

The Impact of Oil Shock on Canadian Economy

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Abstract

This paper aims to analyze the influences of the negative oil price shock which started in 2014 till 2016 to Canada using analytical data and models. The significant drop in oil price had benefited the Canadian economy in several ways but it also brought troubles to the country. In this paper, we aim to find the relationship between the oil price shock to the Dutch disease, and whether the Dutch disease will bring the Canadian economy positive or negative externalities. Another important purpose is to try to find some suggestions for the monetary and fiscal policy to alleviate the negative effect on the country so that the oil price shock would be beneficial to the country.

Keywords

Oil price, Canadian economy, Dutch disease, Policy.

1. Introduction

In June 2014, the oil price had reached the highest point at about \$110 a barrel followed by a decline of more than 70% till \$30 barrel in January 2016. This 18-month period of rapid price drop had affected the world economy in many aspects. Although the oil price shock can be largely attributed to the supply and demand forces in the market, the strategic moves of a few key suppliers also contributed to this rapid fall. One point of view shared by many market watchers was that the price shock happened in 2014 was also due to the supply shocks from the OPEC announcement of not changing its current production levels in the late November 2014, even the non-OPEC country's oil production increased. In the same time, oil supply increased also in Libya, Iraq and United States [1] (Arezki & Blanchard, 2014).

The rapid fall of oil price influenced the Canadian economy in both positive and negative ways. The influences spread across almost all aspects of the country's economy, namely growth, inflation, interest rate, exchange rate and the labour market. By using a dynamic computable general equilibrium model, we analyzed the counterfactual impact of oil price on various Canadian industries and found that the overall impact of a positive oil price shock had positive influences on the Canadian economy by stimulating economic growth and promoting resources reallocation across different industries. In particular, the oil-related industries are favoured while the manufacturing industries get negative impact with a decrease in resources [2] (Dissou, 2010). Therefore, a decrease in oil price will slow down the GDP growth. The Canadian GDP growth rate had stayed at around 1% from 2010 to 2014, while it dropped to below zero following the rapid drop in oil price [6]. (source: Trading economic, Statistic Canada.) Canada had set a policy for the inflation region in 1991 that the country needs to maintain the inflation rate around 1 to 3 per cent and it excludes the oil price impact. Therefore, the oil price shock had a weak connection to the inflation rate and the interest rate [3] (Moshiri & Moghaddam, 2018).

Canada is both an oil-exporting and importing country since some provinces have abundant natural oil resources while others do not. It is also suffering from the Dutch disease, a situation where a resource boom in an economy causes the value of the currency to appreciate and the

tradable manufacturing industries to experience the “crowding-out” effect. [4] (Beine, Bos, & Coulombe, 2009) This means different regions will be impacted differently when the oil price changes. For the oil-importing province, when the oil price rises, the cost of production rises too so they may import less. When the oil price drops, they will import more and can benefit from the lower cost of production. The oil-exporting provinces experience adverse influences when oil price fluctuates. As Canada has next-to-zero barriers to hinder labour from moving within the country, labour will likely flow into the oil-exporting province when oil price booms and flow out when price drops [3]. (Moshiri & Moghaddam, 2018) However, the low oil price will cause the exchange rate depreciation that makes Canada balance of trade worse off because imported goods will become more expensive. On the other hand, the export-oriented industries may be better off, especially the manufacturing industries. This is called the “exchange rate effect” [5]. (Carbone & Mckenzie, 2016) Taking into consideration of all these factors, this paper aims to analyze my point of view which is that the rapid fall of oil price is not a bad thing for Canada since some of the negative effects can be offset by other positive effects.

2. Organization of the Text

2.1. Canadian GDP

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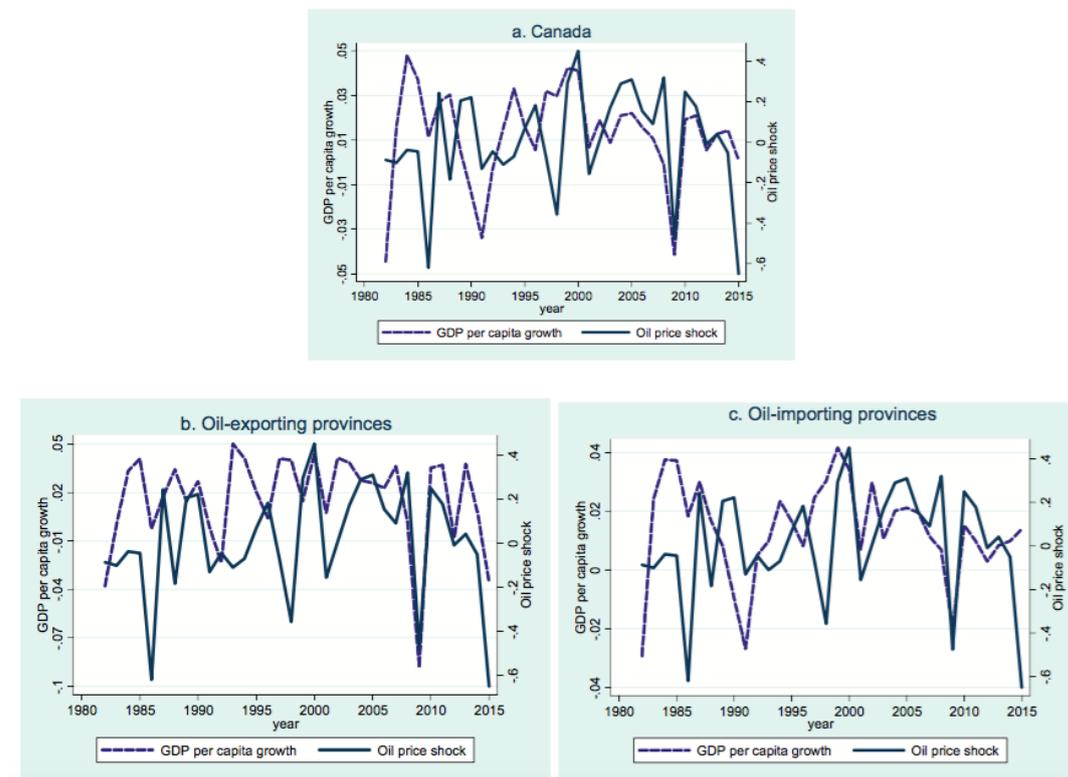


Fig 1. GDP per capita growth with oil price shock

Oil is the primary resource in the world, it is used in the production process, transportation and its own is good. Due to its special property, it takes an important role in the economy. When the price of oil increases, the cost of production follows. For example, in the plastic industry, oil is the raw material for the production, and when the oil price rises, the plastic producers have to increase the price of their product to cover the higher cost of goods. When the firm finishes the production, the distribution of the goods also relies on petrol for transport. As a result, the cost of production rises and the price of the final goods increases on an even larger scale. This

reduces the demand for the products, especially the more price-elastic ones. The revenue for some industry will be reduced, which negatively impacts the GDP.

In Canada, Moshiri and Moghaddam (2018) used the vector auto-regression (VAR) model to analyze the relationship between oil price and GDP³. They suggested that the oil shock increases the growth of GDP per capita in both oil-importing and oil-exporting provinces and the oil-exporting province got a greater impact. In the long run, Oil-exporting province benefits from the positive oil shock and oil-importing province benefit from the negative oil shock without any negative effect on the other provinces. They also illustrated the oil price had a more significant effect in GDP growth after 2000. For the oil-exporting provinces, where the crude oil industry becomes a pillar of the economy, when the oil price drops, the profit return for the investment dropped since the cost of searching new oil sand is high. Fewer investors will invest their money in this region when the oil price becomes too low that need a very long period to cover its sunk cost. Besides, since the oil price drops, people's purchasing power is also affected due to the reduced total revenue in the oil company. Besides, the consumption level reduces and so does the government tax revenue from the oil industry. As a result, the output in the oil-exporting province will reduce. However, for the oil-importing province, the total output increases. Firms benefit from the lower cost of production, i.e. cheaper raw material and fuel, as well as the higher consumption of the oil-related production. It is then not surprising that the oil-exporting provinces' economy shares a similar trend with the oil price while the oil-importing provinces showed a trend quite the opposite. Overall, since there are both oil-importing and oil-exporting provinces, the effect of the oil price shock in Canada was not significant, even the GDP growth rate had reached negative after 2014 but it back to the regular rate after 2016 and maintain constant in the long run⁶(Statistic Canada).

Natural resources account for 20% of total export, and 6.4% of the import for Canada⁶ (Source: Statistic Canada). When the oil price decreases, the demand for the oil soars all over the world, but it does not necessarily benefit the oil-exporting country because the profit return of the production may not increase or even be negative due to the currency depreciation. To be more specific, the industry produces crude oil as a product the oil only makes a small part of the production process. The positive effect from a low cost of production may be offset by the negative effect from low oil price and low value of the currency. However, the currency depreciation benefits the other exporter, especially the export-related manufacturing, since the demand for the export will increase significantly if the product is price-elastic in the global market. Overall, currency depreciation may help the country to improve its balance of payment. During a negative oil price shock, the oil-related industry will be negatively impacted while other sectors thrive. This is when the government can step in and help reallocate resources more quickly. More resources can be directed to the oil-importing provinces so that they can leverage the lower cost of production to improve efficiency. To help the crude oil company, policymakers can cut tax to help the firm remain competitive in the market. Tax on the other sectors which benefit from the oil price shock can be up-adjusted so that the government tax revenue remains stable.

2.2. Exchange Rate

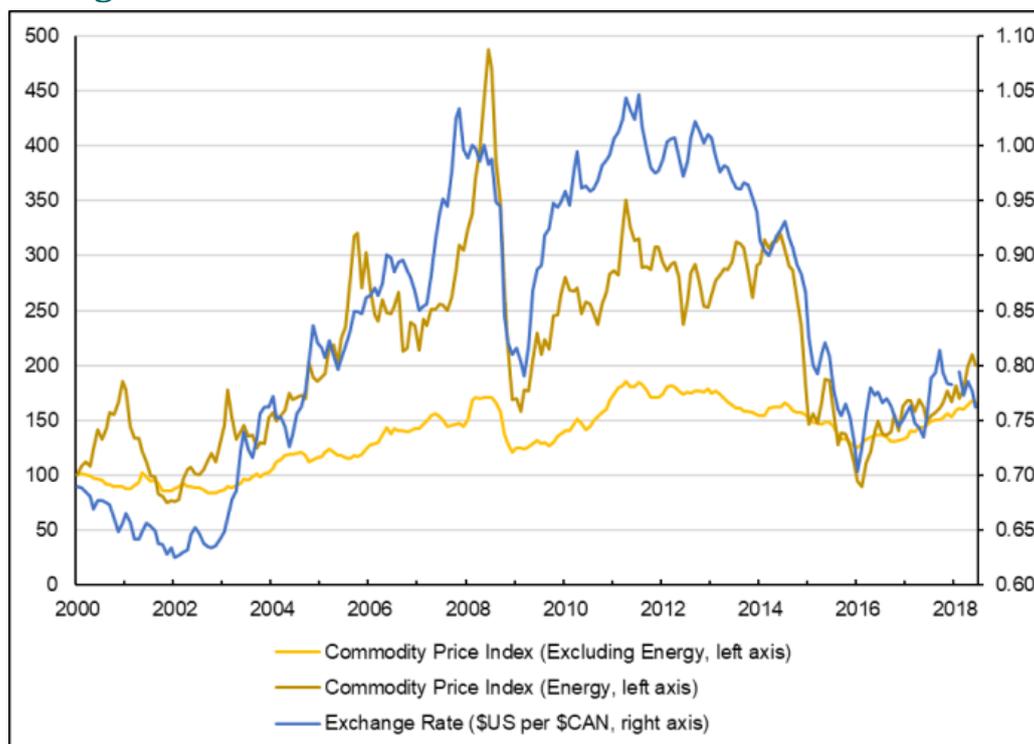


Fig 2. Exchange Rate and energy price

Antweiler (2015) wrote that the Canadian dollar is a petrodollar for its exchange rate is strongly connected to the oil price [7]. When there has positive oil shock, the currency appreciates, and vice versa. He mentioned that a ten per cent increase in oil price will cause the exchange rate to increase by three per cent. Also, when the oil price rises under the multi-sector intertemporal general equilibrium model, it stimulates the aggregate demand positively and the exchange rate will appreciate while the traditional manufacturing exporter will be crowded out from the market. [2] (Dissou, 2010) This is similar to the Dutch disease's phenomenon. The figure above gives the evidence to support this idea that when the energy price (which included the oil price) increases, the exchange rate also increases. However, in our case, due to a decrease in oil price, the exchange rate falls from 0.9 to 0.7 \$ US per \$CAN between 2014 and 2016. This neutralizes the currency appreciation effect in the Dutch disease. The depreciation may cause decreasing demand for the Canadian dollar in the exchange market. When the oil price decreases, less capital goes to the oil-related industry in this country since investment is less profitable and foreign buyers need less amount of money to purchase the same amount crude oil which same as before. With low oil price, the inflation rate can also maintain at a relatively low level so that the exchange rate depreciates without inflation effect.

Under the circumstances of the oil price drop, the manufacturing export firms benefit from the cheaper cost of production, especially in the oil-rich provinces where companies can rely on the domestically produced oil. When the currency depreciates, the price of the export goods become relatively cheaper which triggers the export demand especially for goods for which consumers tend to be more price-sensitive. In the figure, the commodity price remains stable while the energy price shared a similar trend with the exchange rate. During the negative oil shock from 2014 to 2016, the cost of production was lowered, leading to a lower price of final goods which contributed to a decrease in the commodity price index that excluding the energy. With a low cost of production and price, the country's export becomes more competitive in the global market. This benefits the manufacturing sector and the labour market. After 2017, the exchange rate and world oil price both fluctuated in a small range, this is good for the Canada

export sector theoretically. However, in the real world, the balance of trade worse after 2014 and remain negative until 2018[6] (Statistic Canada). This shows that the negative impact on the depreciation in the trading market took the benefit from the manufacturing sector. The reason for this situation is may cause by low competitiveness for the export sector in the world market so that low price did not help the export largely, and the domestic product did not substitute the import goods even the price increase.

For this part, I will suggest that the monetary policy needs to control the currency supply in a steady state so that the inflation remains in the target range with a low-interest rate, and the exchange rate does not fluctuate sharply and stays in the range of 1 to 0.77 USD/CAD[6] (Statistic Canada). The interest rate may not need to be adjusted in this situation since currency depreciation benefits Canadian manufacturing. However, if the value of the currency dropped too low that may harm the trade, the interest rate can increase the value of the currency. To improve the balance of payment, the Canada government also need to put some subsidy or tax cut to the manufacturing company so that they can be more competitive in the market.

2.3. Labour Market

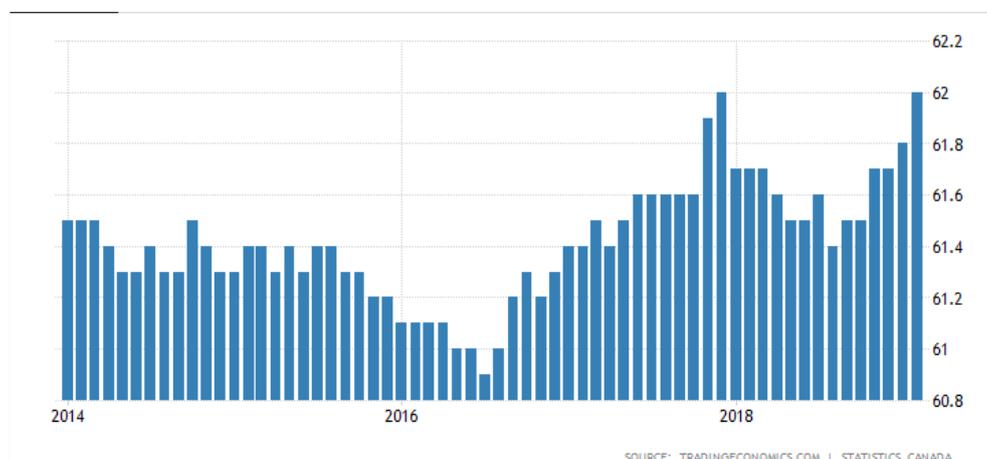


Fig 3. Canada Employment rate

As we have established previously, two different types of provinces exist in Canada, the oil-exporting ones and the oil-importing ones. In the oil-exporting provinces like Newfoundland-Labrador, Saskatchewan, and Alberta, the oil industry is the key industry in the province so that the employment rate is related to the oil price. For oil-importing province, manufacturing is more important so that demand for labour is due to the economic environment and business cycle. Another factor to consider is the relatively free motion of the labour, not only from one province to another but cross the border from especially the USA.

When there is an oil boom, the demand for labour surges in oil-exporting provinces and the opposite is true for the oil-importing provinces. This causes the labour force to move from oil-importing provinces to oil-exporting provinces. In Alberta, before 2002, the share of the resources sector was 24.3% of the province total GDP. After the oil shock, the share reached 40.7%. The migrated labour force as a fraction of total labour almost doubled from 1.7% to 3.1% from 2002 to 2007 during the oil boom [8] (Beine, Coulombe, & Vermeulen, 2014). However, in 2014, the oil price dropped. The oil-exporting provinces experienced a negative oil shock, the demand for the labour in the oil industry shrank. The unemployed in that province moved to the oil-importing provinces where the demand for labour rose at that time due to the low cost of production. The total employment maintained stable at that time at around 61.3% [6] (Statistic Canada). The migration of labour helped the oil-importing provinces benefit from the oil shock and offset some negative impact from the oil-importing province. Therefore, free

movement of labour ensured that the country can reallocate resources more efficiently and absorb better the negative impact of the oil shock.

The government can consider investing more in training so that the unemployed from the oil-related sector can equip themselves with capabilities required in other sectors. Maintaining a stable rent and housing price is necessary for Canada since housing price is one factor that can affect the labour movement. If one province's property price is too high, it will build a barrier for labour to stay in that province. The high housing price is a part of the cost of living and when that becomes high, the worker will find it hard to afford so fewer workers will move to that region even when there is an increasing demand of labour. Shortage of labour will increase the labour cost for companies and in extreme cases, it may force the companies to move to other places, negatively impacting the province's economy. In my opinion, immigration policy for the skilled worker can be more friendly. For example, workers with a good academic background can be given a higher passing rate if they apply for citizenship so that more skilled workers can stay in the country.

2.4. Welfare

Table 1. Percentage Change in EV Welfare Measure by Region and Impact Channel

Numble	Total Effect	Energy cost	Exchange
Resource Intensive Province			
Alberta	-4.69	0.28	-0.26
Newfoundland-Labrador	-5.24	0.77	-0.26
Saskatchewan	-3.52	0.06	-0.26
Other Province			
Brithish Columbia	-0.26	0.11	-0.27
Ontario	-0.16	0.15	-0.29
Quebec	-0.19	0.18	-0.29
All of Canada	-0.89	0.19	-0.28

Table 2. Welfare Impact of Different Oil Price Shocks

Percent Oil Price Change	Alberta	Ontario	Canada
-20%	-9.05	-0.28	-1.68
-10%	-4.69	-0.16	-0.89
10%	5.01	0.21	1.00
20%	10.29	0.47	2.09

Carbone and Mckenzie (2016) analyzed the relationship between negative oil shock and welfare by using the Equivalent Variation (EV) model with income change and the benchmark (pre-oil shock) market prices [5]. The result showed that oil price drop negatively impacts welfare when benchmarked to pre-oil shock consumption (~0.9%) across the country. In other words, the 10 per cent decrease in oil price reduced the income level by 0.9 per cent. In the oil-exporting provinces, the impact was amplified to -5.24% in Newfoundland-Labrador. In the oil-importing provinces, the change in income is not as significant during the negative oil shock. However, all the provinces had positive welfare gain due to the energy price effect that country benefit from the low energy price as it lowers the cost of production and living cost. They used two provinces, Alberta and Ontario, as the example of the oil-producing province and oil-consuming province respectively, to compare the impact of the oil shock on different types of provinces. During negative oil shock, Alberta and Ontario both had negative welfare impact, aligned with the country while during oil booming, the index was all positive. The welfare index

changed significantly in Alberta while it had a small impact on Ontario that all the index was greater than 4.00 while Ontario's result was all under 0.05 per cent. Overall, the oil shock had some impact on Canada welfare but the negative impact and positive impact during oil shock can be partially offset since the country have both the oil-exporting province and oil-importing provinces. When oil price decreased, the labour in the oil-exporting province receive lower-income and some may lose their jobs the same as the capital due to lower profit return. This negative effect can be partly offset by the positive effect in the oil-importing provinces as they get cheaper energy and raw material for the firm to produce their product. The demand for labour in that province will increase at that time. Overall, during the oil price collapse, people's welfare in Canada decreased.

To improve welfare during negative oil price shock, the government can decrease income tax to alleviate the impact. When income tax decreases, people's real income and purchasing power will increase so the effect of a decrease in income level will be reduced, especially for workers in the oil company and its related sectors. The unemployed can get a higher subsidy from the government and their purchasing power will increase so that the aggregate demand in Canada will increase. The increase in government spending will make a multiplier effect to the market that one-dollar increase in government spending will make more than a one-unit increase in the country's output. As a result, the demand in Canada will increase and this will stimulate the country's economic growth.

3. Conclusion

Under a threshold vector autoregression and generalized impulse response functions (GIRFs) model, the positive oil shock has a greater impact on Canadian economic growth than the negative oil price shocks and the difference is even more significant during low economic growth periods [9] (Donayre & Wilmot, 2015). Therefore, during the negative oil price shock from 2014 to 2016, I agree that the negative oil shock influenced the Canada economic growth in a negative way that the GDP growth rate decreased during the same period but it still benefited other sectors especially the export commodity sector and domestic firms in the long run. The rapid fall in oil price means that firms could use cheaper raw material and energy which lowered the cost of production. The exchange rate will also be affected by the oil price since Canada is a net oil-exporting country. Currency depreciation alleviated the Dutch disease effect since high exchange rate presents challenges to the manufacturing sector. In this situation, the Dutch disease is not a 'disease' to the Canadian economy. Although the balance of payment became negative after the oil shock, the country can cover this problem by specializing in the manufacturing sector until the next oil boom happen. The oil-exporting provinces and oil-importing provinces had different impacts due to the oil shock, calling the policymakers to help reallocate the labour and capital resources more efficiently and smoothly, with lower barriers from oil-rich region to other regions. During negative oil shock, the resources will move from oil-exporting provinces to oil-importing provinces since the crude oil company's output increases which require more labour and other resources and vice versa. Therefore, free trade or less barrier can help the country to get more benefit from oil shock no matter it is positive or negative. Besides, oil shock also influences the welfare in Canada, negative oil shock cause negative welfare while positive oil shock increases the income level and the oil-exporting province had a greater impact on that. The negative effect on welfare during oil price decrease can be improved by cutting income tax so that people's purchasing power increases the same as the demand.

Lower entry barrier in the oil-relative industry can also help Canada economic growth since the country has abundant resources to be exploited to extend its production capacity if more investor invests in that region. Oil tax can be higher or subsidies can be lowered to promote the

oil industry to shift to develop renewable energy. The oil tax revenue can be the subsidies to the renewable resources to reduce the dependency on oil so that the oil price shock may have a weaker effect on aggregate demand in the long run. During oil price collapse, income tax can be reduced to stimulate the country's demand since it can increase people's real income. Additionally, stable monetary policy is required for the country since the oil price did not have a strong connection with the inflation and interest rate when the oil price shock has a weak influence to the aggregate demand in the long-run under moderate economic growth. As a result, the negative oil shock influences the Canadian economy negatively in the short run. The Country can cover the negative impact and can still benefit from the oil shock.

The impact of oil price on other aspects, such as the stock market, wage per capita, political influence, etc. is beyond the scope of this paper, Nevertheless, analyzing such impact may help to get a clearer result for the relationship between the oil price and the Canadian economy for policy purposes. The use of CAD/USD as the exchange rate has limits in this paper because the exchange rate fluctuation is also driven by other economic shocks in both the US and Canada, which means economic conditions in Canada can only partially affect the value of its currency. A better representation of the real value of the Canadian dollar can help increase the precision of the results of this analysis but is left for future studies.

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