

Measuring the Impact of Doi Moi on Vietnam's Gross Domestic Product

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In 1986 a wide range of policy measures, known as Doi Moi, was introduced to promote Vietnam's transition to a market economy. This paper represents the first attempt to measure the effect of Doi Moi on Vietnam's GDP. In the paper the level of GDP actually reached is compared with the level that would have been reached had the policy not been implemented, i.e. without the improvements in productivity and the increases in investment ratio that can be directly attributed to Doi Moi. Cross-time changes in GDP were depicted by a production function of capital stock, economically active labour force and technical progress. It was found that, after a time lag, Doi Moi appeared to have a significant positive effect on productivity, which by 1998 accounted for a 42% increase in GDP.

I. Introduction

The transition towards market economies currently taking place in a number of socialist countries can be considered as a large-scale structural adjustment programme which has exerted huge effects. The renovation policy Doi Moi initiated in Vietnam in the mid-1980s is a good example of such a programme, and has shifted a stagnant economy to a new epoch of economic development. Considerable research has been carried out on the impact of Doi Moi on various aspects of the Vietnamese economy, such as price movements and GDP growth (Irvin, 1995), agricultural production (Nghiep, 1993; Tran, 1998) and efficiency in industrial production (Nghiep, 1995). This, however, will be the first published article to directly measure the impact of this policy on Vietnam's level of GDP. It is based on result covering the period 1986–98.

In this research, a production function (GDP function) for Vietnam was estimated from the statistics available for the period 1986–98. The production function was formed to measure changes in GDP in the period covered by considering two major factors which were thought to be the major impacts of Doi Moi:

changes in total productivity and changes in capital stock. The impact of Doi Moi was then measured by comparing the actual level of GDP with the level of GDP which would have been obtained had this renovation policy not been implemented, i.e. with no improvements in total productivity and no increases in the investment ratio.

The paper is structured as follows. Section II presents the salient features of Doi Moi and outlines Vietnam's recent economic performance. The analytical model used to measure the effect of the policy on GDP is set out in Section III. Construction of the capital stock data required to estimate the GDP function is discussed in Section IV while actual estimation of the function is covered in Section V. Section VI measures the impact of Doi Moi on GDP by plotting actual and hypothetical values. Section VII summarises the main findings and provides some concluding remarks.

II. A Brief Review of Recent Economic Performance

Doi Moi presents a wide range of policy measures including removal of administered prices of good and services, removal or reduction of government controls on the foreign exchange market and international trade, acceptance of non-socialist forms of business management, such as private enterprises and joint ventures in the industry and service sectors and individual farms in the agricultural sector, and banking reforms. The adoption of these measures in 1986, has stimulated the economy to a remarkable extent.

The Vietnamese economy has been managed on socialist lines since the 1950s, when the revolutionary forces took over the North, but consistent nationwide data are available only for the period after 1986, when the renovation policy was launched and a new system of economic statistics was adopted. For this reason, the discussion in this section will be limited to the period 1986–98, with the assumption that the economic situation in the first three years 1986–88 was similar to that in the pre-renovation period, and thus data available for these years could be considered as representing the condition in the pre-renovation period.

Table 1 summarizes some economic indicators for Vietnam from 1986. The gross domestic product was stagnant in the period 1985–88 with an average annual growth rate as low as 3.9%. Meanwhile GDP shot up by about 5.2% per annum in 1988–91 and then reached 8.6% in 1991–98. Production growth reached record heights for a long period until the Asian financial crisis began to exert a negative impact in 1998.

Regarding the price trends, the pace of inflation which once soared to an annual rate of over 380% (1985–88) began gradually to lose its momentum in the years when the government decided to launch the new policy package, and declined in recent years to a level comparable to the average for the Asian NIEs and the major ASEAN member-countries. This sharp decrease in inflation was the result of a combination of factors, including more active border trade, reduction of public subsidies to state-owned enterprises, an upward shift in the supply

Table 1 Some Selected Economic Indicators for the Period 1986–98

	1985–88	1988–91	1991–98
Real GDP annual growth rate (%)	3.9	5.2	8.6
Inflation rate (%)	380 (1986)	62 (1989)	17 (1996)
Investment/GDP ratio (%)	15.6	15.7	27.9
Exports			
million of roubles + US dollars	823	1947	7256
of which million of US dollars	(?)	1138	7256

Sources: General Statistical Office (various years), Economist Intelligence Unit (2000).

side resulting from improvements in state-owned enterprises' production efficiency and the emergence of more productive private production units.

In the agricultural sector, individual farms are now dominant except in some specific crops like coffee and tea, so that the state-owned and cooperative production units hold only a minor share in total production. However, in the industrial sector, value-added in both state-owned and private enterprises has grown rapidly with little change in their relative shares of total industrial production since 1986. Nevertheless, even though state owned enterprises still hold a high production share, it should be understood that the privatization approach has spread to a considerable extent to the so-called state-owned enterprises so that they now operate under conditions closely akin to those of private enterprises.

In the foreign trade sector, exports have grown faster than imports in most years in the period after the announcement of Doi Moi, bringing about massive improvements in the trade balance. It is also worth noting that there has been a large shift in the destinations of exports from Vietnam: a sharp decline in the volume of exports to the former Soviet bloc, and a very substantial increase in exports to Western economies.

III. The Analytical Model

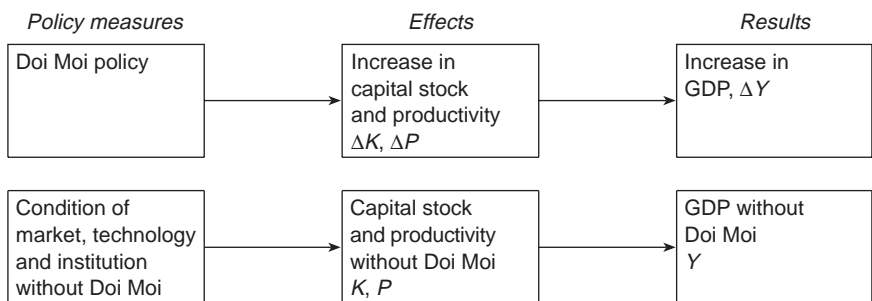
Doi Moi comprises a diverse set of policy measures applied to a wide range of areas in the Vietnamese economy: recognition of non-socialist forms of production such as individual farms in the farming sector and private enterprises in the industrial and service sectors, abolition of price control mechanisms; reforms in the financial sector; promotion of foreign investments, etc. These diverse policy measures can be considered as having affected gross domestic product in two ways: raising the level of total productivity, and increasing capital stock resulted from increases in investment.

The series of price system reforms, including abolition of the rationing system for all essential goods and removal of administered prices for most commodities, and the acceptance of the legal status of individual farms and private enterprises

could be considered as having exerted direct effects in boosting effectiveness in terms of resource allocation and productivity. On the other hand, fiscal and monetary reforms like the devaluation of the domestic currency, restructuring of the banking system, positive real interest rate policy, and efforts to reduce government budget deficits were conducive to increasing domestic and foreign savings.

The relationship between the policy measures of Doi Moi and Vietnam’s GDP can be illustrated in the following diagram:

Figure 1 Relation between Doi Moi and GDP



Gross domestic product can be expressed as a function of capital stock, labour force, and productivity level as follows:

$$Y_t = f(K_t, L_t, D_t) \tag{1}$$

where,

Y_t is real gross domestic product in year t ; K_t is capital stock in year t ; L_t is labour force in year t ; and D_t is a dummy variable depicting changes in the level of total productivity.

It is further assumed that the GDP function takes a Cobb-Douglas form as follows:

$$Y_t = e^{a+bD_t} K_t^\alpha L_t^\beta \tag{2}$$

In Equation (2), the term e^{a+bD_t} stands for the level of total productivity, which depends on the dummy variable D_t , and $K_t^\alpha L_t^\beta$ indicates the effects of changes in the quantity of capital and labour on GDP. As indicated later, the hypothetical GDP for the case without Doi Moi will be measured by assigning appropriate figures to the dummy variable D_t and the capital stock variable K_t . The formation of a similar function was first proposed and used by Abramovitz (1956) and Solow (1957) and since then has been applied rather successfully in the analysis of the GDPs of various countries all over the world (Chenery et al., 1986; and Nghiep, 1988).

With the assumption of constant returns to scale ($\alpha + \beta = 1$), Equation (2) becomes:

$$Y_t/L_t = e^{a+bD_t}(K_t/L_t)^\alpha \quad (3)$$

or,

$$\ln(Y_t/L_t) = a + bD_t + \alpha \ln(K_t/L_t) \quad (4)$$

As most Asian countries were severely affected by a region-wide financial crisis in the later years of the 1990s, a dummy variable (AC equal to 1 in 1998 and 0 in the remaining years) is added to Equation (4) to pick up the possible impact of this crisis. Thus, the following function is finally obtained for the regression:

$$\ln(Y_t/L_t) = a + bD_t + cAC + \alpha \ln(K_t/L_t) \quad (5)$$

The following steps were taken to measure the effect of Doi Moi on GDP:

- (1) Estimating the coefficients a , b , c , α and β of the GDP function in Equation (5) from data on GDP, capital stock, labour force, and assumed values for the dummy variables.
- (2) Computing the hypothetical GDP for the case in which Doi Moi had not been implemented from assumed values for capital stock and the dummy variables.
- (3) Taking the difference between actual (predicted) GDP and hypothetical GDP as the effect of Doi Moi.

IV. Building Capital Stock Data

Since there are as yet no capital stock data and these are indispensable for the estimation of a GDP function for Vietnam, we have tried to fill this gap by building a series for the period 1986–98, based on the following assumptions:

The capital stock in the initial year (1986) is proportional to the level of GDP in that year: $K_{86} = k \times Y_{86}$ (the coefficient k stands for a capital-output ratio which is discussed and determined below).

The capital stock in each year of the period 1987–98 may be estimated from the following function: $K_t = K_{t-1} \times 0.94 + I_{t-1}$ (I_{t-1} indicates gross investment in year $t - 1$).

The assumption expressed in the second assumption means that the capital stock in year t (for example in 1990) equals the capital stock in year $t - 1$ (1989) minus 6% of depreciation, plus gross investment in year $t - 1$ (1989). The first assumption follows the Harrod-Domar model, which argues that in a period there is a stable relationship between capital stock and GDP of a country, depending on the structure of the currently used technology.

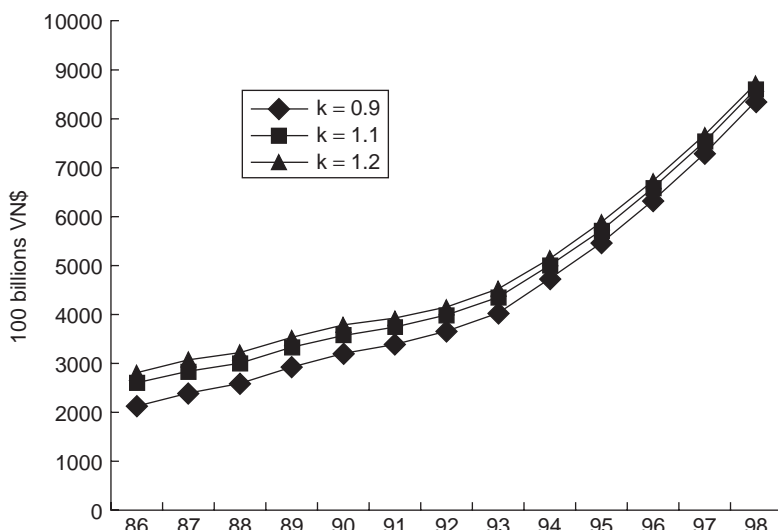
The coefficient k was determined through consideration of the capital-output ratios in some other countries. Table 2 reports some estimates by Nghiep (1988)

Table 2 Estimated Capital-Output Ratios in Some Selected Asian Countries in 1980

Country (or region)	k	Country (or region)	k
Myanmar	0.82	Thailand	1.49
Sri Lanka	0.81	Hong Kong	1.36
Malaysia	1.15	South Korea	1.86
Singapore	1.26	Japan	2.59
Philippines	1.38		

Source: Nghiep (1988).

Figure 2 Estimated Capital Stock



of this ratio in several countries in Asia in 1980. Together with common observations on the economic condition of Vietnam in 1986, these figures seem to suggest the range 0.8–1.3 for the capital-output ratio in Vietnam in this year. Table 3 presents some series of capital stock estimated from different values assumed for the coefficient k . Three of these series are plotted in Figure 2 for comparison.

All of the four estimated series of capital stock show a common trend: the K/Y ratio remains comparatively stable in the period 1986–92, and increases relatively rapidly in the period 1993–98. It is also observed that, although the four series differ from each other considerably in the early years, they gradually get closer as the end of the period approaches. The series obtained from the assumption $k = 1.1$ was chosen for use in the estimation of the GDP function, although the choice of any of these four series would not have led to significant differences in the estimated effect of Doi Moi on the level of GDP (the separate

Table 3 Estimated Capital Stock for Vietnam in the Period 1986–98
(100 billion VNS, constant 1989 prices)

	Y	k = 0.9		k = 1.0		k = 1.1		k = 1.2	
		K	K/Y	K	K/Y	K	K/Y	K	K/Y
1986	2378	2140	0.90	2378	1.00	2616	1.10	2854	1.20
1987	2472	2382	0.96	2606	1.05	2830	1.14	3053	1.24
1988	2599	2606	1.00	2810	1.08	3021	1.16	3231	1.24
1989	2809	2944	1.05	3141	1.12	3339	1.19	3536	1.26
1990	2953	3207	1.09	3393	1.15	3578	1.21	3764	1.27
1991	3129	3405	1.09	3579	1.14	3754	1.20	3928	1.26
1992	3399	3669	1.08	3833	1.13	3998	1.18	4162	1.22
1993	3674	4047	1.10	4201	1.14	4356	1.19	4510	1.23
1994	3998	4719	1.18	4864	1.22	5009	1.25	5154	1.29
1995	4380	5455	1.25	5591	1.28	5728	1.31	5864	1.34
1996	4789	6317	1.32	6445	1.35	6573	1.37	6701	1.40
1997	5182	7274	1.40	7394	1.43	7515	1.45	7635	1.47
1998	5482	8350	1.52	8463	1.54	8577	1.56	8690	1.59

Notes: 1. *World Tables*' GDP data in the period 1986–90 were adjusted to (a) reflect a growth rate of 8.1% in 1989 and (b) show 1989 constant prices.

2. Gross investment at 1989 prices used in the computation of K was estimated via the following two steps: (a) calculation of the investment rate (I/Y) at current prices, and (b) multiplying the investment rate with GDP at 1989 prices.

Sources: GDP and gross investment (for estimation of capital stock) are based on World Bank (1995, 1997), General Statistical Office (1995) and Economist Intelligence Unit (2000).

effects of changes in total productivity and capital stock would be different but the total combined effect of these two factors would not differ greatly). The assumption $k = 1.1$ was chosen because of the common belief that the Vietnamese economy was extremely stagnant in 1986 because inefficient performance of state-owned enterprises led to a high capital-output ratio.

V. Estimation of The GDP Function

To estimate the GDP function, together with the data on GDP and capital stock explained above, we used FAO data on economically active population for the labour variable. The series Economically Active Population was chosen instead of the series Social Labour Force published in the *Statistical Yearbook* (General Statistical Office, various issues) for the following two reasons. First, the series Social Labour Force, which sought to report the quantity of actual employment, could be expected to have a low degree of accuracy in view of the present state of data collection in Vietnam. Furthermore, we intended to estimate a level of total activity that would reflect the efficiency of the economy in using the existing stocks of both labour and capital. The FAO *Production Yearbook* provided two different series for economically active population, one for 1986–96 and

one for 1990–98. The labour data used in this paper are based on the 1990–98 series with the figures for the period 1986–89 being estimated by linking the former series with the latter series using the annual growth rates in the former.

V.1 On the pattern of total productivity change

Did the Doi Moi policy have any impact on total productivity? And if so, how large was it and what was the pattern of this cross-time change? To answer these questions several series of numbers have been assigned to the dummy variable D_t in the estimation of the GDP function. Following are the two series of D_t , which appear in the GDP functions reported in Table 5:

$$D_{1t} = 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13$$

$$D_{2t} = 0, 0, 0, 0.5, 1, 2, 3, 4, 5, 5.5, 6, 6.5, 7$$

The series D_{1t} makes it possible to test the assumption that total productivity increased at a constant rate throughout the period 1986–98. On the other hand, a GDP function with D_{2t} incorporates the assumption that Doi Moi began to exert a relatively weak effect on total productivity from around 1988; this effect intensified in the period 1990–94 and weakened thereafter (see Figure 3). The assumption in D_{2t} is in accordance with the common observations on the diffusion path of new technologies. When a new technology emerges it spreads out slowly at the beginning, the speed of diffusion accelerates and then gradually slackens before the diffusion rate reaches a ceiling. As Doi Moi was adopted in 1986, if D_{2t} proves to be relevant in the regression analysis, one can conjecture that this dummy variable accurately depicts the cross-time impact of this policy on total productivity.

Figure 3 Alternative Assumptions on Productivity Changes

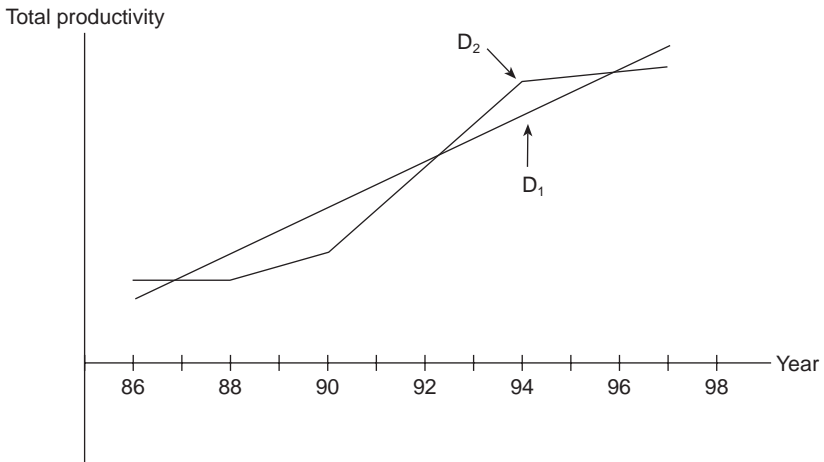


Table 4 GDP, Gross Investment, Capital Stock, and Labour Force

	GDP	Investment	Capital stock	Economically active labour force
1986	2378	371	2616	30.4
1987	2472	361	2830	31.2
1988	2599	499	3021	32.1
1989	2809	440	3339	32.9
1990	2953	390	3578	33.8
1991	3129	469	3754	34.7
1992	3399	598	3998	35.4
1993	3674	915	4356	36.2
1994	3998	1019	5009	36.9
1995	4380	1189	5728	37.7
1996	4789	1336	6573	38.0
1997	5182	1513	7515	39.2
1998	5482		8577	40.3

Notes: GDP, Investment and Capital Stock in 100 billion 1989 VNS; Labour force is in millions.

Sources: 1. For GDP and capital stock, see Table 2.

2. For working population, see FAO (various issues).

Table 4 shows the basic data used in the regression analysis and Table 5 reports some GDP functions obtained from this analysis. The inclusion of the dummy variable *AC* slightly improved the fit of all equations. The estimates of coefficient *c* are negative and significant at a high confidence level in all GDP functions where *AC* was included, indicating the Asian economic crisis did adversely affect the Vietnamese economy. This effect was estimated at about -3.6% in terms of GDP annual growth rate (using Equation 6).

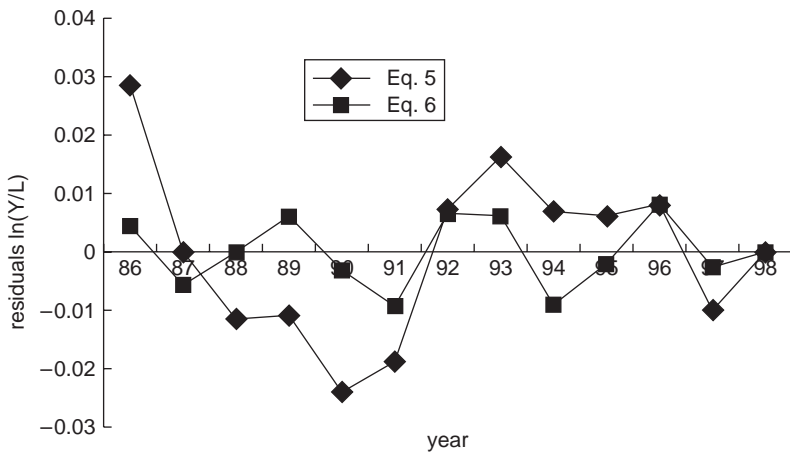
It is obvious that those functions that assume different rates of technical progress (Equations 3 and 6, using D_{2t}) show higher values of adjusted R^2 , and *F* and Durbin-Watson statistics as compared with the assumption of constant rate of technical progress (Equations 2 and 5, using D_{1t}) and the assumption of no technical progress (Equations 1 and 4). The residuals obtained from Equations 5 and 6 are illustrated in Figure 4 to clarify the relevance of the assumption on technical progress incorporated in D_{2t} . The following two points are observed. First, Equation 6 yields smaller residuals in most years of the study period. Second, Equation 5 largely overestimates GDP in the period 1988–91 and underestimates it in 1986 and in the period 1992–96. Especially in the sub-periods 1988–91 and 1992–96, the residuals from Equation 5 are highly autocorrelated, and this autocorrelation is substantially reduced in Equation 6. These observations strongly support the assumption on technical progress incorporated in D_{2t} , and endorse the view that there was a considerable lag between the time Doi Moi was put in force and the time it began to exert effects, at least as regards total productivity.

Table 5 Estimated GDP Functions

	Eq. 1	Eq. 2	Eq. 3	Eq. 4	Eq. 5	Eq. 6
$a(\text{constant})$	1.390 (0.1679)	2.514 (0.3705)	2.676 (0.1679)	1.221 (0.1187)	2.131 (0.3683)	2.415 (0.1361)
$b(D_1)$		0.0204 (0.0065)			0.0155 (0.0061)	
$b(D_2)$			0.0328 (0.0041)			0.0282 (0.0031)
$c(AC)$				-0.0704 (0.0264)	-0.0481 (0.0229)	-0.0337 (0.0095)
$\alpha(K)$	0.6656 (0.0259)	0.4029 (0.0860)	0.3778 (0.0374)	0.7019 (0.0248)	0.4903 (0.0851)	0.4354 (0.0302)
$\beta(L)$	0.3344	0.5971	0.6222	0.2981	0.5097	0.5646
Adjusted R^2	0.982	0.990	0.997	0.989	0.993	0.999
F	660	600	2263	518	539	3238
Durbin-Watson	0.592	0.878	1.811	0.868	0.941	2.471
Degrees of freedom	11	10	10	10	9	9

Notes: 1. β s were estimated as $1-\alpha$.
 2. Standard errors of the estimates are in parentheses.

Figure 4 Residuals from the Estimated GDP Functions



The coefficient b in Equation 6, the best among the six reported GDP functions, indicates that there existed signs of improvement in total productivity (in this case considered to be a combined effect of technical progress, more active operation of market forces, improvement in production organization, improvement in the banking system, etc.), and this productivity improvement was equivalent to a GDP annual growth rate of 3.3% in the period 1990–95. The estimate of α reveals a value of 0.435 for the production elasticity of capital and 0.565 for that of labour.

These estimates are very close to the values obtained by Nghiep (1988) from a set of cross-country data in 1970–80. It should also be noticed that these estimates are close to the averages of actual GDP shares of capital and labour in many countries in the world. For these reasons, Equation 6 will be used to measure factor productivity and the impact of Doi Moi in the following sections.

V.2 Total Productivity and Marginal Productivity

The total productivity and marginal productivity of capital and labour in the period 1986–98 can be computed from the following equations:

$$\begin{aligned} \text{Marginal productivity of capital: } & \delta Y/\delta K = \alpha Y/K \\ \text{Marginal productivity of labor: } & \delta Y/\delta L = \beta Y/L \\ \text{Total productivity: } & e^{a+bDt+cAC} \end{aligned}$$

Table 6 reports the estimates of these categories of productivity in the period 1986–98. The figures for the marginal productivity of capital show a steady decline from 1986 to 1991, and then reverse to show an increasing trend. This tendency can be considered as reflecting the combined effect of various factors that have affected capital productivity in two opposite directions. Technical progress, institutional building and increased labour input were among those factors that shifted the marginal productivity curve of capital upwards. On the other hand, increased capital stock could be the major factor working towards reducing capital productivity ($MP = \alpha K_t^{\alpha-1} L_t^\beta$). It is also observed that capital maintained

Table 6 Total productivity, and Marginal productivity of Capital and Labour

	Total Productivity	Marginal productivity	
		Capital	Labour
1986	11.194	0.395	441
1987	11.194	0.380	447
1988	11.194	0.375	457
1989	11.353	0.379	482
1990	11.514	0.372	493
1991	11.844	0.369	509
1992	12.182	0.370	542
1993	12.531	0.380	573
1994	12.889	0.386	612
1995	13.072	0.394	656
1996	13.258	0.400	712
1997	13.446	0.402	746
1998	13.185	0.394	768

Note: Marginal productivity is measured in \$/\$ a year (Capital) and thousand \$/person a year (Labour).

a fairly high level of marginal productivity throughout the study period. This implies that Vietnam still used capital at a level considerably below its equilibrium level, or in other words, Vietnam still had the capacity to absorb more capital from the domestic and international markets.

Labour shows a marginal productivity series with noticeable cross-time changes. The series has an upward trend throughout the study period, but the increase is particularly marked in the later half. This tendency is consistent with changes in the general wage rate observed in recent years. Total productivity also shows an upward trend and the rate of change seems to follow the usual path of technical diffusion: low at the beginning, accelerated and then slowing down. Total productivity in 1997 was 20% higher than its level in 1986–88.

VI. Measuring The Impact of Doi Moi on GDP

The impact of Doi Moi on GDP was measured as the difference between the predicted level of GDP and the hypothetical level that would have occurred if Doi Moi had not been implemented. The hypothetical values for gross investment and total productivity used to measure the level of GDP in the absence of Doi Moi were calculated as follows.

Figure 5 show the actual investment ratios in the period 1986–97, and the ratios that we assigned for the hypothetical case in the period 1989–97. It is obvious from this figure that the share of gross investment in GDP was fairly stable at around 15% in the first three years but began to show a steady increase around 1992. Furthermore, available data for the pre-renovation period reveal investment ratios similar to those in the first three years under Doi Moi.¹ Thus it seems reasonable to assume an investment-GDP ratio of 15% for the hypothetical case. With respect to total productivity, as the model used in the regression analysis (Equations 3 and 6 in Table 4) has confirmed a productivity boost starting around 1989 as a result of various technical and institutional changes in accordance with the Doi Moi policy, we can assume that the productivity level in the years from 1986 to 1988 would have continued throughout the period of study had Doi Moi not been adopted.

The basic assumptions used to compute the hypothetical GDP can be summarized as follows:

- (1) The investment ratios (I/GDP) in the period 1988–98 would have been maintained at 15% (the average level in 1986–88).
- (2) The total productivity in the period 1989–98 would have been maintained at its level in 1986–88.

1. Investment-GDP ratios for the pre-renovation period are not available because published statistics show Gross Social Product instead of GDP. However, comparisons of GDP and Gross Social Product available in some later years revealed that the investment-GDP ratio was around 13–15% in 1984–85.

Figure 5 Actual and Hypothetical Investment Ratios

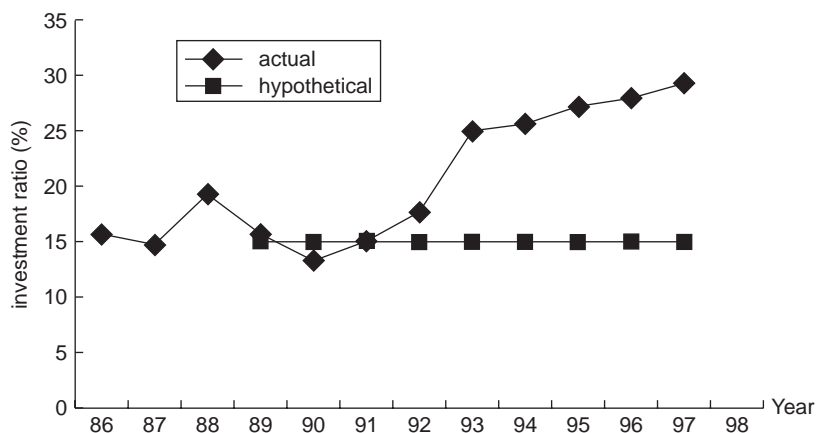


Table 7 Impact of Doi Moi on GDP (in 100 billions of 1989 VNS)

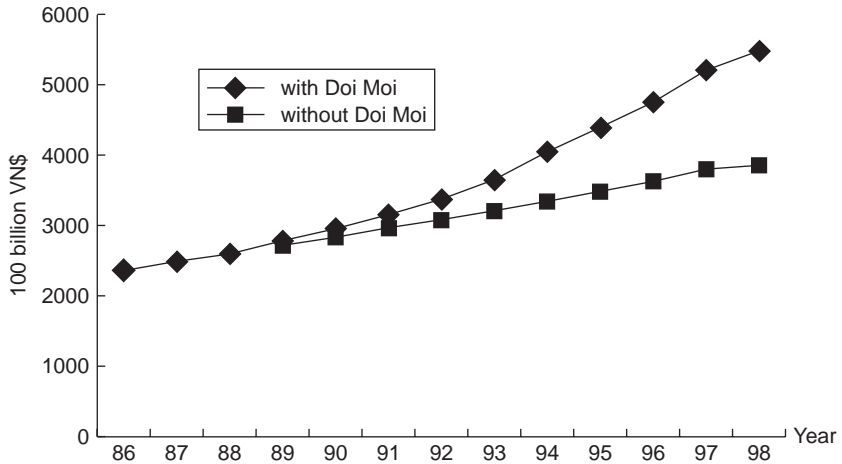
	Capital stock		GDP			Change (6) = (4) - (5)
	Actual (1)	Hypothetical (2)	Actual (3)	Predicted (4)	Hypothetical (5)	
1986	2616		2378	2369		
1987	2830		2472	2486		
1988	3021		2599	2599		
1989	3339	3230	2809	2792	2713	79(3)
1990	3578	3457	2953	2962	2837	125(4)
1991	3754	3693	3129	3158	2964	194(7)
1992	3998	3941	3399	3377	3083	294(10)
1993	4356	4214	3674	3651	3215	436(14)
1994	5009	4512	3998	4034	3348	686(20)
1995	5728	4841	4380	4391	3494	897(26)
1996	6573	5208	4789	4749	3623	1126(31)
1997	7515	5613	5182	5196	3810	1386(36)
1998	8577	6054	5482	5482	3867	1615(42)

Note: Percentage changes shown in parentheses.

The level of GDP in each year of the period 1989–98 was estimated in the following way: $K_{88} \rightarrow GDP_{89} \rightarrow I_{89} \rightarrow K_{90} \rightarrow GDP_{90} \rightarrow I_{90} \rightarrow K_{91} \rightarrow GDP_{91} \dots$

Table 7 reports the estimated capital stock and GDP in the hypothetical case as compared with the actual and predicted corresponding values. The hypothetical and predicted values of GDP are plotted in Figure 6. There appear clear gaps between predicted GDP and hypothetical GDP in the period 1989–98, due to differences in the quantity of capital stock and the level of total productivity in

Figure 6 GDP with and without Doi Moi



the two cases. The GDP gap started from 3% (in terms of percentage of hypothetical GDP) in 1989 and rose as high as 42%, equivalent to 161 trillions of VND, in the 1998. While the predicted GDP recorded an average annual growth rate of 7.2% in the period 1986–98, the annual growth rate was only 4.2% in the hypothetical case in the same period. It should also be noted that, of this 3% difference in the annual growth rate of GDP between the two cases, about one half could be explained by difference in capital stock, and the other half by difference in the pace of productivity change.

VII. Concluding Remarks

This paper can be summarized as follows:

- 1) An attempt was made to depict cross-time changes in GDP in the period 1986–98 by a function (production function) of capital stock, economically active labour force and technical progress. A regression analysis was adopted and showed that making reasonable assumptions on the path of technical progress one can obtain a function with coefficients whose significance is such as to explain more than 98% of the variations of GDP at a high level of confidence.
- 2) The statistics of the estimated GDP functions strongly support the assumption that there was a lag of about three years between the time Doi Moi was put into force and the time it began to exert a significant impact on the level of total productivity, and that this impact, initially rather weak, intensified in the years around 1991 to 1995, and weakened thereafter. It was also observed that the investment ratio remained fairly stable at around 15% until an obvious

upward trend began in 1991. These trends in total productivity and investment ratio support the view that although Doi Moi was put in force in 1986, it was not until the early 1990s that it began to make a significant impact on the level of GDP.

- 3) An attempt was made to measure the impact of Doi Moi on GDP by comparing predicted GDP and hypothetical GDP. The hypothetical GDPs in the period 1989–98 were estimated on the assumption that both the total productivity and the investment ratio in this period would have maintained the average level of 1986–88 had Doi Moi not been implemented. This counterfactual analysis shows that Doi Moi has significantly boosted the level of GDP via upward shift of total productivity and investment. This impact was estimated at about 3% of GDP in 1989, gradually increased and attained a level as high as 42% of GDP in 1998. One should, however, keep in mind that these estimated percentages of Doi Moi's impact on GDP are indicative only since they depend heavily on the relevance of the above-stated assumption on technical progress and gross investment.
- 4) After a long period of steady growth, the Vietnamese economy recorded low growth rates in 1998 and 1999, when most other countries in Asia faced a severe financial crisis. The regression analysis in this paper confirmed that this financial crisis exerted a strong negative impact on the economy. This impact was estimated at about 3.6% in 1998 in terms of annual GDP growth. However, one should not take the Asian financial crisis as the single factor responsible for the downward trend of the Vietnamese economy in recent years. The decline in technical progress measured in the latter half of the 1990s seems to be among the major causes of this downward trend.

The quantitative approach in this paper has confirmed that the high GDP growth rates recorded in Vietnam in the 1990s could be explained mostly by increase in investment and improvement of productivity under the Doi Moi policy. However, this approach does not provide an insight into the specific components of Doi Moi that have brought about these changes in investment and productivity. Some previous studies (Irvin, 1995; Nghiep, 1995) have identified macro-balance, micro-efficiency, producers' positive response to market chances and political stability as the major factors leading to this success. We would, however, prefer not to discuss these aspects in detail because the main focus of the present work is on measuring the impact of Doi Moi on GDP.

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