



Understanding the dynamics of **Circular Financial Flows** in the Commodity Sector

By Prof. Yaneer Bar-Yam, New England Complex Systems Institute (NECSI)

Introduction

The economic transformation from subsistence to diversified manufacturing and service economy is at the core of the development challenge facing the Commodity Dependent Developing Countries (CDDCs) - countries whose economic activity is dominated by extractive or agricultural commodities.

The most widely discussed foundation for making the transition, known as 'the Washington consensus', includes unregulated markets and open borders. However, its effectiveness in providing a long-term solution to the needs of the CDDCs is continuously challenged¹.

Recently, the CFC has studied, analyzed and investigated the financialization of commodity markets and its adverse impact on CDDCs². In this context, it focused on the financial flows

between firms, households, investors and foreign markets, and how these flows affect the development of CDDCs. Sustainable development requires consistency between a country's wages and consumption, investment and returns. Inconsistent internal financial flows result in ineffective investments in development and provisions for foreign aid which quickly exit the country leaving achievement of no sustained development gains.

As a result, much of the people in CDDCs is trapped in a subsistence or impoverished state³. The central challenge facing CDDCs is how to promote cycles of money *within* the country to encourage and produce development in diversified sectors. Illustration of these conclusions using representative archetypes of subsistence agriculture, extractive and cash-crop dominated economies, emergent economies, and developed economies is at the centre of this analysis.

¹ D. Rodrick, Goodbye Washington Consensus, Hello Washington Confusion? A Review of the World Bank's Economic Growth in the 1990s: Learning from a Decade of Reform, Journal of Economic Literature pp. 973 (987 (December 2006).

² Proceedings of the Brussels Conference on Promoting Beneficial Financial & Commodity Market Synergies, Brussels, 9 and 10 December 2010 (Common Fund for Commodities, 2011)

³ P. Guillaumont, Caught in a Trap: Identifying the Least Developed Countries, (Economica, 2009)

The challenge of understanding the flows

Understanding the cross-border flows turns out to be essential to developing a better understanding of the challenges faced in development. This raises some fundamental questions about the effectiveness of deregulation and open borders with limited currency exchange controls or tariffs and other border policies. It also shows that a balance between open and closed borders is needed. While freer trade is better for consumers, consumers are also workers. Without a viable production economy, households are not in a position to earn additional income that enables them to consume products. A dependence on remittances and flow of foreign aid may arise that allows some consumption of globally sourced products.

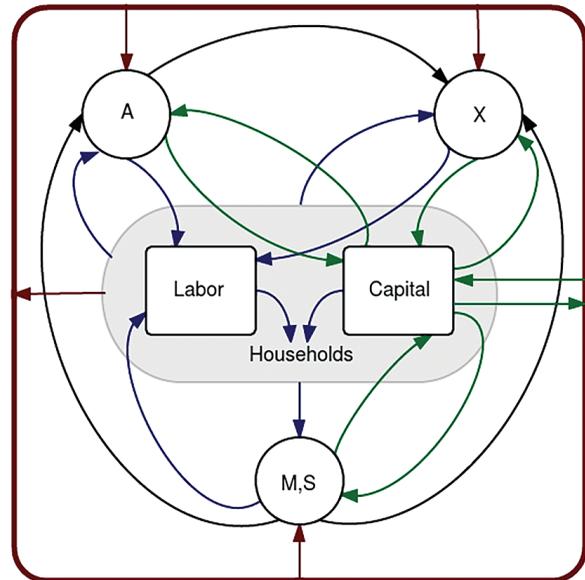
Opening borders implies not only that exports are possible, but that imports will dominate much of local economic activity. Financial flows within the country will decline, becoming insignificant compared to out flows to purchase globally sourced products. Importantly for a CDDC, essentially with a single dominant export product, the relative value of wages inside and outside the country will depend on that export. Opening the borders of a CDDC may harm a country's competitiveness and inhibit diversification investments at the time of high commodity prices because of higher wages resulting from commodity dependence.

By contrast, a compelling example of successfully balancing open and closed borders is the policies associated with China's development. The use of industrial zones with restricted imports and exports is a hybrid policy that deviates from the policies of the Washington consensus, but is consistent with the recommendations emerging in this analysis. This analysis further calls for customized policies for individual countries based on an understanding of their particular economic activities and opportunities.

Similarly, it can be shown that even for the US, the leading industrialized country, robust development occurs when both monetary and fiscal policies are set so as to balance the flows of the 'wages and consumption loop', and the 'investment and returns loop'⁴. When growth in the consumer loop dominates, runaway inflation leads to economic instability. If the investor loop dominates, economic instabilities, including periodic recessions, and declining interest rates lead to uncharted high-risk economic conditions. Analysis in this paper extends this effort to consider the structural transition of development. A more complete discussion of the analysis relative to the economic literature as well as analysis and implementation for specific countries is left to future work.

Models based on financial flows are typically used to describe 'business cycles' (Goodwin model and Kalecki model). A flow diagram aimed at understanding the challenges facing CDDCs has been elaborated which represents the flow of money between internal and external sectors for a national economy, as shown in Figure 1 below.

Figure 1: Schematic diagram of flows between economic sectors and households



Sectors: Agriculture (A), extraction/mining (X), combined manufacturing and service (M,S). Payments for goods and services are in blue, inputs are in black, investment flows in green, foreign trade in red.

The diagram in Figure 1 reflects a country's (A)gricultural sector, e(X)tractive sector, capital and labour, and its (M)anufacturing and (S)ervice sector. To reflect the dynamics of income generation and re-investment, the diagram distinguishes between:

- Blue arrows** flows in which money is exchanged for goods or services;
- Green arrows** flows related to saving, borrowing, and ownership;
- Red arrows** external trade.

For example, consumer spending flows out from households who purchase the goods and services produced in the manufacturing and service sector, which in turn pays to households

⁴ Yaneer Bar-Yam, Jean Langlois-Meurinne, Mari Kawakatsu, Rodolfo Garcia, Preliminary steps toward a universal economic dynamics for monetary and fiscal policy, arXiv:1710.06285 (October 10, 2017; Updated December 29, 2017).

for labour (blue arrow) and pays investors for capital (green arrow). Households can also be investors and receive income for both labor and capital investments.

Economies differ drastically in the size and structure of their financial flows. To illustrate the use of the diagram, a few archetypes defined by a signature set of traits should be considered:

- A. Agrarian:** most of the population supports itself with subsistence agriculture
- B. Extractive:** mineral or fuel extraction dominates over both agriculture and manufacturing
- C. Cash Crop:** agricultural exports dominate the economy
- D. Emerging:** shift (the structural transformation) from agriculture to manufacturing

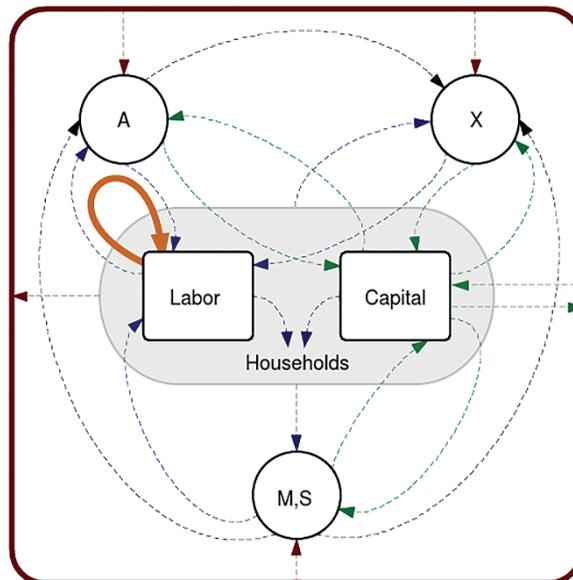
A **developed economy** is characterised by a large manufacturing and service sector that is internally driven, and is not included in this summary about development.

In the following diagrams, the thickness of flows illustrates their relative significance in the economy.

A. Agrarian economy. Figure 2 shows that in an agrarian economy where financial flows are so small that they are all shown only as dashed lines. Although the agricultural sector is the site of most productive activity, it is not commercialized. Unlike other flows, the subsistence flow does not represent

a financial flow. It is represented with an orange arrow passing by the agricultural node and back to the farmer households.

Figure. 2: Financial flows in a representative agrarian economy



Note: Agrarian economy has little substantial commercial production, and consequently all flows are minimal (dashed arrows). Subsistence agricultural production is economically important but is not a financial flow. It is denoted with an orange arrow passing near the agricultural sector.



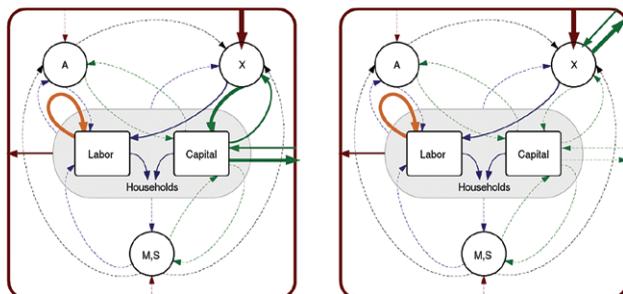


B. Extractive economy. Figure 3 shows the flow diagram for a country whose primary economic activity is extraction, e.g. a petroleum exporter. Revenue arises largely from exports of the extractive industry. There are no other economically important domestic industries: consumer goods are imported from abroad and capital flows largely out towards foreign investment opportunities. Thus, export revenue is transferred abroad directly. Ownership of the extractive sector may be in control of domestic or other foreign investors.

sector. Consumer products and services are imported, except for an independently co-existing subsistence economy.

Note: Panel A reflects domestic ownership of resources, where profits from exports flow as returns to domestic capital investors. Panel B reflects foreign ownership, where the extractive sector receives investments from foreign sources and returns profits abroad. Reinvestment, the remainder of revenue, flows directly out of the country.

Figure 3: Financial flows in a representative extractive economy

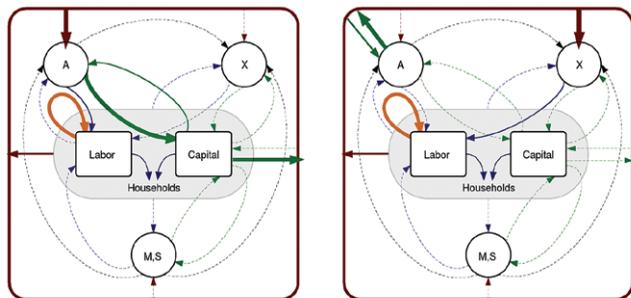


The financial flows thus affect the country only in a limited way, flowing immediately to foreign industries as investment and consumer spending. The extractive economy may coexist with a subsistence economy with which it does not interact.

The main revenue flow consists of payments to the extractive sector for natural resource exports. Domestic capital (left figure) is invested abroad, laborers receive wages from the extractive

C. Cash-crop economy. The main characteristics of extractive economies are shared by cash-crop economies, where commercial agricultural production for export resembles mineral exports, and agricultural land may be controlled by domestic (Figure 4, Panel A) or foreign (Figure 4, Panel B) investors. Investors have few domestic diversification opportunities and invest their capital mostly outside of the country. **As a result, most of the export revenue flows directly out of the country.** Unlike the extractive economy, resources in this case flow through the agricultural sector rather than the extractive sector. As with extractive economies, there is limited effect on the domestic economy.

Figure 4: Financial flows in a representative cash crop economy

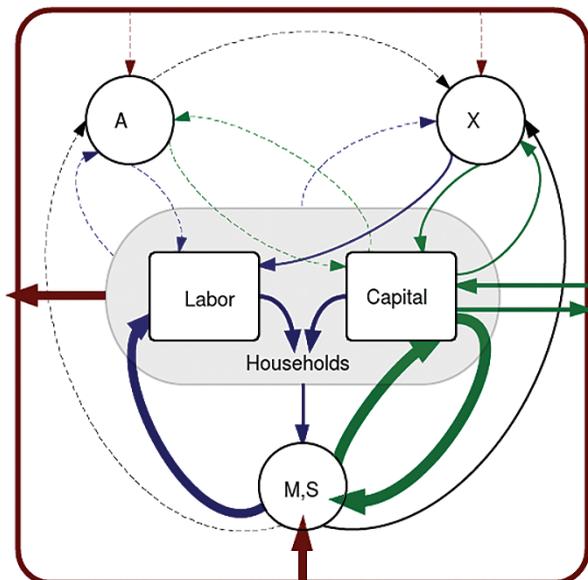


Note: Panel A reflects domestic ownership of resources, and Panel B reflects foreign ownership. A cash crop economy is analogous to an extractive economy, with similar trade and investment flows.

D. Emerging economy. Figure 5 describes an emerging (rapidly developing) country. The manufacturing and service sector is large; it is the main source of wages and the main destination of investment. Total flows and wages are significantly larger than in agrarian economies and most primary commodity exporters, which indicates higher standards of living. Agriculture and extractive industries provide a comparatively small share of wages, returns, and consumer products.

While the manufacturing and service sector is a substantial source of internal consumption, a large portion of manufactured goods are exported and a large share of household consumption is imported.

Figure 5: Financial flows in a representative emerging (industrial) economy



Note: Subsistence agriculture is not a substantial portion of the economic activity. The industrial sector dominates wages, exports, and investments. Households purchase both domestically produced and imported consumer goods in significant volume. Household consumption of goods and services is largely met by domestic production. Large bidirectional capital flows connect investors to global financial markets.

Paradigmatic economies summary

Developed economies based their development on **local, recurrent circular economic flows** of goods and services. In contrast, the CDDCs are advised to focus **on the global economy** as a source of economic activity.

Emphasizing the role of global trade as a source of development has led in some cases to extractive industry and cash crop economies that are failing to diversify and instead are fully reliant on commodities. The absence of locally closing economic flows results in economic activity which is not self-reinforcing and not sustainable within the country. Reliance on commodities for participation in global trade de-links domestic consumption from production, so that expenditures on consumption do not return to households but exit to the global economy. This also means that opportunities for domestic investment are very limited, and savings and profits exit to foreign investment markets. **Commodity dependence and lack of diversification are reflected in consumption and investment flows out of the local economy.**

The standard model of international economics calls for each country to provide its best products to the global market. However, this does not address the implications of an un-diversified economy for domestic development. Given the current state of single product economies, a more successful development model would target diversified local economic activity at the same time as export industries. It is reasonable to raise the question whether this model is consistent with existing policies.

Domestic-based and globally-driven development

This flow based view of economic development raises questions regarding feasibility of relying on the global trade to overcome commodity dependence. International financial flows create global competitive pressures on CDDCs and favor specialization. Yet, such local specialization runs counter to the need for diversity of economic activity to ensure diverse employment and the mutually reinforcing growth of diversity and productivity. The possibility of change in economic activity associated with growth of export industries is hard to expect in a CDDC endowed with a limited set of tradeable commodities, so it can hardly be a source of necessary diversification.

The domestic financial flows of a country, as a whole, are different from international flows. They are necessarily diverse because they must meet varied human needs of a whole population. Because they are constrained by geography, they tend to be part of shorter loops than international flows. Shorter loops are more reliable and can be accelerated independently of the higher complexity and uncertainty of global markets. **Diverse and shorter loops that run in parallel are less vulnerable to volatility.** These features make domestically oriented sectors more robust and sustainable than international ones. Indeed, development concepts that focus on promoting imports and exports fail to recognize that such flows are not in and of themselves consistent with broad-based economic growth.

To appreciate and understand when and why economic development fails to take place in a nation, even in the presence of strong international financial flows, it is necessary to identify and disentangle domestic flows of money that enable diversified development (e.g. local infrastructure, manufacturing and agriculture) from flows that are primarily international in nature and do not directly involve economic sectors that contribute to diversified growth locally. It is also important to recognize the roles of such economic flows in interventions aiming to

promote development, whether through humanitarian aid or economic investment. **In a subsistence agriculture, extractive or cash crop economy, the addition of development aid or investment typically results in flows that follow the paths of existing dominant flows. In all these cases, financial flows do not close within the country.** The natural path for money is the purchase of goods from foreign sources, or the investment in opportunities that are foreign. **Development aid should seek to create consistently cycling monetary flows within the country.**

The systemic dynamic effects of coupling to the global economy through the commodity trade should be better understood. **For extractive or cash-crop economies, most of the domestic economy is essentially isolated from what may otherwise appear to be a strong GDP.** Commercial agriculture and mining are more strongly tied to the global economy than to the domestic one, and the wide majority of a country's population has little connection to them. Monetary flows from outside the country pay for products of the extractive industry. Those flows go to profits and wages for a narrow part of the domestic workforce, and the resulting consumption is for foreign goods. Significant investment flows only to the extractive industry itself and returns value to global investment markets, leaving little in the country.



Photo: Adobe Stock

The majority of investment directed toward developing the extractive industry is also likely to be primarily for infrastructure constructed by foreign companies and equipment purchased from foreign sources. There is essentially no robust economic development nor opportunity for widespread increases in standards of living.

National governments may try to regulate the proportion of revenue distributed to labor and profits, and capture part of the profits for local instead of foreign ownership. Nevertheless, the domestic expenditures must be linked to domestically-contained flows or the impact of these interventions will be limited. Indeed, there is considerable concern that strong government interventions in economic activity limit the quality of governance by drawing attention away from the demands of the citizenry.

The pressures of global economic integration may also impact developed economies. Some, if not all, historically developed economies might, under an unfavorable scenario, converge toward a structure similar to un-diversified, developing economies. When a particular industry becomes dominant in exports, problems also arise in developed countries. While the discovery of a high-value export may seem to 'strengthen' a country's currency in the short term, the analysis of structural changes in economic flows shows that it may counterintuitively *hinder* the nation's ability to achieve extended organic internal growth in the long term. This counterintuitive result is similar to that of injection of aid from wealthy nations to developing countries that can distort economic activity rather than forming a self-consistent one.

Activating a domestic economy

It can be seen that a successful export-oriented industry does not necessarily lead to widespread domestic economic development when there is a disconnect between the financial flows of the local and global economy. However, the existence of such economic flows may be considered a resource for developing the domestic economy.

For example, a local service sector with higher wages may develop out of the incomes generated from exports. However, the pressures of globalization also affect such local linkages and their emergence cannot be taken for granted. Instead, it becomes a development effort in itself.

Instead of relying upon development of sectors directly coupled with export industries, it is likely that the promotion of domestic development may also be achieved through targeted investment in production and through distribution of wealth to promote demand. Interventions that promote

both supply and demand may be more effective than either one separately. Such strategies are being adopted in some oil exporting countries.

In addition to the challenges facing production and consumption flows, the availability of savings for domestic investment may be limited when low barriers to investment in global equity markets result in flows to the most lucrative risk-return opportunities abroad. This leakage of finance depletes domestic financial flows and the opportunities for development of CDDCs. If savings of households in an economy are reliably made available for investment in domestic industries, an important condition for circularity of flows is met. The main obstacles to meeting this condition are the accumulation of reserves by domestic banks and debt obligations due to absence of investment opportunities, as well as 'capital flight' driven by tax incentives or higher returns.

Conclusions

Sustainable economic growth of a representative developed economy is typically driven by strong internal economic flows, and, similarly, an emergent economy has strong internal economic flows that are only partially driven by external economic flows. The model of circular economic flows shown in this work offers an explanation of why historical evidence does not support the assumption that opening borders can work as a first step in achieving self-sustained economic development in a CDDC.

The inconsistency between flows dominated by global economic activity and the internal flows offers a plausible explanation of persistent commodity dependence. It is also clear from our analysis why development assistance may be ineffective when borders are open: the injection of financial resources does not create robust internal economic flows in a developing economy and is not consistent with achieving a developed economy.

While development interventions and investment may be focused on mitigating structural problems or promoting production, self-reinforcing development cannot be achieved without creating self-consistent circular flows of resources. The cycling of flows enables increased standards of living precisely because there is a self-consistent growth of economic activity. An analysis of the local barriers to achieving self-consistent flows in individual countries, as well as the local opportunities, is essential to understanding which interventions will be most constructive, and which policies are required to enable effective development interventions.

Acknowledgements: This manuscript is based upon a report written by the author along with Katriel Friedman, Joseph Norman and Dominic Albino. Additional acknowledgements are to Niko Kesten and Ramon Xulvi-Brunet for assistance in manuscript preparations, Jeff Fuhrer, Michael Clark and Peter Timmer for helpful discussions. Preliminary work relevant to the results was supported by Asian Development Bank. This work was supported in part by a grant from the Common Fund for Commodities.

Note: This work is a summary of conclusions of a project on new strategies for commodities supported by the Common Fund for Commodities (CFC). The views expressed here are those of the authors and do not represent the views of the Common Fund for Commodities or any of its Member Countries and/or any other International Organisation.



Photo: ©Chris Steele-Perkins/Magnum Ph