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WEALTH FEDERATION'S THREAT TO NATIONALIZE OIL
RESOURCES IN SASKATCHEWAN**

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Estimating the Credibility of the Co-operative Commonwealth Federation's Threat to Nationalize Oil Resources in Saskatchewan

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Abstract

Several scholars and politicians argue that the ideology and policies of the Cooperative Commonwealth Federation (CCF) governments in Saskatchewan from 1944 to 1964, including an alleged expropriation threat, retarded the development of Saskatchewan's oil and gas resources. Since 1950, a significant portion of Western Canada's wealth has been generated by the oil industry, and in Canada, the provinces control the mineral rights. Provincial government policy could have a significant effect on the level of private investment in the resource sector, and consequently, the wealth of the province. We adapt Davis' (2001) model of a mine to the Saskatchewan context to estimate if the CCF's threat of nationalization was seen as credible by the oil industry. We assume that any credible expropriation threat would have been priced into the value of government land lease sales, where the land was leased for the purposes of oil and gas exploration and production. The results of this model indicate that oil companies did not perceive a risk of expropriation occurring in Saskatchewan. Furthermore, compared to the post-CCF period, the CCF had a positive effect on expenditure on land by the petroleum industry. Through auxiliary regressions, the CCF was found to have a positive effect on exploration effort and oil production in Saskatchewan.

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Introduction

Several scholars and politicians argue that the ideology and policies of the Cooperative Commonwealth Federation (CCF) governments in Saskatchewan from 1944 to 1964, including an alleged expropriation threat, retarded the development of Saskatchewan's oil and gas resources.¹ Since 1950, a significant portion of Western Canada's wealth has been generated by the oil industry, and in Canada, the provinces control the mineral rights.² Provincial government policy could have a significant effect on the level of private investment in the resource sector, and consequently, the wealth of the province. The economic literature demonstrates that the threat of nationalization and/or expropriation of assets without compensation can lead to underinvestment in the country where the threat is present, as well as sub-optimal extraction of resources.³ Since these outcomes could also arise from less extreme policies like higher tax rates, or other economic fundamentals of the resource economy, a more difficult challenge is quantifying the credibility of the threat so as to determine whether or not the threat is the cause of the poor economic outcomes. The purpose of this paper is to adapt the Davis (2001) model of the impact of an expropriation threat on the value of a mine to the Western Canadian oil industry, and estimate the perceived probability on the part of private interests in the sector that the Cooperative Commonwealth Federation (CCF) government would have expropriated Saskatchewan's oil resources in the 1940s and 1950s.

¹ Richards and Pratt (1979). MacKinnon (2003, 19) suggests that many business people and right-of-centre politicians feel that the socialists in Regina rather than oil in Alberta have had more to do with Saskatchewan's perceived under-performance. MacKinnon cites Colin Thatcher, former Saskatchewan MLA, "The CCF-NDP has been a curse on the province of Saskatchewan and have unquestionably retarded our economic development, for which our grandchildren will pay."

² While both Saskatchewan and Alberta produce oil and natural gas, the greater importance of energy resources for Alberta is clear. Alberta is the 9th largest producer of oil in the world and the 3rd largest natural gas producer. Within Canada, Alberta produces 55% of Canada's conventional crude oil. Saskatchewan is Canada's second largest producer of oil in Canada, producing 20% of Canada's conventional crude oil.

³ Long (1975), Geiger (1989), Melese and Michel (1991), Konrad, Olsen and Schöb (1994), Bohn and Deacon (2000), Jacoby, Li and Rozelle (2002).

Davis (2001) estimates the credibility of the African National Congress' (ANC) threat to nationalize South African mineral assets in the 1990s.⁴ Following the release of Nelson Mandela and other political prisoners and the legalization of the African National Congress as a political party in 1990, the ANC threatened to expropriate mineral resources and mines if elected. While the ANC threat triggered a reaction in the South African business community, Davis finds that the expropriation threat following the ANC's election to power in 1994 was not taken to be highly credible by investors, as the estimated expropriation probability of expropriation without compensation was 1.4%.⁵ Davis finds, however, that the value of the mines decreased by approximately 4.8%. The low impact of the nationalization threat on the value of the mine could reflect that the corporations operating the South African mines had a safe savings alternative or if other institutional forces mitigated the adverse effects of the threat.⁶ It could also reflect that in the first quarter of 1994, prior to being elected, the ANC's Coordinator for Minerals and Energy Policy stated that the ANC had no intention of nationalizing or expropriating either mineral rights or mining companies.

⁴ Davis's study of the credibility of expropriation threats can be used as a benchmark when including political risk in applied models of investment timing, resource extraction, and land and natural resource valuation. Mahajan (1990), Clark (1997, 2003) develop models that price expropriation risk into firm investment projects. These models are intended by the authors to provide a measure of the likelihood of expropriation. Picht and Stüven (1991) find that self-interested governments are more likely to expropriate when they are governing during periods of poor economic performance, indicating that politically motivated expropriation is driven by economic performance.

⁵ Jones (1984) finds that U.S. oil companies producing in Venezuela during 1961 to 1978 faced probabilities of adverse government actions of 55% to 96% in a given year. Picht and Stüven (1991) use a sample of 31 "less developed" countries for the period 1960 to 1977 and find that average likelihood of expropriation ranged from 51% to 69%.

⁶ Haber et al. (2003) argue that when an industry has specific technological features that limit the ability of a government to expropriate, or when the industry is able to call upon foreign governments to enforce property rights, economic agents are able to mitigate the institutional changes designed to reduce property rights. They use the Mexican oil industry from 1911 to 1929 as a case study. They find that though there was endemic political instability throughout the period, and taxes on oil production continually rose, the reason for the decline of the oil industry in Mexico was that Mexico ran out of oil deposits that could be extracted competitively, given current prices, technology and competing sources. The increase in petroleum taxes had little effect on investment, because changes in the tax rates had only a minor effect on rates of return. In addition, the unstable Mexican governments depended on oil revenues for one-third of their income, enabling the oil firms to coordinate their activities and threaten production boycotts. In the case of the Mexican oil industry, the informal institutions mattered substantially more than the formal institutions.

We adapt Davis' (2001) model of a mine to the Saskatchewan context. We assume that any credible expropriation threat would have been priced into the value of government land lease sales, where the land was leased for the purposes of oil and gas exploration and production. We believe that this is a reasonable proxy for the value of the province's oil reserves as the amount firms pay for land should reflect the net present value of expected profits from oil reserves it may contain and, as land leases were sold competitively at auction in Saskatchewan and Alberta, their an expropriation risk could be priced into their value. The results of this model indicate that oil companies did not perceive any risk of expropriation occurring in Saskatchewan. Furthermore, compared to the post-CCF period, the CCF had a positive effect on expenditure on land by the petroleum industry. Through auxiliary regressions, we find that the CCF had a positive effect on exploration effort and oil production in Saskatchewan.

The Co-operative Commonwealth Federation's Expropriation Threat

In February 1905, the federal government introduced legislation that created two provinces out of the Northwest Territories. A north/south border was positioned that created two provinces roughly equal in size by area (275,000 square miles each) and population (about 250,000 each in 1905).⁷ The economies of the two provinces remained largely agricultural and the incomes and populations of the two provinces were roughly equal until after the Depression. The provinces' shared experiences of economic devastation, drought and out-migration during the Great Depression impressed upon their governments the need to diversify their economies away from agriculture. The approaches toward economic diversification would prove to be very different between the provinces, particularly with respect to public policy toward the emerging

⁷ Only after a prolonged battle with the federal government did these provinces gain control over their natural resources in 1930. See Boothe and Edwards (2003, 93-97).

oil and gas industry. The “populist” Social Credit government elected in 1935 in Alberta would respond by ensuring that the tools of capitalism would better serve Albertans by favouring policies that encouraged external private capital to locate in the province. In Saskatchewan, the Cooperative Commonwealth Federation (CCF) party was elected to power in 1944 and embarked on an economic program initially favouring nationalization and public ownership of natural resources and key industries. The resources of the province were to be developed to benefit the citizens of Saskatchewan, rather than external capitalists.

Prior to the discovery of the large oil pool at Leduc in 1947, relatively little crude oil was produced in Alberta and virtually none in Saskatchewan.⁸ Natural gas was produced in small quantity in Alberta but no substantial quantity of gas would be produced in Saskatchewan until the mid 1950s.⁹ Playing a role in shaping public policy was the market power of private energy producers. The provincial governments lacked the necessary public capital to develop the resources on their own. Further, the risks inherent in oil and gas exploration proved unpalatable for provinces emerging from the debt problems of the 1930s, particularly as it was not obvious that there was an external market for oil.¹⁰ Finally, as domestic sources of capital were not well developed, external private capital that produced the oil had credible exit threats.

In Alberta the Social Credit government, newly-formed and newly-elected in 1935, sought to diversify the economy by building upon the nascent oil industry that had been established as a result of the small, and by then declining, production of oil in Turner Valley. To do so, it sent assurances to the financial sector and the oil industry that the province would

⁸ In 1947, one million cubic metres of oil were produced in Alberta, mainly from the Turner Valley area. This was less than 6% of the amount produced in 1955. In 1947 only 83,000 cubic metres of oil was produced in Saskatchewan. *Statistical Handbook*, Canadian Association of Petroleum Producers.

⁹ In general, natural gas was not profitable for the firms, though some managed to recover costs by supplying nearby towns with natural gas for heating and light.

¹⁰ Hanson (1958), Richards and Pratt (1979), Johnson (2004). Britnell (1953) expressed scepticism that the provinces would find an export market for their high cost oil.

provide every incentive to risk capital and it established a regulatory regime that emphasized private property rights and a generous royalty regime (Hanson 1958, Richards and Pratt 1979). In 1949 it passed the Mines and Mineral Act in which royalty rates on petroleum and natural gas were established. An important element of the Act was to commit the provincial government to a relatively low maximum royalty rate equal to just 16.67% of gross production.¹¹

In Saskatchewan, the CCF's approach to developing the province's natural resources departed dramatically from that of the Social Credit party in her sister province to the west. While the CCF would not win an election in Saskatchewan until 1944, in the 1934 and 1938 provincial elections CCF candidates campaigned on a platform of social ownership of all major industries.¹² At the July 1933 Cooperative Commonwealth Federation National Convention, the party unveiled its "Regina Manifesto" which stated that the party sought to "replace the current capitalist system" with a social order based upon economic equality.¹³ Among other things, the CCF called for natural resources to be developed for the public benefit, and "not for the private profit of a small group of owners [or] financial manipulators." However, the Manifesto made clear that a policy of outright confiscation would not be pursued (Zakuta 1964, 162). By 1944, the CCF's Natural Resources and Industrial Development Committee had identified the natural

¹¹ Doern and Toner (1985). Interestingly, it was not until 1971 after the election of a new government following the end of the 36-year reign of the Social Credit party that this low maximum royalty rate was raised. Great effort was made to maintain the sanctity of the original contract agreed to by the Social Credit government of 1949 and the industry by changing the maximum royalty rate only on remaining oil reserves. This had the effect of raising the royalty rate to 23% of gross production. Dramatic increases in oil prices would soon cause the government to abandon this agreement and tie royalties to the price of oil (Doern and Toner, 1985).

¹² In 1938, the CCF ran second in terms of popular vote and won 10 seats despite fielding candidates in only 30 of 52 ridings. In the 1944 election, the CCF would sweep to power winning 50 of 55 seats.

¹³ See pages 1 and 2 of the "Regina Manifesto" reprinted in Zakuta (1964, 160-169). Richards and Pratt (1979, 101). The Depression had instilled in the CCF leaders the idea that capitalism had failed. Production was for profit and not for human need, and these two objectives could not be reconciled. Further, the CCF leaders believed that private corporations refused to produce to meet public need unless the returns were unreasonably high. The CCF's solution to this was a new economic order, a planned economy that placed three key industries under public ownership or direction, the profits of which should go back to the people. These industries were the banking and finance corporations; other industries and services essential to economic planning; and the natural resources industry (Johnson 2004, 29).

resource sector as the central candidate for social ownership.¹⁴ The committee recommended that the government acquire those mineral rights that were privately owned, prevent further alienation of natural resources, and plan for the eventual and complete socialization of all natural resources. The 1944 CCF election platform (the *Program for Saskatchewan*) stated that the party would proceed to public development and ownership of the natural resources. However, the *Program* made no mention of the Committee's recommendation that privately owned resources should be restored to the province. The Committee also made mention of collecting royalties and taxes from privately owned enterprises, so it is not clear whether full socialization would ever occur.

In the 1944 Saskatchewan election campaign, Douglas and his colleagues were called on to defend and clarify the CCF's policy on socialization of industry and resources. From their responses, it appears that the main focus of the party in the 1944 election was the development, rather than socialization, of resources. The Saskatchewan CCF Committee on Socialization of Industry and Natural Resources stated that "industry should not be socialized for the sake of socialization, but only under certain defined circumstances" (Johnson 2004, 30). Douglas argued that social ownership should be expanded upon when needed to prevent monopoly and exploitation of the public.¹⁵ Premier Douglas believed that royalties and land rental regulations would be sufficient to capture a fair share of resource revenues.

From 1944 to 1948 the newly-elected CCF sought to promote Saskatchewan's economic diversification through nationalization and promotion of secondary manufacturing and natural resources. The 1944 Natural Resources Act gave the Minister of Natural Resources power to

¹⁴ According to Johnson (2004, 43-44), the CCF's Natural Resources and Industrial Development Committee advocated that the development of resources should take place under public instead of private control.

¹⁵ Douglas argued that Canadians already had experienced social ownership in the form of the national railway, provincial telephone and electrical services, etc... (Johnson 2004, 30-31).

“acquire any lands or works by purchase, lease or expropriation” as necessary to develop and utilize the resources of the province.¹⁶ The 1944 Mineral Taxation Act imposed a tax on undeveloped freehold mineral rights to encourage holders of the rights, which had been granted by the federal government, to allow the rights to revert to the province.¹⁷ Failure to pay the mineral tax resulted in forfeiture of the mineral rights to the Saskatchewan government. A resolution adopted by the CCF party at its’ 1946 convention called upon the Government of Saskatchewan to place oil and natural gas “under social ownership, control and operation.” Similar resolutions were approved in 1947 and 1948. By October 1947, mineral rights in undeveloped areas had been seized by the Saskatchewan Department of Natural Resources.

A notorious episode in Saskatchewan history occurred in 1944 shortly after the CCF had won the election. Imperial Oil, Canada’s major oil company, approached the CCF government with a proposal for a long-term contract that would give the company exclusive exploration rights over a large section of the province should it find commercial volumes of oil. While the government’s own advisors suggested that turning down the offer would delay exploration and possible industrial development for many years and that the risks inherent in oil and gas exploration were inappropriate for a provincial government to take on, it nonetheless refused the offer and as a result, Imperial Oil allegedly boycotted the province.¹⁸

Despite the aggressive policies and positions of the CCF in its first term of government, debate over public versus private development of resources continued within the CCF, and by its second term in office, the party was backing away from its earlier direction of public ownership

¹⁶ Richards and Pratt (1979, 110). Joe Phelps, the Minister of Natural Resources, began plans for the development of government-owned factories, including a pulp mill, a woollen mill, a brick yard, a show factory and a tannery (Johnson 2004, 68).

¹⁷ Richards and Pratt (1979, 110). Approximately 10% of Saskatchewan’s mineral rights were owned by private firms or individuals. The stated reason for the Mineral Taxation Act 1944 was to “compensate the people of the province for the depletion of these alienated minerals.” (Government of Saskatchewan, Department of Natural Resources and Industrial Development, *Annual Report 1949*, 37.)

¹⁸ However, several companies, including Husky Oil, continued to invest. (Richards and Pratt 1979, 134).

as capital market forces and moderates within the CCF had moved Saskatchewan into the same passive rentier role as Alberta.¹⁹ Following its formation in 1946 for the purposes of economic planning and policy evaluation, the Economic Advisory and Planning Board (EAPB) recommended in late 1947 and again in early 1948 that Saskatchewan rely on private development of the province's mineral resources (Johnson 2004, 123 and 131). On September 1, 1948, all forfeiture proceedings under the 1944 Mineral Taxation Act were stopped pending on the resolution of the court proceedings surrounding the Canadian Pacific Railway's action to have the Act declared *ultra vires*.²⁰ As a result of this, the Saskatchewan Government passed an Order in Council allowing the return of forfeited mineral rights upon payment of the mineral taxes, with a deadline of October 31, 1950 for revestment applications. As of March 31, 1950 82% of the forfeited mineral rights had been revested, with the remainder being unclaimed.²¹ Revestment of the mineral rights was completed by December 31, 1951, with 96.3% of the mineral rights restored to their original owners and the remainder retained by the Crown.²²

After the 1948 election, and following the Leduc and Redwater oil discoveries in Alberta, the CCF was sensitive to criticism about the relatively slow pace of oil exploration in Saskatchewan. In an attempt to bring the oil majors like Imperial Oil back to the province,

¹⁹ Johnson (2004). The moderation of the CCF in Canada from 1933 to the 1950s had been described as the "becalming of a protest movement" (Zakuta 1964, Whitehorn 1992). The party's official stand on the role of social ownership versus private enterprise moved from a prohibition of capitalism in 1933 to the aiding and encouraging of private business to fulfill its legitimate function in 1948. The distinction between the CCF and the "old parties" diminished further through the 1950s (Zakuta 1964, 74, 87-88).

²⁰ Saskatchewan Department of Natural Resources Annual Report (1950, 29). The Court of the King's Bench decided in favour of the government of Saskatchewan on June 15, 1950, resulting in an appeal from Canadian Pacific Railway being filed (Saskatchewan Department of Natural Resources Annual Report 1951, 23). The Saskatchewan Court of Appeals found the tax on mineral rights to be *intra vires*, and the tax on mineral rights where there was production to be *ultra vires* on June 11, 1951. The Canadian Pacific Railway subsequently appealed once more, and the judgement of the Supreme Court of Canada (June 30, 1952) was that the Act was valid in all respects. (Saskatchewan Department of Natural Resources Annual Report 1951, 22). The CPR served notice that the Supreme Court's decision would be appealed to the Privy Council, but six months later dropped the appeal. Ten days after the CPR's appeal was dropped, the government of Saskatchewan announced that there would be no forfeitures during 1953. (Saskatchewan Department of Natural Resources Annual Report 1953, 35)

²¹ Saskatchewan Department of Natural Resources Annual Report (1951, 22).

²² Saskatchewan Department of Natural Resources Annual Report (1952, 24).

Premier Douglas sent letters to major and independent oil companies in which he stated that the province “has no intention of either expropriating or socializing the oil industry” (Richards and Pratt 1979, 135-136). By the early 1950s the CCF had formally abandoned the nationalization option and by the mid 1950s the oil policies of the CCF had largely converged with those of the Social Credit government in Alberta.

There seem to have been several reasons for the CCF’s change in policy direction. First, the government was losing popularity through its first term. In the 1948 election, the CCF party went from forty-seven seats to thirty-one; one of the seats lost was that of Joe Phelps, the Minister of Natural Resources and an enthusiastic proponent of nationalization. The position of Minister of Natural Resources went to J. H. Brockelbank, whose ideology was less radical than his predecessor’s.²³ By this time too the failure of the publicly owned firms established by the CCF government in 1945 and 1946, firms that competed with existing private firms, had become apparent.²⁴ Second, the CCF government faced a threat from the oil companies in the province that they would move out if the government went through with an agreement over the leasing of Crown reserves that the industry saw as putting the government in the oil business.²⁵ Financial necessity also encouraged the CCF government to converge towards Alberta’s policies and

²³ It is also the case that CCF “moderates” did not have enthusiasm for these early attempts at nationalizing industry and resource development. Richards and Pratt (1979) and Johnson (2004, 92) attribute these ambitious policy directions as primarily driven by Joe Phelps, the Minister of Natural Resources in the CCF’s first term of Government from 1944-1948. Johnson (2004, 62) describes Phelps as “fanatically loyal to the CCF platform and ideology,” and he stood in contrast to principled yet practical cabinet ministers like Tommy Douglas, Clarence Fines and J.H. Brockelbank.

²⁴ In the two years following its election in 1944, the CCF government established a brick manufacturing plant, a shoe factory, a tannery, a fish processing and marketing board, a timber board, a fur marketing service, a box factory, a provincial bus company, and a sodium sulphate mine (Richards and Pratt 1979, 112).

²⁵ Johnson (2004), Richards and Pratt (1979, 143). In March 1954 the Saskatchewan government entered into a “farm-out” (An arrangement whereby the owner of a lease assigns some portion (or all) of the lease to another company for drilling) agreement with Co-operative Refineries Limited, creating a loud outcry in the oil industry. The government was warned that private oil could withdraw from the province unless reassured that the agreement did not establish a precedent for government investment in production and development. The CCF government retreated, and the agreement was changed into a royalty agreement that removed the offensive joint venture features. (Richards and Pratt 1979, 185).

approaches to resource development. American investors sent a clear message to the Treasurer, Clarence Fines, that Saskatchewan government bonds would not be in demand if the CCF did not improve the province's credit position (Richards and Pratt, 1979).

Richards and Pratt (1979) argue that the slower growth of the oil and gas sector was the result of the "threat of nationalization" from the CCF.²⁶ This conclusion seems to stem from the fallout from the CCF's rejection of Imperial Oil's offer in 1944. In a 1950 memorandum to Premier Douglas reporting on the discussions with Imperial Oil about the company's lack of activity in Saskatchewan and the prospects for the company becoming more active in the province, senior government officials reported that Imperial identified four reasons for not operating in Saskatchewan since 1945; first, they felt there was difficulty obtaining land; second, there were "more interesting" geological structures in Alberta; third, there was a necessity to place all available funds in Alberta to protect the discoveries that they had made; and fourth, they had a "fear of expropriation in Saskatchewan."²⁷ Further support for this view came from the coincidence of the moderation in the CCF approach to resource development after 1948 and increasing exploration effort in Saskatchewan. The province had its first major oil discovery in 1952.²⁸

²⁶ Alex Cameron, a Liberal (opposition) member of the Saskatchewan Legislature in 1950 alleged that "The major oil companies have been stung by government bureaucracy, loaded with excessive taxation and having to carry these leeches (CCF patronage land controllers) on their backs, have thrown in the sponge." (Tyre 1962, 201). Cameron said that exploration for oil and gas had ground to a virtual halt in Saskatchewan and no new gas wells had been brought into production since 1946.

²⁷ D.H.F. Black, Government of the Province of Saskatchewan Department Memo to T.C. Douglas, October 11, 1950.

²⁸ Johnson (2004, 156). The relatively slower development of the oil and gas resources of Saskatchewan in the 1940s and early 1950s would have also reflected the fact that the vast majority of proven reserves of conventional oil were in Alberta. With Alberta's geological formations having been proved to hold commercial quantities of oil, with new oil services firms established in Alberta to service the newly discovered fields, and with new pipelines being established to transport oil from field to market, it is not surprising that exploration in Saskatchewan may have held less appeal for oil companies. Hanson (1958) describes how the development of the Redwater oil discovery in Alberta drew resources away from the further development of the Leduc oil field. This in part reflected the shortage of equipment for drilling in the late 1940s and early 1950s which also means that that it would not be surprising that resources would not go to Saskatchewan until these big Alberta fields were developed. Hanson (1958, 99) describes

Despite the fact that any moves towards nationalizing Saskatchewan's oil resources were in the CCF's first term in government, it is uncertain whether the government's threat of expropriation was considered credible by investors, and if it was, whether the expropriation risk had a lasting effect on the development of the province's oil resources. The CCF rhetoric and actions like the Natural Resources Act 1944 and Mineral Taxation Act 1944 signalled intent and capacity to expropriate, though it was not clear if the government would pay compensation. Further, the CPR's court action against the CCF government's 1944 Mineral Taxation Act shows that industry could call on higher levels of government and the courts to enforce their property rights.

The Davis (2001) Model

Davis (2001) models the effect of the threat of uncompensated expropriation on the value of an operating mine within a standard natural resources profit maximization problem where the value of an operating mine i at time t is the expected present value of the remaining net revenues derived from extraction. Davis follows Davis and Moore (1998), where the current value of an optimally managed extraction program is the product of current average profit and remaining reserves, which are known with certainty.²⁹ To simplify this value determination, Davis assumes that the mine operator produces constant output, reflecting the mine's capacity and the firm's contractual obligations to deliver minerals.³⁰

The value of a mine i at time s is the expected present value of remaining net revenues from extraction of the mineral, subject to reserve and capacity constraints:

how drilling in Alberta slowed down after 1951 as exploration and development efforts moved into Saskatchewan where some successes had been occurring

²⁹ Solving for the mine's value would typically involve forecasting future prices and costs given the planned production profile and discounting the expected net cash flows at the risk adjusted rate.

³⁰ The value of a mine becomes much more complex if the producer can vary output in response to uncertainty over variables such as price since the calculation of the mine's value would then require assumptions about the investor's risk aversion, or an assumption of complete markets.

$$V_{is} = \max_{\{q_i\}} E_s \left[\int_s^{T_i} \left[P(t) q_i(t) - C_i(q_i(t), Q_i(t)) \right] e^{-r_a(t-s)} dt \right] \quad (1)$$

$$s.t. \quad \dot{R}_i(t) = -q_i(t), R_{is} = R_i(s), R_i(T_i) = 0, 0 \leq q_i(t) \leq K_i$$

Here P is the exogenous mineral price common to all mines i of the commodity type, q_i is per period output, Q_i is cumulative extraction, C_i is total extraction cost, K_i is the fixed mine capacity that constrains production, and r_a is the constant risk-adjusted discount rate. T_i is mine i 's total lifetime. The cost function allows for increasing costs with depth, as well as non-constant returns to scale. Given that cost increases with depth, Davis assumes that economic, rather than physical exhaustion occurs. This means that the expected remaining economically recoverable reserves for mine i at time s are $R_{is} = \int_s^{T_i} q_i(t) dt$. In the absence of an expropriation threat, remaining mine life for mine i at time s is $N_i(s) = T_i - s$ periods.

Following Davis and Moore (1998), the current value of a mine as an optimally managed maximization program is:

$$V_s = v(\cdot) + \varpi(\cdot) \left[(P(s) - a(s)) R(s) \right] \quad (2)$$

where

$$v(\cdot) = \int_s^T \left[C_q(t) - a(t) + v(t) - \int_t^s C_Q(\tau) e^{-r(\tau-t)} d\tau \right] q(t) e^{-r(t-s)} dt \quad (3)$$

$$\varpi(\cdot) = \left[1 - \left(\frac{C_q(s) - a(s) + v(s)}{P(s) - a(s)} \right) \right] \quad (4)$$

and where r is the risk-free interest rate, a is the average cost of production, and v is the shadow value of capacity. Solving for both $v(\cdot)$ and $\varpi(\cdot)$ requires specification of the mine's cost function and the future profile of prices, but alternatively, these terms can be estimated. The sign of $v(\cdot)$ is indeterminate, so nothing can be said about the expected empirical properties of the

intercept term, except that $\dot{v}(t)v(t) < 0$, where $\dot{v}(t) = dv/dt$. The sign of $\varpi(s)$ is expected to be positive and less than one, as the shadow value of capacity will be positive whenever capacity constrains production.

Davis (2001) assumes that a mine owner faces a randomly occurring uncompensated expropriation event. At any time s , given that the mine is still in private hands, there is a constant probability $\eta\Delta s$ that the mine will be expropriated within the next discrete time period, Δs . Davis arbitrarily takes Δs to be a day, and $\eta > 0$ reflects the average daily arrival rate, or intensity, of the expropriation event. The probability of initial expropriation in exactly x days' time, from the initial perspective, is $\eta(1-\eta)^{x-1}$. Where η is small in relation to x , which is likely in this model, the cumulative probability density function of random remaining lifetime x is approximately $1 - e^{-\eta x}$. The *ex ante* probability distribution of expropriation in x days' time can be approximated by the distribution $\eta e^{-\eta x}$.

If a capacity constrained mine will be expropriated at day $X < T$, giving a shortened privately owned lifetime of $x(s) < N(s)$, the mine's expected value becomes:

$$V_s \cong \gamma^*(s, x) + \varpi(s) [(P(s) - a(s))R^*(s)] \quad (5)$$

where the reserves of the private mine owner are $R^*(s) = x(s)K < R(s)$, and

$$\gamma^*(s, x) = E_s \left[\int_s^X \left[C_q(t) - a(t) + v(t) - \int_s^t C_Q(\tau) e^{-r_a(t-\tau)} d\tau \right] q(t) e^{-r_a(t-s)} dt \right] \quad (6)$$

With impending expropriation, mine owners would choose to increase output if they are able to do so. Davis's assumption that the mine produces at capacity for its remaining life allows him to ignore any effects on production in response to the expropriation threat. This means that the only effect of the expropriation threat is to reduce the mine owner's perception of the private lifetime

and the value of reserves. In other words, the expropriation threat is fully capitalized in the value of the mine. Notice that equation (6) is a modification of equation (3), where the terminal period is the date of expropriation, X , instead of the date of economic exhaustion, T .

The expected private value of the mine at time t with given expropriation intensity η , where $x(t) \in (0, \infty)$ is the random number of days from time t to the expropriation event is:

$$V_t(\eta) \cong \int_0^{N(t)} [\gamma^*(t, x) + \varpi(t) [(P(t) - a(t)) R^*(t)]] \eta e^{-\eta x} dx + e^{-\eta N(t)} [\gamma(t) + \varpi(t) [(P(t) - a(t)) R(t)]] \quad (7)$$

The first term on the right hand side is the expected value of the mine if expropriation occurs at $x(t) < N(t)$, before the mine is exhausted. The second term on the right hand side allows for expropriation to occur in $x \geq N$ days, which means the value of the mine is the value of the original asset, with $e^{-\eta N}$ the probability of $x > N$, that is expropriation not occurring the mine has been economically exhausted. Davis simplifies the model further for estimation purposes with linear approximations of $\gamma(t)$, $\varpi(t)$ and $\gamma^*(t, x)$, yielding:

$$V_t(\eta) \cong \gamma_0 + \gamma_1 t + \gamma_2 N(t) \left(\frac{1 - e^{-\eta N(t)}}{\eta N(t)} - 1 \right) + (\varpi_0 + \varpi_1 t) [(P(t) - a(t)) R(t)] \left(\frac{1 - e^{-\eta N(t)}}{\eta N(t)} \right) \quad (8)$$

Comparing equation (8) to equation (2), the threat parameter acts in a precise way on the intercept term and the level of reserves as perceived by the private owner of the mine. If we define the change in the mine's value from the expropriation threat as $V_{it}(\eta)|_{\eta>0} - V_{it}(0)$, we expect this term to be negative if the expropriation threat is real and credible. The term $\gamma_1 t$ captures the time trend in the model, which is included to capture any time-specific effects, such as technological change, that would have an effect on mine value. The term

$\gamma_2 N(t) \left(\frac{1 - e^{-\eta N(t)}}{\eta N(t)} - 1 \right)$ determines the effect the expropriation probability has on mine value

through its effect on reserve lifetime. The term $(P(t) - a(t))R(t)$ is average rents, and

$[(P(t) - a(t))R(t)] \left(\frac{1 - e^{-\eta N(t)}}{\eta N(t)} \right)$ determines the effect of the expropriation threat on mine value

through its effect on average rents from the mine. Multiplication by $(\varpi_0 + \varpi_1 t)$ allows for a time trend on average rents. It is possible that average rents from production are a function of time as well as price, cost and reserve levels.

Davis (2001) specifies an empirical model that he estimates with a non-linear fixed effects regression using quarterly observations for 13 South African gold mines for the period 1988.1 through 1995.2. The regression equation is:

$$\begin{aligned}
 V_{it} = & \alpha_{0i} + \alpha_{1i}t + \beta_{0i} [(P(t) - a_i(t))R_i(t)] + \beta_{1i}t [(P(t) - a_i(t))R_i(t)] \\
 & + D_t \alpha_2 N_i(t) \left(\frac{1 - e^{-\eta N_i(t)}}{\eta N_i(t)} - 1 \right) + D_t \beta_{0i} [(P(t) - a_i(t))R_i(t)] \left(\frac{1 - e^{-\eta N_i(t)}}{\eta N_i(t)} - 1 \right) \\
 & + D_t \beta_{1i}t [(P(t) - a_i(t))R_i(t)] \left(\frac{1 - e^{-\eta N_i(t)}}{\eta N_i(t)} - 1 \right) + \delta_i JSE_t + \varepsilon_{it}
 \end{aligned} \tag{9}$$

D_t is a dummy variable that is 1 during the threat period which defined by the ANC's term in power; 1990.1 to 1994.1. Davis includes JSE , the Johannesburg All Share Index, to control for any post stock market crash (October 1987) disequilibrium effects, as well as to control for the fact that equity values may have been affected by the African National Congress' rise to power and the prospect of ending sanctions. The first four terms on the right hand side of the equation can be interpreted as giving the value of the mine; the next three terms are an adjustment to the mine value caused by the expropriation threat for the threat period.

Adapting the Davis model to the Saskatchewan context is not straightforward. The major difference in this data set compared to the one used by Davis is that we can only obtain annual data for the provinces of Alberta and Saskatchewan.³¹ Where Davis imputed the market value of a mine's gold reserves by adding the market capitalization of the mine and the market value of long-term debt, and subtracting the market value of non-gold assets, we need to rely on an alternative market based measure of a province's oil assets since data on market capitalization was not available at the firm, field or provincial level.³² In this data set, the value of a province's oil reserves is proxied by the value of land leased per year which is approximated with yearly expenditures by the petroleum industry on land. We believe that this is a reasonable proxy for reserves, as the amount firms pay for land should be based on the net present value of expected profits from oil reserves it may contain and would reflect a competitively determined value into which expropriation risk could be priced. Land and the petroleum and natural gas rights are auctioned by the provincial governments in a first-price, sealed bid auction. In Alberta, the auctions occur, on average, 24 times per year. In Saskatchewan, the auctions occur six times per year. Following Davis, we assume that output in a given time period does not change in response to the expropriation threat, and that reserves are known with certainty. The assumption that output cannot be varied is valid in this context since market demand rather than capacity to produce was the limiting factor in production prior to 1973. This reflected the glut conditions on the world market, the relatively high cost of production in the Western Canadian Sedimentary Basin, and the lack of pipelines until the mid-1950s to transport the oil to market.

³¹ The data set used by Davis has more observations than this (390 compared to 116), but the time period for this data set is much longer (58 years compared to 8 years).

³² Market values of oil firms in Alberta and Saskatchewan would be difficult to use for this sort of exercise since the large firms would have had investments and interests in other nations.

We define the period over which the Co-operative Commonwealth Federation held power in Saskatchewan from 1944 to 1964 as the time period when the probability of expropriation was positive.³³ We choose this definition of the threat period since the historical literature on this topic infers that the CCF's nationalization rhetoric and policy actions of its first term left a lasting reputation for the government.³⁴ To strengthen our possibility of identifying the threat of expropriation in Saskatchewan, we also include observations for the Province of Alberta where we assume that Alberta was a jurisdiction recognized by oil companies as absent of a risk of expropriation.

In the Davis model, $\eta > 0$ is the average daily arrival rate or intensity of the expropriation event, and x is the random remaining lifetime of the mine in days. Here, $\eta > 0$ is the average yearly arrival rate of the expropriation event. As in the Davis model, expropriation is modelled as if there is no compensation. The model takes the form:

$$\begin{aligned}
landExp_{it} = & \alpha_0 + \alpha_1 t + \alpha_2 N_{it} + \alpha_3 [(P_t - C_{it}) * R_{it}] + \alpha_4 t * [(P_t - C_{it}) * R_{it}] \\
& + \beta_0 CCF_{it} * N_{it} * \left[\frac{1 - e^{-\eta N_{it}}}{\eta N_{it}} - 1 \right] + \beta_1 CCF_{it} * [(P_t - C_{it}) * R_{it}] * \left[\frac{1 - e^{-\eta N_{it}}}{\eta N_{it}} - 1 \right] \\
& + \beta_2 CCF_{it} * t * [(P_t - C_{it}) * R_{it}] * \left[\frac{1 - e^{-\eta N_{it}}}{\eta N_{it}} - 1 \right] + \delta_0 S_{it} + \delta_1 Loughheed_{it} \\
& + \delta_2 Blakeney_{it} + \delta_3 NOP_t + \delta_4 NEP_t + \mu_0 TSE_t + \mu_1 OPEC1_t + \mu_2 OPEC2_t + \varepsilon_t
\end{aligned} \tag{10}$$

³³ Tommy Douglas resigned as Premier in 1961 to found the New Democratic Party of Canada, a coalition of the federal CCF party and the Canadian Labour Congress. In 1964, the CCF government under Woodrow S. Lloyd was defeated by the Liberals. The Saskatchewan CCF renamed itself as the "Cooperative Commonwealth Federation, Saskatchewan Section of the New Democratic Party of Canada". In 1967, the party dropped the CCF label, becoming the Saskatchewan New Democratic Party (NDP). The NDP returned to power in 1971 under a program of nationalizing natural resources, stating that it would give first priority to public ownership in the form of Crown corporations, and "where feasible" the government would "reclaim ownership and control of foreign owned resources". (*New Deal for People*, 1971). To this end, several Crown corporations were founded to develop Saskatchewan's oil, natural gas, potash and mining industries. (Saskatchewan Encyclopaedia, "Crown Corporations".)

³⁴ We explore an alternative specification of the threat period, which would be for the period prior to 1948 when the CCF was not clearly disavowing its nationalizing interests. Since our data set begins with observations for 1947, we are limited by the few observations in this threat period definition. Further, this period coincides with a the period during which there had been no oil discoveries in Saskatchewan which would make it difficult to determine if the effect arose from the expropriation threat or just the higher risk that there would be no oil to find.

The dependent variable, *landExp*, is the value of annual expenditures on land by the petroleum industry in province *i*. The variable *t* accounts for a time trend, and *N* measures reserve lifetime. The term $(P - C) * R$ is the current value of reserves, where *P* is the price of crude oil, *C* is the average cost of extraction, and *R* is reserves remaining. Reserve lifetime and net rents are interacted with a dummy variable for the CCF and the expropriation probability term in order to determine the expropriation probability as well as the effect the CCF had on these variables. The first four terms can be thought of as determining the value of land purchased by the petroleum industry. The next three terms are an adjustment for the expropriation threat. The dummy variable for Saskatchewan, *S*, captures the average difference in the value of land sales in Saskatchewan compared to Alberta after controlling for the quantity and profitability of oil reserves. The variable *Lougheed* captures the effect of royalty “renegotiation” in Alberta under Premier Lougheed (1971 – 1972).³⁵ The variable *Blakeney* (1975 – 1982) captures the effect of Premier Blakeney increasing royalty rates in Saskatchewan relative to Alberta. The *TSE* variable is the Toronto Stock Exchange Composite 300 Index, which picks up economy-wide effects and economic changes over time. The remaining dummy variables account for federal policy regimes

³⁵ When he became Premier of Alberta in 1971, Peter Lougheed was able to enact radical changes to Alberta’s royalty structure so that Alberta could capture a greater share of resource rent. Lougheed unilaterally re-wrote Alberta’s royalty policies to capture more of the resource rents, and aggressively developed a public presence in the resource industry. Soon after the election of his Conservative government, Lougheed set to work to increase the royalty rate in place during the 36-year reign of the Social Credit party. Effort was made to maintain the sanctity of the original contract agreed to by the Social Credit government of 1949 by changing the maximum royalty rate only on remaining oil reserves. This had the effect of raising the royalty rate to 23% of gross production. Dramatic increases in oil prices following the first OPEC price shock would soon cause the government to abandon this agreement and tie royalties to the price of oil. Weir (2003) calculates that between 1975 and 1982, Alberta’s effective royalty rate averaged 31%. With the effects of the 1980 National Energy Program and declining world oil prices, royalty rates fell to an average of 23% between 1983 and 1991 and to an average of 17% from 1992 to 2000. Saskatchewan also increased royalty rates after the OPEC oil shock. The NDP government of Allan Blakeney in Saskatchewan had a mean annual effective royalty rate of 38% between 1975 and 1982, 23% from 1983 to 1991 and 18% from 1992 to 2000. Lougheed’s activist approach was criticized by “pro-free enterprise” conservatives in Alberta as his government promoted ownership in companies that competed with existing and flourishing private firms in the economy. Perhaps anticipating this criticism, two days after he was elected Lougheed declared that “We stand for free enterprise – not socialism. We stand for social reform and individual rights – not big government control.” (*Alberta in the Twentieth Century*, Volume 11, 49). Lougheed also emphasized in 1975 that Alan Blakeney’s NDP government’s participation in the economy made Lougheed’s own government look “laissez-faire” in comparison. (*Alberta in the Twentieth Century*, Volume 11, 57).

and the effect of OPEC on the petroleum industry in Canada. These variables include the National Oil Policy (1961 - 1973), the National Energy Program (1980 - 1982), and two periods of OPEC (1973 – 1985 and 1985 – 2004).

When $\eta > 0$, then $0 < \left[\frac{1 - e^{-\eta N}}{\eta N} - 1 \right] < 1$, and $\lim_{\eta \rightarrow 0^+} \left[\frac{1 - e^{-\eta N}}{\eta N} \right] = 1$. As the probability of

expropriation approaches zero, the non-linear model converges to a linear model, and the threat has no effect on land value. The variables interacted with the CCF dummy fall out of the regression equation. The linear model is simply the nonlinear model, with the probability of expropriation equal to zero. The model takes the form:

$$\begin{aligned} \text{landExp}_{it} = & \alpha_0 + \alpha_1 t + \alpha_2 N_{it} + \alpha_3 \left[(P_t - C_{it}) * R_{it} \right] + \alpha_4 t * \left[(P_t - C_{it}) * R_{it} \right] \\ & + \delta_0 S_{it} + \delta_1 \text{Lougheed}_{it} + \delta_2 \text{Blakeney}_{it} + \delta_3 \text{NOP}_t + \delta_4 \text{NEP}_t \\ & + \mu_0 \text{TSE}_t + \mu_1 \text{OPEC1}_t + \mu_2 \text{OPEC2}_t + \varepsilon_t \end{aligned} \quad (11)$$

This model regresses expenditure on land on the year, reserve lifetime, net rents, and net rents interacted with a time trend. The model also includes dummy variables for Saskatchewan, the royalty renegotiation under Premier Lougheed in Alberta, the National Oil Policy, the National Energy Program, and the OPEC periods.

The Data

The Canadian Association of Petroleum Producers (CAPP) publishes detailed information on the Canadian petroleum industry in its Statistical Handbook. The data are collected through company surveys, and CAPP intends them to provide “a historical summary of the petroleum industry’s progress”. For most variables of interest for our study there are annual data for 1947 to 2004, including prices of crude oil and natural gas per cubic metre; net expenditures on land, exploration, development, operations and royalties; production and

extraction; well information; and several measures of reserves. The data is reported by province or geographical area.³⁶ Table 1 contains summary statistics and variable definitions for the model. The data set consists of observations for Alberta and Saskatchewan from 1947 to 2004 giving a total of 116 annual observations.

The data on reserves usable for the purpose of this paper are the remaining established reserves at year end.³⁷ Government reports from the provinces of Alberta and Saskatchewan were used to determine reserve levels from 1945 to 1961. Data on Alberta's reserves (1948 – 1967) are from the Oil and Gas Conservation Board Report 68-18. The reserve observations for 1945 – 1947 are from Hanson (1958). His source for reserves was the Petroleum and Natural Gas Conservation Board, the previous incarnation of the Oil and Gas Conservation Board. For Saskatchewan, reserve data (1953 – 1963) are from the Saskatchewan Petroleum and Natural Gas Statistical Yearbooks 1900 – 1959, 1960, 1961, 1962 and 1963. The first official report of Saskatchewan's reserves was in the 1952 Annual Report of the Department of Natural Resources. Prior to that, Saskatchewan had relatively few producing wells and fields, making reserves difficult to estimate. Reserves for the period 1945 – 1952 in Saskatchewan were approximated by letting reserves equal production.

³⁶ The geographical areas are British Columbia, Alberta, Northwest Territories, Saskatchewan, Manitoba, Ontario, Eastern Canada and East Coast Offshore. The exception to this is the data on production, which only includes New Brunswick and Ontario in Eastern Canada. The reserves data disaggregates the Northwest Territories into regions (Arctic Isles, Beaufort Sea and McKenzie Delta), but the production data does not.

³⁷ The data on reserves includes initial volume in place by year of discovery (1947 – 2005) and geological age (as of December 31 2005), yearly production (1947 – 2006), initial established reserves by year of discovery (1947 – 2005), and remaining established reserves at year-end (1962 – 2005), and reserve additions. CAPP defines “initial established reserves” as established reserves before production; “remaining established reserves” as initial established reserves minus cumulative production; and “cumulative production” as production of oil/gas to date. Initial established reserves by year of discovery credits additional discoveries or reserve additions in a given oil pool in subsequent years back to the year of the initial discovery. As such, the data would not reflect the actual knowledge of the oil industry at the time of the land sales and could not be used to determine its investment decisions.

For oil prices, we use the Edmonton par price in current dollars per barrel from the Historical Statistics of Canada for the years 1947 to 1975,³⁸ and “Energy in Canada 2000: The Statistical Series” published by Natural Resources Canada for 1976 to 1998.³⁹ We convert price per barrel to price per cubic metre with the conversion factor being 6.292 barrels per cubic metre. The Edmonton par price in dollars per cubic metre (yearly average) for 1999 to 2004 is from “Crude Oil Data” published by Natural Resources Canada.⁴⁰ Data for the Toronto Stock Exchange 300 Composite Index are from the Historical Statistics of Canada (1956 – 1977), Series J4819 through J494 and CANSIM II, series V122620 (1977 – 2006).⁴¹ All current dollar values are deflated to constant 1972 values using the consumer price from CANSIM II, series V737344 with a base year of 2001.⁴²

Production and reserve data from CAPP are reported in thousands of cubic metres, which was adjusted to cubic metres. Reserve data for both provinces prior to 1963 are reported in millions of barrels, which we convert to cubic metres. Cost data includes annual industry expenditures by province, for exploration, development, operations, and royalties in millions of current dollars, but does not include specific extraction costs. Average costs of production were approximated using the CAPP data on annual net cash expenditures.⁴³ In the Davis model, average costs were calculated by adding capital expenses, lease payments and taxes to average working costs. Average well operating costs per cubic meter of production are calculated as total

³⁸ This comes from dividing total value produced (Series Q20) by quantity produced (Series Q19)

³⁹ Series 8.02

⁴⁰ <http://www2.nrcan.gc.ca/es/erb/prb/english/View.asp?x=476>

⁴¹ For the years prior to 1956, a rough estimate of the stock index was created by averaging the stock indices for Mines, Industrials, Banks and Utilities from the Historical Statistics of Canada, Series J490 through J493. The base year used was 1972, with the index in 1972 equal to 100.

⁴² The CPI was converted into a 1972 base year by dividing all values by the CPI entry for 1972 and then multiplying by 100.

⁴³ Expenditures were disaggregated into four categories: exploration, development, operating and royalties. Exploration expenditures are for categories of geological and geophysical; drilling; land; and other. Development expenditures include costs for drilling; field equipment; enhanced oil recovery; gas plants; and other. Operating expenditures include wells and flow lines; gas plants; and other.

expenditures on wells and flow lines, development drilling, field equipment and the “other” categories and royalty expenditures divided by annual production. These can be considered the working costs for oil production, but the cost information is for the entire petroleum industry, which includes oil and natural gas. This means that the average cost calculated is higher than the actual average cost per cubic meter of oil produced. Net rents were created by subtracting average cost from price and multiplying this term by current reserves. Reserve lifetime was approximated by dividing current reserves by yearly production, the same approach that was taken by Davis.

The threat period of interest is the time period where the Cooperative Commonwealth Federation (CCF) was in power in Saskatchewan, from 1944 to 1964. Using a dummy variable for this time period, and weighting it by the probability of expropriation will determine whether the CCF had an effect on the value of land lease sales. We also include dummy variables to account for policies and events that likely impacted on the petroleum sector in Saskatchewan and Alberta. Oil production was prorated in Alberta from 1949 until 1973 since the capacity of the province to produce exceeded the level of demand for oil Hanson (1958). Two federal programs were the National Oil Policy (1961 – 1972) and the National Energy Program (1980 – 1982). The National Oil Policy (NOP) guaranteed a market for western-produced oil at a price that was higher than the world price, and was guarded against competition from cheaper oil (Doern and Toner 1985, 81). The National Energy Program (NEP) kept oil prices in Western Canada below the world market price from late 1980 to 1982. In Alberta, Peter Lougheed’s Progressive Conservative government (1971 – 1985) renegotiated the royalty agreements in favour of the province in the period 1971 to 1972. The formation of OPEC (1973) was also likely to have had an effect on investment in Alberta and Saskatchewan, though this is after the

supposed threat period. To reflect the structural changes within the OPEC era, two dummy variables were used for the periods 1973 – 1985 and 1985 – 2004. From 1973 to 1985, the OPEC cartel's prorationing agreement increased the world price of oil. In 1985, the agreement was broken, leaving the OPEC members free to produce at capacity, driving the world price down.

Empirical Analysis

We estimate the models for land expenditures specified in (10) and (11). From the non-linear model specified in (10), we use the estimate of η to estimate the perceived likelihood of expropriation of oil resources by the CCF government. The estimated coefficients for the linear and non-linear models are presented in Table 2.

From the estimates of the non-linear model, it appears that there was no credible threat of expropriation during the CCF's period in power. The probability parameter, η , was very small in magnitude and not statistically significant.⁴⁴ The calculated perceived probability of expropriation was 0%, indicating that there was no perceived threat of expropriation on the part of land lease purchasers. A likelihood ratio test of the statistical similarity of the models in (10) and (11) reveals that the models are statistically the same. A possible reason for the zero probability of expropriation is the higher level of government in Canada to which firms could appeal to in the event of expropriation by the provincial government. Once Canadian Pacific Rail successfully sued the CCF government over the 1944 Mineral Taxation Act, full reversion of the expropriated mineral rights was enforced by the courts. As shown by Haber *et al* (2003),

⁴⁴ Different specifications were tested, some resulting in an unidentified model

the existence of an outside mechanism for enforcing property rights limited, and in this case nullified, any expropriation threat by the CCF government.

As for the other explanatory variables in the models, the coefficient for reserve lifetime was negative which could reflect that as reserve lifetime increases (holding production constant) the level of expenditure on land decreases. Reserve lifetime can be increased by improvements in extraction technology, lowering production levels, new discoveries, decreasing costs, and increasing price. Increased reserve lifetime increases land value (assuming constant production) because there are more reserves to extract over a longer period of time, but decreases the incentive to explore for more reserves, and consequently results in decreased expenditure on land. The estimated coefficient for net rents is statistically insignificant and positive as expected. The higher the value of current reserves to a firm, the greater the incentive is to explore for more reserves, yielding greater expenditure on land.

The estimated coefficient for the dummy variable for Saskatchewan was negative and statistically significant capturing that the value of aggregate land expenditures in that province are 1.02% lower than Alberta in the nonlinear model and 0.92% lower in the linear model after accounting for the size and profitability of reserves in the two provinces. This is possibly capturing alleged negative effect of the political climate in Saskatchewan on investment; any tax and royalty policies pursued by all Saskatchewan governments that deviate from Alberta; or it could simply reflect the fact that Saskatchewan has lower quality oil reserves.⁴⁵

To assess whether there was a CCF effect on the value of land expenditures that was not related to outright expropriation, we estimate a linear model of land sales, similar to (11) but which includes a CCF dummy variable as an explanatory variable and interacted with reserve

⁴⁵ Oil in Western Canada is found within the Western Canadian Sedimentary Basin, which covers north-western BC, most of Alberta, southern Saskatchewan and part of southern Manitoba.

value and reserve lifetime measures. The estimated coefficients for this model are reported in Table 3. The estimated coefficient on the CCF dummy variable is large in magnitude, positive and statistically significant. This indicates that while the CCF was in power, expenditures on land were 136.8 million dollars per year higher than the average for Saskatchewan for the entire sample period. This is a close to 50% decrease in the negative premium associated with Saskatchewan. Given that the CCF's threat to expropriate was not credible, the CCF appears to have successfully signalled that its goal was economic stimulation and private development of Saskatchewan's resources.

The regression results from this model indicate that the CCF only had a significant effect on reserve value through reserve lifetime, but not through net rents. This is a feasible result, as it is often the case that production is fixed and cannot easily be changed, particularly when production capacity exceeds market demand as was the case in Western Canada prior to 1973. A common practice by firms is to have a set reserves to production ratio, and changes in the ratio may have more effect than price fluctuations. Furthermore, beyond the setting of royalty rates, the CCF would have had little or no effect on price or operating costs, which determine net rents. The Saskatchewan government had fixed the royalty rates after 1950 and harmonized with Alberta's policy.⁴⁶ The coefficients for net rents and net rents interacted with the time trend were small in magnitude and not statistically significant. Interacted with the CCF dummy, the coefficients were again small but slightly larger in magnitude, and significant. This indicates that the CCF did have an effect on reserve value. The coefficient on net rents was positive, and the increase in magnitude indicates that the CCF had a positive effect on reserve value, and thereby increased expenditures on land. The dummy variable for Saskatchewan is large in

⁴⁶ Richards and Pratt (1979, 90, 179 – 181).

magnitude, negative and statistically significant. There is a large negative effect from smaller and more costly oil reserves in Saskatchewan.

Returning to the other estimated coefficients in Table 2, the effect of Peter Lougheed's renegotiation of royalty rates in Alberta was a large negative decrease in expenditure on land in that province. As Peter Lougheed suggested in defence of his own government, Allen Blakeney had a larger negative effect on the value of land lease sales in Saskatchewan than Lougheed had in Alberta. As Weir (2003) shows, Blakeney's royalty rates on oil were higher than what was being levied by Lougheed in Alberta, often close to 10% higher. This is an expected result as an increase in royalties paid to the province decreases the profits from production. Decreasing profits will lower the value of the reserves, hence lowering land values and decreasing the incentive to buy additional territory to explore.

The time trend was positive, indicating technological improvements have had a positive effect on the amount spent on land. This is likely because as technology improves, a greater percentage of existing reserves are recoverable, increasing the value of the land to a firm. Net rents interacted with the time trend was also very small in magnitude, but had a negative coefficient. The coefficient for the Toronto Stock Exchange Composite Index was positive, but insignificant.

The coefficient for the National Oil Policy is negative, small in magnitude, and statistically insignificant. While the NOP guaranteed access to the Ontario market for western oil at a price higher than the world price, it did not solve the problem that the production capacity in the west exceeded the level of demand. The coefficient for the National Energy Program is negative and large in magnitude. This estimated coefficient for the NEP is no surprise, as the NEP imposed a four-year pricing regime for oil and gas that put the Canadian prices for these

commodities well below the world prices, and established a revenue sharing scheme that increased the federal share of revenues by levying new taxes, among other things (Doern and Toner 1985, 7-8). Doern and Toner (1985) note that there were strong objections to the NEP in Western Canada. Fixing the Canadian price below the world price and increasing taxes decreased the profitability of oil extraction and decreased the value of reserves. The estimated coefficient for the first OPEC period was positive, as expected. The OPEC cartel's prorationing agreement increased the world price of oil, which had the effect of increasing the value of reserves. Increasing the value of reserves increased the value of land expenditures in both provinces. The effect of the second OPEC period, after the cartel's agreement was broken, is negative and had a larger effect than in the first period. The larger magnitude could reflect the coefficient capturing negative effects from Alberta recessions (1986 – 1988, 1989 – 1992).⁴⁷

Other CCF Impacts on Natural Resource Development

The non-linear model suggests that there was no credible threat of expropriation associated with the CCF government in Saskatchewan. It is possible, however, that the CCF had other economic effects on the development of the oil and gas resources in the province, and on the wealth of the province. Following Bohn and Deacon (2000), we estimate linear models to explain exploration and development activity measured by wells drilled per year and annual oil production. Variable definitions and summary statistics are presented in Table 4 and the estimated coefficients for the models specified in (12) and (13) below are presented in Table 5.

It may be the case that expropriation risks not only affect reserve values, but as Bohn and Deacon (2000) argue, exploration and development of resources may also be affected. The purpose of this model is to isolate the political effects of changes in parties and party leaders on exploration decisions made by firms in Alberta and Saskatchewan. Exploration and

⁴⁷ Alberta Heritage, "Recession and Recovery"

development intensity is approximated by the number of wells drilled. The model takes the form:

$$\begin{aligned} \log(wells)_{it} = & \alpha_i + \beta_0 CCF_{it} + \beta_1 NDP_{it} + \beta_2 SC_{it} + \beta_3 Liberal_{it} + \gamma_0 \log(price)_t \\ & + \gamma_1 \log(avgDepth)_{it} + \gamma_2 t + \delta_0 Loughheed_{it} + \delta_1 Blakeney_{it} \\ & + \delta_2 OPEC1_t + \delta_3 OPEC2_t + \delta_4 Proration_{it} + \delta_5 NEP_t + \delta_6 NOP_t + \varepsilon_t \end{aligned} \quad (12)$$

The model regresses the logarithm of number of wells drilled per year on ownership instability (the presence of the CCF), the logarithm of price, the logarithm of average well depth, a time trend, and a dummy variable for OPEC. In addition, dummy variables for the presence of prorationing,⁴⁸ the NEP and NOP were included as these are expected to have an effect on exploration decisions. Dummy variables for when the other political parties in Alberta and Saskatchewan were in power were also included (New Democratic Party, Social Credit Party and Liberal Party). The Progressive Conservative Party is the omitted category, as it was the only political party that has been in power common to both provinces.⁴⁹ Average well depth was calculated by dividing total metres drilled by the total number of wells drilled. Data from CAPP on number of wells drilled and total meters drilled was only available from 1955 to 2004. For data from 1947 to 1954, government reports were used. For Saskatchewan, the Petroleum and Natural Gas Statistical Yearbook 1900 – 1959 was the source for total wells drilled and total footage drilled. For Alberta, Hanson (1958, 117) was the source for total footage drilled and average well depth. Number of wells drilled was found by dividing total footage by average well depth. For both provinces, depth in feet was converted to meters.

Following Bohn and Deacon (2000), a similar specification to (12) for production intensity is approximated using the ratio of production to reserves yields (13).

⁴⁸ Government allocation of production among pools and wells. See Hanson (1958).

⁴⁹ The models include dummy variables for the periods when various political parties were in power in both Alberta and Saskatchewan. In Alberta, political parties tend to remain in power for a long time: since Alberta became a province, only three political parties have held power and only two have held power over the sample period.

$$\begin{aligned} \log\left(\frac{\text{production}}{\text{reserves}}\right)_{it} = & \alpha_i + \beta_0 CCF_{it} + \beta_1 NDP_{it} + \beta_2 SC_{it} + \beta_3 Liberal_{it} + \gamma_0 \log(\text{price})_t \\ & + \gamma_1 \log(\text{avgDepth})_{it} + \gamma_2 t + \gamma_3 t^2 + \delta_0 Loughheed_{it} + \delta_1 Blakeney_{it} \quad (13) \\ & + \delta_2 OPEC1_t + \delta_3 OPEC2_t + \delta_4 Proration_{it} + \delta_5 NEP_t + \delta_6 NOP_t + \varepsilon_t \end{aligned}$$

The model regresses the logarithm of production in terms of yearly output per reserve levels on ownership instability (the presence of the CCF), the logarithm of price, the logarithm of average well depth, a time trend, and a dummy variable for OPEC. Data on yearly production and reserves by province are from CAPP. As with the exploration model, dummy variables for the presence of prorationing, the NEP and the NOP were included. The same additional dummy variables included in the exploration model were included in this model to test the effects of political parties on production levels. The year-squared term is included because production may be characterized by “Hubbert’s peak”, where production in Canada peaked in the early 1970s.

Where Bohn and Deacon computed an ownership risk index using an estimated investment model, we account for ownership instability using a dummy variable for the presence of the CCF. The data set used by Bohn and Deacon for oil exploration was annual observations on 27 countries for the period 1957 – 1988. The data set for the oil production model used by Bohn and Deacon was for 26 countries over the same time period. Here, the data set has 3 more years of observations, but the panel has much less depth. We do not include API gravity which Bohn and Deacon included as a measure of oil quality for a given country. Land area was also omitted as Alberta and Saskatchewan are similar in total area, and because Bohn and Deacon intended the variable as a control for geologic abundance.

For explaining exploration and development activity, the CCF had a positive, but not statistically significant influence. This is not unexpected, given the results of the previous models estimated. In addition, in order to attract firms, the CCF government offered concessions

and stated it would not expropriate. The coefficient is likely capturing these positive effects. The CCF government was also aggressively pursuing resource development along with its socialist policies, which can partly explain the positive effect on exploration and development levels. The coefficient for the Liberal government is positive and significant. The coefficient for the NDP government is negative and significant. For the time period in question, both the NDP and the Liberals had never been in power in Alberta, and so the effects are purely from Saskatchewan. These effects are interesting, as the NDP was the successor party to the CCF and formed crown corporations in the petroleum industry, so a negative effect on exploration is not unexpected. However, the absence of a significant positive influence of the Social Credit Party in Alberta is surprising. The populist party sought to attract external capital to develop Alberta's oil resources and was in power in Alberta from 1935 to 1971. It is possible that the coefficient could be capturing other effects, such as collinearity with the pro-rationing regime variable.

In the production model, the estimated coefficients for the political parties are not significant, with the exception of the Social Credit party. The coefficients for the CCF, NDP and Liberal parties were positive, and the coefficient for the Social Credit party was negative. The value of overall R^2 for this model was 71%. These results indicate that the CCF party did not have a major effect on exploration or production intensity, and any effect it has was positive. These results indicate that expenditure on land did not fall due to a perceived expropriation threat, and that production and exploration decisions were positively affected.

The logarithm of price has a small positive but statistically insignificant effect on exploration. The positive sign is expected: as price increases, the profitability of production increases, giving firms an increased incentive to explore for new reserves. It is important to note, however, that the number of wells drilled is total wells, not just exploratory wells. Price

may have a larger effect on the incentive to drill development wells as opposed to exploratory wells. The logarithm of average well depth had a positive effect that was large in magnitude as well as statistically significant. The sign was not expected, as drilling deeper wells costs more, and should have a negative effect on the number of wells drilled. However, the unexpected sign could be due to technical changes in exploration and drilling, making deeper wells less costly. An additional explanation is that when oil firms have a significant cash flow, they may drill more and deeper wells. The positive coefficient could be picking up this correlation. The time trend has a small, positive and significant effect on wells drilled, which likely reflects improvements in technology. The first OPEC period had a positive and statistically significant effect on the number of wells drilled; the second period had a negative but not significant coefficient. The sign of these coefficients is consistent with the previous models estimated. The small magnitude of the coefficients can be attributed to time lags in response to the OPEC production adjustments. Another possible reason for the smaller coefficients is that increased rents were captured in land prices and royalty payments rather than by the firms.

The prorationing dummy has a positive, large but not statistically significant effect on exploration intensity. Prorationing restricted output per well but not total output, creating an incentive to explore and drill more wells. Prorationing artificially restricts supply, increasing the price, which gives firms an even greater incentive to increase production to capture higher rents. Because output per well was restricted, in order to increase production levels, a firm would have to drill more wells. The coefficient for the NEP was negative, but not significant. Since the NEP kept the Canadian price substantially below the world price in Canada, the negative sign on the coefficient makes sense, and the lack of significance can be explained by the price used in the regression was a Canadian price. The coefficient for the NOP was negative and significant. The

sign is not expected as the NOP guaranteed a market for western oil which should have had a positive effect on exploration levels.

For the production model, the estimated coefficient on the logarithm of price is positive, but very small and insignificant. This result could reflect the fact that there is a lag between price changes and output adjustments, or that production is price inelastic. The coefficient on the logarithm of average well depth is negative, and significant. The deeper a well, the more costly production is, and the harder it is to get oil out of the ground. The time trend has a negative coefficient that is large in magnitude and significant. The time-squared coefficient is positive, very small in magnitude and significant. This suggests that production has been decreasing over time, as suggested by Hubbert (1956).⁵⁰ The prorationing coefficient is negative but not statistically significant. The negative coefficient is an expected result, as production per well was held below maximum capacity. The coefficient for the NOP was positive and significant reflecting that the NOP caused an increase in production in Alberta (Richards and Pratt 1979, 168).

The coefficient for the first OPEC period is negative, and for the second OPEC period the coefficient is positive, opposite the expected results. However, both coefficients are small in magnitude and only the coefficient for the second OPEC period is significant. The unexpected signs for the OPEC variables could reflect technological change in secondary recovery and just the discovery and development of more reserves from which to produce. The coefficient for the NOP was positive and significant. The NOP caused an increase in production in Alberta,⁵¹ and so the sign is expected. The coefficient for the NEP is positive and not significant. The positive coefficient is likely due to the exodus of investment in the oil and gas sector from Alberta after

⁵⁰ "Nuclear Energy and the Fossil Fuels" M.K. Hubbert, Presented before the Spring Meeting of the Southern District, American Petroleum Institute, Plaza Hotel, San Antonio, Texas, March 7-8-9, 1956

⁵¹ Richards and Pratt (1979, 168)

the institution of the NEP. The NEP held the Canadian price below the world level, and as a result, investment in both exploration and development decreased, by approximately \$11.5 billion dollars.⁵² The loss of investment meant that as production declined but then steadied, reserve levels declined, causing the production to reserves ratio to increase.

Conclusions

A significant portion of Western Canada's wealth is generated by the oil industry, and this source of wealth was thought to have been under the threat of expropriation in Saskatchewan during the governance of the CCF. The purpose of this paper was to calculate the perceived probability of expropriation occurring in Saskatchewan in the 1940s and 1950s, and to determine the effect of the expropriation threat on the oil industry in both Alberta and Saskatchewan. The calculated expropriation probability was 0%. Further analysis shows that the CCF government had a significant positive effect on land sales, exploration and development and oil production in Saskatchewan. These results suggest that the CCF had did not have a significant negative effect on the Saskatchewan oil industry compared to Alberta. Saskatchewan had much lower levels of land expenditure compared to Alberta, but this difference decreased by approximately 50% when the CCF was in power. The CCF policy of encouraging private resource development was much more credible and had a stronger effect on the Saskatchewan oil industry than the stated policy of nationalization and socialization of resources.

⁵² Mansell and Percy (1990, 32)

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TABLE 1: SUMMARY STATISTICS

Variable	Definition	Mean (Std. deviation)
$landExp$	Net expenditures on land in millions of constant 1972 Canadian dollars.	110.67 (124.67)
t	Year	1975.50 (16.81)
N_{it}	Reserve lifetime in years.	14.86 (9.42)
S	Dummy variable for province of Saskatchewan	0.50 (0.50)
CCF_t	Dummy variable for the time the Cooperative Commonwealth Federation was in power in Saskatchewan (1944 – 1964)	0.16 (0.36)
R_{it}	Oil reserves in province i in cubic metres. Previous reserves plus reserve additions minus production.	3.98e+08 (3.95e+08)
P_{it}	Edmonton par crude oil price in constant 1972 Canadian dollars per cubic metre	37.62 (18.51)
Q_{it}	Annual production of crude oil in province i in cubic metres.	2.65e+07 (2.15e+07)
C_{it}	Average cost of operation per cubic metre of production in constant 1972 Canadian dollars per cubic metre.	110.95 (239.47)
$(P_{it} - C_{it}) * R_{it}$	Net rents in constant 1972 Canadian dollars.	-2.58e+10 (8.34e+10)
TSE	Toronto Stock Exchange 300 Composite Index with 1972 = 100.	211.11 (213.37)
NOP	Dummy variable for years where the National Oil Policy was in effect (1961 – 1973)	0.22 (0.42)
NEP	Dummy variable for the years where the National Energy Program was in effect (1980 – 1982)	0.02 (0.13)
$Lougheed$	Dummy variable for the time period where Premier Lougheed renegotiated royalty rates in Alberta (1971 – 1972)	0.03 (0.16)
$Blakeney$	Dummy variable for the time period where Premier Blakeney increased royalty rates in Saskatchewan substantially above those in Alberta (1975 – 1982)	0.07 (0.25)
$OPEC1$	Dummy variable for the OPEC period 1973 – 1985	0.22 (0.42)
$OPEC2$	Dummy variable for the OPEC period 1985 – 2004	0.34 (0.48)

TABLE 2: LAND VALUE MODEL RESULTS

	Dependent variable: expenditure on land	
	Linear Model	Non-Linear Model
<i>Constant</i>	-7218.24 (-2.23)	-7096.21 (-2.18)
<i>t</i>	3.79 (2.28)	3.73 (2.24)
<i>N</i>	-1.32 (-1.24)	-2.20 (-1.87)
$(P - C) * R$	6.82e-09 (0.42)	6.64e-09 (0.41)
$(P - C) * R * t$	-3.37e-12 (-0.41)	-3.27e-12 (-0.40)
$CCF * N * ((1 - \exp(-\eta * N)) / (\eta * N)) - 1$		1592.81 (0.00)
$CCF * (P - C) * R * ((1 - \exp(-\eta * N)) / (\eta * N)) - 1$		0.02 (0.00)
$CCF * (P - C) * R * year * ((1 - \exp(-\eta * N)) / (\eta * N)) - 1$		-8.50e-06 (-0.00)
<i>S</i>	-185.47 (-10.34)	-205.59 (-10.21)
<i>NEP</i>	-3.07 (-0.06)	-3.44 (-0.06)
<i>NOP</i>	-15.06 (-0.63)	-0.02 (0.00)
<i>Lougheed</i>	-66.35 (-1.43)	-70.00 (-1.51)
<i>Blakeney</i>	-98.42 (-2.84)	-81.63 (-2.31)
<i>TSE</i>	0.01 (0.10)	0.01 (0.12)
<i>OPEC1</i>	53.03 (1.53)	58.51 (1.68)
<i>OPEC2</i>	-103.80 (-2.17)	-95.37 (-1.98)
η		-5.01e-05 (0.00)
<i>Probability of expropriation (1 - exp(-η))</i>		0.00
R^2	0.6974	0.7106
<i>Observations</i>	116	116

Note: t-statistic in parentheses

TABLE 3: LINEAR MODEL WITH CCF EFFECTS REGRESSION RESULTS

	Dependent variable: expenditure on land
<i>Constant</i>	-111202.00 (-3.23)
<i>t</i>	5.79 (3.27)
<i>N</i>	0.21 (0.15)
$(P - C)*R$	4.64e-09 (0.29)
$(P - C)*R*year$	-2.26e-12 (-0.28)
<i>CCF</i>	134.29 (2.69)
$N*CCF$	-1.08 (-0.34)
$(P - C)*R*CCF$	1.39e-05 (0.84)
$(P - C)*R*year*CCF$	-7.12e-09 (-0.84)
<i>S</i>	-207.96 (-10.69)
<i>Lougheed</i>	-83.25 (-1.85)
<i>Blakeney</i>	-78.40 (-2.30)
<i>NEP</i>	-10.08 (-0.19)
<i>NOP</i>	8.04 (0.32)
<i>TSE</i>	-0.02 (-0.23)
<i>OPEC1</i>	65.14 (1.93)
<i>OPEC2</i>	-95.82 (-2.06)
R^2	0.7324
Observations	116

Note: t-statistic in parentheses

TABLE 4: SUMMARY STATISTICS FOR EXPLORATION AND PRODUCTION MODELS

Variable	Definition	Mean (Std. deviation)
<i>Log(wells)</i>	Logarithm of number of wells drilled per year	7.49 (1.15)
<i>Log(Q/R)</i>	Logarithm of output (production) divided by current reserves.	-2.47 (0.77)
<i>CCF_t</i>	Dummy variable for the time the Cooperative Commonwealth Federation was in power in Saskatchewan, measures ownership security (1944 – 1964)	0.16 (0.36)
<i>Log(price)</i>	Logarithm of the Edmonton par price of crude oil in constant 1972 Canadian dollars	3.52 (0.47)
<i>Log(depth)</i>	Logarithm of average well depth in metres	7.00 (0.24)
<i>t</i>	Year	1975.50 (16.81)
<i>t²</i>	Year squared	3902881.00 (66429.81)
<i>OPEC1</i>	Dummy variable for the OPEC period 1973 – 1985	0.22 (0.42)
<i>OPEC2</i>	Dummy variable for the OPEC period 1985 – 2004	0.34 (0.48)
<i>Prorating</i>	Dummy variable for the presence of prorating in Alberta (1949 – 1973)	0.47 (0.50)
<i>NOP</i>	Dummy variable for years where the National Oil Policy was in effect (1961 – 1972)	0.26 (0.44)
<i>NEP</i>	Dummy variable for the years where the National Energy Program was in effect (1981 – 1982)	0.02 (0.13)
<i>Liberal</i>	Dummy variable for the time the Liberal party was in power in either Alberta or Saskatchewan	0.07 (0.25)
<i>SC</i>	Dummy variable for the time the Social Credit party was in power in either Alberta or Saskatchewan	0.21 (0.41)
<i>NDP</i>	Dummy variable for the time the New Democratic Party was in power in either Alberta or Saskatchewan	0.22 (0.42)

TABLE 5: EXPLORATION AND PRODUCTION MODEL RESULTS

	Dependent Variable: log(wells drilled)	Dependent Variable: $\log\left(\frac{\text{production}}{\text{current reserves}}\right)$
<i>Constant</i>	-188.97 (-10.35)	3416.66 (2.11)
<i>log(price)</i>	0.04 (0.25)	0.05 (0.22)
<i>log(depth)</i>	1.40 (5.17)	-1.84 (-4.96)
<i>t</i>	0.09 (9.95)	-3.42 (-2.09)
<i>t</i> ²		8.61-04 (-2.08)
<i>OPEC1</i>	0.70 (2.91)	-0.15 (-0.51)
<i>OPEC2</i>	-0.28 (-1.08)	0.44 (1.49)
<i>Prorationing</i>	1.25 (3.73)	-0.59 (-1.34)
<i>NEP</i>	-0.12 (-0.42)	0.06 (0.19)
<i>NOP</i>	-0.66 (3.67)	0.39 (1.58)
<i>CCF</i>	0.33 (1.25)	0.35 (1.14)
<i>Liberal</i>	0.60 (2.39)	0.16 (0.57)
<i>NDP</i>	-0.55 (-3.33)	0.15 (0.73)
<i>SC</i>	4.77e-03 (0.02)	-0.58 (-1.86)
<i>Lougheed</i>	-0.01 (-0.06)	-0.25 (-0.79)
<i>Blakeney</i>	-0.20 (-0.99)	-0.35 (-1.51)
<i>R</i> ² within	0.8637	0.6633
<i>R</i> ² overall	0.8158	0.7071
Observations	116	116

Note: t-statistic in parentheses