Memorandum To: The Economic Advisor to the Prime Minister of Ethiopia
From: Qi Xue, McCourt School of Public Policy, Georgetown University
Subject: Shifting Agriculture Development-Led Industrialization to Industrial-Led Economic Growth

Policy Challenge: *Mismatch of Government Investment and Smallholder Farmers*

Ethiopia's rural-based economy accounts for 80% of employment and nearly half its GDP (Dercon and Hill, 2009). Since agriculture contributes a substantial share of GDP and export, one would assume that the government is placing agriculture at the core of its development policy. This is only partially true. Agriculture is the bedrock of Ethiopia's development strategy, as the Agriculture Development-led Industrialization (ADLI) underpins (Woldehanan, 2008; Dercon & Zeitlin, 2009). Yet little evidence suggests that enough (or effective) interventions are set out to boost Ethiopia's smallholder farming.

Adenew (2009) notes that the current government strategy focuses on promoting higher value-added crops, commercialization, and supporting large-scale farming, while little attention was given to smallholders. They face the challenge of being vulnerable to weather conditions, lack of irrigation, and low productivity due to few fertilizers and improved seeds available (Dercon & Hill, 2009). In practice, accelerated growth is assumed to be achieved by commercialization and private sector development. The evidence above posed a serious question to the ADLI strategy: a policy framework sets agriculture as the bedrock of industrial development ignores the fact that smallholder farmers contribute 95% of production, and they own 95% of land in Ethiopia (Adenew, 2009).

In this memo, I shall argue that ADLI is fundamentally incapable of bringing Ethiopia to the next stage of development, given the constraints of agriculture conditions in Ethiopia. The industry should be considered the next driver for economic growth – absorbing surplus labor, incentivizing productivity, and bringing down food prices to fuel Ethiopia's long-term economic development. The following paragraphs will start with a diagnosis by drawing the assumptions from Lewis-Ranis-Fei's dualistic mode. Evidence will be evaluated against the premises concerning the prospect performance of Ethiopian agriculture and its inter-sectoral linkages. Considerations for policy interventions shall be presented in the last section.

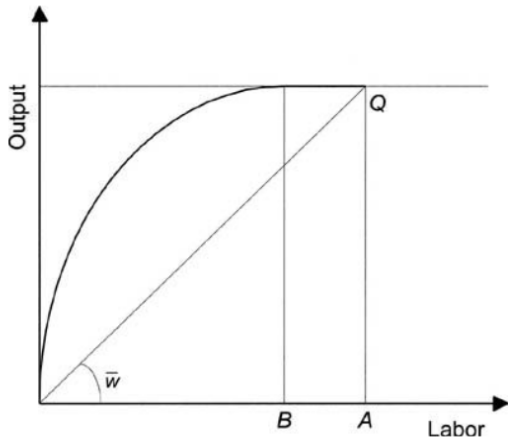
Diagnosis: *Lewis-Ranis-Fei model – Surplus Labor and Inter-sectoral Linkages*

According to Ray (1998), the rural-urban movement is the most important structural transformation in developing countries. Agriculture is often regarded as a source of labor and food supply to the industry. Ethiopia is no exception. On resource allocation, the key is to re-evaluate ADLI's applicability with regard to the growth prospect of agriculture-led

development; more importantly, the dynamics and structural transformation between sectors.

A theoretical framework for studying the structural transformation is the Lewis model. To simplify the story, Lewis (1954) applied four sets of assumptions. (1) The economy comprises a traditional sector characterized by over-population and a modern sector that can absorb surplus labor from agriculture. (2) The supply of labor from agriculture is perfectly elastic, equivalent to "unlimited supplies of labor." (3) The surplus labor in agriculture has zero marginal product; therefore, their migration to the industry will not affect the total agriculture output (see figure below). (4) Production in agriculture will not be reinvested, while profits will be used for reproduction purposes in the modern sector.

Figure 1. The production function of Labor and Output in the Lewis Model



(Source: Ray, 1998)

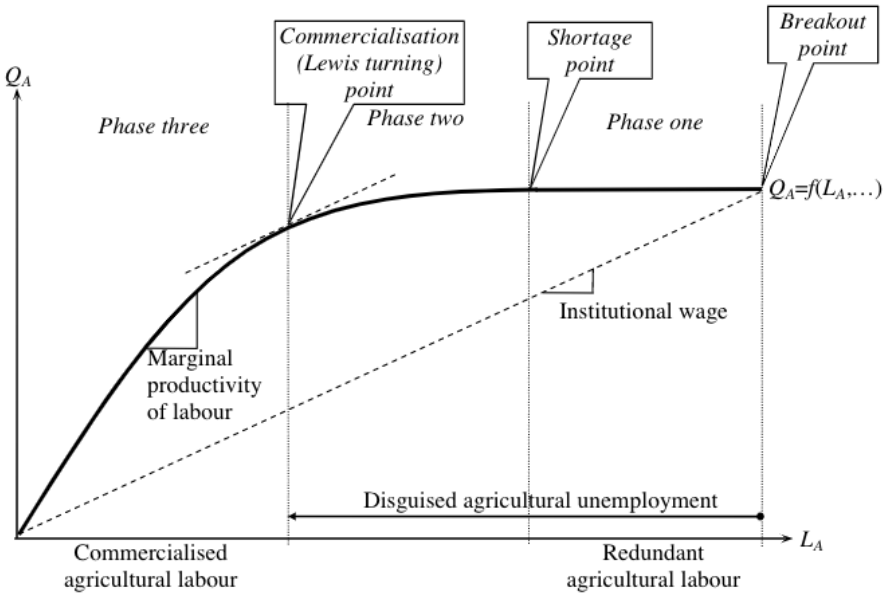
Adapted from Ray (1998), the above figure 1 illustrates the relations between labor supply and agriculture output. According to Lewis, "unlimited supplies of labor" is bound to supply fixed plots of land. Due to diminishing marginal returns, the production curve is bowed. As labor supply increases up to point B, no further output is expected. In theory, output AQ and BQ are both regarded as zero marginal production. Labor invested in agriculture is characterized as "disguised employment" within the rural sector. Lewis (1954) supposed that labor beyond point B should be soaked up by industry[1], thus completing the rural-urban movement's transition. Still, he left out the dynamics in the transition of labor in his theory.

Armed with the core concept of Lewis, Ranis, and Fei (1961), extended this two-stage dualistic model into three phases. The first phase is similar to Lewis, characterized by surplus labor. The following phase witnesses the rural-urban coexistence, showing the interplay of rural-urban transition. The last phase is referred to as "commercialization," indicating the end of

[1] This hypothesis clearly ignores the unemployment in urban areas, which was later modified by Todaro in 1971. But this discussion is beyond the scope of this analysis.

the dual economy. The figure below illustrates the three economic development stages while introducing the three points reflecting its labor supply.

Figure 2 Lewis-Ranis-Fei Phases of Economic Development



(Source: Ercolani and Wei, 2010)

According to Ercolani and Wei (2010), the breakout point marks the creation of the industrial sector, thus entering phase one. In phase one, agriculture workers are paid with a constant institutional wage, even though their marginal productivity could be zero. Meanwhile, "unlimited supplies of labor" are moving to the industry, similar to Lewis' model. Further, if workers with positive marginal products were to withdrawn from agriculture, there will be a negative effect on aggregate agriculture output (Vines and Zeitlin, 2008). To maintain surplus labor in agriculture, Ranis and Fei (1961) argue that agriculture's productivity should be enhanced to transit extra labor to industry continuously. If not, this marks the shortage of labor while entering phase two. As disguised agriculture employment gradually soaked up into manufacture, thus embarks the commercialization point, the dualistic structure will disappear (Ray, 1998).

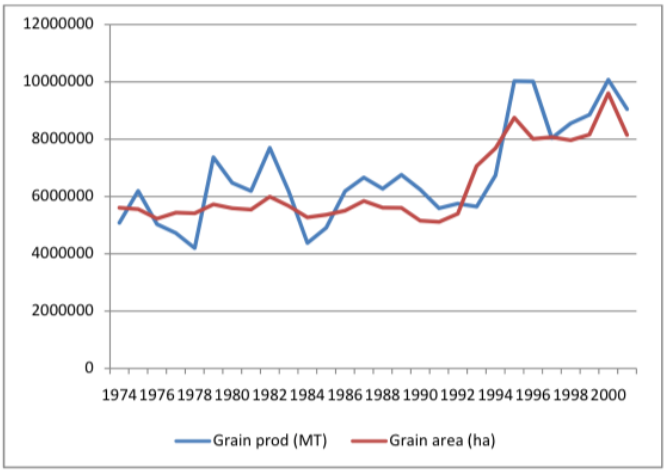
The dualistic approach suggests that an agriculture-dominated structure does not satisfy the conditions for economic take-off. Driven by non-reproducible land recourses and capital stock taken as a given, the traditional sector cannot expand along with population growth. Conversely, rapid population growth will offset any technology improvement within the agriculture sector. On the other hand, the modern sector fits in the Solow model with the function Y = F (K, L), indicating increasing capital and labor investment will sustain economic growth in the long run. The Lewis-Ranis-Fei model thus provides a suitable framework for understanding the growth path of Ethiopia. In this memo, I contend that two specific elements of the Lewis-Ranis-Fei dualistic model – surplus labor and sectoral interlinkages –

may help capture the status quo in Ethiopia and lay out the basis for potential policy interventions.

Evidence for the Role of Surplus Labor to Productivity

Lewis (1954) regarded the agriculture sector as "unlimited supplies of labor" to the industry. Even it was modified by Ranis and Fei (1961) as the initial stage of rural-urban transformation, it stills fits the early phase of overpopulation in Ethiopia's agriculture. Adenew (2009) noted that the recent growth in agriculture is mainly driven by agricultural land expansion rather than productivity increase (see figure 3). Facing overpopulation, smallholder farmers are choosing land clearance in response to the rising food demand. The above evidence states the fact that agriculture is not capable of holding the pressure of population growth. There was clear surplus labor in agriculture since land clearance.

Figure 3: Trend in the area of cultivated land under grain and production



(Source: Adenew, 2009)

One could argue that investment within agriculture might help absorb the surplus labor. Two options arise. One is to invest in rural non-farming enterprises; the other is to invest in farming activities. Given the low marginal productivity of farmers, only two percent of households rely exclusively on non-farm activities as a source of income (Rijkers, Söderbom, and Teal, 2008). Therefore, the rural non-farm enterprise could hardly be a source of employment in Ethiopia.

Further, investment in agriculture faces multiple constraints as well (Adenew, 2009): (1) Fragmented land allocation makes it difficult for farmers to reinvest and scale up their productivity; (2) Given the current limitation in irrigation and uncertain in weather patterns, the potential for sustainable agriculture growth is slim; (3) Agriculture investment in Ethiopia is commercial-driven, export-oriented and run by enterprises, indicating that commercialization is not an ideal source of employment (Dercon & Zeitlin, 2009). This leaves policy innovation to promote agriculture-led development as a bleak option. Given the limited scope of further land extension, workers in agriculture might move to other sectors (rural

non-farming activities or the modern sector). Thus, productivity per worker will be higher in agriculture (Dercon and Zeitlin, 2009), incentivizing increased profits in large-scale farming.

Evidence for Sectoral Interlinkage that Affects Economic Growth

As well elaborated by Ray (1998), industrial capital accumulation is the engine of economic growth. Capital accumulation cannot be achieved without labor and capital investment, which is also contingent upon the agricultural sector's development. Evaluating Ethiopia's growth strategy, it is critical to understand the endogeneity of agriculture growth to other sectors.

Dercon and Zeitlin (2009) noted an upward trend in the land-labor ratio in recent years. I contend that Ethiopia has passed the shortage point and thus is entering the second phase of dualistic development. If rural workers continue to migrate, Ethiopia's industry will gradually soak up the extra labor. The aggregate agricultural output will decline given minor policy innovations in technological input (such as seeds and fertilizer). A shortage of food supply will result in inflated food prices relative to industrial goods, thus putting Ethiopia's export disadvantaged.

This hypothesis corroborates with the evidence. Dercon and Zeitlin (2009) note that the global trade trend indicates that Ethiopia relies on external input to sustain its industry. The higher price of agricultural products in Ethiopia forces the industry to seek a competitive supply from the international market. In a partial equilibrium analysis, rising domestic market costs can only be explained in a domestic supply shortage. Knowing that improved seeds at an adoption rate of only 3-4% (Adenew, 2009), it is not surprising to see rising food prices along with the transition of workers from agriculture to industry.

Moreover, the marketization rate is far too low for agriculture to play a leading in economic development. Adenew (2009) notes that transaction cost is one of the barriers that prevent the marketization of crops: only 15-25% of rural production is old in the market. Research also finds that nearly half of the smallholder farmers are net buyers and mainly produce for their consumption (Woldehanan, 2008). One might assume that participating in international trade should relieve the pressure on inflated food prices. Clearly, Ethiopia is not endowed with trade conditions. Being a Landlock country, Ethiopia relies upon access to the sea through Djibouti; thus, freight cost is substantially high (Dercon and Hill, 2009). Given all the constraints, the applicability of ADLI is highly in doubt. Nor can it bring Ethiopia to the next stage of development.

Consideration for policy interventions

This policy memo calls for a policy shift in Ethiopia's development policy based on the current evaluations. Evidence suggests that agriculture is incapable of creating sustained growth,

given geographical and technology constraints. Releasing surplus labor into the industry can incentivize large-scale farming in agriculture. I suggest that industrialization should be given more attention, with the caveat is necessary to improve agricultural productivity to achieve balanced growth. The "East Asian Miracle" has shed light on industrial-led development, modeling the success of the rural-urban transition. Moreover, population growth in Ethiopia alongside industrialization is another driver for the opportunity for change.

To summarize, some level of recourses should continue to inject into the innovation of agriculture on investment allocation. This productivity increase should be kept at a level that is enough to offset the output loss in labor transition. Meanwhile, the remaining investment should be made to manufacture and other non-farming sectors to tap into Ethiopia's great potential in economic growth.

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