

EXPORT INSTABILITY AND ECONOMIC GROWTH IN ETHIOPIA

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1. INTRODUCTION

A large and unanticipated fluctuation in export earnings, as different studies have tried to show, is a problem to a country's sustainable investment and growth. This problem is even more serious for countries like Ethiopia where about 71 per cent of the total imports is for investment goods and equipment, raw materials, fuel, and semi-finished goods.¹ Besides, while imports were growing at an annual rate of 8.5 per cent, exports have stagnated for a number of years.² As a result, we have a situation where, on the average, current export earnings can finance less than 40 per cent of the total import expenditures.³

Apart from its impact on real economic variables, export instability influences the movement of monetary variables. Unexpected and occasional ups and downs in export earnings will adversely affect the domestic price situation, which is usually inflexible downwards, with the concomitant inflation discouraging savings and possibly distorting the allocation of resources further away from the optimum [MacBean and Nguyen 1988: 100].

In general, export instability will reduce growth below what it would otherwise have been with a more stable sets of prices [see, for example, Love (1975), Imagawa (1985), and Otoni and Villanueva (1990)]. Fluctuations in government expenditures on infrastructure and the stop-go policies resulting from export instability raise the risks associated with investment and cause inefficiencies [MacBean and Nguyen 1988: 100]. What is more, industries whose requirements for raw materials and spare parts are largely met from imports may have to operate below full capacity due to large and sudden reductions in export proceeds. It is also contended that by narrowing the confidence interval of expected returns from new investments, fluctuations increase the opportunity cost of money to be invested in the external sector and the national economy at large.

In order to offset the adverse effects of export instability⁴, it is necessary, according to MacBean and Nguyen (1988), to devise conducive policies such as holding adequate foreign exchange reserves, easy access to international borrowing by improving credit worthiness and/or intervention in commodity markets through international commodity agreements. The offsetting measures are not, however, so much helpful in solving export instability, apart from alleviating the immediate foreign exchange needs of the country concerned.

This paper tries to identify the sources of export instability in Ethiopia and attempts how their adverse effects on the country's economic growth can be tackled.

It is organised as follows. In Section 2, attempts are made to measure the magnitudes of instability in export earnings, quantities and prices. A model is then developed in Section 3 to identify the significance of export prices and/or quantities of the major export commodities in the determination of the performance of total export earnings. The model also examines the degree to which the latter are sensitive to changes in the magnitudes of the former. In Section 4, the paper deals with the importance of Ethiopia's exports in the process of fulfilling growth objectives. To this effect, the revised Harrod-Domar (H-D) growth model is used. Using this model, the section indicates some of the basic problems relating to alternative policy strategies towards the attainment of a self-sustained growth (SSG). The paper concludes with some policy recommendations on how to improve the performance of the export sector and, related to that, on how to increase the tempo of economic growth in Ethiopia.

2. THE MAGNITUDE OF EXPORT INSTABILITY

Various alternative definitions of export instability are given in the literature. For our purpose, it suffices to use the following definition: "Export instability means instability of export earnings, export prices, and export quantities," [Herrmann 1989: 219]. Export instability is often measured by an index which is calculated as (relative) changes in earnings from a certain reference value. But which earnings do we take? Is it total export earnings, or earnings from specific exports such as primary goods or manufactured goods? Various authors argue that it is total export earnings rather than earnings from specific goods that is relevant in affecting the growth objectives of least developed countries (LDCs), for the former is stronger in raising investment risks and disrupting imports of capital goods than the latter [MacBean and Nguyen 1988: 87]. It is with this understanding that this paper focuses on fluctuations in total export earnings and their respective quantities and prices.

The usual formula to measure instability is the percentage deviation from the exponential trend fitted to observed values within a given span of time⁵ [Herrmann 1989: 219]. Fitting the trend equation on Ethiopia's export earnings, prices and quantities for the period between 1978/79 and 1988/89, however, resulted in insignificant equations and growth rates. The values of these variables had no clear upward or downward trend but were found to be scattered around the average values for the period. Hence, the index of instability was calculated as the percentage deviation from the period average.

The results, presented in Table 1, show higher instability of prices (11 per cent) than earnings (9 per cent). The quantity instability (5 per cent) is found substantially lower than those of both prices and earnings; however, the quantity fluctuations were predominantly in a direction opposite to the price fluctuations and had a dampening effect on the fluctuations of earnings. These results indicate that, given the current export structure and policy parameters, Ethiopia's export earnings are more vulnerable to external shocks (such as export price falls and world economic recession) than domestic supply problems (due to natural disaster, drought and so

on). Moreover, the quantity index shows relatively stable export quantities not because of a stable upward or downward trend but, as stated above, due to its relative stagnation over the years under study. When this relative stagnation is compared to the variability of the corresponding prices, it reveals that there are structural rigidities in the production of commodities that insulate the effects of changes in (international) prices on quantities supplied in the same or the following year. It appears, therefore, that unless these structural rigidities are removed, the government will not be able to control the instability in export earnings using the existing policy parameters.

Table 1: Instability Indices for Total Export Earnings, Export Prices and Export Quantities (1978/79 - 1988/89)

	Mean Values	Instability Indices (per cent)
Total Export Earnings	8,351	9
Export Price Index (1978/79=100)	118.43	11
Export Quantum Index (1978/79=100)	94.18	5

Source: Calculated on the basis of data taken from IMF, *Ethiopia: Recent Economic Development*, May 1984; June 1985; and January 1990.

3. SENSITIVITY OF TOTAL EXPORT EARNINGS TO FLUCTUATIONS IN PRICES AND/OR QUANTITIES

Exports of developing countries are concentrated in a narrow range of primary commodities and are destined to few markets. Thus, fluctuations in earnings from one commodity or market are not offset by compensating changes in proceeds from another product or trading partner [Love 1975: 35]. This implies that total export earnings are highly sensitive to changes in the prices and/or quantities of the dominant export commodities, with the elasticity of earnings with respect to prices/quantities accounting for a significant share of the sum total. It can, therefore, be argued that as a country diversifies its exports more and more, the elasticity of each export commodity will get smaller and smaller.

As far as the structure of Ethiopia's exports is concerned, only three commodities (namely, coffee, hides and skins, and oilseeds and pulses) accounted for more than 80 per cent of the total export earnings for the period 1984/85 to 1988/89. Of the earnings from these commodities coffee alone accounted for about 80 per cent, on the average, during the same period.⁶ The country's export earnings are, therefore, likely to be sensitive to changes in the prices/quantities of these commodities.

To assess the degree of sensitivity of total export earnings to changes in the prices and quantities of the major export commodities and to see the relationships between these variables, the simple model outlined below was estimated.

3.1 The Model

The assumptions of the model are based on the equation

$$R = \sum_{i=1}^n p_i q_i \quad [1]$$

where R is total export earnings and p_i and q_i are the price and quantity of export item i . From Equation 1, it is clear that a change in p_i or q_i , or both, affects the value of R , and hence we can write

$$R = f(p_i, q_i), \quad i = 1, 2, \dots, n \quad [2]$$

Since one of the variables on the right-hand side can be expressed as a function of the other, with no change in assumptions, we can deal with one of them, say, p_i . Equation 2 will then become

$$R = f(p_i), \quad i = 1, 2, \dots, n \quad [3]$$

Taking the total differential of Equation 3, we get

$$dR = \frac{\partial R}{\partial p_1} dp_1 + \frac{\partial R}{\partial p_2} dp_2 + \dots + \frac{\partial R}{\partial p_n} dp_n \quad [4]$$

Dividing Equation 4 throughout by R and multiplying the right-hand side by p_i/p_i , the equation reduces to

$$\dot{R} = e_1 \dot{p}_1 + e_2 \dot{p}_2 + \dots + e_n \dot{p}_n \quad [5]$$

where \dot{R} and \dot{p}_i are the growth rate of total export earnings and the price of export item i , and e_i is the elasticity of total export earnings with respect to the price of export item i . Since Equation 5 is homogeneous, a constant term is introduced to allow for more flexibility, and the equation is now written as

$$\dot{R} = \beta_0 + \beta_1 \dot{p}_1 + \beta_2 \dot{p}_2 + \dots + \beta_n \dot{p}_n + \mu \quad [6]$$

where β_0 is the constant term and $\beta_1, \beta_2, \dots, \beta_n$ denote the elasticity parameters to be estimated, and μ the disturbance term. It is assumed that $0 < \beta_i \leq 1$ ($i = 1, 2, \dots, n$). Moreover, it is assumed that the horizontal summation of the elasticities cannot be greater than one, i.e., $\beta_1 + \beta_2 + \dots + \beta_n \leq 1$, except for estimation and/or data collection errors. The extreme case of $\beta_1 + \beta_2 + \dots + \beta_n = 1$ could happen only when either all prices or all quantities register equal values throughout the period under consideration, so that all the changes in \dot{R} are attributed to changes in the remaining set of variables alone. Before proceeding to the estimation of the parameters, two points about the importance of the model are worth mentioning.

First, apart from its use for sensitivity tests, the model helps policy makers to assess the extent to which export diversification could be successful, should policy changes be made to that effect. Secondly, given that price trends in a commodity market are roughly known, planners would be able to set, compensating measures against uncertainty beforehand using the estimated parameters.

3.2 Estimation and Results

In order to estimate Equation 6, the country's export commodities are grouped into four. The three main exports -- coffee, hides and skins, oil seeds and pulses -- each forms a group while the rest of the exports are lumped together to form the fourth. Available data for the entire period of our analysis (1970-89) consist only of the quantities and earnings on the country's export items. Average annual prices were computed by dividing the export earnings by the respective quantities. The equation was first estimated from these data by ordinary least squares (OLS) for the period 1970-89. Tests of significance of the parameters was then conducted and the model re-estimated for the same period and for the ten-year period 1980-89 after dropping variables found insignificant.

To compare the sensitivity of total export earnings to price variations with their sensitivity to changes in quantities, another regression is run by using the growth rates of the quantities of the export commodities in place of those of the prices in Equation 6.

The results, summarised in Table 2, show that all the equations with the price growth rates as explanatory variables are significant. As expected, the elasticity of export earnings with respect to the prices of the dominant export items, namely, coffee and hides and skins are significant. Moreover, the sum of these elasticities account for more than 70 per cent of the total elasticity. We also note that the relative importance of hides and skins is largely reduced with the shortening of the period of our analysis to the ten-year period of 1980-89. On the other hand, the importance of coffee in determining the performance of the total export earnings increases from 0.34 to 0.44, meaning that a 100 per cent increase in the price of coffee would entail a 10 per cent increment in total export earnings. This reveals that the country's export earnings have become more dependent on the exports of coffee alone over the last 10 years. The findings further show that the prices of all export items other than the three main export commodities are not important determinants of total export earnings.

The results also indicate that the equation in which quantity growth rates are explanatory variables is not significant. This is primarily because of the relative stagnation of the quantity of exports over the study period. Stagnation in the quantity of exports could exist because of either full capacity utilization with no further investment and technical progress in the sector, the existence of a wide gap between the production and supply of exports with no policy initiatives to narrow the gap, reduced external demand for a country's exports, or some combination of these.

Ethiopia's realities, however, reveal that it must be the second factor that has been at work. As pointed out in various studies, there is underutilization of capacity because of shortage of foreign exchange and market limitations. And since these two problems are largely the result of lack of competitiveness in the world market, the government could be accused of wrong policies against exporters and the export sector at large. It can easily be seen from the various policies which the government has been following so far (for instance, exchange rate policy, interest rate policy, etc.), that there is no conducive environment for exporters and producers of export commodities. The ever increasing flow of illegal exports to the neighbouring countries is, among other things, an evidence of the existing problems in the policies. Formation of appropriate policies could, therefore, enable the country to increase the volume of legal exports by diverting illegal exports into legal channels, without even increasing its production.

Table 2: Regression Results of Sensitivity Analysis

Indep. Varia.	Period	Estimated parameters					R ² (F-ratio)
		Const.	Coffee	Hides & skins	Oilseeds & pulses	Other exports	
p	1970-89	-0.009.7	0.342 (3.517)	0.406 (2.73)	-0.085* (-0.796)	0.061** (0.61)	0.68 (7.288)
p	1970-89	-0.0102	0.346 (3.865)	0.383 (2.707)	--	--	0.65 (15.09)
p	1980-89	-0.0110	0.440 (3.315)	0.224** (0.983)	--	--	0.66 (5.733)
q	1970-89	-0.0701	-0.043** (-.14)	0.0784** (0.395)	0.0686** (0.729)	0.068** (0.869)	0.132** (0.476)

* Figures in parentheses are t-values.

** Insignificant at 5 per cent.

4. EXPORTS AS A MEANS OF GROWTH

In the foregoing discussion, the main focus was on identifying the major causes underlying the unsatisfactory performance of Ethiopia's exports. The implications of this to economic growth has not yet been addressed. This section attempts to raise some of the important arguments pertinent to the subject and forwards some relevant policy alternatives necessary to initiate and sustain an acceptable rate of economic growth in Ethiopia.

To this end, the revised Harrod-Domar (H-D) growth model due to Imagawa (1985) was employed. He revised the model by incorporating exports as an additional variable in explaining growth. This improves the applicability of the H-D

growth model to the analysis of economic development in LDCs. Although the model cannot and is not expected to address the whole range of problems in economic development and policy, it tries to explain the importance of exports in economic growth, given the existing structure and stage of development of the economy and its potential capacity to generate alternative development scenarios.

In what follows, the model and the conditions derived from the parameters of the model, in order to examine the success of alternative economic policies in attaining the objective of self-sustained growth (SSG), are outlined.⁷ The estimation procedure and the result are also presented.

4.1 Specification of the Model

In its simplest form, as suggested for LDCs, the model rests upon the assumption that the determinants of growth in these countries are investment and exports. While investment is the center of growth, exports too are assumed to be an inducing factor.⁸ The basic analytical framework of the model consists of the following five relationships:

$$Y_t = \beta K_t + \eta E_t \quad [7]$$

$$C_t = \alpha Y_t \quad [8]$$

$$M_t = \mu Y_t \quad [9]$$

$$E_t = E_0 e^{r t} \quad [10]$$

$$Y_t = C_t + \dot{K}_t + E_t - M_t \quad [11]$$

where Y_t = gross domestic product (GDP)
 K_t = capital stock
 C_t = consumption
 E_t = export
 E_0 = initial value of export
 α, β, μ, η = parameters
 M_t = import
 K_t = investment,
 r = export growth rate

Equation 7 includes both a supply factor, K_t , and the external demand factor, E_t . But one should be aware of the fact that the equation cannot be called a production function since export cannot be regarded as a production factor.

Moreover, the parameter η is assumed to be positive and can be called the propensity to induce production [Imawaga 1985: 113].

Utilising Equations 7 to 11, the following equation about investment can be obtained:

$$\dot{K} = \rho\beta K_t + (\rho\eta - 1)E_0 e^{\eta t} \quad [12]$$

where $\rho = (1 - \alpha - \mu)$

Now, based on Equations 7 to 11 and the simultaneous solution 12, the definitions and the conditions for the growth rate of GDP, policy target, and alternatives, namely, self-sustained growth (SSG), export drive (ED), internal drive (ID) and import substitution (MS) are outlined below.

The growth rate of GDP is defined as

$$\dot{R}_Y = \frac{\dot{Y}_t}{Y_t} \quad [13]$$

The definitions of SSG, ED, ID and MS are given by Equation 14, 15, 16 and 17 respectively

$$\lim_{t \rightarrow \infty} Y_t > 0, \quad \lim_{t \rightarrow \infty} \dot{Y} > 0 \quad [14]$$

$$\lim_{t \rightarrow \infty} \frac{\partial R_Y}{\partial r} < 0 \quad [15]$$

$$\lim_{t \rightarrow \infty} \frac{\partial R_Y}{\partial \alpha} < 0 \quad [16]$$

$$\lim_{t \rightarrow \infty} \frac{\partial R_Y}{\partial \mu} < 0 \quad [17]$$

To specify the conditions for the policy alternatives, Equations 7 to 11 are solved simultaneously for GDP. This gives

$$Y_t = \beta[K_0 - A]e^{\rho\beta t} + [\beta A + \eta E_0]e^{\eta t} \quad [18]$$

where K_0 is the initial capital stock and

$$A = \frac{(\rho\beta - 1)}{(r - \rho\beta)} E_0$$

1) The conditions for SSG are

$$\rho\beta > r, K_0 - A > 0, \text{ or } \rho\beta < r, \eta r > \beta \quad [19]$$

2) The conditions for ED are

$$\rho\beta > r, \eta r < \beta \text{ and } K_0 - A > 0 \text{ or } \rho\beta < r \quad [20]$$

3) The conditions for ID are

$$\rho\beta > r \text{ or } \rho\beta < r, K_0 - A > 0 \quad \text{and}$$

$$\eta r < \beta \text{ or } \rho\beta < r, K_0 - A < 0 \text{ and } \eta r > \beta \quad [21]$$

4) The conditions for MS are

$$\rho\beta < r, K_0 - A > 0 \text{ and } \eta r > \beta \quad [22]$$

The combinations of parameters can be interpreted as follows: $\rho\beta$ is the internal rate of growth, ηr the trade effect weighted by external rate of growth, and $\rho\eta$ the cross effect of internal and external factors [Imagawa 1985: 115].

The revised H-D type model can be empirically tested first by estimating the structural parameters in Equations 7 to 11 and then examining individual as well as combined parameters in accordance with the conditions stated in Equations 19 to 22.

4.2 Estimation and Results

The parameters of Equations 7 to 11 were estimated by single equation OLS regression from the data given in the Annex. The estimates, given in Table 3, are then used to compute the values of the combined parameters presented in Table 4. It can be observed from the results that the internal rate of growth ($\rho\beta$) is greater than the external rate of growth (r), revealing that the country's current economic strategy is inward-looking. Moreover, the incremental output/capital ratio (β) is greater than the trade effect weighted by the external rate of growth (ηr), and the initial condition ($K_0 - A$) is positive, implying that the country could achieve the desired objectives of SSG using only ED and ID policies. The policy of import substitution, on the contrary, is found to be inappropriate to Ethiopia. This goes with the proposition that, in the early stage of development, the engine of growth depends largely on the expansion of primary commodity exports, as is often experienced by

low-income countries. As these countries enter the take-off stage, the pattern of production shifts away from primary products and towards consumer goods and import substitution, depending more on the expansion of the domestic market for own products. Hence, the dependence on exports decreases. However, as the economy approaches the end of the take-off stage, the domestic market becomes increasingly saturated and is unable to accommodate further expansion. Thus, economic growth becomes, once again, dependent on export performance [Otoni and Villanueva 1990: 777].

Table 3: Estimates of the Structural Parameters of the Revised Harrod-Domar Model

β	η	R^2	α	R^2	μ	R^2	r	E_0	R^2
3.417	3.639	0.96	0.81	0.38	0.253	0.86	0.026	605.4	0.42
(6.559)*	(1.94)	[0.84]	(2.94)	[2.22]	(9.155)	[0.889]	(3.166)		[0.991]

* The figures in parentheses are t-ratios.

** The figures in the brackets are values of the Dubin-Watson statistic.

Table 4: Computed Values of the Combined Parameters

ρ	$K_0 - A$	$\rho\beta$	ηr	ρr
0.443	732.4	1.514	0.095	1.612

To sum up, given the current structure of the economy defined by relationship between the estimated structural parameters of the model, i.e., an internal rate of growth ($\rho\beta$) greater than the external rate of growth (r), an incremental output/capital ratio greater than the trade-weighted external rate of growth (ηr) and a positive initial condition ($K_0 - A$), the country could attain the objective of SSG by giving greater emphasis towards promoting exports and raising the level of national savings. Private investors (both domestic and foreign) should be encouraged by creating a conducive environment so that they will investment not only in the production of exportables but also of goods and services for the domestic market. Policies formulated to this effect should be 'neutral' with regard to promoting exports and import-substituting products.

5. CONCLUSIONS AND RECOMMENDATIONS

The results of this study have clearly shown that the prices of Ethiopia's export commodities are not only highly unstable but also the major sources of the fluctuations in total export earnings. On the other hand, the quantity index showed relative stability over the period covered in the study. The stability was not because of stable upward or downward movements of the index but due to the relative stagnation of export quantities. In any case, the relative stability of the index had a dampening effect on the fluctuations in the total export earnings.

Moreover, total export earnings are found to be more sensitive to changes in the prices of coffee and hides and skins. The elasticity coefficients of these prices alone accounted for more than 70 per cent of the total. What is more, for the most recent ten years, the prices of coffee have become the only significant source of fluctuations in total export earnings, implying that the country's foreign exchange earnings is becoming more and more dependent on the exports of only this commodity. On the other hand, the quantities of the different export items are found to have no significant influence on the direction of changes in total export earnings. This is mainly due to the former's relative stagnation over the period under consideration. The paper, based on these findings, therefore recommends that policies that facilitate flexibility in production for exports be formulated. And the policies should be aimed at those exportable commodities whose expansions have been hampered by the existing economic rigidities.

Furthermore, despite the governments minimal emphasis on the expansion of the export sector, exports are found to have a significant impact on the country's growth process. In terms of magnitude, the impact of exports on the growth of output is found to be less than that of investment. The results lead one to stress that, given the country's current economic structure, the policy emphasis should be towards the export sector and raising the level of national savings. To this end, both domestic and foreign private investors should be encouraged. In so doing, however, an environment wherein investors could take investment risks should first be created. The first criterion of such an environment is the 'sustainability' of policy parameters. "A 'sustainable' environment," as defined by Rodrik, "is one which, barring large unexpected shocks, can continue in the foreseeable future and is perceived as stable by the private sector" [1990: 934].

NOTES

1. Calculated on the basis of data taken from National Bank of Ethiopia, *Annual Report*, various years for the period 1979/80-1988/89.
2. The rates of growth for imports and exports are obtained by estimating the exponential trend equation for the period 1974/75 - 1988/89. This equation is of the following type:

$$\ln X = \ln a + bt + \mu$$

where X is export earnings or imports, a constant term, b growth rate, t time, and u error term.

3. Calculated for the period 1984/85 - 1988/89.
4. The adverse effects of export instability can probably be observed in terms of fluctuations in income, investment and employment, and possibly higher inflation. The marginal costs of holding reserves are the opportunity costs involved in forgoing investments which would have

been undertaken less the returns on the overseas assets in which reserves are held [MacBean and Nguyen 1988: 102].

5. The formula is

$$\frac{100}{N} \sum_{t=1}^N \left[\frac{(|X_t - \hat{X}_t|)}{\hat{X}_t} \right]$$

where X_t is the observed magnitude of the variable, \hat{X}_t is the magnitude estimated by fitting an exponential trend ($\hat{X}_t = ae^{bt}$) to the observed value and N is the number of observations.

6. Calculated on the basis of data taken from NBE, *Annual Report*, 1988/89.
7. For the proofs of the conditions see Imagawa (1985: 114-115).
8. Exports are vehicles for technology transfer through the importation of capital goods, and a channel for positive inter-sectoral externalities through the development of efficient and nationally competitive management training of skilled labour Exports also enhances the capacity to service external debt and thus by improving credit worthiness, the expansion of the export sector induces higher flows of foreign credit that make an ever higher rate of investment obtainable [Otoni and Villanueva 1990: 770].

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Annex

**Ethiopia's GDP, Capital Formation, Exports, Imports and
Consumption Expenditure 1974/75-1989/90**
(in million Birr)

Year	GDP (Y_t)	Capital Formation (K_t)	Exports (E_t)	Imports (M_t)	Consumption (C_t)
1974/75	5,524.50	579.70	478.20	673.50	5,158.10
1975/76	6,004.00	578.00	539.10	679.40	5,484.00
1976/77	6,826.30	560.90	642.80	744.20	6,428.40
1977/78	7,229.20	545.40	670.70	797.80	7,088.80
1978/79	7,967.20	698.90	744.90	1,220.10	7,713.90
1979/80	8,429.90	854.00	950.60	1,468.20	8,087.80
1980/81	8,845.50	921.80	851.50	1,384.20	8,294.00
1981/82	9,245.00	1,081.70	778.10	1,641.60	8,664.10
1982/83	10,003.00	1,240.40	809.60	1,753.00	9,367.50
1983/84	9,961.00	1,569.70	929.60	2,067.00	9,309.80
1984/85	9,812.00	1,540.50	743.60	1,770.40	9,486.00
1985/86	10,773.00	1,563.30	923.80	2,201.20	10,479.20
1986/87	11,119.00	1,796.80	794.80	2,233.80	10,853.40
1987/88	11,401.00	1,872.60	773.60	2,274.70	11,267.70
1988/89	12,264.00	1,660.80	903.60	2,108.20	11,858.20
1989/90	12,439.00	1,534.70	756.90	1,824.10	12,242.20

Source: National Bank of Ethiopia, *Annual Report*, various issues.

