

The Adam Smith Rule:  
Inequality and emerging markets  
(First Draft)

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**Abstract**

What we denote the Adam Smith rule of inequality, captures how the conditions that generate high top income shares may lead to destitution of lower classes. We explore how the richness of a small number may create underdevelopment and unnecessary poverty. We show how this story can be based on a consistent approach to the demand composition problem. Everybody cares about the quality and quantity of their consumption in a manner that creates a hierarchy of demand. Low income earners prefer low quality, while high income earners prefer higher qualities that may only be available in foreign markets. In this set-up the extent of the market limits the entry of local industries, while the entry of local industries determines the extent of the market. The mutual dependencies give rise to multiple equilibria. Rising incomes at the top can i) increase poverty at the bottom as high income recipients demand no low quality products produced at the

local level and only high quality products produced abroad, and ii) the vanishing local production increases the employment in agriculture, and iii) workers' wages decline as more workers are employed in agriculture. We show how land reforms can induce local industries, and how restrictions to trade in some cases can induce domestic development.

## 1 Introduction

In *The Wealth of Nations*, Adam Smith insisted: "For one very rich man, there must be at least five hundred poor, and the affluence of the few supposes the indigence of the many" (Smith 1776:232). The exact numbers can of course be debated, but at least in developing countries high concentration of wealth in the hands of the few can in itself generate low incomes to the many. This paper explores i) one important mechanism behind the Adam Smith rule and ii) the policy implications that can be derived.

As we all know, top income shares have indeed been rising over the last 25 years, also in developing countries. For instance, the top 1 % income share rose from 10 to 22 in India, from 8 to 14 in China, and from 10 to 19 in South Africa. Some observers can nevertheless claim that we should not care much about this rising inequality since redistribution from a small group at the top to a majority of citizens at the bottom, cannot have much impact on the total well-being of the great lot.

That argument, however, presupposes that other things remain the same. But higher inequality causes other things to change: rising top income shares can directly limit the income expansion, and even reduce it, at the bottom of the

income distribution which may help explain why the income shares to the bottom 50% have declined so much in so many countries over the same period as top income shares have risen. The share going to the bottom 50%, for instance, declined from 22 to 15 percent both in India and China over the period from 1990 to 2015.<sup>1</sup>

To understand how wealth concentration at the top can create misery in the rest of the population and for the country as a whole, we emphasize

1. how the demand for food is a priority that needs to be lexicographically satisfied before consumers start demanding other products;
2. how the demand for higher quality products, in particular, go up with individual incomes when consumers care about both quality and quantity of each non-food product;
3. how the income distribution composes the total demand and thus determines the emergence of markets for different products with different qualities and characteristics.

While 1) and 2) establish a hierarchy of potential demands for the different income classes, 3) determines which demands that are socially articulated and fulfilled.

Special emphasis is put on the foundation of individual preferences that can generate 2) and 3). Preferences are over non-food consumption goods and their quality. We depart from the traditional assumption where quality is considered a continuous variable. We focus in-stead on how goods from different suppliers have distinct qualities and supply prices and that consumption of a mix of qualities generate a utility that depends on the average of qualities consumed.

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<sup>1</sup>There is no observations from South Africa.

Now, in developing countries industrialization typically begins with the production of simple low-quality products for domestic consumption. In the start, developing countries may simply be unable to produce the high quality and advanced products, and in particular the fashionable brands, that the rich upper class demands. Therefore the upper class relies on imports to cover their demand for high quality products, paid for by exporting agricultural products.

Development can be severely affected by a biased composition of demand caused by a high level of inequality in income and wealth. The high level of inequality can prevent the rise of local industries. We show how rising top income shares can thus gradually erode the potential for emerging domestic markets, undermining the job-creation outside agriculture. Workers receive declining earnings as long as more and more of them must rely on decreasing-return-activities in agriculture. The logic is simple. Agriculture is in high demand by the poor *and* by the rich — in accordance with two different aspects of Engels law. For the poor agriculture output is food that can be eaten and the share of food in income is high. For the rich agriculture is cash crops that can be traded for luxury imports and the share of luxury imports is high. If there are only rich and poor there is no demand for local manufactures. If there is a poor middle class there can be demand for local manufactures.

In other words, a take-off of industrial development can be held back or severely limited, without a local middle class,. As long as a high level of inequality implies a lack of markets for local industries, there will be no local industrial development, reinforcing the high inequality between land owners and workers. So when local industrialization depends on the extent of the market, the extent of the market can be determined by the degree of local industrialization. This two-ways dependency

can thus lead to multiple equilibria for the same endowments and the same basic principles behind each individual preferences.

In our set-up all equilibria are Pareto optimal. The low wage equilibrium is thus not a poverty trap in the Big-push sense, where everyone is better off by a coordinated industrialization effort. Here not even allowing for side payments opens up for moving between equilibria. With two Pareto optimal equilibria efforts to move from one to the other will be met with resistance. Moreover, influential groups may want to shift the equilibrium opening up for interesting political economy implications.

In the discussion below most attention is devoted to the case with two locally stable equilibria. The low development equilibrium is characterized by high ground rents to the land-owning class who demands no non-food domestic products. the land-owners use all their income (beyond food expenditures) to buy luxury goods from abroad. All workers are thus employed in agriculture that thus yields a low wage. The low wage incomes are used for food consumption only.

The other equilibrium is better for workers - but worse for the land owning class. Labor incomes are sufficiently high to generate a positive demand for the products of local industries. Some workers are thus dragged out of agriculture, raising the wage of all workers, which again sustains the positive demand for local industrial products.

We show how land reforms and other forms of asset redistribution can change the equilibrium outcome from a low development equilibrium to one with local industries. In other words, redistribution of wealth may induce additional changes that reduce inequality even further. Similarly, we derive results for trade-openness.

Throughout we are inspired by seminal papers by Baland and Ray (1992) and

Eswaran and Kotwal (1993) on the macro side and combine it with a new twist on the quality quantity trade-offs. We are also highly inspired by Banerjee and Newman (1993) and Zweimuller(2000) . (More... )

What we denote the Adam Smith rule of inequality, captures how conditions that generate high top income shares may at the same time lead to destitution of lower classes. A similar regularity was emphasized by other scholars, before Smith. Ortes (1774), for instance, claims that "advantages and evils always balance one another: The great richness of a small number are always accompanied by the absolute privatization of the first necessities of life for many others. The wealth of a nation corresponds with its population, and its misery corresponds with its wealth" — echoed by by Marx as: "Accumulation of wealth at one pole is [...] at the same time accumulation of misery, agony of toil, slavery, ignorance, brutality, mental degradation, at the opposite pole [...]" (Marx 1867:709). The economic historian Eli Heckscher expressed similar views when he claimed that "the wealth for the country [is] based on the poverty of the majority of its subjects", ... "a tendency to keep down the mass of the people by poverty, in order to make them better beasts of burden for the few"(Heckscher, 1962:153, 166 ).

## 2 Quality and quantity in consumption

### 2.1 The quality quantity preferences

The income of agent  $i$ ,  $y_i$  is first spent on the minimum nutritional needs consumption of agricultural goods,  $y_0$  such that

$$a_i = \min\{y_0, y_i\} \quad (1)$$

Only if  $y_i > y_0$ , the excess income is spent on manufactured consumption goods in order to maximize the quality adjusted utility. Inspired by Theil (1952) Houthakker(1952) Becker& Lewis (1973) and Rosen (1981) we consider a utility function

$$U = u(c, q) \quad (2)$$

where  $q$  is quality and  $c$  is quantity of consumption. The function  $u$  is an aggregator of quality and quantity where quality and quantity are complements. Hence the elasticity of substitution between quality and quantity is less than unity.<sup>2</sup>

Assuming that the unit supply-price of consumption for a given quality is an increasing function of quality,  $p(q)$ , the budget constraint can be written

$$y - y_0 = cp(q) \quad (3)$$

and where the slope of the budget line, with quality  $q$  on the horizontal axis and

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<sup>2</sup>Elasticity of substitution equal to one would imply that the multiplicative aggregation  $cq$  could be used.

quantity  $c$  on the vertical is

$$m = \frac{cp'(q)}{p(q)} \quad (4)$$

The slope captures that an increase in consumption by one unit costs  $p(q)$  while an increase in quality costs  $cp'(q)$ , the increase in unit price times the quantity produced.

In optimum, the first order condition

$$\frac{u'_q}{u'_c} = m \quad (5)$$

has to hold. Using the budget in combination with this optimality condition we can derive how demand for quality is affected by changes in income.

$$\frac{\partial q}{\partial y} = \left[ \frac{1 - \sigma}{\rho - \sigma} \right] \left[ \frac{qp(q)}{y - y_0} \right] \left[ \frac{\rho}{p'(q)(qp'(q) + p(q))} \right] > 0 \quad (6)$$

here  $\rho$  is the measure of curvature of the budget line akin to the *elasticity of substitution*, where a budget line that is close to linear will have a  $\rho$  which is large. It follows from the second order condition that the budget line has to be less curved than the indifference curve in optimum, hence  $\rho > \sigma$ .<sup>3</sup> We therefore have the following proposition.

**Proposition 1** *The demand for quality increases continuously with income if and only if quality and quantity are complementary in consumption.*

In the traditional formulations the quality of goods (or in the case of Becker

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<sup>3</sup>In the algebra of the problem restrictions on  $\rho$  sets restrictions on the second order derivative of  $p(q)$

children) may vary continuously. We will depart from this assumption and consider the case where goods from different suppliers have distinct qualities and that the consumer that consume a mix of qualities consider the quality if the mix as being equal to the weighted average of qualities.<sup>4</sup>

An implication of different goods having fixed qualities in a hierarchy of qualities is that the consumer moves upward among these qualities and upgrades consumption to more pricy higher quality consumption as income increases.

**Proposition 2** *For low income levels the consumer only consumes the lowest quality good. As income increases the demand for low quality products eventually goes to zero. When income is sufficiently high the consumer only consumes the highest quality product. For intermediate levels of income the consumer combines consumption of the two qualities below and above the preferred quality, conditional on income.*

*Proof* See appendix I.

The implications of this proposition is critical for the rest of our discussion. One implication is straight forward: when distribution of wealth is highly unequal, the demand for non-food output is directed towards the highest quality. When distribution of wealth is more equal, the demand is directed towards the lowest or two intermediate qualities. If only the low and intermediate qualities can be produced domestically, there is an interesting general equilibrium effect where the

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<sup>4</sup>For example half a bread of quality 1 and half a bread of quality 2 is considered equivalent to one bread of quality 1.5. It follows that in a hierarchy of good qualities with a fixed price ladder the consumer will consider the convex envelope as the relevant  $p(q)$  price quantity This assumption about blended goods can be replaced with assumption about none blending without affecting the main results. But the analysis will then have some complicating issues related to non-divisibility.

income distribution determines the demand composition that in turn determines the creation of jobs and thus in the end the income distribution

### 3 The aggregates

Labor supply is equal to  $N$  and is employed either in agriculture or in production of consumption good  $b$ . The production function in agriculture is decreasing returns to scale  $a(\cdot)$  while production of  $b$  goods production is linear.

$$L_a + L_b = N \tag{7}$$

$$A = a(L_a) \tag{8}$$

$$B = L_b \tag{9}$$

For a given wage, employment and rents in the agricultural sector is determined by

$$w = a'(L_a) \tag{10}$$

$$\pi = A - wL_a \tag{11}$$

The difference between good  $b$  and good  $d$  is the distinct qualities  $q_b$  and  $q_d$  where  $q_d > q_b$ . When consuming a combination the overall quality of consumption

is the arithmetic average of the two.

$$c_i = b_i + d_i \quad (12)$$

$$q_i = \beta_i q_b + (1 - \beta_i) q_d \quad (13)$$

$$p_i = \beta_i p_b + (1 - \beta_i) p_d \quad (14)$$

$$\text{where } \beta_i = b_i / c_i \quad (15)$$

The budget can be written

$$y_i - y_0 = c_i p(q_i) \quad (16)$$

$$\text{where } p(q_i) = \alpha_0 + \alpha_1 q_i \quad (17)$$

$$\alpha_0 = \frac{q_d p_b - q_b p_d}{q_d - q_b} \quad (18)$$

$$\alpha_1 = \frac{p_d - p_b}{q_d - q_b} \quad (19)$$

Here  $\beta_i$  and  $(1 - \beta_i)$  are the shares of local and imported manufactured goods respectively in consumption. The quality of  $c_i$  is determined by the weighted average of the qualities of  $b_i$  and  $d_i$  respectively. It follows that  $p_i$  depends linearly on the average quality of the consumption bundle of consumer  $i$  with parameters given by  $\alpha_0$  and  $\alpha_1$ .

In order to get simple solutions we work with the case where the elasticity of substitution is set to 1/2. Then in equilibrium<sup>5</sup> the following closed form solutions hold

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<sup>5</sup>Here the min-max function assures that only positive  $\beta$  less than unity is considered.

$$q_i^* = \max\{q_b, \min\{\frac{\sqrt{y_i - y_0}}{\sqrt{\frac{p_d - p_b}{q_d - q_b}}}, q_d\}\} \quad (20)$$

$$\beta_i^* = \frac{q_d - q^*}{q_d - q_b} \quad (21)$$

$$b_i = \begin{cases} 0, & \text{if } y_i < y_0 \\ \beta^* \frac{(y_i - y_0)}{\beta^* p_b + (1 - \beta^*) p_d}, & \text{if } y_i > y_0 \end{cases} \quad (22)$$

It follows that  $b_i$  is first increasing and then decreasing in  $y_i$ . It gets positive at  $y_i = y_0$  grows to its maximum when  $q_i^* = q_b$  and then back to zero when  $q_i^* = q_d$ . These two points are given by

$$y_m = q_b^2 \frac{p_d - p_b}{q_d - q_b} + y_0 \quad (23)$$

$$y_h = q_d^2 \frac{p_d - p_b}{q_d - q_b} + y_0 \quad (24)$$

The interval over which this happens depends on the relative sizes of price differences and quality differences. The relationship between  $y_i$  and  $b_i$ ,  $b(y, p_b, p_d)$  is always tent mapped.. .

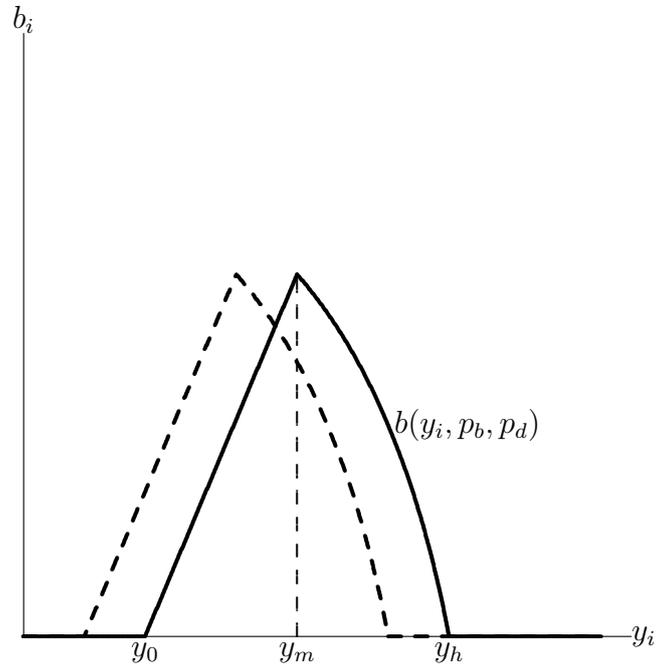
In the figure we have also included a dashed curve capturing a case where consumer  $i$  has gotten a lump sum transfer. Such a transfer will make consumer  $i$  richer for all levels  $y_i$  and the consumer will start consuming  $b$ - goods for a lower level of  $y_i$ .

Demand for local manufactures  $B$  are determined by local demand. <sup>6</sup>

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<sup>6</sup>Remember that  $B$  is neither exported or imported. Only the high quality substitute  $D$  is.

Figure 1: Demand for  $b_i$  as function of  $y_i$

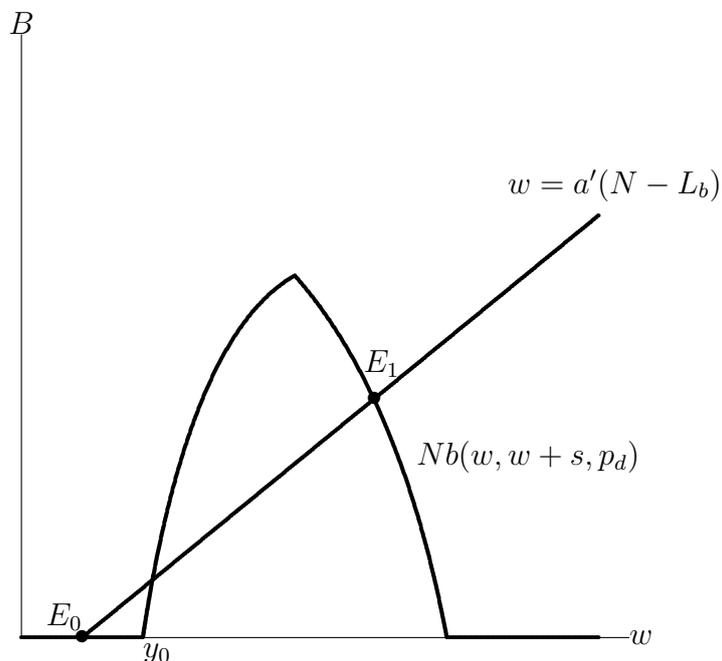


$$B = \sum_{i=1}^N b(y_i, p_b, p_d) \quad (25)$$

The distribution of income in the economy determines the overall quantity  $B$ . Assume first that the number of land owners  $J$  is low so that all landowners has income above  $y_h$ . If all the wage earners only have wage as their source of income  $y_i = w$ . Moreover the pricing of  $B$  yields  $p_b = w + s$ . Taking this into account we can aggregate the  $N$  wage earners demand for  $B$ -goods to get

$$B = Nb(w, w + s, p_d) \quad (26)$$

Figure 2: Equilibrium in  $B$ -goods market generated by interaction between wage level and demand.



Moreover, from labour market clearing we get

$$w = a'(L_a) = a'(1 - B) \quad (27)$$

These two equations give demand for  $B$  as function of wage income and wage rate as function of  $B$ -sector employment ( $L_b = B$ ).

The model configuration shown has two equilibria. One in  $E_1$  with local manufactures production and one in  $E_0$  without. The two equilibria are generated by the interaction between local demand, local production and local job creation.

The intuition behind the dual equilibria is simple: As seen by the workers the equilibrium without local industries is an example of a bad - but yet socially efficient - equilibrium. Landowners become rich by underdevelopment.

The properties of the two equilibria can be summarized as follows:

- In  $E_0$ . Only agriculture  $A$  is produced. All  $J$  land owners land rents go to finance their  $y_0$  and imports.  $Ja_0 + p_d D = a(N) - Nw$ . All workers income finance agricultural staples,  $Nw < Na_0$ . Since agriculture is so large, the income distribution is polarized and equilibrium without  $B$  demand and  $B$  production is possible.
- In  $E_1$ . Both  $A$  and  $B$  is produced. All land owners land rents go to finance their  $a_0$  and imports.  $Ja_0 + p_d D = a(N - L_b) - (N - L_b)w$ . Wage is high and more than sufficient to finance agricultural staples,  $Nw > Na_0$ . Some of worker income finances  $B$ -goods and some finances  $D$ -goods. Since agriculture sector is smaller than in  $B$  such an high wage equilibrium is possible.
- $E_1$  is better than  $E_0$  for workers.  $E_0$  better than  $E_1$  for land owners.

Note that the two equilibria are a result of the economy trading in one manufactured goods and not in the other. It could be altered in two directions, full trade and no trade:

First, if there was trade in both goods the price  $p_b$  would be determined by the world market and the wage would be fixed, making the wage schedule vertical, resulting in a unique equilibrium.

Second, if there was no trade, also the rich land owners would be forced to demand  $b$ -goods and the possibility of equilibrium  $E_0$  would disappear. This can be summarized in the following proposition

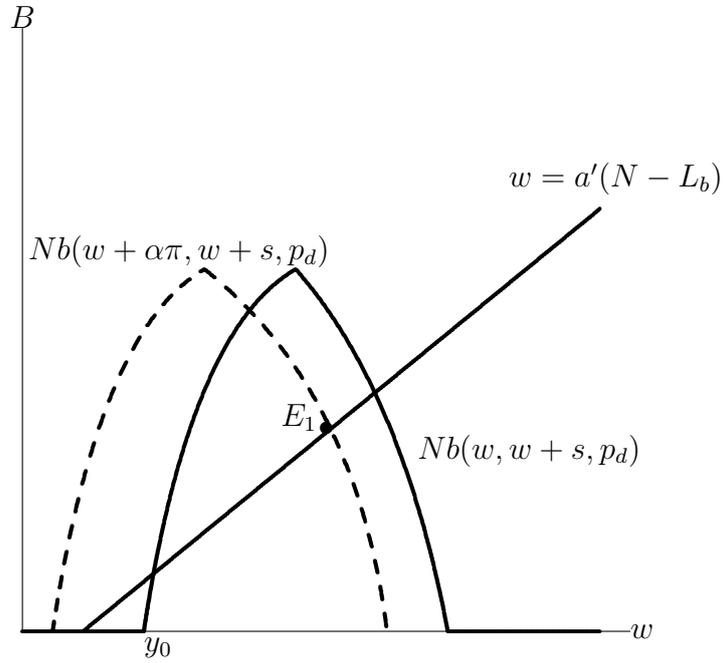
**Proposition 3** *Given a sufficiently concentrated ownership of land and high supply of labor the economy will have two equilibria. One with low wages and without local manufacturing production. Another with higher wages and with manufacturing production. The dual equilibria would disappear if either trade was completely frictionless in all goods, or if there was no trade at all.*

Trade reform in one of two directions might affect the dual equilibria property. As already illustrated redistribution of land is another way.

The following figure illustrates the case where workers each are given a share  $\alpha$  of the land rents  $\pi$ . In that case the income varies with wage for two reasons: As wage grows the wage income increases while profit income decreases. If The profit income share is moderate the wage effect dominates and the share of land rents merely gives a horizontal shift in the  $B$ -good demand schedule. In the figure the redistribution is sufficient to remove the low wage equilibrium  $E_0$ .

**Proposition 4** *Redistributing land from big landowners can induce local industrialization.*

Figure 3:  $B$ -goods demand after land reform



## 4 Concluding discussion

This setup can be used for further explorations

- Political economy of industrialization
- Dynamics of industrialization. Learning by doing etc etc. Combined with big push. can look at coordination and gains for all.
- Political economy of land and land reform.
- Many issues related to distribution and development. Geography trade costs.
- regional trade arrangements

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