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Determinants of Capital Formation in the Malaysian Rubber Estate Sector

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This study empirically determines the factors affecting capital formation in the Malaysian rubber estate sector. A partial adjustment adaptive expectation model was tested on annual time series data over the period 1961 to 1985. The results suggest that capital formation in Malaysian rubber estates is determined by future prices of rubber, interest rate on financial assets, interest rate on agricultural loans and size of holdings. The results indicate at least two areas where the government can play an active role in promoting investments in the rubber estate sector, i.e. *by providing cheap funds by varying the interest rate on loans in favour of producers, and sustaining income by stabilising rubber prices.*

The importance of capital as a necessary condition of progress has long been recognised by economists. It has been universally accepted that, in production economics, capital has been an important determinant of output production, besides labour. However, to an economy as a whole, Rajagopalan and Krishnamoorthy[1], and Singh *et al.*[2] pointed out that capital is one of the crucial factors that triggers the economic development of a country. Nurkse[3] argued that a country is poor due to lack of capital and the problem of capital formation in a poor country exists on both the demand and supply sides; Nurkse states that: 'On the supply side, there is the small capacity to save, resulting from the low level of real income. The low real income is a reflection of low productivity, which in its turn is due largely to the lack of capital. The lack of capital is a result of the small capacity to save, and so the circle is complete. On the demand side, the inducement to invest may be low because of the small buying power of the people, which is due to their small real income, which again is due to low productivity. The low level of productivity, however, is a result of the small amount of capital used in production, which in its turn may be caused at least partly by small inducement to invest.'

Therefore, capital improves land productivity, labour efficiency and managerial skills. In agriculture, capital formation on land involves capital investment on irrigation, land improvement and soil conservation which affects output and subsequently land productivity. On the other hand, labour efficiency and managerial skills are acquired by formal, vocational and extension education as a result of capital investments on agricultural machinery and equipment. The process of training and learning thus improves the skills of both labour supply and managerial abilities. In short, without an adequate investment on capital, agriculture cannot make a substantial contribution to the economic development of the country.

This study observes the trend and magnitude of capital formation in the Malaysian rubber estate sector. The factors affecting capital formation in the sector are also examined. An over-view of capital structure and its trend in the rubber sector, the model and choice of variables and the empirical results are also discussed.

METHODOLOGY

Capital Formation in the Malaysian Rubber Estate Sector: An Over-view

In Malaysia, the agricultural sector plays an important role in the development and the economy, contributing 33% of total employ-

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ment, 18% share of gross domestic product and 28% of total export earnings[4].

In view of its importance, the development of the sector was accorded top priority. In the Fifth Malaysia Plan, 26% of the federal funds are allocated to agriculture followed by 33% to the non-agricultural sector (*i.e.* commerce and industry, transport, energy, public utilities, *etc.*), 22% to the social sector, 12% to security and 7% to administration. Funds allocated under the Fifth Malaysia Plan totalling 10 562 million ringgit to agriculture are for land development, drainage and irrigation, replanting and rehabilitation, training and extension, credit and subsidies and research. While the government's contribution to capital investment in agriculture is clear and substantial, very little is known about private capital formation in Malaysian agriculture.

There are at least two reasons for this. First, there is no general agreement on the definition of capital formation in agriculture. For example, Kumar[5] did not include capital expenditure on the construction of warehouses, cold storage and roads, in his definition of capital formation although these items were included as part of capital formation in studies by Bansil[6] and Kurian[7]. Second, is the unavailability of published data on components of capital formation among the developing nations including Malaysia. However, in Malaysia for the rubber sector[8], data on capital formation in the estates are readily available. Hence, this study covers only the rubber estate sector.

In this study, capital formation in the rubber estate sector includes expenditure on planting, building and other constructions, transport equipment, plants and equipment. The average capital expenditure in the rubber estate sector for the period 1961–85 is presented in *Table 1*. It is observed clearly that capital expenditure on replanting rubber formed a major part of expenditure in the rubber estate sector in the 1960s and 1970s, and to some extent in the first half of the 1980s. The percentage of total expenditure on replanting, however, declined from about 65% in the 1960s to about 31% in 1981–85.

TABLE 1. CAPITAL EXPENDITURE IN THE RUBBER ESTATE SECTOR, 1961–85

Item	Expenditure (million ringgit)				
	1961–65	1966–70	1971–75	1976–80	1981–85
Planting					
New-planted rubber	14.3	8.5	9.7	10.0	9.9
Replanted rubber	65.6	65.7	49.5	40.0	31.4
Building and other constructions					
Residential	6.8	5.4	11.2	19.0	28.0
Non-residential	4.5	4.3	6.0	5.7	9.2
Other constructions	1.7	1.6	2.3	4.4	2.2
Transport equipment					
Passenger cars	0.2	0.7	1.0	1.6	1.4
Lorries, vans, pick-ups, *etc.*	0.9	2.0	3.1	4.2	4.9
Other vehicles	0.1	0.1	0.2	0.3	0.4
Plants and equipment					
Agricultural machinery	1.1	2.5	3.6	4.4	4.0
Plant machinery and equipment	3.9	8.5	12.4	9.4	7.6
Total capital expenditure	99.1	99.3	99.0	99.0	99.0

Source: Department of Statistics, Rubber Handbook Statistics, various issues.

On the other hand, during the same period, capital expenditure on residential buildings increased from about 7% to 28%. There is also a general upward trend in expenditure on transport equipment and plants. Increase in this expenditure reflects efforts by the estate sector to increase the quality of life in the estates and the adoption of more modern equipment in rubber production. However, the increased expenditure on certain items did not increase the total capital expenditure as it was offset by the reduction in capital expenditure in planting. One reason for the rapid reduction in both new-planted and replanted rubber in the estate sector was the substitution of rubber with oil palm *(Figure 1)*.

THE MODEL

Review on Related Literature

Studies to determine factors affecting capital formation in developing countries are quite numerous. Panikar[9] pointed out that as long as the returns to investment in agriculture are low, the incentive to invest will be low. However, investment will increase with the introduction of new inputs which embody modern technology. Sisodia[10] showed that capital formation in India is determined by the size of holding, greater degree of urbanisation, extent of commercialisation and income level, the latter factor being the crucial variable affecting capital formation.

Prasad[11] divided the factors affecting capital formation into internal and external factors. Internal factors are cropping pattern, type of farming, resource position and the progressive nature of the cultivator. On the other hand, external factors consist of availability of good infra-structure, irrigation and cheap credits. He concluded that the external factors play a crucial role in the investment pattern in India.

Desai[12] divided capital into durable and non-durable capital. Durable capital consists of capital invested on farm equipment, cattle, cart and farm buildings. Non-durable capital consists of working capital spent on seeds, fertilisers, hired labour, *etc.* Desai found that for both progressive and backward areas in India, the size of operational holdings, net household income and the extent of commercialisation had a positive effect on durable

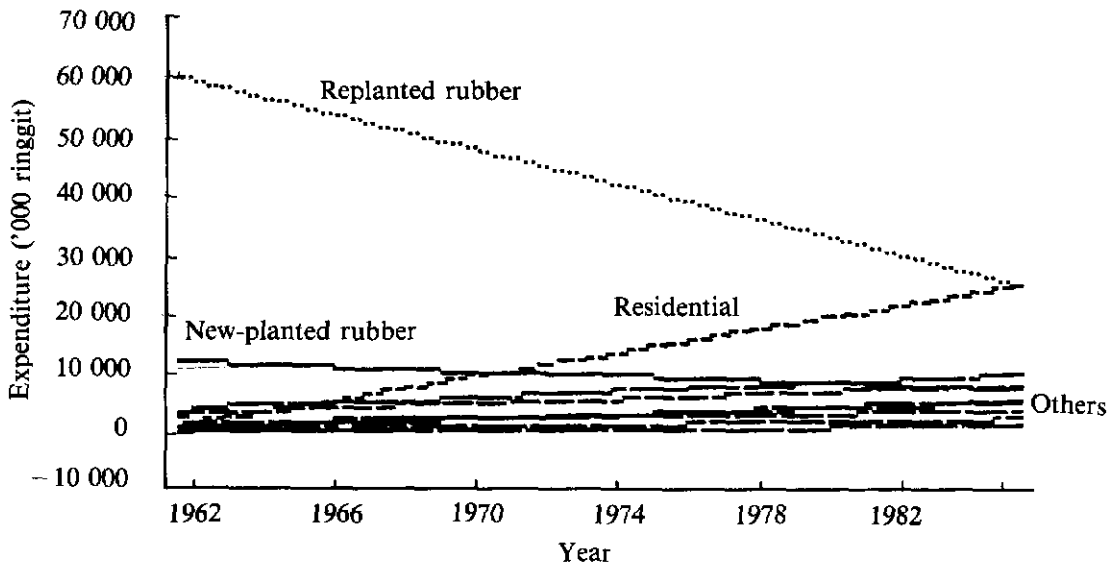

Figure 1. Trends in capital expenditure in rubber estates, 'Others' include non-residential, other constructions, transport equipment, and plants and equipment.

capital. On the other hand, non-durable capital is also positively related to the size of operational holdings, net household income and in addition, irrigation and borrowing. However, owned funds form the major source of finance in both the areas, but the dependence on credit is larger in the backward area.

Ghosh[13] argued that the rate of interest played an important role in determining the volume of investment. Availability of credit in adequate quantity at appropriate interest rates has a bearing on the extent of capital investment by farmers in India. Shah and Singh[14] found that capital formation depends on the cropping pattern of the farmers, the level of technology and the size of holding.

Misra and Mallick[15] pointed out that availability of saving, income level, irrigation, urbanisation and size of holdings have positive effects on capital formation. Singh[16] found that family size and farm output affect investment in human capital. Rajagopalan and Krishnamoorthy[1] pointed out that saving and investment opportunities affect capital formation in agriculture. On the other hand, Singh *et al.*[2] found out that farm size, previous net income level and family size were the important variables that affected capital formation.

The Estimating Model

Based on the above literature, the model for capital formation in the Malaysian rubber estate sector is specified as follows:

$$CF_t^* = a_0 + a_1P_t^* + a_2R_{at} + a_3R_{it} + A_t + \mu_t \quad ...1$$

where CF^* is the desired level of capital expenditure

P^* is the expected commodity price (proxy for expected income level)

R_a is the opportunity cost of using owned funds

R_i is rate of interest on borrowing

A is the size of holding (area planted)

μ is the disturbance term.

Equation 1 is not ready for estimation due to two unobservable variables CF^* and P^*. To make estimation possible, the following mechanism is introduced,

$$CF_t - CF_{t-1} = \Theta(CF_t^* - CF_{t-1}) \quad ...2$$

and $$P_t^* - P_{t-1}^* = \beta(P_{t-1} - P_{t-1}^*) \quad ...3$$

where *Equations 2* and *3* are known as the partial adjustment and adaptive expectation models respectively.

Equation 2 is the adjustment model proposed by Chow[17] and Θ is the coefficient of adjustment. The partial adjustment model implies that change in the demand for capital expenditure between *Year t-1* and *Year t* is proportional to the difference between the desired demand in *Year t* and the actual demand in *Year t-1*. Thus, producers take time to adjust their demand for capital expenditure from the desired level to the actual level.

On the other hand, *Equation 3* means that the difference in expected value $(P_t^* - P_{t-1}^*)$ equals a proportion of the difference between actual (P_{t-1}) and expected value (P_{t-1}^*) of price in the past, and β is the coefficient of expectation. In agriculture, it is commonly agreed that producers do not have perfect knowledge of their decision environment. They face uncertainty in particular with respect to commodity prices. Since future commodity prices are unknown, when producers make plans on decisions, it is argued that they predict future commodity prices and base their planning upon that prediction.

Following Habibullah[18], substituting *Equation 1* into *Equation 2* and then into *Equation 3*, the following estimating equation is obtained,

$$CF_t = \alpha_0 + \alpha_1P_{t-1} + \alpha_2(R_{at} - R_{at-1}) + \alpha_3R_{at-1} + \alpha_4(R_{it} - R_{it-1}) + \alpha_5R_{it-1} + \alpha_6(A_t - A_{t-1}) + \alpha_7A_{t-1} + \alpha_8CF_{t-1} + \alpha_9CF_{t-2} + w_t \quad ...4$$

where α_0, α_1, α_2, *etc.* are parameters to be estimated. The disturbance term w_t is assumed to have mean zero and constant variance.

Equation 4 is a dynamic model because adjustment is allowed between desired and actual levels of capital expenditure through *Equation 2*. *Equation 4* postulates that the demand for capital formation (proxy by capital expenditure) is determined by the expected commodity price level (proxy for expected income), change in current interest rate on interest-bearing financial assets (proxy for opportunity cost of using owned funds), previous level of interest rate on financial assets, change in current rate of interest on loans (proxy for cost of borrowing), previous level of interest rate on loans, change in current and lagged one-period area planted (proxy for size of holding) and lagged one-period and two-period capital expenditure.

Equating CF_t^* to CF_t in *Equation 1*, that is, dropping *Equation 2* from the model, a static model is obtained,

$$CF_t = \delta_0 + \delta_1 P_{t-1} + \delta_2(R_{at} - R_{at-1}) + \delta_3 R_{at-1} + \delta_4(R_{it} - R_{it-1}) + \delta_5 R_{it-1} + \delta_6(A_t - A_{t-1}) + \delta_7 A_{t-1} + \delta_8 CF_{t-1} + e_t \quad \ldots 5$$

where δ_0, δ_1, δ_2, *etc.* are parameters to be estimated. The disturbance term e_t is assumed to have mean zero and constant variance. The disappearance of variable CF_{t-2} from the model is clearly observed.

Method of Estimation and Data

This study is based on Malaysian annual time series data over the period, 1961–85. The data for rubber price *(P)*, interest rate on loans (R_i) and financial assets (R_a) were compiled from various issues of *Quarterly Economic Bulletin*[19] and *Annual Report*[20] published by Bank Negara Malaysia. As a proxy for the opportunity cost of using owned funds, interest rates on Malaysian financial assets which include Treasury bill rates (three-month, six-month and twelve-month), government security rates (five-year and twenty-year), commercial bank saving deposit rates and commercial bank fixed deposit rates (three-month, six-month, nine-month and twelve-month) were tested. The best interest rate on financial assets selected as a proxy for the opportunity cost of using owned funds is the five-year government security rate and therefore five-year government security rate (R_a) has been used throughout the analysis[18]. Data on area planted *(A)* and capital expenditure *(CF)* were compiled from various issues of *Rubber Statistics Handbook*[8] published by the Department of Statistics.

In this study, capital expenditure was disaggregated into capital expenditure on new-planted rubber, replanted rubber, residential buildings, non-residential buildings, other constructions, passenger cars, lorries and vans, other vehicles, agricultural machinery, plant and machinery and total capital expenditure (the sum of all items of capital expenditure listed above).

Two models were estimated; the static model represented by *Equation 5* and the dynamic model represented by *Equation 4*. Altogether, twenty-two regression equations were estimated. All regressions were estimated using the maximum likelihood method due to Beach and MacKinnon[21].

It is expected that the demand for capital expenditure is positively related to expected price, opportunity costs of using owned funds, size of holding and lagged level of capital expenditure. On the other hand, a negative relationship is expected between the demand for capital expenditure and interest rate on loans.

THE EMPIRICAL RESULTS

The results of the estimated regression equations are shown in *Table 2* for the static model*. Out of the eleven equations, only one equation, that is, the estimated equation of capital expenditure on replanted rubber shows all the variables to be significant. This is followed by total capital expenditure and capital expenditure on residential buildings. This study shows that expected price which is a proxy for expected income level, is significant and the expected sign in seven out of the eleven equations. This

*Discussion of the results is based on the significance of the variables based on '*t*-statistics' and the expected signs shown by the variables.

implies that the expected price plays an important role in determining capital expenditure on replanted rubber, residential buildings, other constructions, lorries and vans, other vehicles, agricultural machinery and total capital expenditure. The next important variable affecting the demand for capital expenditure is the interest rate on loans. In *Table 2,* the interest rate on loans is significant and has the expected sign in affecting the demand for capital expenditure on replanted, residential, passenger cars and total capital expenditure.

The rate of interest on alternative financial assets only shows an important role in determining capital expenditure on replanted, residential buildings, other constructions, plant and machinery and total capital expenditure. Size of holding is also significant and shows the expected sign in new-planted and replanted rubber and total capital expenditure. On the other hand, lagged one-year capital expenditure is significant and shows the expected sign in new-planted and replanted rubber, residential buildings and total capital expenditure.

Results for the dynamic model are shown in *Table 3.* The results show an improvement over the static model. Out of the eleven models, four estimated equations which include replanted rubber, residential buildings, other constructions and total capital expenditure show that all the variables are significant. The important role of expected price in determining the demand for

TABLE 2. REGRESSION RESULTS FOR STATIC MODEL

Item	New-planted rubber	Replanted rubber	Residential buildings	Non-residential buildings	Other constructions	Passenger cars
Constant	−26 332.9 (−1.2577)	−42 008.6 (−2.0043)*	−44 756.8 (−2.8535)**	23 223.8 (2.3453)**	4 109.49 (0.49621)	3 261.5 (1.0045)
P_{t-1}	0.47048 (0.26945)	4.7441 (1.9091)*	8.0238 (5.3983)***	0.05291 (0.04649)	3.8616 (3.5865)***	0.29863 (1.2139)
$(R_{at} - R_{at-1})$	859.39 (0.33667)	8 944.4 (4.1767)***	3 699.5 (1.8964)*	1 415.3 (0.75383)	1 838.7 (1.9736)*	171.84 (0.76164)
R_{at-1}	2 689.5 (1.2747)	6 378.6 (3.6757)***	3 199.0 (2.6486)**	−1 556.3 (−1.5582)	383.37 (0.40357)	306.15 (1.1549)
$(R_{it} - R_{it-1})$	625.41 (0.61196)	−6 011.7 (−3.2266)***	−238.39 (−0.29862)	−332.99 (−0.54720)	−954.40 (−0.71125)	−152.35 (−1.6328)
R_{it-1}	579.78 (0.76816)	−2 756.0 (−2.3419)**	1 177.2 (2.1438)*	124.72 (0.31954)	−745.11 (−0.78318)	−294.85 (−2.8573)**
$(A_t - A_{t-1})$	295.05 (3.7370)***	529.47 (4.9945)***	52.244 (0.84973)	68.650 (1.0995)	31.659 (0.53973)	−2.0617 (−0.18855)
A_{t-1}	17.790 (1.2468)	86.239 (3.3912)***	9.0394 (0.77534)	−19.002 (−3.0012)***	−4.2703 (−0.49977)	−3.6325 (−1.3692)
CF_{t-1}	0.58840 (4.4585)***	0.62215 (6.7923)***	0.36320 (3.8283)***	0.52630 (1.6052)	−0.48463 (−1.8246)*	0.02647 (0.08033)
R^2	0.9010	0.9854	0.9890	0.9381	0.8172	0.7723
rho	−0.1624	−0.6128	−0.7939	−0.8400	−0.4968	0.4354
D.W.	2.018	1.317	2.029	2.386	2.250	1.582
d.f.	14	14	14	14	14	14

TABLE 2. REGRESSION RESULTS FOR STATIC MODEL (CONTD.)

Item	Lorries and vans	Other vehicles	Agricultural machinery	Plant and machinery	Total capital expenditure
Constant	−276.40 (−0.10036)	−249.25 (−0.42643)	5 184.1 (0.65088)	−10 608.9 (−0.50107)	−57 073.2 (−1.2485)
P_{t-1}	2.4019 (6.1385)***	0.32301 (4.7464)***	1.4564 (1.9670)*	2.8731 (1.5794)	16.761 (2.6626)**
$(R_{at} - R_{at-1})$	−345.27 (−1.2277)	−47.853 (−0.88274)	−72.986 (−0.08995)	2 776.9 (1.2298)	19 429.0 (3.6731)***
R_{at-1}	−374.99 (−1.1540)	−29.496 (−0.43777)	702.31 (0.85834)	4 901.4 (1.9379)*	12 708.4 (2.9573)**
$(R_{it} - R_{it-1})$	534.06 (2.7037)**	116.93 (2.7837)**	399.67 (1.2643)	−238.42 (−0.29226)	−12 529.9 (−2.7545)**
R_{it-1}	445.80 (1.9060)*	44.868 (0.98355)	−147.72 (−0.51780)	−1 335.2 (−1.6747)	−4 423.1 (−1.5166)
$(A_t - A_{t-1})$	−38.747 (−2.4944)**	−7.5019 (−2.3165)**	2.9933 (0.11549)	30.171 (0.47477)	940.81 (3.4590)***
A_{t-1}	−7.0030 (−3.2254)***	−0.69797 (−1.5589)	−11.018 (−2.0962)*	−3.3801 (−0.25630)	105.44 (2.1338)*
CF_{t-1}	0.00829 (0.05910)	−0.13742 (−0.74714)	−0.42564 (−1.5320)	−0.34219 (−1.1656)	0.52956 (4.9015)***
R^2	0.9841	0.9352	0.8539	0.6633	0.9718
rho	−0.7814	−0.4541	0.1081	0.2664	−0.5542
D.W.	2.113	2.036	1.918	1.820	1.938
d.f.	14	14	14	14	14

Statistically significant at the 1% (***), 5% (**) and 10% (*) levels.
Figures within brackets are 't-statistics'.

capital expenditure is shown in eight estimated equations which include replanted rubber, residential buildings, other constructions, passenger cars, lorries and vans, other vehicles, agricultural machinery and total capital expenditure. The variable P_{t-1} is significant and has the expected sign. Rate of interest on loans is significant and shows the expected sign in replanted rubber, other constructions, passenger cars and total capital expenditure.

On the other hand, the rate of interest on financial assets is significant and shows the expected sign in new-planted and replanted rubber, residential buildings, other constructions, passenger cars and total capital expenditure. The important role of size of holding is shown by the significant and expected sign of variable A in new-planted and replanted rubber, other constructions and total capital expenditure. Lastly, the previous level of capital expenditure is significant and shows the expected sign in new-planted and replanted rubber, residential buildings, lorries and vans and total capital expenditure.

CONCLUSION

Overall, the results suggest that the demand for capital expenditure or the level of capital

formation in the Malaysian rubber estate sector are determined by the expected price of rubber, opportunity costs of using owned funds, interest rate on loans, size of holding and previous level of capital expenditure. Therefore, if producers expect future prices of rubber to increase, the current investment level will also increase. An increase in area planted means that capital is likely to increase.

The results also suggest that producers seek external financing rather than use their own funds. When there is an increase in the level of interest rate on interest-bearing assets, producers are likely to invest in these assets. Thus, the shortage of funds for capital investment purposes for production is compensated by borrowing. However, the amount of borrowed funds for capital investments is dependent on the level of interest rate. The amount of capital invested is reduced if the interest rate on loans is higher. In addition, the previous level of capital investment also affects the current level of capital expenditure.

There are at least, two areas where the government can play a role in encouraging investments in the rubber sector; by varying the

TABLE 3. REGRESSION RESULTS FOR DYNAMIC MODEL

Item	New-planted rubber	Replanted rubber	Residential buildings	Non-residential buildings	Other constructions	Passenger cars
Constant	−26 601.1 (−1.7213)	−28 924.3 (−2.1371)*	−44 824.0 (−2.9852)**	23 007.2 (2.0812)*	3 716.3 (0.45073)	1 271.7 (0.79501)
P_{t-1}	2.7312 (1.5668)	4.4692 (2.8371)**	8.5640 (6.0558)***	0.20187 (0.15315)	5.1974 (4.8478)***	0.97660 (3.0387)**
$(R_{at} - R_{at-1})$	5 450.9 (1.6779)	7 686.7 (5.5660)***	3 911.9 (2.1630)*	1 589.9 (0.68170)	3 351.5 (3.3710)***	397.88 (2.0644)**
R_{at-1}	3 461.0 (1.9397)*	6 736.6 (4.8554)***	2 768.2 (2.4364)**	−1 401.97 (−1.0520)	3 053.7 (2.4935)**	471.44 (2.9983)**
$(R_{it} - R_{it-1})$	−1 015.6 (−0.82007)	−5 237.6 (−4.3988)***	−386.73 (−0.52659)	−358.59 (−0.47810)	−3 287.6 (−2.1923)**	−309.47 (−3.8612)***
R_{it-1}	−611.67 (−0.66653)	−4 100.6 (−3.9979)***	1 524.9 (2.5322)**	52.820 (0.08648)	−3 670.6 (−2.7304)**	−379.25 (−4.0495)***
$(A_t - A_{t-1})$	267.76 (3.9886)***	550.42 (8.0330)***	35.557 (0.61955)	62.025 (0.89851)	118.19 (1.9599)*	−10.046 (−1.3985)
A_{t-1}	22.433 (2.0861)*	84.507 (5.1174)***	7.3177 (0.68756)	−19.543 (−2.6764)***	13.157 (1.3793)	−2.4305 (−1.6140)
CF_{t-1}	0.99249 (5.2953)***	0.78709 (6.7565)***	0.42670 (2.6308)**	0.32962 (0.59988)	−0.83227 (−3.5806)***	−0.12724 (−0.33677)
CF_{t-2}	−0.42244 (−2.1874)**	−0.14849 (−1.5320)	−0.11400 −0.87975)	0.18301 (0.48253)	−0.8832 (−0.51601)	−0.29740 (−1.3176)
R^2	0.9492	0.9933	0.9924	0.9381	0.8762	0.9762
rho	−0.8365	−0.6219	−0.8832	−0.8218	−0.3316	−0.5645
D.W.	2.346	2.112	1.861	2.403	2.321	2.0751
d.f.	12	12	12	12	12	12

TABLE 3. REGRESSION RESULTS FOR DYNAMIC MODEL (CONTD.)

Item	Lorries and vans	Other vehicles	Agricultural machinery	Plant and equipment	Total capital expenditure
Constant	920.56 (0.23436)	493.87 (0.79211)	2 409.9 (0.26358)	−9 211.6 (−0.41583)	−41 156.9 (−0.87357)
P_{t-1}	2.5732 (5.5427)***	0.27269 (4.3996)***	1.6736 (2.0205)*	3.4192 (1.5985)	15.353 (2.4312)**
$(R_{at} - R_{at-1})$	−221.80 (−0.60143)	7.7910 (0.13835)	256.99 (0.26445)	3 031.1 (1.1716)	18 192.5 (3.4310)***
R_{at-1}	−75.436 (−0.16463)	31.621 (0.44168)	1 064.1 (1.1376)	5 479.2 (1.9416)*	14 380.8 (2.5096)**
$(R_{it} - R_{it-1})$	630.74 (2.7276)**	86.887 (2.2283)**	266.88 (0.72964)	−245.01 (−0.26443)	−11 971.6 (−2.6475)**
R_{it-1}	305.20 (0.85149)	−28.137 (−0.51516)	−330.58 (−0.89093)	−1 538.2 (−1.5611)	−7 010.0 (−1.7875)*
$(A_t - A_{t-1})$	−29.428 (−1.2664)	−4.0261 (−1.1052)	9.6970 (0.32153)	60.954 (0.80125)	942.47 (3,5773)***
A_{t-1}	−8.9503 (−3.0992)***	−1.0576 (−2.3263)**	−8.1872 (−1.1606)	−5.8534 (−0.41157)	108.65 (2.0288)*
CF_{t-1}	−0.27855 (−1.5527)	0.06605 (0.30100)	−0.35564 (−1.1377)	−0.37434 (−1.1930)	0.58462 (2.5079)**
CF_{t-2}	0.23882 (1.8783)*	−0.02838 (−0.15624)	0.05465 (0.20338)	−0.26209 (−1.0032)	−0.02398 (−0.13899)
R^2	0.9787	0.9597	0.8822	0.6823	0.9772
rho	−0.4402	−0.6921	−0.0070	0.2432	−0.6470
D.W.	2.113	2.282	1.971	1.918	2.100
d.f.	12	12	12	12	12

Statistically significant at the 1% (***), 5% (**) and 10% (*) levels.
Figures within brackets are 't-statistics'.

level of interest rate on loans in favour of the producer, thus, providing cheap funds; and, stabilising rubber prices, thereby making income in the rubber sector more certain.

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