exact number of 100.00% due to the rounding inherent within the GTAP database. In the longer-run environment, the national export volume is projected to increase more by 0.01760%. However, this increase is projected to reduce more the national export price index in the same time frame by 0.00761% as markets clear.

TABLE-6: Calculation to acquire the projected change in export value

Sector	Projected change in export volume (1)	Projected change in export price (2)	Projected change in export value (1 + 2)
Grains and Crops	-0.00250%	0.00045%	-0.00205%
Livestock and Meat Products	-0.06558%	0.00932%	-0.05626%
Mining and Extraction	-0.00590%	0.00094%	-0.00496%
Processed Food	-0.04048%	0.01078%	-0.02970%
Textiles and Clothing	-0.07449%	0.01067%	-0.06382%
Light Manufacturing	-0.07504%	0.01212%	-0.06292%
Heavy Manufacturing	-0.07011%	0.01028%	-0.05983%
Utilities and Construction	-0.05931%	0.01258%	-0.04673%
Transport and Communication	-0.05357%	0.01398%	-0.03959%
Business Services	17.80369%	-4.44817%	13.35552%
Other Services	-0.07965%	0.02072%	-0.05893%
All sectors (National)	0.00466%	-0.00547%	-0.00082%

Source: GTAP model simulation.

TABLE-7: The share-weighted sum of export value of each sector

Sector	Pre-value (USD mil.)	Pre-share	Projected change	Projected post- value (USD mil.)	Post- share
Grains and Crops	10,110.00	5.39%	-0.00205%	10,109.79	5.39%
Livestock and Meat Products	925.00	0.49%	-0.05626%	924.48	0.49%
Mining and Extraction	9,315.00	4.97%	-0.00496%	9,314.54	4.97%
Processed Food	8,123.00	4.33%	-0.02970%	8,120.59	4.33%
Textiles and Clothing	7,108.00	3.79%	-0.06382%	7,103.46	3.79%
Light Manufacturing	23,420.00	12.50%	-0.06292%	23,405.26	12.49%
Heavy Manufacturing	107,328.00	57.27%	-0.05983%	107,263.79	57.24%
Utilities and Construction	1,093.00	0.58%	-0.04673%	1,092.49	0.58%
Transport and Communication	9,030.00	4.82%	-0.03959%	9,026.43	4.82%
Business Services	6,805.00	3.63%	13.35552%	7,713.84	4.12%
Other Services	4,143.00	2.21%	-0.05893%	4,140.56	2.21%
All sectors (National)	187,398.00	100.00%	-0.00082%	187,396.47	100.44%

Source: GTAP database and model simulation.

National price and volume of imports

The national import price index is projected to decrease by 0.00009% in the short run, while the national import volume is projected to increase by 0.01557%. Equivalent to the case of national exports, these changes can also be explained by the share-weighted sum of the import value of each sector. Table 8 presents the calculation to acquire the projected change in import value of each sector, while table 9 delivers the share-weighted sum. In the longer run, the projection is a decrease of 0.00007% for the import price index and an increase of 0.01664% for the import volume.

TABLE-8: Calculation to acquire the projected change in import value

Sector	Projected change in import volume (1)	Projected change in import price (2)	Projected change in import value (1 + 2)
Grains and Crops	-0.01154%	-0.00013%	-0.01167%
Livestock and Meat Products	0.01488%	-0.00011%	0.01477%
Mining and Extraction	-0.02102%	0.00019%	-0.02083%
Processed Food	0.01429%	-0.00011%	0.01418%
Textiles and Clothing	-0.00483%	-0.00013%	-0.00496%
Light Manufacturing	0.02947%	-0.00012%	0.02935%
Heavy Manufacturing	0.01581%	-0.00006%	0.01575%
Utilities and Construction	0.03886%	-0.00021%	0.03865%
Transport and Communication	0.03129%	-0.00027%	0.03102%
Business Services	0.03685%	-0.00034%	0.03651%
Other Services	0.05373%	-0.00029%	0.05344%
All sectors (National)	0.01557%	-0.00009%	0.01548%

Source: GTAP model simulation.

TABLE-9: The share-weighted sum of the import value of each sector

Sector	Pre-value (USD mil.)	Pre-share	Projected change	Projected post- value (USD mil.)	Post-share
Grains and Crops	11,782.00	5.74%	-0.01167%	11,780.63	5.74%
Livestock and Meat Products	1,047.00	0.51%	0.01477%	1,047.15	0.51%
Mining and Extraction	10,012.00	4.88%	-0.02083%	10,009.91	4.88%
Processed Food	9,547.00	4.65%	0.01418%	9,548.35	4.65%
Textiles and Clothing	7,962.00	3.88%	-0.00496%	7,961.61	3.88%
Light Manufacturing	26,100.00	12.71%	0.02935%	26,107.66	12.72%
Heavy Manufacturing	117,763.00	57.37%	0.01575%	117,781.55	57.37%
Utilities and Construction	1,093.00	0.53%	0.03865%	1,093.42	0.53%
Transport and Communication	9,030.00	4.40%	0.03102%	9,032.80	4.40%
Business Services	6,805.00	3.31%	0.03651%	6,807.48	3.32%
Other Services	4,143.00	2.02%	0.05344%	4,145.21	2.02%
All sectors (National)	205,283.00	100.00%	0.01548%	205,314.77	100.00%

Source: GTAP database and model simulation.

The increases in national import demand can also be explained by compositional factors between import demand from private and government households and firms. Contracting sectors are projected to decrease their imports, while expanding sectors are projected to import more to meet their expansion needs. This trade-off effect will ultimately form national import demand from national firms.

Meanwhile, import demand from private and government households is influenced by the changes in domestic supply of all goods and services. Contracting sectors are projected to reduce their domestic supplies of relevant goods and services due to their loss of competitiveness as skilled labour is projected to move from them into the expanding business services sector. This reduction is projected to stimulate private and government households to increase their demand for imports of those goods and services. While the business services sector would experience a reduction in its domestic supply as already discussed, the other expanding sectors would

experience the contrary since these sectors would acquire more demand of domestic purchases for intermediate inputs from the business services sector.

Particularly for private demand of imports, the changes in domestic price, import price as well as income level will vary the elasticities within a private consumption bundle of domestically supplied and imported goods and services based on the CDE assumption. The trade-off effects will result in national import demand from private and government households. The projected increases in the national import volume in both the short and longer run are due to these compositional factors.

Terms of trade

As commonly known, terms of trade are defined as the ratio of the export price index of a country relative to its import price index. The results show that the terms of trade are projected to decrease by 0.00538% in the short run. This reduction is derived from the difference between the projected decrease in the national export price index (0.00547%) and the projected decrease in the import price index (0.00009%) in the short run.

In the longer-run environment, where the national export price index is projected to decrease more while the national import price index is projected to decrease less, the final effect to the terms of trade is the more decrease by 0.00755%. Again, this reduction is mathematically similar to the difference between the projected decrease in the national export price index (0.00761%) and the projected decrease in the import price index (0.00007%) in the longer run.

National trade balance

The national trade balance (i.e., total exports minus total imports) is influenced by the projected change in exports and imports of all sectors and is projected to decrease in the short run by 32.58 USD million. This net negative effect on the national trade balance can be inferred by reviewing national export and import projections in table 5. From table 5, it can be seen that the projected increase in national import volume in the short run (0.01557%) exceeds the projected increase in export volume (0.00466%), while the projected decrease in the national import price index (0.00009) is smaller than the projected decrease in the national export price index (0.00547%). These relative numbers implicate that the country is projected to experience the increase in national import expenditure that outweighs the increase in national export revenue.

In the longer-run environment, it is projected that the national trade balance decreases much less by 12.42 USD million. Mathematically, this is mostly due to the projected additional increase in the national export volume under the longer-run setting (from 0.00466% to 0.01760%) that outweighs the projected additional increase in the national import volume (from 0.01557% to 0.01664%). This larger additional increase in the national export volume relative to the national import volume can be explained by reviewing the projections in industry output in table 12. Industry output of all sectors is projected to improve in the longer run, meaning that reduction in output becomes smaller or even becomes positive, while a portion of additional industry output is for exports.

4.2.2. Business Service Industry Results

Table 10 presents the summary of the business service industry results of the policy scenario. The following analysis discusses in turn each the industry variable presented in the table.

TABLE-10: Summary of the business services industry results of policy scenario (rebating input VAT by 4.57%)

Variables	Unit	Business Services	
		Short Run	Long Run
Industry output	% change	0.47285	0.48186
Price of exports	% change	-4.44817	-4.45353
Volume of exports	% change	17.80369	17.82649
Price of imports	% change	-0.00034	-0.00029
Volume of imports	% change	0.03685	0.03629
Trade balance	USD mil.	74.06	74.19

Source: GTAP model simulation.

Industry output

The output of the business services sector is projected to increase by 0.47285% in the short run, much lower than the projected increase in the export value in the same time frame (13.35552%). This result reflects two effects. The first is a substitution effect as domestic supply reduces because the exporters divert their production from previously available for domestic supply to be exported, and because of the reduction in domestic demand since the domestic consumers face the higher domestic price, as indicated in the partial equilibrium analysis summarised in table 1. By using the proportion of domestic supplies and exports to total output presented in figure 6, the calculation of the projected change to the domestic supply can be made as delivered in table 11. Based on table 11, the domestic supply of business services in terms of value is projected to decrease by 5.25768% in the short run.

TABLE-11: Calculation of the projected change in the domestic supply of the business services sector – short run

	Proportion (%)	Pre-value (USD mil.)	Projected change (%)	Projected post-value (USD mil.)
Industry output	100.00	22,103.15	0.47285	22,207.66
Export	30.79	6,805.00	13.35552	7,713.84
Domestic supply	69.21	15,298.15	-5.25768	14,493.82

Source: GTAP database and model simulation.

The second is an expansion effect as the labour, particularly skilled ones, from other sectors is projected to move to the business services sector to seek higher wages. The additional labour in the sector would increase the industry output of business services. In the longer run, it is projected that the capital deployment would increase in the expanding sector of business services, enabling an increase in its projected output (0.48186%).

Price and volume of exports of business services

Indonesian exporters of business services are arguably price takers in the global market of the services; hence, they are facing the constant world price. This event is because Indonesia has a low market share hence low market power in the global market of any service. Calculated from the World Integrated Data Solution, the share of Indonesia's services exports in the world in 2017 was only 0.46% (World Bank, 2019). Consequently, the removal of input VAT as much as 4.57% of export sales of business services is expected to be transferred by Indonesian exporters to reduce the export price index of the services with the relatively similar rate. The results confirm this expectation by projecting a decrease of 4.44817% for the export price index of business services in the short run. This reduction in the export price index is projected to stimulate the increase in the export volume of the services by 17.80369% because, with lower prices, the foreign demand increases to clear the market.

In the longer-run environment, the export volume of the business service sector is projected to increase more by 17.82649% because the sector would attract a proportion of the additional capital stock available. Further, this more increase in the export volume is projected to pull down more the export price index of the sector by 4.45353% as markets clear.

Price and volume of imports of business services

The projected decrease in the export price index of business services from Indonesia would directly decrease the import price of those services by the country's trading partners. It would ultimately reduce the import price index of the same services into Indonesia from trading partners. The GTAP model tracks the change in the import and export price index of particular products due to a shock in one country's export tax or import tariff in a linear way. The results show that the import price index of business services into Indonesia is projected to reduce by 0.00034% in the short run and by 0.00029% in the longer run.

In the GTAP model, import demand for a product is constituted by import demand from private and government households and firms for that product. As discussed, the introduction of zero-rated VAT would induce domestic prices to rise and domestic supply to decrease. The higher domestic price and the lower domestic supply of business services, in turn, are expected to increase the import demand of those services from households and firms. Particularly for private demand of imports, the changes in domestic price and import price of business services will vary the elasticities within a bundle of domestically supplied and imported business services based on the CDE assumption that ultimately form the private imports of those services.

Moreover, it can be seen from Appendix E that the foreign supply of business services is the second-highest source of imports for the domestic sector of business services in Indonesia. Therefore, while the domestic sector of business services is projected to expand through additional exports, import demand for those services is also projected to increase. The results show that the import volume of business services into Indonesia is projected to increase by 0.03685% in the short run and by 0.03629% in the longer run.

Balance of trade in business services

According to the results shown in table 10, the projected increase in export volume of business services (17.80369% in the short run and 17.82649% in the longer run) far outweighs the projected increase in the import volume of those services (0.03685% in short run and 0.03629% in longer run). Although the projected decrease in export price of the services (4.44817% in the short run and 4.45353% in the longer run) is larger than the projected decrease in the import price (0.00034% in the short run and 0.00029% in the longer run), it can be inferred that the projected increase in export value of business services still far exceeds the projected increase in import value of those services. Therefore, the projected increase in the trade balance of the business service sector by 74.06 USD million in the short run and by 74.19 USD million in the longer run can be explained.

4.2.3. General Industry Results

Table 12 presents projected changes in the industry output for each sector due to the policy shock together with an indication of the industry size in the Indonesian economy as measured by the proportion of the output of a sector relative to the total output of all sectors. It is projected that all sectors producing goods (i.e., grains and crops, livestock and meat products, mining and extraction, processed food, textiles and clothing, light manufacturing, and heavy manufacturing) and one service sector (i.e., transport and communication) would contract in the short run. The projected decreases reflect the projected move of some of their labour, particularly skilled ones, to the expanding sector of business services to seek higher wages.

TABLE-12: Change in industry output under policy scenario

Sector	Output Size	Short Run	Long Run
Grains and Crops	7%	-0.00489%	-0.00307%
Livestock and Meat Products	1%	-0.00458%	-0.00045%
Mining and Extraction	8%	-0.01142%	-0.00593%
Processed Food	7%	-0.01393%	-0.00866%
Textiles and Clothing	3%	-0.04150%	-0.02600%
Light Manufacturing	9%	-0.01559%	-0.00606%
Heavy Manufacturing	16%	-0.02970%	-0.01578%
Utilities and Construction	14%	0.01051%	0.01242%
Transport and Communication	16%	-0.00291%	0.00411%
Business Services	1%	0.47285%	0.48186%
Other Services	17%	0.00407%	0.01180%
All Sectors	100%	-0.00151%	0.00583%
Capital Goods = Regional Investment	17%	0.01305%	0.01396%

Source: GTAP model simulation.

Meanwhile, the sector of utilities and construction and the sector of other services are projected to experience a small net increase in their output because, while those two sectors may experience losses from the move of some of their labour to the expanding sector of business services, that potential reduction in output is projected to be outweighed by the potential increase in demand for intermediate inputs by the business services sector. This event is also the case of the other services sector that includes financial and insurance services which are the main suppliers for the business services sector (see Appendix C).

In the longer run, all sectors are projected to experience an improvement in their output, meaning that their reduction in output on account of the resource shifting effects is projected to be smaller than the expansion effects of the business services sector or even change to be positive such as the projection for the transport and communication sector. This case is because capital would not only concentrate in the sector of business services but also to spread to all other sectors in the domestic economy until the capital achieves its long-term equilibrium rate of return across all sectors in the country.

5. CONCLUSION

In summary, there are three essential things to be considered as the projections of economy-wide impacts of the introduction of zero-rated VAT on exports of business services in Indonesia. First, zero-rated VAT on business services is likely to deliver long-run national economic benefits reflected in the projected increase in the export quantity of the services and the projected increase in real wages, particularly for skilled labour. Second, there may be negative effects on other sectors, particularly in the short run, in terms of reduction of their industry output due to the likely relocation of some resources from those sectors into the expanding sector of business services. Third, there is a projection for real regional income to decrease in the short run due to the immediate loss of VAT revenue from input VAT previously not refunded to the exporters. However, this short-run negative impact on VAT revenue is likely outweighed by higher factor incomes and the increase in tax revenue from higher exports and domestic sales in the longer run, hence resulting in the likely increase in real regional income.

Further research may disaggregate the national projections to capture the provincial distribution of welfare. For the case of Indonesia where inequality between cities and villages, and between the western and eastern parts are large and common, this approach would be worthwhile to show more fully the national and distributional implications of the policy change and worth doing.

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7. REFERENCES

- Australian Productivity Commission. (2010). *Supplement to bilateral and regional trade agreements: A CGE analysis of some economic effects of trade agreements*. <https://www.pc.gov.au/inquiries/completed/trade-agreements/report/cge-supplement.pdf>
- Balassa, B. (1978). Export incentives and export performance in developing countries: A comparative analysis. *Weltwirtschaftliches Archiv*, 114(1), 24–61. <https://www.jstor.org/stable/40438317>
- Bouet, A., & Debucquet, D. L. (2010). The economics of export taxes in the context of food security. In Organisation for Economic Co-operation and Development (Ed.), *The economic impact of export restrictions on raw materials* (pp. 59–78). Paris, France: OECD Publishing.
- Chandra, P., & Long, C. (2013). VAT rebates and export performance in China: Firm-level evidence. *Journal of Public Economics*, 102, 13–22. <https://doi.org/10.1016/j.jpubeco.2013.03.005>
- Chao, C.-C., Chou, W. L., & Yu, E. S. H. (2001). Export duty rebates and export performance:

- Theory and China's experience. *Journal of Comparative Economics*, 29, 314–326. <https://doi.org/10.1006/jceec.2001.1713>
- Chen, C.-H., Mai, C.-C., & Yu, H.-C. (2006). The effect of export tax rebates on export performance: Theory and evidence from China. *China Economic Review*, 17, 226–235. <https://doi.org/10.1016/j.chieco.2005.06.001>
- Ernst & Young. (2019, April 5). *Indirect tax alert: Indonesia broadens list of exported services eligible for zero-rated VAT*. Ernst & Young. <https://www.ey.com/gl/en/services/tax/international-tax/alert-indonesia-broadens-list-of-exported-services-eligible-for-zero-rated-vat>
- Feldstein, M. S., & Krugman, P. R. (1990). International trade effects of value-added taxation. In A. Razin & J. B. Slemrod (Eds.), *Taxation in the global economy* (pp. 263–282). Chicago, IL: University of Chicago Press.
- Gourdon, J., Hering, L., Monjon, S., & Poncet, S. (2014). *Export management and incomplete VAT rebates to exporters: The case of China* (FERDI Working Paper No. 117). http://www.ferdi.fr/sites/www.ferdi.fr/files/publication/fichiers/wp117_poncet_et_al_web.pdf
- Harrison, J., Horridge, M., Jerie, M., & Pearson, K. (2016). *GEMPACK manual*. Centre of Policy Studies, Victoria University, Melbourne. <http://www.copsmodels.com/gpmanual.htm>
- Herdian. (2018, October 26). Penetapan PPN 0% ekspor jasa dorong daya saing Indonesia (Zero-rated VAT on services exports is to improve Indonesia's export competitiveness). *Bisnis Indonesia* (Online Edition). <https://finansial.bisnis.com/read/20181026/10/853674/penetapan-ppn-0-ekspor-jasa-dorong-daya-saing-indonesia>
- Hertel, T. W. (1997). Introduction. In T. W. Hertel (Ed.), *Global trade analysis: Modeling and applications* (pp. 3–10). Cambridge, United Kingdom: Cambridge University Press.
- Hertel, T. W., & Tsigas, M. E. (1997). Structure of GTAP. In T. W. Hertel (Ed.), *Global trade analysis: Modeling and applications* (pp. 13–73). Cambridge, United Kingdom: Cambridge University Press.
- Indonesian Central Bank. (2019, March 12). *Current account: Services*. Indonesian Central Bank. http://www.bi.go.id/seki/tabel/TABEL5_3.xls
- Kontan. (2018, October 3). Perluasan tarif PPN 0% ekspor jasa berpotensi kurangi defisit transaksi berjalan (Expanding zero-rated VAT to several other exported services will decrease Indonesia's current account deficit). *Kontan* (Online Edition). <https://nasional.kontan.co.id/news/perluasan-tarif-ppn-0-ekspor-jasa-berpotensi-kurangi-defisit-transaksi-berjalan>
- Organisation for Economic Co-operation and Development. (2017). *International VAT/GST guidelines*. Organisation for Economic Co-operation and Development. <https://www.oecd-ilibrary.org/docserver/9789264271401-en.pdf?expires=1553784976&id=id&accname=ocid194734&checksum=0E0CC9D7ED884CAF5DB8C2551B67D8A1>
- Suwiknyo, E. (2018, July 18). Pengawasan ekspor jasa diperlukan (Monitoring tax compliance by exporting service sectors is essential). *Bisnis Indonesia* (Online Edition). <https://ekonomi.bisnis.com/read/20180718/10/817835/pengawasan-ekspor-jasa-diperlukan>
- Wang, L., & Anwar, S. (2019, January 4). Does VAT rebate policy prompt the export performance of mechanical products? Paper presented at the Allied Social Science Associations (ASSA) and American Economic Association (AEA) 2019 Annual Meeting: Trade and Economic Regimes Session, Atlanta, GA. <https://www.aeaweb.org/conference/2019/preliminary/paper/byHZ2Ebf>
- World Bank. (2019, March 31). *World integrated trade solution: Indonesia and world service exports, in BOP, current US\$, 2017-2017*. World Bank. <https://wits.worldbank.org/CountryProfile/en/Country/IDN/StartYear/2017/EndYear/2017/Indicator/BX-GSR-NFSV-CD>
<https://wits.worldbank.org/CountryProfile/en/Country/WLD/StartYear/2017/EndYear/2017/Indicator/BX-GSR-NFSV-CD>

017/Indicator/BX-GSR-NFSV-CD

World Trade Organization. (1991). *Services sectoral classification list*. World Trade Organization.
https://www.wto.org/english/tratop_e/serv_e/mtn_gns_w_120_e.doc

APPENDICES

Appendix A WTO services sectoral classification list: business services

SECTORS AND SUB-SECTORS

1. BUSINESS SERVICES

A. Professional Services

- a. Legal Services
- b. Accounting, auditing and bookkeeping services
- c. Taxation Services
- d. Architectural services
- e. Engineering services
- f. Integrated engineering services
- g. Urban planning and landscape architectural services
- h. Medical and dental services
- i. Veterinary services
- j. Services provided by midwives, nurses, physiotherapists and para-medical personnel
- k. Other

B. Computer and Related Services

- a. Consultancy services related to the installation of computer hardware
- b. Software implementation services
- c. Data processing services
- d. Data base services
- e. Other 845+849

C. Research and Development Services

- a. R&D services on natural sciences
- b. R&D services on social sciences and humanities
- c. Interdisciplinary R&D services

D. Real Estate Services

- a. Involving own or leased property
- b. On a fee or contract basis

E. Rental/Leasing Services without Operators

- a. Relating to ships
- b. Relating to aircraft
- c. Relating to other transport equipment 83105
- d. Relating to other machinery and equipment
- e. Other 832

F. Other Business Services

- a. Advertising services

- b. Market research and public opinion polling services
- c. Management consulting service
- d. Services related to management consulting
- e. Technical testing and analysis services
- f. Services incidental to agriculture, hunting and forestry
- g. Services incidental to fishing
- h. Services incidental to mining
- i. Services incidental to manufacturing (except for 88442)
- j. Services incidental to energy distribution
- k. Placement and supply services of Personnel
- l. Investigation and security
- m. Related scientific and technical consulting services
- n. Maintenance and repair of equipment (not including maritime vessels, aircraft or other transport equipment)
- o. Building-cleaning services
- p. Photographic services
- q. Packaging services
- r. Printing, publishing
- s. Convention services Other8790

Source: Adapted from WTO (1991).

Appendix B Sectoral aggregation for utilised GTAP database

Aggregated To			Aggregated From					
No.	New Sector Code	New Sector Description	No.	Old Sector Code	Old Sector Description			
1	GrainsCrops	Grains and Crops	1	pdr	Paddy rice			
			2	wht	Wheat			
			3	gro	Cereal grains nec			
			4	v_f	Vegetables, fruit, nuts			
			5	osd	Oil seeds			
			6	c_b	Sugar cane, sugar beet			
			7	pfb	Plant-based fibers			
			8	ocr	Crops nec			
			23	pcr	Processed rice			
2	MeatLstk	Livestock and Meat Products	9	ctl	Cattle, sheep, goats, horses			
			10	oap	Animal products nec			
			11	rmk	Raw milk			
			12	wol	Wool, silk-worm cocoons			
			19	cmt	Meat: cattle, sheep, goats, horse			
			20	omt	Meat products nec			
			3	Extraction	Mining and Extraction	13	frs	Forestry
						14	fsh	Fishing
15	coa	Coal						
16	oil	Oil						
17	gas	Gas						
18	omn	Minerals nec						
21	vol	Vegetable oils and fats						
4	ProcFood	Processed Food	22	mil	Dairy products			
			24	sgr	Sugar			
			25	ofd	Food products nec			
			26	b_t	Beverages and tobacco products			
			5	TextWapp	Textiles and Clothing	27	tex	Textiles
						28	wap	Wearing apparel
						6	LightMnfc	Light Manufacturing
30	lum	Wood products						
31	ppp	Paper products, publishing						
37	fmp	Metal products						
7	HeavyMnfc	Heavy Manufacturing	38	mvh	Motor vehicles and parts			
			39	otn	Transport equipment nec			
			42	omf	Manufactures nec			
			32	p_c	Petroleum, coal products			
			33	crp	Chemical, rubber, plastic prods			
			34	nmm	Mineral products nec			
			35	i_s	Ferrous metals			
8	Util_Cons	Utilities and Construction	36	nfm	Metals nec			
			40	ele	Electronic equipment			
			41	ome	Machinery and equipment nec			
			43	ely	Electricity			
			44	gdt	Gas manufacture, distribution			
			45	wtr	Water			
			46	cns	Construction			

9	TransComm	Transport and Communication	47	trd	Trade
			48	otp	Transport nec
			49	wtp	Sea transport
			50	atp	Air transport
			51	cmn	Communication
10	Business_Ser	Business Services	54	obs	Business services nec
11	OthServices	Other Services	52	ofi	Financial services nec
			53	isr	Insurance
			55	ros	Recreation and other services
			56	osg	PubAdmin/Defence/Health/Education
			57	dwe	Dwellings

Source: GTAP database aggregator.

Appendix C Calibration process to acquire the policy scenario (in USD million)

DOMESTIC PURCHASES – VDFA			
FROM SECTOR	VDFA	VDFA excluding VAT	VAT
1 Grains and Crops	46.70	46.70	-
2 Livestock and Meat Products	0.89	0.89	-
3 Mining and Extraction	37.20	37.20	-
4 Processed Food	35.90	32.64	3.26
5 Textiles and Clothing	130.00	118.18	11.82
6 Light Manufacturing	473.00	430.00	43.00
7 Heavy Manufacturing	1,691.00	1,537.27	153.73
8 Utilities and Construction	228.00	207.27	20.73
9 Transport and Communication	2,260.00	2,054.55	205.45
10 Business Services	363.00	330.00	33.00
11 Other Services	6,350.00	6,350.00	-
Subtotal	11,615.69	11,144.70	470.99
IMPORT PURCHASES – VIFA			
FROM SECTOR	VIFA	VIFA excluding VAT	VAT
1 Grains and Crops	1.21	1.21	-
2 Livestock and Meat Products	0.23	0.23	-
3 Mining and Extraction	0.10	0.10	-
4 Processed Food	1.39	1.26	0.13
5 Textiles and Clothing	1.89	1.72	0.17
6 Light Manufacturing	16.80	15.27	1.53
7 Heavy Manufacturing	337.00	306.36	30.64
8 Utilities and Construction	0.84	0.76	0.08
9 Transport and Communication	169.00	153.64	15.36
10 Business Services	173.00	157.27	15.73
11 Other Services	163.00	163.00	-
Subtotal	864.46	800.83	63.63
PRIMARY FACTORS – EVFA			
FACTOR	EVFA	EVFA excluding VAT	VAT
1 Land	-	-	-
2 Unskilled Labour	809.00	809.00	-
3 Skilled Labour	3,585.00	3,585.00	-
4 Capital	5,229.00	4,753.64	475.36
5 Natural Resources	-	-	-
Subtotal	9,623.00	9,147.64	475.36
Total Purchases including VAT	22,103.15	100.00%	
Total Purchases excluding VAT	21,093.16	95.43%	
Total Input VAT	1,009.98	4.57%	

Source: GTAP database, calculated.