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Staff Analytical Note/Note analytique du personnel 2016-13

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by Robert Fay, Justin-Damien Guénette and Louis Morel

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September 2016

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ISSN 2369-9639

Acknowledgements

We would like to thank Michael Francis, Konrad Zmitrowicz, Mark Kruger and Césaire Meh for valuable input and suggestions.

Abstract

Between mid-2014 and early 2016, oil prices fell by roughly 65 per cent. This note documents the channels through which this oil price decline is expected to affect the global economy. One important and immediate channel is through higher expenditures, especially in net oil-importing countries. Although there is considerable uncertainty over the estimated impact, to date, these expenditures appear to have been small, because the response of investment in oil-producing countries has been negative, large and quick to materialize. This negative response has dominated the positive response of expenditures in oil-importing countries. It is also important, however, to consider how the oil price decline can improve private and public sector balance sheets, as it is expected to support private and public spending in future years. To this extent, global benefits go beyond what is captured in current GDP measures and, as such, there is more to this issue than meets the eye.

Bank topics: Business fluctuations and cycles; International topics; Recent economic and financial developments
JEL codes: F01, E32, E37, Q43

Résumé

Entre le milieu de 2014 et le début de 2016, les prix du pétrole ont chuté de 65 % environ. La présente note analytique décrit les canaux par lesquels cette chute des prix du pétrole est susceptible de se répercuter sur l'économie mondiale. L'un d'eux, un canal important et immédiat, est la hausse des dépenses, en particulier dans les pays importateurs nets de pétrole. Même si une incertitude considérable entoure l'estimation des effets, ces dépenses se sont avérées faibles jusqu'ici, en raison de la forte réaction négative de l'investissement dans les pays producteurs de pétrole, laquelle s'est manifestée rapidement. Cette réaction négative a été supérieure à la réaction positive des dépenses dans les pays importateurs de pétrole. Toutefois, il importe également d'examiner comment le recul des prix du pétrole peut améliorer les bilans des secteurs privé et public, étant donné qu'il devrait soutenir les dépenses de ces secteurs dans l'avenir. Dans cette optique, les avantages à l'échelle mondiale vont au-delà de ce qu'indiquent les mesures du PIB actuelles et, tout bien considéré, cette question se révèle plus vaste qu'il y paraît à première vue.

Sujets : Cycles et fluctuations économiques; Questions internationales; Évolution économique et financière récente
Codes JEL : F01, E32, E37, Q43

1 Introduction

Between mid-2014 and early 2016, the price of oil dropped by about 65 per cent (from US$110 to less than US$40 per barrel). If we assume that it is the result of a supply shock, a large oil price decline should have generated substantial benefits for the global economy through increased expenditures by households and firms in oil-importing countries. Based on estimates from the literature, the overall benefit to the global economy from the oil supply shock could amount to about 1.2 per cent of global gross domestic product (GDP). To date, however, the observed weakness in global economic growth suggests that these additional expenditures have been small.

This purpose of this note is to

- document the channels through which a positive oil supply shock transfers wealth from oil producers to oil consumers,
- discuss why the impact on global GDP appears to have been small to date, and
- elaborate on the idea that measures of current expenditures (such as GDP) do not fully capture the global benefits of low oil prices, as some benefits could take the form of improved private and public balance sheets.

With these goals in mind, our main messages are as follows:

- The macroeconomic impacts of the large decline in oil prices since mid-2014 are complex to analyze, as they operate through many channels and differ across regions.
- Despite the redistribution of income between oil producers and oil consumers occurring more or less as expected, global GDP has not increased materially, as predicted by the literature. This is mainly because the negative response of investment in oil-producing countries has been large and quick to materialize. It has dominated the positive response of expenditures in oil-importing countries.
- It is important, however, to distinguish between the impacts of low oil prices on income versus expenditures. While the real income gains may not have led to increased expenditures, increased savings are improving private and public sector balance sheets, which should support private and public spending in the future.

The note is organized as follows: Section 2 describes the framework used to examine the decline in oil prices and its impact on the global economy. Section 3 shows evidence that the expected transfer of wealth between oil producers and consumers has occurred. Section 4 discusses why the impact of lower oil prices on global expenditures has been relatively limited and why the benefits go beyond what is captured in expenditures. Finally, Section 5 concludes.

2 Framework to Analyze the Impact of the Oil Price Decline on the Global Economy

The impact of an oil price shock on the global economy depends crucially on the source of the shock—whether it is the result of changes in global demand or in oil supply.[1]

- An adverse shock to the level of global economic activity should reduce the demand for oil as an input into production and, consequently, push its price down. Lower oil prices, in turn, would be expected to mitigate some of the negative impact of the initial demand shock on global activity, but would be insufficient to fully offset that impact.
- A large exogenous increase in the supply of oil that reduces prices, however, would be expected to boost global GDP in two stages.
    - In a first stage, stronger global oil production increases global GDP directly in producer countries. The greater availability of oil, which is an important factor of production globally, would be expected to increase potential output in both producer and consumer countries.
    - In a second stage, lower oil prices lead to a redistribution of income globally from net oil producers to net oil consumers. In oil-importing countries, for instance, lower gasoline prices would act as a gain in real disposable income for consumers, which in turn could be either saved or spent. It is assumed in the economic literature[2] that global GDP increases through this redistribution process, since the increase in spending among oil importers is usually larger in absolute terms relative to the decline in spending expected among commodity exporters. This is because the marginal propensity to spend is generally larger among oil-consuming countries relative to oil-producing countries (which have sizable buffers to dampen the initial impact of lower oil prices on activity).

Bank of Canada analysis suggests that the majority of the fall in oil prices observed since mid-2014 is due to the increased supply of oil.[3,4] Based on estimates from the literature, the more than US$70 decline in the price of oil from mid-2014 to early 2016 could be expected to increase the level of global output by about 1.2 per cent in the coming years. There is a large

[1] For simplicity, we ignore oil-specific demand shocks such as improvements in fuel-economy standards. These shocks did not play a material role in the recent decline in oil prices.
[2] See, for instance, Husain et al. (2015) and Obstfeld et al. (2016).
[3] Positive oil supply shocks are assumed to account for two-thirds of the decline in oil prices since mid-2014. This assumption is partly informed by results coming out of the structural vector-autoregressive (SVAR) model of Kilian and Murphy (2014). However, substantial judgment has been applied to the model's results to mitigate the shortcomings associated with using the Baltic Dry Index series as a proxy for global economic activity (such as an oversupply of bulk carriers pushing down shipping costs).
[4] For a description of global oil supply developments in recent years, please consult the Bank of Canada *Monetary Policy Report* (January 2015, January 2016) and Büyükşahin et al. (2016).

degree of uncertainty around this estimate, and the extent of the impact is expected to vary widely by region, depending on net exporter/importer status.[5]

As shown in **Table 1**, the channels through which the oil price decline can affect the global economy are complicated, both in terms of the timing of the adjustments as well as their size. Although much of the focus of commentators on the impact of the oil price shock has been the impact on expenditures, the decline has likely also fed into savings (at the household, corporate and government levels).

Table 1: Regional implications of a supply-driven drop in oil prices

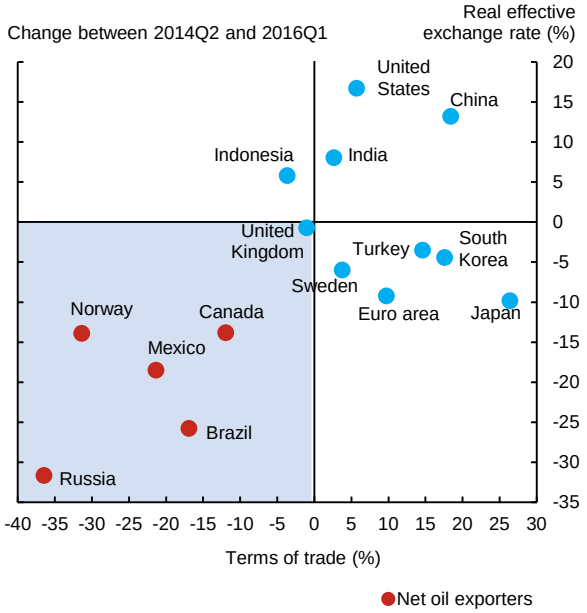
	Oil-producing countries	Oil-consuming countries
Impact on production	• Increased oil production in countries where the oil supply shock originates • Greater abundance of oil increases the economy's potential output	• Greater abundance of oil increases the economy's potential output
Impact on income and spending	• Large decline in terms of trade puts downward pressure on spending, more than offsetting production-related income gains • Small increase in national income from higher potential output	• Stronger terms of trade increase spending (by more than the decline in oil producers' spending) • Small increase in national income from higher potential output
Costs and benefits incurred	Main costs incurred: • Lower profits for oil firms lead to reduced investment in the energy sector • Employment and financial losses lower real household income and reduce private consumption • Increased leverage as incomes fall o Accentuates financial stability risks • Reduced fiscal space • Disinflationary pressures when close to the zero lower bound	Main benefits incurred: • Lower petroleum prices boost real household income • Higher consumer demand and lower production costs lead to increased investment • Increased private and public savings facilitates deleveraging where needed o Could reduce financial stability risks • Additional fiscal space • Inflationary pressures when close to the zero lower bound
Possible adjustment mechanisms (including policy)	• Currency depreciation • Monetary policy easing • Fiscal stimulus • Labour and capital mobility • Reduction in national savings	• Currency appreciation • Monetary policy tightening o Increase in nominal monetary policy rates in response to a rise in output that exceeds that of potential output o Lower headline inflation temporarily increases real interest rates • Fiscal consolidation (e.g., lower gasoline subsidies)
Timing	• Adjustment takes place quickly as firms reduce current and planned investment in response to the shock • Governments may limit support to maintain fiscal credibility and financial stability	• Adjustment in private consumption occurs slowly as forward-looking households smooth spending o Households may save a larger portion of the income gain if ▪ the extra income is perceived as temporary ▪ households are still deleveraging

[5] See, for example, Husain et al. (2015), Andrle et al. (2015) and Cashin et al. (2012).

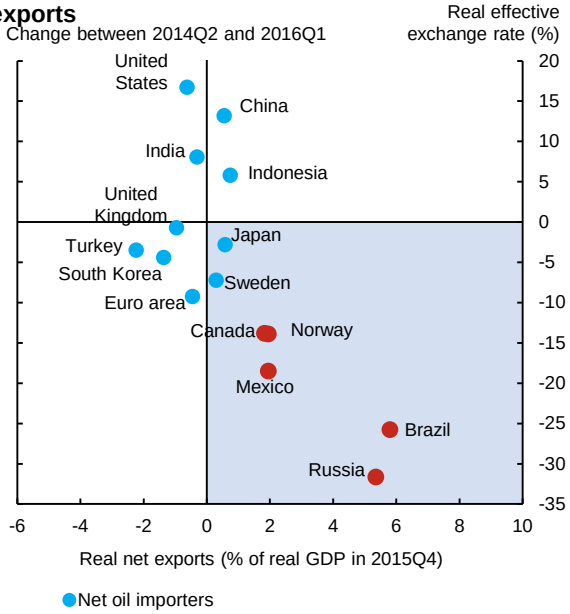
3 A Transfer of Wealth Has Occurred Between Oil Producers and Oil Consumers

As outlined above, the decline in oil prices (and commodity prices more generally) should redistribute income from oil producers to oil consumers. There is evidence in the data to support this transfer of wealth. For instance, the large fall in oil prices, and the decline in commodity prices more broadly, have generated a decline in the terms of trade of net commodity exporters and an improvement in those of net commodity importers since mid-2014 (**Chart 1**). In turn, these terms-of-trade movements have had implications for exchange rates and net exports: most net commodity exporters have seen a depreciation of their currencies, which, all else equal, has helped to improve their real net exports positions. Flexible exchange rates are generally helping to facilitate the adjustment of the global economy to this new economic environment.

Chart 1: For most oil exporters, terms of trade have declined...



... while real effective exchange rate depreciations are providing support to net exports



Net oil exporters Net oil importers

Sources: J.P. Morgan, OECD and national sources via Haver Analytics, United Nations Commodity Trade Statistics Database and Bank of Canada calculations

4 The Benefits of Lower Oil Prices Go Beyond the Impact on Current Expenditures

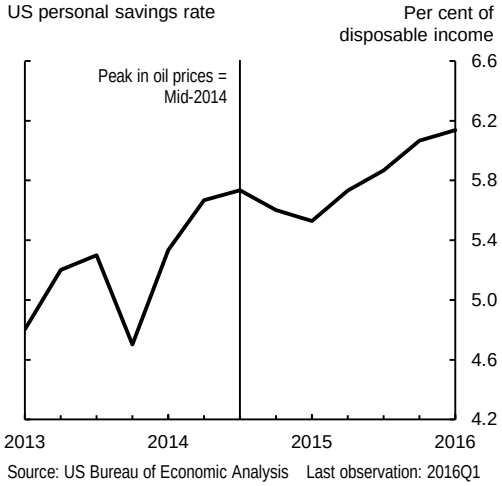
As discussed above, the impact of lower oil prices is expected to vary across oil producers and oil consumers. The positive impact is expected to be largest in oil-importing regions that do not produce oil, such as the euro area, Japan and emerging markets such as India. The United States and China, while net importers of oil, are also large oil producers, so they benefit less

than non-producing nations. Conversely, in net oil-exporting regions, the impact is expected to be highly negative. Nevertheless, historical experience might not give a full picture of how this particular oil shock will affect various regions. This is because, as discussed in the Bank of Canada's *Monetary Policy Report* (Bank of Canada 2015, 2016), there are many factors that explain why the impact on the level of global output coming from lower oil prices has likely been relatively low to date—and why this is expected to remain the case in the coming years.

- **The negative impact on investment has been large and quick**: Oil producers globally cut back investment sharply as prices plummeted, in part related to expectations of higher future supply and tighter access to credit. This cut in investment is most apparent in countries that face high marginal costs and short lead times for extracting oil—such as the United States, where the shale-oil sector adjusted relatively rapidly to the fall in oil prices.

- **Benefits to consumers have been slow to materialize**: Consumer spending has been sluggish to react to lower oil prices. In some countries, gasoline profit margins initially increased, helping to create uncertainty over the benefits that would accrue to consumers. Despite persistently lower gasoline prices, consumers have not fully spent the additional gains in real disposable income and have increased their savings/reduced their debt (especially in advanced economies). In the United States, where lower oil prices boosted personal disposable income per capita by up to $500 (or 1 per cent of income), there is evidence that consumers may have perceived the drop in oil prices to be temporary (Leduc, Moran and Vigfusson 2016), tempering spending and increasing household savings (**Chart 2**). In the euro area and Japan, economic conditions were not conducive to increasing spending (owing to ongoing deleveraging in the euro area and weak confidence in Japan).

Chart 2: US consumers have increased their savings rate relative to mid-2014



Source: US Bureau of Economic Analysis Last observation: 2016Q1

- **Governments in emerging markets captured some of the benefits**: In some countries, gasoline subsidies were reduced, while in others, gasoline prices have responded only partially, given their government-regulated nature.[6] The fall in oil prices has therefore

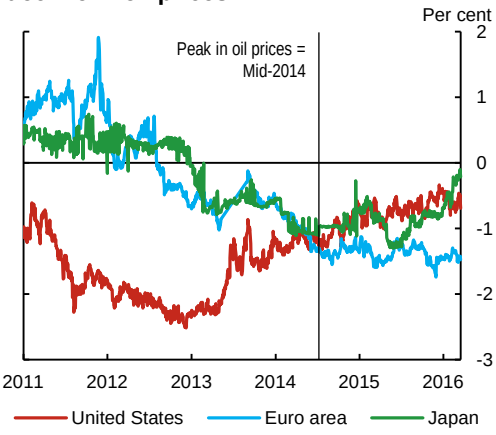
[6] According to an IMF study (Coady et al. 2015), subsidies on petroleum are large, amounting to about 1.8 per cent of global GDP in 2015 (or US$1.5 trillion), down from 2.2 per cent in 2013. Therefore, based on this study, the reduction in these subsidies would have dampened global GDP by 0.4 per cent.

led to an increase in fiscal space in a number of emerging-market economies, which could contribute to growth and greater financial stability in the medium term.

- **Benefits have been mitigated by exchange rate depreciations**: Reflecting monetary policy divergence, some currencies in oil-importing regions (e.g., the euro area and Japan) have depreciated (despite the positive terms-of-trade shock), offsetting some of the decline in the local cost of petroleum.
- **Magnifying factors have amplified the negative effects of lower oil prices**: Some governments in net oil-exporting countries reduced their fiscal support beyond what history would suggest because of the sizable negative impact on their fiscal buffers. Also, sustained low prices have exacerbated country-specific challenges in some oil-producing emerging markets (e.g., Nigeria, Colombia).

The International Monetary Fund (IMF) recently identified another potential factor limiting the positive impact on expenditures (Obstfeld, Milesi-Ferretti and Arezki 2016). The authors argue that by lowering headline inflation, the decline in oil prices may have raised real interest rates and, therefore, compressed demand in advanced economies where nominal policy rates are constrained by the zero lower bound. However, the decline in oil prices should have only a temporary effect on inflation. Thus, real interest rates should be unchanged if inflation expectations remain well anchored. This is why central banks tend to look through the first-round effects of large movements in oil prices. Measures of real interest rates for advanced economies have not generally increased as oil prices have fallen, suggesting that the channel proposed by the IMF may not be all that important (**Chart 3**).

Chart 3: Real implied bond rates have not increased materially following the decline in oil prices



Source: Bloomberg

All things considered, despite the observed redistribution of income, the anticipated boost to global spending from the oil supply shock has yet to materialize: the level of global GDP appears little changed as a result of the income transfer from oil producers to oil consumers, and is perhaps even slightly diminished.[7] One important point needs to be stressed, however. **When the benefits that make their way into savings are considered, the overall benefits are likely to be much larger than those currently captured in global GDP.** Based on estimates from the literature, the overall benefit to the global economy from the oil supply shock could amount to

[7] Blanchard and Acalin (2016) argue that the front-loaded negative effects of lower oil prices on oil-related investment may have dominated the positive real income effects on consumption in the United States.

about 1.2 per cent of global GDP.[8] Improvements in private and public balance sheets, although they are not directly visible in measures of current output, better position economic agents to increase spending in the future. Therefore, the benefits measured in GDP could rise in coming years.[9]

5 Conclusion

This note has endeavoured to lay out the channels through which lower oil prices are expected to affect the global economy. In doing so, it has emphasized that the benefits to the global economy extend beyond what is currently captured in measures of expenditures—there is more to this issue than meets the eye. Although a consensus has emerged that the benefits to the global economy from a positive oil supply shock are net positive, there is considerable uncertainty surrounding estimates of the overall impact, as well as the impact currently reflected in measures of output. The recent rise in the level and volatility of oil prices will further complicate efforts to assess the benefits to the global economy. Much remains to be done to estimate and continuously assess the accrued benefits of lower oil prices. Further research efforts are therefore required. The analytical framework laid out in this note suggests that the final impact will depend crucially on the behaviour of consumers in oil-importing regions and fiscal authorities in oil-exporting regions.

[8] This order of magnitude for the expected overall impact of lower oil prices on global GDP is comparable to estimates reported by the European Central Bank (2016) and the International Monetary Fund (Husain et al. 2015).
[9] The long-term benefits to the level of global output are bounded by the combination of the permanent rise in the supply of oil and the positive effect on potential output of a greater abundance of oil as an input into production.

References

Andrle, M., P. Blagrave, P. Espaillat, K. Honjo, B. Hunt, M. Kortelainen, R. Lalonde, D. Laxton, E. Mavroeidi, D. Muir, S. Mursula and S. Snudden. 2015. "The Flexible System of Global Models—FSGM." International Monetary Fund Working Paper No. 15/64, March. Available at https://www.imf.org/external/pubs/ft/wp/2015/wp1564.pdf.

Bank of Canada. 2015. *Monetary Policy Report*. January.

———. 2016. *Monetary Policy Report.* January.

Blanchard, O. and J. Acalin. 2016. "Lower Oil Prices Are Good for the United States." In *Reality Check for the Global Economy*. Peterson Institute for International Economics Briefing 16-3. Available at https://piie.com/system/files/documents/piieb16-3.pdf.

Büyükşahin, B., R. Ellwanger, K. Mo and K. Zmitrowicz. 2016. "Low for Longer? Why the Global Oil Market in 2014 Is Not Like 1986." Bank of Canada Staff Analytical Note No. 2016-11. Available at http://www.bankofcanada.ca/wp-content/uploads/2016/07/san2016-11.pdf.

Cashin, P., K. Mohaddes, M. Raissi and M. Raissi. 2012. "The Differential Effects of Oil Demand and Supply Shocks on the Global Economy." International Monetary Fund Working Paper No. 12/253. Available at https://www.imf.org/external/pubs/ft/wp/2012/wp12253.pdf.

Coady, D., I.W.H. Parry, L. Sears and B. Shang. 2015. "How Large Are Global Energy Subsidies?" International Monetary Fund Working Paper No. 15/105. Available at https://www.imf.org/external/pubs/cat/longres.aspx?sk=42940.0.

European Central Bank. 2016. "Global Implications of Low Oil Prices." *Economic Bulletin*, Issue 4 (June): 29–32. Available at https://www.ecb.europa.eu/pub/pdf/other/eb201604_focus01.en.pdf.

Husain, A.M., R. Arezki, P. Breuer, V. Haksar, T. Helbling, P. Medas, M. Sommer and an IMF Staff Team. 2015. "Global Implications of Lower Oil Prices." International Monetary Fund Staff Discussion Note 15/15. Available at http://www.imf.org/external/pubs/ft/sdn/2015/sdn1515.pdf.

Kilian, L. and D.P. Murphy. 2014. "The Role of Inventories and Speculative Trading in the Global Market for Crude Oil." *Journal of Applied Econometrics* 29 (3): 454–478. Available at http://onlinelibrary.wiley.com/doi/10.1002/jae.2322/abstract.

Leduc, S., K. Moran and R.J. Vigfusson. 2016. "The Elusive Boost from Cheap Oil." Federal Reserve Bank of San Francisco *Economic Letter* 2016-13 (April). Available at http://www.frbsf.org/economic-research/files/el2016-13.pdf.

Obstfeld, M., G.M. Milesi-Ferretti and R. Arezki. 2016. “Oil Prices and the Global Economy: It’s Complicated.” iMFdirect blog post, 24 March. Available at https://blog-imfdirect.imf.org/2016/03/24/oil-prices-and-the-global-economy-its-complicated/.