NATURAL RESOURCE EXPORTS, WEALTH ACCUMULATION AND DEVELOPMENT IN SETTLER ECONOMIES: NORTHWESTERN ONTARIO AND SOUTH AUSTRALIA 1905-1915

by

L. Di Matteo¹, J.C.H. Emery² and M.P. Shanahan³*

¹ Department of Economics, Lakehead University, Thunder Bay, Ontario, Canada
² Department of Economics, University of Calgary, Calgary, Alberta, Canada
³ School of Commerce, University of South Australia, Adelaide, Australia

January 6, 2010

* Martin Shanahan acknowledges the assistance of an Australian Research Council Grant in supporting this research and thanks John Wilson for research assistance. Livio Di Matteo acknowledges the support of the Social Sciences and Humanities Research Council of Canada. Herb Emery acknowledges the support from the School of Commerce, University of South Australia that allowed him to visit the School in August 2003 which resulted in this collaboration. The authors thank participants at the Canadian Network for Economic History Conference at Kingston, Ontario, April 2005 for their comments.
ABSTRACT

We compare the wealth holdings of probated decedents in two British settler economies, the Thunder Bay District (TBD) in Northwestern Ontario and South Australia (SA) during the 1905 to 1915 period. We study the effects of a common resource for export, wheat, in the same decade, 1905 to 1915, on the accumulation of wealth in two economies where institutional quality is comparable to explain successful development from natural resource exports. South Australia benefited from an earlier wheat export episode from 1850 to 1870 whereas in 1905, the TBD was really a new economy that stood where SA did in 1880. Adelaide, the capital of SA is a coastal port that served as a direct gateway to the world grain market, whereas the Lakehead, the major center of TBD, was an intermediate terminus on the Canadian transportation system as grain would have to have been transferred from Great Lakes Freighters to ocean going vessels on the way to market. While the average wealth level in SA was substantially higher than in TBD in 1905, we find that between 1905-1915, the change in the average wealth levels was equivalent in SA and TBD. As the quantity of grain produced in SA was 4 percent of the quantity shipped through the Lakehead, SA was able to retain more of the income associated with wheat production and transportation. Contrary to the “Curse of Resources” literature, we assess that successful natural resource based development can occur with long-term success hinging on the ability to retain linkages through reliance on domestic rather than externally owned capital.
INTRODUCTION

Sachs and Warner (1995, 1999, 2001) show that resource abundant economies (as measured by export dependence on natural resources) have had slower growth than resource scarce economies since 1970. This negative correlation between natural resource exports and growth has been dubbed the “Curse of Resources” and has triggered a sizeable literature that seeks to explain this surprising outcome. As Sachs and Warner (2001) note, the Resource Curse is a surprising phenomenon given the expectation that resources are a catalyst for development. “Staples” (natural resources for export) approaches to economic development describe a process by which “linkages” associated with the natural resource production encourage industrialization provided the linkages are strong enough, and the income associated with them is retained in the domestic economy.\(^1\) The successful development of many of the high income countries of today such as Canada, the United States, Australia, and New Zealand was based on exploitation and export of abundant natural resources such as fish, fur, timber, gold, grain, coal and oil.\(^2\) In contrast, low income but resource abundant economies today such as the oil states of the Middle East and Africa seem to struggle to develop and experience sustained high growth rates in per capita incomes. Where resource abundant developing economies of the nineteenth century managed to industrialize, the resource abundant economies of today remain dependent on their resource sectors.

Sachs and Warner (1995) dismiss the relevance of historical successful resource based development cases for understanding the resource curse. First, they argue that these countries developed in a world of relatively high transportation costs that

---

\(^1\) The economic development of resource abundant, sparsely populated regions has been explained by the classic staples approach or models of export-led development as originally set out in the work of H. A. Innis who followed earlier work by G.S. Callender (1902, 1965[1909]) and W.A. Mackintosh (1923). The classic works on Canadian staples by Innis are _The Fur Trade in Canada_ (1930) and _The Cod Fisheries_ (1940). Modern versions of staple theory see economic development as a process of diversification around an export base. For relevant literature, see the papers by Baldwin (1956), Watkins (1963) and Caves (1966, 1971).

\(^2\) The staples approach with its focus on natural resource exports has served as an explanatory framework for nineteenth century Canadian and Australian economic history. A comparative study of the success of staples in Canada, Australia and Argentina is provided in Fogarty (1988). For a comparison of Canada and Australia, see Pomfret (1981). Since the late nineteenth century, Canada and Australia have developed more diversified economies, giving rise to the argument that staples are no longer an important force, but they remain small, open economies dependent on a variety of export products - including natural resources - for growth and well-being. For the role of natural resources in U.S. development, see Wright and Czelusta (2004)
encouraged manufacturing and processing industries to locate near available resource endowments such as coal and that they never had as intensive exploitation of natural resources compared to resource dependent economies of the mid-to late 20th century. This view neglects that in the absence of protectionist policies, countries like the Canada, Australia and New Zealand primarily exported raw, or unprocessed, natural resources and imported much of the manufacturing needs from the distant British market. Crafts (2004, 54) notes “that the United States was a high tariff country throughout its rise world economic leadership”. If the abundance of local power sources and resources for inputs into manufacturing were the key determinant of industrialization, then the failure of much of the US northeast, and Northern Ontario in Canada, to industrialize and develop stand as important historic counter examples. If we consider the resource intensity of Canada and the United States just prior to their creation as nation states, then we see their successful development began as resource based economies. Finally, Auty (2001) argues that there is nothing deterministic about resource abundance and successful development and sustained growth. He notes that many resource abundant economies grew rapidly between 1870-1913 and 1950-1973. The growth collapses of the late 1970s and early 1980s of resource dependent economies is ironic, he says, since the collapse was the result of resource dependent economies trying to reduce their resource dependence.

Counter to the view of Sachs and Warner (1995, 2001), it could be that the explanation for the “resource curse” may be found in an understanding of why successful natural resource based development has occurred historically but not recently. To that end, we examine the level, distribution and composition of wealth of probated decedents

---

Hughes and Cain (1994, 30) show that in the Colonial economy of the 1700s, nine-tenths of the population were employed in agriculture, fishing, timbering and mining. McCallum (1980) shows that in the mid-nineteenth century Ontario, Canada’s industrial heartland today, two-thirds of its population were engaged in farming with substantial cash sales generated from wheat production and 80 percent of wheat production exported. A comparison of export to GDP ratios for nation states can be mis-leading at any point in history, and particularly mis-leading when comparing across time. Comparing a countries of large area like the United States or Canada where there are several identifiable regional economies engaged in inter-regional, as well as international, trade with smaller area, single region nations like Kuwait is misleading. While the Canadian and United States national economies may not be as resource intensive as some of the resource abundant economies of today, some sub-national economies were and are intensive exporters of natural resources. For example, for the Provinces of Alberta and Saskatchewan, natural resource (international) exports in 1984 were 35 percent of provincial GDP which is higher than Nigeria, Venezuela and Iran in 1970 as shown in Sachs and Warner’s (2001) Figure 1.
in the Thunder Bay District, Ontario, and in South Australia over the period 1905 to 1915. We are interested in examining how much wealth accumulated during these wheat export booms; how much of that wealth was invested in the local economy, and how much was held in assets external to the local economy. Wealth is in many ways a superior variable to income for our purposes, because it can capture the long term impacts of the effect of natural resource exports on economic development.\footnote{Chambers and Gordon (1966) show that the effect of natural resource exports on long run per capita income growth will reflect the increase in the value of “land”, the fixed factor in natural resource exploitation. See Hartwick (1977) and Rodriguez and Sachs (1999) for the reasons why resource exporting economies need to save and invest resource rents in order to sustain consumption levels experienced during the resource boom.} We interpret the accumulation of wealth in a resource based economy as symptomatic of a successful development episode.

A comparison of wealth accumulation in the Lakehead region and in South Australia allows us to infer the determinants behind successful and unsuccessful development from natural resource exports. We look at the effects of a common resource for export, wheat, in the same decade, 1905 to 1915, in two British Settler economies. Institutional quality in these two economies should be comparable even if the institutions are different.

There are differences between the two regions that may be informative for identifying the ways in which natural resource exports influence economic development. South Australia benefited from earlier resource export episodes, including copper in the 1840s, wheat and wool in the 1850s and wheat again in the 1870s. On the other hand, the Thunder Bay District and its port towns of Port Arthur and Fort William was really a new economy in 1905. Finally, recent work by Gallup, Sachs and Mellinger (1998) and Rappaport and Sachs (2003) highlights the positive correlation between coastal locations and income levels but does not provide a satisfactory explanation for why the correlation exists. The grain production in the SA economy was for the most part contained within 60 miles of coast, whereas Port Arthur/Fort William was an intermediate terminus on the Canadian transportation system; grain being transferred from Great Lakes Freighters to ocean going vessels on the way to market. Our comparison of wealth accumulation in these two economies, therefore, may be able to inform us as to why coastal locations are
beneficial for economic development. Perhaps the most interesting aspect of our comparison of the SA and TBD economies during a period of rising wheat exports, is that South Australia represents an economy where transportation, production and handling of wheat is carried out by local owners of capital so that capital’s share of income is retained locally. Thunder Bay District in contrast, is akin to a resource exporting country where production and transportation functions are controlled by external capital and that income does not remain in the local economy.

What we learn from the changes in wealth levels in the two locations is that while average wealth levels in SA were substantially higher than in TBD, between 1905-1915, the rate of increase in average wealth levels was equivalent in SA and the TBD. The volume of wheat passing through the Lakehead was substantially greater than the quantity of wheat produced in SA, but SA appropriated more linkages from the boom enabling it to match the Lakehead’s growth. The higher wealth levels in SA relative to the TBD during the 1905-1915 period are rooted in the fact that SA was a region of older settlement and over time earlier wealth accumulation was able to compound into higher levels relative to the more newly settled TBD. Long term economic development from natural resources is therefore a function of the ability to retain linkages from the resource activity as well as the passage of time necessary for linkages to develop and wealth to accumulate.

WHEAT EXPORTS AND THEIR IMPACT ON TWO SETTLER ECONOMIES

The years 1905 to 1913 were an important period for the economic development of the Thunder Bay District and the South Australian economy. For TBD, this was the period of substantial initial development while for SA, the period saw the return of prosperous economic conditions following more than a decade of economic stagnation.

While European settlement of the Thunder Bay District began during the fur trade when it was home to Fort William, the inland headquarters of the Northwest Company of Montreal, it was the coming of the transcontinental railway in the 1880s linked the region to the Prairie wheat economy and central Canada and spurred the regions development. The Thunder Bay District was uniquely juxtaposed between the Prairie wheat economy,

---

from which it would benefit by having its major metropolitan centre serve as entrepot, and central Canada, where it was part of Canada’s wealthiest province. The northwestern portion of the province, along with the Thunder Bay District, was directly tied to the Prairie Wheat Boom via the grain port function of the twin cities of Fort William and Port Arthur known collectively as the "Lakehead". Moreover, a portion of the economy was rooted in local manufacturing development, resource extraction and agricultural development.

The population of the district grew rapidly with the greatest expansion between 1901 and 1911 when the population nearly tripled to approximately 40,000. Most of the population growth during the boom period occurred at the Lakehead as the result of high in-migration and by 1921 over 70 percent of the District’s population was at the Lakehead. The economic boom at the Lakehead ended with the onset of the First World War. The increase in interest rates in 1913 tightened farm credit and halted the expansion of the wheat boom that was then followed by the disruption of the war and the reduction in immigrant flows to the west. The opening of the Panama Canal in 1914 may have also redirected some of the flow of wheat and commerce away from the Lakehead and to the west coast. The value of building permits in Fort William rose steadily from 1907 and peaked in 1912 at just over 4 million dollars and then fell dramatically for the next four years to reach 0.6 million dollars by 1916. At least a dozen major employers shut down from 1914-22 and the size of the labour force declined. Recovery did not begin until the construction of the first pulp mill in 1917.

The European settlement of South Australia was barely 70 years old in 1905. South Australia had a rural based economy founded under a system of ‘systematic colonization’ to produce a self supporting system financed by land sales aimed at avoiding the financial and social crises of other Australian colonies or the problems related to penal colonies. Despite initial difficulties, within twenty years of settlement the colony boasted a population of 85,000 and over 160,000 acres of wheat were sown,

---

6 Di Matteo,"Economic development of the Lakehead", Evidence on Lakehead", "Booming sector".
7 Gross regional product in the absence of the wheat boom at the Lakehead would have been 42 per cent smaller. In addition, by 1921,there were 1,534 farms supporting a rural population of 7,397 around the Lakehead. Forestry also employed thousands, in extraction, at sawmills and at the three pulps mills either operating or under construction by 1921. See Di Matteo, "Booming sector", p. 611-614.
with a large portion being used to feed the gold rushes in the neighboring colony of Victoria. Indeed so successful was South Australia in agricultural pursuits that by the 1870s it was regarded as ‘the granary of the continent’. By 1901, the first year of Australian federation the population of the new state of South Australia was 359,000, with 162,000 or just over 42 percent living in the capital Adelaide. A decade later the state’s population reached almost 410,000, with Adelaide accounting for around 50 percent of the population.

SA was geographically distant from the Atlantic economy, but culturally and historically linked to England. Although distant from the centre of world financial markets in London and the newly emerging industrial strength of North America, it still felt itself to be part of the modern industrial world. Changes in transportation affected the State’s external trade. The great circle route (south from England until the roaring 40s below South Africa, west to Australia and then after leaving Australia, back to 40° south and around the Cape of Good Hope) meant that in the 1870s clippers took 80 days to get to England. The opening of the Suez Canal in 1869 and the rise of steamships changed the technology of shipping, although by 1883 still only one-third of cargo returned to the UK via the Suez. It was not until 1911 that steamers replaced clippers in the wheat trade.

Despite South Australia’s early expansion in wheat exports (and lead in the use of agricultural machinery), it took some time for farmers to understand their environment. From the mid 1850s average yields declined in South Australia until a slight upturn in the late 1860s. Offsetting the decline was the expansion of acreage. Despite considerable research into the topic it was not until new varieties of wheat were developed and planted

9 Stevenson, Tables 1.1 p13, in Vamplew et al.
10 Shaw (1954 p.168)
12 In 1911 the population of Adelaide was just under 190,000, representing 46.4% of South Australia’s population. Equivalent figures for 1871, 1881, 1891 and 1901 are 33.8%, 37.6%, 42.2% and 45.3%. By 1921 the percentage was 51.6 % (Hirst, 1973, pp 227). Ontario had a more dispersed urban settlement pattern. In 1891, Toronto - Ontario's largest city - had a population of 181,000 which represented less than 10 percent of the province's population. In 1891, only 35 percent of Ontario's population could be considered urban - that is living in centers of 1000 or more.
13 According to Dunsdorf (footnote 12, page 172) “Steamships became firmly established in the wheat carrying trade only between 1905 and 1909, or even 1911. The Official Yearbook for New South Wales reported for the year 1905-06 (p.349) that three-fourths of the wheat exported was carried by sailing vessels. For 1911 the same source (p 438) states that since 1909 sailing vessels had been replaced by steamers: “…the proportion of wheat now carried in sailing vessels is very small”.”
in the late 1890s, and these were combined with more effective use of fallowing and fertilizers that average yields per acre again increased.

A major factor impacting on the South Australian economy was out of the control of settlers; drought. Droughts of differing levels of severity occurred in the 1860s and the 1880s, while the combination of the depression in the early 1890s followed by one of the worst droughts ever recorded (from 1895-1903) put significant brakes on economic prosperity. A further drought at the end of World War I slowed economic recovery.\footnote{For example, in pre-drought 1891 there were 7.6 million sheep in South Australia; by the end of 1914 there were only 3.6 million. (Vamplew et al, Table 11.9)}

The First World War not only made trading agricultural products with Europe difficult, it also impacted heavily on the workforce. The period from 1914 to the 1940 was one of relative stagnation of living standards for the whole of Australia (McLean and Pincus 1983) and South Australia was not an exception.

Apart from remaining preeminent in wheat production within Australia until the 1890s, South Australia also developed a significant pastoral industry. Together these gave the economy a large agricultural base for wealth accumulation, as well as heavy exposure to the risk of drought. While no extensive gold deposits were found in South Australia, copper deposits north of the capital provided an alternative resource export for over 60 years. Wheat, wool and copper, together with benefits of being the nearest capital to the silver and lead deposits at Broken Hill underpinned Adelaide and South Australia’s growth through the 19th century. Compared to the other states of Australia, South Australia had the advantage of agricultural land that was comparatively close to the capital, and relatively easy to clear.\footnote{Dunsdorf\text{\textregistered} (1956), pp 99-106.} This also contributed to development of a network of rail lines, many of which carried wheat to Port Adelaide and from there, directly to London.\footnote{Until the 1870s Australia as a whole was not a consistent exporter of wheat with the colonies of New South Wales, Victoria and Queensland being net importers until 1867. Against this trend South Australia became a net exporter comparatively early, exporting a (then record) 3 million bushels to Great Britain in 1872. Despite large annual fluctuations (that impacted on the local economy) this trade continued through the period of interest (Dunsdorf\text{\textregistered}, 1956, pp167-168). Note too that in 1870 there were only 133 miles of railway open in South Australia, while by 1900 there were 1,736 miles- two thirds of this being built after 1880. (Butlin, (1964)[1976] p.321.)}

The onset of Australian Federation in 1901 also brought a change to trade arrangements. As a colony, South Australia had levied its own tariffs and customs prior
to 1900. Until 1877 there was a 10 per cent ad valorem duty on imported wheat while from 1888 until 1900 South Australia charged 2 shillings per cental (100 pounds) on wheat. Only Victoria was seen as being seriously protectionist in outlook and practice.\textsuperscript{17} Federation removed customs duties between the states, while overall Australia, like Canada, adopted a protectionist regime.\textsuperscript{18} Thus, prior to 1900, SA had the unique ability to capture linkages through protectionist policies, but after 1900, they were not able to do this. On the other hand, the TBD was never able to set its own independent tariff policy.

South Australia benefited not only from the transport of grain via Adelaide but also from the actual production of wheat in the region. In other words, it also earned substantial rents from the land factor which would not have been available in the case of Thunder Bay. The Thunder Bay District benefited from transporting prairie grain in a manner described by McCallum (1980) – the appropriation of linkages from a staple produced far from the region. In addition, the South Australian wheat boom economy began earlier than the Thunder Bay District’s, was more regionally focused in terms of the economic impact and had its transport functions centralized via Adelaide.

While the Lakehead towns were the dominant metropolis of their region, they did not have access to the rich and compact agricultural hinterland that Adelaide did and their economic growth was largely dependent on their transshipment function which they increasingly had to share with Vancouver, Montreal and Quebec City. The railways that shipped grain to the Lakehead and the shipping companies that took the grain from the Lakehead represent external capital/businesses for the Thunder Bay district and as such, the share of income earned by that capital would not have been retained in the region. Adelaide, on the other hand was able to create a virtual locational monopoly on grain shipping out of its relatively compact region. The average rail distance wheat had to be transported by rail in South Australia was 50 miles. Despite the development of other ports along the coast in the 1870s, Meinig (1962, 140) describes the overall design of the rail network as “long extensions deep into the interior, not only to serve the pastoral and mining regions, but also as instruments of grand strategy to capture a major

\textsuperscript{17} This section leans on Dunsdorfs, 1956, p 165-167.
\textsuperscript{18} Pomfret, 2000, p 116. In 1913 Canada had an average tariff of 18% and Australia 17%.
share of the interior trade of neighboring colonies.” Moreover, all railways in SA were state owned so that the transportation income was retained in the SA economy.

South Australia had a substantial head start in terms of economic development. While 1885 represents the dawn of grain shipping at the Lakehead and the full prairie wheat boom was still over a decade away, in 1885, South Australia exported almost 8 millions bushels of wheat and flour and the population of South Australia was over 70,000. However, during the period 1905-1915, when wheat production boomed in Canada and regained ground after years of drought in SA, the volume of wheat production in Canada far exceeded that of South Australia (See Table 2) and indeed the volume of wheat shipped through the Lakehead was far greater than that through Adelaide. Whereas South Australia’s wheat production and exports during the 1880s were comparable in scale to those of the Ontario economy in the 1850s and 1870s, the 1905 to 1915 period saw wheat shipments through the Lakehead that dwarfed the size of wheat production and exports of SA (See Table 1).

Nonetheless, in relative terms, wheat had been extraordinarily important to South Australia for many years. Between 1860 and the mid 1890s, between 60 and 80 percent of South Australia’s wheat production was exported, mostly to the UK. In South Australia in 1870, the agricultural (12.6%), pastoral (14.48%), and dairy sectors (3.15%) contributed one-third of the colony’s GDP and by 1910, this had fallen slightly to 29 percent with agriculture (mostly wheat) contributing 17 percentage points. In comparison, Canada in 1870, agriculture’s (all kinds) share of GDP was 28 percent and by 1910, it was a little over 20 percent. For Canada in 1870 wheat contributed 4.5 percent to GNP (0.16 of 28%), and by 1910, 4.8 percent (0.24 of 20%). Despite South Australia having been overtaken at the end of the 19th century as the single largest wheat

---

19 As a further example of the possibilities to ‘extract more’ from wheat production, The 1908 Royal Commission on “The Question of the Marketing of Wheat” in South Australia, found that merchants purchasing wheat from farmers colluded so as to reduce the prices received by farmers by 1d to 2d per bushel. A similar enquiry in Victoria found evidence of ‘sharp practice’ that resulted in wheat bags being systematically under-weighed by 1.1 to 3.3 per cent. (Dunsdorf, 1956 pp 223-226).

20 Canada exported 5.2 million bushels of wheat and flour in 1885 (Series M305, Historical Statistics of Canada, 2nd Edition). By 1911, exports of wheat and flour from Canada reached 98 million bushels.

21 See McCallum (1980), Table s.3.

22 Dunsdorfs (1956, p 168).

23 Sinclair (1981)

24 Urquhart (1994).
producer in Australia by Victoria and New South Wales, we estimate that wheat’s contribution to state product had fallen to ‘only’ 6.97 percent of South Australia’s gross state product (0.41 of 17%).25

THE DATA

Given both countries sold on the world wheat market, from 1905-1915, the Canadian grain economy should have generated income at the Lakehead many times larger than that seen in SA. There are two ways in which these differences could be apparent; in the overall increase of the economy and population, and to the extent that linkages are retained/captured, in wealth estimates. Wealth is a better measure for evaluating the long term impacts of natural resource exports than current income,26 thus we focus on estimates of average wealth over the period as an indicator of the effect of natural resource exports on development. We are interested in examining how much wealth accumulated during these wheat export booms; how much of that wealth was invested in the local economy, and how much was held in assets external to the local economy.

The South Australian data are derived from probate and succession duty documents which are constructed after the death of an individual. Essential to the legal transfer of assets, these represent consistent, well-monitored information on personal wealth. Probate records contain papers filed to the court by the administrators of an estate including a copy of the testator’s will, the executor’s oath, correspondence with the court etc... The records contain information on the testator’s name, address, occupation and a sworn estimate of gross wealth; but no list of assets, the age of the testator, and other family details. To obtain this information it was necessary to match the probate records with two other sources; the individual’s death certificate and succession duty records. The death certificate contained information on the testator’s age and cause of death as well as providing a cross check for recorded occupation. Between 1905 and

---

25 This last figure may under-estimate wheat’s importance to the SA economy. It is calculated by using Butlin’s national figures on the contribution of wheat to agricultural output in 1910/11 (41% by value) (1962, Table 44 p 96 Gross Output agriculture 1900/01-1938/39).
26 Hartwick (1977) and Rodriguez and Sachs (1999). Chambers and Gordon (1966) show that the effect of natural resource exports on long run per capita income growth will reflect the increase in the value of “land”, the fixed factor in natural resource exploitation.
1915 the state levied succession duty on all estates and this process produced a succession file which contained a full inventory of the assets of the deceased, their heirs and the duty payable on each inheritance. The succession duty process required an independent appraiser estimate the market value of each individual piece of property, which may include assets as trivial as salt and pepper shakers or as large as pastoral stations or manufacturing businesses.

Between 1905 and 1915, a total of 12,475 people were probated in South Australia. The top one percent of wealth leavers held approximately 30 percent of the wealth and the top 10 percent, 70 percent of the wealth. Such a distribution was similar to the distribution of wealth in New Zealand at the same period and to that of the United States in 1860. It was far more equal than the distribution of wealth in the United Kingdom at the same time where probate records suggest the top 1 percent held two-thirds of all wealth, and the top 10 percent held 90 percent of the wealth.27

For the purposes of constructing a data set from the probate data, four strata were selected. A one percent sample of estates between £0 and £500; a two percent sample for estates between £501 and £2500; a five percent sample of estates between £2501 and £20,000 and the complete population over £20,000. Records of a total of 337 individual estates were recorded but exact date of probate was only available for 307 of which two had negative net wealth leaving 305.

The Ontario data set was constructed from the probate records of the District of Thunder Bay Surrogate Courts from years 1885 to 1920. Prior to the Thunder Bay District's creation in 1885, the region's estates were probated in the District of Algoma. Under the Surrogate Courts Act, 1858 (Statutes of Canada, 22 Vict., Cap. 93, 1858) a surrogate court with the power to issue grants of probate and administration valid throughout the province was established in each Ontario county, replacing the centralized Court of Probate established in 1793. The inventory was conducted by the executor of the estate (administrator in intestate cases) and legally needed only to be performed in

---

27 These comparisons, while all based on probate records, are fraught with danger given differences in the age structure, data coverage, estimation techniques etc. They should be regarded as indicative rather than exact. For a more complete discussion see Shanahan (1995). As a further example, estate multiplier estimates for Wentworth County, Ontario, between 1872 and 1902 show the top 10 percent of the distribution owned from 83 to 92 percent of the wealth. See Di Matteo and George (1992). For South Australia between 1905 and 1915, multiplier based estimates of wealth distribution suggest the top 10 percent held 70-80 percent of the wealth.
response to a request by a legatee or creditor but in practice was brought in voluntarily without awaiting the compulsory summons.\textsuperscript{28}

All estates bearing application dates in the years 1885 to 1920 were examined but only those 591 estates from 1905 to 1915 are used in this paper for comparison purposes. Variables recorded include place of residence, occupation, marital status, number of children, date of death, whether they had a will and the value of the estates. Unfortunately, age at death was not available in these probate records.\textsuperscript{29} The inventory provided estimates of wealth grouped into 16 categories.\textsuperscript{30} Like the Australian data an advantage of this data source is that there are separate estimates of real estate, financial assets and personal property over a substantial period of time.

**AVERAGE WEALTH IN TBD AND SA, 1905 TO 1915**

After converting the wealth in both data sets into U.S. dollars, the average wealth in South Australia probated decedents was roughly 15 times greater than that of probated decedents in the Thunder Bay District (Figures 1 and 2). SA wealth levels were higher than TB District in 1905 suggesting that much of that wealth was in place at the start of the period under study as opposed to accumulated over the period. One interpretation is that some of this initial difference in wealth levels reflects SA’s development through its earlier copper, wool and wheat export periods in the nineteenth century. The higher wealth levels for South Australia also reflect prolonged accumulation and growth over a substantial period of time.

---

\textsuperscript{28} According to Howell’s *Law and practice*, pp. 325-326: “The inventory should contain a statement of all the goods, chattels, wares and merchandize, as well moveable as not moveable, which were of the person deceased at the time of his death within the jurisdiction of the court. A proper inventory should enumerate every item of which the personal estate consisted, and should specify the value of each particular. But unless by order of court, or in obedience to a citation, an inventory does not set forth the goods and chattels in detail.” Probate instructions do not specify how asset value was assigned. For real estate, livestock and personal property the evidence suggests that it was market value. Sometimes, property was sold and its selling price recorded in the inventory, whereas more often it was an estimate of what the property would fetch if sold. Financial assets by their nature were precisely recorded. Mortgages held, the amount of insurance payments, and bank account balances were precise amounts. In addition, real estate was usually recorded net of any mortgages outstanding.

\textsuperscript{29} Some data on age could be acquired by census-linkage but only three census years (1881, 1891, 1901) are currently available.

longer period of time prior to 1905 as well as the possibility that more of the benefits of the wheat economy were retained relative to the Thunder Bay District. As well, there was inflation in asset values in Australia in the late 19th century that could also explain substantially higher levels of wealth (Bentick 1969, McLean 1994). The values of these assets increased 1870-1890; fell somewhat to the mid 1890s but had high levels by 1905. In addition, some of the difference in wealth levels could also be ascribed to differences in the distribution of ages of the populations in the two regions. The Thunder Bay region was newly settled and therefore likely had a younger average age than South Australia.

The higher overall levels of wealth of South Australia can be ascribed to endowments, linkage effects and timing. A comparison of the changes in wealth levels across the two economies over 1905 to 1915 allow us to identify the conditions and factors that result in natural resource exports developing an economy. If SA’s capacity to accumulate wealth exceeds that of Thunder Bay over 1905 to 1915, then the reasons for successful resource export based development are to be found in factors specific to SA, such as its coastal ports. On the other hand, if there is no difference between the capacities to accumulate wealth across the two economies over the same period, then the reasons for successful resource export based development are to be found in factors specific to the earlier period, when Ontario also successfully developed through wheat exports.

As mentioned above, one of the difficulties that we have encountered in assessing the change in average wealth levels are the relatively high values for SA wealth in 1908 and 1911, which we believe could also partly be the result of having relatively fewer observations for the SA sample in some years. Figures 3 and 4 plot LOWESS smoothes of the value of real wealth in South Australia and Thunder Bay District. The

---

31 Another possibility is that differences in extraction methods have resulted in quite different samples being taken from the probate records. For Thunder Bay district, all estates probated between 1905 and 1915 have been included. In the case of South Australia, we have a stratified random sample being used. While selecting estates over 20000 pounds, the process also identified those leaving little wealth. While there may be differences in the proportion of estates of different sizes between the two samples, there is no obvious bias of either data set to its relative population.

32 For South Australia, the CPI index with 1939=100 (Source: Mitchell) was used while the Altman adjusted Urquhart Index was used for the Thunder Bay data. Not all of the South Australian data had a year date and therefore the size of the data set was reduced to n=304.
LOWESS smoothes help deal with the impact of extreme observations in assessing the wealth profile over time. These Figures suggest that this boom period for both economies reached a peak in 1913 with the decline in wealth after 1913 ascribed to adjustments to a post-boom equilibrium. Figure 5 further adjusts for the impact of outliers on wealth by removing the top and bottom estate and recalculating the average for each year and then normalizes the annual value by the average for 1905 to 1915 for the regional economy. This figure suggests that the changes in wealth levels over the period, particularly from 1905 to the peak value in 1913, are the same.

Table 2 shows the proportion of probated decedents reporting financial assets and real estate across the two regions. The differences in the proportion reporting real estate ownership were much smaller across the two regions whereas there is a very large gap in financial asset ownership. Figure 6 shows the value of real estate in each year normalized by the average value of real estate for the period 1905 to 1915. This figure suggests that the value of “local assets” in the two economies had common changes. The common changes in real estate ownership trends and values and the greater importance of financial wealth for the South Australian decedents suggests that members of the South Australian small open economy had the potential to be capital exporters by 1905. The importance of financial assets in the portfolio would also suggest that SA is an example of what needs to happen for resource exports to generate sustainable income levels according to Rodriguez and Sachs (1999).

The fact that the increase in average wealth was common to both economies despite the much greater level of grain trade activity in TBD suggests that there are features of the SA economy that allowed it to capture a greater share of the economic rents/linkages associated with the rural economy. We also suspect, following McCallum (1980) that these characteristics are shared with Southern Ontario from 1840 to 1870. Two potential explanations need to be considered. First is the coastal location of the Port of Adelaide compared to the inland entrepot location of TBD. To the extent that total resource costs of transporting grain to market were lower in SA than from the prairie grain economy, there was more surplus to be captured by producers and transporters. Second, it may be important who captured the surplus and how they

---

33 See McLean (1994) Figure 4.
captured it. We characterize this latter point as a modification of a Stolper-Samuelson theorem argument where a relative increase in the price of a commodity will increase the real return to the factor used intensively in that industry and reduce the real return to the other factor, but where that increase in real return ultimately remains depends on the location of the owner of the factor of production.

To demonstrate the reasons for South Australia’s ability to generate the same average change in wealth as the Thunder Bay District despite having total bushels of wheat produced that represented at most 4 percent of total bushels of wheat shipped through the Lakehead, we provide the following exercise. The role of the Thunder Bay District in the Canadian Grain trade was to handle enormous quantities of grain arriving by rail from western Canada. The grain was transferred from rail cars, weighed, inspected, and stored in terminal elevators before being transferred to a lake freighter. The costs of doing these functions were on the order of 1.5 to 2 cents per bushel.34 As much of the elevator capacity at the Lakehead (80 percent in 1905 and 60 percent in 1915) was owned by the railways, a large portion of this income would not have been retained by the Lakehead region. Only the Paterson Elevators had its private owners based in the Lakehead. In addition, the income of farmers from wheat production would accrue to the prairie provinces, not TBD. The income earned by the railways that brought the grain to the Lakehead, other than the wage payments to locally based employees, would accrue to the location of the railway’s head office in the east of the country as would the income earned by the companies that owned the ships that plied the great lakes. We estimate the income from the wheat activities at the Lakehead District as the number of bushels of wheat shipped from the Lakehead each year shown in Figure 7, multiplied by 1.5 cents per bushel for years 1905 to 1915.

For the South Australian economy, we are looking at a situation where production, transportation to the ocean port and handling were all carried out in the SA economy. As we noted earlier, the SA rail network was state owned. Under the strong assumption that the income for these activities was completely captured by local producers, shippers and handlers, we approximate the income from a bushel of wheat for

---

the South Australian economy by the price of wheat in England less the cost of ocean transportation from Australia. The average market price of an Imperial Bushel of wheat at Pt. Adelaide was 0.19 of a Pound for 1905 to 1914.\textsuperscript{35} If we value the pound in US dollars (an average of approximately 4.85 over the years 1905-1915), the price per bushel of wheat was roughly equivalent to 90 cents. The total wheat income for South Australia is thus approximated as the annual number of bushels of wheat produced time 90 cents per bushel.\textsuperscript{36}

Figure 8 demonstrates that despite a vast difference in quantities of grain produced, transported and traded, wheat exports generated substantially higher income in SA than TBD before 1910, and the convergence in grain trade incomes only takes place after 1910 when grain shipments through the Lakehead increased substantially. Our estimates of wheat incomes for the two economies provide a clear explanation for the higher average wealth levels in SA relative to TBD, and the changes in wheat incomes generally reflect the changes we demonstrate in average wealth in the two economies over 1905 to 1915. For the Thunder Bay District, this estimated income from the wheat trade shows the same approximate pattern as the average wealth estimates in Figure 5.

This comparison highlights the key determinants for successful development from the export of natural resources; the ability to retain linkages associated with the resource exports. One way to think of our comparison of these two wheat exporting economies is that South Australia represents an economy where transportation, production and handling of wheat is carried out by local owners of capital so that capital’s share of income is retained locally. Thunder Bay District in contrast, is akin to a resource exporting country where production and transportation functions are controlled by external capital and that income does not remain in the local economy.\textsuperscript{37} While wheat

\textsuperscript{35} The price of wheat in Port Adelaide was 0.33 of a Pound in 1915, substantially higher than any other price over the period. The average price of a bushel of wheat in Port Adelaide is 0.2 of a Pound if this 1915 observation is included.

\textsuperscript{36} The issue of the level of freight rates or prices received by farmers is not relevant to this calculation so long as wheat production is not too supply elastic. Those rates and prices pertain to the distribution of the wheat income across activities and agents involved in the production and trade of wheat. So long as all of these agents reside in the domestic economy, then the price of wheat at the port represents the income per unit of quantity for the domestic economy.

\textsuperscript{37} It should be noted that this characterization is still relevant today with the region referred to as a resource extraction colony. See J. Ibbotson (2006) “A new province called Mantario?” The Globe and Mail, August 9\textsuperscript{th}, p. A4.
exports would have increased the incomes of farmers, transportation companies and other sectors across Canada, the regional benefits of the grain trade would have been distributed according to the home address of the head offices and the owners of capital. As a consequence, much of the income and wealth generated by the resource exports did little for the TBD economy.

CONCLUSION

In this paper, we find that natural resources can result in successful economic development in both the short run and the long run. The wheat boom of the early twentieth century led to similar changes in wealth in the Thunder Bay District and in South Australia suggesting successful short term impacts of the wheat boom across regions. At the same time, the level of wealth was substantially higher in South Australia than the Thunder Bay District suggesting that the wheat boom certainly generated successful long-term economic development in South Australia.

There are important differences between the two regions. South Australia benefited from earlier resource export episodes, including copper in the 1840s, wheat and wool in the 1850s and wheat again in the 1870s whereas in 1905, the Lakehead was really a new economy. Adelaide SA is a coastal port that, for much of the latter nineteenth century was a direct gateway to the world grain market, whereas the Port Arthur/Fort William port was an intermediate terminus on the Canadian transportation system, as grain would have to have been transferred from Great Lakes Freighters to ocean going vessels on the way to market. Adelaide managed to maintain more of a hold on its hinterland region than did the Lakehead, which faced substantial competition from other ports. Nevertheless, the Lakehead experienced similar growth rates in wealth because of the much higher volume of grain produced in Canada and shipped through the Lakehead relative to Adelaide,

While average wealth levels in SA were substantially higher in SA than in TBD, between 1905-1915, the increase in average wealth levels was equivalent in SA and the Lakehead district. The volume of wheat passing through the Lakehead was substantially greater than that produced in SA but SA was able to appropriate more linkages from grain production. The higher wealth levels in SA relative to the TBD during the 1905-
1915 period is rooted in the fact that SA was a region of older settlement and over time earlier wealth accumulation was able to compound into higher levels relative to the more newly settled TBD. Moreover, South Australia had greater control over its institutions especially prior to 1901 when it was actually able to pursue its own tariff and commercial policy.

Long term economic development from natural resources is therefore a function of the ability to retain linkages from the resource activity as well as the passage of time necessary for linkages to develop and wealth to accumulate. The failure of the Thunder Bay District by the late twentieth century to successfully develop self-sustaining long run economic growth and export capital as South Australia began to do in the early twentieth century is rooted in the key differences in linkage generation and retention between the two regions. The key to capturing the linkages from natural resource production is to eventually generate domestic sources of capital rather than rely on external sources of capital. Our comparison suggests that an understanding of the apparent poor performance of resource abundant economies has little to do with intrinsic properties of natural resources and more to do with the sources and ownership of capital used to produce and transport the natural resources to market. Oil producing nations would be least likely to succeed given the combination of capital intensive production and transportation of the commodity along with the traditional reliance on external (most often US) capital.

REFERENCES


TABLE 1: WHEAT PRODUCTION IN SOUTH AUSTRALIA AND CANADA

| Year | Area Under Wheat (acres) | | | |
|------|--------------------------|------------------|-----------------|
|      | **SA** | **Australia** | **Canada** | |
| 1870 | 604761 | 1123839 | 1647000 | |
| 1880 | 1733542 | 3052617 | 2367000 | |
| 1890 | 1673573 | 3228535 | 2701000 | |
| 1900 | 1913247 | 5666614 | 4225000 | |
| 1910 | 2104719 | 7372456 | 8865000 | |
| 1915 | 2739214 | 12484512 | 15109000 | |

| Year | Wheat Production (Bushel per Acre) | | | |
|------|-----------------------------------|------------------|-----------------|
|      | **SA** | **Canada** | | |
| 1870 | 11.50 | 10.20 | | |
| 1880 | 5.00 | 13.70 | | |
| 1890 | 5.60 | 15.60 | | |
| 1900 | 5.90 | 13.20 | | |
| 1910 | 11.60 | 14.90 | | |
| 1915 | 12.50 | 26.00 | | |

**SOURCE:** CANADA-HISTORICAL STATISTICS OF CANADA
### TABLE 2: ASSET HOLDING PROPORTIONS

<table>
<thead>
<tr>
<th>Year</th>
<th>Real Estate</th>
<th></th>
<th>Financial Assets</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>S. Aust</td>
<td>T. Bay</td>
<td>S. Aust</td>
<td>T. Bay</td>
</tr>
<tr>
<td>1905</td>
<td>0.68</td>
<td>0.87</td>
<td>0.92</td>
<td>0.73</td>
</tr>
<tr>
<td>1906</td>
<td>0.85</td>
<td>0.58</td>
<td>0.94</td>
<td>0.67</td>
</tr>
<tr>
<td>1907</td>
<td>0.72</td>
<td>0.59</td>
<td>0.84</td>
<td>0.77</td>
</tr>
<tr>
<td>1908</td>
<td>0.75</td>
<td>0.62</td>
<td>0.96</td>
<td>0.81</td>
</tr>
<tr>
<td>1909</td>
<td>0.79</td>
<td>0.76</td>
<td>0.95</td>
<td>0.71</td>
</tr>
<tr>
<td>1910</td>
<td>0.73</td>
<td>0.70</td>
<td>0.95</td>
<td>0.66</td>
</tr>
<tr>
<td>1911</td>
<td>0.83</td>
<td>0.72</td>
<td>0.97</td>
<td>0.53</td>
</tr>
<tr>
<td>1912</td>
<td>0.82</td>
<td>0.69</td>
<td>0.95</td>
<td>0.64</td>
</tr>
<tr>
<td>1913</td>
<td>0.74</td>
<td>0.69</td>
<td>0.97</td>
<td>0.64</td>
</tr>
<tr>
<td>1914</td>
<td>0.84</td>
<td>0.74</td>
<td>1.00</td>
<td>0.69</td>
</tr>
<tr>
<td>1915</td>
<td>1.00</td>
<td>0.81</td>
<td>0.83</td>
<td>0.68</td>
</tr>
</tbody>
</table>

**Average**

|   | 0.79 | 0.70 | 0.95 | 0.67 |

**Source:** Probate records (see text).
FIGURE 1

MEDIAN WEALTH 1905-1915 (US DOLLARS)

SOURCE: PROBATE RECORDS (SEE TEXT).
FIGURE 2

AVERAGE WEALTH 1905-1915 (US DOLLARS)

SOURCE: PROBATE RECORDS (SEE TEXT).
FIGURE 3

SOUTH AUSTRALIAN REAL OFFICIAL NET WEALTH (1938=100, pound sterling) VERSUS YEAR-LOWESS SMOOTH (BANDWIDTH=0.3) (n=304)

Source: Probate records (see text).
FIGURE 4

THUNDER BAY DISTRICT REAL WEALTH (1900=100, dollars) VERSUS YEAR-LOWESS SMOOTH(BANDWIDTH=0.3) (n=591)

SOURCE: PROBATE RECORDS (SEE TEXT).
FIGURE 5

COMPARISON OF NORMALIZED WEALTH AFTER ADJUSTING FOR EXTREME OBSERVATIONS EACH YEAR*

*BOTTOM AND TOP ESTATE Dropped FOR EACH YEAR TO ESTIMATE AN OUTLIER ADJUSTED AVERAGE WEALTH FOR EACH YEAR. THIS IS NORMALIZED BY THEN DIVIDING EACH YEAR BY THE AVERAGE FOR THE WHOLE 1905-1915 PERIOD.
SOURCE: PROBATE RECORDS (SEE TEXT).
FIGURE 6
COMPARISON OF NORMALIZED* REAL ESTATE

* NORMALIZED BY DIVIDING EACH YEAR BY THE AVERAGE FOR THE WHOLE 1905-1915 PERIOD.
SOURCE: PROBATE RECORDS (SEE TEXT).
FIGURE 7

Source: Canal Statistics, Department of Railways and Canals and Dominion bureau of Statistics, Statistics Canada, 54-201 (1919-1931); Canada Year book (pre 1919).
FIGURE 8

Estimated Gross Incomes From Wheat Production, Transportation and Trade, The Lakehead and South Australia, 1905-1915

SOURCE: AUTHORS CALCULATIONS (SEE TEXT)