Sub-Saharan African Economies’ Growth Paths and Exports Structures: Confirming the Concept of Poverty Trap?

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1. Context

- Many low-income countries = commodity-exporters,
- and many commodity-exporters = commodity-dependent countries
- => impact of the 2008-10 crisis on countries exhibiting this specific market structure?
- Long-term growth prospects of these countries?

- These countries are characterised by high vulnerability:
  - to the volatility of international commodity prices, making their growth rates themselves volatile
  - and to fluctuations of global demand for their exports - fuels, mineral or agricultural products.

- Because volatility is an intrinsic feature of commodity prices:
  - It has been amplified during the 2003-08 commodity boom by the increasing linkages between commodities and financial markets: commodities traded as financial assets.

- Moreover, theories of the secular decline of commodity prices (R Prebisch, H Singer, A Maizels): this volatility ensnares low-income countries and explains slow growth.
Argument:

The growth trajectories of countries exhibiting such market and export structure,
and the impacts of crises and shocks on them,
may be analysed via the conceptual framework of the concept of the poverty trap:
I.e. feedback processes, increasing returns, spillovers, multiple equilibria, irreversibility, threshold effects...

Due to this export structure:

=> it is difficult for low-income countries to reach the ‘tipping point’ above which they can trigger long-run growth

=> this export structure prevents industrialisation, yet crucial, as industrialisation is the key route towards growth, and as industrial products are less subject to volatility.

Poverty traps reinforce themselves through endogenous processes: low productivity, low value-added, export of commodities, representing a decreasing share of unit of GDP due to technological progress (World Bank, 2009a)
However, for other studies:

- Fluctuations of growth rates may be explained by different conceptual frameworks: e.g., growth accelerations-decelerations, refuting the existence of ‘traps’ for commodity-dependent countries

- Industrial and emerging countries need a series of primary commodities as inputs for their industries => demand for these commodities, and therefore prices, follows cycles can be investigated without the poverty trap concept.

- Moreover, arguments that demand from emerging countries will stay high (e.g., China), and therefore commodity prices will stay high, hence foster high growth rates for commodity-dependent countries.

- Related argument: commodity-dependence does not cause lower growth, as the production of commodities may generate Hirschmanian linkages to the rest of the economy and be a basis for industrialisation (Wright and Czelusta, 2004; ‘Making the Most of Commodities’, Morris et al., 2012).
Against these views:

1) Via a theoretical analysis of the concept of the poverty traps

2) It can be shown that low-income commodity-dependent SSA countries’ growth trajectories confirm the relevance of the conceptual framework of poverty traps.

Because commodity-dependent countries’ growth trajectories exhibit 3 definitional features of traps:

1) threshold effects, bifurcations and lasting impacts of external shocks;

2) cumulative causation and increasing gaps between groups of countries according to their export structure;

3) Low equilibria trapping commodity-dependent countries (Sindzingre, 2012).

The 2008-10 crisis, another period of commodity boom followed by a slump, and the most severe recession in 50 years, is an additional example of the processes subsumed in the concept of ‘trap’.
Outline

1. Key theoretical features of the concept of poverty traps

2. Market structures characterised by commodity dependence in SSA

3. Theoretical critiques regarding the very existence of poverty traps: competing explanations of poor countries’ growth profiles.

4. Against these critiques: explanatory power of the concept of poverty traps and its 3 key features

5. The assessment of causalities does not mean determinism and involves complex causal factors:
   - Other factors combine with the relationship between commodity-dependence and growth.
   - These factors counter or reinforce the formation of traps, in particular domestic institutions.
2. Properties of poverty traps: main theoretical issues

- Lock-in processes, cumulative causation, low equilibria

- The concept of the poverty trap: irreversibility, cumulative causation, feedback processes, lock-in devices, multiple equilibria (high and low), threshold effects, non-linearity and non-convexity, increasing returns.

- Multiple equilibria or ‘traps’: Arthur (1989, 1994): positive feedbacks, path dependence, “lock-in by historical small events”, self-reinforcing mechanisms, cumulative causation, some equilibria able to lock in economies or individuals in inefficient behaviour and low levels of income.

- Increasing returns in growth theory, e.g., Allyn Young (in the 1920s), Nicholas Kaldor (in the 1960s).

- B Arthur: dynamic nature of increasing returns and positive feedbacks, their stochastic character = random deviations from long-run tendencies

- This property => multiple long-run states depending on initial conditions and random fluctuations, and of ‘specialised’ outcomes (e.g. in geographical terms).

- At the individual level => learning, experience and the perception of success may lead to the reinforcement of some processes, e.g., the transmission of some information at the expense of others: such processes lock individuals in inefficient behaviour.
even with suitable initial conditions, the same mechanisms can lead to either optimal or inefficient equilibria.

Lock-in (e.g. by technological choices) and positive feedbacks

Path dependence (David, 1985, 2000) = phenomena that have the dynamic property of non-ergodicity in stochastic processes (i.e. not having the “ability eventually to shake free from the influence of their past states”), and which, beyond market failures and inefficiencies, imply the existence of “winners and losers”.

P David (2000) : ‘lock-in’ = the “entry of a system into a trapping region”

= the basin of attraction that surrounds a locally (or globally) stable and self-sustaining equilibrium.

A dynamic system that enters into such regions needs, in order to escape from it, external forces that alter its structure.

Locked-in equilibria may be optimal or detrimental

P David: whatever the equilibrium, individuals are happy doing something, “even though they would be happier doing something else if everybody would also do that other thing too”, because incomplete information prevent them from coordinating and moving elsewhere collectively.

Alternatives paths are possible: path dependence does not mean determinism.
Poverty traps as major causes of underdevelopment: coordination failures

Period of the WWII theorists: G Myrdal, A Hirschman, P Rosenstein-Rodan (1943): why some economies are unable to trigger the virtuous process of catching-up?

=> concepts of **spillover effects, linkages and complementarities**: overlap with those of **cumulative causation and path dependency**.

Rosenstein-Rodan: **spillovers** = increasing returns to an activity proportional to the number of others who undertake the same activity.

**Absence of spillovers, coordination failures** => multiple equilibria and underdevelopment traps: **low equilibria, coordination failures and poverty traps are endogenous and self-reinforcing**.

=> **markets alone cannot achieve the coordination** necessary for triggering development (Adelman, 2000; 2001).

Markets do not necessarily lead from the lowest equilibrium to the best one (Hoff, 2000).

=> **hence role of the state at the early stages of development = the entity most able to reallocate factors and resources across markets** => ‘big push’ (Murphy et al., 1989).

**State capacity is endogenous to the level of development** (Bardhan and Udry, 1999) => underdevelopment traps are likely at early stages of development;

Their determinants are economic, political, institutional.
Traps as a central concept in theories of growth

Some growth models: when jointly considering income and growth rate, non-linearity, multiple equilibria=salient feature of the growth process (Fiaschi-Lavezzi, 2003)

Kelly (2001): Schumpeterian growth models: development = progress through a space of commodities, from simple to complex goods (linkage formation) => thresholds: below a critical probability of linkage formation, development ceases; above, innovation continues.

Poverty trap => cf concepts of polarisation and ‘club convergence’ (Azariadis, 2006): refuting growth convergence across countries to similar steady-state income levels and the hypothesis that variations in income growth are due to different initial conditions.

Since the 1960s, only East and South East Asian countries caught up with industrialised countries; the less developed countries are not catching up: ‘twin peak’ shape of the world distribution of per capita incomes, polarisation of growth rates (Quah, 1996).

Role given to history (past events have large and lasting effects); non-linear processes and lock-in constraints on the growth of certain countries.

Figure 1: Relative GDP levels vs. growth rates

Source: Fiaschi and Lavezzi (2003), based on the Penn World Table 5.6 for the 1960-1989 period for 120 countries. GDP = relative income with respect to the (world) average of the period.
Barrett and Swallow (2006): standard growth models = a single dynamic equilibrium
=> convergence of growth paths toward a single level of welfare

**Figure 2: Welfare dynamics under the convergence hypothesis.**

Multiple dynamic equilibria => S-shape of the growth function, with stable dynamic equilibria at high and low levels of welfare (Wh, Wl), => at least one unstable dynamic equilibrium, a critical threshold (Wc).

Only a large positive shock make economies or households able to escape the basin of attraction of the low-level equilibrium, move toward a higher equilibrium.

**Figure 3: Welfare dynamics under the poverty traps hypothesis.**

Source: Barrett and Swallow (2006)
3. Commodity-dependence in Sub-Saharan African countries

- Most low-income developing countries: **dependence on commodities for their exports, undiversified export structure.**

- E.g., in SSA, since the mid-2000s, **fuels represent more than one-third of exports** (IMF, 2007, table 4.1): together with ores and metals, **half of exports.**

- UNCTAD (2008a) **dependency rate** = average share of the 4 main commodity exports value/value of total exports for the period 2003–2005. Dependency rate > 50% => more than 50% of earnings from exports come from the 4 commodities: more than half of all developing countries rely on 4 commodities for 50% of their exports earnings; 31% rely on 4 commodities for more than 75% of their export earnings.

- **Relationship with low per capita income:** among the 45 LDCs, 30 = dependency rate > 50%; in Africa, 34 of the 52 countries = more than 50% dependent.

- **Dependency rate > 80% = West African countries, Western Asian countries (oil).** Also agricultural products (cotton, cocoa, coffee): some SSA countries: DR > 65%.
10 SSA countries have commodities exports making over 75% of total export

Figure 4: resources export as % of total exports

Figure 5:

Source: Ross (2011).
Figure 6: Mining in Africa, 2012

Table 1: Structure of merchandise exports of Sub-Saharan African countries, 1995-2010

<table>
<thead>
<tr>
<th></th>
<th>Food (% of total)</th>
<th>Agricultural raw materials (% of total)</th>
<th>Fuels (% of total)</th>
<th>Ores and metals (% of total)</th>
<th>Manufactures (% of total)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low- and middle income SSA countries*</td>
<td>18</td>
<td>15</td>
<td>7</td>
<td>4</td>
<td>36</td>
</tr>
<tr>
<td>Low-income countries</td>
<td>31</td>
<td>25*</td>
<td>10</td>
<td>8*</td>
<td>2</td>
</tr>
<tr>
<td>East Asia and Pacific</td>
<td>11</td>
<td>8</td>
<td>4</td>
<td>2</td>
<td>6</td>
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<td>Latin America and Caribbean</td>
<td>20</td>
<td>16</td>
<td>3</td>
<td>2</td>
<td>15</td>
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<tr>
<td>South Asia</td>
<td>17</td>
<td>12</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

Source: adapted from World Bank World Development Indicators 2012 and previous reports, table 4.4. *: data for 2009. **: all SSA countries except Equatorial Guinea. §: data missing for most other countries. Food: SITC sections 0 (food and live animals), 1 (beverages and tobacco), and 4 (animal and vegetable oils and fats) and SITC division 22 (oil seeds, oil nuts, and oil kernels). Agricultural raw materials: SITC section 2 (crude materials except fuels), excluding divisions 22, 27 (crude fertilisers and minerals excluding coal, petroleum, and precious stones), and 28 (metalliferous ores and scrap). Fuels: SITC section 3 (mineral fuels). Ores and metals: SITC divisions 27, 28, and 68 (nonferrous metals). Manufactures: SITC sections 5 (chemicals), 6 (basic manufactures), 7 (machinery and transport equipment), and 8 (miscellaneous manufactured goods), excluding division 68.
Strong relationship between commodity prices and growth rates in SSA

Figure 7: Sub-Saharan Africa: growth rate (right scale) and commodity prices (annual price index, 2005=100, real 2005 dollars, left scale), 1960-2011

Vulnerability of export-oriented countries to external demand:

Figure 8: elasticity of world trade to world income by decade

Source: IMF (2009c).
Countries that share this commodity-dependence are likely to be caught in ‘international poverty traps’ (UNCTAD)

- in commodity-dependent countries, a combination of international trade and finance relationships reinforces the cycle of stagnation, which, in turn, reinforces the negative impact of external relationships.

UNCTAD (2002): globalisation tighten this international poverty trap: closer linkages between energy and agricultural commodity markets, as well as commodity and financial markets over the 2000s

- => increase in price volatility and therefore uncertainty
- => detrimental effect on investment and governments’ financial management (UNCTAD, 2008b; Sindzingre, 2010).

The international poverty trap, and its factors – low productivity, debt trap - confirmed by the high commodity price fluctuation and succession of booms and busts of 2003-2008 (Gore, 2010).
4. Three criticisms of the argument of commodity-based growth traps

- Many critiques of the concept of poverty trap: three main arguments:
  - i) if traps exist, they may be generated by many other factors than commodity-based market structures;
  - ii) commodities do not always generate traps;
  - iii) the very existence of poverty trap may be questioned.

- Lack of correlation between commodity-based export structures and traps: traps may be caused by many factors unrelated to commodities

- Critiques of commodity-generated traps: 2 arguments.
  - 1) the lack of convergence between groups of countries -a group growing more slowly relatively to other countries- is caused by many possible factors.
  - Even in commodity-exporting countries, the negative relationship with growth hide other causes, e.g., greater probability of debt overhang (Manzano and Rigobon, 2001).
Poverty traps = a product of poor public policies: e.g., protection

or of certain initial economic conditions: low savings rates as the latter depend on the level of per-capita income, or credit market imperfections and borrowing constraints (Banerjee and Newman, 1994).

Azariadis and Drazen (1990): ‘low growth traps’ or ‘underdevelopment traps’, i.e. multiple and stable equilibria for economies exhibiting similar initial conditions, result from ‘threshold externalities’ created by increasing returns in the accumulation of human capital.

Azariadis (1996): why similar countries do not converge to the same steady state?

Many causes of poverty traps: subsistence consumption, limited human capital, demographic transitions when fertility is endogenous (as in SSA), political economy problems such as coordination failures among voters.

Explaining per capita income not at the country but at the individual or household level: location effects intensify microeconomic poverty traps:

- Traps here generated by spatial processes (Benabou, 2000), or ‘neighbourhood effects’, which explain why in particular areas poverty traps exist and persist (Durlauf, 2003): dynamic dimension, as the place of residence restricts future opportunities.
- Poverty traps: a group that if composed initially of poor members, will remain poor over generations (Durlauf, 2003).
- Spatial poverty traps = self-reinforcing processes: low level of education, poor schooling infrastructure, low levels of taxes, limited supply of public goods.

- Decision for an individual to acquire an education depends on the prior existence of other educated members in a group: interdependence of behaviour
- => ‘neighbourhood effects’, which generate different types of groups that have different steady states (with/without educated members) (Durlauf, 1996; 2003).
- This interdependence is intertemporal: it affects future social interactions:
  dynamics => persistent income inequality.
- Spatial poverty traps: reciprocal feedbacks micro/macro levels, mutually reinforcing.
Question: do poor people live in ‘poor areas’ or do the characteristics of some areas create poorer people?

Jalan and Ravallion (1997): does residence make the difference between growth and contraction in living standards for otherwise identical households?

If so, poverty traps may be spatial, externalities may be geographic:

- neighbourhood endowments of physical and human capital influence the productivity of a household's own capital

(cf. post-reform rural China’s spatial poverty traps; cf. Hoff, 2000, China’s ‘local underdevelopment traps’).
Lack of correlation: the export of commodities may be a basis for sustained growth

2) 2nd argument against commodity-generated traps:

- Many commodity-exporting countries enjoyed an increase in their per capita income, were not caught in a poverty trap, and grounded growth on primary products, e.g., Australia (metals), New Zealand (agricultural products), Canada, Scandinavian countries...

- At the historical level, growth in many developed countries has been based on commodities. Commodities used as inputs in industrialisation, supported by colonisation: the ‘small open economy’ model (Hopkins, 1973): the imports of commodities from colonised countries, exports of manufactured products to them.

- Many developed countries have based their industrialisation on natural resources.

- Wright (1990): the rise of US manufacturing in the 1890s is associated with a rise in the resource intensity of exports (natural gas, petroleum, copper);

- natural resource abundance lowered input prices => this fostered industrial production (steel products,) => increase in manufactured exports.
Theoretical arguments: the irrelevance of the very concept of trap in explaining developing countries’ growth profiles

The thesis of poverty traps created by commodity dependence is criticised on the argument that problems of commodity-exporting countries are well-explained by more powerful theories:

- e.g., Dutch disease (Corden and Neary, 1982);
- Or the ‘resource curse’ (Sachs and Warner, 1995).

Moreover, critical arguments go beyond commodity-exporting countries and refute the relevance of the concept of trap for analysing growth trajectories.

- They argue that price profiles in commodity markets follow both trends and cycles (Cashin and McDermott, 2002), or ‘supercycles’.
- A cycle is not a trap: over the long-run, SSA growth has moved closely with global real GDP growth:
- with the slowing of global growth, SSA exports are affected by lower external demand and declines in commodity prices (IMF, 2009b).
Chang and Helbling (IMF, 2009a): long-term trends in commodity prices are not relevant to the understanding of medium term price fluctuations: rates of change are highly variable and the trend component shifts over time, reflecting changes in longer-run price determinants (e.g., costs of marginal fields or mines).

=> importance of the fluctuations in the trend component relative to those in the cyclical component: if fluctuations in the cyclical component dominate, long-term trends provide useful signals; if not, past trends provide little guidance.


- turning point in SSA growth in the 1990s and the possible formation of clubs
- initial conditions matter for income distribution but not for growth.

Saba Arbache and Page (2007b): growth acceleration and deceleration episodes in SSA, 1975-2005 => importance of volatility. But no evidence that growth volatility has a relationship with long-term economic performance: many growth accelerations and as many growth collapse episodes, which offset the previous ones.

- Interestingly (confirming traps?), they find that growth accelerations and decelerations have an asymmetric impact on human development outcomes.
Figure 9: GDP per capita (current and PPP constant 2005 US dollar) (left axis) and GDP per capita annual growth rate (right axis) in Sub-Saharan Africa

Source: World Bank World Development Indicators database, August 2012. PPP: purchasing power parity. For a similar graph underscoring the low level of GDP per capita and high volatility of growth rates, see Arbache and Page (2007).
Easterly *et al.* (1993): ToT shocks explain a large part of the variance in growth but fluctuations of growth rates do not necessarily build a poverty trap, and these fluctuations do not predict what long-run performance and per capita income will be: global technological change determines long-run growth, while country characteristics determine relative income levels.

Easterly (2005): the concept of poverty trap is irrelevant: in SSA, over the last 50 years, levels of income per capita have increased slowly despite high fluctuations in terms of growth rates. Poverty traps in the sense of zero growth for low income countries rejected by the data in most time periods. Divergence between rich and poor nations in the long run does not imply zero growth for poor countries.

Kraay and Raddatz (2005): no evidence of traditional determinants of poverty traps: low savings, low technology, low productivity in low-income countries => no ‘unfavourable initial conditions’: poverty depends on policies. Institutions may create poverty traps: divergence between countries associated with institutions rather than disadvantages of initial income (Easterly, 2005).
Concept of poverty trap challenged by the concepts of growth ‘acceleration’ / ‘deceleration’

Hausmann et al. (2005): turning points in growth performance. **Rapid acceleration** = growth sustained for at least 8 years; 80 such episodes since the 1950s.

- Growth accelerations correlated with increases in investment and trade, and real exchange rate depreciations.
- External shocks produce short-lived growth accelerations
- Growth accelerations are highly unpredictable
- Growth ‘decelerations’, or ‘growth collapses’ do not imply poverty traps.

**Econometric tests of the existence of traps may also be inconclusive.** Rodriguez (2008), on 44 developed and developing countries via the estimation of economies of scale in manufacturing

- If positive spillovers and increasing returns are the basis for multiple equilibria, then the former should be prevalent when countries are transitioning either into or out of poverty traps, i.e. during periods of growth collapses and growth accelerations.

- But no evidence of systematic differences in economies of scale between transition and non-transition episodes => questions the thesis that increasing returns in manufacturing generate poverty traps (but it does not mean the absence of increasing returns in other sectors, e.g., agriculture).
5. The concept’s explanatory power: recognising traps’ definitional features in growth trajectories of commodity-dependent countries

- The relevance of traps’ definitional features: threshold effects; cumulative causation and relative paths; lock-in processes and low equilibria,
- The 3 key definitional features of poverty traps = to subsume processes that
  (i) create threshold effects;
  (ii) generate divergence relative to other countries’ dynamics via cumulative causation;
  (iii) lock-in in low equilibria.
- Concept of poverty trap: full accuracy in the explanation of growth trajectories of commodity-dependent developing countries.

1) the critiques of the concept of poverty traps overlook the definitional features and properties of the concept:
- poverty traps refer to growth processes that are non-linear, non-convex, subject to cumulative causation, increasing returns, multiple equilibria and threshold effects.
- B Arthur, P David: ‘small events’ may induce large effects that may be irreversible.
Critiques do not see that the key feature of the concept = **path dependence, irreversible processes** (weight of history), and **thresholds**.

The concept refers to the existence of **lock-in processes** - economies being attracted within a low equilibrium attraction basin – and their dynamic consequences, e.g. increasing lock-in, stabilisation, etc., which makes structural breaks more difficult and the reaching of a higher-growth path more costly (‘self-discovery’, Hausmann and Rodrik, 2003).

⇒ This is why a trap cannot simply be assimilated to growth rates movements such as decelerations, or fluctuations.

⇒ lock-in processes are a crucial dimension of the concept.

2) the concept of trap = processes that are dynamic and relative to other countries’ dynamics:

= countries appear to be caught in low equilibria, trapped in basins of attraction (in terms of growth, efficiency) **that are lower than in other countries**

A key issue = time horizon, secular scale or short-term fluctuations.

**Do growth trajectories of commodity-dependent low-income countries exhibit these 3 definitional features?**
Threshold effects, bifurcations, tipping points, random deviations and lasting effects created by external shocks

Commodity-dependent countries: the other feature of poverty traps= small shocks may generate large effects and make countries fall into lower equilibria:

Also important and recurrent shocks, world business cycles and commodity prices cycles, which affected international trade after the 1970s, particularly in the 2000s.

Commodity prices volatility makes fiscal and debt management difficult and increases the likelihood of irreversibilities.

+ Commodity markets are integrated => increasing returns, feedback effects.

Commodity-dependent countries are more likely to be exposed to external shocks.

Funke et al. (2008) (159 countries, 1970-2006) on persistent terms of trade shocks: SSA and the Middle- East have been more affected than Western Hemisphere and Asia-Pacific countries, due to these two regions lesser diversification, dependence on a few natural resources and lower manufacturing base.

SSA countries exhibited in average more than 2 persistent terms of trade shocks.
- Hence: even larger if a large shock....: the 2008-09 global recession => threshold effects
- 2008: Oil countries: the sharpest price fluctuation within a year.

- Due to the very sharp decline in global demand: most severe crisis since WWII: it affected goods (capital goods, durable consumer goods, cars, etc.) financed by credit before the crisis, + drying up of the credit to the private sector.

- Developing countries with export-based market structure face a fall in demand from rich countries for their products
- => end on investment projects, increased unemployment - investment and employment being the aggregates that have the largest impact on future incomes.
- SSA: high uncertainty
IMF (2009a): **magnitude of price changes and volatility rose to unprecedented levels** for many major commodities.

**Table 2: Comparison of commodity price volatility** (weekly; in percent)

<table>
<thead>
<tr>
<th></th>
<th>Six-Month Change</th>
<th></th>
<th>Standard Deviation¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crude oil (WTI)³</td>
<td>−76.8</td>
<td>−60.1</td>
<td>18.4</td>
</tr>
<tr>
<td>Aluminum</td>
<td>−52.9</td>
<td>−33.4</td>
<td>12.1</td>
</tr>
<tr>
<td>Copper</td>
<td>−54.8</td>
<td>−52.6</td>
<td>12.2</td>
</tr>
<tr>
<td>Nickel</td>
<td>−68.0</td>
<td>−49.0</td>
<td>23.6</td>
</tr>
<tr>
<td>Corn</td>
<td>−52.4</td>
<td>−51.8</td>
<td>13.9</td>
</tr>
<tr>
<td>Wheat</td>
<td>−45.2</td>
<td>−38.0</td>
<td>16.0</td>
</tr>
<tr>
<td>Soybeans</td>
<td>−44.1</td>
<td>−51.3</td>
<td>12.8</td>
</tr>
<tr>
<td>Memorandum</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gold</td>
<td>−25.4</td>
<td>−30.1</td>
<td>8.7</td>
</tr>
</tbody>
</table>

Source: IMF (2009a)
The IMF commodity price index had declined by 55% between the July 2008 peak and December 2008.

**Figure 10: Commodity and petroleum prices**

Source: IMF (2009a)
Figure 11: The impact of the crisis on SSA: the plunge in commodity prices

Sources: IMF (2009e); IMF, Commodity Prices, and UN Comtrade. 1: Composite of cocoa, coffee, sugar, tea, and wood, weighted by SSA exports.
Figure 12: SSA: declining export demand

Source: IMF (2009e).
Commodity prices booms, e.g., 2003-08 = shocks that have a negative impact, i.e., increased dependency vis-à-vis commodities due to higher prices.

Undiversified export structure, dependence on volatile and declining earnings => vulnerability to external shocks = ingredients of a lack of resilience to shocks: for economies at the tipping point - in export earnings, fiscal equilibrium, institutional, individual income, etc – these ingredients precipitate a fall to a lower equilibrium.

Ex. 1979 drop in commodity prices (1986 for oil countries): despite growth rates in the 2 previous decades, it toppled commodity-exporting countries into lower equilibrium still enduring => ‘prolonged users’ of IMF financing: 3 decades later, high cost of getting out of these ‘bad’ equilibria – policies, financing –, beyond the capacities of any ‘big push’.

Commodity-dependence => countries highly dependent on imports of the commodities they do not export. The volatility of the 2005-08 commodity boom hit food-importing countries, with many are at subsistence level: pushed entire groups into poverty.

Macroeconomic volatility increases the likelihood of lower equilibrium, as it entails asymmetrical processes: busts last longer than booms (Cashin et al., 2002).
- **At the micro-level, macroeconomic volatility** – shocks on commodity prices transmitted to producers’ earnings, or creating fiscal deficits reducing publicly provided social security - **triggers irreversible processes for the individuals close to subsistence income.**

- Individuals sell the assets necessary to their future income and productivity => pushes them in a trapping, lower equilibrium: selling land, reducing spending on children’s education.

- Zimmerman and Carter (2003): poverty dynamics: different households respond differently to income shocks depending on their assets.

- **Change in technology enhances productivity, but requires capital and access to credit, which creates thresholds and traps at the household level**

- The rich have access to credit, investment, higher productivity, higher returns. The poor are caught in a poverty trap compounded by indebtedness (limited access to credit markets and moneylenders’ distorted interest rates).

- **Rates of return positively correlated with initial wealth, which creates threshold-based multiple equilibria** (Barrett and Carter, 2005).
Deep-rooted, persistent structural poverty vs. temporary poverty
- bifurcated accumulation strategies;
- dynamic asset poverty thresholds (Carter and Barrett, 2006).

- Evidence from past experience of shocks on producers’ earnings: in Indonesia, during the 1997-98 Asian crisis, household spending on education declined – e.g., children were withdrawn from schools –: even more among the poorest households (Thomas et al., 2004).

- The 2008-09 recession = similar effects.
- World Bank (2009b): the fall in internationally traded food prices should alleviate the increases in poverty of the first half of 2008: but does not offset the increase in extreme poverty from the increase in local food prices between January 2005 and mid-2008
- domestic food prices may decrease, but with a lag.
- Even if the number of people in extreme poverty decreases, ingredients of irreversible negative effects on the human capital of future generations

- => hence intergenerational poverty traps (Dasgupta, 1997).
Cumulative causation and increasing gaps between groups of countries according to their export structure

- **Concept of poverty traps = a relative concept.**
- Even if poor countries do grow, this does not refute traps: specific market structures create **traps relatively to other countries’ growth trajectories.**

- Commodity-producing countries, which often rely on 1 or 2 exported primary products, grow because their products are the object of international demand (e.g., oil, copper):
  - beyond the detrimental fact this demand is external (no control of domestic policies), fluctuating and unpredictable, **global demand is boosted by technology intensity.**

- In dynamic terms, even if these countries grow slowly (Easterly, 2005), **the elevation of their income per capita is slower than other group of countries:**
  - =they do not converge:
  - => discontinuities, clubs of countries with differing growth profiles: a group sharing a market structure of commodity-based exports, narrow industrial base, low degree of diversification.
Dynamics of an increasing gap commodity-exporting countries/other groups: empirical observation of the secular decline in the price of commodities.

The decline in commodity prices: correlation between economic stagnation and commodity dependence

Raul Prebisch, Hans Singer: secular decline in world real prices of commodities and the deterioration in the ToT of commodities vis-à-vis manufactures => industrialisation, as productivity and technical progress = key factors of growth (Prebisch, 1959).

Maizels (1984, 1987): over the long term, the trend in the commodity terms of trade deteriorates: 3 key factors:

- **the low price-and-income-elasticities of demand** for commodities vis-à-vis manufactures;
- **the technological superiority of developed countries** and the economic power of their transnational corporations, which allows these countries to capture excess profits in trade with underdeveloped areas;
- **the asymmetrical impact of labour union power** in developed countries and labour surplus in developing countries on the division of the benefits of increased productivity.
Composite index of commodity prices of *The Economist*=continuous decline since 1845: **in 1999, the industrial commodities index had fallen to a record low in real terms: 80% below its level in 1845** (1845-50=100, and 1999=20) (*The Economist*, 1999).

Over 1862-1999, Cashin and McDermott (2002): downward trend in real commodity prices **by 1% per year** over that period + no evidence for a break in this long-run trend.

**Decline in commodity prices confirmed by the IMF.**

IMF (2009a): over the long-run, prices for many commodities have declined relative to those of manufactures and services.

IMF (2009a): the secular decline stems from productivity gains in the commodity sectors; **many commodities’ share in total consumption declines as income increases: but rates of decline vary across commodities** (available reserves, industry structure, demand characteristics, etc).

**Oil is an exception in the decline:** several causes, e.g., oligopolistic supply structure, concentration of reserves.
Figure 13: The secular decline in commodity prices

Figure 14: Agriculture and cotton price indices (Real, MUV-deflated, 2000=100)


Source: Baffes (2011).
Divergence confirmed by historical data.

Booth (2008): comparison of West Africa and South East Asia: *widening gap in the 20th century* for agricultural development, export growth and the impact of a shock such as the 1930s slump. South East Asian countries benefited from increases in productivity and public policies, vs. West African countries.

This divergence confirmed by the asymmetry of the impact of ToT shocks: Blattman *et al.* (2004), Hadass and Williamson (2003), confirming H Singer: the long-run impact of relative price shocks reinforced industrial comparative advantage in the ‘center’ and favoured the sector that carried growth, while it reinforced primary product comparative advantage in the ‘periphery’, harming the sector that fostered growth.

Poor commodity-dependent countries caught in endogenous processes: low productivity, low value-added and the export of commodities reinforce each other. These factors cumulate and push economies towards lower equilibria.
Due to technological progress, the quantity of commodities used in a unit of GDP has steadily decreased since 1971 (World Bank, 2009a).

**Figure 15:** technological progress has reduced the quantity of commodities used per unit of GDP

The continuous decrease of the share of SSA in world trade is a signal of the divergence between ‘club’ of countries.

**Figure 16: Sub-Saharan Africa’s exports: percentage of world exports (right axis) and value (left axis), 1948-2011**

Figure 17: Share of exports in world exports by region, 1948-2011 (percent)

- **This dynamic and relative dimension of the concept of poverty trap:** change of the world distribution of output per worker towards a ‘twin peaked’ shape: low income countries associated with a specific export structure.

**Table 3: Annual growth rates in p.c. GDP, 1870-1994** (std. deviations in parentheses)

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<tr>
<td>17 Industrial nations</td>
<td>1.50 (0.33)</td>
<td>3.20 (1.10)</td>
<td>1.50 (0.51)</td>
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<tr>
<td>28 LDCs</td>
<td>1.20 (0.88)</td>
<td>2.50 (1.70)</td>
<td>0.34 (3.00)</td>
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**Azariadis (2006):** **LDCs grow a bit slower and less predictably than the world average.**
Outside East and Southeast Asian countries, less developed countries **are not catching up with OECD countries.**
Catching up observed only by including in models a great number of structural features that are *ad hoc* and questionable, such as ethnic or political features.
Low equilibria trapping commodity-dependent countries

- A key characteristic of commodities => causing commodity-dependent countries to be caught in poverty traps
  - = price volatility.

- Volatility (of international prices, of supply and demand) = key channel by which commodity dependent countries are ensnared in a low equilibrium

- Dependence on commodities for earnings, volatility of the latter’s international prices => intrinsic volatility of macroeconomic aggregates.

- Oil countries: better prospects? 2005-08 commodity boom => impressive growth rates.

- But IMF: fragility of this growth (IMF, 2006): negative relationship between macroeconomic volatility and growth (Loayza et al., 2007; Ramey, 1995).
Commodity dependence lock countries into low equilibria because of price volatility, due to the transmission of world prices shocks and volatility to producing countries (Baffes and Gardner, 2003).

Volatility prevents diversification, risk-pooling and long term growth strategies.

It has a devastating impact on the macroeconomic management of countries. Very difficult to maintain any fiscal balance and a credible state capacity with highly volatile and unpredictable revenues in countries where revenue from commodities may represent more than ¾ of total revenue.

Olters (2007): fiscal management very difficult in oil-exporting countries. oil prices are highly volatile => permanent threat for the fiscal balance.

= Angola, Cameroon, Chad, the Republic of Congo, Côte d’Ivoire, Equatorial Guinea, Gabon, and Nigeria)
Vulnerability of commodity-dependent countries due to the dependence of their revenues on commodities with volatile prices. Confirmed by the impact of the financial crisis…

In oil-rich countries, government revenues from natural resources accounted for 60% of total government revenues in 2011.

Figure 18: Government Revenue from Natural Resources in 2011 (% General Government Revenue)

Figure 19: The fiscal vulnerability of commodity exporters, e.g. to the 2008 crisis shock


Volatility demonstrated on an historical scale.

Cf Cashin and McDermott (2002): the Economist’s composite commodity price index over 1862-1999:

- “ratcheting-up” in the variability of price movements; increasing amplitude of price movements in the early 1900s; increasing frequency of large price movements after the collapse of the Bretton Woods regime of fixed exchange rates (early 1970s).

- The downward trend in real commodity prices “completely dominated by the variability of prices”.

Volatility confirmed by the 2008-09 crisis: collapse of commodity prices in the second half of 2008 ending the boom that started in early 2002.

Helbling et al. (2009): despite the integration of commodity markets, commodity price fluctuations dominated by the prices of a few commodities:


- Second half of 2008: sharp drop: energy prices declined by 70%, metals prices, 50%; food prices, by 30%.
Historically, commodity prices have been volatile and subject to large swings.

Source: Baffes and Haniotis (2010).

Figure 20: Commodity Price Indices (Real, MUV-deflated, 2000=100)


Figure 21: Real commodity prices, energy and non-energy, 1960-2011 (2005=100)
Negative impact of terms of trade volatility and shocks on growth:

- Kose and Reizman (1998): shocks, i.e. fluctuations in the prices of primary commodities => significant decrease in growth and aggregate investment in SSA.

- The more a country is dependent on commodities for exports, the more relative prices (between tradable and non-tradable) may become volatile (Hausmann and Rigobon, 2002).

Historical perspective: Blattman et al. (2004): negative consequences of the exporting of commodities, because they have been more volatile than other products: countries with more volatile prices have grown slowly relative both to the industrialised countries and to other primary product exporters (panel of 35 countries, 1870-1939).

- Volatility was much more important for accumulation and growth than was secular change.

- A channel = foreign capital inflows declined where commodity prices were volatile

- + asymmetry industrialised/developing countries: changes in volatility had a negative influence on income growth in developing countries, but not in industrial countries (asymmetry of the impact of ToT shocks also found by Hadass and Williamson (2003) for the 1870-WWI period).
Increasing vulnerability due to the linkages between markets

Integration of commodity markets among themselves, and of commodity and financial markets.

‘Financialisation’ of commodity markets demonstrated by A Maizels (1994).

Increasing role of the financialisation of commodity markets in the 2000s in price volatility: impact of derivative markets on price volatility (Nissanke, 2010).


Shown by the impact of the 2008-09 financial crisis on low-income countries:

Nissanke (2009): The key channels of transmission of the financial crisis to low-income countries= precipitous fall in commodity prices, escalating cost of trade finance and severe difficulties in accessing trade credit.
Figure 22: Macroeconomic volatility and economic growth

Source: Loayza et al., 2007, based on the World Development Indicators, cross-country sample, 1960–2000
The argument that many developed countries started growth with primary products does not hold for low-income countries, where commodities cannot be utilised as inputs in industrial processes. E.g., cocoa, coffee, oil.

Hausmann and Rodrik (2006): industrialisation requires structural transformation, i.e. changing the exported products.

But market failures: for a given level of development, countries with more advanced export package will grow more rapidly, while the other countries are constrained by the low productivity associated with their export package.

A Hirschman, P Rosenstein-Rodan: linkages and complementarities for countries to get out of the underdevelopment trap and trigger industrialisation.

Leamer et al (1999): commodity-based market structures can increase income inequality: on Latin America/ East Asia: natural-resource-intensive sectors (e.g., agriculture) absorb capital that otherwise flow to manufacturing => reduces skill accumulation => impedes industrialisation.

Questionable argument=long-lasting low equilibria do not exist, some countries got out of them.

Commodity-dependent low-income countries differ from the 1960s Asian ‘developmental states’ (and China), i.e. growth based on state-led industrial sectors, protection, limited natural resources, education, etc.
Many commodity-exporting countries = stabilisation in a basin of attraction of a low equilibrium

path dependence, weight of past market structures, remarkable stability of their export structure over decades.

E.g., at the beginning of the 20th century, Senegal produced 141,000 tons of groundnuts: 68% of its exports in 1929, and 80% in 1960;
this commodity was still Senegal’s principal export at the end of the 20th century;
E.g., in 1990, oil represented 97% of Nigerian exports, and 87% in 2010 (World Bank World Development Indicators 2012).

Persistence of a low industrial base:
In 1990, SSA represented 0.8% of world manufacturing value added, and in 2010, 0.7% (without South Africa, 0.3% in 1990 and 2010) (UNIDO, 2011, Table 8.1).

Matsuyama’s (2008): initial conditions may perpetuate themselves, and an economy that starts below a certain threshold may be ‘trapped forever’ below that threshold.
6. Traps as outcomes of combinations of many determinants

- **Causality does not mean determinism:** the endogeneity of the ‘commodity-poverty trap’ relationship with other determinants

- **Argument dismissing** the view that commodity-based export structures foster the formation of **poverty traps**, since some countries grounded their growth on natural resources - oil or non-oil resources (e.g., Scandinavian countries, Canada, etc).

- **Not a valid argument:** as any macro-level causal process, the impact of this market-structure on the formation of traps **may be modified, reoriented, countered or intensified**, by a great number of other processes:
  - these countries’ ‘initial conditions’
  - I.e., the history and credibility of their economic and political institutions, their level of education, or demographic and geographic characteristics.
This endogeneity: Barrett and Swallow (2006): ‘fractal’ poverty traps = a trap in which multiple dynamic equilibria involve simultaneously micro (households, individuals), meso (communities), macro - scales of analysis”, these 3 levels “self-reinforcing through feedback effects”.

Simultaneous involvement of all levels => an economy stabilised in such equilibrium has difficulties to get out of it and reach a different one: governments, markets and communities simultaneously trapped in low-level equilibria.

Countries which caught up harnessed many factors: human capital, capacity of innovation (Thorbecke and Wan, 2004).

Contrasts with commodity-exporting low-income countries: low levels of human capital, lack of industrial sectors and labour markets absorbing educated workforce => dualistic market structures, no spillover effects (cf SSA oil countries).

Low-income countries are not endowed in the factors that endogenously cause growth: moreover, they are endowed in primary products, which generate disincentives for these growth-enhancing factors:

- commodity-based economies typically generate disincentives for education + oligarchic and corrupt political economies that limit education to an elite.
Institutions as key factors of the transformation - countering or reinforcing - of the causality

- **Endogeneity of causalities**: between growth and factors of growth, and among the latter, institutions => cumulative and non-linear processes.
- Countries which succeeded in the catching-up process developed specific institutions and in turn were helped by them (with or without natural resources, e.g. Asian developmental states).
- The form of institutions having a positive or negative relationship with growth, is difficult to assess *ex ante* (Engerman and Sokoloff, 2003).
- **Growth and the content of these institutions co-evolve**: growth modifies institutions and the aspiration to certain institutions (equity, democracy) AND institutions modify the type of growth (the distribution of its gains). **Institutions create or intensify existing threshold effects: ex post** (Sindzingre, 2007b).
- **Institutions = key element of the feedback processes of commodity-poverty traps.**
- Poor institutions combined with commodity dependence maintain slow growth.
- Slow growth combined with commodity dependence maintains poor institutions.
- Commodity dependence, volatile commodity prices, volatile growth rates maintain poor institutions,
- which, in turn, reinforces the negative effects of commodity dependence (Mehlum 2002; Robinson et al., 2002; Auty, 2001; 2006).
Symmetrically, institutions may shape the exploitation of natural resources in a way that prevents traps and foster industrialisation.

Wright (1990): **end-19th century US**, specific institutions transformed the endowment in natural resources (minerals) in engines of industrialisation and increasing returns: **legal system, geological research, public knowledge, education system**: mineral abundance = “an endogenous historical phenomenon driven by collective learning, increasing returns, and an accommodating legal environment”.

E.g., Norway: the risks of oil countered by a *longue durée* path dependence, i.e. institutions centred on equality and efficiency, rulers having a long time horizon = **institutions able to lock-in governments’ commitments, or ‘meta-institutions’** (Acemoglu, 2003; Kydland and Prescott, 1977) preventing a worse lock-in, a fall into a worse equilibrium (Dutch disease): Petroleum Fund (Mehlum et al., 2008).

**Combination of appropriate policies and existing institutions modified the negative effects of commodities** in Scandinavian countries (Blomström and Kokko, 2003): when institutions are ‘producer-friendly’, more natural resources may increase income (Mehlum et al., 2006).

**Opposite outcome when such institutions are lacking**: even accelerate the fall in a commodity trap **when political instability, predatory rulers, high inequality**.
Multiple equilibria as outcomes of self-enforcing combinations of market structures and institutions

- Institutions transform the impact of market structures on growth and combine with them.

- Bowles (2006): why institutions that have implemented “highly unequal divisions of the social product” have been so widespread; why they persist even in cases “where they convey no clear efficiency advantages over other feasible social arrangements”.

- Evolutionary perspective: unequal institutions persist because these arrangements are “self-enforcing conventions”, and because the poor have difficulty in coordinating the types of “collective action necessary to ‘tip’ a population from an unequal to a more equal set of institutions”.

- The key point defining the concept of trap =the processes generate multiple ‘growth-export structures-institutions’ equilibria - ‘low’ or ‘high’. They are subject to increasing returns and create tipping points very costly to reach for economies that are in a low equilibrium.

- This is why many cross-country regressions on the relationship institutions-growth find non-linear effects (Barro, 1994): e.g., inequality.
Typically, ‘low’ equilibria include institutions generating the lock-in of social groups, e.g., kinship norms: Hoff and Sen (2006): “collective conservatism”.

These equilibria not created by divisive norms and inequality alone, but by a combination, which stabilises in a low equilibrium and involves a low level of income, high inequality, narrow industrial sector, an export-structure based on a few commodities.

More than elements taken in isolation, ‘combinations matter’.

Easterly et al. (1993): country characteristics alone, institutions or geography, cannot be determinants of growth, because they are much more stable than the unstable growth rates they are supposed to explain.

Blattman et al. (2004): combination of a commodity-based export structure, of volatility, and local institutions => results in lower growth performance.

Engerman and Sokoloff, (e.g., 2006) on growth paths divergence in the two Americas: institutions may create poverty traps, as they shape opportunities.

Unequal economic and political institutions persist though they close to many individuals opportunities (land, education, capital), combining with endowments and market structures (climate, labour abundance).
7. Conclusion

Commodity-dependent low-income countries exhibit market characteristics that differ from countries that reached higher equilibria, e.g. East Asia.

Key features of their past growth experience confirm that poor commodity-dependent countries exhibit 3 key properties of the concept of the poverty trap:

- non-linear growth processes; small events’ irreversible effects; bifurcations, thresholds and lasting effects created by external events;
- cumulative causation and increasing gaps with other groups of countries;
- low equilibria;
- (and simultaneous macro and micro trapping processes.)

In low-income SSA commodity exporters, a major shock such as the financial crisis may reinforce these processes.

Against the critiques of ‘traps’: causalities do not constitute determinism:

- commodity-based market structures combine with other determinants of growth (institutions), which may aggravate the negative impact, OR, on the contrary, transform the link towards a basis for growth.
- These other determinants are endogenous to growth
- => hence it is unlikely that institutions have this latter capacity in low-income countries: this endogeneity is one of the key features of poverty traps.
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