

SECTORAL CONTRIBUTION TO INDONESIA'S ECONOMIC RECOVERY: THE POTENTIAL OF AGRICULTURE AND AGRIBUSINESS¹

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INTRODUCTION

In mid 1997, Indonesia was hit by a currency crisis. The domestic currency depreciated by about 67 percent against the U.S. dollar between July and December 1997 and it depreciated an additional 118 percent between December 1997 and January 1998 (Figure 2.1). Even though the currency recovered about 27 percent of its value from January to April 1998, it depreciated about 83 percent from April until June 1998. After that, the exchange rate began to recover somewhat. In a year, between June 1998 and June 1999, the exchange rate appreciated about 41 percent. Within that period, the exchange rate appreciation averaged about 6 percent per month.

This currency crisis caused deterioration throughout the economy. The financial and exchange rate turbulence negatively influenced economic activity, resulting in a decline in real GDP growth to 4.5 percent in 1997 from 9.3 percent in 1996 (Figure 2.2). This condition was further exacerbated by social unrest occurring in May 1998 that disrupted the production and distribution systems and triggered inflationary pressure in the real sector. Against the backdrop of these worsening developments, fuelled by the sharp deterioration of the rupiah, real output contracted even more in 1998. By the fourth quarter of 1998 the economy had contracted by 13.2 percent relative to a year earlier, with almost all sectors experiencing negative growth except for certain agricultural sectors. The economy stabilised somewhat in 1999, but through the third quarter the economy still contracted by 1.7 percent compared to one year earlier.

It has been hypothesised that agriculture was less affected by the economic contraction than other sectors because the depreciation of the exchange rate would increase demand for Indonesia's agricultural exports. This sector might help to drive the country's economic recovery. This chapter investigates how Indonesia's agricultural sector and agribusiness responded to the sharp deterioration of the rupiah. In particular, it examines whether there is a positive correlation between the depreciation of the rupiah and agricultural and agribusiness exports.

INDONESIA'S AGRICULTURAL SECTOR

The agricultural sector, including forestry and fishing, is one of the most important sectors of the Indonesian economy in terms of employment. According to the 1997 population census the share of agriculture in total employment was 44 percent, the same as in the 1995 census. This sector is also one of the largest sources of national income. In the early 1970s agriculture contributed between 40 and 50 percent of real GDP. By the early 1980s its share had declined to approximately 23 percent and in 1997 it was around 15 percent.

The drive to increase rice production from the mid-1960s showed impressive results, enabling Indonesia to achieve the goal of rice self-sufficiency in 1985. The agricultural sector's performance was less impressive in the 1990s, however. Poor weather, pest infestation, and the transfer of rice acreage to non-agricultural use caused production to contract in many areas. This led to growing concerns regarding the sustainability of rice self-sufficiency.

The focus of government agricultural policy is to maintain food security and promote efficient production, processing, and marketing of agricultural products. A key aim of the rice policy framework is to ensure food security by promoting competition in this sector. Accordingly, trade in all qualities of rice has been opened to general importers and exporters. As the rupiah strengthened and world prices fell, the domestic price of rice was declining. This prompted the government in the 1990s to provide transitional protection to rice farmers with an import tariff, while balancing the impact on consumers. The existence of the tariff will be assessed from time to time.

ROLE OF AGRICULTURE IN THE ECONOMY

Saragih (1999) suggests three reasons why agriculture is one of the only sectors that might help to rebuild the economy. First, agriculture is one of the main sectors that showed positive growth in the past several years. Even though rice production declined somewhat in 1997 as a result of severe drought, production soon increased again. The agricultural sector's share of real GDP was relatively stable at around 15 to 17 percent between the first quarter 1994 and the third quarter of 1999 (Table 2.1). It was the second largest industry in that period, followed by trade. In 1997, the industrial sector grew 5.25 percent compared to only 1.14 percent growth in the agricultural sector (Table 2.2). In 1998 however, industrial output contracted by more than 11 percent whereas agricultural output grew by 1 percent. For the first three quarters of 1999 while the industrial sector contracted by 0.5 percent (buoyed by the positive growth of oil and non-oil sub-sectors), the agricultural sector expanded by almost 2 percent. The expansion in the agricultural sector was mostly due to increased output of food, estate crops, and fisheries. These sectors grew by 1.9 percent, 2.8 percent and 4.1 percent respectively in 1998, while they expanded by 4.0, 3.2, and 1.7 percent respectively in the first three quarters of 1999.

Second, according to Saragih (1999), agribusiness comprises a significant share of non-oil and gas manufacturing value added, exports, and employment, while it comprises only a small share of non-oil/gas imports. This suggests that the industry imposes only a small burden on foreign exchange reserves. Third, agribusiness, which consists mostly of small and medium scale enterprises, is generally environmentally friendly and provides income and employment to low-income/low-skilled workers.

THE ROLE OF AGRICULTURE IN THE EXPORT SECTOR

In theory, the sharp depreciation of the rupiah exchange rate in 1997 and 1998 represented a window of opportunity for Indonesia's agricultural exports and it should have boosted the agricultural sector.

In fact, however, the depreciation of the rupiah exchange rate was not directly followed by an increase in Indonesia's agricultural exports (Figure 2.3). Exporters may delay reacting to a change in the value of the currency, creating a gap between the timing of the changes in the exchange rate and the volume of agricultural exports. Changes in exports still do not closely follow changes in the exchange rate, however, when agricultural exports are lagged one period (Figure 2.4).

The weak response of Indonesia's agricultural exports during the recent currency crisis was surprising. Since the huge depreciation of the rupiah made Indonesian goods measured in dollars more competitive on world markets, it was expected that agricultural exports would increase. Three typical explanations for why agricultural exports did not respond as expected are: the lack of trade finance caused by the collapse of the domestic banking system, the excessive dependence on imported inputs, which had become more expensive in rupiah terms, and the rising social and political instability, which caused international purchasers of manufactured goods to source from other countries.

A fourth reason is that agricultural exports suffered from a decline in the terms of trade during the economic crisis. World market prices for Indonesia's main agricultural export commodities, such as fish and shrimp, fell sharply between the first half of 1997 and the first half of 1999, and agriculture export prices generally tended downward between January 1997 and September 1999 (Figure 2.5). This decline in the prices of export goods meant that revenues from agricultural exports measured in U.S. dollars declined, even though the volume of exports continued to grow. Thus, the performance of Indonesia's agricultural exports during the economic crisis must be assessed in terms of quantity or volume as well as in terms of revenues.

To accurately gauge the impact on agricultural exports from the changes in the exchange rate separate from the impact from the changes in the terms-of-trade, export value should be measured in real terms.² We calculated a real-value index, a time-series of agricultural export value at a constant average 1997-99 price (Table 2.3). We first divided the value of exports in current prices by the volume of exports to arrive at a base price for each month from January 1997 to September 1999. We then multiplied monthly export volume by the average of the monthly base prices to determine the value of exports holding price constant. The implicit price deflator is the ratio of export value measured at current prices to export value measured at constant price.³ According to this deflator, the average price of Indonesia's agricultural exports in September 1999 was 36.8 percent lower than in January 1997. Because of the decline in prices, export revenues (represented by export value at current prices) in September 1999 were only 17.90 percent higher than in January 1997, even though export volume (represented by export value at constant prices) was 86.58 percent higher.

Figure 2.6 compares agricultural exports valued at current prices and at the constant average price with the implicit price deflator in terms of indices with January 1997 as the base. While the price deflator followed a general downward trend from January 1997 to September 1999, both nominal and real exports were more erratic. Both measures of export value fell sharply several times,

particularly in 1998 and at the beginning of 1999. The value of exports generally recovered after February 1999. The coincidence of the sharp downturn in the real value of agricultural exports in May 1998 with the riots in Jakarta suggests that concern about Indonesia's social and political stability may have led international buyers to divert orders to other countries.

Correlation Analysis

To formally analyse the impact of the rupiah depreciation on the agricultural sector, we calculated the correlation coefficient between average monthly exchange rate and two sets of data related to agricultural exports. One set of data, provided by the Indonesian Statistical Central Agency, covered agricultural exports in total and for 12 categories of agricultural commodities for the period January 1997 to September 1999. The other data set, provided by the Indonesian Ministry of Trade and Industry, covered exports for 66 agribusiness products categorised at the 9-digit level under the harmonised system (HS).

Before doing the correlation analysis, we examined the time-series properties of all the variables using the Phillips-Perron unit root test to determine the order of integration.⁴ For the rupiah exchange rate data, that analysis showed that the level series is integrated on order one, while the first-difference series (month-to-month change in the exchange rate) is stationary, or integrated on order zero (Table 2.4). Thus, to avoid stationarity issues and to be able to run the correlation analysis, we used the first-difference series for all related variables.

We found no significant correlation between the first-difference of the rupiah exchange rate and the first-difference of real (constant average price) agricultural exports nor did we find any significant correlations between the first-differences of the exchange rate and real exports of specific categories of agricultural commodities.⁵ Thus changes in the exchange rate do not appear to be correlated with changes in real agricultural exports. However, we did find a positive correlation between the exchange rate and the real export value of fish, fats and oils, coffee, processed fish, and other processed food, when the export series were lagged six to eight months. This suggests that it takes a half a year or more for exports of some products to respond to changes in the exchange rate. Similarly, in the analysis of the 66 categories of agribusiness exports (HS 9-digit level categories) we found significant positive correlations between changes in the exchange rate and changes in real exports for nine categories of domestic agribusiness, when the export series were lagged six months. These nine categories were milk (37 percent), dried fruits and vegetables (46 percent), other prepared fruit (39 percent), prepared and preserved fish (39 percent), smoked fish (46 percent), frozen and chilled fish (41 percent) palm oil (33 percent), fried shrimp (26 percent), and other prepared food (31 percent).⁶ This positive correlation for these categories of prepared food products indicates that exports of some agribusiness products did increase in response to the exchange rate depreciation when the effect of the decline in the terms of trade is taken into account.

CONCLUSION

In general, we can conclude that the drastic depreciation of the exchange rate from 1997 to 1999 did benefit Indonesia's agricultural sector and agribusiness in the short-run. The analysis of 9-digit level agribusiness exports found a significant positive correlation between changes in the exchange rate and changes in real exports for nine categories of domestic agribusiness. Nevertheless, the measured impact of the rupiah depreciation on real agricultural exports was somewhat less than we had expected.

It should be remembered that Indonesia suffered from a decline in the terms of trade at the same time as the currency crisis. The decline in agricultural commodity and agribusiness exports during the economic crisis, despite growing export competitiveness caused by the depreciation of the rupiah, was due to this terms-of-trade shock. World market prices for most of Indonesia's agricultural export commodities, such as fish and shrimp, fell sharply during the period under observation. Moreover, social and political factors, such as the sporadic rioting around Indonesia and uncertainty over political conditions in the period under observation that might have a negative impact on all types of exports, including agricultural products.

While recent economic developments in Indonesia have clearly been motivated by social and political uncertainty rather than by sound economic judgement, this situation is likely to change for the better. The installation of a newly elected government in October 1999 improved market confidence and substantially reduced political uncertainty. Economic issues and how the government handles them are likely to be the main determinants of macroeconomic indicators in the future. In particular, the market will now judge the government by what it actually does, rather than by hopes for the new government. If the government fails to live up to expectations, market sentiment could shift and the economy could fall back to the low level that prevailed for much of the past two years. With greater social and political stability the agricultural sector and agribusiness will be able to contribute to the recovery of the economy in general and to the export sector in particular.

Notes

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2. The author thanks Dr. L. Peter Rosner (HIID) for help with this part of the study.
3. The concept is similar to the concept of the GDP deflator.

4. The null hypothesis that a unit root exists (the variable is integrated on order one) is tested by comparing the value of the t -statistic from the Phillips-Perron test for each variable to the MacKinnon 1-percent, 5-percent, and 10-percent critical values.
5. The commodity categories included: fish, shrimp, rubber, fats and oils, coffee, cocoa, processed fish, processed food and vegetables, other processed food, fruits and vegetables, animal feed, tea, and other agriculture goods.
6. The interested reader can find a fuller discussion of the results in Abimanyu 2000.

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TABLE 2.1
Composition of Gross Domestic Product, Q1 199 to Q3 1999
(Percent share of constant dollar GDP)

| | Agriculture | Mining | Industry | Utilities | Construction | Trade | Transportation | Financial Services | Other Services |
|---------|-------------|--------|----------|-----------|--------------|-------|----------------|--------------------|----------------|
| 1994 Q1 | 17.87 | 9.36 | 22.40 | 0.99 | 6.81 | 16.34 | 6.91 | 9.37 | 9.94 |
| Q2 | 17.30 | 9.21 | 22.68 | 1.04 | 7.57 | 16.63 | 6.93 | 8.97 | 9.67 |
| Q3 | 17.62 | 9.21 | 23.50 | 1.05 | 7.00 | 16.86 | 7.12 | 8.26 | 9.38 |
| Q4 | 14.14 | 9.73 | 24.58 | 1.10 | 7.77 | 17.25 | 7.42 | 8.30 | 9.70 |
| 1995 Q1 | 17.36 | 9.20 | 22.69 | 1.06 | 7.69 | 16.55 | 7.29 | 8.74 | 9.41 |
| Q2 | 17.93 | 9.11 | 22.32 | 1.12 | 7.39 | 16.66 | 7.06 | 9.07 | 9.33 |
| Q3 | 15.91 | 9.21 | 24.46 | 1.14 | 7.69 | 16.70 | 6.95 | 8.90 | 9.03 |
| Q4 | 13.46 | 9.46 | 25.90 | 1.14 | 7.66 | 17.02 | 7.18 | 9.04 | 9.14 |
| 1996 Q1 | 16.82 | 9.21 | 22.98 | 1.14 | 7.59 | 16.70 | 7.47 | 8.98 | 9.12 |
| Q2 | 17.23 | 9.06 | 23.07 | 1.19 | 7.50 | 16.60 | 7.15 | 9.22 | 8.99 |
| Q3 | 15.05 | 9.00 | 25.16 | 1.17 | 8.75 | 16.44 | 6.93 | 8.91 | 8.59 |
| Q4 | 12.67 | 9.00 | 27.23 | 1.18 | 7.90 | 17.21 | 7.15 | 9.00 | 8.67 |
| 1997 Q1 | 16.47 | 8.91 | 23.88 | 1.20 | 8.42 | 16.35 | 7.48 | 8.36 | 8.93 |
| Q2 | 15.32 | 9.03 | 24.50 | 1.29 | 8.24 | 16.72 | 7.35 | 8.69 | 8.87 |
| Q3 | 15.78 | 8.71 | 25.17 | 1.26 | 8.14 | 17.18 | 7.05 | 8.20 | 8.51 |
| Q4 | 12.02 | 8.95 | 25.76 | 1.31 | 7.85 | 17.59 | 7.46 | 10.32 | 8.73 |
| 1998 Q1 | 17.01 | 9.08 | 25.02 | 1.33 | 5.71 | 17.06 | 7.74 | 8.11 | 8.93 |
| Q2 | 17.62 | 9.94 | 24.18 | 1.53 | 5.27 | 16.25 | 7.38 | 7.65 | 10.18 |
| Q3 | 17.97 | 9.91 | 26.02 | 1.50 | 5.51 | 15.49 | 6.57 | 7.26 | 9.78 |
| Q4 | 16.53 | 10.90 | 25.66 | 1.59 | 5.87 | 15.19 | 6.96 | 7.00 | 10.29 |
| 1999 Q1 | 19.22 | 9.87 | 25.05 | 1.50 | 5.55 | 15.15 | 6.91 | 6.80 | 9.95 |
| Q2 | 18.16 | 9.66 | 25.31 | 1.61 | 5.62 | 15.70 | 6.93 | 6.85 | 10.17 |
| Q3 | 17.06 | 9.92 | 25.77 | 1.63 | 5.67 | 16.00 | 7.09 | 6.82 | 10.05 |

Source: Central Statistical Agency.

TABLE 2.2
Quarterly and Annual Growth of Real GDP and Selected Components
(Percent change)

| | GDP | Agriculture | | | | | Industry | Trade | |
|---------|--------|-------------|--------|--------------|-----------|----------|----------|--------|-----------|
| | | Total | Food | Estate Crops | Livestock | Forestry | | | Fisheries |
| 1997 Q1 | -2.49 | 26.71 | 94.88 | -47.49 | -10.37 | 0.57 | -10.71 | -14.50 | -7.35 |
| Q2 | 0.56 | -6.46 | -22.79 | 73.75 | 6.67 | -0.34 | 12.51 | 3.16 | 2.84 |
| Q3 | 6.00 | 9.20 | -5.01 | 47.64 | 3.98 | 30.66 | 6.74 | 8.92 | 8.95 |
| Q4 | -2.06 | -25.39 | -37.38 | -32.20 | 5.56 | -15.82 | -0.65 | 0.24 | 0.28 |
| Annual | 4.54 | 1.14 | -2.85 | 1.61 | 4.92 | 12.62 | 5.79 | 5.25 | 5.98 |
| 1998 Q1 | -8.03 | 30.14 | 95.46 | -29.69 | -11.81 | 16.77 | -8.26 | -10.67 | -10.82 |
| Q2 | -10.57 | -7.34 | -12.52 | 31.71 | -3.22 | -30.49 | 5.95 | -13.58 | -14.78 |
| Q3 | 4.12 | 6.17 | -11.65 | 56.15 | -1.02 | 37.81 | 6.48 | 12.04 | -0.79 |
| Q4 | -3.93 | -11.60 | -7.08 | -24.94 | 2.93 | -25.17 | -1.68 | -5.23 | -5.78 |
| Annual | -13.20 | 0.81 | 1.90 | 2.76 | -7.08 | -1.85 | 4.08 | -11.88 | -18.05 |
| 1999 Q1 | 2.88 | 19.58 | 49.45 | -23.90 | 0.98 | 19.15 | -12.32 | 0.41 | 2.63 |
| Q2 | 0.18 | -5.34 | -14.63 | 30.60 | -2.96 | -11.26 | 12.61 | 1.22 | 3.78 |
| Q3 | 1.54 | -4.60 | -16.59 | 17.52 | -1.78 | 9.07 | 7.17 | 3.40 | 3.49 |
| Annual | -1.66 | 1.82 | 4.01 | 3.17 | -0.51 | -8.07 | 1.69 | -0.50 | -5.69 |

Source: Central Statistical Agency.

TABLE 2.3
Nominal and Real Value of Agricultural Exports and Implicit Price Deflator,
January 1997 to September 1999

| | | Value of Agricultural Exports at: | | | | | | |
|------|-------|-----------------------------------|---------------------|------------------|---------------------|-------------------------|---------------------|--------|
| | | Current Price | | Constant Price | | Implicit Price Deflator | | |
| | | US\$ millions | Monthly % change | US\$ Millions | Monthly % change | Index 1/97 = 100 | Monthly % change | |
| 1997 | Jan. | 531.6 | | 443.4 | | 1.20 | 100 | |
| | Feb. | 587.1 | 10.44 | 490.8 | 10.69 | 1.20 | 100 | 0.00 |
| | March | 515.4 | -12.21 | 398.0 | -18.91 | 1.29 | 108 | 8.26 |
| | April | 559.6 | 8.58 | 478.0 | 20.08 | 1.17 | 98 | -9.58 |
| | May | 625.3 | 11.74 | 501.9 | 5.00 | 1.25 | 104 | 6.42 |
| | June | 670.8 | 7.27 | 578.1 | 15.18 | 1.16 | 97 | -6.87 |
| | July | 804.0 | 19.86 | 704.7 | 21.91 | 1.14 | 95 | -1.68 |
| | Aug. | 635.5 | -20.95 | 625.2 | -11.29 | 1.02 | 85 | -10.89 |
| | Sept. | 632.6 | -0.45 | 703.9 | 12.60 | 0.90 | 75 | -11.59 |
| | Oct. | 614.7 | -2.83 | 683.8 | -2.86 | 0.90 | 75 | 0.03 |
| | Nov. | 704.3 | 14.57 | 774.4 | 13.26 | 0.91 | 76 | 1.16 |
| | Dec. | 529.3 | -24.85 | 499.4 | -35.51 | 1.06 | 88 | 16.53 |
| 1998 | Jan. | 405.2 | -23.43 | 346.4 | -30.65 | 1.17 | 98 | 10.40 |
| | Feb. | 411.7 | 1.60 | 354.7 | 2.41 | 1.16 | 97 | -0.79 |
| | March | 532.1 | 29.22 | 533.5 | 50.39 | 1.00 | 83 | -14.07 |
| | April | 424.9 | -20.13 | 442.2 | -17.11 | 0.96 | 80 | -3.65 |
| | May | 482.1 | 13.47 | 524.5 | 18.62 | 0.92 | 77 | -4.34 |
| | June | 504.1 | 4.57 | 397.4 | -24.24 | 1.27 | 106 | 38.01 |
| | July | 643.6 | 27.65 | 573.4 | 44.30 | 1.12 | 94 | -11.54 |
| | Aug. | 587.8 | -8.67 | 585.0 | 2.02 | 1.00 | 84 | -10.48 |
| | Sept. | 594.7 | 1.17 | 560.8 | -4.13 | 1.06 | 88 | 5.54 |
| | Oct. | 502.1 | -15.57 | 519.1 | -7.44 | 0.97 | 81 | -8.78 |
| | Nov. | 597.6 | 19.03 | 640.2 | 23.34 | 0.93 | 78 | -3.49 |
| | Dec. | 511.5 | -14.41 | 545.7 | -14.77 | 0.94 | 78 | 0.42 |
| 1999 | Jan. | 357.0 | -30.20 | 355.6 | -34.84 | 1.00 | 84 | 7.12 |
| | Feb. | 453.8 | 27.11 | 519.0 | 45.95 | 0.87 | 73 | -12.91 |
| | March | 556.8 | 22.69 | 590.2 | 13.72 | 0.94 | 79 | 7.89 |
| | April | 506.6 | -9.02 | 503.6 | -14.67 | 1.01 | 84 | 6.63 |
| | May | 581.8 | 14.84 | 624.1 | 23.92 | 0.93 | 78 | -7.33 |
| | June | 484.4 | -16.74 | 544.6 | -12.74 | 0.89 | 74 | -4.58 |
| | July | 574.8 | 18.65 | 702.6 | 29.03 | 0.82 | 68 | -8.04 |
| | Aug. | 657.5 | 14.39 | 835.2 | 18.87 | 0.79 | 66 | -3.77 |
| | Sept. | 626.8 | -4.67 | 827.5 | -0.93 | 0.76 | 63 | -3.78 |

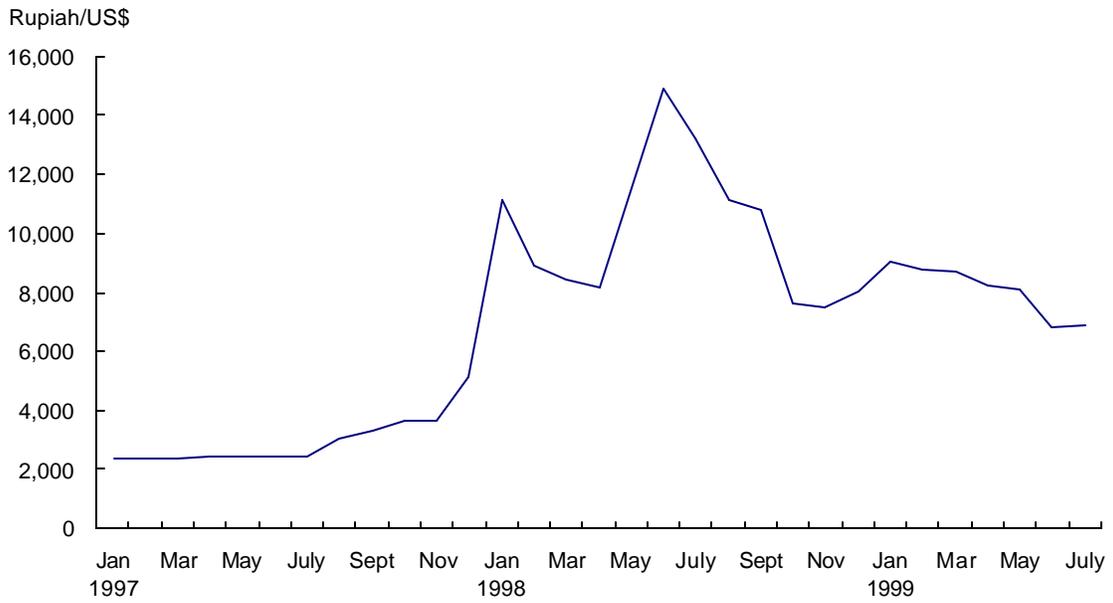
Source: Ministry of Industry and Trade.

TABLE 2.4
Phillips-Perron Unit Root Test on the Rupiah Exchange Rate,
January 1997 to September 1999

| | (t-statistics) | | |
|-----------------------------------|----------------|--------------------|----------------------|
| | Constant | Constant and trend | No constant or trend |
| Exchange rate level | -1.601 | -1.386 | -0.272 |
| First-difference of exchange rate | -4.782 | -4.840 | -4.481 |

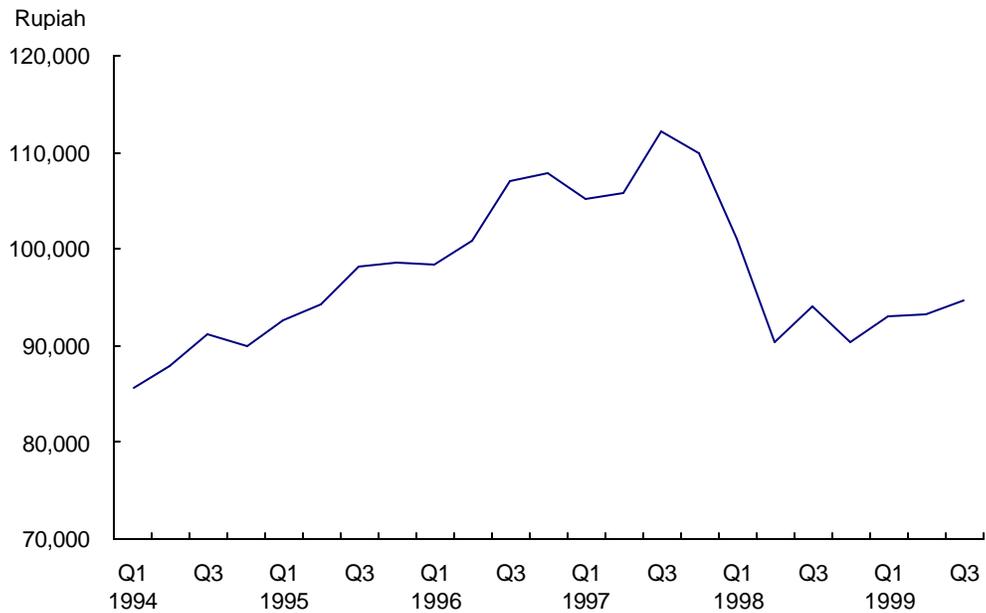
Note: Monthly data.

FIGURE 2.1
Movement of the Rupiah versus the U.S. Dollar,
January 1997 to July 1999



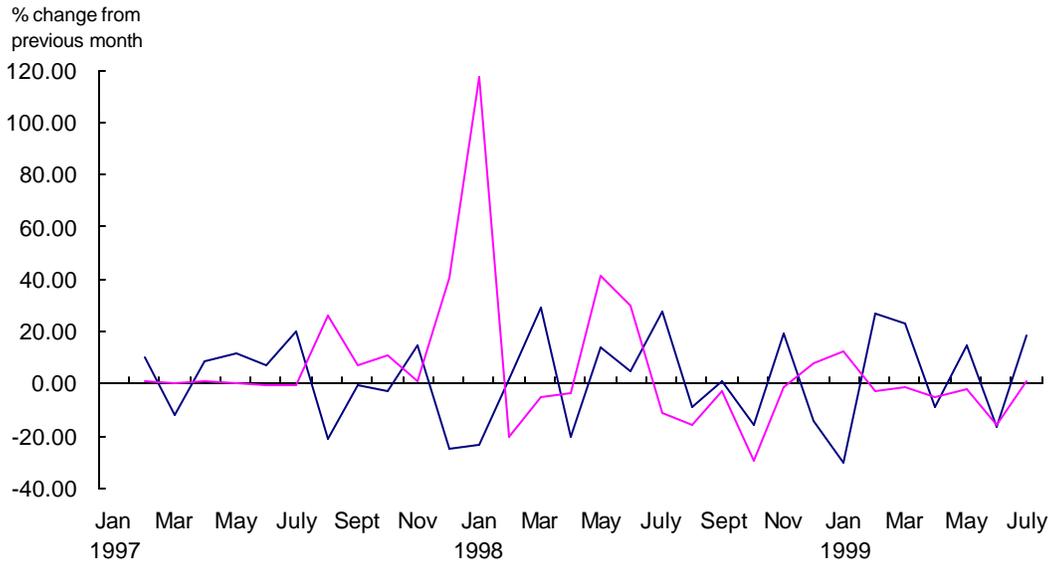
Source: Central Bank of Indonesia.

FIGURE 2.2
Indonesia's Gross Domestic Product, Q1 1994 to Q3 1999
Constant Prices



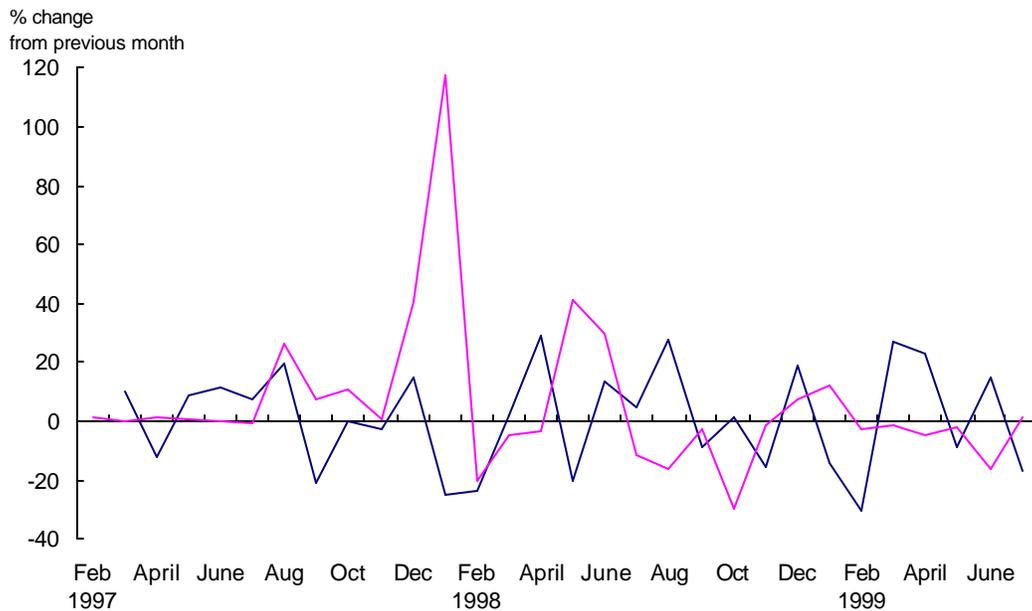
Source: Central Statistical Agency.

FIGURE 2.3
Monthly Changes in Agriculture Exports and the Rupiah Exchange Rate
 January 1997 to September 1999



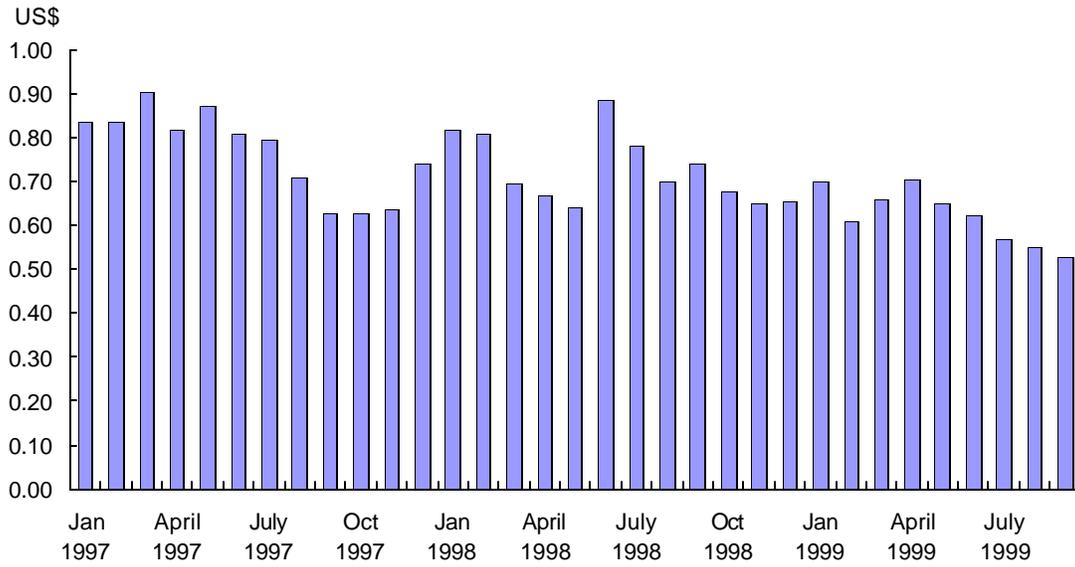
Source: Central Bank of Indonesia and Ministry of Industry and Trade.

FIGURE 2.4
Changes in Agriculture Exports Lagged One Month and the Rupiah Exchange Rate
 February 1997 to September 1999



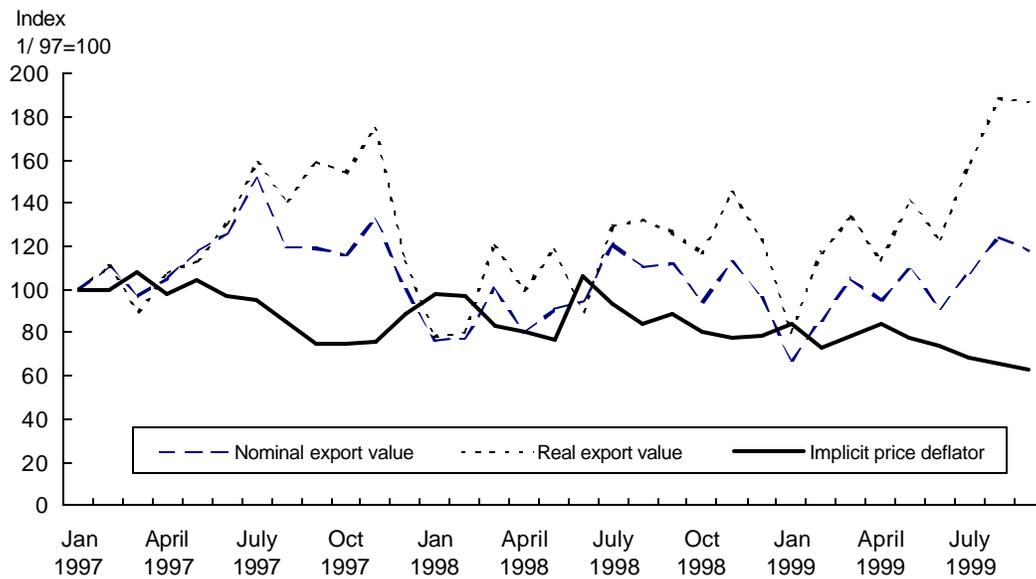
Source: Central Bank of Indonesia and Ministry of Industry and Trade.

FIGURE 2.5
Agricultural Export Prices, January 1997 to September 1999



Source: Ministry of Industry and Trade.

FIGURE 2.6
Nominal and Real Value of Agricultural Exports and Implicit Price Deflator, January 1997 to September 1999



Note: Real export value is value of exports at constant average price for January 1997 to September 1999.
 Source: Ministry of Industry and Trade.