Economic performance of Vietnam, 1976-2000: New evidence from input-output model

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This version 9 November 2007 [2]

Abstract. This study provides a concise introduction to the economic history of Vietnam from 1976 to present. We identify different phases of the development of the Vietnamese economy, from its unification after a Vietnam war to the current phases of the transition (1989-2000) and propose a specific pattern of transition in the case of Vietnam. This research is the first attempt to make a synthesis quantitative analysis of socio-economic aggregate data during different phases of the Vietnamese economy in 1986-2000, in which different national input-output tables (1989, 1996 and 2000) in constant prices have been employed. The economic performances are investigated from three aspects: (i) evolution of domestic final demand; (ii) evolution of international trade structure and (iii) the technological change. The analysis shows economic history of Vietnam from 1986 up to present as a continuous evolutionary process and integration in to the international market is inevitable. Government programmes only played a vital role of accommodator to the economic changes of the Vietnamese economy.

JEL classification: C67, N15, P27, E60.

Key words: input-output analysis, Vietnamese economy, economic history, transition economy, macro-economic policy.

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1. A quick tour on literature on the Vietnamese economy

As early as the 1980s, Marr & White (1988) introduced to the West an early assessment of the Vietnamese postwar economy (1975-86), presenting its increasing troubles in a centrally planning economy. This collection of works done by Western researchers with their limited data reflected the difficulty at that time in accessing to data. One may still remember that during such period all production statistics and other economic data were considered "top secret" (*tuyet mat*), and circulated only in the top leaders or planning authorities. However, Kimura's (1989) seminal analysis of the process of changes in Vietnam during 1975-86, provides a set of rich data for such an ambiguous period. Vo Nhan Tri's (1990) excellent study on the country's economic conditions before 1975, followed by a careful investigation on the policy change since 1975 and its economic consequences up to the end of 1988, may be the earliest publication systematically dealing with the *Doi Moi* (Renovation) conducted by a Vietnamese. The accelerated changes occurred in Vietnam after the collapse of the Soviet Union quickly captured by the Japanese scholars and policy makers. As a result, a new strategy for the regional cooperation is proposed by Murano & Takeuchi (1992). In addition, Than & Tan (1993) collect a number of researches prepared by regional economists up to 1991, showing the regional realization of a changing Vietnam. Ljunggren (1993) provides a collection of insight work, of which Dollar (1993) investigates the macroeconomic conditions of the country until the beginning of the 1990s. Tran T. Dang (1994) provides a succinct overview of the economy during a wide span of time from 1955 to 1992 with an attempt to achieve the continuity in data of various aspects.

Ten year after, the *Doimoi* was officially carried out, Fforde & de Vylder (1996a) started to evaluate the Reforms in detail from various aspects (up to 1990). As a consequent development, their seminal book (Fforde & de Vylder, 1996b) provides a detailed story of the process from its beginning until early 1990s (1993), quickly becoming a classic reference for these turning periods. One of the most important message Fforde and de Vylder emphasize is that the "Reform" is in nature a "bottom-up" process, and the "Renovation" is therefore responsive rather than proactive. Moreover, as early as that time, Le Dang Doanh (1996) foretells the slowdown of the economy if the reform fails to deal with the idling state sector.

Concerning the pattern of the Reform, Riedel and Comer (1997) argue that the one in Vietnam is as "big-bang" as the ones in Eastern Europe, but the key difference is that since the former (like China) is a purely agricultural country, the "shock-therapy" generates outcomes far different from the latter's. Sharing the view that the initial conditions of

Vietnam (and China) are essential to its success, Griffin (1998), however, insists in the conventional view that Vietnam and its neighbor have been adopting a gradual approach to the Reform.

Besides, Harvie & Tran (1997) study the economy until the end of 1995, and then Wolff (1999) updates the country's situation until 1996. Beresford and Dang's (2000) comprehensive work on trade and aid up to the mid 1990s produces a valuable investigation on Vietnam's international trades since 1960s.

After 1997, when signs of slowdown arose, both in the economic performance as well as the government's will to cope with further challenges, and the economy itself began to reveal many weak characteristics, observers seemed to be skeptical of a miracle in Southeast Asia and less enthusiastic with the affairs of Vietnam. Many authors called for further changes from various aspects (Kokko (1999), Anderson (1999), Litvack & Rondinelli (1999)) However, Tran-Nam Binh & Chi Do Pham (2000) try to warm up the interest by bringing the literature up to date till the end of 1990s. Boothroyd and Pham (2000) attempt to evaluate the socio-economic impact of the Reform until 1995. Importantly, Tran Van Tho *et al.* (2000) successfully generate a synthesis of data on economic performance of the country from 1955 until late 1999. Alpert's (2005) collection of essays by various authors, although it appeared recently, is not very updated, and seems to fail to achieve the ambition reflected in its title. Most recently, CIEM (2005), an annual report by and for the Vietnamese policy makers, discusses the current situations of the economy from the Vietnamese orthodox point of view.

This study provides a concise introduction to the economic performance of Vietnam from 1986 to present, the paper focuses on the Vietnamese economy's structural change and its performance. The paper focus on the current phases of the economic transition of Vietnam (1986-2000) by exploring the three national input-output tables (1989, 1996 and 2000). The interrelationships between structural change and economic performance are investigated from three aspects: (i) evolution of domestic final demand; (ii) evolution of international trade structure; and (iii) the technological change. A multi-sectoral dynamic input-output model is presented to quantitatively assess the potential effects of structural changes in the performance of the economy.

The main contributions of this paper are three. First, we demonstrate that the economic structural change in Vietnam is one of the most important driving forces of economic performance. Second, we propose a specific pattern of transition in the case of Vietnam. Third, this research is the first attempt to make a synthesis quantitative analysis of socio-

economic aggregate data during different phases of the Vietnamese economy in 1986-2000, in which different national input-output tables in constant prices employed.

The paper is organized as follows. Section 2 presents an outline of economic history of Vietnam from 1976-2004. Section 3 presents the data of the Vietnamese economy from 1989-2000 and proposes the IO framework to derive non-competitive IO tables at constant prices. In section 4 we propose the static IO model for measuring input-output multipliers and for calculating the impact of various types of structural changes on economic performance. Section 5 provides an input-output analysis of the economic history of Vietnam from 1986 to the present, in which the historical picture is enriched by evidence from exploring the three input-output tables of Vietnam. The last section concludes.

2. An outline of the economic history of Vietnam from 1976-present

In this paper, we return to the period rightly after the reunification of the country in 1975 to study the economic policies during this period as well as their serious consequences, and then pointed out why the Reform had been necessarily carried out. As we will see the seeds of reformation had emerged long before it was formally announced. We are trying to explain the economic history of Vietnam from 1976 up to present as a continuous historical process, in which many policies were, on the one hand, endogenous (forced to be carried out by the economic conditions with only one choice), and on the other hand, by being dominated by the ideological views, had substantially influence the economic development. More concretely, it is the market-oriented policy that creates engine for the economy, but the policy itself is obstinately based on a groundless principle that the SOE (state owned enterprise) sector should dominate the economy. As a result, all developmental policies, implicitly or explicitly, must follow the principle. This fact has been a string to connect most of important events in the recent economic history of Vietnam.
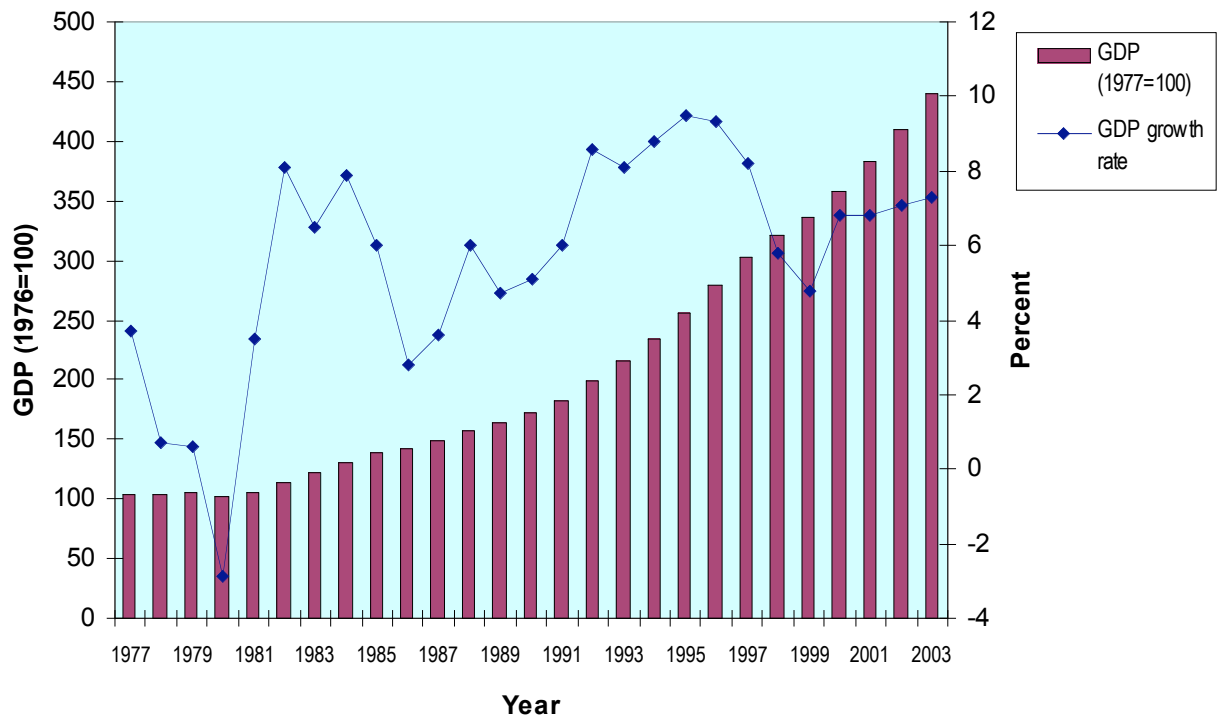
FIGURE 1 Economic Growth in Vietnam, 1977-2003

Source: Tran Van Tho *et al.* (2004) for data to 1999, post 1999 data from CIEM (2005)

Figure 1 shows the growth of Vietnam's GDP during 1977-2003. One may notice that in general the economy has been achieving a continuously steady growth. However, a closer look at the growth rate may tell us a more interesting and concrete story. An important feature is that the rate severely falls down until 1980. This is the first phase in our story. The second phase ranges from 1980 to 1986, when the economy first recovered quickly, and then slowed down again. The third phase is from 1986 to the end of 1990, when the Soviet Union collapsed. This phase must have observed drastic struggles for changing ideas and development models. The fourth phase is from 1990 to 1996, when the economy underwent a smooth progress. However, in the fifth phase, ranging from 1996 to 1999, there is again a slowdown. The final phase is from 2000 to present, when the economy shows signs of recovery. In the following sections, we will look into each phase in more detail, and point out the rise and fall of the growth rate in each phase are different in nature.

2.1. *"Socialist Transformation" Expanded to the South, 1976 - 1979*

Although the making of Vietnam's modern history is remarked by the fall of Saigon on April 30, 1975, its modern economic history only began in December 1976, when the sixth congress of the Vietnamese Communist Party (VCP) closed and officially concluded the way

ahead for the unified Vietnam. The conclusion was: "[to move] directly from small-scale production to large-scale production without passing through the capitalist stage, to give priority to heavy industry, and to turn Vietnam into a socialist country with modern agriculture and industry within twenty years." (Ton That Thien, 2005: 26)

By that time, the US aids to the South had ceased for one year. In addition, aids from China to the North were being cut step by step, along with emerging political conflicts of the two countries' leaderships, and would come to an end in 1978. However, a grand program called "socialist transformation" (*cai tao xa hoi chu nghia*) was firmly imposed throughout the defeated South. The agriculture was collectivized, while industry and commerce were nationalized. Hundred thousands of people leaving the country at that time led to a huge lost in human capital. The incentive system of the new regime immediately showed its impacts: productivity rapidly decreased, agricultural outputs fell down, industry stagnated and commerce froze. The country began to suffer from a shortage of food.

However, during this difficult time, most of investment resources were driven to the heavy industry, whose output did not meet the immediate demand of the people. During 1976-9, about 65% annual state investment was given to this industry (Figure 2). Moreover, it should be noted that the state budget was strongly dependent on external sources, most of them from the Soviet Union (Table 1).

TABLE 1 Foreign economic aid, 1976-1980

	1976	1977	1978	1979	1980
Foreign grants and loans (% of Budget Revenues)	44.8	34.5	32.9	40.8	40.6

Source: Vo Nhan Tri (1990: 101)

2.2. The "bottom-up" Reforms, 1979-1986

The "socialist transformation" program in the South, along with the impulse of the so called "socialist relation of production" in the whole country had economically failed, especially in agriculture. Since Vietnam was typically a agricultural country (by that time 80% of population were farmers), the fall in agricultural output directly and harshly affected the people's living standard. Burdens of the wars with Cambodia (ended at the late of 1978) and

with China (1979) must have become extremely heavy to an economy which had been exhausted after a 30-year war against the French and then US.

In the summer of 1980, when poverty was spreading nation-wide, the first, small-scale trials of reforming the agriculture took place in Hai Phong, a port-city near Hanoi. That is the idea of making "end-product contract" with households (*khoán hộ*), which was not new but used to be pitilessly attacked from the top leaders, who insisted that it was a dangerous deviation from the socialist path. However, changing in incentive system had improved the efficiency dramatically (see, for example, Kompas (2002) for an estimation). The immediate success of the case encouraged the authorities to expand (but still cautiously) it to other localities. To January of 1981, Party Secretariat's Directive No 100CT/TU was issued as an act of recognizing the idea. However, only until April 1988 was Politburo's Resolution No. 10/NQTU on the "Renovation of economic management in agriculture" approved, and was the reformation in agriculture officially accepted. This revealed that there must have been a persistent struggle within the leadership. The process of the reform also shows that that is in fact a reform from the "grass-root," or a "bottom-up" one.
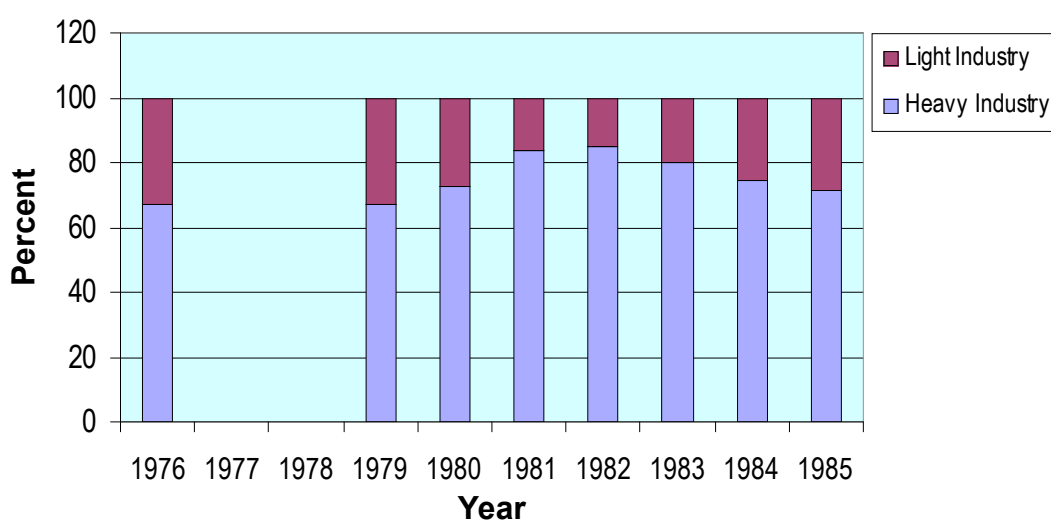
FIGURE 2 State Investment by Industry, 1976-1985

Source: Vo Nhan Tri (1990), Table 2.3 and Table 3.3

As Rozelle and Swinnen (2004) point out, to transition economies, success in agriculture plays an essential role in determining the success and pattern of the economy's transition path afterwards. It is likely that most of the transition economies have commenced their reform in agriculture, but only few of them (including Vietnam and China) succeeded. Earlier, Riedel

&Comer (1997) and Grifin (1998) have emphasized the significance of the initial conditions in these countries. It may be true because both China and Vietnam had a big share of farmers in population (around 70%), whereas in Eastern European and Central Asian countries this share accounted for about 10-30%. It is the stabilization of a major part of population that rapidly releases pressure over the leadership, help to keep the social disorder not to go too far. Therefore, the economy is stable enough to be possibly shifted to another stage of reform, rather than falling into a political chaos. Moreover, and more importantly, the impressive performance in agriculture must have been more convincing than any other ideological dogmas, helping to change insights of all factions in the ruling group surviving after the crises, to allow them to have both time to restore order and changing views to start reforming the remaining parts of the economy. That is exactly what had happened to Vietnam in this period.

2.3. The Economic Renovation, 1986 - 1990

Under the pressure of the "bottom up" reforms without political disorders, the Party started a formal reform called *Doi Moi* (Renovation). The years of 1986-1990 are a phase of decisive transformation, which proves the significant contribution of institutional changes to economic performance.

In 1987, the domestic market was liberalized: rationing system abolished for many commodities and market determined prices for nonessential goods introduced, the dual price system was modified to reduce the differentials between state controlled and free market prices. At the end of 1987, two important laws were approved: Land Law and Law on Foreign Investment. While the former, followed by Resolution 10 (as mentioned above) in 1998, helped to liberalize the huge resource in rural areas by identifying households as basic production units in rural economy, and therefore providing an effective incentive system, the latter mobilize the external resources, most of them from capitalist countries. In March, 1988, several important Decrees were issued, encouraging the development of the non-state sectors. At the same time, land-use right was set at 15 years (and would be increased to 20-50 years in 1993). The SOEs was also reformed so that they become more autonomous in determining their business plans.

However, it must be noticed that the time these important reforms occurred, the State budget was almost exhausted, and it must print a huge amount of money to finance the deficit. This immediately led to hyperinflation in 1986 (see Figure 3).
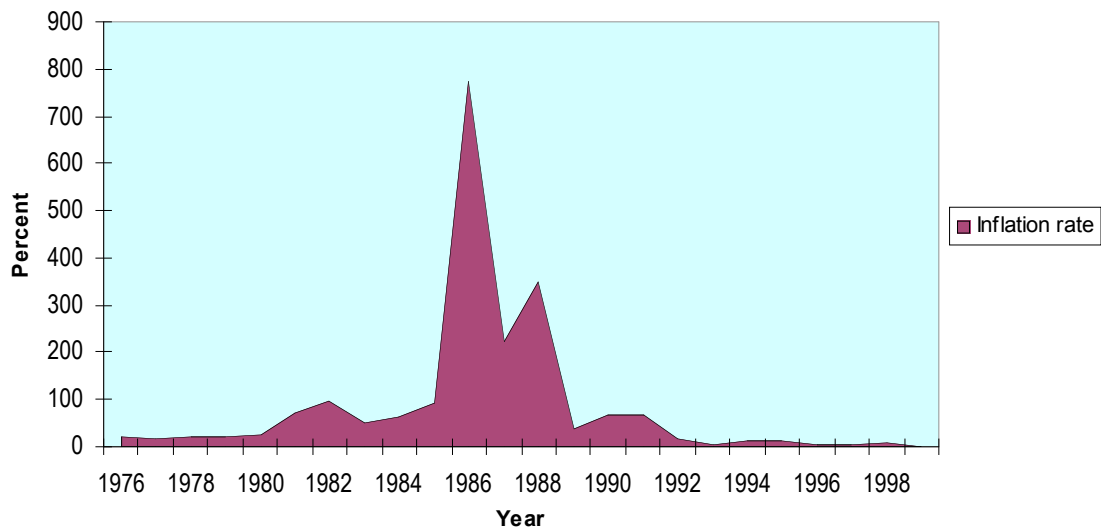
FIGURE 3. Inflation Rate 1976-1999

Source: Tran Van Tho et al. (2004)

However, this time also observed a dramatic success in taming inflation. In mid 1988, the Government increased interest rate up to 6%/month, and then inflation quickly slowed down. The interest rate was increased one more in the end of 1989 (almost 10%/month), and inflation was under control. (see Dollar's 1993: Figure 8-1, p. 213)

Although the collapse of the Soviet Union in 1989 was a disaster to poor socialist countries like Vietnam, but the shock, in today's retrospective, seems to hit the country mostly politically, but not economically. One looking into the economic data during that time may find that the economy evolved in a surprisingly smooth manner. Although Vietnam fell into a "classic case of a developing country with macroeconomic instability" (Dollar 1993: 211) in 1989, the crisis was much smaller than that of 1986.

The achievements in the period were impressive. In agriculture, the initial institutional reforms in 1979/80 had helped to reduce amount of food imported. But after the reforms in 1988, agricultural outputs soared and in the following year Vietnam became a rice exporter (Figure 4). Nguyen Tri Khiem (1996:22) provides a useful summary of the reforms and their impressive consequences in agriculture during the 1980s.
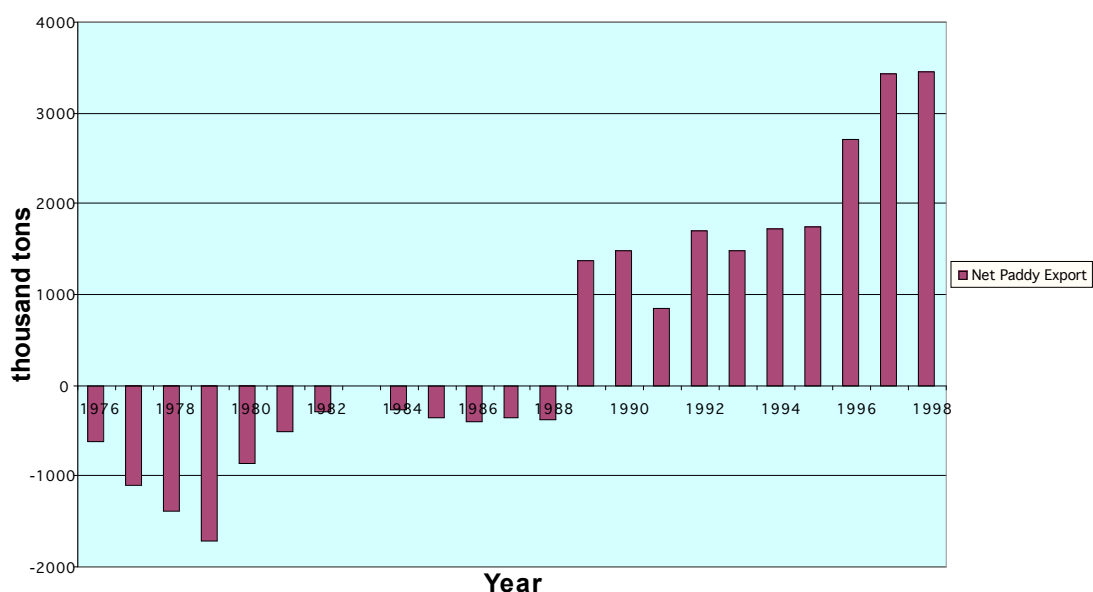
FIGURE 4 Net Paddy Export, 1976-1998

Source: Author's calculation from Tran Van Tho *et al.* (2004)

Table 2 below summarized some impacts of the reforms during each steps of the reformation.

TABLE 2 Impact of Reforms (average annual percent change)

Indicator	Pre-reform (1976-1979)	First Reform (1980-1985)	Second Reform (1986-1990)
Real GDP per capita	-0.9	2.1	1.8
Agricultural output per person employed	-10.7	0.8	0.8
Industrial output per person employed	3.2	2.8	8.8
Heavy indusrty	-4.9	-3.8	11.7
Light industry	-0.5	11.3	7.6

Source: Dang T. Tran (1994: 35)

2.4. More Opened Economy, 1990-1996

As pointed out in the previous section, the last phase ends with the collapse of the Soviet Union. Although general economic performance of Vietnam was not severely affected before and after the event, it is obvious that there had been a great shift in international economic

relations of the country. Therefore, if the last phase was recognized by many fundamental *internal* reforms, this phase can be marked with a new development in international economic relations. There was a big re-orientation of trade partners from the Soviet Union and East European countries to Japan, EU, China (1991), and then ASEAN countries (to be an ASEAN full member in 1995), and finally the United State (1995). Figure 5 clearly shows that the international trade started to take off since 1989.
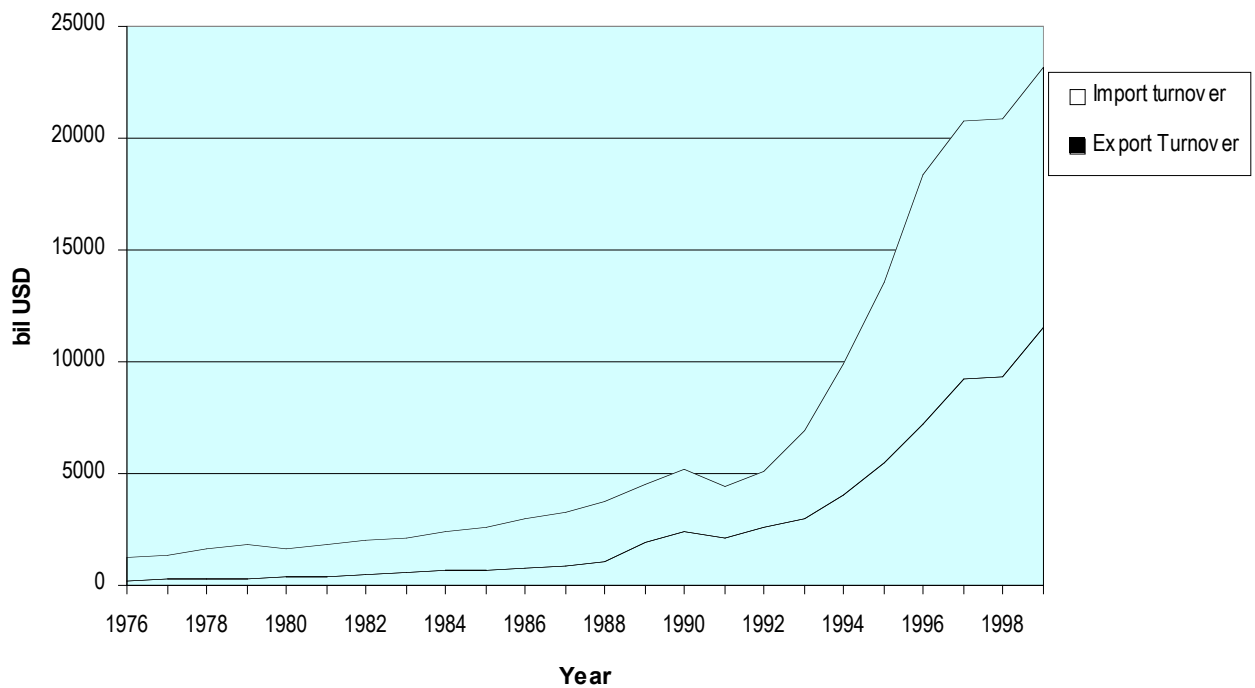
FIGURE 5 Foreign Trade, 1976-1999

Source: Tran Van Tho *et al.* (2004)

In 1990, SOEs were restructured under the form of mergers and consolidations, reducing their number from 12000 to less than 6000. Government's transfers (subsidies) to SOEs also reduced. However, the SOEs reform did not mean to weaken their economic power. That the share of State sector in GDP was firmly increasing during this period (see Figure 6) reflects "Hanoi's consensus" on the "dominating role of state sector" as a fundamental characteristic of the "socialism-oriented market economy". This fact seems to explain why the economic growth started to slow down since 1996.
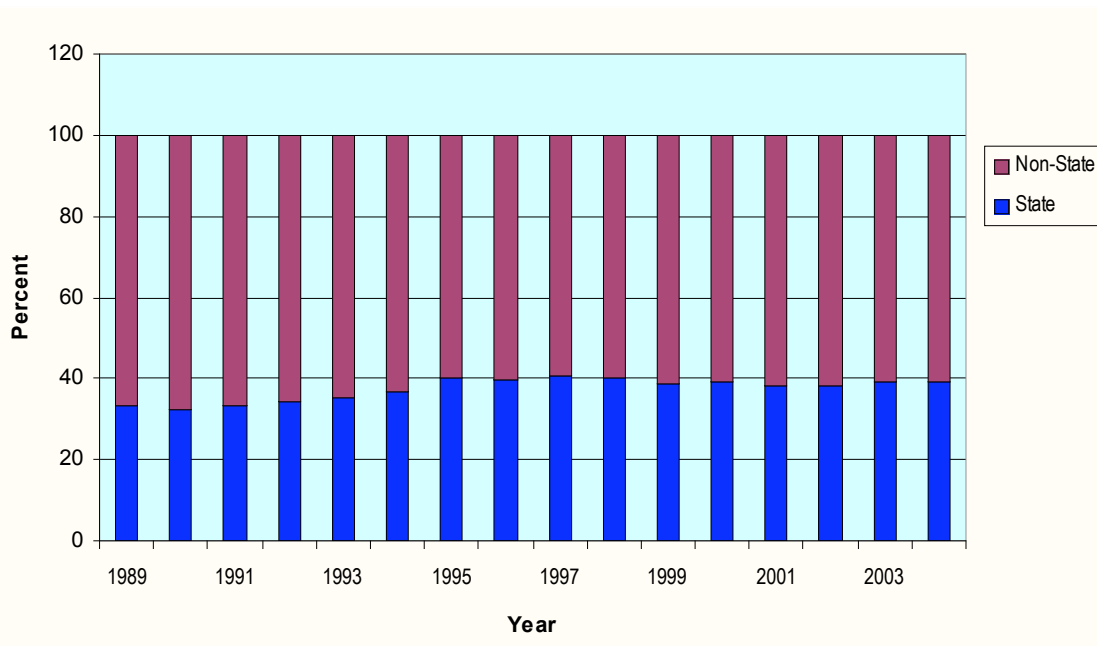
FIGURE 6 GDP by ownership, 1989-2004

Source: Tran Van Tho *et al.* (2004) for data to 1999, post 1999 data from CIEM (2005)

2.5. Economic Slowdown, 1996-2000

One widely-observed feature of the economy in this period is its slowdown. Superficially, one may, as Vietnamese politicians have been doing, relate such phenomenon to the Asian crisis in 1997. However, critical observers may find that the economy had revealed signs of slowdown at least since 1996 (Kokko (1999), Truong Do Xuan (2000), for examples). Looking at Figure 1 one may realize that the growth rate began to diminish after reaching its height in 1995. Figure 6 shows that at least since 1989, the state sector's share in GDP had kept increasing during 1989-1995 and standing constant for a quite long period of time. This discloses a fact that SOE restructuring programs only aims at strengthening the state sector. Especially, the year 1996 observed a series of conservative policies. Early in the year there was a hostile campaign against "advertisements using foreign languages" (Womack 1997). This is however only a prelude. In June, The Eighth Party Congress reemphasized the "leading role" of the state sector as a strategic task[3]. The state investment then accelerated with a pace more rapid than any other period (see Figure 7).

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[3] In the draft of Political Report, it was suggested to increase the state sector's share in GDP from current 40% to 60%, but then softened to a "leading role" (Womack 1997).

After the outbreak of the Asian crisis in July 1997, the economy was influenced but at a degree lower than other Southeast Asian countries. Foreign investment relatively decreased (Figure 7) and the growth of foreign trade suffered a pause (in that year only). The economy decelerated until 1999 and shows signs of recovery in 2000.
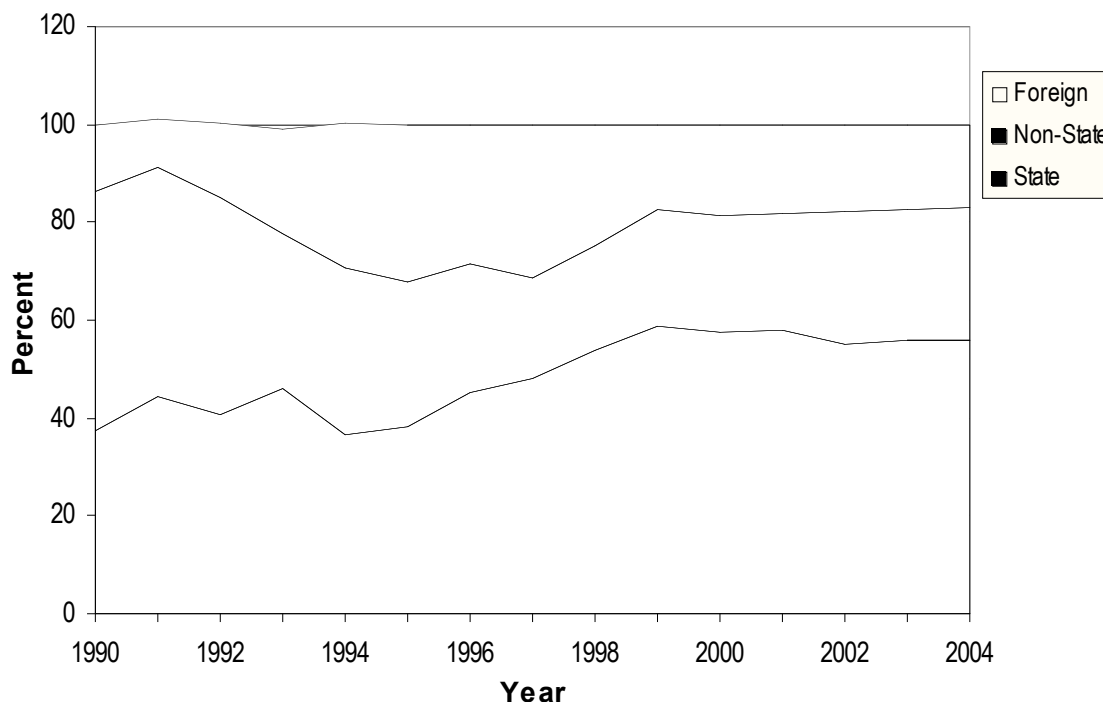
FIGURE 7 Structure of Investment by ownership, 1990-2004

Source: Pham & Le (2003) for 1990-94 data, Tran Van Tho *et al.* (2004)

for 1995-99 data, post-1999 data from CIEM (2003, 2005)

2.6. Signs of Recovery, 2000- present

Since 2000, the Vietnamese economy seems to return to its track of high economic growth. Table 3 shows a picture of the economy during this period. However, what is the engine of the growth is still questionable. The unstableness of the macro economy can be observed by the fluctuation of inflation which seems to be very unpredictable. While inflation rate is very low until 2003, it increases sharply up to almost 10% in 2004. Some blamable causes are global petroleum price increase, flu bird disease. However, many economists argue that a main cause is the increase in state's credit to SOEs. Although official data is not available, we can estimate how rapid the state's credit expands before 2004 by looking at the development as well as structure of state investment in industrial sector (Table 4). This measure may help

to accelerate the economy in short-run. But due to inherent weakness of this sector, one may be not optimistic about the long-run achievement.

TABLE 3 Key Economic Indicators, 2000-2004

	2000	2001	2002	2003	2004[(p)]
GDP growth rate (%)	5.5	6.9	7.0	7.2	7.2
Industrial production growth rate (%)	15.7	14.6	14.5	16.0	16.0
Unemployment rate (%)	6.4	6.3	6.0	5.8	5.8
Inflation rate (%)	-0.6	0.8	4.0	3.0	9.0
Government balance (%GDP)	-2.8	-2.9	-2.0	-2.2	-2.5
Domestic Public Sector Debt (accumulated, %GDP)	2.0	3.3	4.3	5.0	4.5
Trade balance (USD mil)	-1,187	-1,135	-3,027	-5,141	-5,865
Current account balance (USD mil)	503	670	-500	-1,930	-1,990
Current account balance (% GDP)	1.5	2.1	-1.1	-4.7	-4.4
Total external debt (%GDP)	41.2	38.5	38.1	37.8	37.1

Source: World Bank (2005). (p): projection.

TABLE 4 Investment of Enterprises Managed by the Ministry of Industry (Unit: Billion dong)

	2002 (actual)	2003 (est)	2004 (planned)	2003/02 (%)	2004/03 (%)
Total	21018,26	29360,14	48702,51	139,69	165,88
State Budget	567,65	428,31	727,44	75,45	169,84
State credit	3910,65	4365,63	12027,93	111,63	275,51
Discount	7309,69	6913,71	7807,98	94,58	112,93
Foreign loans	4387,13	6021,00	5082,05	137,24	84,41
Commercial credit	2579,19	8720,06	17277,16	338,09	198,13
Self investment	282,08	796,04	928,93	282,20	116,69
Others	2064,01	2174,38	5040,76	105,35	231,82

Source: Ministry of Industry (http://www.moi.gov.vn/News/detail.asp?Sub=42&id=694)

3. The Data and Input-Output methodology to derive non-competitive Input-Output tables at constant prices

3.1. Review of the economic account compilation in Vietnam

3.1.1. National Accounts

As shown in Table 5, in the early 1990s, General statistical office of Vietnam (GSOVN) through its National accounts department (NAD) started compiling the country's annual national accounts which is based on the United nations' System of national account (SNA)[4]. This initial activity was benefited from technical and financial assistance of United nations development programme (UNDP). Later on, Asian Development Bank (ADB) provided a long-term technical assistant grant to help to improve the compilation of Vietnam's national accounts including the compilation of input-output (IO) tables. Table 1 shows that, national accounts time-series data are available from 1986 onwards.

Since 1998, GSOVN has embarked on the compilation of quarterly national accounts. Data on quarterly time-series gross domestic product (GDP) are available from 1998 onwards.

TABLE 5 History of National accounts in Viet Nam

Started Compiling	Frequency of Compilation	Available Time Series Data	Compiler
1986	Annual	1986 onwards	NAD, GSOVN
1998	Quarterly	1998-2007	NAD, GSOVN

3.1.2. National Input-Output Tables

Compilation of SNA-based national IO tables started in the early 1990s with 1989-benchmark IO table with only 54 sectors. The second national IO table was compiled on 1996 with 97 sectors. The latest national IO table was compiled on 2000 with 112 sectors. During the interval between 2 national benchmark IO tables, national IO tables were annually updated. However, these data are unofficial and only available upon requested.

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[4] In line with Vietnam's transition to market economy in 1986, the GSOVN shifted its framework of compiling the country's economic accounts from the Material Product System (MPS) to the United Nations' SNA.

TABLE 6. SNA-Based IO Compilation in Vietnam

Kind / Reference Year	Size	Type	Methodology
National Benchmark Tables			
1) 1989	54x54	Competitive/Current price	Direct Full Survey
2) 1996	97x97	Competitive/Current price	Direct Full Survey
3) 2000	112x112	Competitive/Current price	Direct Full Survey
National Updated Tables*			
1) 1990	54x54	Competitive/Current price	RAS Method
2) 1991	20x20	Competitive/Current price	RAS Method
3) 1992	20x20	Competitive/Current price	RAS Method
4) 1993	20x20	Competitive/Current price	RAS Method
5) 1994	43x43	Competitive/Current price	RAS Method
6) 1995	45x45	Competitive/Current price	RAS Method

* unofficial data are available upon request

3.2. Compilation Methodology

For the purpose of comparative analysis, the following data transformation was undertaken by the GSO of Vietnam.

1. Unifying sector classification of three national benchmark IO tables (1989, 1996 and 2000) into 52-sector classification;

2. Building of import matrices for the three national benchmark IO tables;

3. Derivation of the non-competitive type of IO tables ; and

4. Generation of the non-/competitive IO tables at constant prices of 1994.

3.2.1. Sector re-classification

The first task done was to reclassify the sectors of the available three national benchmark IO tables into a common classification. As it was shown in table 2, in 1989 it was only 54 sectors involved in the survey. However the number of sectors increased to 97 and 112 in 1996 and 2000 respectively. For the purpose of comparative analysis, all these three table need to be unified in the sole sector classification. Shown in Annex A is the revised 52-sector classification followed in reconstructing the three IO tables.

3.2.2. Building of import matrices

As shown in Table 2, Vietnam's national IO tables are of the competitive-imports type wherein no distinction is made between domestically and imported products consumed in production and consumption. So far, no attempt has been made to construct the more useful non-competitive type of table that explicitly distinguishes the usage of imported from domestic products.

For the purpose of building non-competitive IO tables, the following method was conducted to calculate the national import matrix by the non-survey method.

The starting point for derivation of non-competitive IO tables is the material balance equation of the input-output account:

(1) $$X_i = W_i + D_i + E_i - M_i$$

where:

X_i = gross output of sector i

W_i = intermediate domestic demand for the output of sector i [1]

D_i = final domestic demand of product i

E_i = export demand of product i

M_i = total imports of products classified in sector i

Import of commodity i, M_i, consists of M^w for intermediate demand and M^f for final demand. They appear in the total import supply and as part of both intermediate and final demand in equation (3-1). Let u_i^w and u_i^f stand for the domestic supply ratios (the proportion of intermediate and of final demand produced domestically). Thus:

(2) $$X_i = u_i^w \sum_j a_{ij} X_j + u_i^f D_i + E_i$$

(3) $$M_i = m_i^w W_i + m_i^f D_i$$

where the import coefficients are define as $m_i = (1 - u_i)$ for both intermediate and final goods.

Here, the assumptions are that: first, there is no direct re-export of imports; second, imports and domestic goods with the same sector classification are alternative sources of supply and are perfect substitutes in all uses; third, the domestic supply ratio for intermediate use, u_i^w, is assumed to be same for all sectors using commodity i as an input.

Equation (2) and (3) can be conveniently restated in matrix notation as:

(4) $$X = \hat{u}^w AX + \hat{u}^f D + E$$

(5) $$M = \hat{m}^w AX + \hat{m}^f D$$

In this study, however, it was imperative that a national imports table be generated that could adequately serve as the basis in regionalizing the import transaction. For this purpose, a direct estimation methodology was developed to build the import coefficient matrices. The approximation of diagonal matrix of import coefficients for intermediate use $\hat{m}^w$ can be calculated as follows:

The import coefficient of sector i, $\hat{m}_{ii}^w$, can be estimated by the equation:

(6) $$\hat{m}_{ii}^w = \frac{M_i}{TDD_i},$$

where

TDD_i = total domestic demand for sector i.

By definition $TDD_i = W_i + D_i = X_i - E_i + M_i$ (which is can be calculated with the data can be extracted from competitive IO table).

3.2.3. Derivation of IO tables of the non-competitive type

With the availability of the 52-sector national import tables, we can now derive the non-competitive type of IO tables that is universally accepted as the more effective instrument for a more meaningful micro-economic analysis. Subtracting the imports table from the given competitive IO tables gives the non-competitive IO tables wherein input-output transactions are net of imported inputs. To balance the IO tables a separated import column is added to the IO matrices.

Based on the non-competitive tables which were generated in the phase 3 and the 52- sector vectors of deflation for the year of 1989, 1996 and 2000, the non-competitive IO tables at constant price of 1994 were calculated.

4. The Input-Output models

4.1. Static IO Model - Derivation of Leontief inverse matrices (type I and II)[5]

In the standard input-output model, the Leontief inverse matrices show how much of total change in each industry's output is needed, in terms of direct, indirect and, in types II matrices, induced requirements, due to one unit change in the final demand of a given industry.

The type I Leontief [inverse] matrix is defined as follows:

$$(7) \qquad B = (I - A)^{-1}$$

where:

B   = Type I standard Leontief inverse matrix

I   = Identity matrix

A   = Direct input coefficient matrix

In order to derive the type II Leontief inverse matrix we assume that the value added of production could be decomposed into two components: (i) income paid to household as wage paid to employees and (ii) income paid to capital includes amount of depreciation and a part of operating surplus (excluding amount redistributed). Hence, not like other studies where type II of IO model is developed with households endogenous, in our paper the type II of IO model is constructed with two income groups, namely the employment income group and the capital income group. In this revision of the IO model, household and capital are considered like industries, selling service/good (labour/capital), earning revenues (compensation of employees and rents) and making purchases (household expenditure and capital formation).

As sources of income paid to household can be: compensation of employees and redistribution of operating surplus, hence we have:

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[5] This section refer to the concept developed by (Trinh et all, 2005), presented at PAPAIOS conference, 2005

(8) $$W = W_1 + W_2$$

where :

W_1 = compensation of employees

W_2 = income created by redistribution of operating surplus.

Similarly, income paid to capital, denoted by R includes amount of depreciation, a remaining part of operating surplus (excluding amount redistributed), foreign direct investment and capital transfer or borrowing.[6]

(9) $$R = R_1 + R_2$$

where:

R_1 = Depreciation (consumption of fixed capital).

R_2 = Income created by redistribution of operating surplus.

Hence, we may decompose value added va into:

(10) $$VA = W_1 + W_2 + R = W + R$$

Using w to denote vector of coefficient of income paid to household (1xn) and r (1xn) denotes vector of coefficient of income paid to capital. For each industry i we have: $w_i = W_i / X_i$ and $r_i = R_i / X_i$ where X_i denotes gross output of sector i.

Using C to denote vector of household expenditure and c a corresponding vector of coefficients and I to denote a vector of investment and i a vector of coefficients, we have:

(11) $$c_i = \frac{C_i}{\sum_{i=1}^{n} W_i} \text{ and } i_i = \frac{I_i}{\sum_{i-1}^{n} R_i}$$

---

[6] In fact source of total income paid to household consists of compensation to employees (income from production-earned income) and other unearned income sources such as property incomes and transfer incomes. Similar to capital, total capital resources, apart from operating surplus and depreciation, also includes capital resources received by foreign direct investment and capital transfer or borrowing. Due to the limitation of data sources, in this study, we assume the unearned income W_2 and exogenous sources of capital income R_2 are zeros.

Hence, we may rewrite extension formulation based on Leontief standard system as follows:

(12) $$X = AX + cW + iR + f$$

$$W = wX$$

$$R = rX$$

where:

X = vector of gross output (n$\times$1);

f = vector of final demand except consumption and capital formation (n$\times$1)

W = total income paid to household (scalar)

R = total income paid to capital (scalar)

Rewrite equation (12) in a matrix form, we have[7]:

(13) $$\begin{pmatrix} X \\ W \\ R \end{pmatrix} = \begin{pmatrix} A & c & i \\ w & 0 & 0 \\ r & 0 & 0 \end{pmatrix} \begin{pmatrix} X \\ W \\ R \end{pmatrix} + \begin{pmatrix} f \\ 0 \\ 0 \end{pmatrix} = A^* X^* + F^*$$

Therefore, the direct purchase coefficient matrix is extended by adding two extra rows and columns. The tow rows are "compensation of employees" and "the consumption of capital plus operating surplus" coefficients; the two columns are "household expenditure" and "capital formation" coefficients respectively.

The equation (13) suggests us the type II Leontief inverse matrix, which is calculated in this study as follows:

(14) $$B^* = (I - A^*)^{-1}$$

where:

B^* = Type II Leontief inverse matrix

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[7] Theoretically, $A^* = \begin{pmatrix} A_{ij} & c & i \\ w & A_{hh} & 0 \\ r & 0 & A_{kk} \end{pmatrix}$

where: A_{hh} = household consumption per unit of exogenous household income and A_{kk} = capital formation per unit of exogenous capital income. In this study these cells are set to zero.

4.2. Measure of industry's impacts – Input-output multipliers

4.2.1. Concept of the multiplier – from Keynes, Kalecki, Leontief to Miyazawa

The concept of multiplier, according to Keynes: "… was first introduced into economic theory by Mr. R. F. Kahn in his article on 'The Relation of Home Investment to Employment' (Economic Journal, June 1931)' " (Keynes, 1946, p.113). However, it is widely recognized that the concept of [investment] multiplier was first defined by Keynes.

According to Keynes, consumption C is originally induced by the [real] income Y [8]: $\Delta Y = \Delta C + \Delta I$, where I denotes investment. Therefore, by defining the *marginal propensity to consume* (or consumption coefficient in our input-output model) $c = \dfrac{dC}{dY}$, then the Keynesian investment multiplier equation would be: $\Delta Y = k\Delta I$, where $k = \dfrac{1}{1-c}$. The investment multiplier k, "tells us that, when there is an increment of aggregate investment, income will increase an amount which is k times the increment of investment" (Keynes, 1946, p.115).

However, in the community, there are always number of income groups, thus the Keynesian investment multiplier holds only for a particular income distribution pattern. Miyazawa (1976), in his lecture note on "input-output analysis and the structure of income distribution", developed a concept of income multiplier for an economy with r different income-groups. In fact, the Miyazawa income multiplier is the extension and improvement of Kalecki income multiplier for income distribution pattern of two income-groups. Let d_1 and d_2 denote the relative shares of the 1st and the 2nd income group; and c_1, c_2 denote the marginal propensity to consume of the 1st and the 2nd income group respectively, the generalized Kalecki income multiplier, as described by Miyazawa, is as follows: $k = \dfrac{1}{1-(c_1 d_1 + c_2 d_2)}$ (Miyazawa, 1976, p.3).

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[8] Originally, Keynes had distinguished the two terms: income and real income. However as stated in his General Theory, he considered them as virtually interchangeable "In certain contexts we must not overlook the fact that, in general, Y increase and decrease in a greater proportion than real income; but in other contexts the fact that they always increase and decrease together renders them virtually interchangeable" (Keynes, 1946, p. 114)

In this paper we combine Kalecki multiplier and simple Leontief output multiplier by applying the concept of Miyazawa multiplier for the two different income group, namely household and capital income group.

By *endogenising* the household and capital sectors, we propose to enlarge the coefficient matrix as described in the previous section (3.1). Based on the basic Keynesian argument that Income = Consumption + Investment, we argue that income of the community includes not only income from individual owners of *factors* (household group) but also from entrepreneurs. Hence, it is a mistake to allocate all income to consumption as a household expenditure since there are always the decisions to consume and the decisions to invest. The formal is belong to household income group and later is of capital income group. It is the reason why income needed also allocated to capital formation.

> "Income is created by the value in excess of user cost which the producer obtains for the output he has sold; but the whole of this output must obviously have been sold either to a consumer or to another entrepreneur; and each entrepreneur's current investment is equal to the excess of the equipment which he has purchased from other entrepreneurs over his own user cost. Hence, in the aggregate the excess of income over consumption, which we call saving, cannot differ from the addition to capital equipment which we call investment… The decisions to consume and the decisions to invest between them determine incomes". (Keynes, 1946, p.64)

4.2.2. Derivation of Input-output multipliers and effects

An input-output multiplier is an indicator for measuring of an industrial impact on the economy. As multiplier is defined as the ratio of the industry's total impact to its direct impact. The peculiarity of our definition of multiplier is in the way to construct the enlarged inverse matrix multiplier (see section 3.1).

Borrowing the traditional definitions described in Johnson, T.G. (1999), we distinguish between variety kinds of effects and between multipliers and total effects as follows:

Initial effect: The exogenous change in final demand.

Direct effect: The direct effect is the first round of response to the initial effect. It may be the same as the initial effect, if the initial change in final demand is entirely absorbed domestically. Otherwise the direct effect will be smaller than the initial effect. The direct effect may be in different units

than initial effects. The direct effect may be in income or employment while the initial effect was expressed in output, for example.

Indirect effect: The impact on the economy as the demand for intermediate inputs changes.

Induced effect: The change in the economy due to the re-spending of income earned as a result of the initial and subsequent changes.

Simple effect: The sum of direct and indirect effects.

Total effect: The sum of direct, indirect and induced effects.

Simple multiplier: The sum of direct plus indirect effects divided by direct effects. Also known as the Type I multiplier.

Total multiplier: The sum of direct plus indirect plus induced effects divided by direct effects. Also known as the Type II multiplier

In this paper, we calculate various types of multipliers for both type I and type II effects. The Gross output multipliers are calculated by using both competitive and non-competitive type IO tables.

Gross output multiplier

Direct and indirect effects (type I) $$OM_j = \sum_{i=1}^{n} b_{ij} \qquad (15)$$

Direct, indirect and induced effects (type II) $$OM_j^* = \sum_{i=1}^{n} b_{ij}^* \qquad (16)$$

Where:

b_{ij} = coefficient of Leontief inverse matrix (type I)

b_{ij}^* = coefficient of enlarged Leontief inverse matrix (type II)

Income multipliers (for both household and capital income)

Direct and indirect effects (type I) $$IM_j = \sum_{i=1}^{n} \frac{v_i b_{ij}}{v_j} \qquad (17)$$

Direct, indirect and induced effects (type II) $$IM_j^* = \sum_{i=1}^{n} \frac{v_i b_{ij}^*}{v_j} \qquad (18)$$

Where:

v_i = labour or capital income of industry i (or j) per one VND of total output of that industry.

Employment multipliers

Direct and indirect effects (type I) $EM_j = \sum_{i=1}^{n} \dfrac{e_i b_{ij}}{e_j}$ (19)

Direct, indirect and induced effects (type II) $EM_j^* = \sum_{i=1}^{n} \dfrac{w_i b_{ij}^*}{w_j}$ (20)

Where:

e_i = employment per VND 1 million of total output of industry i.

Consumption, Investment and Export multipliers

Consumption, Investment and Export multipliers type I and II are calculated as follows:

$$FM = (I - A)^{-1} F./F$$ (21)

$$FM^* = (I - A^*)^{-1} F./F$$ (22)

where:

$(I - A^*)^{-1}$ = enlarged inverse matrix multiplier type II

FM = matrix of final demand multipliers (nx3)

F = matrix of final demands includes consumption, investment and export (nx3)

$./$ = matrix operator - element by element divide

From (3-9) and (3-10), Consumption, Investment and Export multipliers of the industry *i* are calculated as follows:

Direct and indirect effects (type I) $FM_i = \sum_{j=1}^{n} \dfrac{b_{ij} f_j}{f_i}$ (23)

Direct, indirect and induced effects (type II) $FM_i^* = \sum_{j=1}^{n} \dfrac{b_{ij}^* f_j}{f_i}$ (24)

5. A economic structural change of Vietnam from 1986-present – evidence from input-output tables

In this section, we return to the period rightly after the *Doi Moi* (renovation) of the country in 1986 to study the economic structural change during this period as well as their serious consequences, and then pointed out why the Reform had been necessarily carried out.

Structural change has a number of dimensions. Firstly, this is an evolution of domestic final demand resulted from a shift from agriculture to industry and services, and from low labour productivity sector to the sector which has higher labour productivity or to the relative more capital intensive sector. Some completely new sectors, such as fine arts and handcrafts, electronics and car and motorcycle assembly, have begun to emerge, contributing to industrial growth, and we are seeing the emergence and development of new sophisticated engineering industries such as chemicals, computer and office equipment, electric and electronic equipment, telecommunication, based on substantial change within already-existing sectors. Secondly is the evolution of international trade structure; and Thirdly is the technological change, and lastly is ownership restructuring, meaning the decline of state owned industrial enterprise along with the growth of foreign-owned and non-state sector, is affecting the structure of industry, and may be one of the main drivers of productivity improvement.

Shift in GDP Structure has indeed occurred since 1976. During 1976 – 2000, the Vietnamese economy saw a transformation from an agriculture-based toward an industry-and-service-based economy. However, the domination of the agriculture was only sharply declined since the early 1990s. Before this turning point, the agriculture was still dominated more or less than 40% of the GDP, and the economy did not show any clear trend in restructuring (Figure 8). After 1992, there is a continuous trend in transformation with a steady expansion of the industry. The share of the service sector seems to be stable at about 40% of the GDP.

Since the early 1980s, structural change in final demands has occurred. The proportion of investment in GDP has been increasing. As a result, the total final consumption relatively declined (see Figure 9). During this period, thank to the access to new markets, the international trade has also been extended with a remarkable growth of more than 20% per annum (Figure 9). These structural changes (both in production and final demand) must have been the major engine for the economy to achieve its sound growth since mid of the 1980s.
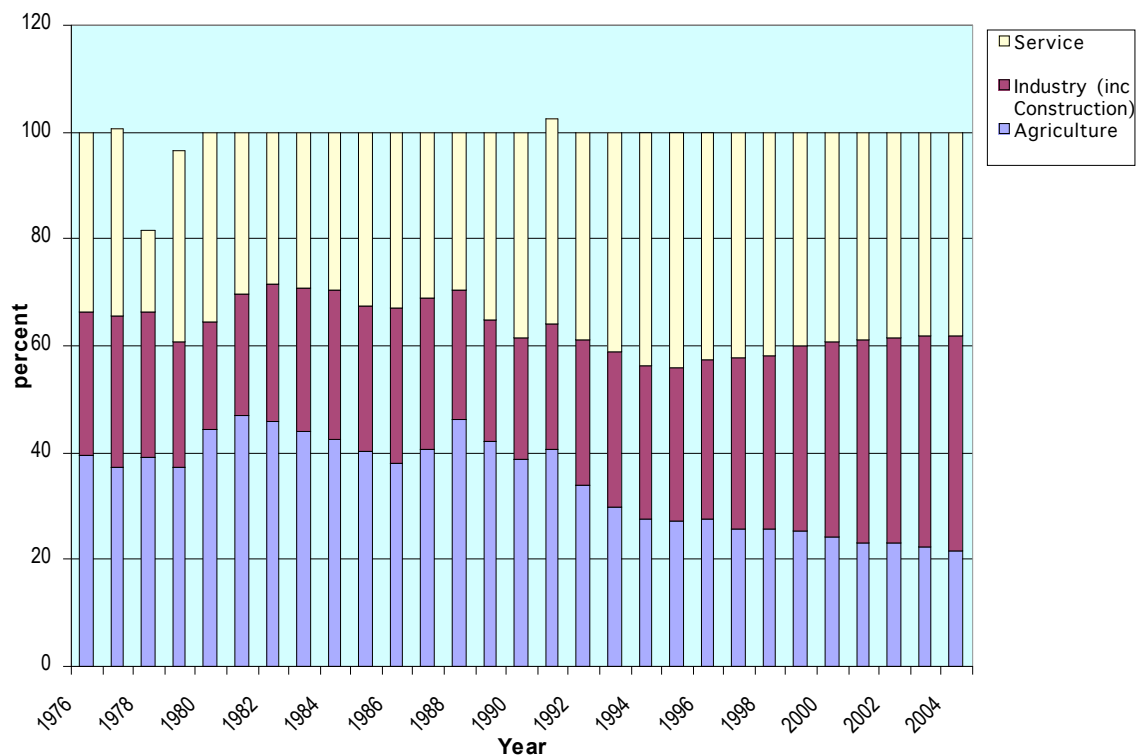
FIGURE 8 Structure of GDP by Sector, 1976-2004

Source: Tran Van Tho *et al.* (2004) for data to 1999, post 1999 data from CIEM (2005)
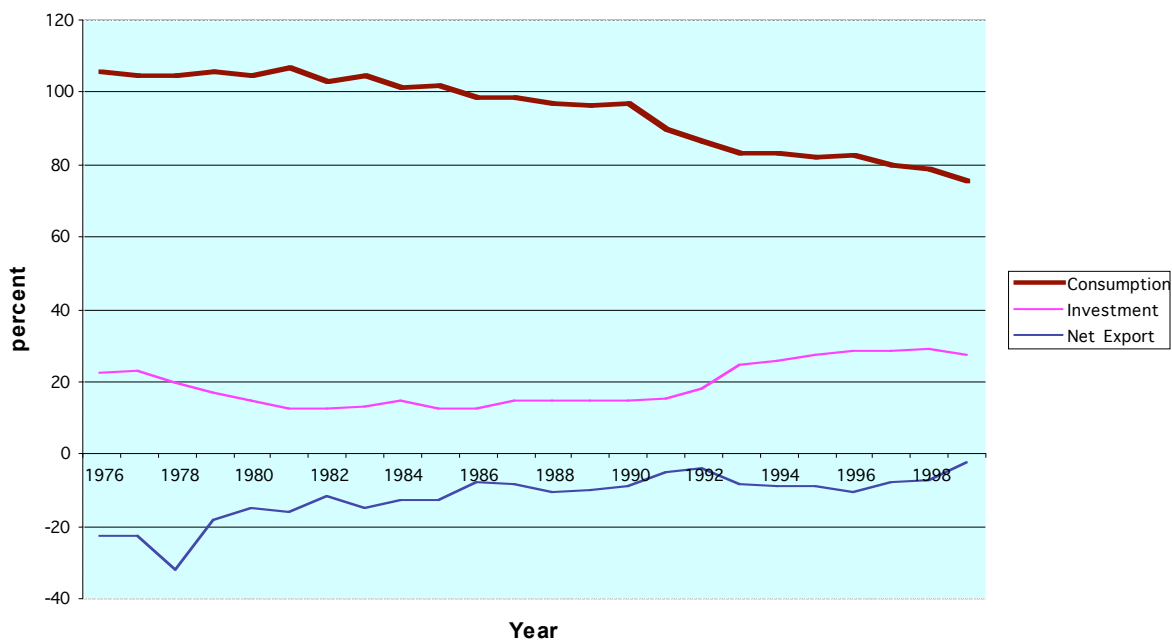
FIGURE 9 Structure of Final Demand, 1976-1999

Source: Tran Van Tho *et al.* (2004)

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Next part of the paper focus on the current phases of the economic transition of Vietnam (1986-2000) by exploring the three national input-output tables (1989, 1996 and 2000). Input-output analysis is consistent with the different phases of the development of the Vietnamese economy which were identified in the previous sections.

5.1 The Economic Renovation, 1986 - 1990

Let us take a close look at the evidence from 1989 input-output table. Table 7 shows the level of output multiplier (OM) calculated from competitive type IO table and non-competitive one for three phases of reform. The different between two types of OM shows precisely the impact of international trade on economic performance which we call the outer impact. In the first phase of reform, we could see that, OM competitive type is 2.317. It shows that if imports and domestically produced goods in each sector are not treated separately, or saying in the other way if the contribution of import substitution is neglected, then in order to produce one additional unit of output, the total of all outputs from each industry need to be increased for 2.317 units more. However, as we have mentioned, since there are no impacts of import substitution, by calculating OM in such a way, the whole increment of 2.317 units is concerned as domestically produced. In fact, thank for the international trade, part of the output requirement is substituted by imported goods. That is the reason why we need to calculate OM from the non-competitive type IO table. As shown in table 7, due to the impact of import substitution, OM drops to 1.510, it means instead of 2.317 units of total output need to be increased, the requirement now is only 1.510 units. Hence we can calculate the outer impact from international trade which is 1.534. This is a strong supported evidence for the evolutionary movement of Vietnamese economy, or in our terminology, a bottom-up process, in which *Doi Moi* is a critical point marks the shift of Vietnamese economy from planned economy to marker oriented one. We could say integration in to the international market is inevitable. Import substitution and export expansion resulted from various liberalizations in this period, of which the critical one is liberalization of domestic market, are reactions of the economy under the pressure of the "bottom up" reforms (1979-1986), the exhaustion of State budget and mainly the collapse of the Soviet Union – which is used to be a formal big export-market of Vietnam.

TABLE 7 Output multipliers and Outer Impact (type I)

Phase of reform	Output Multiplier Competitive type	Output Multiplier Non-competitive type	Outer impact
The Economic Renovation, 1986-1990 (IO 1989)	2.317	1.510	1.534
More Opened Economy, 1990-1996 (IO 1996)	2.392	1.540	1.553
Economic Slowdown, 1996-2000 (IO 2000)	2.573	1.518	1.695

Table 7 shows the OMs only at the highest aggregated level. Break-down OMs in to 52-sector are shown in table 8. We could see that, except sector 39 (Petroleum and natural gas) and sector 2 (Animal husbandry), 38 (Products of publishing house) where there are no impact of international trade (outer impact is or almost is zeros)[9], the other sectors' outer impacts are about 1.2 and above. Sectors, whose outer impacts are higher than 1.5, are concentrated in manufacturing sectors. Some sectors have incredible high outer impact (more than 2.0), such as sector 26 (Soap, detergents, perfumes and other toilet preparation), sector 27 (Plastic, plastic products). Reason for these high impacts lays on the import substitution for domestic intermediate and final demand of manufacturing goods. Few sectors have high impact but are not manufacture, such as sector 5 (coal) and sector 9 (Processed and preserved fruits and vegetables) due to Vietnam has a traditional of exporting coal as well as agricultural products, thus reason here is export expansion. It again, confirms the impacts of international trade which is certainly an inevitable movement toward economic integration of Vietnamese economy.

Table 9 presents level of labour and capital income multipliers (VND income/VND output) type I and II in 1989. Obviously, level of type II multipliers are always greater than those of type I one, due to the induced effects. Looking at the results presented in table 9, we could say how much total income increment (paid to household and capital) will be generated in all sector of the economy that results from a change of VND 1 of income from labour/capital in each industry. From that we could see how is efficiency of industries. Labour income

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[9] In Vietnam, since there is no oil refinery industry, all domestic demand of petroleum and gas are imported. In contrast, in 1989 Animal husbandry and Products of publishing house are sectors with few imports/exports.

generated is higher in manufacturing industries, due to that fact that in this period most of the newly emerged manufacture sectors are labour intensive. Increments of labour in come in agriculture related sectors are not quite high, except animal husbandry. In term of capital, the picture is not quite clear, it also reflected the technology of a nation at this time, where most of sectors are labour intensive.

Table 10 shows the level of employment multipliers (type I and II) in 1989, 1996 and 2000. The employments multipliers show the total increases in employment throughout the Vietnamese economy which results from an increase in final demand which is enough to create one additional employment in that industry. Again, the picture of labour intensive is looming. Most of sectors have its high level of multipliers. Sectors have low level of employment multiplier is agriculture and most of the service sectors. This implies that these sectors do not attract much labour.

TABLE 8 Vietnam Output Multipliers and Outer impacts, 1989, 1996 and 2000

Code	2000			1996			1989		
	OM competitive	OM non-competitive	Outer impact	OM competitive	OM non-competitive	Outer impact	OM competitive	OM non-competitive	Outer impact
1	1.603	1.249	1.284	1.642	1.170	1.403	1.716	1.287	1.334
2	2.138	1.509	1.417	1.842	1.454	1.266	1.800	1.657	1.086
3	1.602	1.214	1.319	1.476	1.196	1.234	1.501	1.218	1.232
4	2.228	1.288	1.729	1.634	1.270	1.287	1.968	1.328	1.482
5	1.827	1.302	1.403	2.334	1.570	1.486	2.384	1.469	1.622
6	2.231	1.624	1.373	2.238	1.581	1.416	1.734	1.324	1.309
7	1.668	1.295	1.288	2.178	1.536	1.418	1.600	1.268	1.263
8	2.855	1.899	1.503	2.819	2.043	1.380	2.499	1.672	1.494
9	2.395	1.696	1.412	2.575	1.783	1.445	2.453	1.469	1.669
10	2.656	1.725	1.540	2.298	1.563	1.470	2.558	1.732	1.477
11	2.358	1.760	1.340	2.712	2.043	1.327	2.249	1.607	1.399
12	2.386	1.767	1.350	2.428	1.818	1.336	1.943	1.597	1.217
13	3.203	1.913	1.674	2.211	1.693	1.306	2.376	1.712	1.388
14	3.113	2.125	1.465	2.290	1.907	1.201	2.343	1.848	1.268
15	2.698	2.145	1.258	2.403	1.870	1.285	2.606	2.059	1.265
16	2.543	1.481	1.717	2.249	1.539	1.462	2.298	1.549	1.483
17	2.449	1.573	1.557	2.003	1.612	1.242	2.209	1.666	1.326
18	3.069	1.851	1.658	2.299	1.626	1.414	2.575	1.781	1.446
19	2.466	1.552	1.589	2.942	1.924	1.529	2.665	1.843	1.447
20	2.907	1.636	1.777	2.951	1.769	1.668	2.783	1.811	1.536
21	2.416	1.653	1.462	2.768	1.995	1.387	2.234	1.810	1.234
22	2.409	1.345	1.792	2.109	1.545	1.365	3.166	1.770	1.789
23	2.543	1.420	1.791	2.902	1.489	1.949	2.427	1.814	1.338
24	2.619	1.305	2.007	3.006	1.503	2.000	2.667	1.461	1.826
25	2.744	1.579	1.737	2.422	1.444	1.677	2.540	1.649	1.541
26	2.732	1.332	2.050	2.978	1.474	2.021	3.017	1.477	2.043
27	2.673	1.450	1.843	3.767	1.556	2.421	3.336	1.309	2.549
28	2.786	1.390	2.004	2.829	1.658	1.707	2.853	1.571	1.816
29	3.511	1.513	2.321	2.985	1.268	2.354	2.267	1.194	1.899
30	2.883	1.364	2.114	3.253	1.440	2.259	2.326	1.266	1.838
31	3.487	1.470	2.372	3.074	1.456	2.111	2.313	1.186	1.950
32	3.873	1.722	2.249	2.725	1.422	1.916	2.594	1.360	1.907
33	3.508	1.503	2.334	2.479	1.490	1.663	2.774	1.185	2.342
34	3.468	1.598	2.170	2.905	1.640	1.771	2.545	1.513	1.682
35	3.225	1.581	2.040	2.781	1.507	1.845	2.590	1.526	1.698
36	3.661	1.836	1.994	2.512	1.458	1.723	3.272	1.675	1.954
37	3.165	1.801	1.757	2.669	1.597	1.672	2.249	1.604	1.402
38	2.608	1.587	1.643	2.761	1.860	1.484	1.216	1.116	1.089
39	2.758	1.244	2.218	1.405	1.091	1.288	1.000	1.000	1.000
40	1.982	1.173	1.689	2.437	1.453	1.677	2.456	1.465	1.677
41	1.753	1.230	1.426	2.551	1.651	1.545	2.060	1.513	1.362
42	2.984	1.630	1.831	2.623	1.717	1.528	2.021	1.483	1.363
43	2.503	1.474	1.698	1.613	1.249	1.292	1.577	1.319	1.195
44	2.756	1.372	2.009	2.202	1.237	1.780	2.842	1.361	2.089
45	2.315	1.547	1.497	2.126	1.613	1.318	2.200	1.681	1.309
46	2.233	1.248	1.788	2.207	1.315	1.678	2.420	1.412	1.714
47	1.687	1.179	1.430	1.986	1.419	1.399	2.032	1.242	1.636
48	1.716	1.282	1.339	1.565	1.254	1.248	2.147	1.584	1.356
49	2.308	1.475	1.565	1.957	1.319	1.483	3.234	1.759	1.838
50	2.174	1.398	1.555	1.853	1.435	1.292	2.424	1.689	1.435
51	2.014	1.304	1.544	1.804	1.344	1.343	2.127	1.466	1.452
52	1.883	1.300	1.449	1.595	1.238	1.288	1.310	1.174	1.116
Total	2.573	1.518	1.695	2.392	1.540	1.553	2.317	1.510	1.534

TABLE 9 Labour and Capital income multiplier (type I and II) - 1989

Code	Description	Type I		Type II	
		Labour	Capital	Labour	Capital
1	Agriculture (except animal husbandry)	1.16	4.83	5.17	86.21
2	Animal husbandry	2.01	13.21	1.53	3.20
3	Forestry	1.18	5.80	1.15	3.80
4	Fishing	1.23	5.34	2.19	15.22
5	Coal	1.50	7.21	1.62	5.75
6	Mineral mining	1.20	5.14	2.07	17.33
7	Other mining	1.16	5.25	1.55	7.33
8	Other food stuff	1.78	7.92	2.05	10.99
9	Processed, preserved fruits and vegetables	1.99	8.99	1.46	7.03
10	Alcohol, beer and liquors	2.13	9.84	1.73	7.31
11	Sugar, refined	2.40	10.98	1.47	6.49
12	Tea, coffee processing	1.77	7.44	1.89	21.11
13	Cigarettes and other tobacco products	5.08	25.29	1.37	4.31
14	Processed seafood and by-products	2.71	12.44	1.66	7.27
15	Milling and grain products	2.84	12.71	2.24	11.66
16	Ceramics, glass, porcelain	1.53	7.17	1.85	7.30
17	Bricks, title (all kinds)	1.55	7.42	1.99	7.16
18	Cement	3.71	21.51	1.59	3.76
19	Other construction materials	1.82	8.14	5.64	28.82
20	Paper pulp and paper products and by-products	2.99	14.92	2.76	8.57
21	Processed wood and wood products	1.77	7.82	2.67	15.30
22	Chemical products	2.74	13.68	3.88	12.02
23	Fertilizer, pesticides and veterinary medicine	4.82	24.06	1.90	5.91
24	Health medicine	1.58	7.82	1.51	4.85
25	Processed rubber and by-products	2.14	9.90	1.76	7.32
26	Soap, detergents, perfumes and other toilet preparations	1.73	8.45	1.58	5.27
27	Plastic, plastic products	1.44	7.04	1.57	5.19
28	Other chemical products	1.93	9.27	1.81	6.39
29	Other metallic products	1.13	5.31	1.23	4.81
30	Equipment, machinery	1.21	5.46	1.41	6.63
31	Electrical and electronic products	1.22	7.06	1.16	2.73
32	Ferrous metal and products	1.36	6.54	1.58	5.53
33	Non-Ferrous metal and products except machinery and equipments	1.21	5.84	1.29	4.50
34	Manufacture of textiles	1.52	6.87	1.72	8.26
35	Carpet and rugs	1.48	6.42	2.77	19.08
36	Leather, footwear, bleaching, dyeing of fabrics	3.30	15.05	4.64	21.08
37	Other industry	1.57	7.27	1.53	6.29
38	Products of publishing house (newspapers, periodicals and books)	1.07	4.38	1.48	45.78
39	Petroleum, natural gas	.	.	.	.
40	Electricity and gasoline	7.37	50.26	1.42	2.88
41	Water	1.81	18.26	1.23	2.13
42	Construction	1.24	5.44	1.89	11.83
43	Trade	1.26	6.67	1.16	3.14
44	Personal repairs	1.48	6.61	2.57	13.65
45	Hotel and restaurants	1.64	7.74	1.58	5.93
46	Freight and passenger transport	1.89	9.15	2.15	7.45
47	Communication services	1.23	6.41	1.20	3.34
48	Banking, credit, treasury, lotto, insurance and retirement subsidy	1.73	8.99	1.25	3.56
49	Science and technology	2.05	9.81	5.15	18.25
50	State management, defense & compulsory social security	1.52	6.68	2.19	12.78
51	Culture, health, education, sport	1.36	6.19	1.39	6.22
52	Other services (Tourism, Real estate, business and consultancy services, and other personal services)	1.36	11.12	1.04	1.92

TABLE 10 Employment multiplier in 1989, 1996 and 2000 (type I and II)

Code	Description	2000 I	2000 II	1996 I	1996 II	1989 I	1989 II
1	Agriculture (except animal husbandry)	1.07	1.73	1.06	2.00	1.13	3.39
2	Animal husbandry	4.79	19.88	6.13	30.36	4.43	47.39
3	Forestry	1.51	17.75	1.27	17.75	2.01	36.78
4	Fishing	1.22	5.04	1.28	10.56	1.15	4.89
5	Coal	1.37	10.67	1.84	13.09	1.55	14.60
6	Mineral mining	1.51	4.24	1.44	5.81	1.17	4.28
7	Other mining	2.01	47.25	2.97	27.74	1.45	22.73
8	Other food stuff	3.19	8.99	4.33	15.17	3.88	33.13
9	Processed, preserved fruits and vegetables	4.44	9.70	8.08	18.45	3.83	18.12
10	Alcohol, beer and liquors	13.36	43.13	8.56	47.69	10.77	92.89
11	Sugar, refined	14.00	29.93	17.56	36.37	5.34	24.82
12	Tea, coffee processing	2.85	5.04	4.09	8.80	6.99	39.11
13	Cigarettes and other tobacco products	15.52	42.49	42.25	119.35	25.39	110.84
14	Processed seafood and by-products	11.31	38.47	6.80	64.78	9.67	58.42
15	Milling and grain products	155.57	261.65	146.22	315.54	8.12	44.55
16	Ceramics, glass, porcelain	1.73	8.79	1.50	10.43	1.45	10.55
17	Bricks, title (all kinds)	1.75	9.22	1.74	14.88	1.60	13.90
18	Cement	2.78	14.15	2.44	20.85	2.18	16.15
19	Other construction materials	2.48	24.85	10.11	85.45	9.56	139.50
20	Paper pulp and paper products and by-products	2.85	16.69	4.10	29.16	2.42	20.51
21	Processed wood and wood products	1.46	5.93	2.83	18.41	2.15	31.61
22	Chemical products	1.16	3.49	1.53	10.13	1.28	3.47
23	Fertilizer, pesticides and veterinary medicine	3.43	32.57	3.09	23.10	2.36	24.92
24	Health medicine	1.69	9.38	2.36	11.22	2.08	16.51
25	Processed rubber and by-products	8.13	31.43	3.91	16.47	9.10	58.92
26	Soap, detergents, perfumes and other toilet preparations	3.21	28.26	2.57	14.65	3.61	34.47
27	Plastic, plastic products	1.88	13.22	1.85	6.26	1.28	4.84
28	Other chemical products	2.37	17.35	8.37	40.87	2.77	18.11
29	Other metallic products	1.68	7.12	1.17	3.62	1.21	13.16
30	Equipment, machinery	2.79	24.14	2.26	14.69	2.87	92.24
31	Electrical and electronic products	3.65	22.73	2.60	21.94	1.36	19.03
32	Ferrous metal and products	6.87	40.61	2.47	32.38	1.91	23.40
33	Non-Ferrous metal and products except machinery and equipments	4.79	32.35	5.15	50.01	1.76	37.69
34	Manufacture of textiles	6.36	31.65	6.50	39.78	3.29	43.83
35	Carpet and rugs	1.42	3.36	1.45	4.90	1.86	19.31
36	Leather, footwear, bleaching, dyeing of fabrics	1.76	3.71	1.17	2.81	1.14	2.76
37	Other industry	2.18	4.26	2.18	6.86	1.23	5.16
38	Products of publishing house (newspapers, periodicals and books)	1.16	1.54	1.25	2.50	1.07	10.17
39	Petroleum, natural gas	1.21	4.78	1.07	6.79	.	.
40	Electricity and gasoline	1.67	28.96	2.61	44.82	2.58	21.98
41	Water	1.20	7.72	1.84	14.31	1.36	9.80
42	Construction	10.21	91.78	1.91	13.34	1.69	24.31
43	Trade	1.14	3.39	1.11	4.59	1.15	6.22
44	Personal repairs	1.14	2.84	1.09	3.22	1.79	17.76
45	Hotel and restaurants	1.67	5.84	1.56	7.42	1.41	6.91
46	Freight and passenger transport	1.09	3.13	1.14	4.53	1.27	4.34
47	Communication services	1.62	23.53	1.65	17.81	1.13	7.98
48	Banking, credit, treasury, lotto, insurance and retirement subsidy	2.07	22.10	1.59	25.16	1.38	7.07
49	Science and technology	2.32	21.11	3.29	18.32	1.92	11.22
50	State management, defense & compulsory social security	1.31	4.04	1.32	6.75	1.82	12.58
51	Culture, health, education, sport	1.25	4.41	1.24	5.97	1.15	4.81
52	Other services (Tourism, Real estate, business and consultancy services, and other personal services)	5.58	106.19	6.01	140.36	2.67	112.67

TABLE 11 Output induced by types of final demands – 1989

Year/Type		Consumption	Investment	Export
1989	Type I	1.42	1.45	1.42
	Type II	6.50	6.42	6.48

Table 11 presents interesting results, which are output induced by types of final demands in type I and type II. The results show that, in 1989 impacts of increasing in final demands are quite balancing. If we consider direct and indirect impacts, with an certain increment ether in consumption or export, the total output of the nation needed to be produced to satisfy are equally. Result of type I suggests that investment has highest level. However, the picture is not the same if we consider the induced effect. Again we see the level of impacts is higher. But relatively, investment is no longer the top. Induced of consumption is highest followed by export. It suggests that, in this time, domestic consumption is a most importance factors which influence the total gross output of the economy.

Table 12 shows the value added induced by types of final demand. In 1989, labour income generated by any increasing in investment was lowest. It shows that there is a low level of efficiency of investment or capital formation in generating labour income. Consistence with picture from table 4-5, household consumption plays a highest level of inducement. The induced impacts of household consumption on labour income are highest in both tow type of multipliers, followed by export.

In terms of capital income, there is a shift in the roles of investment. In both types of multipliers, induced impacts of investment are highest, followed by export.

In short, the results of the exercise from input-output table of 1989 have confirmed our argument above that the evolutionary movement of Vietnamese economy towards market one with more integration and an increasing role of international trade. Important roles of export expansion and domestic final consumption are the motivation induces all the reform process. And then, liberalizations, one implemented, has it own impacts on domestic consumptions, import substitutions and export expansions. Different with the previous reform, which is reform from the "grass-root" or a "bottom-up" one, the economic renovation of 1986-1990 on the one hand is a *Doi Moi* programme endogenously, but in the other hand, consistence with the previous reform, is an evolutionary process, in which government programmes play a role of accommodator to the economic structural changes of the Vietnamese economy.

TABLE 12 Value added induced by types of final demands – 1989

Year	Type of income	Type I			Type II		
		Household Consumption	Investment	Export	Household Consumption	Investment	Export
1989	Labor income	1.32	1.25	1.33	6.03	5.60	5.94
	Capital income	1.46	1.59	1.51	6.53	8.04	7.63

5.2. More Opened Economy, 1990-1996

As pointed out in the previous section, the last phase ends with the collapse of the Soviet Union and this phase can be marked a great shift in international economic relations associated by new development in international economic relations, which are shifts from East European countries to Japan, EU, China (1991), and then ASEAN countries (to be an ASEAN full member in 1995), and finally the United State (1995). Figure 5 (section 2) clearly shows that the international trade started to take off since 1989.

Evidence from 1996 input-output table is strongly supportive. As described in table 7, there is an increasing in outer impact (1.553 in 1996 vs. 1.534 in 1989). In this phase of reform, OM competitive type is 2.392 (compared to 2.317 in 1989) and OM of non-competitive type is 1.540. It again shows clearly that international trade soared. Taken into account the contribution of import substitution and export expansion, the total of all outputs from each industry need to be domestically produced 1.540 units more compared to 2.392 units more when there are assume no international trade impacts.

As shown in table 8, most of the manufacturing sectors have its high outer impact (greater than 1.5), any the majority of them are greater than 2.0. These are indeed a record number. Industries, whose outer impacts in 1989 are close to 1.0 such as sector 2 (Animal husbandry), sector 38 (Products of publishing house) and even sector 39 (Petroleum and gas) whose outer impact in 1989 is zeros, shows its integration into the world economy.

Looking at the level of labour and capital income multiplier (table 13), we could see there is a shift in level of labour income multipliers. Labour income generated in manufacturing industries due to any increment in domestic final demand is higher compared to the previous phase. It also reflects the fact that there is a trend in allocation of productive factors towards

labour intensive manufacture. Contrast to this, in agriculture and some of the service sector and state management sectors, labour income multipliers decrease slightly.

In term of capital, there are a sharp decrease in agriculture (sector 1), fishing (sector 4) and all kind of mining (sector 6, 7) compared in the previous phase. There is also an boost in capital income multipliers of the manufacturing sectors but not all. Hence, the picture still reflects the technology of a nation at this time, where most of sectors are labour intensive.

The employments multipliers (table 13) show the increases in employment throughout the Vietnamese economy compared with the previous phase. Most of sectors have its higher level of multipliers, particularly in sector 9 (processed, preserved fruits and vegetable), sector 11 (sugar, refined), sector 15 (milling and grain products) and sector 34 (manufacture of textile) which are high-labour intensive sectors, employment multipliers are more than double.

Output induced by types of final demand presented in table 14 (type I and type II). The results (type I) show that, balancing impacts among all types of final demand, which taken in the previous phase, no longer remain. In 1996 impact is highest in investment, followed by export and lowest in consumption. If we consider not only direct and indirect impacts, but also induced impacts, we see the level of impacts is much higher. But relatively, investment is no longer the top. Induce by consumption is highest followed by export. It suggests that, in this time, domestic consumption and export are still most importance factors which influence the total gross output of the economy.

TABLE 14 Output induced by types of final demands – 1996 and 2000

Year/Type		Consumption	Investment	Export
1996	Type I	1.51	1.67	1.54
	Type II	5.48	4.71	5.14
2000	Type I	1.57	1.62	1.54
	Type II	4.33	3.59	3.93

TABLE 13 Labour and Capital income multiplier (type I and II) - 1996

Code	Description	Type I		Type II	
		Labour	Capital	Labour	Capital
1	Agriculture (except animal husbandry)	1.11	3.39	1.41	16.32
2	Animal husbandry	1.38	4.31	1.96	14.42
3	Forestry	1.13	3.54	1.33	10.05
4	Fishing	1.19	3.78	1.56	9.33
5	Coal	1.60	5.88	1.61	4.46
6	Mineral mining	1.55	5.43	1.86	5.82
7	Other mining	2.73	14.93	1.24	2.34
8	Other food stuff	3.87	12.91	2.29	8.88
9	Processed, preserved fruits and vegetables	4.31	13.96	2.43	11.66
10	Alcohol, beer and liquors	1.98	8.23	1.28	2.91
11	Sugar, refined	15.07	50.31	1.82	7.09
12	Tea, coffee processing	3.32	10.71	1.89	9.21
13	Cigarettes and other tobacco products	2.91	10.14	1.36	4.35
14	Processed seafood and by-products	2.99	9.74	2.44	10.96
15	Milling and grain products	8.38	26.76	2.40	13.04
16	Ceramics, glass, porcelain	1.63	6.87	1.48	3.30
17	Bricks, title (all kinds)	2.04	7.73	1.49	3.85
18	Cement	2.60	14.15	1.38	2.61
19	Other construction materials	3.27	12.74	3.78	9.37
20	Paper pulp and paper products and by-products	4.06	15.30	2.03	5.33
21	Processed wood and wood products	3.70	12.59	2.79	9.79
22	Chemical products	1.67	5.74	1.70	5.78
23	Fertilizer, pesticides and veterinary medicine	2.19	8.13	2.72	7.35
24	Health medicine	2.05	8.03	1.64	4.02
25	Processed rubber and by-products	1.79	6.27	1.50	4.69
26	Soap, detergents, perfumes and other toilet preparations	2.35	8.56	2.20	6.19
27	Plastic, plastic products	3.57	14.17	2.16	5.17
28	Other chemical products	2.82	9.86	2.77	8.82
29	Other metallic products	1.37	4.78	1.52	4.93
30	Equipment, machinery	2.06	7.16	3.06	9.96
31	Electrical and electronic products	1.74	6.35	1.82	5.10
32	Ferrous metal and products	1.57	5.82	1.44	3.92
33	Non-Ferrous metal and products except machinery and equipments	1.66	5.92	1.71	5.06
34	Manufacture of textiles	2.22	8.05	1.89	5.36
35	Carpet and rugs	1.71	6.22	1.52	4.27
36	Leather, footwear, bleaching, dyeing of fabrics	1.42	4.79	1.75	6.42
37	Other industry	2.01	7.04	1.67	5.23
38	Products of publishing house (newspapers, periodicals and books)	2.20	8.25	1.75	4.62
39	Petroleum, natural gas	1.05	3.32	1.20	7.26
40	Electricity and gasoline	1.34	4.54	1.53	5.52
41	Water	2.84	12.27	1.35	2.94
42	Construction	1.83	7.11	2.37	5.87
43	Trade	1.15	4.07	1.19	3.62
44	Personal repairs	1.23	4.99	1.11	2.59
45	Hotel and restaurants	1.87	7.79	1.30	2.95
46	Freight and passenger transport	1.34	5.40	1.32	3.10
47	Communication services	1.40	5.42	1.42	3.56
48	Banking, credit, treasury, lotto, insurance and retirement subsidy	1.19	4.52	1.20	3.09
49	Science and technology	1.24	3.77	.	.
50	State management, defense & compulsory social security	1.25	3.91	4.15	28.40
51	Culture, health, education, sport	1.18	3.75	1.74	9.87
52	Other services (Tourism, Real estate, business and consultancy services, and other personal services)	1.20	5.52	1.08	2.25

Table 15 shows the value added induced by types of final demand. In 1996, labour income generated by any increasing in household consumption is lowest. It shows that even consumption is a most importance factors influences the total gross output of the economy, but it contribution to GDP is lowest. Hence, there is a low level of efficiency of household consumption investment or capital formation in generating labour income. Regarding to capital income, the most importance source is investment. Export expansion and household consumption plays a same role. Investment plays a same critical role in both type I and II of multiplier. It shows the importance of capital formation in this phase of economic development. It also consistence with the neo-classical argument of industrialization, when the economy is shifted, in the longer-time, apart from expansion of the economy it is a technological change process, hence its trend reflected by importance role of capital intensive sectors.

TABLE 15 Value added induced by types of final demands – 1996 and 2000

Year	Type of income	Type I			Type II		
		Household Consumption	Investment	Export	Household Consumption	Investment	Export
1996	Labor income	1.62	1.76	1.73	5.43	6.69	6.06
	Capital income	1.45	2.20	1.46	5.51	5.63	4.62
2000	Labor income	1.69	1.69	1.64	4.32	4.80	4.53
	Capital income	1.69	1.72	1.46	4.81	3.61	3.23

5.3. Economic Slowdown, 1996-2000

As presented in the section 2, widely-observed feature of the economy in this period is its slowdown which resulted partly from to the Asian crisis in 1997.

The economic slowing down trend is quite obviously if we look at the output induced by types of final demands in 2000 (table 14), all impact levels of consumption, investment and export are lower than those of 1996. This shows the less efficiency of the economy. Contribution to GDP of investment still plays a highest role (table 15) but the different between type I and type II multipliers are narrowed. It reflects the slowing down trend of the

economy. Among the decreasing in efficiency of all types of final demand, the worse one is investment. Lowest level of efficiency in investment is a critical reason why the is a decreasing in share of foreign investment in GDP this phase.

Look at the level of OMs (table 7), we still perceive the increasing in level of outer impact. In 2000, impact from international trade is 1.695 compared with 1.540 in 1996 and 1.534 in 1989. It, again, shows obviously the importance role of economic integration, or saying in the other way of import substitution and export expansion. Vietnam now is on the way to be fully integrated in ASEAN group and is a new member of WTO. This trend is evitable and unchangeable.

6. Conclusion

In this paper we are trying to explain the economic history of Vietnam from 1986 up to present as a continuous historical process, in which many policies were, in one hand, endogenous (forced to be carried out by the economic conditions with only one choice), and in the other, in turns, by being dominated by the ideological views, had substantially influence the economic development. The result from three national IO tables strong support for the evolutionary movement of Vietnamese economy, or in our terminology, a bottom-up process, in which *Doi Moi* is a critical point marks the shift of Vietnamese economy from planned economy to marker oriented one. Hence, we could say integration in to the international market is inevitable and domestic final demand, through its impact of consumption, investment and export, play a vital role not only in the wealth of nation (gross output) but also in improvement of welfare (GDP).

Since movements of Vietnamese economy there is an evolutionary process, any movement against this trend will caused the sufferings to the economy. Government programmes, hence, have played and should play a vital role of accommodator to the economic structural changes of the Vietnamese economy.

TABLE 16 Labour and Capital income multiplier (type I and II) - 2000

Code	Description	Type I		Type II	
		Labour	Capital	Labour	Capital
1	Agriculture (except animal husbandry)	1.15	2.77	1.38	6.06
2	Animal husbandry	1.38	3.38	1.72	6.18
3	Forestry	1.16	3.06	1.21	3.00
4	Fishing	1.21	3.19	1.29	3.25
5	Coal	1.25	3.35	1.26	2.97
6	Mineral mining	1.63	4.47	1.71	3.86
7	Other mining	1.31	4.10	1.17	2.18
8	Other food stuff	2.77	7.41	2.29	5.44
9	Processed, preserved fruits and vegetables	2.36	6.24	1.61	3.98
10	Alcohol, beer and liquors	1.94	5.19	1.83	4.40
11	Sugar, refined	3.90	11.47	1.45	2.88
12	Tea, coffee processing	2.80	7.13	1.93	5.54
13	Cigarettes and other tobacco products	4.80	14.70	2.12	4.02
14	Processed seafood and by-products	8.65	23.59	3.62	8.21
15	Milling and grain products	21.84	53.48	6.35	23.39
16	Ceramics, glass, porcelain	1.58	4.37	1.71	3.76
17	Bricks, title (all kinds)	2.12	7.13	1.59	2.80
18	Cement	3.18	10.07	2.11	3.88
19	Other construction materials	1.39	3.78	1.71	3.90
20	Paper pulp and paper products and by-products	2.27	7.03	1.72	3.24
21	Processed wood and wood products	3.05	8.89	1.78	3.59
22	Chemical products	1.33	3.73	1.39	3.00
23	Fertilizer, pesticides and veterinary medicine	1.56	4.58	1.43	2.86
24	Health medicine	1.30	3.49	1.39	3.31
25	Processed rubber and by-products	1.87	5.07	1.67	3.85
26	Soap, detergents, perfumes and other toilet preparations	1.36	3.67	1.53	3.56
27	Plastic, plastic products	1.51	4.33	1.48	3.07
28	Other chemical products	1.36	3.77	1.38	3.02
29	Other metallic products	1.61	4.50	1.60	3.46
30	Equipment, machinery	1.34	3.68	1.38	3.07
31	Electrical and electronic products	1.72	4.77	1.73	3.77
32	Ferrous metal and products	2.51	7.09	2.43	5.15
33	Non-Ferrous metal and products except machinery and equipments	1.69	4.65	1.77	3.93
34	Manufacture of textiles	2.14	6.23	1.82	3.67
35	Carpet and rugs	1.79	5.00	1.80	3.88
36	Leather, footwear, bleaching, dyeing of fabrics	2.58	7.29	2.37	5.02
37	Other industry	2.79	7.65	2.00	4.50
38	Products of publishing house (newspapers, periodicals and books)	1.51	4.36	1.48	3.02
39	Petroleum, natural gas	1.32	3.66	1.49	3.28
40	Electricity and gasoline	1.13	3.27	1.12	2.28
41	Water	1.17	3.36	1.14	2.34
42	Construction	1.67	4.86	1.74	3.52
43	Trade	1.44	4.00	1.43	3.14
44	Personal repairs	1.29	3.29	1.62	4.57
45	Hotel and restaurants	1.56	4.29	1.46	3.22
46	Freight and passenger transport	1.24	3.46	1.19	2.56
47	Communication services	1.13	3.40	1.09	2.12
48	Banking, credit, treasury, lotto, insurance and retirement subsidy	1.22	3.40	1.24	2.72
49	Science and technology	1.36	3.44	1.75	5.11
50	State management, defense & compulsory social security	1.24	3.00	2.32	9.32
51	Culture, health, education, sport	1.17	2.89	1.44	4.84
52	Other services (Tourism, Real estate, business and consultancy services, and other personal services)	1.19	3.18	1.27	3.02

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ANNEX 1 Sector Classification and Aggregation

Code	Description	Code 2000	Code 1996	Code 1989
1	Agriculture (except animal husbandry)	01-06	01-05	37
2	Animal husbandry	07-12	06-10	38
3	Forestry	13	11	39
4	Fishing	14, 15	12	24
5	Coal	16	13	2
6	Mineral mining	17	15	3
7	Other mining	18-21	14, 16, 17	4
8	Other food stuff	22-25	18-21	31
9	Processed, preserved fruits and vegetables	26	22	26
10	Alcohol, beer and liquors	27-29	23, 24	30
11	Sugar, refined	30	25	25
12	Tea, coffee processing	31, 32	26, 27	27
13	Cigarettes and other tobacco products	33	28	28
14	Processed seafood and by-products	34	29	29
15	Milling and grain products	35, 36	30	23
16	Ceramics, glass, porcelain	37, 38	31, 32	22
17	Bricks, title (all kinds)	39	36	18
18	Cement	40	35	17
19	Other construction materials	41, 42	37, 38	19
20	Paper pulp and paper products and by-products	43	33	21
21	Processed wood and wood products	44	34	20
22	Chemical products	45, 46	39, 40	10
23	Fertilizer, pesticides and veterinary medicine	47-50	41, 42	11
24	Health medicine	51	43	14
25	Processed rubber and by-products	52	44	12
26	Soap, detergents, perfumes and other toilet preparations	53, 54	45	13
27	Plastic, plastic products	55, 56	46, 47	15
28	Other chemical products	57,58,59	48, 49	16
29	Other metallic products	60-64, 66	50-54	9
30	Equipment, machinery	65, 67-69	55, 56	7
31	Electrical and electronic products	70-72	57, 58	8
32	Ferrous metal and products	73	59	5
33	Non-Ferrous metal and products except machinery and equipments	74	60	6
34	Manufacture of textiles	75-77	61, 62	32
35	Carpet and rugs	78, 79	63, 64	33
36	Leather, footwear, bleaching, dyeing of fabrics	80, 81	65, 66	34
37	Other industry	82, 83, 85	67-69, 71	36
38	Products of publishing house (newspapers, periodicals and books)	84	70	47
39	Petroleum, natural gas	86	72, 73	55
40	Electricity and gasoline	87	74, 75	1
41	Water	88	76	35
42	Construction	89, 90	77	40
43	Trade	91	78	44, 46
44	Personal repairs	92	79	53
45	Hotel and restaurants	93, 94	80	45
46	Freight and passenger transport	95-98	81-84	41, 42
47	Communication services	99	85	43
48	Banking, credit, treasury, lotto, insurance and retirement subsidy	101-103	87, 88	48
49	Science and technology	104	89	50
50	State management, defense & compulsory social security	107, 111	91, 95	49, 54
51	Culture, health, education, sport	108-110	92-94	51
52	Other services (Tourism, Real estate, business and consultancy services, and other personal services)	100, 105, 106, 112	86, 90, 96, 97	52