

Revised May 14, 2004

Information for the editor

*Word count: With character and space	42,003 (= 6540words)
* 1 Figures (@ 1500)	1,500
* Total	<u>43503</u> characters with space

**Ethiopian Macroeconomic Modeling in Historical Perspective:
Brining Gebre-Hiwot and His Contemporaries to Ethiopian
Macroeconomics Realm.**

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**Revised version of Paper Prepared for Western Michigan University, Department of
Economics, and Institute of Development Research (IDR) of AAU Conference,
Addis Ababa University, July 2003. (Revised May, 2004)**

Ethiopian Macroeconomic Modeling in Historical Perspective: Brining Gebre-Hiwot and His Contemporaries to Ethiopian Macroeconomic Realm.

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Abstract

Much of the macroeconomic analysis in Ethiopia is hardly linked to the country's pioneer development thinkers. The latter, however, articulated the Ethiopian development problems and what should be the appropriate policy direction to address them nearly a century ago. This articulated development thinkers of the early 20th century Ethiopia had captured the imagination of prominent Ethiopian historians and their students. Ethiopian economists seem to lag behind in appreciating the theoretical insight of these pioneer development thinkers. This article is aimed at bridging this gap. The paper will, first, reviews the economic ideas of these reformer-intellectuals and then build a linear model based on the synthesis of their development thinking. The model is then solved to render analytically solutions that will give theoretical insights on historic and contemporary macroeconomic issues in Ethiopia. I argue that some important development concepts such as the deterioration of the terms of trade of developing countries, the vicious circle of poverty and structuralist analysis of North-South macro economic interaction has, contrary to the statement in existing development literature, has its origin in early 20th century Ethiopian Development thinking.

I. Introduction*

Recent macroeconomic analysis in Ethiopia is hardly linked to the country's pioneer development thinkers. The latter, however, articulated the Ethiopian development problems and what should be the appropriate policy direction to address them nearly a century ago. This articulated development thinkers of the early 20th century Ethiopia had captured the imagination of prominent Ethiopian historians and their students (see Bahru 2002 for instance). Ethiopian (Africanist) economists seem to lag behind in appreciating the theoretical insight of these pioneer development thinkers. This article is aimed at bridging this gap. The paper has the modest objective of reviewing the economic ideas of these reformer-intellectuals and then build a linear model based on the synthesis of their development thinking. Extending an earlier study on Gebre-Hiwot (see Alemayehu 2002), in this article a linear macro model is formulated and solved to render analytically solutions

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that gives theoretical insights on historic as well as contemporary macroeconomic issues in Ethiopia.

The paper is written with two distinct readers in mind: students of development studies (including general readers on African development thinking) and contemporary economists. Thus, the former category may skip section three, without losing much of the essence of the paper. The rest of the paper is organized as follows. In section two I will discuss, preceded by a brief biography, the basic development ideas of three important development economists of the early 20th century Ethiopia: Gebre-Hiwot Baykedagne, Mikael Tessema and Déréssa Amante. In section three an attempt to synthesize the basic ideas of the three writers within the context of a general Gebre-Hiwot linear macro model is made. This linear model is solved to render analytical solution to shed light on the theoretical implication of this development thinking. Section four concludes.

II. Review of the early 20th Century Development Thinking in Ethiopia

Chaulk (1978) noted that during the four decades from the battle of *Adwa* (between Italy and Ethiopia) till the Italian brief occupation of 1936-41, most Ethiopian intellectuals seem to be optimistic about the future development of their country. The first period is referred, following Baharu's (1994) periodization of the Ethiopian intellectual history, as the first period (the other two being 1941-74 and 1974 to present). The period is unique because of: (a) the general euphoria for development following the Italian defeat in *Adwa*. Intellectuals such as Geber-Hiwot underscored that with out development and self sufficiency the *Adwa* victory, and hence Ethiopia's independence, is meaningless, (b) the increased number of Ethiopian's that went to study in Europe and the development of modern schooling at home, (c) the fascination of many of theses intellectuals with the Japanese development experience¹, and (d) the articulation of and debate over development ideas through the medium of the weekly news paper - *Berhanena Selam* (referred as BS, hence forth).

Although the scope of the debate in BS were wide ranging and involved many intellectuals of the period, this article is primarily concerned with the works of some the influential writers of economic development issues. The economist of the time under analysis focused on the following issues which they thought are central for Ethiopia's development: (a) the role of education and educated work force, (b) war/conflict and development, (c) the role of the state in development, (d) the role of institutions (organization), (e) the importance of infrastructure and (e) the nature of Ethiopia's economic interaction with industrialized countries.

Notwithstanding the proliferation of a number of articles in the then vibrant medium of the time, *BS*, the economic writings of the three authors noted above stands out both by the

¹ This has led to the label 'the Japanaizers' in the Ethiopian intellectual history. The works of 'the Japanaizers' have continued even after Italy's brief occupation as is epitomized in Kebede Mikael's (How Did Japan Mange to Develop? Bahru (2002) also noted that the first Ethiopian constitution is highly influenced by the Japanese one. The latter, among others, is influenced by Gebre-Hiwot's first work (Gebre-Hiwot 1912).

mere extent of their engagement in economic development discourse, and, most importantly, by the substance and depth of their economic argument.

2.1 The Macro Context and Development: Negaderas Gebre-Hiwot Baykedagne (1886-1919)²

Gebre-Hiwot was born on 30th of July 1886 in the village of *May Masha* in the district of Adwa, Tigray region of Northern Ethiopia. That period, according to Bahru (2002), was exceptionally turbulence in Tigray: the political disintegration and psychological void created by the death of emperor Yohannes who came from that region, the ravages of one of the longest and most devastating famines the country had ever known, and the depredation that attended emperor Menilek's campaign of 1890 to assert his new authority – all combined to produce great instability in Tigray (Bahru 2002; Chaulk 1978). It was at this period he fled to Hamasen (Eritrea) at the age of seven (see Bahru 2002; Alemayehu 2002, Sosena 1999, Tinker 1995; and Chaulk 1978). As noted in Bahru (2003), in a trip to the port of Massawa, Gebre-Hiwot and his friends got permission from a captain of a German ship to visit the ship. On departure, Gebre-Hiwot stowed away (this may not be deliberate, see Ayele 1980). On arrival, the captain entrusted the young boy to a rich Austrian family, who adopted him. He learned the German language and gone on to study medicine at Berlin University (Bahru 2002; Chaulk 1978).

After completion of his study he returned to Ethiopia as part of a medical team sent from Germany to attend emperor Menelik (apparently being unable to get employment in Europe because of the color of his skin, see Ayele 1980). After his arrival Gebre-Hiwot learned the Amharic language and reportedly made the private secretary and interpreter to the emperor. In November 1909 he chose to exile himself in the British colony of the Sudan, apparently having difficulty with empress Taytu (emperor Menelik's influential wife). He returned from the Sudan felling critically ill. He recovered, after being hospitalized at Massawa and subsequently wrote two of his writings: *Emperor Menelik and Ethiopia, 1912* and *Government and Public Administration 1924*³ (Bahru 2002). According to Bahru (2002) and also Gebre-Hiwot (1912), he was 'disappointed by Menilek as a modernizing monarch ... [and] ... apparently pinned his hopes on the young prince – Iyyasu. He was soon to be disillusioned, as Iyyasu failed to demonstrate the resolution and consistency necessary for the social and economic change that Gebre-Hiwot and fellow intellectuals recommended'. This has forced him to bank his hopes on another young prince, Tafari Mekonnen (latter Haileselassie I) in whose reign he held two major administrative posts: inspector of the Addis Ababa-Djibouti railway in 1916 and *Naggadras* (Chief of Commerce) of *Dre Dawa* in 1919, before his untimely death on 1st of July 1919 (Bahru 2002)⁴.

² Naggadras Gebre-Hiwot's name is sometimes spelt as 'Näggadras Gäbrä-Heywät Baykädañ'.

³ Why Gebre-Hiwot had given his book the title 'Government and Public Administration' while the book is essentially 'a Treaty on Political Economy of Development' is quite intriguing. Ayele (1980) has hypothesized two possible factors: (a) Gebre-Hiwot's desire to be read by the rulers to whom the former title is appealing and (b) the nature of the German economic thinking of the time which articulated the Smith (1976) type classical economics within the national interest framework of Germany and explicitly linking it with public administration (called Cameralistic thinking in Germany of that time).

⁴ According to Ayele (1980) since Gebre-Hiwot's ideas were against the interest of the ruling feudal lords, he ended up having a number of enemies. These groups have assigned a certain Goshu Ezineh, an employee of the Addis Ababa Municipality to assassinate him. This individual did refuse the assignment and he

Gebre-Hiwot's work is not only published (in Amharic) but also recently translated in to English (see Tinker 1995). In Gebre-Hiwot's model, every nation is capable of developing. He noted that division of labour is central for accumulation; and need to be accompanied by efficient resource allocation both within and across sectors as well as inter-generational transfer of knowledge. Notwithstanding this, he mentioned human capital (i.e. educated work force) and infrastructure development as the prime prerequisites for development. All such efforts, he argues, should be accompanied by balanced management of potential and actual conflicts across ethnic groups through maintaining law and order. In such national project, the role of state for Gebre-Hiwot is to regulate the market (including desirable protection against the inflow of processed goods from abroad) in a pragmatic and flexible manner. If a country is capable of initiating such a process, it will follow the path of development subject to an array of constraints that he classified as internal (related to conflict) and external (related to deterioration of the terms of trade). Thus, the degree (of severity) of constraints would determine the level of development a country may attain⁵. Since his basic ideas are formalized in Alemayehu (2002), details of his ideas are left out in this paper⁶. (see Alemayehu 2002 for detail). In this paper, section three, I have provided a linearized version of his model by combining his ideas with that of his contemporaries (Michael Tessema and Déréssa Amante) – thus building the early 20th century Ethiopia's economic thinking-based macro model.

2.2 The Micro Context and Development: Mikael Tasamma (1900-1963)

According to Bahru (2002), in early 20th century, Teferi (latter Haile Selassie I), at the instigation of *Dajjanch* Gabra-Sellase Bary-Gabr, the governor of Adwa, sent four students to Italy. One of these students and the one managed to get a distinguished carrier was Mikael Tasamma. Mikael is the native of *Adwa* (Tigray, Northern Ethiopia) and protégé of *Dajjach* Gabra-Sellase. During his child hood he went to Hamasen (Eritrea) and joined the evangelical school. After his few years stay in Eritrea and first exposition to modern education he moved to Addis Ababa with the help of *Dajjach* Gabra-Sellase (Biniam 2001). Subsequently he went to the University of Rome and wrote a doctoral thesis in political science. But the thesis was deemed anti-Italian and he was not allowed to defend it. He returned to Ethiopia on the eve of the war with Italy and put in charge of Italian affairs at

himself is assassinated. Finally, a certain Dr Nicolay Zerbos of Greek origin has been given the assassination task and he did manage to kill Gebre-Hiwot. Sadly enough Dr Zerbos got the title of '*Bitwoded*' (a high official government rank) and died a natural death latter.

⁵ Gebre-Hiwot's book has no reference at all. He, however, mentioned an American economist by the name Carry. This may refer to the famous American economist of the time Mathew Carry or his famous and influential economist son Henry Carry. These economists were strong advocates of infant industry protection policy (against British liberalism of the period). Henry Carry was arguing that free trade is British imperialist ambition to keep the US as primary commodity producer for ever (see Chang 2002). This view has certainly influenced Gebre-Hiwot's thinking. Moreover, Gebre-Hiwot used to live in Germany and most likely knows the works of F. List who himself is influenced by these American economists. List's view that in the presence of more developed countries, backward countries cannot develop new industries without state intervention, especially tariff protection, (see Chang 2002) is a common thread that runs in Gebre-Hiwot's book.

⁶ Gebre-Hiwot's ideas revolve around two major constraints of development. These are classified as internal and external. The former is related to conflict while the later to terms of trade deterioration. He expounded these ideas both analytically and empirically throughout his book (see Alemayehu 2002 for details).

the foreign ministry. During the ‘Grazaiani massacre’⁷ he managed to escape from Italian concentration camp and saved his life. After the defeat of Italy he occupied the post of director-general and inspector-general at the Ministry of Justice. He retired from government in 1947/48 and engaged in the private legal practice till his death in 1963 (Bahru 2002, 85-86).

He was an active contributor to the economic debate and discussion (in particular on micro economic issues) in *Berehanena Sälam*. Although Mikael writes on microeconomic issues, including perhaps the first diagrammatic analysis of marginal product and revenue schedules in the Amharic language, he often began his discourse by asking his fellow intellectuals ‘why is Ethiopia underdeveloped?’, and ‘why did Ethiopia fail to expand education which is vital for development?’ (BS, *Nehase* 19, 1919 Et.C. C⁸).

In his search for answer for these questions Mikael refers to the writings of Gebre-Hiwot and Déréssa and concur with their views – and hence the similarity of ideas among these three development economists (BS, *Nehase* 19, 1919 Et.C).

Mikael's writings are different from the other two because he (a) makes reference to classic works such as Smith (1976) and other Italian economists, (b) uses large data and draws lessons from world history and/or specific countries such as the Netherlands, England, USA etc, (c) offers detailed treatment of economic concepts (invariably accompanied by illustrative examples, including diagrams). He offered an elaborative discussion of, *inter alia*, wealth creation, distribution of income, exchange, diminishing marginal utility, cost-value-price⁹, division of labour, interest rate, profit, business organization such as cartels, stages of development (BS 1921-1922 Et.C, various issues).

Mikael’s detailed exposition of economic concepts adds a different dimension to some of Gebre-Hiwot’s analysis whose exposition is informed by the labour theory of value. For Mikael, for instance, productive labour could include services (BS, Megabit 5, 1921 Et.C); and value is not only labour but also the ability to render utility and the fact that the product is demanded (BS Yekatit 14, 19210 Et.C). Like Gebre-Hiwot, however, he believes interest rate is inversely related to the level of development, but due to a decline in marginal product of capital (BS, Tikmet 14, 1922).

Mikael discussed Ethiopian development issues usually as a digression from his microeconomic exposition. Whenever he did that, development for him comes from hard work and knowledge acquired from education, not from, say, natural resources endowment

⁷ Graziani was member of the fascist Italian government appointed to ‘govern’ Ethiopia. He massacred thousands of children and adults in Addis Ababa, following an assassination attempt on his life by two patriot Ethiopians (of Eritrean origin).

⁸ Et.C. refers to Ethiopian Calendar which is about 7 to 8 years behind the European calendar. We have also used names of months in Amharic. Hence, *Meskrem* refers to September; *Tikimit* to October; *Hidar* to November; *Thasas* to December; *Tire* to January; *Yekatit* to February; *Megabit* to March; *Miazia* to April; *Genbot* to May; *Sene* to June; *Hamle* to July; August to *Nehase*; and *Paugme* to the Ethiopian 13th month which has only 5 (in each leap year 6) years. All months in Ethiopian calendar have 30 equal days each.

⁹ Mikael warns on the need to make a distinction between costs, value and price for Ethiopians since the Amharic language has only one word for all (*waga*) (BS, *Tire* 30, 1921).

as such. Like that of Gebre-Hiwot and D  r  ssa, the role of education in this process is central for Mikael (BS, Megabit 19, 1921).

Mikael believes on the importance of ‘self interest’ for development and noted that factors of productions get their just reward through the operation of the free market. Contrary to Gebre-Hiwot’s concern about distribution of income, Mikael is against collectivist (or state-based) notion of distribution of income. This is because he believed that such notion of distribution is not only unpractical but also leads to under-development (BS, Tikmet 7 1922). The only thing that he recommends in relation to this is the need to organize consumer associations, which he inferred from his discussion of industrial organization in Europe. He noted how vital such associations are in defending the interest of its members (BS, Meskrem 23, 1922 Et.C.).

On the external dimension of development, again in contrast to Gebre-Hiwot and D  r  ssa, he uncritically accepts free world trade as a means to an expansion of world wealth, and from which every country could potentially benefit (BS, Megabit 19, 1921 Et.C). He believed international trade could lead to global development and also possibly to global state under the auspices of which each individual country could prosper (BS, Miazia 10, 1921 Et.C).

One of the areas where he discussed the issue of Ethiopia’s underdevelopment at length is in his account of, perhaps pre-dating Rostow, ‘stages of development’ and the crucial role of industrialization to achieve the highest of such stages. Mikael noted, he is forced to write about this issue to encourage Ethiopians to pursue industrialization. However, he wrote, Ethiopians generally wish to industrialize but fail to materialize it. He says, we (Ethiopians) are slow to act and do not know the value of time; and poses: ‘my fellow Ethiopians, when will you be awake from your long sleep?’(BS, Thassas 10, 1922 Et.C.).

Readings of Mikael’s articles show that he had the intention of teaching his fellow intellectuals what he calls political economy (which essentially is microeconomics). Although he discussed rigorously crucial economic concepts at micro level, supported by enumerable illustrations and relevant references, his attempt at linking that with Ethiopia’s problem were weak, especially by the standard of Gebre-Hiwot and D  r  ssa. As aptly remarked by Bahru (Bahru, 2002: 111), ‘Mikael’s writings look as a faithful translation of Italian [and some of the classical] works and his contribution is pale compared to that of Gebre-Hiwot’. What is interesting in the context of this paper, however, is his special focus on micro level analysis and their relevance to understand development issues.

2.3 The Role of Institutions in Development: Blatta D  r  ssa Am  nt   (1887-1952)

Blatta D  r  ssa was one the prolific development economists of early 20th century Ethiopia. According to Bahru (2002) Blatta D  r  ssa has neither went abroad for education nor attended any of the celebrated educational institutions (traditional or modern) in Ethiopia. He was the member of the *L  qa N  gamt  * aristocracy (Wellega, South-Western Ethiopia), being cousin of the local ruler D  jjach Kumsa (G  br  -Egizbh  r) Moroda. In the 1920s he emerged as one of the creative contributors to the weekly *Berehanena S  lam*, which, as noted above, was the intellectual mouth piece of the time. As note by Bahru (2002) *Blatta D  r  ssa* combined intellectual pursuit with exceptional entrepreneur drive. In 1930 he was given the

rank of *Blatta*¹⁰ (having been a *fitawrari* until then) and made the director in the Ministry of Agriculture. In exile in the Sudan, during the Italian brief occupation, he pursued his entrepreneur drive. After 1941, *Blatta* Déréssa developed a reputation as an Oromo oral historian (Bahru 2002). As early 20th century development economist *Blatta* Déréssa has written on the importance of Japan's experience as a model for Ethiopia's development. He characterized this model as '*safe modernization*' (BS, 1925) and emphasized the significance of institutions (which he also equated with organization) for development. He also made an impressive analysis of inflation in Ethiopia of that time.

The Role of Institutions/Organization

Déréssa's emphasis on the role of institution in development comes from his quest for understanding why ordinary people and government appointees do not shoulder the responsibility of working for their country. He observed that these people invariably leave that responsibility to the government. According to him the main reason for this culture of Ethiopian's is lack of institutions (organization). He defines organization (which I daubed it here as institutions) as government rules and regulations that specify the task, responsibility, accountability procedure and autonomy of the appointee in executing the task in question. He noted that this is widely used in Europe and Ethiopia needs to adopt it (BS, Tire 5, 1919).

Writing in 1919 Et.C. (1926/27 in European calendar) he noted that for the last 20 years there were a lot of good intentions and efforts towards development (building s such as the planned bridge over the Nile river, establishing an armament factor, Tannery, School for the clergy, Modern Schools, Hospital etc). However, these efforts were not accompanied by institutional building. The latter, he argues, has resulted in failure to realize these planed targets. Déréssa noted that it is difficult to identify those responsible for this failure because there is no institutional (organization) set-up, with relevant accountability, to help us finger point at the responsible persons.

One way of addressing this, according to him, is sending students to Europe to study what Déréssa calls 'organization'. However, he noted, the number of students Ethiopia were sending to Europe during that time were in the range of ten to twenty people which he argued are too few to bring meaningful change in the country. He mentioned that such a number is not enough even for a single company let alone for a country as big as Ethiopia. He advised the government to follows the footsteps of Japan which did send thousands of her people to Europe for education. Déréssa wrote that the financial burden is not too much, for it can be financed, according to his calculations, by a one month tax income of the Dire Dawa and Addis Ababa customs offices (BS, Yekatit 17, 1919).

He stressed the role of institution by insisting that Ethiopia can not use the old system of running its affairs to run the affairs of the modern economy¹¹.

¹⁰ A title given to an educate person at the rank of a director.

¹¹ He noted that this is tantamount to a refusal by a gold merchant who used to have a very small scale for weighing the gold he sells; and insists on using that when he changes his business to trade in bulky goods such as ivory and wax where a very big scale is needed. (BS, Yekatit 17, 1919).

His idea of learning from Japan was exceptionally strong when he discussed the role of education in development. Like that of Gebre-Hiewot and Mikael, Déréssa was enthusiastic about the role of education in development. He was so enthusiastic that he began a fund raising campaign to build schools across the country. It seems he got his passion for education from Japan's experience that he seems to have been following closely. For Déréssa, learning about Japan is important not only to make Ethiopians feel guilty of the time they wasted thus far, but also to inspire them to work hard in the future. After giving detailed figures about the Japanese success in education (such as the number of schools, universities, student, student sex ratio, printing presses, the governments income etc) he wrote, Japan (which was 60 years back as backward as Ethiopia was) is truly independent and rich because of education and hard work towards attaining it. To realize this he suggested to set up a council of wise-men that will advise the government on issues of modern education (BS, Tikimet 16, 1920).

Déréssa made a link between his idea of organization (institution) and his utmost determinant of development – education - by illustrating it using the expansion of modern education not only in Japan but also in some of the European colonies of the time (such as Tunisia and Algeria). His insightful analysis began when he examines the issue of how to finance this modern education. Here, he offered probably the first analysis of the vicious cycle of poverty, and most interestingly, how to break out of it (BS Tikimet 29, 1921:354). Notwithstanding this, the development economics literature attributes the idea of vicious circle of poverty to the post-world war works of Rosenstein-Rodan (1943) and Nurkse (1953) (see Basu 1997).

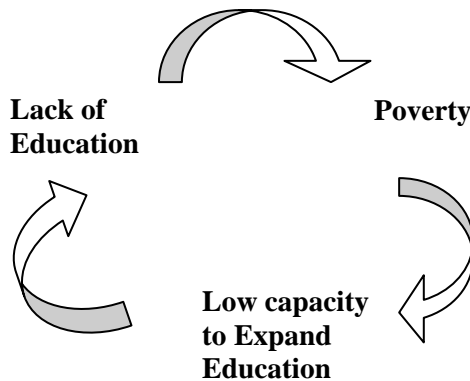


Diagram 1: Déréssa's Vicious Cycle of Poverty (1921 Et.C, [1928 European calendar]).

Déréssa's vicious cycle of poverty is given in Diagram 1. The solution to this vicious circle of poverty, according to Déréssa, is analogous to the treatment of a sick person, where a physician (doctor) who, knowing that his patient is weak, does give him/her a medicine (or carry out a surgery) that will make him/her even weaker, but eventually better. By the same analogy, Déréssa emphasized the need to make sacrifice (in terms of higher education tax or effectively domestic saving) to expand education across the country. For Déréssa this needs to be institutionalized, and the institutions need to have council of advisors. Unless we do that, he lamented, anything we do will be built on weak foundation. (Tikimet 29, 1921:354).

Terms of Trade (Domestic and External) and Inflation

The final thread that Déréssa discussed relates to the role of the external sector and inflation in Ethiopia's development. In one of his articles he attempted to resolve the apparent trade-off between rural and urban welfare following a surge in export of agricultural output (live animals) from Ethiopia in 1920s¹². He basically argued that such trade-off is inevitable but could be avoided through rural-urban integration. This integration (cooperative) effort needs to aim at building infrastructure that links the rural and urban areas. This will in turn help both the rural and urban population to benefit from the export trade by generating a price level between the current export price and the hitherto farm-gate price (BS, Megabit 17, 1917).

The final issue that he examined is inflation. He examined these both from global and national perspective. His inflation analysis is written in 1931. This was the period of the great depression in the industrial world. Inflation was also a major problem in many countries. Déréssa made an impressive analysis of inflation in Ethiopia during this period. He stated that hoarding (of the then commodity money) is common in many countries and is a problem created by rich people. This hoarding reduces the amount of money in circulation (hence excess of transaction demand over money in circulation). This, according to Déréssa, is aggravated by over production and the use of capital-intensive technology in industrialized countries that led to losses and unemployment which further reduced the effective demand and hence inflation (compare with Keynes 1936 and Kalecki 1971). He noted that this global condition has repercussion on Ethiopia. He said inflation problem in Ethiopia comes from a decline in world price of silver (the commodity money in Ethiopia of that time). Since the Ethiopian money was also silver-based and was not backed by gold, its value has declined in tandem with world price of silver. This has led to depreciation of the Ethiopian money since Ethiopians need nearly double of what they used to require for the same items that they import. This has led to concentration of currency in the hands of few merchants leading to a shortage of money in rural areas. This is aggravated by a decline in the price of Ethiopia's exportables, further reducing the money supply in Ethiopia. These two, according to Déréssa, are the external dimension of the inflation problem in Ethiopia.

Déréssa then went on discussing what he calls the 'internal cause of inflation' that is created by the Ethiopian themselves. He said, today our spending has increased nearly four fold. Half of this is due to fall in the world price of silver (hence the terms of trade effect) as explained above. The other half is due to Ethiopians' dual pattern of consumption: the spending required to maintain the age-old Ethiopian traditional pattern of consumption, and the other which is needed for that part consumption and life style adopted from the Europeans. This pattern, he noted, is also apparent at the level of government structure. Thus, Ethiopian's are spending, he noted, an amount enough to run two countries while their source of income is the limited resource of a single country – Ethiopia. (BS, Yekarit 3, 1924).

¹² The trade-off occurred because rural households got higher prices for their produce owing to the export while urban dwellers paid higher prices owing to the shortage in domestic market induced by the rising level of exports..

This problem could be addressed, according to Déréssa, not by failing to adopt the European model of development but rather by real understanding of the meaning of development. For him development is not dependence on Europe, but rather an expansion of education, especially in areas of industry, developing a saving culture, and hard work. Till we reach the European level, he argued, we can follow agricultural development strategy in the short run. This needs to be accompanied by reducing imports and consumption of luxuries (see BS, Yekati 3, 1924). His writings in this part basically follow Gebre-Hiwot's line and it will not be far from truth if we argue that he might have read and is convinced by Gebre-Hiwot's line of thinking about the role of education and the development strategy that Ethiopia needed to follow.¹³

III. A Linear Gebre-Hiwot Model (The LGB Model)

3.1 The Model¹⁴

These three development economists of early 20th century Ethiopia, especially of Gebre-Hiwot and Déréssa, have at least four areas that they were concerned with: the role of *education* (human capital) in development, *the internal constraint* for development, the *trade link with Europe* and its repercussion on backward countries' development in general and Ethiopia's development in particular, and *creative way of adopting* the European model of economic development (including the nature of economic relation with them) in general, and that of Japan in particular to the Ethiopian reality.

In this section I have attempted to synthesize and formalize these major tents with an objective of developing a macroeconomic modeling history of Ethiopia that may also inform contemporary macroeconomic issues in the country.

The Internal Constraint for Development

The LGB model is a two sector model (a third export sector is embodied in the two): agriculture (Q_a) and non-agriculture (Q_n) output (Q). Agriculture being the most important one. All parameters of the model ($a, b, c \dots$ with their subscript showing the equation number are) assumed to be positive constants. Given such notation, total output in nominal terms is given as,

$$PQ = P_a Q_a + P_n Q_n \equiv PQ_a + Q_n \quad [1]$$

Where: P_a and P_n are price of agricultural and non-agricultural outputs and p a general relative price level (see equation [2] below for definition of P).

Out put in the agricultural sector, largely following Gebre-Hiwot (1924), is determined by conditions of war/conflict (W), population growth (P^0), the domestic tax rate (t_d), general

¹³ The latter is especially apparent in Déréssa's computation of the balance of trade and terms of trade deterioration, which for the first time in Ethiopia is done by Gebre-Hiwot.

¹⁴ See Annex 1 for glossary of symbols used in the model and their definition.

price level (P), the extent of division of labour (D_L) and the proportion of the labour force engaged in productive (L_p) and unproductive sectors (L_u). The non-agricultural sector output is given as a function of agricultural output, price and investment (I). These are given in equations 2 & 3.

$$Q_a = a_2 - b_2 W + c_2 \dot{P}^o + d_2 D_L + e_2 \left(\frac{L_p}{L_u} \right) - f_2 t_d + g_2 P \quad [2]$$

$$Q_n = a_3 Q_a + b_3 P + c_3 \lambda_1 I \quad [3]$$

Where: $\lambda_1 = \frac{I_h}{I}$ and $I = I_h + I_p$;

$$P = \frac{P_a}{P_n} \text{ and } P_n = 1$$

a_2 to g_2 , are positive parameters; λ is a policy parameter and P_n is assumed unity.

Productive labor is central in the LGB model. In fact Gebre-Hiwot's work is based on the labour theory of values while Mikael seems to rely more on utility theory of values. Déréssa is silent at this issue. Since Mikael's work is more of a translation than adoption and Déréssa's ideas can be linked to Gebre-Hiwot through his discussion of the role of education (skill) in development, we could further specify productive labour as in equation 4.

$$L_p = a_4 + b_4 I_p + c_4 I_h \quad [4]$$

The physical (I_p) and human (I_h) capital formation (or investment) terms are crucial for both Gebre-Hiwot and Déréssa. The former captures the impact of infrastructure while the later that of education (skilled labour/human capital) that both writers repeatedly emphasized in their writings.

$$I = a_5 + b_5 Q + c_5 \lambda_2 M - d_5 r \quad [5]$$

Where: λ_2 is the composition of imports into luxury (lx) and essential (i), and $= M_{lx}/M$

Equation 6 specify the private saving (or the inverse of private consumption) equation; while equations 7 and 8, taxes on domestic and external (foreign) sector, which form part of the public saving.

$$S_{dp} = a_6 + b_6 (Q - T_d) \quad [6]$$

$$T_d = a_7 + b_7 Q \quad [7]$$

$$T_f = a_8 + b_8 M_{lx} + c_8 M_i \quad [8]$$

Where: $0 < c_8 < b_8 < 1$ in a developmental state, according to Gebre-Hiwot; and $M = M_x + M_i$

The formulation of price and the monetary block follows Déréssa's idea:

$$M^d = a_9 + b_9 \lambda_3 Q - c_9 \left(\frac{P_x}{P_m} \right) - c_9 r + d_9 P \quad [9]$$

Where: λ_3 is a scalar, greater than 1 (1 being normal) for Déréssa, and is the scale factor for the pattern of consumption.

$$M^s = \bar{M} + b_{10} \left(\frac{P_x}{P_m} \right) \quad [10]$$

$$M^d = M^s \quad [11]$$

Equations 9 and 10 define the demand for and supply of real money while equation 11 shows the equilibrium condition in the money market. These functions are very similar to a standard IS-LM model except that money during that time was commodity money and hence the world price of silver does affect both demand and supply through the terms of trade, according to Déréssa. The negative effect of interest rate (r) on money demand is based on Gebre-Hiwot's formulation (see Alemayehu 2002) and also Mikael's idea.

The External Constraint for Development

$$X = a_{12} + b_{12} \left(\frac{P_x}{P_m} \right) \quad [12]$$

$$M = a_{13} - b_{13} \left(\frac{P_x}{P_m} \right) + c_{13} Q \quad [13]$$

$$\left(\frac{P_x}{P_m} \right) = a_{14} - b_{14} \left[\left(\frac{Q_n}{Q_a} \right)_N / \left(\frac{Q_n}{Q_a} \right)_S \right] - c_{14} \left(\frac{T_s}{T_N} \right) \quad [14]$$

Where: T is the cost of transport from country N (the North) to country S (South)

Both exports (equation 12) and imports (equation 13) in LGM are a function of the terms of trade (as well as level of output for imports). The terms of trade in turn is determined by the level of development or degree of processing the export commodity, as shown by the proportion of the value-added in the non-agricultural sector of the two trading parties, N & S . Moreover, the cost of transporting exports to their destination (country of trading partners) does also affect the terms of trade. For the same distance, this cost is usually high for the backward country which exports bulky, unprocessed, goods, according to Gebre-Hiwot. This could adversely affect its terms of trade by eroding its competitiveness.

Identities of the Model and Model Closure Rules

The model rests on some crucial identities outlined in equations from 15 to 19.

Equation [15] will determine the level of foreign saving (S_f) while equation [16] renders the level of public saving.

$$I = I_p + I_h = I_n + I_a = S_f + (S_{dg} + S_{dp}) \quad [15]$$

$$S_{dg} = (T_a + T_n) + (T_{lx} + T_i) - G \equiv T_d + T_f - G \quad [16]$$

The current stock of debt (D) is sum of foreign saving (assuming no grants, as indeed is done by Gebre-Hiwot), interest (i_w) payment on previous debt (D_{t-1}) and the level of previous debt (D_{t-1})¹⁵:

$$D = S_f + i_w D_{t-1} + D_{t-1} \quad [17]$$

The Balance of payment in the LGB model is given by,

$$B = X - M - i_w D_{t-1} \quad [18]$$

Output in the agricultural sector is exhausted by the demand from the non-agricultural sector, exports, own consumption and tax. The output in the non-agricultural sector and imports are demanded for the purpose of investment both in the non-agricultural and agricultural sectors. These two conditions of aggregate demand, together with aggregate supply are given as equation 19. The interaction of this aggregate supply side with that of demand, together with conditions shown in money market above, will determine the level of general prices.

$$Q^s = \frac{[(Q - S_{dp}) + I + G + X - M]}{P} \quad [19]$$

3.2. Some Partial Equilibrium Analytical Solutions

The above model shows that the system has nineteen equations with nineteen endogenous variables and twelve exogenous variables (see Annex I for details). The model is akin to an aggregate supply and aggregate demand system (AD-AS) that usually render stable equilibrium solutions. In this section I will provide some partial analytical solutions that may capture the essence of these economists' thinking of the time.

¹⁵ Although this specification here and in equation 18, has a dynamic formulation, I have not used it in the model solution. This is done by assuming the lagged values as exogenous. Thus, the solution to equations 17 and 18 is arrived at given the solution from the static formulation of the model set out in the rest of the model and the pre-determined lagged values.

To illustrate the analytical potential of the model specified above, I have reported five partial analytical solutions of the model. The results are partial, because the full equilibrium effect of the model is not taken in solving for the choice variables.

Assuming investment is equally divided between its human and physical capital formation component and using the output, price, investment and terms of trade interactions, as given by equations 1 to 5, and 13, I have solved this set of equations for real levels of total and agricultural outputs.

Since the resulting algebraic expression is long and messy¹⁶, I have reported here the partial derivatives with respect to conflict, investment, and education, (which are taken as the internal constraints for development by these economists); and with respect to terms of trade (which is the external constraint for development). The resulting expressions are given in equations 20 to 24.

The Internal Constraint

Equations 20 and 21 show the effect of conflict/war on the level of total and agricultural output respectively. The equations show that, other things remain constant, conflict has a negative effect on economic performance. This however assumes that the terms in the bracket of the denominators yield positive values. The magnitude of this effect depends on movement of prices, investment conditions and the size of the unproductive labour. Investment on education and infrastructure, as shown by equation 22 and hinging on the same assumptions as that of equations 20 and 21, has, however, a positive effect.

$$\frac{\partial Q}{\partial W} = \frac{2b_2(P_a + P_n a_3)L_U}{-(2PL_U - ((P_n a_3 + P_a)[e_2 b_5(b_4 + c_4)])]} \quad [20]$$

$$\frac{\partial Q_a}{\partial W} = \frac{2b_2 L_U P}{-(2PL_U - ((P_n a_3 + P_a)[e_2 b_5(b_4 + c_4)])]} \quad [21]$$

$$\frac{\partial Q}{\partial I} = \frac{-2c_3 P_n \lambda_1 L_U}{-(2PL_U - ((P_n a_3 + P_a)[e_2 b_5(b_4 + c_4)])]} \quad [22]$$

The External Constraint

In the LGM model, the external constraint for development is depicted by deterioration of the terms of trade (ToT, given in this model as P_x/P_m) and the relative cost of transporting exports as shown and discussed in equation 14. Deterioration of the terms of trade does negatively affect the level of imports, and hence investment, as well as total and agricultural output as shown by equations 23 and 25. This partial result, as in the other solutions above depends on positive outcome of the terms in the denominator of equations 23 and 24.

¹⁶ 'Mathcad Professional' software is used.

$$\frac{\partial Q}{\partial(ToT)} = \frac{-e_2 c_5 \lambda_2 b_{13} [(P_a + a_3 P_n)(c_4 + b_4)]}{(2PL_U - (P_n a_3 + P_a)[e_2 b_5 (b_4 + c_4)])} \quad [23]$$

$$\frac{\partial Q_a}{\partial(ToT)} = \frac{-e_2 c_5 \lambda_2 b_{13} P[(c_4 + b_4)]}{(2PL_U - (P_n a_3 + P_a)[e_2 b_5 (b_4 + c_4)])} \quad [24]$$

IV. Concluding Remarks

In this paper an attempt to analyze and synthesize the works of three pioneer Ethiopian development economists is made. The paper shows that these thinkers might be considered as pioneers in development economics. This is in particular true in their exposition of the terms of trade deterioration (which in the development economics literature is described as ‘the Prebisch-Singer hypothesis’), the vicious cycle/circle of poverty, and creative adoption of European development model to conditions in developing countries. The latter view, which is referred as ‘safe modernization’ by these economists, also took Japan as its model.

On the basis of the idea of these development economists, a linear model is specified and partial equilibrium solutions are derived. The paper thus shows not only the origin of some basic tents of development economics in Africa, but also the possibility of formalizing it in simple but logical framework. The model formulation, it is hoped, is also helpful to squarely focus on major development problems of Ethiopia at the turn of the early twenty century. Such modeling attempt is also helpful to document the history of development macroeconomics in general and model building effort in Ethiopia in particular. It is further hoped that this initial attempt in modeling could also be used as the basis for contemporary modeling exercise in Ethiopia. This is a logical approach since the problems analyzed by these pioneer development economists nearly a century ago are still very much relevant to the current condition in Ethiopia.

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Annex I: Symbols used in the Model and their Description		
Symbol	Description	Status in the Model
Q	Real output	Endogenous
Q_a	Real Output in the agricultural sector	Endogenous
Q_n	Real Out put in non-agricultural sector	Endogenous
W	An indicator of War or Conflict	Exogenous
P^o	Population growth	Exogenous
DL	Division of Labour	Exogenous
L_u	Unproductive labour	Exogenous
t_d	Domestic tax rate (tax rate on domestically produced goods)	Exogenous
λ_1	Parameter that determine the ratio of human to physical investment	Exogenous
λ_2	Parameter that determine the ratio of luxury(lx) to essential or investment related (i) imports	Exogenous
λ_3	A scalar, greater than 1 (1 being normal) for Déréssa, and is the scale factor for the pattern of consumption.	Exogenous
I	Real level of total investment	Endogenous
I_p & I_h	Investment on Physical and human capital respectively.	Endogenous
S_{dp}	Domestic saving of the private sector	Endogenous
T_d	Total tax from domestic economic activity	Endogenous
T_f	Total tax from foreign (external) economic activity	Endogenous
M_d	Nominal demand for money	Endogenous
M_s	Nominal supply of money	Exogenous
P	General price level	Endogenous
r	Domestic interest rate	Endogenous
X	Real level of Exports	Endogenous
M	Real level of Imports	Endogenous
(P_x/P_m)	Terms of trade (ratio of export to import price)	Endogenous
$(Q_n/Q_a)_N / (Q_n/Q_a)_S$	Ratio of the non-agricultural and agricultural activity in the developed (N) to that of the underdeveloped countries (S)	Exogenous
T_S/T_N	The cost of transporting commodities from one (S) country to the other (N)	Exogenous
S_f	Foreign saving	Endogenous
S_{dg}	Domestic saving of the public (government) sector	Endogenous
G	Government (public) consumption	Exogenous
D	The level of Debt	Endogenous
B	The Balance of payment	Endogenous
i_w	World interest rate on debt	Exogenous
Lagged values	All lagged (pre-determined) variables are assumed exogenous	Exogenous