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# **Disentangling the Natural Resources Curse: National and Regional Socioeconomic Impacts of Resource Windfalls**

**David A. Fleming and Thomas G. Measham**

*CSIRO*

*Social and Economic Sciences Research Program*

**Black Mountain Laboratories, ACT 2601, Australia**

**David.Fleming@CSIRO.au**

**Tom.Measham@CSIRO.au**

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## **Disentangling the Natural Resources Curse: National and Regional Socioeconomic Impacts of Resource Windfalls**

### **Abstract**

Why are some economies likely to grow more slowly when facing natural resource windfalls? What are the causes and consequences of the so-called natural resource curse? These are commonly asked questions in the economics literature, where different studies have addressed them using different empirical methods, samples and case studies. In a detailed survey, van der Ploeg (2011) reviews 10 different hypotheses commonly used to explain the resource curse at national level. In this article we complement van der Ploeg's survey by categorizing the 10 resource curse hypotheses into market and political factors in order to better understand the potential consequences of resource windfalls in regions or countries. We then focus on conceptualizing the resource curse at regional level, which in contrast to cross-country evaluations, has received much less attention from academics. Abstracting from environmental and land tenure issues, we develop our conceptual framework by analysing the causality trees that emerge from the two main direct economic shocks produced by resource booms in local areas: labor demand shock and income generation. These causality trees schematize the potential socioeconomic impacts that originate from these effects in a sequence of three hierarchical levels of consequences: First, migration and crowding-out of local firms' labor, characterized mainly by the inflow of temporary and new resident workers (who also bring new income to local towns) and the movement of labor from local manufacturing and agriculture to the mining sector. Second, the migration patterns and new levels of income will increase the demand for local goods such as housing, services and others, increasing their price in the community. Third, higher demand (and prices) for local goods will produce new jobs in sectors such as construction and services, in contrast to the decline in employment likely to happen in crowded-out local manufacturing. Additional discussion is provided for the indirect socioeconomic outcomes likely to emerge from different points across

these three levels of consequences. We also expand on the different factors likely to affect the RC occurrence and magnitude of effects across space. We finish by discussing some policy implications.

*Keywords:* Natural resources curse, regional development, economic growth, mining

## **1. Introduction**

The term resource curse (RC) was first proposed by Auty (1993) to describe how resource-rich countries generally develop more slowly than non-endowed countries, but was Sachs and Warner who popularized the term to label their finding that “...resource-poor countries vastly outperform resource-rich economies in economic growth” (Sachs and Warner, 1995, p. 3). This negative link between natural resource windfalls and economic growth has since then been demonstrated by several empirical studies analyzing cross-country samples (e.g., Sachs and Warner, 2001) and within country analysis (e.g., James and Aadland, 2011). However, an important number of empirical economics studies claim the contrary, i.e., that there is no such thing as the RC. The discrepancies regarding the RC in the literature are so remarkable that it is even possible to find the same author claiming the two opposing views in different studies (e.g. James and James, 2011 *versus* James and Aadland 2011; Bulte et al 2005 *versus* Brunnschweiler and Bulte 2008) –in table 1 we list selected influential studies with the opposite points of view. Given the importance of the topic following the wave of an international mining boom and debate about the real effects of natural resources on economic development is far from over –see, for instance, van der Ploeg and Poelhekke’s (2010) comment to Brunnschweiler and Bulte (2008)– in this paper we further develop the RC concept to provide a better understanding of the range of potential effects that the extraction and trade of natural resources can bring to countries, but especially to the regions hosting resource extraction industries. We attempt to do this in two steps. First, we start by

categorizing the different RC hypotheses proposed in the literature –and summarized by van der Ploeg (2011) – into market and political factors and discussing how they are likely to operate differently within countries –at regional levels. Then, we provide a new definition of the RC to expand its dimensions from not just national consequences, but also to a range of potential local socioeconomic outcomes. In this last step we schematize all the different (expected and unintended) socioeconomic impacts that resource (especially minerals and fossil fuels) windfalls can produce over local economies, in order to have a better understanding of what the RC means for regions hosting resources extraction industries and how it can be approached.

The remainder of the paper is structured as follows. In section two we briefly review some of the literature debating the occurrence of the RC and provide a categorization of van der Ploeg's (2011) ten hypotheses to discuss their implications across space. In section three we focus the discussion on our reconceptualization of the resource curse, placing emphasis on the regional outcomes likely to arise from natural resources windfalls. In section four we expand our discussion by outlining some critical factors that can importantly affect the resources curse outcomes across space (such as the location of resources, economic history of regions, etc.). Finally, section five concludes.

## **2. The resource curse hypotheses and evidence**

Starting with the empirical work of Sachs and Warner (1995), many studies have devoted quantitative analysis to substantiate and discuss the RC. From the large pool of research looking at this issue, cross-country evaluations are the most common studies found within the economics and political science literature, while analysis of particular case studies is a more common feature in the applied sociology and human geography fields (e.g. Measham et al, 2010). Within this vast literature, there is an important number of studies providing empirical evidence of the RC.

However, as mentioned in section 1, there exists also a significant body of empirical literature claiming that the RC is a fallacy and misrepresented by other studies. In order to provide a broad overview of the discrepancies in the literature, in table 1 we list some influential work providing both sides of the RC picture. The objective of our paper is not to back the literature supporting the RC and refute the critics, but to re-orientate the discussion by expanding on the potential RC-type effects across space and outlining factors that can affect their occurrence at regional and country levels.

**[table 1 here]**

Summarizing influential RC literature (from both sides of the debate), van der Ploeg (2011) and Frankel (2010) conducted two recent large and well elaborated surveys that capture a vast number of studies analyzing the RC. Besides surveying an important volume of empirical evidence, van der Ploeg's study also provides a theoretical discussion about the causes of the RC, which he summarizes in ten different hypotheses. In figure 1 we list van der Ploeg's ten RC hypotheses and provide a categorization of them based on their sources: market sources, political sources and a hybrid of both.

**[figure 1 here]**

The RC hypotheses categorization, not clearly depicted in van der Ploeg's (2011) work, is an important feature to have in consideration as the different types of RC sources can have different outcomes when looking at national versus regional levels effects. Thus, for instance, some of the hypotheses sourced in political factors could take place in regions where resources are being extracted but not necessarily in the aggregated national level. In other words, some causes of the RC could be avoided by national governments, but may happen anyway as a consequence of local

governments' actions in areas where resources are exploited. In contrast, some of the market hypotheses in figure 1 are effects not triggered (or controlled) by resource-endowed regional governments but of a macroeconomic nature that would end up affecting all regions of the country if not regulated by national authorities.

### **3. The Resources curse across space and dimensions**

Our definition for the RC is given by: *“the whole set of unintended consequences that originate from resource extraction activity and trade that can end up negatively affecting the economic development of regions hosting the resources extraction industry or the entire country”*. This definition differs from most uses of the RC paradox in the literature in two main ways: we are talking of (1) a wide range of environmental and socioeconomic impacts that can end up affecting economic development, not just GDP growth, and of (2) effects at regional or country levels. This last point is important because escaping from RC effects at national level can still leave negative impacts of resources windfalls at sub-national scale. In this paper we elaborate on this RC definition by expanding the discussion and understanding of the diverse and complex range of effects that natural resources extraction and trade can bring to regions, compared to the –much more studied– national level effects.

An important distinction in the remainder of this paper's discussions is that in our definition we make the case of RC effects based on the dynamics that the non-renewable extracting industry have across space. In this way we are refocussing the resource curse away from studies of renewable resources such as agriculture, forestry and fisheries.

### *3.1 Impacts of resource windfalls at regional levels*

A country can avoid the national scale consequences of the resource curse by limiting and controlling the channels described in figure 1; yet still experience sub-national resource curse effects where resources are being extracted. Regional economic dynamics differ from aggregated national effects and RC-type effects can emerge from different sources within countries, which could affect the economic development of resource-endowed regions or the entire country.

When attempting to understand potential regional or community socioeconomic changes that resource extraction industries may produce, it is important to analyze the channels that promote these changes. In figure 2 we provide a causality tree that shows the main channels through which different outcomes may occur. Although these are only potential outcomes not necessarily happening in every regional experience, they can become manifest to different extents. As it can be seen, in figure 2 we have separated the potential regional socioeconomic consequences of resource windfalls in five different levels, according to the order of causality. In the first level, the resource extraction industry causes four direct initial impacts on nearby communities: labour demand shock (mining employment generation), income generation (compensation to landowners and higher wages), environmental consequences and land tenure/aboriginal issues and increase in local taxes revenues. In this paper we focus on the two former consequences, abstracting from environmental consequences and potential conflicts arising from land tenure and aboriginal disputes.

**[figure 2 here]**

The second level is shaped by the subsequent population increase (given by immigration of permanent or temporary residents) produced by the new levels of employment and income that resource windfalls can generate in resource extraction regions. In the third level the increase in employment, income and population become the source for a rise in the demand for local (and non-local) goods and services. In the fourth, the increase in these demands causes the creation of non-mining jobs, commonly known as job spillovers (JS) in local economies. And finally, different boomtown-like and other socioeconomic effects generated across these different levels (employment, income, population movement, consumption and JS) may also arise (Stedman et al 2012). We have mapped these last consequences at the bottom of figure 2; however, as seen by the causality arrows and as discussed below, these outcomes are not necessarily the final consequence to be observed. In the following section we describe the logic of figure 2 by analyzing these five levels.

#### *Primary impacts: employment and income*

As a new natural resource industries form, new employment will be generated and income will increase. Employment raises by the demand of labour to operate the new, or expansions of, extractive activities, while income is generated from new wages and the compensation paid by firms to landowners. These two effects are the initial and noticeable outcomes produced by natural resources windfalls, as widely demonstrated in the literature (e.g. Marchand, 2012; Weber, 2012). However, what has been less studied in economics literature and therefore less understood are the subsequent effects, which are mainly generated by these two initial impacts.

#### *Secondary impact: People movement*

New employment and income sources are likely to increase population in resource extractive regions. This increase in population is a phenomenon to be observed in the short to medium term

and is sourced from counter migration and immigration. Counter migration is given especially by youth population that generally migrate from rural areas to cities looking for job or educational opportunities –phenomenon that has been widely studied in the literature (e.g. Gabriel, 2002; Argent and Walmsley, 2008)– and that given the new labour opportunities offered by the resource industry stay in their communities. The other, and more important, component of population increase is given by permanent or temporary population that immigrate from other areas of the country (Marchand, 2012).

#### *Tertiary impact: Increase in demand for goods and services*

As the population close to resource extraction development increases, higher levels of consumption are to be observed. In particular, local goods and services will be more demanded. Housing and land are particular local goods that can present increased demand, from two sources: higher demand for accommodation of the new temporal and resident population, and income effects in local areas translates to people with more disposable income looking for real estate investments. The increase in population and income will also translate in higher demand for non-local goods, which can be supplied by local firms or by imports. Infrastructure demand will also grow as an increase in (temporary or permanent) population will require more roads and basic services, among others.

#### *Job spillovers*

As new employment and income in local areas boost consumption, employment in sectors providing goods is also likely to increase (Black et al., 2005). As depicted in figure 2, job spillovers (JS) are likely to be found in accommodation and restaurant services (especially if the mining industry employs a considerable amount of FIFO-DIDO type of workers), local services, public jobs and construction.

A potential negative effect of the extraction boom is the crowding out of local manufacturing and agricultural employment, of non-local or tradable goods industries (Kilkenny and Partridge, 2009). As the mining sector starts demanding labour, people who were employed in tradable goods industries may leave the sector, affecting its productivity. The problem is accentuated for this sector of local economies if the supply of the products they provide (such as agricultural commodities) start being covered with more imports. Thus, in the medium to long term, resource booms can have important negative effects over non-local goods industries. Evidence of this phenomenon has been reported in different cases (Rolfe et al., 2007), which sometimes is denominated as *localized Dutch disease* in the literature (term that we employ in figure 2).

At the very end, the total employment effect generated by a resource boom can be positive, zero or even negative. Positive figures will exist when resource-extraction employment and JS exceed the potential jobs lost by the manufacturing and farm sectors. However, it may be the case that as local manufacturing (and similar industries) becomes less competitive due to imports and labour migration originated by the higher wages paid by the mining industry, some firms can end up closing, affecting important number of employees that in numbers can outweigh the total employment covered by locals in the mining industry. This negative effect is a potential and important RC type effect in local areas, as regions can lose firms that could sustain employment and learning by doing in the long term (Kilkenny and Partridge, 2009).

#### *Boomtown-like effects and other unintended impacts*

Other socioeconomic outcomes may arise from the different events described above. One important consequence of natural resources dependency in the long-term is a loss of entrepreneurial spirit in local areas. This is produced because the employment and income levels

generated by the resource extraction industry reduce the marginal benefits of education and innovation (Glaeser et al., 2012).

One short to medium-term potential consequence is that increased prices for housing and local goods (due to higher demand) can affect affordability for families who have not necessarily seen their income increase (for instance, those not employed in the mining sector), which can cause outmigration, especially of women and elderly people. Income inequality and poverty can increase for the same reasons: affordability increases the cost of living for everybody, but not all the local population is benefiting from higher incomes. In this line, Reeson et al (2012) show how income inequality increases among women in regions where mining labour is more predominant.

A subsequent outcome produced by immigration of mining workers and outmigration of women is the increase in the share of male population. This can lead to a high level of social disruption which is known as the *boomtown effect* (Stedman et al 2012). This phenomenon has been historically associated with negative social consequences such as alcoholism, drug abuse, prostitution and violence.

From all the described impacts generated by resource windfalls, employment and income are generally considered positive outcomes for local areas and therefore are always arguments used to justify mining investments in particular regions and countries. However, as outlined in the previous discussion and in figure 2, there are many unintended consequences that can affect negatively the economies of communities and that should be included in the concept of a RC. A reduction of entrepreneurship, the loss of employment in some tradable goods sectors and boomtown effects are consequences that can negatively affect the economic development of entire

regions, so are important to consider to better understand how the RC can take place beyond the performance of macroeconomic indicators.

#### **4. Factors affecting the resources curse in space**

Whether all, some or none of the impacts listed in figure 2 will take place in a resource extractive region will depend on many characteristics of the respective regional economy. Specifically, among the regional characteristics that are very likely to affect the extent of the impacts generated by resource windfalls, we can outline the following:

- *Life cycle of non-renewable resources extraction activity:* One first point that needs to be clear when evaluating the RC is the cycle of the extractive industries. The stages of development of this industry can be categorized in five periods: investment, construction, transition, maturity and winding down or closure (Tonts, 2010). In the initial two periods the labour demand shock would be in its maximum with a decline to a certain threshold in transition and maturity. The differences in labour demand should be considered as subsequent income and migration effects are going to depend on the length of these different stages. The final stage is also an inevitable consequence of non-renewable resources, and critical to have in consideration for long-term planning.
- *Resource price volatility:* the price volatility of the resources that a region or country relies on is of pivotal importance. The higher the volatility of prices the higher is the uncertainty of long-term benefits. This can affect investments in long-term assets (such as housing and infrastructure) and generate employment instability, among others.
- *Economic history:* a community that has historically had mining as a main component of its economic structure is likely to experience less impact from resource extraction expansion than a community with no history of mining.

- *Labour force skills*: the skills that local workers possess are crucial in filling new jobs produced by mining expansions. In this regard, the role of initial skills, training opportunities and labour migration combine to determine how much local labour is used.
- *Weight of manufacturing*: manufacturing is generally one of the industries most affected by resource windfalls. In this way, a local economy that relied heavily on manufacturing before the expansion of the mining industry can be negatively affected by potential firms' closures. On the other hand, if manufacturing was not important before mining development, fewer impacts are likely to be observed.
- *Integration of the regional economy into the national economy*: the more a regional economy is integrated to the national economy, the less likely the regional economy will be to suffer negative consequences from future mining reductions or closures. Thus, distance and other factors are important to consider as more isolated communities will be less likely to cope with resource volatility.
- *Multifunctional economies*: this also relates to the previous point, given that the higher the diversification of a local economy, the less likely it will be (positively or negatively) affected by resource extraction development.
- *Housing market*: if the local economy has a dynamic housing market, the increasing housing demand generated by mining development will be rapidly fulfilled with supply. However, if the housing market does not respond adequately to new demand, housing affordability is likely to become an important issue in the community, especially for residents that are not home owners (Haslam and Rowley, 2013).
- *Type and location of resources*: One important distinction to make when discussing potential resource curse at regional levels is the nature of the resource extraction industry. Typical minerals extraction are likely to be located in one point (where the reservoirs are located) and therefore employment, land tenure and inputs are concentrated in space. On

the other hand, oil and gas extraction are generally scattered across space. The main implication of extraction locus is the compensation that privates can obtain from resource extraction. As natural gas and oil wells are scattered across space, more private owners are likely to receive financial compensation from land use and therefore income will distribute more among local families. By contrast, a mine would compensate a much smaller number of families (if any) as resource extraction is concentrated in one point. Of course this distribution of benefits (income transfers) will depend heavily on the initial land ownership distribution in a community. That is, if most land is concentrated in the hands of a few landholders, then income paid by extraction firms to landowners may increase income inequality in a region.

Another factor influencing the extent of RC effects in regional areas is of course the role of local institutions and government. The powers of local institutions vary between countries, depending upon constitutional arrangements. The result is a wide range of ability to address local resource curse effects. Even where local authorities have legislative authority, they may lack the human resource capacity to effectively address some issues. From figure 1, whether or not –and in what extent– RC hypotheses 3, 5, 8, 9 and 10 take place across resource extraction regions will depend heavily on how local authorities are capable to deal with these issues (Libman, 2013). If the wealth generated by resource windfalls can be appraised by local authorities in terms of local taxes and transfers, more efforts should be placed in order to avoid RC effects coming from these hypotheses. On the other hand, hypothesis 7 could also translate in a sort of competition for wealth in the case of resources spread over space (like oil fields), which could translate in local governments relaxing or facilitating resource extraction development (which generally correlates to poor planning) in order to attract investments that are disputed between different local governments.

## **5. Conclusions**

Given the current mining boom affecting many countries of the world, a growing body of public concern and academic literature have focused on understanding and providing evidence of the effects that the natural resources extraction industries produce on the economy. Among all this research, the term ‘resource curse’ (RC) has gained vast popularity, as it stigmatizes the outcomes that resource dependency brings to national economies, especially across developing countries. However, the existence of a RC is still widely agreed in the academic literature, with many researchers claiming that it is an inevitable consequence of resource windfalls, while other scholars claim the opposite, i.e., there is not such thing as a RC. We believe that the source of this disagreement is beyond the evidence obtained by different empirical methods, but in the understanding of what the resource curse really is and how it can operate across aggregations (national versus regional effects) and space (distance from the resource extraction activity). In this paper we provided a discussion about the RC topic from a regional development perspective based on the ten RC hypotheses summarized by van der Ploeg’s (2011) survey of the RC literature (figure 1) and the diverse potential effects that resource windfalls can bring to the economy of regions hosting resources extraction activities (figure 2).

Mining, or any other non-renewable resource extraction industry, can bring benefits as well as costs to nations, regions and communities hosting the activity. Abstracting from the potential environmental and land tenure impacts of a resource extraction industry, in this paper we attempted to provide a better understanding of the potential socioeconomic consequences, and the channels through which these operate, especially across regions. We have also elaborated on different factors that can alter the RC outcomes across space (section 4).

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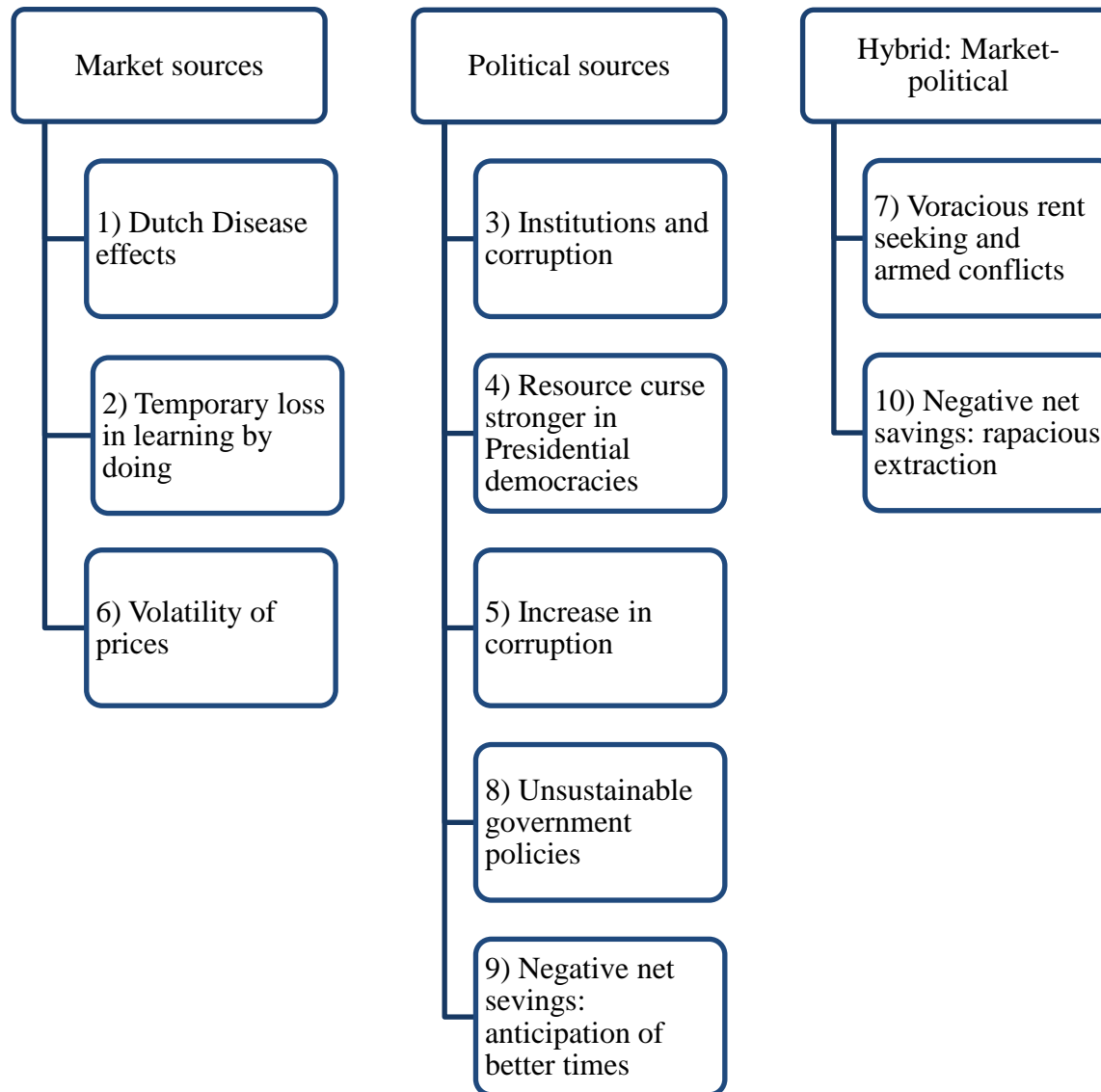
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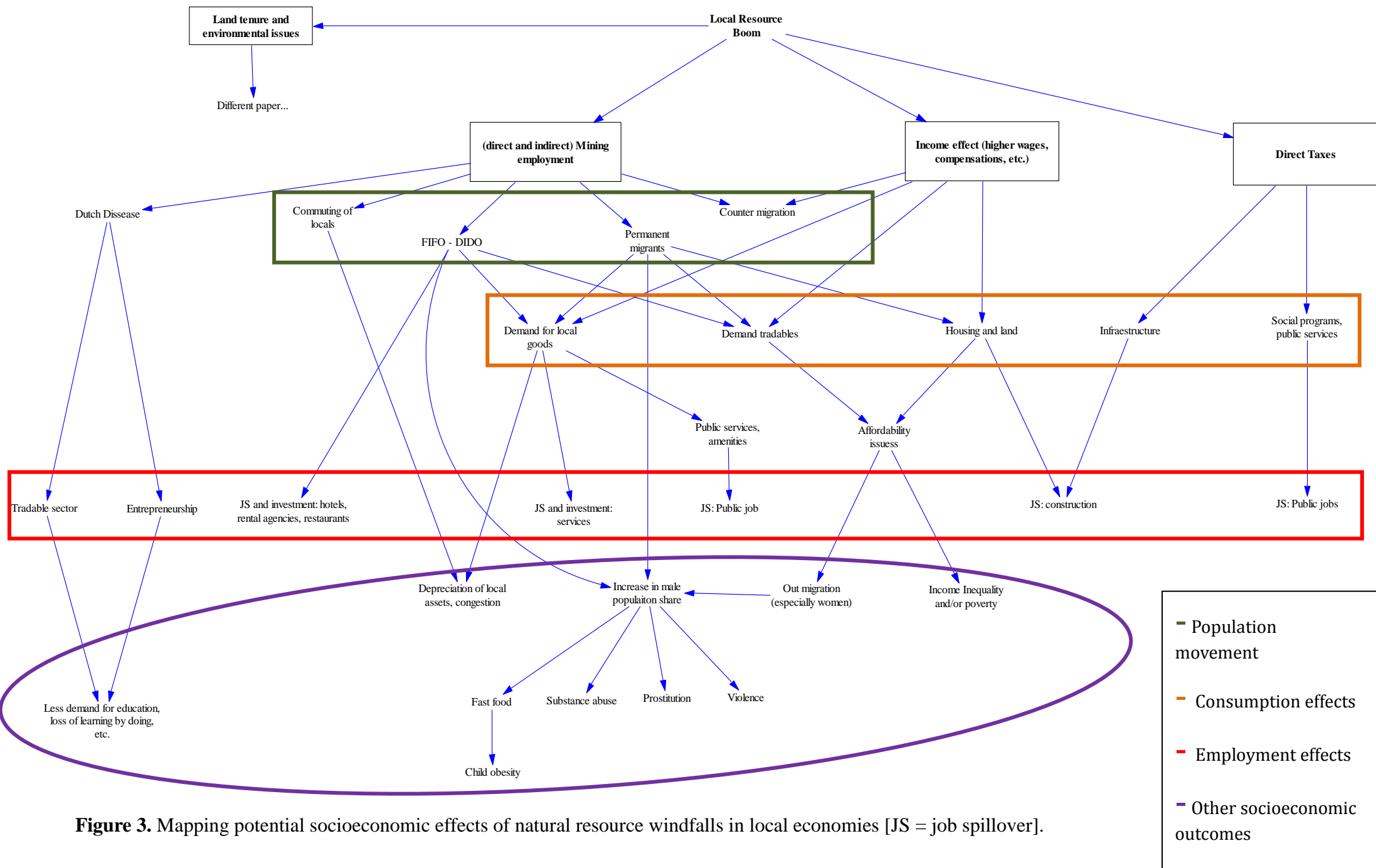
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**Table 1. Opposite claims about the resource curse in the literature, selected studies**

<b>Studies endorsing the resource curse</b>	<b>Studies rejecting the resource curse</b>
Sachs & Warner, 1995	Davies, 1995
Sachs & Warner, 2002	Stijns, 2005
Bulte et al, 2005	Luong and Weinthal, 2006
Collier and Goderis, 2008	Brunnschweiler and Bulte, 2008
van der Ploeg & Poelhekke, 2010	Hajkowicz et al., 2011
James & Aadland, 2011	James & James, 2011
van der Ploeg, 2011	

**Figure 1.** van der Ploeg's (2011) ten hypotheses for the RC categorized by source of causality: market sources, political sources and a hybrid of both [enumeration of hypotheses based on the sequence in van der Ploeg (2011)].





**Figure 3.** Mapping potential socioeconomic effects of natural resource windfalls in local economies [JS = job spillover].