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Publisher Citation

Mohs, J. N., & Galloway, A., Evaluating the Effect of Corporate Tax Reductions on Value Chain Sourcing Decisions, *Strategic Management Quarterly*, June 2019, Vol. 7, No. 3, pp. 1-11.

Comments

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Evaluating the Effect of Corporate Tax Reductions on Value Chain Sourcing Decisions

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Abstract

The objective of this paper is to evaluate the changes in the elements of the value change sensitivity model and identify if there has been a significant shift in the profitability of one country to another. Validating the work on the adjusted present value (APV) formula provided by Rainish, Mensz, and Mohs (2015), this paper analyzes how the new U.S. corporate tax rates will impact a company's sourcing decision. Also, the value-added tax (VAT) is used in all other OECD countries, except the U.S, and therefore this will be part of the evaluation. The third variable that has a crucial impact on sourcing is the average manufacturing wage of the different countries. By examining the taxation and labor system, this paper shows how these essential cost drivers influence the value-chain modeling for the global sourcing. The conclusions, recommendations and implications reached in this study are generalizable and appropriate for use in developing best practice solutions.

Keywords: *Value chain modeling, Global production variables and value creation, Global tax accounting*

Introduction

Myers' & Pogue's (1974) adjusted present value (APV) model highlighted a short-term financial model that includes the use of short-term assets and liabilities. The APV model integrated the making (buying) decision, production location, distribution decision, and tax effects into the firm's capital investment decision-making. Myers, Dill, & Bautista (1976) extended the APV model that also covered the financial leasing contracts. The present value of tax differential cash flows and the changes in the individual cash flow components are used to identify the investment value when leasing. These demonstrate the interdependence of the company's production decision (make or buy), including the customer location, and tax effects.

Rainish & Mensz (2012) used an expanded globalized APV model that is applied to the location and outsourcing variables. Evaluating the operations and financial structure of the firm varies based on the selected activities of the company to optimize its value. This shows how the insufficiency of the basic models found in the textbooks and other materials to understand how a firm operates in a global setting.

Rainish, Mensz, & Mohs (2015) identified how a global firm can optimize its value chain when different key cost variables such as labor costs, transportation costs, and transfer price tax rates change in value. To accomplish this on a conceptual level, a model was created to integrate the buy or build decision, production location, distribution decision, and tax effects into the capital investment decision of the firm. By doing so, the model can be used to optimize the value chain and show how the location of production changes as a result of modifying the different input factors.

In a 2013 Deloitte study, it showed that labor costs, labor productivity, and corporate tax rates are significant factors in determining the country's competitiveness. This paper seeks to apply the model created by Rainish, Mensz, & Mohs (2015) to achieve the significant 2018 corporate tax policy changes in the United States. The United States (U.S.) remains the only OECD country that does not apply a VAT. To get the full picture of how taxes affect profitability

within a country, the varying VAT rates are also evaluated. The third variable examined is the effect of the individual labor rates of a country and the trends in the long run on the company's manufacturing division.

Adjusted Present Value (APV) Model

Rainish & Mensz (2012) redesigned the traditional NPV model to create the framework for a global operation. In the model, the distinction between local and foreign locations, the ownership of activities and price differentiation for the different customers were highlighted. These changes led to the creation of the APV model below:

$$APV_i = \sum_j PV(CF_{ij}) = \left[\sum_j \sum_k \sum_l \left(\sum_c Q_{ijklc} * (P_{ic} - VC_{ijkl}) - FC_{ijkl} \right) \right] * (1 - t_i) + \sum_j t_i Dep_j +$$

$$+ \sum_i \sum_j \sum_k \sum_l (NCF_{ijkl}) + \sum_i \sum_j \sum_k \sum_l (TS_{ijkl}) - \sum_i \sum_j \sum_k \sum_l (CapEx_{ijkl})$$

+ Cost of monitoring + Value of real options + Value of government environment

+ Value of interactions from non-long-term financing effects and operations

where:

TS – the incremental present value of the net tax savings from the interest deductibility of the firm's debt financing and its cost of financial distress

Ti – aggregated tax rate calculated as a weighted average tax rate at the customers' locations

VC – variable cost for investment that includes taxes on production activities

FC – fixed cost for investment

Dep – depreciation for investment

NCF – non-cash flow accounting adjustment effects for an investment

T – income tax rate for investment activity

P – price for product or service of an investment

Q – quantity of product or service sold of investment

Capex – capital expenditures for an investment that is dependent on current global operations

Subscript ijklc – refers to investment (i), activity (j), ownership (k), location (l), and customer (c)

The detailed description of the developed APV model can be found in the Rainish and Mensz paper (model as quoted from Rainish & Mensz, 2012).

Discussion of Global Value Chain Tax Accounting and Data Analysis

As noted in Ranish, Menz and Mohs (2015), the firm’s decision to establish a global supply chain in a specific country or region is often made in a combination of financial and non-financial variables. The non-financial variables cannot be easily quantified and are not relevant in this model. Other financial variables such as transportation costs, material costs, and facilities’ charges are kept constant to better highlight the effects of taxes on the firm’s decision. Below is a brief explanation of the relevant variables.

Corporate Taxes

Taxes are a vital environmental variable for the multinational companies (Doupnik & Perera, 2012). The sovereign governments can tax businesses if an economic relationship exists in any place where an international taxation generally refers to the tax treatment of cross-national transactions (Goodspeed & Witte, 1999). These taxes include direct taxes such as corporate income taxes and indirect taxes such as sales, value-added, property, excise and other related taxes. Based on the empirical studies, the investors are willing to pay for the services to have an access to another country’s workers or market to a certain degree. Prior to the 2018 U.S. tax cuts, it was initially thought that a tax reduction would lead to an increase in the foreign direct investment (FDI) in the U.S. by international partners (Mohs, Wnek, & Galloway, 2018).

The global corporate tax rate has declined from 38% in 1980 to 22.96% in 2018. Before the 2018 tax code change, the U.S. had the fourth highest tax rate with a combined statutory tax rate of 38.91% (comprising federal tax rate and average corporate state tax rate), which had not shown any significant change since the 1980s. With the U.S. having a tax rate of 15.92% higher than the world’s average, consider how this new combined corporate tax rate of 25.82% affected the value chain in its order (Tax Foundation, 2018).

The three common methods of calculating the tax rates as used in the study have their

own pros and cons such as (1) statutory tax rates, (2) average effective tax rates (AETRs), and (3) marginal effective tax rates (METRs). The statutory tax rates have been widely viewed as unsatisfactory compared to AETRs, but they are the most accessible since they are published. The advantage of AETR and METR is that they provide data on actually paid taxes, incorporating the firms’ tax minimizing strategies where statutory tax rates ignore the tax planning effects (Beck & Chaves,

Average Statutory Corporate Tax Rate by Region or Group			
Region or Group	Average Rate	Weighted Average Rate	Number of Countries
Africa	28.73%	28.20%	48
Asia	20.05%	26.26%	45
Europe	18.35%	25.58%	49
North America	23.08%	37.01%	30
Oceania	23.67%	27.10%	18
South America	28.73%	32.98%	13
BRICS	28.32%	27.34%	5
EU	21.82%	26.25%	28
G20	28.04%	30.90%	19
G7	29.57%	33.48%	7
OECD	24.18%	31.12%	35
World	22.96%	29.41%	202

Source: Tax Foundation. Data compiled from numerous sources including: PwC, KPMG, Deloitte, and the U.S. Department of Agriculture.

2012). As for this study, the published combined statutory taxes, published by OCED in *Appendix A* for the year, were evaluated. No other investment incentives have been used.

VAT Taxes

Indirect taxes are viewed as buried or hidden taxes and as such are not commonly disclosed. When applied to a supply chain management framework, indirect taxes can add a significant cost to the flow of goods and services and should be considered according to Rainish, Mensz, & Mohs, 2015.

Indirect taxes are defined as charges levied by a jurisdiction on the consumption, expenditure, privilege or right. In general, these taxes include sales and use tax, VAT, duties and customs, severance, and other different levies that are less obvious than the direct taxes (Choi & Meek, 2012). Indirect taxes, such as VAT, are levied on the various stages of production and readily published.

Europe has one of the lowest corporate tax rates in the world at 18.35% but applied an average VAT of 21.7% while the U.S. does not levy a VAT, making it essential to evaluate when looking at how the changes of the U.S. corporate rates affect the decision-making. In 2015, the standard VAT rates in the OECD had a record high of 19.2% on average and remained stable ever since. Currently, 10 OECD countries have a standard VAT rate above 22% compared to only four in 2008 (OECD, 2016).

For this study, the published VAT rates by OCED in *Appendix B* were used for the year being analyzed. To isolate the value-added portion of the tax, it was only applied to the labor portion of the unit cost.

Average Manufacturing Wage

The wages are one of the most significant variable costs in a firm's supply chain analysis since labor is an integral part of the products' direct assembly/manufacturing expense. About 35 OECD nations observed that wages on average grew 14% between 2000 and 2010. The rate has slowed down with the average hourly wage rate among the OECD countries of \$18.98 per hour in 2010 to \$20.05 per hour in 2017 or a 5.6% growth.

Among the OECD nations, Switzerland and Iceland have consistently been part of the top three most expensive wages. The U.S. manufacturing wage rates increased by 4.3% from \$29.03 in 2010 to \$30.28 in 2017, maintaining its ranking as the seventh highest wage rate. Mexico and Poland have not seen their wages change at the same pace as the other OECD nations. Currently, they are the first and third lowest wages at \$4.30 and \$6.72 per hour, respectively.

For this study, the published average annual wages by OECD in *Appendix C* for the year was used and examined in the conversion of an hourly rate based on 2080 working hours. This also helped to evaluate the wage trend analysis for the countries being analyzed. The study considered the costs as labor costs per unit.

Material Costs

The material costs have remained consistent between countries for each case study either at 20% simulating work that is more labor intensive. In one instance, the material cost is increased to 60% simulating the machining type of work. This is to check if a lower tax rate in the U.S. has made it more complete. Also, any indirect taxes are included in the material costs.

International Transportation Costs

The transportation costs are dependent on different factors but in a simplistic view. These types of costs for a product include function distance, method, and weight. Also, the quality of transport and pricing of goods are also part of the components.

Facilities Charges

The facility charges are estimated, consisting of theoretical capital consummation costs. For this study, these costs involve rent, depreciation, insurance, and provision for the related indirect taxes. These charges are consistent throughout all the cases.

Retained Earnings

The retained earnings variable as described earlier in the transfer pricing structure represents the residual or embedded profit that gets the transfers as a function of the scheme itself. In the case of the subject company, the see-through profit is reduced to a percentage and compliant with the global transfer pricing requirements. By doing this, the subject company has mitigated the impact of cross-jurisdictional tax issues, which may have affected the specific tax variables.

Case Analyses

The sample cases below evaluated the tax and labor changes from 2010 to 2018 and viewed how these variables influenced the model in isolation. The variable data being examined in the cases was extrapolated from OECD and provided in the appendices.

North America Comparison

Introduction. This scenario is used to compare the three North American countries. With the recent U.S. tax changes, all the current corporate tax rates are about 5%. All three have varying wage rates, but the Mexico rate is 86% less than the U.S. rate and 83% lower than Canada's wage rate. The U.S. remains the only OECD country with no VAT while Canada and Mexico rates remain below the average VAT rate globally.

	2010			2018		
	United States	Canada	Mexico	United States	Canada	Mexico
Price Per Unit (\$US)	100	100	100	100	100	100
Variable Cost						
Materials	30	30	30	30	30	30
Labor *	29.03	23.29	4.3	30.28	25.02	4.3
Transportation	10	10	10	10	10	10
Facility Charges	8	8	8	8	8	8
Retained Earnings	5	5	5	5	5	5
Total Variable Cost	82.03	76.29	57.3	83.28	78.02	57.3
Indirect Tax % (VAT)**	0%	5%	16%	0%	5%	16%
Indirect Tax \$ (VAT)	0.00	1.16	0.69	0.00	1.25	0.69
Transfer \$	82.03	77.45	57.99	83.28	79.27	57.99
Net Income (Before Tax)	17.97	22.55	42.01	16.72	20.73	42.01
Corporate Tax % ***	39.2%	29.4%	30.0%	25.8%	26.8%	30.0%
Corporate Tax \$	7.05	6.63	12.60	4.32	5.56	12.60
Net Income	10.92	15.92	29.41	12.40	15.17	29.41

* Appendix C - Labor is 1hr of Avg Manufacture Wage, 2018 rates not yet published, 2017 rates used for 2018
** Appendix B - Assumption is VAT is only applied to labor and that all material is shipped in for assembly
*** Appendix A

Results. From 2010 to 2018, the U.S. has a manufacturing labor increase of \$1.24 or 4.3%, unchanged VAT tax rate of 0%, and a decline in the corporate tax rate of 13.4%. These changes have led to the net income per unit to increase by \$1.48 or 13.6%. At the same period, Canada has a manufacturing labor increase of \$1.73 or 7.4%, unchanged VAT tax rate of 5% and a reduced corporate tax rate of 2.6%. This has led to the net income per unit in Canada to reduce by \$0.75 or -2.9%. In Mexico, the manufacturing labor remains unchanged at \$4.30 per hour, unchanged VAT tax rate of 16%, and an unchanged corporate tax rate of 30%. Therefore there is no change to its net income per unit.

Implications. The preferred production location remains unchanged. As long as there is a huge labor difference that exists between Mexico and other locations, it would be the preferred manufacturing location. The reduction in the corporate tax rate in the U.S. makes them more competitive than Canada, reducing the net income gap from \$5 to \$2.77 per unit (currently \$17.01 with Mexico). Reducing the net income gap to about 18% of Canada's net income, all variable costs need to be considered to determine if there are enough savings to invest in or source manufacturing in Canada.

Developed Economies with Corporate Tax Restructuring

Introduction. This scenario is a comparison of the three developed economies that reduced their corporate tax rates by more than 10% between 2008 and 2018. Two countries remain above the average world corporate tax rate of 22.5% but significantly lower than the average world VAT rate of 19.2%. The third country has a corporate tax and VAT rate close to the OECD average.

	2010			2018		
	UK	United States	Japan	UK	United States	Japan
Price Per Unit (\$US)	100	100	100	100	100	100
Variable Cost						
Materials	30	30	30	30	30	30
Labor *	23.05	29.03	19.03	22.64	30.28	19.12
Transportation	10	10	10	10	10	10
Facility Charges	8	8	8	8	8	8
Retained Earnings	5	5	5	5	5	5
Total Variable Cost	76.05	82.03	72.03	75.64	83.28	72.12
Indirect Tax % (VAT)	17.5%	0%	5%	20%	0%	8%
Indirect Tax \$ (VAT)	4.03	0.00	0.95	4.53	0.00	1.53
Transfer \$	80.08	82.03	72.98	80.17	83.28	73.65
Net Income (Before Tax)	19.92	17.97	27.02	19.83	16.72	26.35
Corporate Tax %	28.0%	39.2%	39.5%	19.0%	25.8%	29.7%
Corporate Tax \$	5.58	7.05	10.68	3.77	4.32	7.84
Net Income	14.34	10.92	16.34	16.06	12.40	18.51
* Appendix C - Labor is 1hr of Avg Manufacture Wage, 2018 rates not yet published, 2017 rates used for 2018						
** Appendix B - Assumption is VAT is only applied to labor and that all material is shipped in for assembly						
*** Appendix A						

Results. From 2010 to 2018, the U.S. has a manufacturing labor increase of \$1.24 or 4.3%, unchanged VAT tax rate of 0% and a decline in the corporate tax rate of 13.4%. These changes have led to the net income per unit to increase by \$1.48 or 13.6%. At the same period, the UK. saw a manufacturing labor decrease of \$.41 or -1.8%, VAT rate increase by 2.5% and a decrease in the corporate tax rate of 9%. This has caused the net income per unit in UK to increase by \$1.72 or 12%. In Japan, the manufacturing labor has increased by \$.09 or 0.5%, VAT rate increase by 3% and a decrease of the corporate tax rate of 9.4%, providing them an improved net income per unit of \$2.17 or 13.3%.

Implications. With all the changes, the profitability by country remains unchanged for Japan, UK, and the U.S. IN the instant case these three countries have improved their net incomes by significantly reducing their corporate tax rates to be more aligned with the global tax trend. However, the lower labor cost of Japan has a more significant effect on the net income despite having the highest corporate taxes.

Europe Nation with No Tax Changes

Introduction. This scenario has made a comparison of the three European countries that had no significant tax changes between 2010 and 2018. One country is considered a developed country with a tax rate of more than 7% higher than the world average. While the two developing nations have a corporate tax rate of approximately 3% lower than the global average. Each country has a VAT at the same rate.

	2010			2018		
	Germany	Czech Republic	Poland	Germany	Czech Republic	Poland
Price Per Unit (\$US)	100	100	100	100	100	100
Variable Cost						
Materials	30	30	30	30	30	30
Labor *	20.08	6.78	5.86	22.23	7.69	6.72
Transportation	10	10	10	10	10	10
Facility Charges	8	8	8	8	8	8
Retained Earnings	5	5	5	5	5	5
Total Variable Cost	73.08	59.78	58.86	75.23	60.69	59.72
Indirect Tax % (VAT)	19%	20%	22%	19%	21%	23%
Indirect Tax \$ (VAT)	3.82	1.36	1.29	4.22	1.61	1.55
Transfer \$	76.90	61.14	60.15	79.45	62.30	61.27
Net Income (Before Tax)	23.10	38.86	39.85	20.55	37.70	38.73
Corporate Tax %	29.5%	19.0%	19.0%	29.8%	19.0%	19.0%
Corporate Tax \$	6.81	7.38	7.57	6.13	7.16	7.36
Net Income	16.29	31.48	32.28	14.42	30.53	31.37
* Appendix C - Labor is 1hr of Avg Manufacture Wage, 2018 rates not yet published, 2017 rates used for 2018						
** Appendix B - Assumption is VAT is only applied to labor and that all material is shipped in for assembly						
*** Appendix A						

Results. From 2010 to 2018, Germany has a manufacturing labor increase of \$2.15 or 10.7%, unchanged VAT tax rate of 19%, and an increase in the corporate tax rate of .3%. These changes have led to the net income per unit to reduce by \$1.87 or -11.5%. At the same period, the Czech Republic has gained a manufacturing labor increase of \$0.91 or 13.4%, VAT rate increase by 1% and a stable corporate tax rate of 19%. This has brought the net income per unit in the Czech Republic to reduce by \$0.95 or -3.1%. In Poland, the manufacturing labor has increased by \$0.86 or 14.7%, VAT rate increase by 1%, and a stable corporate tax rate of 19%, providing them a reduced net income per unit of \$0.91 or 2.9%.

Implications. The preferred production location remains unchanged for Poland, the Czech Republic, and Germany. However, with such a small difference between Poland and the Czech Republic, the other variable costs are kept constant that will identify the best location. Germany had an 11.7% decrease in net income with a 10.7% increase in labor and an insignificant change in its tax rate. Again, it has been highlighted how significant labor costs are on a sourcing decision compared to taxation.

Implications, Summary, and Conclusions

Companies are always searching to make long-term investments in available countries that provide attractive risks and return opportunities. Prior to the 2018 Tax Act, the U.S. had the largest inflow of FDI in 2017 worldwide (OECD, 2017), showing that it was already an attractive investment even with high wages and taxes. When evaluating the sourcing of manufacturing services, the reduced tax rates had no effect when competing with the countries that have significantly lower wage rates. However, by reducing the statutory combined tax rates, the cases highlighted reflect that the U.S. has been more attractive compared with other countries with similar wage rates. Additionally, the analysis indicates that the U.S. despite the rate reductions would appear to be a more attractive location for companies looking to source

professional services such as Information Technology or Engineering. Additional research would be need to further evaluate applicatins of professional service sourcing.

References

- Allen, S., & Echevarria, W.D. (2013). *2013 Global manufacturing competitiveness index*. Deloitte.
- Brealey, R.A., Myers S.C., & Allen, F. (2006). *Principles of corporate finance*. McGraw-Hill, New York.
- Burstein, A., & Monge-Naranjo, A. (2007). *Foreign know-how, firm control, and the income of developing countries*. UCLA.
- Choi, F., & Meek, G. (2012). *International Accounting (7e)*. Upper Saddle River, New Jersey, Prentice Hall Publishing.
- Desai, M., Foley, F., & Hines, J. (2004). Foreign direct investment in a world of multiple taxes, *Journal of Public Economics*. vol. 88, pp. 2727-2744.
- Dirtina, R., & Reimers, J. (2009). Global transfer pricing: A practical guide for managers, *SAM Advanced Management Journal*. vol. 74, issue 2.
- Doupnik, T., & Perera, H. (2012). *International Accounting (3rd)*. New York: McGraw-Hill Irwin.
- Fantasia, J. (2009). *Can today's supply chain deliver tomorrow?* Deloitte.
- Goodspeed, T., & Witte, A. (1999). *International Taxation, Encyclopedia of Law and Economics*, 253.
- Grove, A. (2010). *Andy Grove: How America can create jobs*. Business Week, July 1, 2010.
- Holmes, T., & Schmitz, J. (1995). *Resistance to new technology and trade between areas*. Minneapolis Federal Reserve Bank Quarterly Review, vol. 19, issue 1.
- Lev, B. (September 1974). On the association between operating leverage and risk, *Journal of Financial and Quantitative Analysis*, vol. 9, pp. 627-642.
- Mankiw, N. G., & Swagel, P. (2006). *The politics and economics of offshore outsourcing*. NBER Working Paper 12398.
- McGrattan, E., & Prescott, E.C. (2007). *Openness, technology capital, and development*, Working Paper 651.
- Miller, M. (1977). Debt and taxes. *Journal of Finance*, pp. 261-275.
- Modigliani, F., & Miller, M.H. (1958). The cost of capital, corporation finance and the theory of investment. *American Economic Review*, vol. 48, pp. 261-297.

- Modigliani, F., & Miller, M.H. (1963). Corporate income taxes and the cost of capital: A correction *American Economic Review*, vol. 453, pp. 443-443.
- Mutti, J., & Grubert, H. (2004). Empirical asymmetries in foreign direct investment and taxation. *Journal of International Economics*, vol. 62(2), pp. 337-358. (12 August 2010). Retrieved from Research Library. (Document ID: 640644721).
- Myers, S.C. (1974). Interactions of corporate financing and investment decisions – Implications for capital budgeting. *Journal of Finance*, pp. 1-25.
- Myers, S.C., Dill, D.A., & Bautista, A.J. (1976). Valuation of financial lease contracts. *Journal of Finance*, pp. 799-819.
- Myers, S.C., & Pogue, G.A. (1974). A programming approach to corporate financial management. *Journal of Finance*, vol. 29, pp. 579-599.
- OECD. (2016). *Consumption tax trends 2016: VAT/GST and excise rates, trends and policy issues*. OECD Publishing, Paris. Retrieved from <https://doi.org/10.1787/ctt-2016-en>.
- OECD. (2017). *FDI in figures*. OECD Publishing.
- Rainish, R., & Mensz, P. (2012). Financial framework for global investment and implications. *American International Journal of Contemporary Research*, vol. 2, no. 3.
- Rainish, R., Mensz, P., & Mohs, J., (2015) *Global Financial Model for the Value Chain*, *Journal of Finance and Accountancy*, Volume 18
- Samuelson, P.A. (2004, Summer). Where Ricardo and Mill rebut and confirm arguments of mainstream economists supporting globalization. *Journal of Economic Perspectives*, vol. 18, no. 3, pp. 135-146.
- Schauten, M., & Spronk, J. (2006). *Optimal capital structure – Reflections on economic and other values*. Working paper.
- Sirkin, H., Zinser, M., & Rose, J. (2014). *The shifting economics of global manufacturing*. Boston Consulting Group.
- Wright, J., Jones D., & Hoyle S. (2009). *The sustainable supply chain*. Accenture.

Appendix A

OCED Dataset: Statutory corporate income tax rate

Corporate income tax rate		Combined corporate income tax rate				
Unit		Percentage				
Year		2000	2005	2010	2015	2018
Country						
<u>Australia</u>		34.00	30.00	30.00	30.00	30.00
Austria		34.00	25.00	25.00	25.00	25.00
Belgium		40.17	33.99	<u>33.99</u>	<u>33.99</u>	<u>29.58</u>
Canada		42.43	34.18	29.40	26.70	26.80
<u>Chile</u>		<u>15.00</u>	17.00	17.00	<u>22.50</u>	<u>25.00</u>
Czech Republic		31.00	26.00	19.00	19.00	19.00
Denmark		32.00	28.00	25.00	23.50	22.00
<u>Estonia</u>		26.00	24.00	21.00	20.00	20.00
Finland		29.00	26.00	26.00	20.00	20.00
<u>France</u>		<u>37.76</u>	<u>34.95</u>	<u>34.43</u>	<u>38.00</u>	<u>34.43</u>
<u>Germany</u>		51.61	38.36	29.48	29.79	29.83
Greece		40.00	32.00	24.00	<u>29.00</u>	29.00
Hungary		<u>18.00</u>	<u>16.00</u>	<u>19.00</u>	<u>19.00</u>	<u>9.00</u>
Iceland		30.00	18.00	18.00	<u>20.00</u>	<u>20.00</u>
Ireland		24.00	12.50	12.50	12.50	12.50
<u>Israel</u>		36.00	34.00	25.00	26.50	23.00
<u>Italy</u>		<u>41.25</u>	37.25	31.40	31.29	27.81
Japan		40.87	39.54	39.54	<u>32.11</u>	<u>29.74</u>
Korea		30.80	27.50	24.20	24.20	<u>27.50</u>
Latvia		25.00	15.00	15.00	15.00	20.00
Lithuania		24.00	15.00	15.00	15.00	15.00
<u>Luxembourg</u>		37.45	30.38	28.59	<u>29.22</u>	<u>26.01</u>
Mexico		35.00	30.00	30.00	30.00	30.00
<u>Netherlands</u>		35.00	31.50	<u>25.50</u>	<u>25.00</u>	<u>25.00</u>
<u>New Zealand</u>		33.00	33.00	30.00	28.00	28.00
<u>Norway</u>		28.00	28.00	28.00	27.00	23.00
Poland		30.00	19.00	<u>19.00</u>	<u>19.00</u>	<u>19.00</u>
Portugal		35.20	27.50	<u>26.50</u>	<u>29.50</u>	<u>31.50</u>
<u>Slovak Republic</u>		29.00	19.00	19.00	<u>22.00</u>	<u>21.00</u>
<u>Slovenia</u>		25.00	25.00	20.00	17.00	19.00
Spain		35.00	35.00	30.00	28.00	25.00
Sweden		28.00	28.00	26.30	22.00	22.00
<u>Switzerland</u>		<u>24.93</u>	<u>21.33</u>	<u>21.17</u>	<u>21.15</u>	<u>21.15</u>
Turkey		33.00	30.00	20.00	<u>20.00</u>	<u>22.00</u>
<u>United Kingdom</u>		30.00	30.00	28.00	20.00	19.00
<u>United States</u>		39.34	39.29	39.21	39.00	25.84

Data extracted on 22 Oct 2018 18:07 UTC (GMT) from OECD.Stat

Appendix B

VAT rates																			
	Implemented	1975	1985	1995	2005	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Reduced rates (b)	Specific regional rates
Australia	2000	-	-	-	10	10	10	10	10	10	10	10	10	10	10	10	10	0	-
Austria*	1973	16	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	10.0/13.0	19
Belgium	1971	18	19	20.5	21	21	21	21	21	21	21	21	21	21	21	21	21	0.0/6.0/12.0	-
Canada*	1991	-	-	7	7	6	5	5	5	5	5	5	5	5	5	5	5	0	13.0/14.0/15.0
Chile	1975	20	20	18	19	19	19	19	19	19	19	19	19	19	19	19	19	-	-
Czech Republic	1993	-	-	22	19	19	19	19	20	20	20	21	21	21	21	21	21	10.0/15.0	-
Denmark	1967	15	22	25	25	25	25	25	25	25	25	25	25	25	25	25	25	0	-
Estonia	1991	-	-	18	18	18	18	18	20	20	20	20	20	20	20	20	20	0.0/9.0	-
Finland	1994	-	-	22	22	22	22	22	22	23	23	24	24	24	24	24	24	0.0/10.0/14.0	-
France*	1968	20	18.6	20.6	19.6	19.6	19.6	19.6	19.6	19.6	19.6	19.6	20	20	20	20	20	2.1/5.5/10.0	0.9/2.1/10.0/13.0 & 1.05/1.75/2.1/8.5
Germany	1968	11	14	15	16	19	19	19	19	19	19	19	19	19	19	19	19	7	-
Greece*	1987	-	-	18	18	19	19	19	19	23	23	23	23	23	23	24	24	6.0/13.0	4.0/ 9.0/17.0
Hungary	1988	-	-	25	25	20	20	20	25	25	27	27	27	27	27	27	27	5.0/18.0	-
Iceland	1990	-	-	24.5	24.5	24.5	24.5	24.5	25.5	25.5	25.5	25.5	25.5	24	24	24	24	0.0/11.0	-
Ireland	1972	19.5	23	21	21	21	21	21	21.5	21	21	23	23	23	23	23	23	0.0/4.8/9.0/13.5	-
Israel*	1976	-	15	17	17	15.5	15.5	15.5	16	16	16	17	18	18	17	17	17	0	0
Italy	1973	12	18	19	20	20	20	20	20	20	21	21	22	22	22	22	22	4.0/5.0/10.0	-
Japan	1989	-	-	3	5	5	5	5	5	5	5	5	5	8	8	8	8	-	-
Korea	1977	-	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	0	-
Latvia	1995	-	-	-	18	18	18	21	21	22	22	21	21	21	21	21	21	5.0/12.0	-
Luxembourg	1970	10	12	15	15	15	15	15	15	15	15	15	15	17	17	17	17	3.0/8.0/14.0	-
Mexico	1980	-	15	10	15	15	15	15	16	16	16	16	16	16	16	16	16	0	-
Netherlands	1969	16	19	17.5	19	19	19	19	19	19	19	21	21	21	21	21	21	6	-
New Zealand	1986	-	-	12.5	12.5	12.5	12.5	12.5	12.5	15	15	15	15	15	15	15	15	0	-
Norway	1970	20	20	23	25	25	25	25	25	25	25	25	25	25	25	25	25	0.0/12.0/15.0	-
Poland	1993	-	-	22	22	22	22	22	22	23	23	23	23	23	23	23	23	5.0/8.0	-
Portugal*	1986	-	-	17	19	21	21	20	20	23	23	23	23	23	23	23	23	6.0/13.0	4.0/9.0/18.0 & 5.0/12.0/22.0
Slovak Republic	1993	-	-	25	19	19	19	19	19	20	20	20	20	20	20	20	20	10	-
Slovenia	1999	-	-	-	20	20	20	20	20	20	20	20	22	22	22	22	22	9.5	-
Spain*	1986	-	-	16	16	16	16	16	16	18	18	21	21	21	21	21	21	4.0/10.0	0.0/2.75/3.0/7.0/9.5/13.5/20.0 & 0.5/10.0
Sweden	1969	17.7	23.5	25	25	25	25	25	25	25	25	25	25	25	25	25	25	0.0/6.0/12.0	-
Switzerland	1995	-	-	6.5	7.6	7.6	7.6	7.6	7.6	8	8	8	8	8	8	8	7.7	0.0/2.5/3.8	-
Turkey	1985	-	10	15	18	18	18	18	18	18	18	18	18	18	18	18	18	1.0/8.0	-
United Kingdom	1973	8	15	17.5	17.5	17.5	17.5	15	17.5	20	20	20	20	20	20	20	20	0.0/5.0	-
Unweighted average		15.6	17.3	17.7	17.8	17.8	17.7	17.7	18.1	18.7	18.8	19	19.1	19.2	19.2	19.2	19.2		

Source: national delegates - position as at 1 January 2018

Notes

a. Yearly data: the rates shown in the table are rates applicable on 1 January of each year. Reduced rates and specific rates applicable in specific regions are those applicable as at 1 January 2018

b. Reduced rates: reduced rates include zero-rates applicable to domestic supplies (i.e. an exemption with right to deduct input tax). This does not include zero-rated exports or other supplies subject to similar treatment such as international transport or supplies to embassies, international organisations and diplomatic missions.

*Country notes

Austria. A standard rate of 19% applies in Jungholz and Mittelberg.

Canada. The following provinces have harmonised their provincial sales taxes with the federal Goods and Services Tax and therefore levy a rate of GST/HST of: New Brunswick, Newfoundland and Labrador, Ontario: 13%; Prince Edward Island: 14%; Nova Scotia 15%. During 2016, the provinces of New Brunswick, Newfoundland and Labrador and Prince Edward Island will raise their provincial rates resulting in a combined GST/HST rate of 15%. Québec applies GST at a rate of 5% and Québec Sales Tax at a rate of 9.975% (applied on the same tax base as the GST). Other Canadian provinces, with the exception of Yukon, Rates of 0.9%; 2.1%; 10.0%; 13.0% and 20.0% apply in Corsica; rates of 1.05%; 1.75%; 2.1% and 8.5% apply to overseas departments (DOM) excluding French Guyana and Mayotte.

Greece. Specific regional rates of 4.0%; 9.0% and 16.0% apply in the islands of Lesbos, Chios, Samos, Dodecanese (with the exception of Rhodos since 1 October 2015), Cyclades (with the exception of Mykonos, Naxos, Paros, Santorini since 1 October 2015), Thassos, Northern Sporades (with the exception of Skathos since October 2015), Samothrace and Skiros. According to current planning, the reduced rates on the rest of the Aegean Islands will apply only until 31 December 2016. Since July 2015 the super-reduced rate of 6.5% was decreased to 6%. The standard VAT rate was increased from 23% to 24%.

Israel. The rate of 0% applies when an Eilat resident dealer buys foods from Eilat non-residents. Supplies made by an Eilat resident supplier (to be consumed in Eilat) are exempt from VAT. The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and West Bank. In the Islands of Azores, the standard VAT rate is 18% and the reduced rates are 4% and 9%. In the Islands of Madeira the standard rate is 22% and reduced rates are 5% and 12%.

Portugal. In the Islands of Azores, the standard VAT rate is 18% and the reduced rates are 4% and 9%. In the Islands of Madeira the standard rate is 22% and reduced rates are 5% and 12%.

Spain. Rates of 0.0%, 2.75%; 3.0%; 7.0%, 9.50%; 13.50%, 20% apply in the Canary Islands. Rates of 0.5% and 10% apply in Ceuta and Melilla.

Appendix C

OCED Dataset: Average annual wages

		Series	In 2017 constant prices at 2017 USD exchange rates				
		Time	2000	2005	2010	2015	2017
Country	Unit						
Australia	US Dollar, 2017	i	53,563	56,466	60,348	62,168	61,620
Austria	US Dollar, 2017	i	43,354	45,057	47,314	47,678	48,306
Belgium	US Dollar, 2017	i	47,703	48,437	48,689	50,000	49,419
Canada	US Dollar, 2017	i	40,414	42,640	46,580	50,087	50,033
Chile	US Dollar, 2017	i	14,112	15,531	17,347	18,551	18,645
Czech Republic	US Dollar, 2017	i	9,577	12,370	13,566	14,167	15,374
Denmark	US Dollar, 2017	i	53,228	58,421	63,067	65,239	65,674
Estonia	US Dollar, 2017	i	8,576	11,743	14,397	15,992	17,039
Finland	US Dollar, 2017	i	39,526	43,308	46,513	46,686	46,772
France	US Dollar, 2017	i	35,223	37,785	40,270	41,417	42,410
Germany	US Dollar, 2017	i	39,129	39,602	40,154	43,367	44,466
Greece	US Dollar, 2016	i	20,344	24,018	23,389	19,746	19,542
Hungary	US Dollar, 2016	i	8,794	11,945	11,812	11,040	12,506
Iceland	US Dollar, 2016	i	67,069	76,865	65,381	75,947	90,662
Ireland	US Dollar, 2016	i	42,338	49,661	57,801	51,895	53,112
Israel	US Dollar, 2016	i	40,468	37,658	37,483	39,902	42,378
Italy	US Dollar, 2016	i	32,460	33,401	34,125	33,031	32,931
Japan	US Dollar, 2016	i	38,349	38,070	38,051	37,431	38,234
Korea	US Dollar, 2016	i	24,118	27,906	28,990	29,814	31,390
Latvia	US Dollar, 2016	i	6,925	9,387	11,454	14,048	15,412
Luxembourg	US Dollar, 2016	i	60,652	63,184	68,069	70,474	71,710
Mexico	US Dollar, 2016	i	8,448	9,160	8,596	8,686	8,593
Netherlands	US Dollar, 2016	i	47,442	49,778	52,851	52,999	52,705
New Zealand	US Dollar, 2016	i	35,841	40,593	43,726	45,078	46,917
Norway	US Dollar, 2016	i	46,731	53,540	60,773	66,365	65,786
Poland	US Dollar, 2016	i	10,005	10,326	11,723	12,256	13,431
Portugal	US Dollar, 2016	i	19,980	19,924	20,392	19,057	19,210
Slovak Republic	US Dollar, 2016	i	9,702	11,286	13,490	14,084	14,881
Slovenia	US Dollar, 2016	i	20,225	23,467	26,144	25,770	26,713
Spain	US Dollar, 2017	i	29,844	29,840	32,876	32,318	31,635
Sweden	US Dollar, 2016	i	37,178	40,090	43,508	46,739	47,783
Switzerland	US Dollar, 2017	i	77,009	81,438	85,495	88,460	88,159
United Kingdom	US Dollar, 2016	i	39,460	44,140	46,097	44,680	45,280
United States	US Dollar, 2016	i	52,801	55,391	58,054	60,692	60,558
Lithuania	US Dollar, 2016	i	5,576	7,869	10,242	12,512	14,189

Data extracted on 22 Oct 2018 18:16 UTC (GMT) from OECD.Stat