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## Dissimilarities in Economic Evolution

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*Halvor Mehlum and Jon Vislie*

## Introduction

In December 2011 the Department of Economics, University of Oslo, hosted a symposium to commemorate Nobel Laureate Trygve Haavelmo, on the occasion of the centennial of his birth. The program was made up of eminent scholars giving presentations related to Trygve Haavelmo's contributions to econometrics and economic theory.

Trygve Haavelmo was awarded the Nobel memorial Prize in Economics in 1989 for his seminal contributions to the foundation of modern econometric theory. His numerous publications on econometrics from 1930-40's are well known to the international community. A selection of the symposium presentations on econometrics and econometric methodology will appear in a special issue of *Econometric Theory*. Beyond econometrics, Haavelmo made a lot of interesting contributions to economic theory. The present volume of *Nordic Journal of Political Economy* contains the symposium contribution related to these other contributions.

Well known to the profession is his book "A Study in the Theory of Economic Evolution", from 1954. This was a predecessor on neoclassical growth theory, rent seeking, international inequality and migration. Kalle Moene in his contribution to the present volume combines some of Haavelmo's ideas related to rent seeking and institutional quality, and their consequence for uneven development. In his other well-known book from 1960, "A Study in the Theory of Investment", Haavelmo builds a complete investment theory, from basic principles and distinguishing between flow and stock variables, incorporating not only demand for capital, but also the supply of investment goods. In this book he outlines some important consequences for the macroeconomy and macroeconomic modelling, inspired by both Wicksell and Keynes. In fact, macroeconomic theory caught Haavelmo's attention and thinking during all the years he was teaching at the University of Oslo. Some of these ideas are unfortunately not well known because they appeared in lecture notes in Norwegian. Therefore we decided to publish a translated version of a paper by Haavelmo, published in 1956 in a *Festschrift* in honor to Erik Lindahl, so as to give some flavour of Haavelmo's ideas. In the present volume some of the macro material of Haavelmo is further elaborated in one article by André K. Anundsen, Tord S. Krogh, Ragnar Nymoén and Jon Vislie, and one by Sheetal Chand. These papers are mainly discussing the interaction between monetary policy and the business cycle.

The year before Haavelmo went to USA, was spent in Århus, Denmark, in 1938-39. Niels Kærgård tells a story about the economic profession in Scandinavia at that time, and especially the influence Haavelmo had on macroeconomic thinking at the University of Århus, and perhaps vice versa.

Another issue occupying Haavelmo's mind for years, until his death in 1999, was the tension between population growth, economic progress and environmental quality. It is no exaggeration to say that Haavelmo was very pessimistic as to the future development. Rapid population growth and too high rate of growth in consumption per capita and energy consumption, would lead to environmental degradation and severe welfare loss. This issue is further discussed by Michael Hoel and Bjart Holtmark.

Halvor Mehlum  
Managing Editor

Jon Vislie  
Guest Editor

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*Kalle Moene*

# Dissimilarities in Economic Evolution\*

## Abstract

To explain why some countries are rich and others poor, I provide a brief overview of *A Study in the Theory of Economic Evolution* that Trygve Haavelmo published in 1954, before I elaborate on some features inspired by it. I incorporate grabbing activities into a dynamic development model, emphasizing how small differences in initial resources and institutions may create dissimilarities and big gaps between potentially similar countries, how poverty can arise in the midst of potential affluence, how abundance (of natural resources) and scarcity (of entrepreneurial talents) can be wasteful and harmful to economic growth — in particular when institutions are bad.

**Keywords:** *Haavelmo, Inequality and Development, Growth, Rent-seeking, Rich and Poor Countries.*

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[I]f a sense of proportions plays a role in the choice of topics for scientific efforts, one cannot but wonder why social scientists, and economists in particular, seem to have had a preference for choosing the phenomena of big dissimilarities, the 'real mysteries in economic life', as the data of their theories, while other phenomena, which from a macro-cosmic point of view are only small ripples of variation, are given the most careful 'explanation'. (Haavelmo 1954, p 4.)

## 1 Introduction

There are huge disparities in the world. Millions of people starve in some parts, while hunger is long since forgotten in others. Some countries have impressive economic growth, while other countries simply stagnate. Why do some regions succeed in becoming economically advanced, while others fail?

These are the themes of *A Study in the Theory of Economic Evolution* that Trygve Haavelmo published in 1954. Celebrating Haavelmo's 100 years birthday, I wish to elaborate on some features inspired by the book. There are of course many reasons why some countries are rich and others poor, and Haavelmo discusses many of them. I shall concentrate on a few, but important, reasons that can be captured within a simple coherent framework, slightly different from his.

After a quick review of Haavelmo's book, I shall pursue an old idea in development economics. Development is viewed as a process that allocates resources from small-scale activities to modern enterprises with increasing returns to scale. Successes and failures in development relate to whether this process is sustained or interrupted. Resource availability can trap, or boost, the development process by affecting the profitability of new investments and of unproductive rent extraction, or what Haavelmo calls "grabbing activities".

Although investment in modern enterprises can create its own demand, the development process is seldom smooth. The profitability of modern activities are on the one hand limited by the extent of the market, while the extent of the market is on the other hand limited by the level of modernization. Taken together the two sides can produce something that resembles Say's law: the extent of the market becomes wider as more and more activities are modernized, boosting the profitability of further modernization, creating the conditions for further positive developments. Yet the two sides can also create a development trap where the extent of the market is limited by insufficient modernization, which again erodes the profitability of further modernization.

The availability of resources may determine whether development is sustained or trapped. I distinguish between wasteful abundance of resources and wasteful scarcity of resources. As we shall see, both can increase counterproductive grabbing activities, reduce efficiency and growth, and even block a positive development more generally.

On one front, the availability of rich natural resources can tempt entrepreneurs to specialize in rent extraction or grabbing rather than production — with harmful consequences for growth and development. On another front, a scarce supply of entrepreneurs can constrain growth and development not only because there

can be too few entrepreneurs to exploit the profitable opportunities that may arise, but also because the unexploited investment opportunities further constrain the profits of others. A scarce supply of entrepreneurs may even make grabbing activities particularly tempting.

Rising poverty can in a similar manner lead to a declining productive workforce. Poor people are normally excluded from the formal economy, reducing the extent of the market and constraining the profitability of investors. Thus poverty can hinder a take-off and, as we shall see, it can also make grabbing activities more attractive than otherwise simply because of the low profitability of modernization.

All these development problems are enhanced by weak institutions and a malfunctioning system of governance that are more friendly to grabbers than to producers. We shall be particularly interested in how governing institutions and constraints in production may change entrepreneurial incentives to pursue productive or unproductive activities. Do bad institutions and policies lead to bad entrepreneurial choices as well?

Even though the arguments that follow are inspired by the perspective of *A Study in the Theory of Economic Evolution*, they do not directly follow from the book. I therefore start my essay with a brief overview of Haavelmo's study. (An overview of Haavelmo's overall contributions to economics is given in Moene and Rødseth, 1991.) The rest of the essay consists of a discussion of 'a free for all system' of unequal exchange where I incorporate grabbing of resource rents and the dynamics of industrialization in the same development model. I relate the specific arguments to more general remarks by Haavelmo. The basic idea, that small initial differences can lead to diverging growth paths, is his. Similar countries can thus become dissimilar as time moves on. Potential richness can lead to actual poverty — and some forms of scarcity and some forms of abundance can both be wasteful.

## 2 A Study in the Theory of Economic Evolution

Since this study is Haavelmo's first book after he published the famous *Probability Approach to Econometrics* one would perhaps have expected that he applied the econometric methods that he just had established. But, no. *A Study in the Theory of Economic Evolution* contains no econometrics. In fact, it does not contain a single number. Neither is the book about evolution in the strict Darwinian sense. It is about how economic conditions within groups, countries and regions may evolve; how there can be poverty in the midst of affluence; how economic and social cleavages may emerge and persist — all contained in abstract mathematical models compressed into 114 pages.

The book alternates between simple models of economic growth and general development theories, emphasizing structural differences and the role of leads and lags in economic evolution. Some of the models are a bit mechanical and they are presented with the flavor of a mathematical appendix. Given that most economists at the time had less mathematical training than today, it is not so difficult to understand why the book was overlooked in the beginning. It did not

help that it was given a luke warm review by Robert Solow (1955).

In spite of its dry formalism, *A Study in the Theory of Economic Evolution* is a remarkable book. It is full of fruitful ideas that today seem surprisingly modern. In several respects the book precedes more recent advances in economics such as the integration of accumulated human skills in growth models, the discussion of strategic behavior in international affairs, and the economics of rent seeking behavior— not to speak of Solow's growth model. On the methodological front, the combination of dynamic and stochastic processes in the explanation of economic developments was also way ahead of its time.

### *Haavelmo's many models of dissimilarities*

To answer the question — why some countries are rich and others poor — Haavelmo applies dynamic models with three building blocks:

- **Production and rent expropriation**, exhibiting production functions and how possible rents are extracted where total production depends on how labor, capital and the general level of skills and know-how are allocated between activities.
- **Accumulation**, demonstrating how capital, skills and know-how are accumulated and their dependence on economic variables — incorporating interdependencies, for instance of how knowledge affects capital accumulation and how capital accumulation affects skill formation.
- **Births and deaths**, describing how 'the law of population' depend on economic factors for different groups in society.

Several of the models are fairly general. They are not solved. Haavelmo studies instead various special cases. Together with Wicksell (1901, 1906), Frisch (1940), Tinbergen (1942), and Ramsey (1928) (neglected till 1960s) Haavelmo preceded Solow's text book model of economic growth. But what later became the standard model Haavelmo sees as an inadequate framework. It predicts convergence in growth rates across countries and regions, while divergence is what he is out to explain.

Many of Haavelmo's models are therefore not stationary. Growth rates may differ due to endogenous accumulation of human skills, later known as endogenous growth. Small differences in savings rates that have negligible short run effects, may imply significant differences in the long run development. Haavelmo provides several model examples. In addition to differences in saving rates and other behavioral parameters, he emphasizes how initial conditions can be decisive leading some countries to a development path and others to a path of economic stagnation.

### *The probability approach to development*

First in part IV of the book Haavelmo introduces the stochastic elements in order to establish what we might call *the probability approach to development economics*.



This probability approach is original, emphasizing the role of stochastic shocks related to draughts, rainfall, floods, diseases, and wars. The shocks work as shifts in the moving initial conditions of the models. In the book, he derives both the expected growth path and its variance. It is easy to be impressed. Yet he insists that it is easy to construct stochastic theories that are irrefutable when taken to the data. It is perhaps too easy to find explanation in this way.

The interesting aspects of the evolution should therefore be covered by the exact (or deterministic) part of the model. He underlines that "the question whether phenomena that we call shocks should rightly be thought of coming from the outside or whether they should not rather be considered as produced by the economic mechanism considered"(p 66).

### *Conflicts and unequal exchange*

Haavelmo's theories of interregional relations should perhaps be viewed in this light. The models can be considered examples of 'endogenous' shocks from within, including variations in conflicts and cooperation between countries. He undertakes a lengthy discussions of the attempts to influence the distribution of income between countries via everything from tough trade negotiators to military spending and gun-boat diplomacy.

Haavelmo develops what we today would call conflict models — actually it is the first formal rent seeking model of conflict. Twenty years later such models became associated with the names of Gordon Tullock (1967), Anne Krueger (1974), and Jack Hirschleifer (1989). What Haavelmo calls 'grabbing activities', these authors denote 'rent seeking'<sup>1</sup>. He uses the concept of 'allotment functions', and not 'contest success functions' as became the common term after Tullock (1967). Haavelmo uses an explicit game theoretic formulation, but instead of using the concept of a 'Nash equilibrium' (that in 1954 was not yet well established in economics) he uses the somewhat confusing solution concept of (consistent) 'conjectural variation'.

Central to Haavelmo's arguments is the description of how each agent employs resources unproductively to affect the allocation of rents as long as the marginal return on that activity is higher than the marginal return to productive use of the same resources. Haavelmo (1954, p 92) refers to Pareto, but only to claim:

"[T]he total input capacity of a region may find an outlet in two directions, one leading to a larger global output of goods and services, another towards securing a larger share in the total. A distinction of this kind has been suggested by V. Pareto."

The relevant passage by Pareto is most likely where he discusses how the efforts of men are directed

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<sup>1</sup>The concept of grabbing reemerged, for instance in the writings of Shleifer and Vishny, see for instance their book "The Grabbing Hand" from 1998. Again there is no sign, however, that these authors have read Haavelmo's early contributions.

“... to the production or transformation of economic goods, or else to the appropriation of goods produced by others. War, especially in ancient times, has enabled a strong nation to appropriate the goods of a weak one; within a given nation, it is by means of laws and, from time to time, revolution, that the strong despoils the weak. [...] It is obvious that the maximum economic advantage for society is not obtained in this way.” (Pareto, 1906 p 341.)

Also in his sociological theories Pareto emphasized unproductive efforts in order to affect the distribution of income, talking about an alliance between speculators and workers as if they constituted the rent seekers, while the group of independent property owners and the military class is presented as if they were the productive entrepreneurs (see Pareto 1921). But neither in economics nor in sociology did he develop any formal model of such mechanisms.

Haavelmo’s approach can also be interpreted as a micro foundation for unequal social exchange where relative force determines the outcome. In international trade unequal exchange was a popular concept among left wingers at the time and even more so later in the 1960s and 70s. He rightly emphasizes that a ‘free for all system’, without restrictions on the use of power and without institutions to enforce international regulations, is very different from a well-functioning free-trade regime.

As I see it, a free for all system of social exchange relies on the distribution of de facto power where opposing groups may use all available means to obtain income and influence. There is no formal procedure to be followed in the case of disagreements; the state has no clear monopoly of violence; and brute force can be abused for illegitimate causes.

Unfortunately, this has been the sad situation in many developing countries with power conflicts, weak institutions, and governance failure. To illustrate some aspects of a free for all system I now move to a discussion of a simple model example of how Haavelmo’s perspective of unequal social exchange can be incorporated into development models, combining grabbing of resource rents and the dynamics of industrialization.

### 3 Dissimilarities and free for all societies

Haavelmo (1954) does not combine conflict models with dynamic growth models. To illustrate one simple way to do this, and to explore how economic stagnation and development may depend on institutions and resources, I incorporate grabbing activities into a model with a potential development trap. Development can be trapped as the extent of the market limits the degree of modernization, whereas the degree of modernization limits the extent of the market. Thus if costly modernization is not sufficiently profitable, the whole development process might stop even though further developments would have extended the market, making the initial investments profitable.

Whether the development is trapped in this way, depends on how much of entrepreneurial activities that are wasted in unproductive grabbing, conflicts,

and rent extraction, which again depend on the quality of institutions and of the availability of natural resource rents. The exposition below contains some minor twists on joint work with Halvor Mehlum and Ragnar Torvik (see Mehlum et al. 2003, 2006). In the model we study the incentives to undertake costly industrialization.

### *Basics*

Before I move to a description of each type of entrepreneur and how dissimilarities can arise as producers and grabbers compete, I need to list some basics of the model set-up.

- **Composite macro good:** There are many sectors and total demand is distributed on the different sectors by a unit elasticity. By doing so we can express total production by a composite macro good.
- **Rents created:** We need to distinguish between rents created and rents expropriated. A modern enterprise creates rents, or profits,  $\pi$  (no subscript). Nature creates natural resource rents  $R$  expressed in units of the composite good. We can think of the physical natural resource output as being exchanged in foreign markets for the composite good.
- **Producers, grabbers and workers:** With  $N$  indicating the total number of entrepreneurs, the number of producers is indicated by  $n_p = \alpha N$  and the number of grabbers by  $n_g = (1 - \alpha)N$ . Since productive workers,  $L$  in total, have the opportunity to work in a competitive fringe, using a constant returns to scale technology with productivity 1 and zero profits, the real wage is also unity.
- **Supply of the composite good:** The potential of the fringe implies that the output price is 1 after modernization. Thus the supply of the composite macro commodity is equal to what can be produced by productive labor either in the fringe or in modernized enterprises. Hence, the supply of the macro commodity is equal to  $L$  plus the profits from modern enterprises  $\alpha N \pi$  in total (with an output price equal to one).
- **Demand for the composite good:** The pay-offs to each producer and each grabber,  $\pi_p$  and  $\pi_g$ , include resource rents. This will be made clear shortly. The total demand is:  $L + \alpha N \pi_p + (1 - \alpha)N \pi_g$ . Now since,  $\alpha N \pi_p + (1 - \alpha)N \pi_g = \alpha N \pi + R$ , total demand is equal to  $L + R + \alpha N \pi$ , the value of total supply.

With these basic formalities at hand we now move to a description of what producers and grabbers do.

## *Producers*

The modern technology has increasing returns to scale and requires a fixed number of workers (the fixed cost associated with the minimum size of the enterprise). Employment beyond this fixed employment level produces an output with productivity  $\beta > 1$ .

Investments are induced by profits. To see how profits depends on the level of modernization recall that modernization extends the size of the market. Extending the market makes further modernization more profitable. Total production equals  $L + \alpha N\pi$ , denoted the size of the market. The bigger the size of the market the higher the demand and the higher the profits of modern enterprises. This complementarity between sectors and producers implies, in other words, that more modern producers increase the profits to each, here expressed simply as  $\pi = \pi(\alpha N, L)$  where  $\pi$  is increasing in both arguments,  $\pi'_1(\alpha N, L) > 0$  and  $\pi'_2(\alpha N, L) > 0$ .

A more elaborate discussion of a similar set-up is provided by Mehlum et al. (2003, 2006), and by Murphy, Shleifer, and Vishny's (1989) formalization of Rosentein-Rodan's (1943) idea about demand complementarity between industries.

## *Grabbers*

Grabbing activities are basically unproductive rent expropriation. In the model the interests of the grabbers are concentrated around the resource rents  $R$ .<sup>2</sup> To extract rents grabbers can use everything from lobbyism and politics to extortions and violence. They can be warlords or cronies to other powerful men. They can be straddlers with one leg in the public sector and one in the private, using their public sector influence and contacts to line their private enterprise pockets. They can be part of legal organizations, or involved in organized crime. In the model, we do not rely on any of these details. We simply abstract from the concrete forms that grabbing activities take.

Similarly, to what extent grabbers succeed in their efforts would depend on important details that we also abstract from. In the model, we simply let success and failures depend on the quality of institutions and governance. Grabber friendly institutions can be manipulated to favor certain individuals or groups. The ultimate test is whether it pays to specialize in unproductive grabbing, whether it is an advantage to concentrate efforts within the state, in lobbying or in other forms of influence activities.

The quality of institutions and governance is indicated by  $\lambda \in [0, 1]$ , where more grabber friendly institutions means lower  $\lambda$ , and where a completely free for all society has  $\lambda = 0$ . A final critical assumption is that grabbers and producers are drawn from a common pool of entrepreneurs. This does not mean, of course, that all entrepreneurs necessarily are scrupleless. Many grabbing activities may look respectable. Besides, to incorporate a subgroup of entrepreneurs who are never tempted to grab in ways that are not respectable, would be straightforward.

<sup>2</sup>A more general case is discussed in Mehlum, Moene, and Torvik (2003).

### *Institutions and the competition for rents*

Competing for the resource rents each grabber obtains  $sR/N$ , while each producer gets  $\lambda sR/N$ . As stated the value of  $\lambda$  is supposed to be given by the quality of persistent institutions. The value of  $s$ , however, depends on this institutional quality and of the number of grabbers relative to the number of producers. More specifically, to see how the value of  $s$  is determined, observe that the sum of the shares of resource rents must be no larger than one:  $\alpha \lambda s + (1 - \alpha)s \leq 1$ . Here inequality means that resources are wasted in the act of grabbing. As we shall demonstrate how grabbing might distort development, we err on the safe side by assuming that the act of grabbing implies no direct waste. This optimistic assumption yields

$$s = \frac{1}{(1 - \alpha) + \lambda \alpha} \equiv s(\alpha, \lambda) \quad (1)$$

Alternatively,  $s$  can be expressed by the number of agents in the two activities as (by using that  $\alpha = n_p/N$ )

$$s = \frac{N}{n_g + \lambda n_p} \quad (2)$$

The expressions show that the impact of producers are smaller relative to the influence of grabbers as long as institutions are not perfect  $\lambda < 1$ . The expressions of  $s$  are highly simplified versions of allotment functions (Haavelmo, 1954) and of contest success functions (Tullock, 1967).

We can now express the pay-offs to the two types of entrepreneurs as follows

$$\pi_g = sR/N \quad \text{and} \quad \pi_p = \pi(\alpha N, L) + \lambda sR/N \quad (3)$$

These magnitudes determine the allocation of new entrepreneurs on the two activities.

### *Entry and exit of entrepreneurs*

The occupational choices of new entrepreneurs depend on which activity is most profitable. New entrepreneurs chose to become producer or grabber by the following best response dynamics

$$\begin{aligned} \pi_p \geq \pi_g &\Rightarrow \dot{n}_p = \theta - \delta n_p \quad \text{and} \quad \dot{n}_g = -\delta n_g \\ \pi_p < \pi_g &\Rightarrow \dot{n}_p = -\delta n_p \quad \text{and} \quad \dot{n}_g = \theta - \delta n_g \end{aligned} \quad (4)$$

In these expressions entrepreneurial responses are gradual. We can think of this as if each entrepreneur makes an occupational choice when young and stays on until he exits when old. The flow of new entrepreneurs is  $\theta$  and they go to the most profitable activity. The value of  $\theta$  can in itself depend on the profitability of the activity, and it can be farsighted (Mehlum et al 2003, 2006). Here  $\theta$  is

treated as a constant. In each activity, the exit is at the rate  $\delta$  times the number entrepreneurs who are active in the activity.

### Three paths

This completes the description of the model set-up. There are three different equilibrium paths depending on institutions, resources and poverty: one without modernization with only grabbers; a grabber equilibrium path with partial modernization; a producer equilibrium with complete modernization without grabbers. More specifically:

- **No modernization** is an equilibrium path with  $\alpha = 0$  and  $\pi_g > \pi_p$ , where no entrepreneurial efforts go into modernization and industrialization.
- **Grabber equilibrium** is an equilibrium path with  $0 < \alpha < 1$  and  $\pi_p = \pi_g$  where some modernization takes place. The equality of profits in grabbing and in production can be expressed as  $[\pi_p - \pi_g]N = 0$ . Writing the expression out we have

$$\phi(\alpha) \equiv N\pi(\alpha N, L) - (1 - \lambda)sR = 0 \quad (5)$$

I shall call it *the arbitrage equation* stating that the two activities are equally profitable. Call the value of  $\alpha$  that solves the arbitrage equation  $\alpha^*$ . Stability requires that a higher  $\alpha > \alpha^*$  would imply  $\pi_p < \pi_g$  and a reduction in  $\alpha$  as new entrepreneurs move into grabbing. Similarly, a lower  $\alpha < \alpha^*$  would be self-correcting as new entrepreneurs move into production. Mathematically *the stability condition* can be expressed as

$$\phi'(\alpha) = N^2\pi'_1(\alpha^*N, L) - (1 - \lambda)s'_1(\alpha^*, \lambda)R < 0 \quad (6)$$

Total income  $Y$  can be written as  $Y = \alpha N\pi_p + (1 - \alpha)N\pi_g + L$ . In the grabber equilibrium  $sR/N = \pi_g = \pi_p$  and  $\pi_p = \pi(\alpha N, L) + \lambda sR/N = \pi(\alpha N, L) + \lambda\pi_g$  and we have  $\pi_p = \pi_g = \pi(\alpha N, L)/(1 - \lambda)$ , and accordingly what we denote *the income equation* can be expressed as

$$Y = \frac{\pi(\alpha N, L)}{1 - \lambda} + L \quad (7)$$

- **Production equilibrium** is an equilibrium path with  $\alpha = 1$  and  $\pi_p > \pi_g$ .

Notice that a low level of the productive labor force  $L$  may indicate a country with few workers, or a country with a larger number of potential workers where some are excluded from  $L$  because extreme poverty has made them unproductive. I apply this 'poverty as exclusion' interpretation when I now use the model set-up to discuss how dissimilarities may arise. First we consider the role of natural resources.

### a) *Dissimilarities and Natural Resources*

Is more resources always better for the economy? In the introductory chapter of the 1954 book Haavelmo implicitly says no. There might be no monotone relationship between resource availability and development, he claims. On the contrary, "it seems next to impossible to think of any measure or index of original, natural resources which is such that all economically advanced countries have much of it while all backward countries have little of it" (p 2-3).

I shall now demonstrate this non-monotone relationship that he hinted at. As we shall see, resources can be a curse or a blessing, depending on the institutions of the country. and to what extent the resources stimulate counterproductive activities, including plundering and wars.

**Proposition 1** *No modernization takes place if institutions are sufficiently bad, resource rents are sufficiently high, the number of entrepreneurs is sufficiently low (low  $N$ ), and extreme poverty is sufficiently high (low  $L$ ). In these circumstances, all entrepreneurial talents go into grabbing of resource rents.*

Formally, notice that  $\alpha = 0$  yields a share of resource rents to grabbers equal to  $s(0, \lambda) = 1$ . For all entrepreneurs to go into grabbing it must be the case that  $\pi(0, L) < (1 - \lambda)R/N$ , where the right-hand side is the excess natural resource rents obtained by a grabber (when  $\alpha \equiv 0$ ) and the left-hand side is the net return to the first entrepreneur who invests in modernized production. Clearly, if  $(1 - \lambda)R/N$  is high enough the proposition holds. It is also clear that few entrepreneurs (low  $N$ ), and a low level of  $L$  — and thus a small market and a high level of extreme poverty — both contribute to making the inequality hold.

Proposition 1 describes a collection of worst cases for a country bound not to take off. Institutions are bad and natural resource rents high, tempting all entrepreneurs to grab rather than produce. There are also few entrepreneurs implying that the competition for natural resource rents is not so intense, yielding each grabber a high share of the rents. Poverty is high, implying that the size of the productive labor force is low, which again means that the extent of the market is narrow, making the first investments in modern activities just moderately profitable, if at all.

Proposition 1 is also a strong case for affluence-created national poverty. There is no modernization as there is so much up for grab, either because institutions are weak, or because the abundance of resources is large, or both. Excess profits from grabbing is the opportunity costs of producing. No entrepreneur finds it worthwhile to do anything else than extracting the rents available as long as these opportunity costs are high enough. Any growth in entrepreneurial activities go to grabbing, the rest of the economy remains undeveloped. Notice that for given  $N$  and  $L$ , less resources  $R$  could induce a take-off.

Clearly, when  $N\pi(0, L) > R(1 - \lambda)$ , there will at least be some modernization and we move into what we have called a grabber *equilibrium* (with an interior allocation of entrepreneurs till  $\pi_g = \pi_p$ ). It is easy to define the limits of the grabber equilibrium. Without grabbing total income is given by  $N\pi(N, L) + R + L$ . For given resource rents  $R$  the lowest quality of institutions that maintains no

grabbing,  $\pi_p = \pi_g$  with  $\alpha \equiv 1$ , is defined by

$$\lambda^* \equiv \frac{R}{R + N\pi(N, L)} \quad (8)$$

For given institutional quality  $\lambda$  the highest level of resource rents  $R$  that maintains no grabbing,  $\pi_p = \pi_g$  with  $\alpha \equiv 1$ , is given by

$$R^* \equiv \frac{\lambda}{1 - \lambda} N\pi(N, L) \quad (9)$$

Thus if resource rents are higher than  $R^*$ , or institutional quality lower than  $\lambda^*$ , we have a grabber equilibrium. We can show the following results:

**Proposition 2** *In the grabber equilibrium, more natural resources (higher  $R$ ) is a curse in the sense that a higher value of  $R$  lowers national income. In the production equilibrium, more resources is a blessing in the sense that a higher value of  $R$  raises national income.*

The effect of higher  $R$  on  $\alpha$  in the grabber equilibrium is negative since from the arbitrage equation and the stability condition we have  $d\alpha/dR = s(1-\lambda)/\phi'(\alpha) < 0$ . From (8) it then follows that the impact on total income is negative as well as long as  $\alpha$  declines.

The effect of higher  $R$  on total income in the production equilibrium follows directly from the expression that total income equals  $N\pi(N, L) + R + L$  in this equilibrium.

Proposition 2 is a strong case for Haavelmo's claim that there is no monotone relationship between resources and overall richness of a country. The proposition says more, however, suggesting that one reason why some countries do badly is just their rich natural resources.

More resources have two opposing effects in a grabber equilibrium: an immediate income effect and a displacement effect implying that entrepreneurs move from production to grabbing. The displacement effect is an example of wasteful abundance, an effect that is larger than the income effect in the grabber equilibrium. This follows from the very conditions that guarantee that a grabber equilibrium exist and that it is stable. So two similar countries can become very dissimilar if one of them discovers a rich natural resource. The country that potentially becomes richer by the new discovery may after a while become poorer relative to the other as productive activities are displaced by grabbing. But this can't be independent of the quality of institutions — our next topic.

## b) Dissimilarities and institutions

None of the dynamic models in Haavelmo's 1954 book incorporate institutional features explicitly, but the introductory chapter contains a brief discussion. Referring to Adam Smith, Haavelmo ascribes "a considerable part of of the inter-regional economic dissimilarities to conditions that are essentially man-made,



such as the traditions, form of government, the prevailing general attitudes towards free enterprise and commerce ...”(p 7). He insists that this evolutionary perspective pervades Adam Smith’s writing: “The title ‘An Inquiry into the Nature and Causes of the Wealth of Nations’ would not have been chosen by one who thought that the price mechanism in a short-run commodity market was the essence of economics.”(p 7.)

To highlight the role of institutions further he also points to Joseph Schumpeter, emphasizing how “Marx ... explains historical events — wars, revolutions, legislative changes, and social institutions — such as property, contractual relations, forms of government.” Haavelmo adds that Marx is “more helpful in suggesting new variables than in boiling them down to manageable essentials (for a model builder)”(p 12).

Maybe the simple model approach is ‘too good’ in boiling down man-made institutions to manageable essentials, but the simplicity does yield some clear and interesting results:

**Proposition 3** *In the grabber equilibrium, more grabber friendly institutions (lower values of  $\lambda$ ) reduce profits both in grabbing and in production, and thus lead to lower national income.*

To see this formally, notice from the arbitrage equation and the stability condition that

$$\frac{d\alpha}{d\lambda} = \frac{-sR + (1 - \lambda)s_2R}{\phi'(\alpha)} > 0 \quad (10)$$

where the denominator is negative from the stability condition and the numerator is negative as  $s_\alpha < 0$ . Hence, a reduction in  $\lambda$  reduces  $\alpha$  and the national income as well. It also follows that  $\pi_p(p) = \pi(\alpha N, L)/(1 - \lambda)$  goes down, as  $\lambda$  decreases, both because the numerator declines and  $\alpha$  goes down. Hence, the value of  $\pi_g = \pi_p$  must also go down for both reasons.

The basic message of the proposition is that bad institutions, or more generally bad governance, that allow grabbers to extract rents, increase the opportunity costs of producing, hampering modernization and growth. Thus bad institutions make countries relatively poor, while good institutions would have made them rich. So to what extent natural resource abundance is wasteful, depends on institutions and governance.

More surprisingly, perhaps, the proposition also emphasizes the following: what benefits grabbing, all else being the same, can be bad for both grabbers and producers when all things can adjust to the new circumstances. It is the displacement effect — how grabbers gradually replace producers — that explains how better conditions for the grabbers reduce grabber profits. Again, arrangements that benefit grabbers, raise the opportunity costs of producing, making the profits from production lower as entrepreneurs exit production and enter grabbing. But does this displacement effect depend on the number of entrepreneurs?

### c) *Dissimilarities and Entrepreneurial Skills*

Is it a good thing to have as many entrepreneurs as possible; or, would that lead to excessive rent seeking? Haavelmo does not take up this discussion explicitly, but he is skeptical of simple explanations that refer to entrepreneurial activities as the main example of economic development. On Schumpeter's theory of development he remarks:

"Schumpeter is looking for the driving forces in the process of capitalist economic development and he finds his concept in the process of innovation. The question is then whether we are satisfied with an 'explanation' that makes use of innovations as an external force, or whether we want to think of the innovations as only one of several ways in which the perpetual human struggle for progressive changes manifests itself. We are in any case far from an explanation of how these forces could operate with such obviously different results in the various parts of the globe" (p 18).

One reason why entrepreneurial skills provide different results in the various parts of the globe must be that they can relate to both constructive and destructive activities — production and grabbing in our example. How would an increase in the supply of entrepreneurs affect the paths in our simple theory?

**Proposition 4** *In the grabber equilibrium, an increase in the number of entrepreneurs  $N = n_g + n_p$  raises the number of producers  $n_p$  and lowers the number of grabbers  $n_g$  and raises the profits in both activities.*

To see this we have, from the arbitrage equation, that

$$\frac{d\alpha}{dN} = -\frac{\pi(\alpha N, L) + \pi_1(\alpha N, L)\alpha}{\phi'(\alpha)} > 0 \quad (11)$$

Accordingly,  $n_p = \alpha N$  is increasing, both because  $N$  and  $\alpha$  goes up as  $N$  increases. It is also evident that, as a consequence,  $\pi_p = \pi_g$  go up. That the number of grabbers declines can be seen by expressing the profits from grabbing as  $\pi_g = s(\alpha, \lambda)R = [1/(n_g + \lambda n_p)]NR$ . Since  $\pi_g$  goes up as  $N$  increases, the number of grabbers  $n_g$  must decline.

The result depends on the complementarity in modern production. A higher supply of entrepreneurs, in a situation where  $\pi_p = \pi_g$ , means that there is an immediate entry into each of the two activities. Yet, while each entrant in production raises the profits of the others by expanding the market, each entrant in grabbing reduces the profits to each grabber. These changes turn the flows of entrepreneurs. Now all new entrepreneurs go into production until new entrants again have lead to balancing profits  $\pi_p = \pi_g$ .

If the result is to be believed, we have a simple theory that strengthens the most naive interpretation of the blessing of Schumpeter's entrepreneurs. The result points to double benefits: the more entrepreneurs there are all together, the lower

is the absolute number of entrepreneurs in unproductive rent seeking. Thus underdevelopment can be overcome by enough entrepreneurs. Too few, however, means that an excessively high share of them ends up in unproductive rent seeking and grabbing. Tiny initial differences can be magnified over time.

The result also illustrates how scarcity can create inefficiency and waste, while abundance may lead to efficiency. The proposition states that there is a tendency to use entrepreneurial skills inefficiently when the skills are scarce — what we might denote wasteful scarcity. Thus when an efficient use of scarce entrepreneurial resources is most needed, the entrepreneurial temptations may lead them into wasteful grabbing and not into productive activities. The tendency is opposite when skills are more abundant — what we might denote efficient abundance.

These divergent behaviors can create dissimilarities among countries, in particular if they are combined with migration of entrepreneurial talents. Areas, that have a positive development, can attract more entrepreneurs who would basically go into productive activities and the share of grabbers decline. Does a similar flavor of 'Says law' also apply when it comes to the supply of productive workers?

#### *d) Dissimilarities and Poverty*

For a given population  $\bar{L}$  a low supply of productive workers  $L$  means a high number of poor people  $L_0$ . As stated, I incorporate extreme poverty in this simple manner. The group  $L_0$  is extremely poor in the sense that they are socially excluded and live outside the formal economy with bad health, low nutrition and inadequate education. To make them productive workers requires social investments in health and schooling. The following result applies:

**Proposition 5** *In a grabber equilibrium, a reduction in extreme poverty, that raises the number of productive workers  $L$  further, would increase the share of producers, the number of modern jobs, and the level of profits and national income.*

Formally, from the arbitrage equation and the stability condition we immediately see that that  $d\alpha/dL = -N\pi_2(\alpha N, L)/\phi'(\alpha) > 0$  and the proposition follows.

Why does the size of the productive workforce matter for the allocation of entrepreneurs and for total production? The key is that productive workers become an integrated part of the modern economy with a job either in constant returns activities or as workers in modern enterprises. The job gives them an income and potentially a profit to modern producers. The value added represents higher incomes and thus higher demand. The extent of the market goes up and so does the production in each sector. When each sector produces more the potential advantages of increasing returns becomes higher, raising the profitability of new investments. As production in this way becomes more profitable than grabbing new entrepreneurs are induced to start up with modern activities instead of unproductive work. As a result, grabbing activities decline gradually.

The flip side of this mechanism is that extreme poverty can curb modernization while poverty reductions can boost it. A high level of poverty is a clear

manifestation of the need for a positive development. Yet, it is exactly under these circumstances that it is difficult to initiate a process of structural change towards activities that require fixed investments in order to utilize more efficient increasing-returns technologies. The size of the productive labor force limits the size of the market, making it too small to initiate modernization. So in sharp contrasts to the needs, high poverty leads to more grabbing activities and less productive enterprises.

This is yet another example of wasteful scarcity. A low supply of  $L$  means a high level of extreme poverty. Dissimilarities can thus be dramatically widened by differences in attitudes towards the extremely poor. Persistent, but unnecessary poverty (say in the midst of affluence) can be called social miserliness (Lind and Moene, 2010). Such social miserliness can also imply that the extent of the market becomes too small for a real take off. Accordingly, while poverty can trap the economy in a bad equilibrium, poverty reduction can further positive developments. Not only do a poverty reduction help people to become productive and included in the formal economy, it can also stimulate the growth process by raising the incentives to modernize the economy. This is how poverty reductions make production more profitable, leading to further reductions in the number of grabbers.

The proposition points to indirect positive effects of poverty alleviation in addition to the obvious positive direct effects of eliminating suffering. As stated, the natural resource rents can in itself create a negative development. If a country, that initially is in a grabber equilibrium, could (miraculously) channel some of the resource rents into poverty alleviation in the form of health services and schooling, it would strengthen the positive indirect effects even more. The reduction in the resource rents up for grab would lead to positive displacement. One would obtain less grabbing activity and more production activities, both because  $R$  declines and because  $L$  goes up.

### *Empirical illustration*

One of the main predictions of the model above is that potentially huge dissimilarities can arise when economic evolution is triggered by the same stimuli. The clearest example is that natural resources induce economic growth and development when institutions are producer friendly, while natural resources induce stagnation and backwardness when institutions are grabber friendly.

Empirically this mechanism can be captured by an interaction term between resource abundance and institutional quality in the estimation of a 'growth equation'. Accounting for the direct impact of resource abundance and of institutions the coefficient of the interaction term would be positive and large while the direct effect of resources in itself should be negative and the effect of institutional quality should be positive.

This is exactly what Mehlum, Moene and Torvik (2006) find, applying data for all countries with available information, all in all 87 countries over the period 1965–1990. The estimation controls for initial resources in 1970 (the share of primary exports in GDP, and the share of mineral production in GDP). Initial

institutional quality, as measured by available indexes, range from 0 to 1. It turns out that similar results are obtained when different institutional indexes are tried out.

Among other things we find a strong negative effect on economic growth from initial resources, but also a positive interaction effect between resources and institutions, supporting our claim that natural resources are a blessing when institutions are good, but a curse when institutions are bad. Applying the estimated equations we have

$$\frac{d[\text{growth}]}{d[\text{resource abundance}]} = -14.34 + 15.40[\text{institutional quality}]$$

For countries with high institutional quality (higher than  $14.34/15.40 = 0.93$ ) the resource curse does not apply. Of the 87 countries 15 have higher  $\lambda$  than 0.93. All this constitute supporting evidence that important dissimilarities between countries can be explained by how institutions and lootable resources interact.

In sum, the theory and the empirical results suggest that countries with bad institutions cannot have much natural resources without obtaining harmful consequences for economic growth. More resources in these countries would lead to lower total income as entrepreneurs are induced to give up production and start to compete for natural resource rents. In other words, it is in countries with much valuable natural resources that good institutions and efficient governance are particularly important.

## 4 Concluding remarks

Above I have shown how development may depend negatively on initial resources and initial poverty, and positively on the quality of institutions and the number of entrepreneurs (even when we control for initial income levels). Small differences matter, echoing Haavelmo (1954): "even small initial dissimilarities may in time cause very big — almost irreparable — gaps between potentially similar economic regions." (p 111).

To interpret the dissimilarities one has to open for, as Haavelmo does, that the most important 'shocks' may come from within and that they need to be accounted for explicitly. Unproductive rent extraction can be thought of as such a persistent 'shock' that in combination with simple dynamics of industrialization can produce huge dissimilarities across countries and regions.

The model suggests that important dissimilarities may be the result of 'twin peak dynamics'. Some countries end up in the grabber's club and thus have bad policies and low growth; other countries end up in the producer club and have better policies and higher growth. Thus growth rates and economic performance converge within clubs of countries and diverge between them.

In all cases the entrepreneurs do the best out of the situation in accordance with their self interests. The pattern is that bad institutions are particularly harmful for countries that have a lot of natural resources to plunder. Or put differently, lootable resources put institutions to a test that they otherwise would not be ex-

posed to. Failures can be extremely harmful for economic and social development.

I've also made a case for the idea that both wasteful abundance (of natural resources) and wasteful scarcity (of entrepreneurial talents and productive workers) can be harmful for growth and development, in particular when institutions are bad. These mechanisms suggest that institutional failures are likely to play an essential role in any explanation of the economic dissimilarities "without giving up the fundamental assumption that various people of the earth are, basically, similar." (Haavelmo 1954, p 105.)

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