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An Empirical Analysis of a Regional Dutch Disease:

The Case of Canada

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An Empirical Analysis of a Regional Dutch Disease: The Case of Canada

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ABSTRACT

While there has been extensive research on the *Dutch Disease* (DD), very little attention, if any, has been devoted to the regional mechanisms through which it may manifest itself. This is the first empirical attempt to research a 'regional DD' by looking at the local and spatial impacts of resource windfalls across Canadian provinces and territories. We construct a new panel dataset to examine separately the key DD channels; namely, the *Spending Effect* (SE) and the *Resource Movement Effect* (RME). Our analysis reveals that the standard DD mechanisms are also relevant at the regional level; specifically, we find that: (a) Resource windfalls are associated with higher inflation and a labour (capital) shift from (to) non-primary tradable sectors. (b) Resource windfalls in neighbouring regions are associated with a capital (labour) shift from (to) non-primary tradable sectors in the source region. (c) The (spatial) DD explains (51%) 20% of the adverse effects of resource windfalls (in neighbouring regions) on region-specific non-mineral international exports (in the source region), and does not significantly affect domestic ones.

Keywords: Regional Dutch Disease, Inflation, Exports.

JEL classification: F10, N92, O18

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1. INTRODUCTION

In recent years there has been a fast expanding literature researching the impacts of resource abundance on several measures of economic performance. Albeit facing criticism, recent empirical evidence and theoretical work provide strong support to a negative link between resource abundance and long-term growth (see recent surveys by Frankel 2010, and van der Ploeg 2011). The literature suggests various explanations for this link; these, however, can be largely grouped into either market mechanism explanations that relate to the *Dutch Disease* (DD) or to political explanations that relate to institutional quality (van der Ploeg 2011). We focus on the empirics of the former approach. Very little attention, if any, has been devoted to the regional mechanisms through which the DD may manifest itself. Do resource windfalls (in neighbouring regions) induce regional DD symptoms (in the source region)?[1] In this paper we make a first empirical attempt to research a 'regional DD' by looking into the local and spatial impacts of resource windfalls across Canadian provinces and territories.

Corden and Neary (1982) divide the DD mechanism to two effects, arising from a resource shock. The first, called the *Resource Movement Effect* (RME), describes the movement of production factors from various sectors towards the resource one due to higher marginal productivities. The second, called the *Spending Effect* (SE), describes the inflationary outcome of an income shock which, in turn, decreases the competitiveness of commodities outside the primary sector. The basic idea is that both effects cause non-primary tradable sectors to contract. Although not exclusively (e.g. see Torvik 2001), much of the literature has focused on the potential crowding-out of the manufacturing sector, given the 'learning-by-doing' externalities of the sector (Aizenman and Lee 2010; Krugman 1987; Matsuyama 1992; Sachs and Warner 1997).

There are several empirical studies that attempt to test the DD hypothesis. However, most of them make use of case-study analyses to verify DD impacts, which limits the extent of cross-country comparison (see Forysth 1985; McMahon 1997; Larsen 2006). Many of the studies that provide cross-country econometric estimates of the DD focus on positive income shocks that arise either from remittances (Amuedo-Dorantes and Pozo 2004; Lartey

[1] By 'source region' we mean the region inspected when considering resource booms in neighbouring regions, under the spatial context. This definition holds throughout the paper.

et al. 2008) or aid transfers (Adenauer and Vagassky 1998; Rajan and Subramanian 2009), rather than resource income. Furthermore, empirical analyses (e.g. see Harding and Venables 2011) often confine themselves to researching the correlation between resource abundance and the share of tradable sectors in the overall economy, without empirically exploring neither the intermediate mechanisms that lead to the DD, i.e. RME and SE, nor the spatial aspect of this – focal points of our subsequent empirical study.

In this paper, we contribute to this strand of the literature by studying both the SE and RME of the DD hypothesis at local and spatial levels. For this, we employ the intra-federal case of Canada, which is of particular appeal to this study, given the provincial heterogeneity in resource abundance,[2] and the availability of data at the provincial level. Nonetheless, we realise this confines our conclusions to Canada and its institutional environment. However, we argue that the inter-regional analysis can nevertheless reflect more general inferences similar to cross-country studies, to the extent that these two frameworks are similar. The Canadian economy is highly decentralised by its federal constitution; specifically, provincial ownership and control over local resources are constitutionally entrenched, making them largely equivalent to those of independent countries. In addition, the DD is a market mechanism that is to some extent independent of institutional arrangements, so that the specific institutional settings of Canada should not necessarily inhibit the generalisation of results.

In addition, the regional orientation of our analysis presents several merits. While countries often differ in several dimensions – such as language, the quality of institutions, cultural characteristics, and monetary or fiscal policies – that are difficult to control for in cross-country empirical research, regions within a country are likely to present less variation in them (Barro and Sala-i-Martin 1995). For this reason, cross-regional estimates of DD mechanisms can potentially allow for a better identification of econometric models in comparison to similar cross-country based empirical results. In addition, such a framework allows us to investigate the potential spatial dimension of the DD hypothesis, which has not been considered previously.

More generally, there is no reason why the DD should be confined to a national level or currency-related issues. There is evidence, for instance, that the Faroes and Greenland suffered

[2] For instance, in our sample the average GDP share of mineral output of Quebec and Prince Edward Island is less than 1%, while that of Alberta and Saskatchewan is more than 20%.

from reduced competitiveness in their exporting sectors in the past, as a result of their booming fishing industry (Paldam 1997). Both countries use the Danish krone for their international transactions and the loss of competitiveness of their domestic economies arose from inflationary pressures and a corresponding appreciation of the real domestic exchange rate, rather than changes in the nominal exchange rate which is mainly determined by changes in the Danish economy. There is also some tentative evidence pointing to a positive impact of mineral abundance on average prices across Chinese provinces (Zhang et al. 2008). Additionally, it is well documented that price differentials across regions of the same country are often of similar magnitude to the ones observed across sovereign nations (McMahon 1991; Slesnick 2002; Walden 1998), as well as that regional price differentials can persist over time (Cecchetti et al. 2002; Culver and Papell 2006; Roos 2006). This suggests that DD can materialise at the regional level despite the use of a common currency.

Thus, based on the intra-federal Canadian case, we construct a new cross-provincial panel dataset, covering the period of 1984-2008, to investigate the effects of windfalls of both point-source and diffuse-source resources on provincial inflation and factor movements in the non-primary tradable sectors, and their indirect impact on province-specific non-mineral exports to the rest of the world (international exports) and to other Canadian provinces (domestic exports). Our analysis reveals that some of the standard DD mechanisms are also relevant at the regional level; specifically, we find that: (a) Resource windfalls are associated with higher inflation and a labour (capital) shift from (to) non-primary tradable sectors. (b) Resource windfalls in neighbouring regions are associated with a capital (labour) shift from (to) non-primary tradable sectors in the source region. (c) The (spatial) DD explains (51%) 20% of the adverse effects of resource windfalls (in neighbouring regions) on region-specific non-mineral international exports (in the source region). (d) Region-specific non-mineral domestic exports are not significantly affected by both direct and spatial resource windfalls. (e) DD effects are largely triggered by increases in point-source resources, rather than in diffuse-source ones.

Our study complements the analysis by Beine et al. (2012), who also find evidence of a DD and de-industrialisation for the Canadian economy, particularly during the 2002-2007 period of increasing oil and mineral prices. Our analysis is, though, different in two important aspects. First, Beine et al. (2012) look at the Canadian economy as a whole without focusing on regional and spatial differences across Canadian provinces with respect

to export performance and local mineral resources. Secondly, we also look at the DD mechanisms in more depth and examine how the SE and RME can be driven by mineral abundance at the provincial level.

The paper is structured as follows – Section 2 presents the main empirical evidence of a regional DD for Canada; we first look at differences in inflation, and factor movements across Canadian provinces and examine whether these are correlated with dependence on resource income. Furthermore, we investigate whether mineral-rich provinces experience reduced exports to the rest of the world (international exports) or to other Canadian provinces (domestic exports) and whether this is attributed to the aforementioned DD channels. Section 3 undertakes various robustness tests. Section 4 investigates the spatial channel. Section 5 summarises our main results and offers concluding remarks.

2. Empirical Evidence of a Regional Canadian 'Dutch Disease'

In this section we start with empirically exploring the historical experience of resource-rich Canadian provinces in terms of inflation rates, sectoral capital and labour shifts and composition of exports. Recall that in line with the DD theory, resource rich economies generally experience a SE, according to which a resource windfall produces an income shock which subsequently increases the prices of non-traded goods (i.e. of those goods whose prices are determined domestically rather than in international markets). This resource-induced inflationary pressure causes the real exchange rate to appreciate and results in loss of competitiveness for the exporting sectors (Magud and Sosa 2010). In addition, these economies are also expected to experience a RME according to which production factors are drawn to the resource sector from other sectors, given the high factor returns that sector potentially exhibits; this effect also results in loss of competitiveness for the exporting sectors (Matsuyama 1992).[3] On this basis, our focus in this analysis is on the non-primary tradable sectors,[4] which are predicted to be the ones most affected by the DD symptoms.

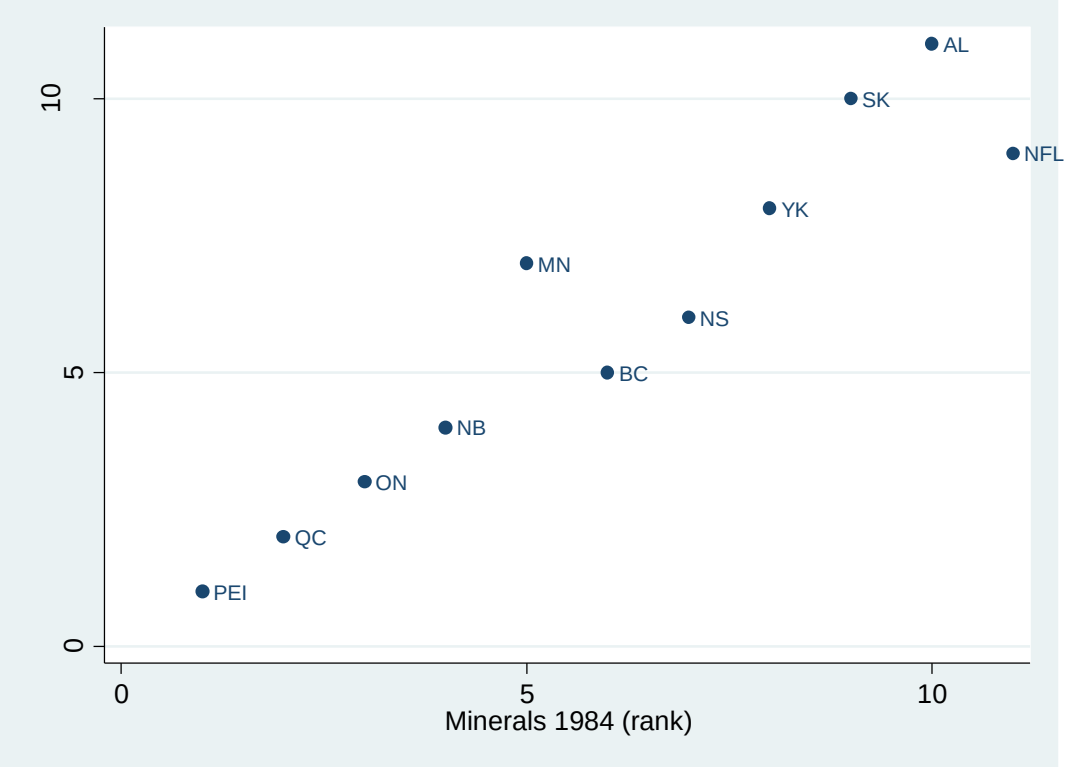
[3] Whether the manufacturing sector will be negatively affected in a disproportionate manner (as often assumed in the DD literature; see Larsen 2006 and Torvik 2001) will largely depend on the relative export orientation of the sector.
[4] These include wholesale trade, retail trade, and manufacturing.

As a first step, we explore whether there is empirical evidence to the DD mechanisms (transmission channels), through which resource abundance may influence export growth (i.e. the SE and RME). Thus, we estimate cross-provincial regressions for 12 Canadian provinces and territories using panel data for the 1984-2008 period,[5] to identify whether resource rich Canadian provinces experience on average higher inflation rates (i.e. SE), as well as a declining share of the non-primary tradable sectors in total capital stock and employment (i.e. RME). Equations 1-3 capture these three DD mechanisms, for Canadian province 'i' at time 't'.[6] As will be evident through the subsequent specifications, we implicitly assume that: first, effects are contemporaneous, and second, non-resource related provincial heterogeneity is largely captured by the fixed effects.[7]

We construct and make use of a proxy for resource abundance (*RA*) that is rather exogenous to changes in other province-specific macroeconomic variables. Our resource-abundance variable *Mineral Production* is constructed using the share in overall provincial income of production in the mineral sector (minerals, quarrying) at the beginning of the period (i.e at the earliest year for which data is available) multiplied by the average annual level of world crude oil prices at time 't'.[8] In other words, we keep the initial share of mineral production in provincial GDP constant throughout time, but we weigh the share at each point in time with the corresponding level of oil prices (which are largely exogenous for small open economies; see Corden and Neary 1984). As one can see from Figure 1, the relative position of Canadian provinces with respect to mineral abundance has changed little over time – the provinces that were largely mineral abundant at the beginning of the period (1984) appear to hold their relative ranking 24 years later.[9] Keeping the share of mineral production in provincial GDP constant throughout time, hence, can still capture accurately the relative position of Canadian provinces with respect to their mineral abundance over time. Thus, to the extent that international oil prices are exogenous and that

[5] The sample includes Yukon, Northwest Territories and the 10 Canadian provinces. This is a maximised panel that covers all years and provinces/territories for which data is available. Unless specified otherwise, all data was retrieved from Statistics Canada. See Appendices 1 and 2 for descriptive statistics, definitions, and data sources for all variables.
[6] Specifications are annual-based; we test different time frames as robustness checks in a subsequent section.
[7] Given the homogenous intra-federal environment in Canada, cross-provincial variations in standard variables such as institutional quality, education, income, and investment, are relatively small, which is why we abstract from adding these to our specifications. Nevertheless we note that results do not change if additional measures are included to control for the aforementioned variables (results available from the authors).
[8] Prices for other minerals largely co-move with changes in the price of crude oil, see Chaudhuri (2001); we employ oil prices given that oil production accounts for a large share of total mineral value. Data on prices were retrieved from the World Bank GEM Commodity database.
[9] Note that Northwest Territories is not included in the graph due to data availability.

FIGURE 1. Relative Ranking (Mineral Production in Provincial GDP)



initial mineral output is pre-determined, we argue that the variation in our resource abundance measure is exogenous since it is largely driven by changes in the international price of oil. For robustness, we also make use of a second resource abundance proxy *Mineral Exports*, which is constructed using the share in overall provincial income of mineral exports at the earliest year for which data is available, multiplied by the average annual level of world crude oil prices at time 't'.

Equation 1 explores whether the inflation rate (*Inflation*) tends to be substantially higher across the resource richer Canadian provinces. Inflation is measured as the annual percentage change in regional price levels. Apart from our province-specific measure of resource abundance, we also include the corresponding measure of resource abundance for the rest of Canada ($RA_{(Rest\ of\ Canada)}$), to capture potential spatial and spurious correlations. Also included is the price level in the previous year ($Prices_{(t-1)}$), to test whether a high level of prices may constrain further price increases in the subsequent year; i.e., to capture convergence effects. Equations 2 and 3 focus on the RME and explore whether annual percentage changes in the share of capital and labour in the non-primary tradable sectors

(*Capital Movement*, *Labour Movement*) correlate with resource abundance. Here also we include the share of capital and labour in the non-primary tradable sectors in the previous year ($Capital_{(t-1)}$, $Labour_{(t-1)}$) as additional regressors, to capture potential convergence effects. All equations include time-province fixed effects.[10] Given the general equilibrium nature of interactions across the variables of our model, each equation also includes the variables that appear on both sides of the other equations, and the entire system is then estimated using the Seemingly Unrelated Regressions (SUR) technique.[11]

$$Inflation_{i,t} = \alpha_0 + \alpha_1 RA_{i,t} + \alpha_2 RA_{(\text{Rest of Canada})i,t} + \alpha_3 Prices_{i,t-1} + \alpha_4 Capital_{i,t-1} + \alpha_5 Labour_{i,t-1} + \alpha_6 Capital\ Movement_{i,t} + \alpha_7 Labour\ Movement_{i,t} + \pi_i + \zeta_t + \varepsilon_{i,t} \quad (1)$$

$$Capital\ Movement_{i,t} = \beta_0 + \beta_1 RA_{i,t} + \beta_2 RA_{(\text{Rest of Canada})i,t} + \beta_3 Prices_{i,t-1} + \beta_4 Capital_{i,t-1} + \beta_5 Labour_{i,t-1} + \beta_6 Inflation_{i,t} + \beta_7 Labour\ Movement_{i,t} + \eta_i + \theta_t + \upsilon_{i,t} \quad (2)$$

$$Labour\ Movement_{i,t} = \gamma_0 + \gamma_1 RA_{i,t} + \gamma_2 RA_{(\text{Rest of Canada})i,t} + \gamma_3 Prices_{i,t-1} + \gamma_4 Capital_{i,t-1} + \gamma_5 Labour_{i,t-1} + \gamma_6 Inflation_{i,t} + \gamma_7 Capital\ Movement_{i,t} + \xi_i + \varphi_t + \mu_{i,t} \quad (3)$$

We focus on the coefficients on the measure of the province's own resource wealth. Regressions 1-3 of Table 1 present results of estimates of the three DD mechanism equations. Regression 1 reveals that mineral dependent Canadian provinces experience higher inflation, as the SE mechanism predicts. Regressions 2 and 3 of Table 1 focus on the RMEs; they suggest that there is a labour shift away from non-primary tradable sectors in mineral dependent provinces, with an opposite effect observed for the case of capital. The opposite RME for the case of capital, although in contradiction with standard DD theory, is in line with the theoretical predictions by Raveh (2013). He shows that reduced mobility costs may lead to an *Alberta Effect*, which refers to the regional capital attraction process that may follow a resource boom (as a result of shifting the tax burden away from capital intensive activities) and which can potentially mitigate or even overturn the accompanied RME. Columns 4-6 of Table 1 replicate the DD regressions for our second resource abundance proxy of *Mineral Exports* (i.e. the share in overall provincial income of mineral exports at the beginning of the period multiplied by the average annual level of world crude

[10] Hausman tests for each of Equations 1-3 reject the random effects specifications in favour of the fixed effects ones (i.e. the null hypothesis is rejected at the 1% level in all cases).

[11] Note that this is not critical for our results, which remain qualitatively the same even when each equation only controls for resource abundance and is estimated separately using OLS so that the general equilibrium effects are not accounted for (results are available from the authors).

oil prices at time 't'), with the corresponding equivalent rest-of-Canada measure included in lieu of the output-based one. The earlier results still hold, although the SE is now of lower statistical significance.

Insert Table 1

We now turn to the possible crowding-out effects of natural resource abundance on non-mineral exports, as predicted by DD theory via the SE and RME. We are interested in examining how resource-rich provinces trade both with other Canadian provinces (domestic exports) as well as with the rest of the world (international exports). Equation 4 explores whether annual growth in the share of (domestic/international) non-mineral exports in GDP (*Export Growth*) tends to be substantially lower across the more resource-rich Canadian provinces. We include the share of exports in GDP in the previous year ($Exports_{t-1}$) as an additional regressor, to test whether past high exports shares may negatively influence increases in export growth in the subsequent year, suggesting that provinces with a previously high share of exports in GDP may find it more difficult to further increase the share, other things equal. Apart from our province-specific measure of mineral production, we also include the corresponding measure of resource abundance for the rest of Canada to control for potential spatial and spurious correlations, similar to Equations 1-3.

Thus, the annual growth in non-mineral exports as a share of GDP from period t_0=1992 to t_T=2008 depends on the export share in the previous year ($Exports_{t-1}$), our measure of resource abundance of the corresponding province (*RA*), as well as for the rest of Canada ($RA_{(Rest\ of\ Canada)}$), the three DD intermediate variables (i.e., *Inflation*, *Labour* and *Capital Movement*), and their three level values in the previous period, capturing convergence (*Prices*, *Labour*, and *Capital)*:[12]

$$Export\ Growth_{i,t} = \delta_0 + \delta_1 Exports_{i,t-1} + \delta_2 RA_{i,t} + \delta_3 RA_{(Rest\ of\ Canada)i,t} + \delta_4 Inflation_{i,t} + \delta_5 Capital\ Movement_{i,t} + \delta_6 Labour\ Movement_{i,t} + \delta_7 Prices_{i,t-1} + \delta_8 Capital_{i,t-1} + \delta_9 Labour_{i,t-1} + \kappa_i + \lambda_t + u_{i,t} \quad (4)$$

[12] We add the three level values (prices, capital, labour) in the previous period to be consistent with the specification presented in Equations 1-3; nevertheless, we note results do not change qualitatively in case these are not included.

We estimate export growth in Equation 4, with regional and time fixed effects (κ_i and λ_t, respectively).[13] We first focus on the effect of mineral production on international exports; results are presented in Regressions 7-11 of Table 2. In Regression 7 we look into the total effect of resources on international exports, by excluding the DD mechanisms from the specification; we find that mineral abundance has a strong negative impact on export growth. In Regressions 8-10 we introduce the three DD intermediate variables (*Inflation, Capital Movement, Labour Movement*) in alternate order. Only the *Labour Movement* variable appears to be significant, signifying that an increase in the share of labour employed in the non-primary tradable sectors is conducive to export growth. The signs of the other variables also accord with intuition (i.e. inflation hampers export growth, while capital concentrated in the non-primary tradable sectors supports export growth) although the coefficients are statistically insignificant. The coefficient on mineral production remains rather stable, apart from Regression 10, where it drops to -0.038 (from -0.045 in Column 7 where no DD channels are introduced). In Column 11 where all DD channels are simultaneously introduced, the coefficient on mineral production drops (in absolute value terms) to -0.036, suggesting that the Dutch Disease mechanisms can jointly explain approximately 20% of the negative correlation between mineral production and international export growth across Canadian provinces, with the labour portion of the RME accounting for the majority of it.

Columns 12 and 13 replicate Columns 7 and 11 for the case of domestic non-mineral exports. Results on domestic and international non-mineral export growth are qualitatively different. Domestic non-mineral exports do not seem to be responsive to DD effects and mineral production appears to have a rather negligible negative effect on the non-mineral exports of mineral-rich provinces to the rest of the Canada. An intuitive explanation for the different response levels of domestic and international exports to DD effects may rest on the different demand elasticities they present. Domestic markets may be less responsive to price changes or factor movements, given that they operate under reduced mobility costs (so that, for instance, even if the price of exportable good *X* increases in Alberta due to a resource boom, Quebec may still find it less costly to import that good from Alberta than from Germany). Conversely, international markets may be far more responsive, based on

[13] Undertaking a Hausman Test for Equation 4 yields a p-value close to 0, thus rejecting the null hypothesis and motivating our use of a fixed effects framework (over a random effects one).

similar reasoning. This, in turn, helps to explain the differences we observe between the two cases.

Insert Table 2

3. ROBUSTNESS TESTS

We now move to empirically examine whether our findings also hold for the case of the non-mineral resource sector (agriculture, fishing, hunting, forestry). We replicate Regressions 7 and 11 for the case of diffuse-source resources and international export growth in the rest of the economy (i.e. exports net of diffuse-source resource related products). Thus, in this exercise we use the equivalent of the previous resource abundance measure for the case of diffuse-source resources; meaning, we take the provincial GDP share of non-mineral resource output in the initial year and multiply it by the average annual Agriculture Price Index at time 't',[14] to arrive at our diffuse-source measure (*Non-Mineral Resources*). We then construct an equivalent measure for non-mineral resource abundance in the rest of Canada. Results are presented in Regressions 14 and 15 of Table 3. Diffuse-source resource abundance is not significantly correlated with international export growth in the rest of the economy.[15] These results are consistent with those of previous studies showing that the *Resource Curse* and DD effects are most acute when considering point-source resources (mining and quarrying).[16]

Regressions 16-20 of Table 3 replicate Regressions 7-11 by replacing mineral production with our second proxy of mineral abundance, i.e. the share of *Mineral Exports* in overall provincial income at the beginning of the period multiplied by the average annual level of world crude oil prices at time 't'. Results are very similar – mineral exports are associated with reduced non-mineral international exports and once we account for all DD mechanisms simultaneously the coefficient on mineral resources is reduced by approximately 27%.

[14] Data retrieved from the World Bank GEM Commodity database. The Agriculture Price Index, constructed by the World Bank, presents an average measure of international prices of various agricultural goods.
[15] Results are similar when investigating the separate DD channels; however, since the end result indicates that there is no significant correlation with exports, we abstract from presenting these.
[16] See Isham et al. 2005; Ross 2001; Sala-i-Martin and Subramanian 2003.

Insert Table 3

In Table 4 we replicate Regressions 1-3 of Table 1 (i.e. the estimations of the DD channels) when having 2, 3, 4 and 5 year intervals, as well as for the entire investigated period under a cross-sectional framework. In these cases all variables are equivalently computed as described in the 1-year setting, only adjusted to the corresponding time interval. For example, in Regression 21 we now have inflation as the price change over a period of two years, with lagged prices referring again to the beginning of the period. The *Mineral Production* variable is then calculated as the average share in GDP over the entire period. Results accord with our findings in Table 1, although much weaker statistically. This is likely to suggest that any DD effects are taking place in the short rather than in the medium or long term, motivating our use of 1-year intervals in the main specifications.

Insert Table 4

An additional robustness test relates to the resource abundance proxy used. Although we prefer adopting a price-based resource measure given its exogenous character, we realise that oil prices may have a direct impact on the DD channels. To address that, we assess the robustness of our results by using two additional resource measures that enable us to better understand the association between mineral endowments and the DD channels, irrespective of variations in prices. First, we focus on the GDP share of mineral output (exports), and second, on real mineral output (exports) per capita. Both sets of variables have been calculated in real terms (using constant 2002 prices), thus eliminating the influence of mineral price volatility on the resource abundance measures. We should note that these two measures are potentially endogenous to our dependent variables (for instance, the DD channels can, in principle, affect local oil production rates; see van der Ploeg 2011), and may therefore suffer from an endogeneity bias; this is why we prefer to use the price-based measure in our main specifications, and adopt these two mainly for robustness. Results of this exercise are relegated to Appendix 3, and are presented in Regressions 43-54, in four subgroups each following the specification of Equations 1-3. Regressions 43-45 and 46-48 look into the first measure using GDP shares (of output and

exports, respectively); Regressions 49-51 and 52-54 test the second measure using per capita terms (of real output and exports, respectively). In all cases, the benchmark results under the price-based measure on the association between resource wealth and the DD channels remain to hold. Meaning, resource wealth is associated with higher inflation and a labour (capital) shift from (to) non-primary tradable sectors, even under these two additional measures.

4. The Spatial Channel

To this point, our main focus has been on a province's own resources and their effects on the province's economy, through the DD symptoms. However, given the regional orientation of our analysis, we are interested in addressing an additional important aspect of this; namely, the spatial dimension. The integrated intra-federal Canadian environment exhibits high inter-regional factor and spatial spillover effects; in our context, this raises an important question: Do resource windfalls in neighbouring regions induce DD symptoms in the source region? Meaning, is there a 'spatial DD'? To the best of our knowledge, no previous studies shed light on these questions; in this section we make a first attempt at addressing them.

For this purpose, we add a spatial lag (Anselin 1988) to our analysis. The spatial lag is constructed by multiplying our previously used *Mineral Production* measure by a distance weighting matrix. The distance matrix outlines the inverse of the Euclidean distance between the two most populated cities of each pair of provinces (or territories). In effect, this multiplication provides a weighted average measure of mineral production in all neighbouring regions (i.e. net of the production in the region inspected), where distances act as weights (and where the closest regions receive the largest weight). We then normalise this measure by the province's own GDP, to arrive at our spatial lag. Investigating this measure can shed light on how a province reacts to resource windfalls in neighbouring regions, which is why we make this the focus of this exercise.

We start by investigating the spatial dimension of the DD channels; thus, we add the spatial lag to each of Equations 1-3, and estimate the system through the same procedure

used previously in Regressions 1-3.[17] Results appear in Regressions 36-38, in Table 5. As can be seen, resource windfalls in neighbouring regions are not associated with a SE in the source region, yet they do affect the RME. The specific patterns are quite interesting. Both the capital and labour spatial RMEs work in the opposite direction than the ones caused by the province's own resources. Specifically, resource windfalls in neighbouring regions decrease (increase) capital (labour) shares in the non-primary tradable sectors. Investigating magnitudes, we cannot compare the spatial effects to the direct ones, given each uses a different measure due to the weighting matrix.[18] However, we can compare between spatial effects: in absolute terms the spatial capital RME is stronger than the labour one; as will be evident later, this interpretation is potentially important to understand the effects on exports. These results imply that a 'spatial DD' is indeed a relevant possibility; resource windfalls in neighbouring regions present a negative externality, consistent with related theoretical arguments made by Raveh (2013) and Wahba (1998).

Next, we explore whether spatial resource booms affect exports in the source region, and how much of this is accounted for by the 'spatial DD'. Thus, as before, we look into the growth of non-mineral exports, focusing initially on international exports (i.e. provincial exports to other countries). We start by estimating Equation 4, with the spatial lag included and the DD channels excluded; this gives the total effect of spatial resource windfalls on non-mineral international export growth in the source region. Results appear in Regression 39 of Table 5. As can be seen, resource windfalls in neighbouring regions decrease the growth in non-mineral international exports. Again, we note that the magnitudes of the spatial and direct measures are not comparable, given the different methods used to derive them. In Regression 40 we control for the various DD channels (equivalent to Regression 11); comparing the coefficient on the spatial lag in this case to that of Regression 39 indicates that the 'spatial DD' can explain approximately 51% of the negative effects of spatial resource windfalls on region-specific non-mineral international export growth.

Last, we follow the same additional tests done for the direct (i.e. non-spatial) effects; namely, investigating diffuse-source resources and domestic trade. Starting with the former, we construct an equivalent diffuse-source resources based spatial lag, to explore whether

[17] The spatial lag exhibits little correlation with the resource measures of both the province's own resources as well as that of the rest of Canada, so that multicolinearity is not a concern. Nevertheless, we note that results do not change qualitatively in case any of these measures is not included in the specification.
[18] Nonetheless, the results of Beine et al. (2012) imply that when aggregated the spatial effects dominate.

spatial diffuse-source resource windfalls affect international exports, net of exports of diffuse-source resources in the source region. We estimate the same specification as in Regression 39, only with the diffuse-source resource measures in lieu of the mineral-based ones, and the equivalent export growth measure as the dependent variable. Results appear in Regression 41, and as can be seen, there is little empirical support for a diffuse-source 'spatial DD'; in other words, similar to our earlier findings in Table 3 (Regression 14), results indicate that it is point-source resources that matter for the DD. Moving to the latter, we estimate Regression 39, focusing on domestic non-mineral exports rather than international ones. Results appear in Regression 42, and as before, we see that also under the spatial dimension, domestic exports are not vulnerable to DD symptoms.

Insert Table 5

5. CONCLUSION

Very little attention has been devoted to the regional mechanisms through which the DD manifests itself. In this paper, we undertake a first empirical attempt to research a 'regional DD'. We make use of cross-province panel data analysis for Canada to show that the DD, through its intermediate channels of the SE and RME, can also be applicable at the regional level. Our analysis reveals that mineral-rich provinces (and territories) experience on average higher inflation and a labour (capital) shift from (to) non-primary tradable sectors that explain approximately 20% of the mineral-induced reductions in region-specific non-mineral international export growth. In addition, we find that: (a) Non-mineral domestic trade is not significantly affected by resource windfalls; (b) Unlike point-source resources (mining and quarrying), diffuse-source ones (agriculture, fishing, hunting, forestry) do not seem to induce DD symptoms.

Given the regional aspect of our analysis, we also make a first attempt at empirically investigating the spatial dimension of the DD, to explore whether mineral-based resource windfalls in neighbouring regions induce DD symptoms in the source region. We find that such windfalls: (a) Negatively affect the growth in non-mineral international exports, yet similar to the direct (i.e. non-spatial) channel, do not affect the equivalent in domestic exports; (b) Induce capital (labour) shifts from (to) non-primary tradable sectors that

explain approximately 51% of the negative effects on international exports described in the previous point.

These are important findings for regional policy-making. Our analysis demonstrates that the DD can also hold at the regional level, making resource-rich provinces relatively less export-oriented over time. For instance, we find that even in a relatively homogenous sample (such as that consisting of Canadian provinces), one can observe substantial variation in inflation rates and factor movement patterns that correlate with measures of resource richness. A better understanding of these regional DD mechanisms is, hence, essential for adopting policy measures that support export performance, particularly in mineral-rich regions.

We envisage various extensions of our analysis. First, one could attempt to empirically estimate regional DD effects for countries with different levels of economic development. Regions in developing economies, for example, may experience inflationary pressure due to additional income arising through remittances (Acosta et al. 2009) or aid (Rajan and Subramanian 2011), rather than through mineral-dependent economic activities. Second, a follow-up study could try to extend the analysis on DD effects looking beyond impacts on exports and assess subsequent indirect consequences in terms of unemployment and poverty levels. Third, our estimates indicate that although the DD can explain a significant portion of the overall negative effect of resource windfalls on international non-mineral export growth, there is still a large unexplained component which we currently abstract from explaining and which, thus, invites further work. Finally, throughout the analysis we assume effects are contemporaneous; additional research is required to properly account for the dynamic aspects of this.

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TABLE 1. Testing for Cross-Regional Dutch Disease Effects in Canada – the Spending and Resource Movement Effects

Dependent variable:	(1) Inflation	(2) Capital Movement	(3) Labour Movement	(4) Inflation	(5) Capital Movement	(6) Labour Movement
Mineral Production	0.020**	0.123**	–0.165***			
	(0.010)	(0.057)	(0.061)			
Mineral Production (Rest of Canada)	–0.115	2.489*	–2.649*			
	(0.247)	(1.337)	(1.455)			
Mineral Exports				0.012	0.146**	–0.220***
				(0.011)	(0.064)	(0.070)
Mineral Exports (Rest of Canada)				0.109	1.078	–2.303**
				(0.159)	(0.925)	(1.016)
R^2 adjusted - within	0.84	0.39	0.29	0.80	0.41	0.33
Observations	208	208	208	172	172	172

Panel regressions 1-3, and 4-6 are estimated as a system using the Seemingly Unrelated Regressions technique. Panel regressions refer to 1984-2008 (1992-2008), with 1-year intervals, when Mineral Production (Mineral Exports) is used as regressor. Standard errors are robust, clustered by province/territory, and appear in parentheses. Superscripts *, ** and *** correspond to a 10, 5 and 1% level of significance. Only the coefficients of interest are reported; yet all regressions include an intercept, time-province/territory fixed effects, prices/capital/labour at t-1, and the DD channels that do not act as a dependent variable in the given specification. Sample includes Northwest Territories, Yukon, and the 10 provinces. Descriptive statistics and descriptions of all variables appear in Appendices 1 and 2 respectively.

TABLE 2. Testing for Cross-Regional Dutch Disease Effects in Canada – International and Domestic Exports (Panel, 1992-2008, 1-year intervals)

Dependent variable:	(7) Growth in International Exports (m)	(8) Growth in International Exports (m)	(9) Growth in International Exports (m)	(10) Growth in International Exports (m)	(11) Growth in International Exports (m)	(12) Growth in Domestic Exports (m)	(13) Growth in Domestic Exports (m)
Mineral Production	–0.045***	–0.044***	–0.045***	–0.038***	–0.036***	–0.001	–0.0002
	(0.012)	(0.012)	(0.012)	(0.006)	(0.006)	(0.002)	(0.0016)
Mineral Production (Rest of Canada)	–0.050	–0.059	–0.052	0.058	0.072	0.049*	0.058**
	(0.092)	(0.088)	(0.090)	(0.123)	(0.136)	(0.026)	(0.026)
Inflation		–0.039			–0.053		–0.002
		(0.055)			(0.059)		(0.012)
Capital Movement			0.001		–0.013		–0.004
			(0.006)		(0.017)		(0.003)
Labour Movement				0.049***	0.052**		0.001
				(0.016)	(0.020)		(0.001)
International exports (m) (t-1)	–4.697**	–4.528***	–4.686**	–4.547***	–4.267***		
	(1.643)	(1.527)	(1.613)	(1.383)	(1.420)		
Domestic exports (m) (t-1)						–1.206	–1.224
						(1.088)	(1.031)
R^2 adjusted - within	0.44	0.44	0.44	0.64	0.65	0.25	0.27
Observations	163	163	163	163	163	163	163

Standard errors are robust, clustered by province/territory, and appear in parentheses. Superscripts *, ** and *** correspond to a 10, 5 and 1% level of significance. All regressions include an intercept, and time-province/territory fixed effects, as well as prices/capital/labour at t-1. Exports marked with 'm' refer to non-mineral exports. Sample includes Northwest Territories, Yukon, and 9 provinces (Prince Edward Island excluded). Descriptive statistics and descriptions of all variables appear in Appendices 1 and 2 respectively.

TABLE 3. Testing for Cross-Regional Dutch Disease Effects in Canada – Robustness Checks (Panel, 1992-2008, 1-year intervals)

Dependent variable:	(14) Growth in International Exports (a)	(15) Growth in International Exports (a)	(16) Growth in International Exports (m)	(17) Growth in International Exports (m)	(18) Growth in International Exports (m)	(19) Growth in International Exports (m)	(20) Growth in International Exports (m)
Non-Mineral Resources	–0.034	–0.005					
	(0.086)	(0.108)					
Non-Mineral Resources (Rest of Canada)	0.064	0.210					
	(0.306)	(0.412)					
Mineral Exports			–0.044***	–0.043***	–0.044***	–0.035***	–0.032***
			(0.014)	(0.013)	(0.013)	(0.007)	(0.006)
Mineral Exports (Rest of Canada)			–0.233**	–0.239**	–0.233**	–0.124	–0.127
			(0.096)	(0.095)	(0.094)	(0.102)	(0.100)
Inflation		0.020		–0.057			–0.072
		(0.021)		(0.061)			(0.065)
Capital Movement		–0.012			0.002		–0.011
		(0.012)			(0.005)		(0.016)
Labour Movement		–0.002*				0.048**	0.051**
		(0.001)				(0.018)	(0.021)
International exports (a) (t-1)	0.016***	0.016***					
	(0.002)	(0.003)					
International exports (m) (t-1)			–4.251*	–4.020*	–4.272*	–4.166*	–3.762*
			(2.177)	(2.041)	(2.132)	(1.987)	(1.879)
R^2 adjusted - within	0.29	0.33	0.40	0.40	0.40	0.58	0.59
Observations	163	163	163	163	163	163	163

Standard errors are robust, clustered by province/territory, and appear in parentheses. Superscripts *, ** and *** correspond to a 10, 5 and 1% level of significance. All regressions include an intercept, and time-province/territory fixed effects, as well as prices/capital/labour at t-1. Exports marked with 'm' ('a') refer to non-mineral (non-diffuse-source) exports. Sample includes Northwest Territories, Yukon, and 9 provinces (Prince Edward Island excluded). Descriptive statistics and descriptions of all variables appear in Appendices 1 and 2 respectively.

TABLE 4. Testing for Cross-Regional Dutch Disease Effects in Canada (Panel, 1984-2008, 2/3/4/5-year intervals and Cross-Section Analysis)

	2-Year Intervals			3-Year Intervals		
Dependent variable:	(21) Inflation	(22) Capital Movement	(23) Labour Movement	(24) Inflation	(25) Capital Movement	(26) Labour Movement
Mineral Production	0.04 (0.030)	0.09 (0.195)	–0.01 (0.100)	0.11** (0.052)	0.36 (0.310)	–0.13 (0.129)
Mineral Production (Rest of Canada)	–2.51*** (0.740)	4.27 (5.063)	–3.04 (2.601)	–4.67*** (1.201)	–2.65 (7.844)	–1.66 (3.275)
R^2 adjusted - within	0.86	0.51	0.43	0.90	0.57	0.84
Observations	99	99	99	69	69	69

	4-Year Intervals			5-Year Intervals			Cross-Section Analysis		
Dependent variable:	(27) Inflation	(28) Capital Movement	(29) Labour Movement	(30) Inflation	(31) Capital Movement	(32) Labour Movement	(33) Inflation	(34) Capital Movement	(35) Labour Movement
Mineral Production	0.02 (0.077)	–0.22 (0.583)	–0.03 (0.132)	0.11 (0.115)	1.37 (0.930)	–0.27 (0.175)	0.04 (0.186)	0.13 (0.435)	–0.11 (0.134)
Mineral Production (Rest of Canada)	–10.31*** (2.401)	20.51 (21.201)	–0.42 (4.863)	–6.37** (2.740)	20.74 (23.708)	–6.45 (4.477)	–1.51 (1.281)	5.65* (3.079)	–1.43 (1.02)
R^2 adjusted - within	0.93	0.56	0.77	0.87	0.65	0.92	0.58	0.83	0.95
Observations	49	49	49	40	40	40	12	12	12

Panel regressions 21-23, 24-26, 27-29, 30-32, and 33-35 are estimated as a system using the Seemingly Unrelated Regressions technique. Standard errors are robust, clustered by province/territory, and appear in parentheses. Superscripts *, ** and *** correspond to a 10, 5 and 1% level of significance. Only the coefficients of interest are reported; yet all regressions include an intercept, time-province/territory fixed effects, prices/capital/labour at t-1, and the DD channels that do not act as a dependent variable in the given specification. In regressions 33-35 the resource proxy includes only the initial GDP share of mineral output (prices excluded given the cross-sectional framework). Sample includes Northwest Territories, Yukon, and the 10 provinces. Descriptive statistics and descriptions of all variables appear in Appendices 1 and 2 respectively.

TABLE 5. Testing for Spatial Cross-Regional Dutch Disease Effects in Canada

Dependent variable:	(36) Inflation	(37) Capital Movement	(38) Labour Movement	(39) Growth in International Exports (m)	(40) Growth in International Exports (m)	(41) Growth in International Exports (a)	(42) Growth in Domestic Exports (m)
Mineral Production	0.020*	0.126**	–0.161***	–0.044***	-0.035***	0.018	-0.001
	(0.010)	(0.051)	(0.058)	(0.01)	(0.003)	(0.072)	(0.002)
Spatial Lag (m)	0.45	-8.368***	6.376***	–0.473***	–0.233***		0.055
	(0.28)	(0.01)	(0.016)	(1.623)	(1.455)		(0.042)
Spatial Lag (a)						0.531	
						(0.381)	
Inflation					-2.535		
					(4.657)		
Capital Movement					-2.166		
					(1.901)		
Labour Movement					5.505**		
					(1.966)		
International exports (a) (t-1)						0.016***	
						(0.001)	
International exports (m) (t-1)				-4.905***	-4.562***		-1.188
				(1.405)	(1.031)		(1.061)
R^2 adjusted - within	0.84	0.47	0.31	0.45	0.68	0.31	0.45
Observations	208	208	208	163	163	163	163

Panel regressions 36-38 are estimated as a system using the Seemingly Unrelated Regressions technique. Panel regressions refer to 1984-2008 (1992-2008), with 1-year intervals, for regressions 36-38 (39-42). Standard errors are robust, clustered by province/territory, and appear in parentheses. Superscripts *, ** and *** correspond to a 10, 5 and 1% level of significance. Only the coefficients of interest are reported, yet all regressions include time-province/territory fixed effects and an intercept. Regressions 33-35 include the DD channels that do not act as a dependent variable in the given specification. Exports marked with 'm' ('a') refer to non-mineral (non-diffuse-source) exports. Spatial lag marked with 'm' ('a') refer to non-mineral (non-mineral-resources) measures. Sample includes Northwest Territories, Yukon, and the 10 provinces in regressions 36-38; in regressions 39-42 Prince Edward Island is excluded. Descriptive statistics and descriptions of all variables appear in Appendices 1 and 2 respectively.

Appendix 1: Descriptive Statistics[19]

Variable	Mean	Standard Deviation	Minimum	Maximum
Mineral Production (208)	3.154	6.476	0.003	51.721
Mineral Production (Rest of Canada) (208)	1.273	0.898	0.251	5.716
Mineral Exports (172)	4.278	7.537	0.0002	48.360
Mineral Exports (Rest of Canada) (172)	1.856	1.377	0.312	7.721
Non-Mineral Resources (208)	4.157	2.753	0.404	17.811
Non-Mineral Resources (Rest of Canada) (208)	2.698	0.548	1.911	5.219
GDP Share of Mineral Output (208)	0.093	0.135	0.001	0.711
GDP Share of Mineral Output (Rest of Canada) (208)	0.045	0.012	0.018	0.082
GDP Share of Mineral Exports (172)	0.113	0.129	0.001	0.528
GDP Share of Mineral Exports (Rest of Canada) (172)	0.079	0.029	0.026	0.197
Real Mineral Output Per Capita (208)	0.002	0.005	0.00	0.034
Real Mineral Output Per Capita (Rest of Canada) (208)	0.001	0.001	0.00	0.003
Real Mineral Exports Per Capita (172)	0.005	0.009	0.00	0.053

[19] Note that variables marked with 'm' refer to mineral based measures, whereas those marked with 'a' refer to non-mineral based measures.

Real Mineral Exports Per Capita (Rest of Canada) (172)	0.003	0.002	0.00	0.009
Inflation (208)	2.786	1.519	-1.254	7.526
Capital Movement (208)	-0.455	4.131	-9.944	19.378
Labour Movement (208)	-1.239	4.261	-39.545	26.507
Prices (208)	87.040	16.519	53.300	121.600
Capital (208)	0.206	0.088	0.013	0.339
Labour (208)	0.307	0.069	0.102	0.405
Growth in International Exports(m) (163)	0.0312	0.434	-0.607	0.535
International Exports(m) (163)	0.254	0.108	0.035	0.527
Growth in International Exports(a) (163)	0.024	0.125	-0.467	0.620
International Exports(a) (163)	0.295	0.096	0.099	0.534
Growth in Domestic Exports(m) (163)	-0.005	0.099	-0.354	0.560
Domestic Exports(m) (163)	0.175	0.062	0.057	0.316
Spatial Lag (m) (208)	0.128	0.316	0.001	2.792
Spatial Lag (a) (208)	0.212	0.333	0.003	1.753

Appendix 2: List of Variables Used in the Regressions[20]

All variables cover the period of 1984-2008, and are annually and regionally based.[21] Unless specified otherwise, data are provided by Statistics Canada (Canada's national statistical agency**:** www.statcan.gc.ca/start-debut-eng.html).

Mineral Production	GDP share of mineral (oil, gas, minerals) output at the beginning of the period multiplied by the average annual price of crude oil (World Bank, GEM Commodities Database).[22]
Non-Mineral Resources	GDP share of non-mineral resources (agriculture, fishing, forestry, hunting) output at the beginning of the period multiplied by the average annual Agriculture Price Index (World Bank, GEM Commodities Database).
Mineral Exports	GDP share of mineral (oil, gas, minerals) exports at the beginning of the period multiplied by the average annual price of crude oil (World Bank, GEM Commodities Database).
Mineral Production, Rest of Canada	Canadian GDP share of mineral (oil, gas, minerals) output in Canada (net of that in the source region) at the beginning of the period multiplied by the average annual price of crude oil (World Bank, GEM Commodities Database).
Non-Mineral Resources, Rest of Canada	Canadian GDP share of non-mineral resources (agriculture, fishing, forestry, hunting) output in Canada (net of that in the source region) at the beginning of the period multiplied by the average annual Agriculture Price Index (World Bank, GEM Commodities Database).
Mineral Exports, Rest of Canada	Canadian GDP share of mineral (oil, gas, minerals) exports in Canada (net of that in the source region) at the beginning of the period multiplied by the average annual price of crude oil (World Bank, GEM Commodities Database).
GDP Share of Mineral Output	The share of mineral (oil, gas, minerals) output in GDP.
GDP Share of Mineral Output , Rest of Canada	Canadian GDP share of mineral (oil, gas, minerals) output in Canada (net of that in the source region).
GDP Share of Mineral Exports	The share of mineral (oil, gas, minerals) exports in GDP.

[20] Note that variables marked with 'm' refer to mineral based measures, whereas those marked with 'a' refer to non-mineral based measures.

[21] In the estimations in Table 4, in which different time frames are used, variables were measured as described, only for the corresponding time periods.

[22] In Regressions 33-35 the initial GDP share of mineral output is not multiplied by the price measure (given the cross-sectional framework).

GDP Share of Mineral Exports , Rest of Canada	Canadian GDP share of mineral (oil, gas, minerals) exports in Canada (net of that in the source region).
Real Mineral Output Per Capita	Real mineral (oil, gas, minerals) output in 2002 prices, divided by population.
Real Mineral Output Per Capita, Rest of Canada	Real mineral (oil, gas, minerals) output in Canada (net of that in the source region) in 2002 prices, divided by population in Canada (net of that in the source region).
Real Mineral Exports Per Capita	Real mineral (oil, gas, minerals) exports in 2002 prices, divided by population.
Real Mineral Exports Per Capita, Rest of Canada	Real mineral (oil, gas, minerals) exports in Canada (net of that in the source region) in 2002 prices, divided by population in Canada (net of that in the source region).
Inflation	Regional inflation rates per annum. Computed as the change in regional price levels.
Capital Movement	The annual percentage change in the share of capital in non-primary tradable sectors (out of total capital). The non-primary tradable sectors include (based on NAICS): Wholesale trade, retail trade, and manufacturing.
Labour Movement	The annual percentage change in the share of labour in non-primary tradable sectors (out of total capital). The non-primary tradable sectors include (based on NAICS): Wholesale trade, retail trade, and manufacturing.
Prices	Regional price levels (consumer price index based).
Capital	The share of capital in non-primary tradable sectors out of total capital. The non-primary tradable sectors include (based on NAICS): Wholesale trade, retail trade, and manufacturing.
Labour	The share of labour in non-primary tradable sectors out of total capital. The non-primary tradable sectors include (based on NAICS): Wholesale trade, retail trade, and manufacturing.
Growth of International Exports (m)	The annual percentage change in the GDP share of region-specific non-mineral (oil, gas, minerals) exports to other countries.
International Exports (m)	GDP share of region-specific non-mineral (oil, gas, minerals) exports to other countries..
Growth of International Exports (a)	The annual percentage change in the GDP share of region-specific non-diffuse-source (agriculture, fishing, forestry, hunting) exports to other countries.

International Exports (a)	GDP share of region-specific non-diffuse-source (agriculture, fishing, forestry, hunting) exports to other countries.
Growth of Domestic Exports (m)	The annual percentage change in the GDP share of region-specific non-mineral (oil, gas, minerals) exports to other Canadian provinces and territories.
Domestic Exports (m)	GDP share of region-specific non-mineral (oil, gas, minerals) exports to other Canadian provinces and territories.
Spatial Lag (m)	Mineral production (constructed as described above) of all regions multiplied by a distance weighting matrix, which records inverse Euclidean distances between the most populated cities of each province/territory, and normalised by provincial GDP.
Spatial Lag (a)	Non-mineral resource production (constructed as described above) of all regions multiplied by a distance weighting matrix, which records inverse Euclidean distances between the most populated cities of each province/territory, and normalised by provincial GDP.

Appendix 3: Robustness Tests with Alternative Resource Measures

PANEL A: GDP Shares						
Dependent variable:	(43) Inflation	(44) Capital Movement	(45) Labour Movement	(46) Inflation	(47) Capital Movement	(48) Labour Movement
GDP Share of Mineral Output	0.02**	0.19***	–0.12**			
	(0.008)	(0.04)	(0.048)			
GDP Share of Mineral Output (Rest of Canada)	–0.06	2.02**	–0.94			
	(0.165)	(0.861)	(0.99)			
GDP Share of Mineral Exports				0.02	0.26***	–0.24***
				(0.011)	(0.056)	(0.068)
GDP Share of Mineral Exports (Rest of Canada)				0.09	1.64***	–1.24*
				(0.09)	(0.535)	(0.638)
R^2 adjusted - within	0.84	0.42	0.28	0.79	0.46	0.31
Observations	208	208	208	172	172	172
PANEL B: Per Capita Terms						
Dependent variable:	(49) Inflation	(50) Capital Movement	(51) Labour Movement	(52) Inflation	(53) Capital Movement	(54) Labour Movement
Real Mineral Output Per Capita	0.82***	6.44***	–6.21***			
	(0.309)	(1.636)	(1.827)			
Real Mineral Output Per Capita (Rest of Canada)	2.38	60.04***	-42.15*			
	(3.675)	(19.305)	(21.721)			
Real Mineral Exports Per Capita				0.31**	2.85***	-3.56***
				(0.313)	(0.838)	(0.941)
Real Mineral Exports Per Capita (Rest of Canada)				1.57	24.89***	-25.03***
				(1.485)	(8.366)	(9.510)
R^2 adjusted - within	0.84	0.41	0.29	0.80	0.43	0.33
Observations	208	208	208	172	172	172

Panel regressions 43-45, 46-48, 49-51, and 52-54 are estimated as a system using the Seemingly Unrelated Regressions technique. Panel regressions refer to 1984-2008 (1992-2008), with 1-year intervals, when the resource proxy is based on mineral output (exports). Standard errors are robust, clustered by province/territory, and appear in parentheses. Superscripts *, ** and *** correspond to a 10, 5 and 1% level of significance. Only the coefficients of interest are reported; yet all regressions include an intercept, time-province/territory fixed effects, prices/capital/labour at t-1, and the DD channels that do not act as a dependent variable in the given specification. Sample includes Northwest Territories, Yukon, and the 10 provinces. Descriptive statistics and descriptions of all variables appear in Appendices 1 and 2 respectively.