"PETROCURRENCY": GOOD OR BAD FOR CANADA’S ECONOMY?

Introduction

North America’s West has always been the stuff of dreams. After the Klondike Gold Rush at the end of the 19th century, and oil in the century that followed, now it’s Alberta’s tar sands that are generating enthusiasm in workers and investors. Strong global demand for raw materials and geopolitical and climatic uncertainties have pushed prices of black gold to record highs, creating a veritable source of manna for Canada. Parallel to this, last spring, the Canadian dollar surpassed the US$0.91 mark for the first time since 1978, marking a historic increase of more than 45% in just four years.

For some, the rising loonie reflects the adjustment of market fundamentals, especially the terms of the trade. As a result, there is no reason to intervene. Others are certain that exploiting western Canada’s tar sands is slowly creating an economic ailment that is reminiscent of the “Dutch disease” that pushed Holland into recession in the seventies. Regional and sectoral disparities are already evident, and the adjustments could be quite harsh.

The purpose of this Economic Viewpoint is to take stock of things. We first turn the spotlight on the tar sands boom, and then we propose an exchange rate equation that takes into consideration the positive impacts of energy prices on the loonie. We then check whether the allure of Albertan oil predisposes Canada to the “Dutch disease”. There are a number of signs but, on the whole, the effects seem likely to be limited.

What is “Dutch disease”?

During the sixties, the discovery of a major natural gas deposit in the North Sea enabled Holland to substantially increase its wealth. Yet, following a number of years of strong economic growth, the country inevitably fell into a recession.

This syndrome, known as “Dutch disease”, refers to the contrast between fairly recessionary domestic conditions and a heavy current account surplus. This imbalance in the balance of payments causes the national currency to appreciate and makes the foreign trade manufacturing sector (excluding energy) less

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1 This term appears to have been used for the first time in 1977 by The Economist, which was attempting to describe the strange phenomenon that afflicted the Dutch economy after the first oil shock in 73-74.
competitive. Although it is generally associated with the discovery of natural resources, Dutch disease can also appear on the heels of significant injections of foreign capital, whether they are associated with a marked increase in commodities prices, international aid or direct foreign investment.

Paradoxically, an increase in wealth can thus have adverse effects. Take the example of the discovery of a gas deposit. If we divide an economy that is undergoing a boom in its energy exports into three sectors, i.e.:

1. Booming goods exported
2. The traditional export sector (tradable goods) and
3. Construction, retail trade and other services (non-tradable goods)

Economic theory indicates that the traditional export sector (manufacturing sector) will be crowded out by the two other sectors².

This translates into two effects. If the foreign capital is converted into local currency and spent on domestically produced goods, then the nominal exchange rate will go up to prevent an increase in domestic prices³. The resulting rise in the real exchange rate will sap the competitiveness of the country’s foreign trade sector. Parallel to this, there will be a transfer of inputs to deal with, on one hand, the increase in demand for non-tradable goods and on the other, the surge in the export of energy goods. Both effects tend to shrink the traditional export sector. In other words, Dutch disease generally leads to a deindustrialization (excluding energy) of the economy.

The case of Canadian oil

Of course, the boom surrounding western Canada’s tar sands has nothing to do with a discovery⁴. Rather, it has to do with oil prices rising to record levels, the growing global demand for natural resources and the technological advances of the last few years that have made it more profitable to exploit the sands. Moreover, as traditional petroleum production had been declining since the second half of the 90s, Canada’s future as an energy exporter increasingly rests on developing non-traditional sources of gas and petroleum. In the short and medium terms, exploiting the tar sands has the most potential.

With an initial approximate volume of 1.6 billion barrels of crude bitumen, Alberta’s tar sands constitute one of world’s largest deposits of hydrocarbons. According to Alberta’s Energy and Utilities Board (EUB), 11% of these reserves (178 million barrels) can be recovered economically using current technology. Of these 178 million barrels of bitumen, 19% are accessible through open-pit mines, while 81% require in-situ technology (for a detailed description of extraction methods, see box 1 on page 4). Including crude bitumen reserves, Canada is second behind Saudi Arabia in terms of world oil reserves.

The tar sands industry is now well-established. Production has grown constantly since the Great Canadian Oil Sands’ (GCOS) first project in 1967. Crude bitumen

² See W. M. Corden and J.P. Neary (1982).
³ This assumes a floating exchange rate system. However, a fixed exchange rate system also leads to appreciation by the real exchange rate, but this time through the increase in domestic prices which results from the increase in the money supply.

⁴ According to the Geological Survey of Canada, recognition of the tar sands dates back to 1875.
production hit a million barrels per day in 2004, or nearly 20% more than in 2003. According to the National Energy Board, activity accelerated again in the last few years, mainly due to:

1. Oil prices remaining at record levels since 2004, resulting in increased cash flows and better profitability.

2. Outlooks that indicate oil prices will remain high in the future and

3. Recognition that the tar sands represent a vast accumulation of economically recoverable oil in a politically stable country.

The outlook for industry is encouraging, and investment plans are many. According to the Canadian Association of Petroleum Producers (CAPP), Canada’s output of crude oil is expected to go from 2.5 mb/d (million barrels per day) in 2005 to 4.6 mb/d by 2015, with potential additional growth to 4.9 mb/d by 2020. According to base projections, 95% of 2015’s potential production will be handled by producers in western Canada, with 3.5 mb/d from the tar sands alone.

The dangers associated with Dutch disease are often related to depleted deposits but, with nearly 250 years of exploitable resources, the risk is low, particularly since, unlike Saudi Arabia’s subterranean oil, it is harder to make a mistake in assessing the Alberta tar sands’ reserves. Price stability then comes into play.

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### World oil reserves

<table>
<thead>
<tr>
<th>Country</th>
<th>Billions of barrels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saudi Arabia</td>
<td>259</td>
</tr>
<tr>
<td>Canada</td>
<td>179</td>
</tr>
<tr>
<td>Iran</td>
<td>126</td>
</tr>
<tr>
<td>Irak</td>
<td>115</td>
</tr>
<tr>
<td>Africa</td>
<td>101</td>
</tr>
<tr>
<td>Koweit</td>
<td>99</td>
</tr>
<tr>
<td>United Arab Emirates</td>
<td>98</td>
</tr>
<tr>
<td>Venezuela</td>
<td>77</td>
</tr>
<tr>
<td>Russia</td>
<td>60</td>
</tr>
<tr>
<td>United States</td>
<td>22</td>
</tr>
<tr>
<td>Others</td>
<td>142</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1,278</strong></td>
</tr>
</tbody>
</table>

Source: Oil and Gas Journal

### Canadian Association of Petroleum Producers Forecasts

(In thousands of barrels per day)

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Western Canada</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conventional Light</td>
<td>940</td>
<td>936</td>
<td>734</td>
<td>577</td>
<td>495</td>
<td>400</td>
<td>309</td>
</tr>
<tr>
<td>Conventional Heavy</td>
<td>263</td>
<td>415</td>
<td>510</td>
<td>476</td>
<td>413</td>
<td>340</td>
<td>263</td>
</tr>
<tr>
<td>Pentanes</td>
<td>116</td>
<td>161</td>
<td>194</td>
<td>160</td>
<td>156</td>
<td>152</td>
<td>149</td>
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<tr>
<td>Tar Sands – mines</td>
<td>209</td>
<td>279</td>
<td>321</td>
<td>552</td>
<td>1,019</td>
<td>1,750</td>
<td>2,273</td>
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<tr>
<td>Tar Sands – in situ</td>
<td>135</td>
<td>149</td>
<td>289</td>
<td>438</td>
<td>1,132</td>
<td>1,745</td>
<td>1,724</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1,663</strong></td>
<td><strong>1,940</strong></td>
<td><strong>2,048</strong></td>
<td><strong>2,203</strong></td>
<td><strong>3,215</strong></td>
<td><strong>4,387</strong></td>
<td><strong>4,718</strong></td>
</tr>
<tr>
<td><strong>Canadian Eastern Coast</strong></td>
<td></td>
<td>21</td>
<td>145</td>
<td>305</td>
<td>320</td>
<td>230</td>
<td>160</td>
</tr>
<tr>
<td><strong>Canada</strong></td>
<td><strong>1,663</strong></td>
<td><strong>1,961</strong></td>
<td><strong>2,193</strong></td>
<td><strong>2,508</strong></td>
<td><strong>3,535</strong></td>
<td><strong>4,617</strong></td>
<td><strong>4,878</strong></td>
</tr>
</tbody>
</table>

Source: Canadian Association of Petroleum Producers, May 2006

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For a number of companies, the profitability of new investment projects depends on price levels\(^7\). In this regard, volatility has been excessive over the last few years, with oil prices going from an average of US$35 per barrel in 2003, to a peak of US$78 per barrel last July, before falling to close to US$60 per barrel in September. What’s more, there are many obstacles to development and a number of projects will never see the light of day. The following points provide a good illustration of the difficulties facing producers:

1. Canada’s unemployment rate is evolving near a record low, especially in Alberta. As a result, it is becoming increasingly difficult to find qualified labour.

2. Refineries are already operating at full capacity. However, growth in tar sands output will require new pipelines for existing or expanding markets and increased refinery capacity.

3. Accelerating global economic activity makes for scarce resources, such as the steel and concrete needed to develop the tar sands, as well as for expanding new mining towns.

4. Environmental restrictions are increasing. Standards are getting higher and higher, making businesses constantly look for new methods for preserving the environment, sparing water and limiting pollution.

**Impact of oil on the currency**

The increase in crude oil production and exportation should prove beneficial for the Canadian economy, both in terms of increasing national revenue and creating value-added jobs. However, pressure on the non-energy manufacturing sector could intensify if wealth creation were to cause the Canadian dollar to go up sharply and remain high. On the other hand, a decrease in global demand or a decrease in energy prices would risk compromising an economy that is more dependent on the petroleum sector.

Until recently, oil’s effects on the Canadian dollar were not well understood. The Bank of Canada’s base exchange rate equation\(^8\), which is estimated for the

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\(^7\) It is estimated the price of a barrel of WTI must be between US$30 and US$35 to generate a real return of 10% for producers.

\(^8\) See Amano and Van Norden (1993).
1973 to 1993 period, showed an inverse relationship with energy prices. That is, a price increase leads to depreciation by the Canadian dollar. Note that, until 1982, Canada was a net oil importer and it was only in 1993 that its exports began to be really significant. Therefore, the oil shocks of 1973 and 1978 had little impact on Canada’s dollar.

Subsequently, a number of updates were done without, however, being able to establish a solid connection with energy prices\(^9\). Yet the recent correlation between energy prices and the currency seems undeniable. The next graph shows that the rolling correlation over six years between oil prices and the loonie has never been higher. It is clear that the relationship was sharply negative until the first half of the eighties, then became weakly positive throughout the nineties, and has accelerated in 2000 and after. With the parallel booms by oil prices and the Canadian dollar in the last few years, it is now possible to find a positive relationship between these two variables by taking into account the structural change that occurred in the early nineties\(^{10}\).

Based on work done by the Bank of Canada, we propose an exchange rate equilibrium model that reflects the positive impact on the currency of the increase in energy prices (see box 2 on page 6 for more details on the estimation method).

Our exchange rate equation shows that the Canadian dollar remains first and foremost a natural resources currency, but that it is also sensitive to the interest rate spread and the evolution of the greenback against the currencies of the U.S.’s other major trading partners. Over the estimation period, from January 1992 to May 2006, the model satisfactorily captures the loonie’s fluctuations, particularly the marked rebound at the end of 2002. The Canadian dollar’s recent appreciation seems to primarily reflect the sharp increase in oil prices since the end of 2003. The dynamic forecast puts the currency at US$0.89 on average for the month of July, that is, a level slightly below the observable value—US$0.89—then in effect.

\(^9\) While Lafrance et al. (2004) completely drop the influence of energy prices to focus on the effects of other variables on the exchange rate, such as productivity, the evolution of the U.S. dollar against the major currencies, and a risk measure, Laidler and Aba (2001) propose separate coefficients for energy prices for the 70s, 80s and 90s, but are still unable to establish a meaningful positive relationship for the 90s.

\(^{10}\) Issa et al. (2006) identify a structural break in the second quarter of 1993, while Bayoumi et al. (2006) establish the link at the start of the 90s.
Box 2
Modelling the real Canada/United States exchange rate

There are a variety of forms for exchange rate forecasting models: monetary, portfolio, general equilibrium, productivity differential and determined by the evolution of economic fundamentals. The specifications of the Bank of Canada’s "classic" model, however, show that the Canadian dollar is, first and foremost, a currency that is tied to raw materials prices1.

We model the evolution of the real exchange rate between Canada and the United States using an error correction model (ECM):

\[ \Delta \log(q_t) = \alpha_1 \left( \log(q_{t-1}) - \frac{\beta_0}{\alpha_1} - \frac{\beta_1}{\alpha_1} \log(ene_{t-1}) - \frac{\beta_2}{\alpha_1} \log(com_{t-1}) \right) + \alpha_2 \text{spread}_{t-1} + \alpha_3 \Delta \log(USD) + \alpha_4 \Delta \log(ene_t) + \alpha_5 \Delta \log(com_t) + \alpha_6 \Delta \log(q_{t-1}) + v_t \]

This estimation method simultaneously captures the information in long-term and short-term variables. In the long term, there is a cointegration relation between the real exchange rate \( q \), the real price of energy \( ene \) and the real price of non-energy commodities \( com \). In the short term, the model takes into account fluctuations in real energy prices, in the real prices of other commodities, of the difference between short-term interest rates in Canada and the United States \( \text{spread} \), and of the impact of fluctuations in the American dollar against the currencies of major American trading partners excluding Canada \( USD \). The analysis of exchange rate variations also suggests that an \( \text{ar}(1) \) type autoregressive modeling be added. A lag by the dependent variable was thus included.

The expression between parentheses represents the relationship between the real exchange rate and long-term variables, i.e., the equilibrium value of the Canadian exchange rate. This implicit equilibrium value, established at US$0.92 in July, is slightly higher than the observable value of US$0.91 then in effect2. The spread between the observable value and equilibrium value can be explained by the cointegration relation’s adjustment coefficient, i.e., the speed at which, in the long term, the real exchange rate converges toward energy and other commodity prices. Coefficient \( \alpha_1 \) is the adjustment coefficient for the correction of imbalances between the observed real exchange rate and its long-term equilibrium trajectory. According to the estimated coefficient, it takes about eleven months to correct half of an imbalance between the real exchange rate and its long-term trajectory.

\[ \begin{array}{c}
\text{Long-term equilibrium value} \\
\text{US$/CAN$} \\
\end{array} \]

\[ \begin{array}{c}
\text{Canadian exchange rate} \\
\text{US$/CAN$} \\
\end{array} \]

Sources: Organisation for Economic Co-operation and Development, Datastream and Desjardins, Economic Studies

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1 See Amano and Van Norden (1993).
2 In an internal Bank of Canada working note, published on Bloomberg in August 2006, the Bank’s International Department finds similar results, with an equilibrium value of US$0.91 for the first quarter of 2006.
First symptoms of Dutch disease in the Canadian economy

With oil at historic peaks and the loonie getting closer and closer to parity with the greenback, there is reason to wonder about the benefits of exploiting the tar sands. At first glance, the increase in oil prices and the loonie’s quick appreciation have had positive effects on the economy as a whole. After all, real GDP is close to production potential and the unemployment rate, at 6.1% in June 2006, has hit a low that dates back to December 1974. Deep down, however, regional and sectoral disparities resulted. Here are some highlights:

- In the last few years, net exports of energy products have more than tripled, going from a low of $18.2B in November 2001 to a peak of $64.3B in November 2006.

The equation’s parameters were estimated for the January 1992 to July 2006 period. The development of Canada’s energy exports and implementation of a new monetary policy are among the reasons that caused us to start our sample in 1992. The regression performed using the ordinary least squares method (OLS) leads to the following estimates.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOG(Q(-1))</td>
<td>-0.059737</td>
<td>0.013663</td>
<td>-4.372211</td>
<td>0.0000</td>
</tr>
<tr>
<td>C</td>
<td>0.027978</td>
<td>0.006603</td>
<td>4.236910</td>
<td>0.0000</td>
</tr>
<tr>
<td>LOG(ENE(-1))</td>
<td>-0.013542</td>
<td>0.003915</td>
<td>-3.458905</td>
<td>0.0007</td>
</tr>
<tr>
<td>LOG(COM(-1))</td>
<td>-0.025626</td>
<td>0.009663</td>
<td>-2.651981</td>
<td>0.0088</td>
</tr>
<tr>
<td>SPREAD(-1)</td>
<td>-0.001658</td>
<td>0.000712</td>
<td>-2.329171</td>
<td>0.0210</td>
</tr>
<tr>
<td>D(LOG(USD))</td>
<td>0.176993</td>
<td>0.058579</td>
<td>3.021439</td>
<td>0.0029</td>
</tr>
<tr>
<td>D(LOG(Q(-1)))</td>
<td>0.126166</td>
<td>0.050663</td>
<td>2.490306</td>
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</tr>
<tr>
<td>D(LOG(ENE))</td>
<td>-0.031494</td>
<td>0.011481</td>
<td>-2.743148</td>
<td>0.0067</td>
</tr>
<tr>
<td>D(LOG(COM))</td>
<td>-0.079976</td>
<td>0.036242</td>
<td>-2.206744</td>
<td>0.0287</td>
</tr>
</tbody>
</table>

Sources: Datastream and Desjardins, Economic Studies
2005. At the same time, net non-energy exports have melted like a snowman in the sun, going from a record surplus of $39.9B in January 2002 to a $5B deficit last April.

- Now, as net exports of non-energy raw materials remained relatively stable throughout the period, this implies a net deterioration by the traditional export sector, i.e. the manufacturing sector, which is now really in the red.

- The rise in oil prices has allowed the oil industry to double its profit margins over the last four years, from 11.8% in the final quarter of 2001 to 23.0% at the end of 2005. On the whole, manufacturers’ profit margins rebounded right after the American recession\(^\text{11}\), jumping back from a low of 4.4% in the third quarter of 2001 to a cyclical peak of 7.1% in the second quarter of 2004, but the Canadian dollar’s pronounced appreciation seems to have caught up to them and margins have decelerated since then, attaining 5.5% this spring.

- The most obvious sign of the disparities brought on by the loonie’s rise concerns jobs. From the peak in November 2002, 243,700 jobs have been lost in the manufacturing sector (-10%), while close to a million have been created in the service sector (+8.5%), and about 60,000 have been in the forestry, mining, oil and gas sector (+22%).

- Regionally speaking, there is no doubt that economic activity is going full steam ahead in western Canada. Buoyed by its oil industry, Alberta’s unemployment rate is half as much as the average in Ontario and Quebec, which have the country’s highest concentration of manufacturing industries.

\(^{11}\) Because of September 11, 2001, the American recession of 2001 was not typical due its shortness and limited scope.
• Also, since mid-2003, wages have been going up much more quickly in Alberta than in Québec and Ontario. The weekly wages of Alberta’s workers have thus been higher than those of Ontario’s since September of 2005.

• This is reflected in retail sales which have, on average, gone up by over 16% since the year began in Alberta, compared to 3.8% in Québec and 4.1% in Ontario.

• Oil revenues are also affecting public finances. While the net debt of Québec (33% of GDP) and Ontario (26% of GDP) are quite high, Alberta has worked itself back in the black and now has net assets amounting to 12% of GDP. In the 2005-2006 fiscal year, Alberta’s budgetary surplus jumped to $8.9B, or $2,732.57 per capita.

Conclusion

Canada’s manufacturing sector is showing several symptoms of Dutch disease, but the effects on the economy as a whole promise to be limited. First, Canada has a highly diverse economic structure, which should help facilitate the inevitable adjustments. What’s more, even though oil only accounts for 3% of the GDP, the western provinces’ momentum should continue to drive economic growth in the next few years. In particular, while exploiting the tar sands is in part responsible for the loss of many jobs in the manufacturing sector, it will still have helped create many more productive jobs in the primary and tertiary sectors. It should also be noted that the recent discomfiture of Canadian manufacturers is not only due to the loonie’s rise, but also to the intensification of competition from Asia, increasing labour costs in Canada, the productivity gap with the United States, rising American protectionism, and generalized deindustrialization by advanced economies12.

At any rate, adjustments by businesses that are the most sensitive to the Canadian dollar’s evolution could prove very limiting and even determinant for the country’s economic future, particularly since these companies are faced with even more worrisome risks between now and mid-2007, i.e., the forecast slowdown by American demand.

In the short term, the expected drop in commodities prices should give the loonie a little respite, but the potential for tar sands exploitation means that a currency that is increasingly being defined as a “petrocurrency” is no where close to losing its lustre. Under these circumstances, manufacturing companies will still be facing very tough times, and everything suggests that layoffs and plant closures will continue for a few more years.

12 The weight of the Canadian manufacturing sector shifted from 35% of the GDP in 1984 to 31% of the GDP in 2002, and this, in spite of a depreciation of 29% of the loonie during the ten last years.
The Canadian exchange rate’s appreciation should lead to further job losses

![Graph showing the relationship between the Canadian dollar and US dollar exchange rates with a decline in manufacturing jobs and an increase in exchange rate.](image)

The situation could prove particularly difficult for the east-central Canada, and especially in Québec where economic growth should slowdown more in the next few quarter. From an already low rate of only 1.5% in 2006, real GDP growth could slow to near 1.0% in 2007, with almost no growth in the first half of the year.

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Bibliography


