Price Pass-Through, Household Expenditure and Industrial Structure: The Case of Taiwan

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Abstract

Taiwan is a characteristic case for her special experience of the economic development process, and a typical small open economy as well as a shortage of natural resources. We apply empirical approach to calculate the extent to which global commodity prices are passed through to domestic prices. According to the results, we find that the pass-through coefficients are 13.5% and 17.3% for the global commodity price to the domestic price of food prices and energy prices, respectively. As for the price pass through from domestic to core CPI, the estimated result for food of 18.9% is close to that in advanced economies. The percentage for energy is 19.24% and it's higher in our case than IMF (2008). The results reflect some key characteristics of Taiwan. First, Taiwan lies in between advanced economies and emerging economies in economic development, and so the price pass-through is situated between advanced economies and emerging countries both in terms of food and fuel, even though Taiwan is lacking in natural resources. Next, the impact of domestic prices on the CPI in regard to energy seems to have a similar pass through effect to core CPI with CPI in food, although the weights for the CPI-energy are less than for the CPI-food. The energy-related industries are either monopolies or oligopolies. They are highly correlated with living industries, although the industrial structure is being upgraded and declining in terms of energy intensity.

We also apply this approach to calculate the GCP price pass-through to export price index (XPI) and import price index (MPI).The price pass-through for food is higher than for energy both in relation to XPI and MPI, it might reflect the difference in the degrees of the industrial linkage effect and the industrial types of domestic-oriented or export-oriented. Basically, since the food-related industries are domestic-oriented and the pressures of world competitiveness are lower, the global commodity price might pass through at a higher level. Furthermore, the price pass-through in relation to XPI is lower than that for MPI both for food and energy. This also reflects the strength of world competitiveness for export-oriented goods and the characteristic of the trade structure. Owing to the export structure being concentrated in the industrial goods, the increase in the global commodity price may give slight pass-through in the export price.

The price pass-through also causes the household's expenditure to change markedly. The expenditures on fuel and power, transport and communication decrease more rapidly than in food-related industries although the global price pass-through domestic price counted in core CPI is similar. This may reflect the differences in the price elasticity of demand.

Besides, we find that if the first energy crisis had been postponed until the 1990s or the 21st century, the shocks would have eventually ceased with the passing of time. The price pass-through has more of an influence in the primary industries and secondary industries even though the traditional industries experienced a hollowing out toward other economies in the 1990s. Basically, the higher the technology level, the smaller the impact on manufacturing industries as prices fluctuate and pass through. Besides, as the service industries expand and are upgraded, the final demand, output and value added, might rise in those domestic-oriented industries.

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I. Introduction

The global commodity price (GCP) boom that occurred in 2008 partially passed through to Taiwan, and this was reflected in the percentage changes in the consumer price index (CPI) in 2007 and 2008 of 1.8% and 3.5%, respectively, even though domestic demand had, relatively speaking, been declining in Taiwan. The contributions of domestic demand to the economic growth rate were 1.90/5.70 and -0.80/1.87 in 2007 and 2008.

The Taiwan economy is characterized by a lack of natural resources, and 99.9% of its crude oil has to be imported. Its expenditure on imports of crude oil far exceeded its trade surplus in 2007. Furthermore, Taiwan has also been export-oriented in terms of its development policies for a long time. The world competitiveness of its traded goods in relation to price is the main advantage of goods made in Taiwan. So as the global prices of commodities are rising, it needs to be asked whether these price increases will pass through to domestic prices and export prices in an identical manner[1].

In the 1980s and 1990s, the industrial structure in Taiwan was predominantly based on manufacturing industries. For instance, the ratios of the secondary industry GDP to total GDP in 1980, 2000, and 2008 were 43.50%, 29.09%, and 25.15%, respectively. By contrast, with the rising shares of GDP being accounted for by the hi-technology industry and the service sector, it needs to be asked if there is any divergence in the linkage between the global commodity price (GCP) and the domestic price level as the industrial structure is being transformed in Taiwan.

According to IMF(2008), the degree of price pass-through in food and energy seems different as economic development, the price pass-through is higher in developing economies than in advanced economies. However, Taiwan is also followed this trends? Is there any other factors such as the reserves in natural resource, the characteristics of small open economy etc. may challenge the tendency?

However, while there have at times been major fluctuations in global commodity prices,

[1] The WPI (wholesale price index) is composed of XPI (export price index, weighted 36.5%), MPI (import price index, weighted 32.7%), and Domestic Sales excluding Imports (weighted 30.8%). XPI and MPI can both be treated in terms of NT$ and US$.

it needs to be asked how such fluctuations have been transmitted to Taiwan's price level. Is the price level affected mainly by economic development, the industrial structure, or the reserves in natural resources?

Besides, the ratios of food and living necessities have been decreasing in households as incomes have been increasing following the global trend, and the food price weights account for more than 35% of the CPI (consumer price index) in developing countries, as compared with less than 20% in developed countries[2]. Taiwan has also adhered to these tendencies. However, according to the "Survey on Household Income and Expenditure in Taiwan," the expenditures on food, rent, water fees and electricity fees account for over half of disposable income, being assigned a weight of 52% for the lowest 20% of households. The higher the price pass-through, the more adverse the effect on the livelihood of households. Although the weight attached to food prices amounts to only 26.08% of the CPI in Taiwan, the extent of the price pass-through is not only linked with inflation issues but also with income redistribution. It is thus worth discussing the relationship between price pass-through and household expenditures.

However, the degree of price pass-through does not only change the household's final demand, but also results in the transformation of the industrial structure. The price pass-through might stimulate or reflect the effect in industrial transformation.

In order to calculate the extent to which global commodity prices are passed through to domestic prices and to evaluate their impact on household expenditures in different categories, besides analyzing the relationship between pass-through, household expenditures and the industrial structure in Taiwan, we employed an econometric model to perform the analysis in an attempt to answer the following questions:

- What is the pass through effect of the fluctuations in international commodity prices on domestic prices in Taiwan?
- Is the price pass through to the domestic price similar to that to the export price?
- Are there any implications for the results of the estimation if we compare them with the

[2]According to the OECD and FAO (2008), the average ratios of the contribution of food prices to consumer price inflation amount to around 39.3% in developing countries and 16.2% in developed countries, respectively.

results for other countries?

- What are the impacts of the fluctuations in global commodity prices on Taiwan's major macroeconomic variables such as real GDP, CPI, and so on?
- Is there any different impact in different categories of expenditure for the households causing the degree of price pass-through?
- If prices have fluctuated heavily, which industries have been the most affected in Taiwan through the changes in household demands resulting from price pass-through? Which industries are the potential winners and losers?
- Is there any relationship between the pass-through and the industrial structure in Taiwan and what are the implications?

In order to answer the above questions, we followed the IMF (2008) to set up the empirical equations to estimate the price pass-through, and referred to the macro-econometric model, AIDS and the input-output tables to evaluate the impacts. The price pass-through might have a distinct effect on the content of household expenditure, so it must provide a more detailed description of private consumption, which is subdivided into 12 categories in the macro-econometric model.

By means of the estimation of AIDS and the Consumption conversion matrix, we can calculate the impact on the supply side. Here, Taiwan is a characteristic case for her special experience of the economic development process, i.e., industrial transformation and upgrading within a short period, and a typical small open economy as well as a shortage of natural resources. According to the results, we find that the pass-through coefficients are 13.5% and 17.3% for the GCP to the domestic price of food prices and energy prices, respectively. As for the price pass through from domestic to core CPI, the estimated result for food of 18.9% is close to that in advanced economies. The percentage for energy is 19.2% it's higher in our case than the IMF.

If we compare the results with those of the IMF (2008), the results reflect some key characteristics of Taiwan.

First, Taiwan lies in between advanced economies and emerging economies in economic development, and so the price pass-through is situated between advanced

economies and emerging countries both in terms of food and fuel, even though Taiwan is lacking in natural resources.

Next, the impact of domestic prices on the CPI in regard to energy seems to have a similar pass through effect to core CPI with CPI in food, although the weights for the CPI-energy is are less than for the CPI-food. The energy-related industries are either monopolies or oligopolies. They are highly correlated with living industries, although the industrial structure is being upgraded and declining in terms of energy intensity.

We also apply this approach to calculate the GCP price pass-through to export price index (XPI) and import price index (MPI). The price pass-through for food is higher than for energy both in relation to XPI and MPI, which might reflect the difference in the degrees of the industrial linkage effect and the industrial types of domestic-oriented or export-oriented. Basically, since the food-related industries are domestic-oriented and the pressures of world competitiveness are lower, the global commodity price might pass through at a higher level.

Furthermore, the price pass-through in relation to XPI is lower than that for MPI both for food and energy. This also reflects the strength of world competitiveness for export-oriented policies.

The price pass-through also causes the household's expenditure to change markedly. The expenditures on fuel and power, transport and communication decrease more rapidly than in food-related industries although the global price pass-through domestic price counted in core CPI is similar. This may reflect the differences in the price elasticity of demand.

Besides, we find that if the first energy crisis had been postponed until the 1990s or the 21st century, the shocks would have eventually ceased with the passing of time. However, the price pass-through has more of an influence in the primary industries and secondary industries even though the traditional industries experienced a hollowing out toward other economies in the 1990s. Basically, the higher the technology level, the smaller the impact on manufacturing industries as prices fluctuate and pass through. Besides, as the service industries expand and are upgraded, the final demand, as measured by output and value added, might rise in those domestic-oriented industries.

II. The transmission mechanisms for the price pass-through in Taiwan

1. The link between international commodity prices and Taiwan's business cycle

According to the comparison in terms of global economic fluctuations between trends in oil prices and food prices by the IMF (2008), it can be seen that food prices and oil prices both soared around the times of the 1973 oil crisis and 1979 energy crisis. However, during the Gulf War of the 1990s and the bursting of the dot-com bubble in the early 2000s, oil prices only rose slightly and they never exhibited any positive co-movement.

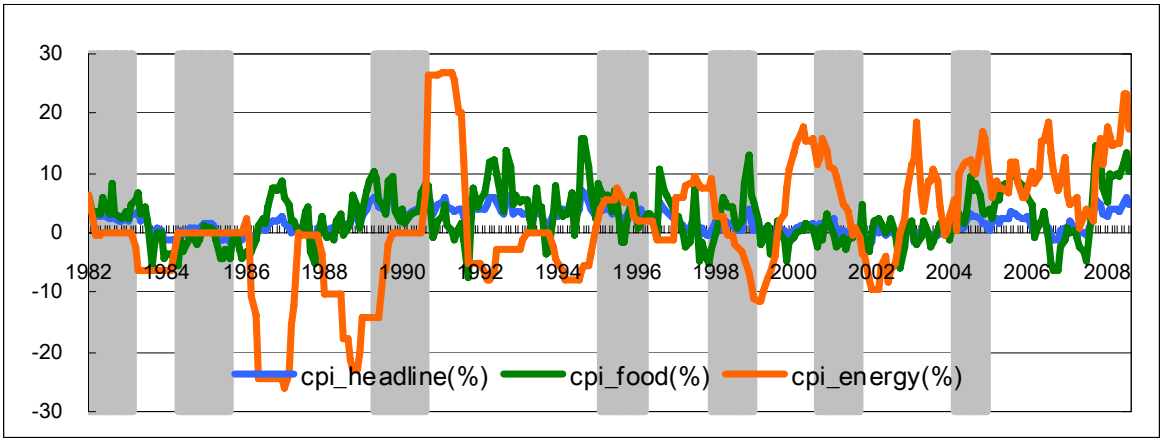
As for Taiwan, according to table 1 and Figure 1, we find that the annual growth rate of the CPI was obviously high during the 1973 oil crisis and the 1979 energy crisis. However, from the 1980s onwards, the fluctuations in the prices of food-related items that were used in the calculation of the CPI, as compared with the prices of oil-related items within the CPI, were relatively smooth in Taiwan. This kind of situation was similar to the global trend.

If we observe the relationships between Taiwan's economic growth rate, wholesale price index (WPI) growth rate and CPI growth rate and the prices of international commodities, which we denote here as West Texas Intermediate (WTI), we find that these relationships greatly depend on the economic structure. In the 1970s, owing to the economic structure of Taiwan being heavily based on the development of the industrial sector (the industrial sector accounted for 39.9% of GDP in 1975, 45.7% in 1980, and 30.35% in 2005), the fluctuations in the global oil price were passed-through mostly to the variations in Taiwan's major macroeconomic variables, such as the domestic price and economic growth rate. However, with the rise of the information, computer and technology industries (ICT) and service industries, the relationship between the change in the international oil price and domestic macroeconomic variables becomes quite obscure.

Table 1 Economic Performance in Taiwan during Periods with High Price Fluctuations

Period (average)	Per capita GNP(US$)	GDP[1] (%)	CPI (%)	WPI (%)	Exchange rate (NT$/US$)	Oil price (WTI)[2]
1972~74	722	9.19	19.54	22.63	38.75	19.58
1979~81	2360	7.35	15.03	14.33	36.27	109.01
1989~91	8451	7.24	4.05	-0.27	26.71	72.27
1999~01	13935	3.12	0.47	-1.36	32.44	82.85
2004~07	16275	5.20	1.58	4.91	32.74	194.81

Notes: 1. The GDP is treated as the annual growth rate in real terms. The per capita GNP is expressed in terms of US dollars based on the exchange rate (NT$/US$).
2. The oil-price is denoted by the Texas Spot price index which is obtained from the IFS cd-rom.
Data source: Authors' calculations based on DGBAS and AREMOS datasets.



Note: The shaded areas denote the recession periods in Taiwan's business cycle.
Data source: The authors' calculation based on the DGBAS and AREMOS datasets.

Figure 1 Price Fluctuations and the Business Cycle in Taiwan

Figure 2 shows the price transmission flow chart in Taiwan. The channels for the global commodity price pass through the domestic price in Taiwan, the import price index (MPI) and the CPI as noted earlier. The tariff rate, exchange rate, RTA and supply and demand shocks are the key factors. The impact of the MPI on the domestic price level is transferred to the WPI through product processing procedures, and these may interact with each other further. The magnitudes for the global price pass through to domestic prices depend on whether there are subsidies, taxes, regulations or quotas as well as market structures and market efficiency. The market prices reflect the firm's production costs (including intermediate input costs and wages, etc.), the consumers' demand elasticity, the market size, the number of competitors, entry barriers and the prices of substitutes, and so the impacts on specific firms differ based on the different industry structures.

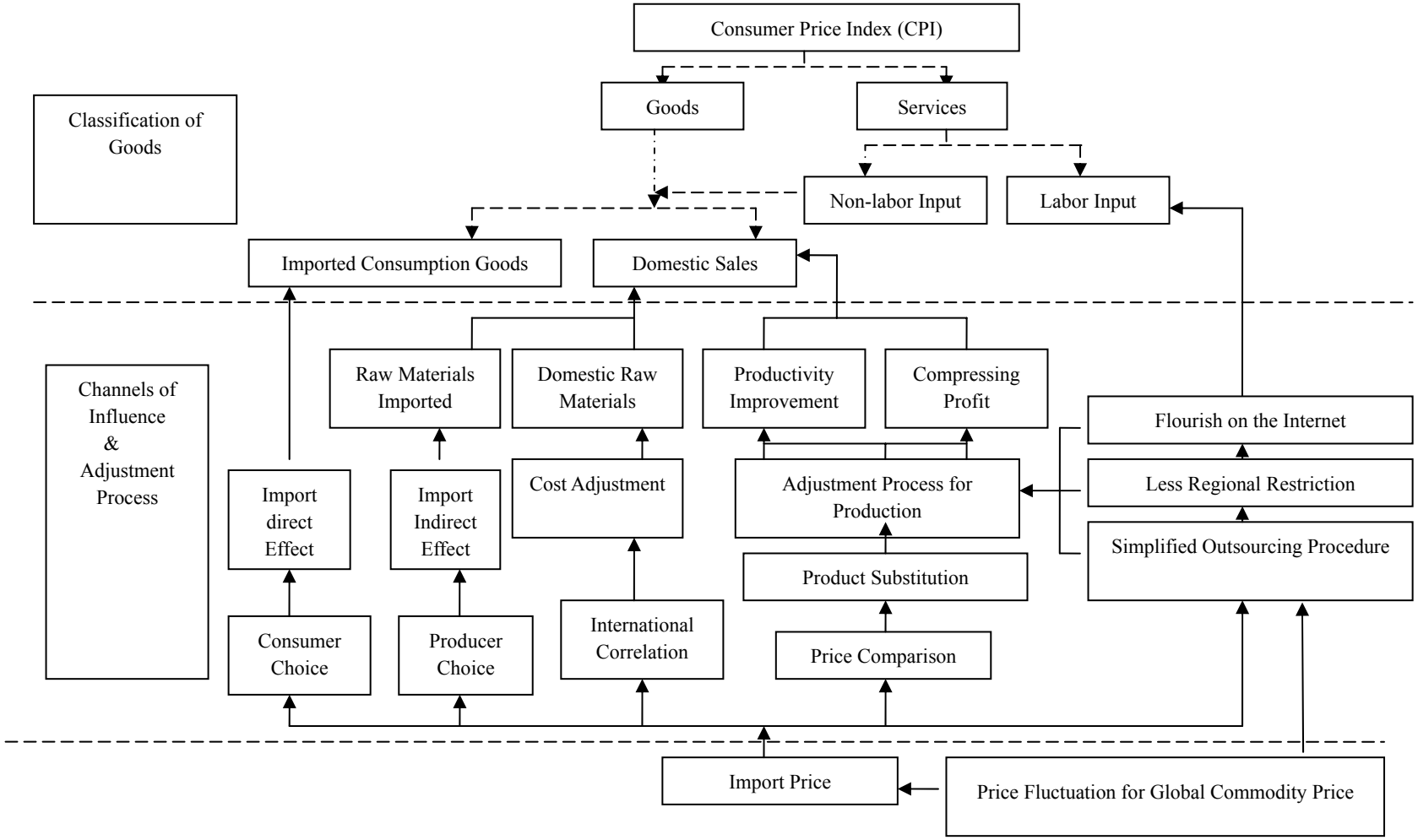


Figure 2 The Price Transmission Flow Chart

2. The compilation of and trends in Taiwan's domestic prices

The period 2001-2003 is deemed to be a period of deflation, for during that time the CPI growth rate in Taiwan was continuously negative. There was then a positive annual growth rate of 1.62% until 2004. The trends in the CPI growth rate are basically smooth and stable. By contrast, the growth rate of the WPI changed suddenly.

In general, the WPI has been referred to as the leading index of the CPI, which means the variation in the WPI will finally pass through to the CPI. However, such a transmission process did not appear to be obvious until 2008. In other words, the price fluctuations in global commodities driven by global demand successfully transferred their positive impact mostly to Taiwan's WPI, but it only passed through a tiny impact on the CPI. This may be interpreted by the weak domestic demand, with upstream and mid-stream firms having much more tolerance towards price fluctuations, the upgrading of Taiwan's economic structure, the expenditure structure of private consumption and by the energy-intensity varying from time to time.

As for the WPI, it is composed of MPI (weighted as 27.3% for the 2006 base), export price index (XPI, weighted 27.5%) and domestic sales excluding imports (weighted 57.5.3% for the 2006 base). It is also formed in the stages of processing, and although raw materials are just weighted as 6.1% of total WPI, it is in the forward location of the supply chain, and so it can be treated as the origin of the connection between the international prices and the domestic prices. A two-digit growth rate has been in existence since 2003, with a peak of 25.80% being reached in 2008.

The intermediate materials growth rate is lower than that for raw materials, its growth rate being around 8% in 2008. The growth rate for finished goods was 3.9% in 2008. This reveals that the pass through from the global commodity price to the domestic price was mostly delivered during the upstream and mid-stream stages in Taiwan. The price transfer delivered from the upstream stage to the downstream stage is, however, not obvious, and shows that the price elasticity of demand is sensitive under weak domestic demand in

particular. If firms pass through the cost up to the market price, they may lose a large part of their market share. By contrast, it also reveals that upstream firms and mid-stream firms can still sustain the high cost pressures although their profitability may be reduced.

III. Empirical Procedures

In order to calculate the price pass-through, especially for food and oil prices, to evaluate its impact on household expenditure and to observe its relationship with the economic structure in Taiwan, we construct an empirical framework as described below. At first, we estimate the pass through effect from the global price to the domestic price, and include the estimated results in the macro-econometric model for Taiwan. Based on the settings for the scenarios, we can quantify the impacts of the changes in the global commodity price (GCP) on the Taiwan economy. Besides, we employ the AIDS model to calculate its impact on household expenditures, and apply input-output tables to evaluate its impacts on the final demand changes as well as the industrial linkages effect in Taiwan as the global price change.

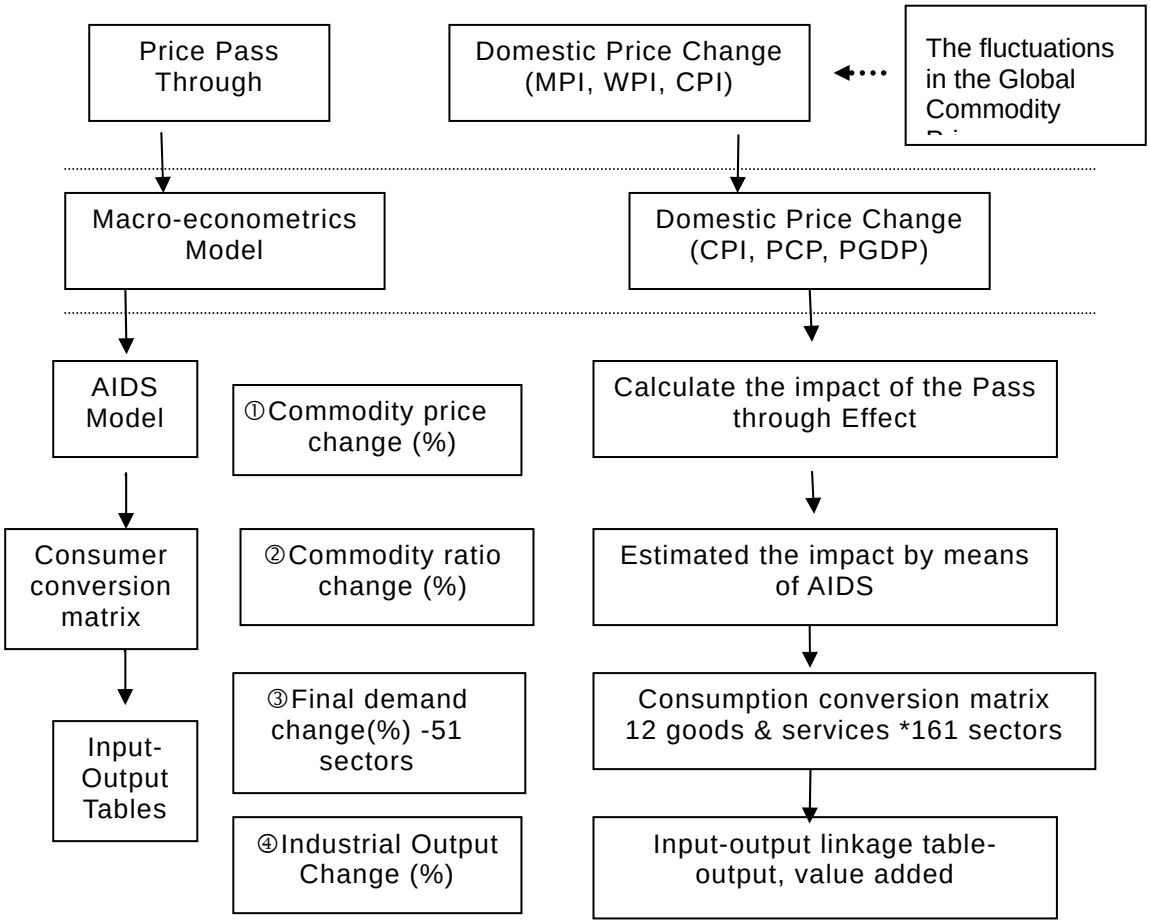


Figure 3 Empirical Study Flow Chart

To sum up, we first estimated the commodity price pass-through from global commodity prices to domestic prices following the IMF (2008). We then modified and link the price pass through estimation to the macro-econometric model to observe the interactions of the major macro variables. Based on the analysis of the demand side, we employ the AIDS model to simulate the changes for the household expenditures.

The price pass-through might have a distinct effect on the content of household expenditure, so it must provide a more detailed description of private consumption, which is subdivided into 12 categories in the macro-econometric model. We then apply the input-output tables based on the structures in 1996 and 2007, so that we can become acquainted with the price pass-through might stimulate or reflect the effect in industrial transformation. And if prices have fluctuated heavily, which industries have been the most affected in Taiwan through the changes in household demands resulting from price pass-through? Which industries are the potential winners and losers?

IV. The Estimation for the Commodity Price Pass-Through in Taiwan

1. The Empirical Model

To assess the potential impact of the changes in international commodity prices on domestic prices and other major macroeconomic variables in Taiwan, we referred to and modified the models of De Gregorio, Landerretche, and Neilson (2007) and the IMF (2008). In the case of the IMF (2008), there are two steps involved. The first one links the change in the domestic price (fuel and food) with the change in the global commodity price (fuel and food). The second links inflation (core CPI) to the changes in the fuel and food prices in terms of the domestic price, respectively, by controlling for changes in the output gap (the Phillips curve).

The steps are stated briefly as follows. The first one involves using bivariate regressions of the following form:

$$\pi_t^{domestic} = \alpha + \sum_{i=1}^{4} \beta_i \pi_{t-i}^{domestic} + \sum_{i=0}^{4} \delta_i \pi_{t-i}^{world} + \varepsilon_t \qquad (1)$$

Here, π stands for the annualized quarter-over-quarter log difference (in percent) in, respectively, food or fuel prices (we also include seasonal dummies). The reported pass-through coefficients, which reflect the pass-through from international to domestic prices, are calculated as:

$$price\ pass-through = \frac{\sum_{i=0}^{4} \delta_i}{1 - \sum_{i=1}^{4} \beta_i} \quad (2)$$

Second, the pass-through from domestic (food and fuel) prices to the CPI (or core CPI) is estimated using the following generalized Phillips curve equations:

$$\pi_t = \alpha + \sum_{i=1}^{4} \beta_i \pi_{t-i} + \sum_{i=0}^{4} \gamma_i (y_{t-i} - y^*_{t-i}) + \sum_{i=0}^{4} \phi_i \pi^{food}_{t-i} + \sum_{i=0}^{4} \varphi_i \pi^{fuel}_{t-i} + \varepsilon_t \quad (3)$$

$$food\ price\ pass-through = \frac{\sum_{i=0}^{4} \phi_i}{1 - \sum_{i=1}^{4} \beta_i} \quad (4)$$

$$fuel\ price\ pass-through = \frac{\sum_{i=0}^{4} \varphi_i}{1 - \sum_{i=1}^{4} \beta_i} \quad (5)$$

As above, π stands for the annualized quarter-over-quarter log difference (in percent) in core, food, and fuel prices, while y and y* denote the annualized quarter-over-quarter log difference (in percent) in, respectively, real and potential GDP[3] (the equations also include seasonal dummies). We also limit contamination of the estimates by endogenous factors, and the pass-through from domestic commodity prices to core inflation is estimated using predicted values of domestic food and fuel inflation from the first-stage bivariate regressions[4,5].

2. The Estimation Results for the Price Pass-Through

According to the IMF (2008), the pass-through found in advanced economies in the 1970s was much higher than the pass-through observed in advanced economies more recently. In emerging economies, about one-half of the shock to domestic food prices ultimately makes its way through to core inflation, whereas in advanced economies, less than one-quarter passes through. These findings are in line with the high share of food in

[3]We followed the IMF (2008) by employing the Hodrick-Prescott filtered trend to estimate potential GDP.

[4]In this way, domestic food and fuel prices reflect only the variation that is due to changes in international prices and lagged effects of domestic price developments, rather than movements in labor, transportation, and retailing costs that may have common origins with overall inflation.

[5]In IMF (2008), the resulting pass-through coefficients are aggregated across countries using weighted averages, with weights inversely proportional to the standard errors of the corresponding country-specific coefficients. Given considerable variation across individual, especially emerging, economies that reflects in part differences in data quality, the measurement of inflation, and sample periods, this approach is designed to give more weight to more precisely estimated pass-through coefficients.

consumption and the relative importance of material costs in production across emerging economies and underscore these economies' sensitivity to food price developments.

The pass-through from international to domestic prices is substantially lower in emerging than in advanced economies. According to the IMF (2008), the low pass-through coefficients may reflect a combination of factors, including declining energy intensity, widespread fuel subsidies and controls in emerging economies, and high fuel taxes in many advanced economies.

Table 3 shows the estimation results. The detailed results are in Appendix A.We find the pass-through effect is lower from the international to the domestic price and higher from the domestic price to core CPI in food. The price pass-through coefficients are 13.5% and 18.9%, respectively. The pass through from GCP to the domestic price increase as time passed away from 11.8% to 13.5% may reflect the increase in global integration and market efficiency and competition. However the change is not markedly. Owing to the data constraint for the world energy price index starting from the 1st Quarter of 1992 (92Q1), the pass-through coefficients are 17.33% and 19.24% for energy, the former is from the GCP to the domestic price and the latter is from the domestic price to core CPI.

If we compare our estimated results with those of the IMF (2008), the price pass through from international to domestic prices is under 10% in advanced economies and around 15% in emerging economies for food for the 1995-2008. Our estimated result of 13.5% lies in between. For energy (fuel), the price pass through is around 22% in advanced economies as well as 12% in emerging economies in the sample period from 1995 to 2008 according to the IMF (2008). Our result of 17.3% is also similar to that of the IMF (2008).

As for the price pass through from domestic to core CPI, this is around 20% in advanced economies and is near 50% in emerging economies for food. It is under 2% in advanced economies and approaches 0% in emerging economies for fuel according to the IMF (2008). The estimated result for food of 18.87% is close to that in advanced economies. The percentage for energy is higher in our case than according to the IMF. Our estimated result is 19.24% for energy.

The estimation results reflect some key characteristics in Taiwan. First, owing to the global integration, the fluctuations in global commodity prices (GCP) will be reflected in the domestic price mostly and directly in Taiwan even though Taiwan lacks natural resources. The level of economic development for Taiwan lies in between that for advanced economies and emerging economies, and so the price pass-through is situated between

advanced economies and emerging countries both in terms of food and fuel.

Second, the domestic price for the CPI in relation to energy seems to have similar pass through effect on core CPI with CPI in food, although the weights in CPI-energy's is less than in CPI- food. This is because the classification for the energy price includes oil, electricity and gas supply, which exhibit more co-movement with the core CPI by means of the spillover effect on the CPI for services. The energy-related industries are either monopolies or oligopolies. They are highly correlated with living industries, although the industrial structure is being upgraded and declining in terms of energy intensity.

Furthermore, we extend the IMF (2008) approach to consider the price pass-through but the domestic price in the MPI and XPI[6], according to Part B in Table 3. The price pass-through for food is higher than for energy both in relation to XPI and MPI, which might reflect the difference in the degrees of the industrial linkage effect and the industrial types of domestic-oriented or export-oriented. Basically, since the food-related industries are domestic-oriented and the pressures of world competitiveness are lower, the global commodity price might pass through at a higher level.

The price pass-through in relation to XPI is lower than that for MPI both for food and energy. This also reflects the strength of world competitiveness for export-oriented goods and the characteristic of the trade structure. The ratio for the importation of agricultural and industrial raw materials was around 75% in 2006, and the global linkage, market competition and efficiency have been increasing for Taiwan since the mid-90's, and so the price pass-through from the fluctuation in global commodity prices to the domestic prices in the MPI is higher and the trend is increasing. Owing to the export structure being concentrated in the industrial goods, the increase in the global commodity price may give slight pass-through in the export price.

If we compare the price pass-through for food, energy, metal and agricultural raw materials in the reduced sample for MPI, we find the GCP (global commodity price) pass-through to the domestic price is more complete in food (MPIFOOD) and in energy (MPIENERGY) than in metals (MPIMETAL) and agricultural raw materials (MPIAGR).

[6] The XPIUSD and MPIUSD are denoted as the price indexes are expressed in terms of US$, the others are in terms of NT$, we added the exchange rate index (er@tw) to remove the effect of exchange rate. However, the results are similar whether there's er@tw or not.

This may be explained by stating that the food and energy market are more efficient, while there is little government policy intervention in the form of subsidies and regulations. Owing to the firms being mostly small and medium in size in the food-related industries, the markets are almost perfectly competitive, and hence the price pass-through for domestic prices is almost perfect. The energy market has been deregulated since the late 1990s, and so the market may be more competitive. The price pass-through in this market is higher than in the metal-industry and agricultural raw materials markets.

In order to link the pass through coefficient with the macro-econometric model and AIDS model, we also calculate the pass through for the CPI in food and the CPI in energy to CPI, and link CPI with the private consumption deflator in terms of 12 categories.

Table 3 The Price Pass-through in Taiwan

Dependent Variable	Independent Variables	Sample Periods	
		1980Q1-1994Q4	1995Q1-2008Q3
Part A. Baseline estimation results (following the IMF(2008))			
CPIFOOD	PFFODWD	11.8	13.5
CPIENERGY	PENERGYWD[1]	-	17.3
core CPI	CPIFOOD	-	18.9
	CPIENERGY	-	19.2
Part B. Other estimation results			
MPIFOOD	PFOODWD	60.4	91.2
MPIENERGY	PENERGYWD[1]	-	73.8
MPIAGR	PAGRWD		53.5
MPIMETAL	PMETALWD		58.9
MPIUSD	PFOODWD	-	42.3
	PENERGYWD[1]	-	19.0
XPIFOOD[2]	PFOODWD	2.7	63.8
XPIUSD	PFOODWD		22.5
	PENERGYWD[1]	-	9.6

Note: 1. In the IFS database, the world price index for energy starts from 1992Q2.
2. There is no energy-related index in XPI(Export Price Index), so we can't calculate the price pass-through for energy goods.

V. The Analysis of Simulation results

1. The Simulation results of Macro-Econometrics Model

To analyze how the price change will impact Taiwan's economy, we use Taiwan's

macro-econometric model to evaluate the overall impacts. In order to capture the trend of the historical price change in Taiwan and depict the characteristics of Taiwan's economic structure, this study makes a detailed distinction between various price indices. In our model, we take the GDP deflator, WPI, MPI, XPI, CPI and private consumption deflator into account. Specifically, the private consumption deflator is classified into 12 categories based on the characteristics of the goods and services.

For the settings of the price functions, we follow the setting of the pass through mentioned above and also consider the impact of the transmission and co-movement between the different price indices. Based on the transmission process and the feedback effect, we capture the variables' interactions. In the process of the selection of the behavioral function, the independent variables are specified and recognized based on related theories. In addition to modeling concisely, each estimator satisfies the statistical diagnoses. The detailed results are in Appendix B.

Here, we perform a simulation as to whether the global commodity price for food and energy is going up such as during the first oil crisis in 1973 and 19747. The annual growth rate of the food price index increased by 80.32% and 23.76%, respectively, and the growth rate of the food price index increased by 33.99% and 251.51%, there being a one-year time lag between the food price and the oil price index which followed, regardless of whether the economic impacts for Taiwan occurred in 1993-94 or 2004-05. We have summarized the scenarios as follows:

(1) Scenario 1: The global commodity price for food and energy is going up such as during the first oil crisis, but this occurred in 1993 and 1994. The annual growth rate of the food price index rose by 80.3% and 23.8% compared with the baseline case in 1993-1994, and the energy price index increased by 34.0% and 251.5% in 1993-1994.

(2) Scenario 1A: The global commodity price for energy increased as in the first oil crisis but this happened in 1993 and 1994. Assuming that only the energy shock occurred,

[7] The annual growth rates were 80.32% and 23.76% for the global food index, which were accessed from the IFS in 1973-1974, The later price rise for the oil price exhibited an annual growth rate of 33.99% and 251.51% for the 3 (Dubai, Brent, Texas) spot price index.

the food shock never took place, i.e., only the energy price index went up by 34.0% and 251.5% in 1993-1994.

(3) Scenario 1B: The global commodity price for food went up such as during the first oil crisis but this happened in 1993 and 1994. Assuming that only the food shock occurred, the energy shock never took place, i.e., only the food price index rose by 80.3% and 23.8% in 1993 and 1994.

(4) Scenario 1C: The global commodity price for energy went up such as during the first food shock but this happened in 1993 and 1994. Assuming that only the energy shock happened, the change in the price index was not the result of the food shock, i.e., the energy price index rose by 80.3% and 23.8% in 1993 and 1994.

(5) Scenario 2: The global commodity price for food and energy went up such as during the first oil crisis but this happened in 2004 and 2005. This occurred for both food and energy. The annual growth rate of the food price index rose by 80.3% and 23.8% in 2004 and 2005. The energy price index increased by 34.0% and 251.5% in 2004 and 2005.

We set the scenario period as starting from 1993 and 2004 and assume that only the food shock, only the energy shock, only the energy shock but the price index changed as the food shock and both the food and energy shocks for some reasons as follows. The first is that we wonder that if the first energy crisis had been postponed 20 or 30 years. Would the situations have any differences? Next were there any different impacts if it happened just as a food shock or energy shock? Which one may dominate the results? Owing to the change in shocks suffering a time lag, we assumed the energy shock happened but that the price index changed as the food shock. Which industries were the winners? Which were the losers? Third, although we hope we could have started the simulation earlier, the global energy price index in IFS started from the 2nd quarter of 1992. We have tried to append this by the 3 (Dubai, Brent, Texas) spot price index, but the data consistency is the first concern.

Table 4 is the global price index and Taiwan's expenditure on GDP in the 1970s. Figure 4 is the difference and percentage change in real GDP for the simulation results of Scenario 1, Scenario 1A and Scenario 1B with the baseline in Taiwan. The detailed results are in Appendix C.

From Figure 4, we can find the shocks will pass away as time passes. The difference or the percentage change in simulation results with the baseline will display a right-biased "U" shape. The worst situation in Real GDP will happen in the 4th year. If we compare the results of both shocks with only the food shock, only the energy shock, and the energy shock but price index will change as the food shock. We find the food shock dominates the results in the beginning (the first two years). Then the energy shock will be the dominant. The negative effect seems to need more time to pass away. The degree of decay is slow relative to the food's. The food shock will shift from a negative impact to a positive impact in the 4th year. However, the energy shock still exists although it diminishes even the price change as the food shock. The food shock and energy shock interact, and the negative extends as if they both happened. Comparing the change and trend from real GDP with CPI or real sectors with the price index, we realized the price indexes have a quicker response. The price index almost responds perfectly in the two years, i.e., they reached the maximum value in 2 years. Then the negative effect tailed off.

As to Scenario 2, owing to the availability of the simulation period being shorter, so the impact does not seem to be ending. According to the information in hand, we know the gaps of real GDP between the simulation results with the baseline will reach the maximum in the 4th year, and then the gap will be reduced. The paths for the change in the price indexes such as CPI, XPIUSD, MPIUSD and so on are also as in Scenario 1, and they will respond more quickly than the real sectors. They will be tailed off as time passes away.

If we compare our simulation results with the real economy in 1973~1975, from Table 4 we recognize the average for the economic growth rate is 10.31% in the 1970s, and it fell from 12.88% in 1973 to 1.38% in 1974 and rose back to 13.96% in 1976. As for the recession periods, the government expanded public expenditure in infrastructure referred to as the "Ten Projects" to stimulate economic growth. However, the growth rates of real exports and real imports are negative in 1975 and drop to new lows since 1956. There are huge gaps between the annually changed rates in 1975 and the 1970's average and there were even one to two outliers in the time series. If there were no government promotion projects to supplement the national income, the recession periods would last longer and the

economic growth might not recover within a short time.

Table 4 The Global Price Index and Taiwan's GDP in the 1970s

Unit: %

Year	Global food index[1]	3 spot price index[1]	Private Consumption Expenditure[2]	Government Consumption Expenditure[2]	Invest-ment[2]	Exports[2]	Imports[2]	GDP[2]	GNP[2]
1970	5.08	0.00	9.98	8.64	13.78	28.68	22.95	11.41	11.36
1971	3.29	22.40	11.13	5.65	23.42	34.76	21.61	12.84	12.96
1972	7.97	11.47	12.73	4.22	18.35	35.35	21.85	13.30	13.36
1973	80.32	33.99	12.53	6.56	11.29	26.29	23.72	12.88	12.83
1974	23.76	251.51	5.88	-8.19	12.71	-6.61	13.86	1.38	1.37
1975	-19.79	-0.44	4.69	12.92	21.17	-0.05	-4.98	4.94	4.42
1976	-6.30	0.89	10.14	9.65	4.76	37.29	24.01	13.96	13.80
1977	-2.94	8.31	7.55	11.09	6.53	12.86	4.81	10.30	10.37
1978	13.38	2.10	10.95	7.20	14.60	23.52	14.63	13.67	14.10
1979	16.64	133.46	11.27	8.28	12.72	6.36	19.17	8.44	8.74
70's average	12.14	46.37	9.69	6.60	13.93	19.85	16.16	10.31	10.33

Note: 1.The global food index and 3 (Dubai, Brent, Texas) spot price index come from the IFS
2. All are in real terms based on 2001 prices.
Data source: DGBAS, http://www.dgbas.gov.tw/ct.asp?xItem=11978&CtNode=2854

In the simulation results, we assumed the government sectors are exogenous, so there is no government expenditure on infrastructure to stimulate the economic growth. The negative effect for the shocks caused the recession periods to persist longer.

If the shocks happened in 1993-1994 as assumed above, will the household expenditure change their structure? The final demand and industrial structure may also change. Are there some industries that are the potential winners or losers? We employ AIDS and I-O tables to calculate the impact in the next section.

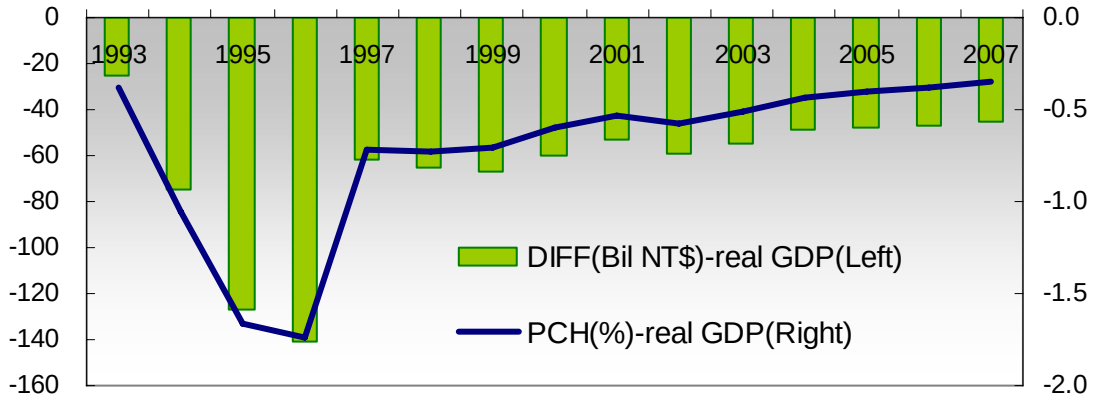


Figure 4-1 The simulation results of Scenario 1

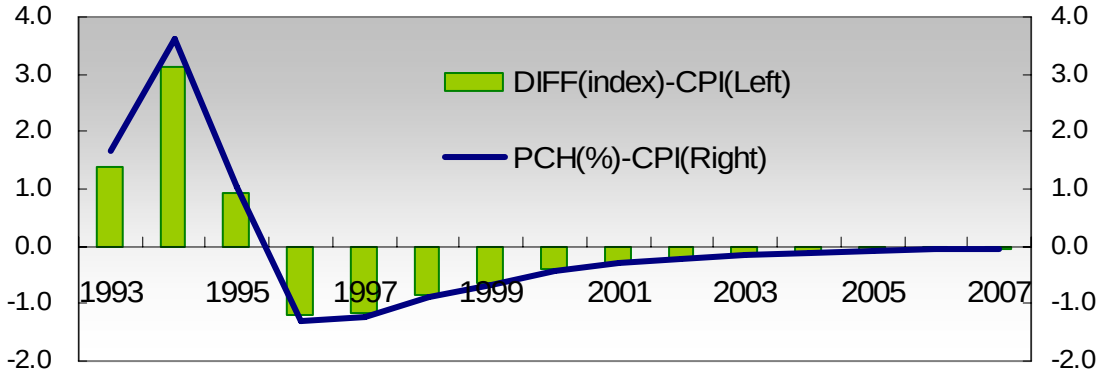


Figure 4-2 The simulation results of Scenario 1

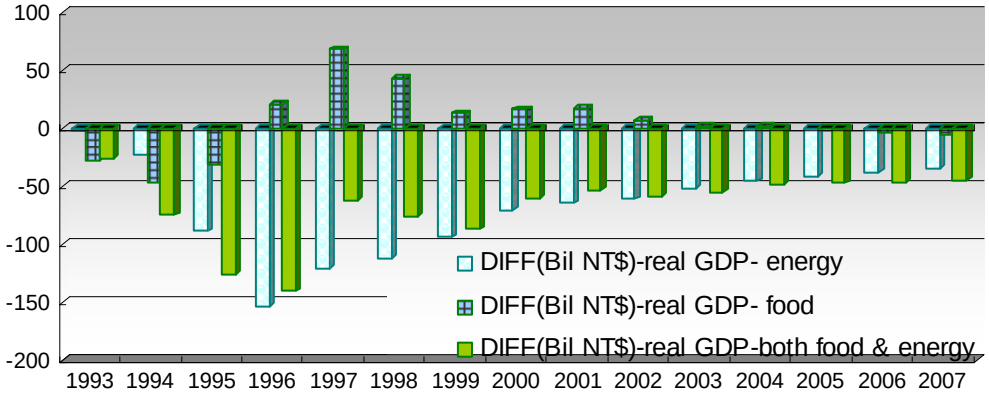


Figure 4-3 The simulation results of Scenario 1, Scenario 1A and Scenario 1B

2. Almost Ideal Demand System (AIDS) Estimation and Application

In the literature on demand-driven systems, some models are used such as the Linear Expenditure System (LES), Rotterdam system, and Almost Ideal Demand System (AIDS). In particular, the Almost Ideal Demand System (AIDS), which was promoted by Deaton and Muellbaurm (1980), is widely used because of its good statistical properties. The equations of the AIDS model satisfy the features of aggregation, homogeneity, and symmetry. The estimation results of AIDS are in Appendix D.

As to the AIDS model, we apply national income data to estimate different price indices. The data comprise twelve categories of household consumption. The sample period is from 1981 to 2007 and 2001 is set as the base year. The estimation results are listed in Appendix D for reference purposes. By performing the AIDS estimation, we use the consumption conversion matrix for 161 sectors and 12 categories of goods and services in

1996 and 2007[8] respectively to estimate the change in the final demand of the 161 sectors. In this way, we can evaluate the change in final demand by using input-output linkage analysis.

3. Input-Output Model-Quantitative Model

In general, the input-output model is good at describing the industrial structure, so it may be the tool we can use to analyze the impact of industrial shocks that result in final demand such as household consumption expenditure, export-oriented and promotional policies and so on. Here, we apply the Input-output Table to the analysis and describe the price pass-through from the household expenditure to the industrial structure that is caused by the global food and energy shocks.

Although the shocks lasted over one year, the gap reached its maximum in the 4th year for the real sector and in the 2nd year for the price indexes. For this reason, we apply AIDS to calculate the impact on household expenditure as the relative price and real income both change, and then by means of the consumption transformation matrix we evaluate the changes in different industries in 1996 and 2007. Basically, the industrial linkage effect is calculated by applying the Input-Output Table in 1996 and 2007 which classifies industries into 162 sectors. Under considerations of keeping the analysis concise, we focus on 10 sectors which are "agriculture", "minerals", "manufacturing—traditional industries", "manufacturing—chemical and petroleum-related industries", "manufacturing—heavy Industries", "construction", "electricity, gas and water", "transportation, telecommunications, wholesale and trading", "finance, insurance and real estate services ", as well as "other services". Here, we divide manufacturing industries into traditional industries which are processed foods, beverages, tobacco, textile mill products, wearing apparel and accessories, leather & leather products, wood & wood products, paper & paper products & printed matter, and so on; chemical and petroleum-related industries which are industrial chemicals, artificial fibers, plastic, plastic & rubber products, misc. chemical manufactures, and petroleum refining products: and heavy industries which may be defined

[8] The 2007 Consumption Transformation Matrix is extended using 2001 as the base. The 2007 Input Output Table is also extended using 2004 as the base by means of RAS which is provided by Professor Hao-Yen Yang.

as hi-tech industries, and they include iron and steel products, metallic products, machinery, electronic products, information products, communications equipment, electronic components & parts, electrical machinery and so on. We divide manufacturing into more detail in order to observe the relationships between the price pass-through caused by the food and energy shocks and the economic structure in Taiwan.

From Table 5, we can calculate the industrial linkage effect for the food shock and energy shock. Here, we just list the simulation results for Scenario 1 and Scenario 2, the others are in Appendix E as reference.

According to Table 5 we observed the shocks that caused final demand to decrease, In Scenario 1 105.5 billion was lost which, as a percentage change, was -0.96%. If we contrast this with the 10 industrial changes, the Finance, Insurance and Real Estate Services decreased 30.3 billion (-2.30%) becoming the largest loss in percentage terms. Electricity, Gas and Water was the major victim owing to the direct impact, although the ratio in relation to the total final demand was less than in the other industries except for minerals. Construction seems to have had no impact on final demand, although the private consumption expenditure included furniture & house equipment expenditure which emphasizes that in semi-durable goods consumers have no direct expenses in this industry, for the purchasing of houses belongs to the investment sector.

In Scenario 2, the amount lost was 182.63 billion which was larger than in Scenario 1 but, if considered in terms of percentage change was only -0.87% smaller than for Scenario 1. Although the economic structure was upgraded, the ratio of the first industry (agriculture) over total GDP declined (it was 1.51% in 2007). The agriculture and traditional manufacturing industries such as processed foods, beverages, tobacco and textile mill products, etc. were the major losers in terms of the percentage change, being -7.46% and -3.99%, respectively. The heavy industries lost 50.9 billion or 0.67% in percentage terms. This impact seemed quiet slight. However, the other services only had a small positive effect as the food and energy shocks occurred. This was the only gainer and only in 2007, for in 1996 it was also a victim. In 2007, the demand for information services, education services, and broadcasting, recreational & cultural services increased, and so each of these

had a positive effect when the shocks came.

If we consider the impact in terms of output in Scenario 1 of Panel 2 of Table 5, we find the “Heavy industries” and “Finance, Insurance and Real estate services” are the potential sufferers if we account for the difference in value. If we consider the percentage change, Minerals and Agriculture are reduced by -14.99% and -3.19% and are the major losers.

In Scenario 2, although the economic structure is being transformed, if we consider this as a percentage change, Agriculture and Manufacturing are the main losers except for the Chemical and petroleum-related industries, and Electricity, gas, and water, which are more related to the energy-related industries in which the negative percentage change reverts slightly. The Finance, insurance and real estate services and Other services belong to domestic-demand types and are low in energy intensity so that they have only slight impacts, with the latter having a positive effect. As for the changes in value added as the change in output (Panel 3 of Table 5), Agriculture and Manufacturing are the main losers and the reductions in percentage change are larger in 2007 than in 1996 although the reductions in final demand are smaller in 2007. However, owing to the industrial linkage rising, the negative spillover effect is also increasing.

To sum up, with the food and energy shock coming, the global commodity price passes through to the domestic price, and the industries regardless of whether they are domestic-demand oriented or export-oriented will suffer different losses. As time passes by, Taiwan’s economic structure is being transformed. However, the potential negative impact on Agriculture and Manufacturing is making itself felt, regardless of whether they are counted in final demand, output or value added. In particular, the primary industry (Agriculture) and the Mineral industry are the most harmed in terms of percentage change although the ratio over total final demand (or output, value added) is quite small. Among the manufacturing industries, the higher the technology level, the slighter the damage, i.e., the traditional industries are the major victims, the next are the chemical and petroleum-related industries, and the heavy industries are only slightly damaged although they may be the highest in terms of energy intensity. The construction industry has no

severe negative impact, for the percentage changes are under -0.5%. The electricity, gas, and water industry are also losers because they are energy-related industries. In the services sector, some are the losers and some are gainers. The transportation, telecommunications and trading industries have higher energy intensity and so they are the potential sufferers. However, the information services, education services, and broadcasting, recreational and cultural services are all potential winners, and they have a positive effect as the shocks take place.

Besides, if we compare the simulation results of the industrial linkage effect through household expenditure being varied owing to the relative prices and real incomes changing as a result of the global commodity price passing through to the domestic price, we find the price pass-through to be higher for agricultural raw materials, metal and food price indexes, except for the energy price index which was missing by the 2nd quarter of 1992. The primary and secondary industries are more harmed as time passes. If we count the degree of damage in the totals for the primary and secondary industries, we find the percentage change is reduced from -48.5 billion (-0.78%) in 1996 to -146 billion (-1.19%) in 2007 for final demand, -140 billion (-1.52%) in 1996 to -402.6 billion (-2.37%) in 2007 for output, and -42 billion (-1.54%) in 1996 to -120 billion (-2.90%) in 2007 for value added. The gap in terms of the percentage change is closer for value added.

Table 5 Simulation Results in Input-Output Tables for Scenario 1 and Scenario 2

No.	Final Demand Industries	1996 Base (millions)	Change Scenario 1	(%)	2007 Base (millions)	Change Scenario 2	(%)
1	Agriculture	258188	-5466	-2.117	326615	-24361	-7.46
2	Minerals	4824	-18	-0.365	85802	-76	-0.09
3	Manufacturing—Traditional Industries	1213545	-15226	-1.255	1412253	-56390	-3.99
4	Manufacturing—Chemical and petroleum-related industries	583044	-5925	-1.016	1701082	-11640	-0.68
5	Manufacturing—Heavy Industries	3232880	-18510	-0.573	7564001	-50984	-0.67
6	Construction	861800	0	0.000	1081775	0	0.00
7	Electricity, Gas and Water	87044	-3360	-3.860	155599	-2570	-1.65
8	Transport.Telecom & Trading	1483245	-8606	-0.580	2925416	-44145	-1.51
9	Finance, Insur. & Real Estate Services	1317928	-30321	-2.301	2745917	-25979	-0.95
10	Other services	1928251	-18058	-0.937	2975259	33521	1.13
	Total	10970749	-105489	-0.962	20973719	-182625	-0.871
No.	Output Industries	1996 Base (millions)	change Scenario 1	(%)	2007 Base (millions)	change Scenario 2	(%)
1	Agriculture	420355	-13427	-3.194	557484	-59344	-10.65
2	Minerals	68539	-10273	-14.989	129606	-29533	-22.79
3	Manufacturing—Traditional Industries	1690809	-26483	-1.566	1893071	-94823	-5.01
4	Manufacturing—Chemical and petroleum-related industries	1662753	-30523	-1.836	3931377	-69332	-1.76
5	Manufacturing—Heavy Industries	4060134	-49906	-1.229	8596517	-132775	-1.54
6	Construction	1013445	-2810	-0.277	1251176	-5043	-0.40
7	Electricity, Gas and Water	366281	-7401	-2.021	623621	-11770	-1.89
8	Transport.Telecom & Trading	2894714	-19983	-0.690	4288290	-75492	-1.76
9	Finance, Insur. & Real Estate Services	1523656	-41806	-2.744	4175374	-40886	-0.98
10	Other services	2549009	-33008	-1.295	4496904	6374	0.14
	Total	16249695	-235620	-1.450	29943420	-512625	-1.712
No.	Value Added Industries	1996 Base (millions)	change Scenario 1	(%)	2007 Base (millions)	change Scenario 2	(%)
1	Agriculture	138045	-6663	-4.83	262879	-29018	-11.04
2	Minerals	42669	-6707	-15.72	72945	-19204	-26.33
3	Manufacturing—Traditional Industries	455928	-6992	-1.53	456809	-20615	-4.51
4	Manufacturing—Chemical and petroleum-related industries	492224	-7271	-1.48	883516	-15861	-1.80
5	Manufacturing—Heavy Industries	1083427	-10946	-1.01	1928870	-29382	-1.52
6	Construction	350008	-798	-0.23	289792	-1425	-0.49
7	Electricity, Gas and Water	174621	-2865	-1.64	251572	-4637	-1.84
8	Transport.Telecom & Trading	2053243	-11306	-0.55	2611210	-41480	-1.59
9	Finance, Insur. & Real Estate Services	1051525	-31708	-3.02	3042128	-35646	-1.17
10	Other services	1714111	-19676	-1.15	2836047	16409	0.58
	Total	7555801	-104933	-1.39	12635768	-180859	-1.43

VI. Conclusion

We have sought to determine if the global commodity prices passed through to Taiwan's domestic prices and their impacts for the household expenditures in different categories. In addition, to test the relationship between pass-through, household expenditures and the economic structure in Taiwan, we employed an econometric model to evaluate and to analyze the empirical results.

The pass-through coefficients are 13.5% for the GCP in food to the domestic price in the sample period (1995Q1 to 2008Q3) in CPI in food. If we compare our estimated results with IMF(2008), the price pass-through from international to domestic prices is under 10% in advanced economies and around 15% in emerging economies for food over the 1995-2008 period. Our estimated results lie in between. For energy (fuel), the price pass through is around 22% in advanced economies as well as 12% in emerging economies in the sample period from 1995 to 2008 for the IMF (2008). Our result of 17.33% is also similar to that for the IMF (2008).

In the price pass through from the domestic prices to core CPI, it is around 20% in advanced economies and nearly 50% in emerging economies for food. It is under 2% in advanced economies and approaches zero in emerging economies for fuel in the IMF (2008). The estimated result for food is 18.87% in advanced economies. It is higher for energy in our case than in the case of the IMF. Our estimated results are 19.24% for energy.

The results reflect some key characteristics of Taiwan. First, Taiwan lies in between advanced economies and emerging economies in economic development, and so the price pass-through is situated between advanced economies and emerging countries both in terms of food and fuel, even though Taiwan is lacking in natural resources. Next, the impact of domestic prices on the CPI in regard to energy seems to have a similar pass through effect to core CPI with CPI in food, although the weights for the CPI-energy are less than for the CPI-food. The energy-related industries are either monopolies or oligopolies. They are highly correlated with living industries, although the industrial structure is being upgraded and declining in terms of energy intensity.

We also apply this approach to calculate the GCP price pass-through to export price index (XPI) and import price index (MPI).The price pass-through for food is higher than for energy both in relation to XPI and MPI, it might reflect the difference in the degrees of the industrial linkage effect and the industrial types of domestic-oriented or export-oriented. Basically, since the food-related industries are domestic-oriented and the pressures of world competitiveness are lower, the global commodity price might pass through at a higher level. Furthermore, the price pass-through in relation to XPI is lower than that for MPI both for food and energy. This also reflects the strength of world competitiveness for export-oriented goods and the characteristic of the trade structure. Owing to the export structure being concentrated in the industrial goods, the increase in the global commodity price may give slight pass-through in the export price.

The price pass-through also causes the household's expenditure to change markedly. The expenditures on fuel and power, transport and communication decrease more rapidly than in food-related industries although the global price pass-through domestic price counted in core CPI is similar. This may reflect the differences in the price elasticity of demand.

Besides, we find that if the first energy crisis had been postponed until the 1990s or the 21st century, the shocks would have eventually ceased with the passing of time. The price pass-through has more of an influence in the primary industries and secondary industries even though the traditional industries experienced a hollowing out toward other economies in the 1990s. Basically, the higher the technology level, the smaller the impact on manufacturing industries as prices fluctuate and pass through. Besides, as the service industries expand and are upgraded, the final demand, output and value added, might rise in those domestic-oriented industries.

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Appendix A The Estimation Results for the Price Pass-Through in Taiwan

(1) Global Food Price Index (PFOODWD) to CPI in Food (CPIFOOD)

(a)Ordinary Least Squares
QUARTERLY data for 52 periods from 1982Q1 to 19994Q4
dlogya(cpifood)

= 0.57837 * dlogya(cpifood)[-1] + 0.12608 * dlogya(cpifood)[-2]
(5.91027) (1.09815)

+ 0.09334 * dlogya(cpifood)[-3] - 0.35902 * dlogya(cpifood)[-4]
(0.80844) (3.54839)

+ 0.01913 * dlogya(pfoodwd) + 0.02277 * dlogya(pfoodwd)[-1]
(0.36899) (0.29665)

+ 0.01472 * dlogya(pfoodwd)[-2] - 0.06504 * dlogya(pfoodwd)[-3]
(0.18566) (0.83224)

+ 0.07439 * dlogya(pfoodwd)[-4] + 0.01135 + 0.00037 * SEASON_2
(1.34956) (1.91303) (0.04729)

+ 0.00022 * SEASON_3 + 0.00378 * SEASON_4
(0.02868) (0.48333)

Sum Sq 0.0700 Std Err 0.0279 LHS Mean 0.0232
R Sq 0.5212 R Bar Sq 0.4573 F 12, 90 8.1633
D.W.(1) 1.8544 D.W.(4) 2.3007

(b) Ordinary Least Squares
QUARTERLY data for 55 periods from 1995Q1 to 2008Q3
Date: 24 MAY 2009

dlogya(cpifood)

= 0.52959 * dlogya(cpifood)[-1] + 0.11811 * dlogya(cpifood)[-2]
(4.18402) (0.88045)

+ 0.18385 * dlogya(cpifood)[-3] - 0.48845 * dlogya(cpifood)[-4]
(1.39157) (3.95678)

+ 0.03297 * dlogya(pfoodwd) + 0.03744 * dlogya(pfoodwd)[-1]
(0.54896) (0.41239)

+ 0.02358 * dlogya(pfoodwd)[-2] - 0.15790 * dlogya(pfoodwd)[-3]
(0.24906) (1.68656)

+ 0.15236 * dlogya(pfoodwd)[-4] + 0.00866 + 0.00067 * SEASON_2
(2.25214) (1.14521) (0.06756)

+ 0.00152 * SEASON_3 + 0.00890 * SEASON_4
(0.15408) (0.88690)

Sum Sq 0.0281 Std Err 0.0258 LHS Mean 0.0218
R Sq 0.6325 R Bar Sq 0.5275 F 12, 42 6.0244
D.W.(1) 1.8904 D.W.(4) 2.3357

(2) Global Energy Price Index (PENERGYWD) to CPI in Energy (CPIENERGY)

Ordinary Least Squares
QUARTERLY data for 55 periods from 1995Q1 to 2008Q3

dlogya(CPIENERGY)

= + 0.81331 * dlogya(CPIENERGY)[-1]
(5.16964)

+ 0.03441 * dlogya(CPIENERGY)[-2]
(0.17868)

+ 0.01491 * dlogya(CPIENERGY)[-3]
(0.07744)

- 0.21091 * dlogya(CPIENERGY)[-4] + 0.07237 * dlogya(penergywd)
(1.48272) (3.23880)

- 0.01019 * dlogya(penergywd)[-1] + 0.00729 * dlogya(penergywd)[-2]
(0.28757) (0.21217)

- 0.05838 * dlogya(penergywd)[-3]
(1.64843)
+ 0.04930 * dlogya(penergywd)[-4]
(1.76111)

+ 0.00286 + 0.00128 * SEASON_2 + 0.00068 * SEASON_3
(0.54973) (0.20564) (0.10850)

+ 0.00115 * SEASON_4
(0.18107)

Sum Sq 0.0114 Std Err 0.0165 LHS Mean 0.0319
R Sq 0.8632 R Bar Sq 0.8241 F 12, 42 22.0876
D.W.(1) 1.8296 D.W.(4) 2.3051

(3) CPI in Food (CPIFOOD) &CPI in Energy (CPIENERGY) TO coreCPI

Ordinary Least Squares
QUARTERLY data for 55 periods from 1995Q1 to 2008Q3

dlogya(corecpi)

= + 1.24737 * dlogya(corecpi)[-1] - 0.33910 * dlogya(corecpi)[-2]
(6.89924) (1.06990)

+ 0.16902 * dlogya(corecpi)[-3] - 0.14988 * dlogya(corecpi)[-4]
(0.50779) (0.78043)

+ 0.03171 * dlogya(cpifood.normalize) - 0.01583 * dlogya(cpifood.normalize)[-1]
(1.29250) (0.61519)

+ 0.02358 * dlogya(cpifood.normalize)[-2] - 0.00021 * dlogya(cpifood.normalize)[-3]
(0.97331) (0.00753)

- 0.02555 * dlogya(cpifood.normalize)[-4] - 0.08034 * dlogya(cpienergy.normalize)
(0.95968) (2.29237)

+ 0.11471 * dlogya(cpienergy.normalize)[-1]
(2.46763)

- 0.00933 * dlogya(cpienergy.normalize)[-2]
(0.19430)

- 0.00084 * dlogya(cpienergy.normalize)[-3]
(0.01786)

- 0.01023 * dlogya(cpienergy.normalize)[-4]
(0.29689)

+ 0.03025 * dlogya(gdp01)-dlogya(pogdp01tw)
(0.63663)

+ 0.06304 * dlogya(gdp01)-dlogya(pogdp01tw)[-1]
(0.86559)

- 0.02974 * dlogya(gdp01)-dlogya(pogdp01tw)[-2]
(0.43783)

- 0.08094 * dlogya(gdp01)-dlogya(pogdp01tw)[-3]
(1.35986)

+ 0.03349 * dlogya(gdp01)-dlogya(pogdp01tw)[-4] - 0.00003
(0.68647) (0.02063)

+ 0.00001 * SEASON_2 + 0.00084 * SEASON_3 + 0.00048 * SEASON_4
(0.00592) (0.55053) (0.30382)

Sum Sq 0.0005 Std Err 0.0040 LHS Mean 0.0117
R Sq 0.9363 R Bar Sq 0.8925 F 22, 32 21.3879
D.W.(1) 1.7989 D.W.(4) 2.4037

(4) Global Food Price Index (PFOODWD) & Global Energy Price Index (PENERGYWD) to Export Price Index in terms of US$ (XPIUSD)

Ordinary Least Squares
QUARTERLY data for 55 periods from 1995Q1 to 2008Q3

dlogya(xpiusd)

= + 1.41309 * dlogya(xpiusd)[-1] - 0.66331 * dlogya(xpiusd)[-2]
(8.25805) (2.27273)

- 0.03608 * dlogya(xpiusd)[-3] - 0.00585 * dlogya(xpiusd)[-4]
(0.12626) (0.03724)

+ 0.01359 * dlogya(pfoodwd) + 0.02891 * dlogya(pfoodwd)[-1]
(0.33589) (0.50588)

- 0.03207 * dlogya(pfoodwd)[-2] + 0.02719 * dlogya(pfoodwd)[-3]
(0.53594) (0.46815)

+ 0.02817 * dlogya(pfoodwd)[-4] + 0.04844 * dlogya(penergywd)
(0.66100) (2.49731)

- 0.03863 * dlogya(penergywd)[-1]

(1.34927)
+ 0.03099 * dlogya(penergywd)[-2]
(1.02603)

- 0.04266 * dlogya(penergywd)[-3] + 0.02992 * dlogya(penergywd)[-4]
(1.43485) (1.40122)

- 0.00763 + 0.00233 * SEASON_2 - 0.00207 * SEASON_3
(1.59509) (0.41063) (0.36402)

+ 0.00004 * SEASON_4
(0.00723)

Sum Sq 0.0083 Std Err 0.0150 LHS Mean -0.0068
R Sq 0.9448 R Bar Sq 0.9195 F 17, 37 37.2635
D.W.(1) 1.8134 D.W.(4) 2.4975

(5) Global Food Price Index (PFOODWD) & Global Energy Price Index (PENERGYWD) to Import Price Index in terms of US$ (MPIUSD)

MPIUSD
Ordinary Least Squares
QUARTERLY data for 55 periods from 1995Q1 to 2008Q3
Date: 24 MAY 2009

dlogya(mpiusd)

= + 1.31311 * dlogya(mpiusd)[-1] - 0.65602 * dlogya(mpiusd)[-2]
(7.61170) (2.28869)

+ 0.23015 * dlogya(mpiusd)[-3] - 0.22866 * dlogya(mpiusd)[-4]
(0.82310) (1.36110)

+ 0.03351 * dlogya(pfoodwd) + 0.09580 * dlogya(pfoodwd)[-1]
(0.48755) (1.02389)

- 0.11259 * dlogya(pfoodwd)[-2] + 0.03775 * dlogya(pfoodwd)[-3]
(1.17314) (0.41518)

+ 0.09008 * dlogya(pfoodwd)[-4] + 0.16005 * dlogya(penergywd)
(1.40732) (5.22394)

- 0.14216 * dlogya(penergywd)[-1]
(2.87029)
+ 0.01946 * dlogya(penergywd)[-2]
(0.35636)

- 0.00018 * dlogya(penergywd)[-3] + 0.02782 * dlogya(penergywd)[-4]
(0.00340) (0.72814)

- 0.00499 + 0.00217 * SEASON_2 - 0.00289 * SEASON_3
(0.73878) (0.24678) (0.32901)

- 0.00001 * SEASON_4
(0.00121)

Sum Sq 0.0199 Std Err 0.0232 LHS Mean 0.0228
R Sq 0.9591 R Bar Sq 0.9403 F 17, 37 51.0658

D.W.(1) 1.8702 D.W.(4) 2.4439

(6) Global Food Price Index (PFOODWD) to Import Price Index in FOOD (MPIFOOD)

(a) Ordinary Least Squares
QUARTERLY data for 52 periods from 1982Q1 to 1994Q4

dlogya(mpifood)

= + 0.97772 * dlogya(mpifood)[-1] - 0.02956 * dlogya(mpifood)[-2]
(5.56860) (0.12240)

- 0.28695 * dlogya(mpifood)[-3] - 0.12734 * dlogya(mpifood)[-4]
(1.16714) (0.76680)

+ 0.23492 * dlogya(pfoodwd) - 0.22336 * dlogya(pfoodwd)[-1]
(2.47914) (2.22463)

+ 0.01285 * dlogya(pfoodwd)[-2] + 0.04578 * dlogya(pfoodwd)[-3]
(0.11731) (0.42671)

+ 0.21142 * dlogya(pfoodwd)[-4] + 1.07341 * dlogya(er@tw)
(2.07004) (6.54747)

- 0.65578 * dlogya(er@tw)[-1]
(1.81457)

- 0.74961 * dlogya(er@tw)[-2]
(1.93519)

+ 0.72277 * dlogya(er@tw)[-3] - 0.07287 * dlogya(er@tw)[-4]
(1.85775) (0.32750)

+ 0.00734 - 0.00850 * SEASON_2 - 0.00531 * SEASON_3
(0.99807) (0.98061) (0.60498)

- 0.00117 * SEASON_4
(0.13288)

Sum Sq 0.0134 Std Err 0.0211 LHS Mean -0.0206
R Sq 0.9699 R Bar Sq 0.9529 F 17, 30 56.8878
D.W.(1) 2.0588 D.W.(4) 2.1728

(b)Ordinary Least Squares
QUARTERLY data for 55 periods from 1995Q1 to 2008Q3

dlogya(mpifood)

= + 0.77871 * dlogya(mpifood)[-1] - 0.23746 * dlogya(mpifood)[-2]
(5.89155) (1.31992)

- 0.01025 * dlogya(mpifood)[-3] - 0.46282 * dlogya(mpifood)[-4]
(0.05826) (3.80574)

+ 0.49789 * dlogya(pfoodwd) - 0.01657 * dlogya(pfoodwd)[-1]
(8.03139) (0.17187)

- 0.18999 * dlogya(pfoodwd)[-2] + 0.14992 * dlogya(pfoodwd)[-3]

(1.92082) (1.42312)

+ 0.40847 * dlogya(pfoodwd)[-4] + 0.92121 * dlogya(er@tw)
(4.13537) (8.27465)

- 0.74821 * dlogya(er@tw)[-1]
(4.18571)

+ 0.20960 * dlogya(er@tw)[-2]
(1.06874)

- 0.02778 * dlogya(er@tw)[-3] + 0.63132 * dlogya(er@tw)[-4]
(0.14251) (4.05665)

+ 0.00877 + 0.00346 * SEASON_2 + 0.00153 * SEASON_3
(1.35885) (0.41906) (0.18514)

+ 0.00467 * SEASON_4
(0.55586)

Sum Sq	0.0175	Std Err	0.0217	LHS Mean	0.0558
R Sq	0.9687	R Bar Sq	0.9543	F 17, 37	67.2920
D.W.(1)	1.8038	D.W.(4)	2.0000		

(7) Global Energy Price Index (PENERGYWD) to Import Price Index in Energy (MPIENERGY)

Ordinary Least Squares
QUARTERLY data for 55 periods from 1995Q1 to 2008Q3

dlogya(mpienergy)

= + 0.34972 * dlogya(mpienergy)[-1] - 0.00432 * dlogya(mpienergy)[-2]
(2.35696) (0.02677)

+ 0.00260 * dlogya(mpienergy)[-3] - 0.48868 * dlogya(mpienergy)[-4]
(0.01636) (3.39563)

+ 0.79259 * dlogya(penergywd) - 0.26123 * dlogya(penergywd)[-1]
(19.6438) (1.91805)

- 0.09247 * dlogya(penergywd)[-2] + 0.03636 * dlogya(penergywd)[-3]
(0.63914) (0.25413)

+ 0.36693 * dlogya(penergywd)[-4] + 0.55764 * dlogya(er@tw)
(3.00393) (4.24134)

- 0.41058 * dlogya(er@tw)[-1]
(2.14530)

- 0.00193 * dlogya(er@tw)[-2]
(0.00972)

+ 0.08849 * dlogya(er@tw)[-3] + 0.00316 * dlogya(er@tw)[-4]
(0.44994) (0.01842)

+ 0.04289 + 0.00011 * SEASON_2 + 0.00119 * SEASON_3
(2.95149) (0.01203) (0.12840)

- 0.00107 * SEASON_4

(0.11294)

Sum Sq 0.0222 Std Err 0.0245 LHS Mean 0.1386
R Sq 0.9889 R Bar Sq 0.9838 F 17, 37 193.434
D.W.(1) 1.7360 D.W.(4) 1.7964

(8) Global Agr. Raw Materials Price Index (PAGRWD) to Import Price Index in Agr. Raw Materials (MPIAGR)

Ordinary Least Squares
QUARTERLY data for 55 periods from 1995Q1 to 2008Q3

dlogya(mpiagr)

= 0.88113 * dlogya(mpiagr)[-1] - 0.11274 * dlogya(mpiagr)[-2]
(5.83470) (0.57156)

+ 0.05586 * dlogya(mpiagr)[-3] - 0.28742 * dlogya(mpiagr)[-4]
(0.29192) (2.14518)

+ 0.21910 * dlogya(pagrwd) - 0.02728 * dlogya(pagrwd)[-1]
(2.61858) (0.21168)

- 0.10842 * dlogya(pagrwd)[-2] + 0.19622 * dlogya(pagrwd)[-3]
(0.82802) (1.56933)

- 0.03205 * dlogya(pagrwd)[-4] + 0.01554 - 0.00346 * SEASON_2
(0.35117) (1.68301) (0.28643)

+ 0.00172 * SEASON_3 - 0.00197 * SEASON_4
(0.14182) (0.16013)

Sum Sq 0.0425 Std Err 0.0318 LHS Mean 0.0320
R Sq 0.8242 R Bar Sq 0.7739 F 12, 42 16.4039
D.W.(1) 1.8400 D.W.(4) 2.4397

(9) Global Metal Price Index (PMETALWD) to Import Price Index in Metal (MPIMETAL)

Ordinary Least Squares
QUARTERLY data for 55 periods from 1995Q1 to 2008Q3
Date: 24 MAY 2009

dlogya(mpimetal)

= 0.82822 * dlogya(mpimetal)[-1] + 0.10215 * dlogya(mpimetal)[-2]
(5.52683) (0.52187)

- 0.10155 * dlogya(mpimetal)[-3] - 0.20962 * dlogya(mpimetal)[-4]
(0.52823) (1.41374)

+ 0.46903 * dlogya(pmetalwd) - 0.24773 * dlogya(pmetalwd)[-1]
(5.12870) (1.71563)

- 0.16049 * dlogya(pmetalwd)[-2] + 0.13209 * dlogya(pmetalwd)[-3]
(1.07526) (0.83971)

+ 0.03117 * dlogya(pmetalwd)[-4] + 0.01391 + 0.00576 * SEASON_2
(0.25483) (0.98728) (0.31686)

+ 0.00410 * SEASON_3 + 0.00453 * SEASON_4
(0.22530) (0.24316)

Sum Sq 0.0960 Std Err 0.0478 LHS Mean 0.0905
R Sq 0.8981 R Bar Sq 0.8689 F 12, 42 30.8337
D.W.(1) 1.8338 D.W.(4) 2.1876

(10) Global Food Price Index (PFOODWD) to Export Price Index in FOOD (XPIFOOD)

(a) Ordinary Least Squares
QUARTERLY data for 52 periods from 1982Q1 to 1994Q4

dlogya(xpifood)

= + 0.84887 * dlogya(xpifood)[-1] - 0.00360 * dlogya(xpifood)[-2]
(4.40539) (0.01418)

- 0.06660 * dlogya(xpifood)[-3] - 0.01638 * dlogya(xpifood)[-4]
(0.32669) (0.10483)

- 0.01109 * dlogya(pfoodwd) + 0.03654 * dlogya(pfoodwd)[-1]
(0.10334) (0.27965)

+ 0.02968 * dlogya(pfoodwd)[-2] + 0.07960 * dlogya(pfoodwd)[-3]
(0.22438) (0.58415)

- 0.12830 * dlogya(pfoodwd)[-4] + 0.71706 * dlogya(er@tw)
(1.09944) (3.18896)

- 0.78377 * dlogya(er@tw)[-1]
(2.05894)
+ 0.49315 * dlogya(er@tw)[-2]
(1.28570)

- 0.40071 * dlogya(er@tw)[-3] + 0.17844 * dlogya(er@tw)[-4]
(1.09529) (0.87294)

+ 0.00363 + 0.00075 * SEASON_2 + 0.01194 * SEASON_3
(0.38208) (0.06636) (1.05863)

+ 0.00621 * SEASON_4
(0.54336)

Sum Sq 0.0225 Std Err 0.0274 LHS Mean 0.0014
R Sq 0.8772 R Bar Sq 0.8076 F 17, 30 12.6026
D.W.(1) 2.0290 D.W.(4) 1.9360

(b)Ordinary Least Squares
QUARTERLY data for 55 periods from 1995Q1 to 2008Q3
dlogya(xpifood)

= + 1.04738 * dlogya(xpifood)[-1] - 0.30253 * dlogya(xpifood)[-2]
(7.89566) (1.56427)

+ 0.04842 * dlogya(xpifood)[-3] - 0.11736 * dlogya(xpifood)[-4]
(0.25083) (0.88101)

+ 0.12518 * dlogya(pfoodwd) + 0.02515 * dlogya(pfoodwd)[-1]
(0.97449) (0.13166)

+ 0.05231 * dlogya(pfoodwd)[-2] + 0.05870 * dlogya(pfoodwd)[-3]
(0.26970) (0.31232)

- 0.05469 * dlogya(pfoodwd)[-4] + 0.56156 * dlogya(er@tw)
(0.41483) (2.31585)

- 0.58544 * dlogya(er@tw)[-1]
(1.81805)

+ 0.21689 * dlogya(er@tw)[-2]
(0.62624)

+ 0.07629 * dlogya(er@tw)[-3] + 0.23760 * dlogya(er@tw)[-4]
(0.21654) (0.92705)

+ 0.00073 + 0.00239 * SEASON_2 + 0.00174 * SEASON_3
(0.05436) (0.12845) (0.09326)

- 0.00107 * SEASON_4
(0.05639)

Sum Sq	0.1872	Std Err	0.0573	LHS Mean	0.0261
R Sq	0.7916	R Bar Sq	0.7294	F 17, 57	12.7337
D.W.(1)	1.8484	D.W.(4)	2.2545		

Appendix B Taiwan Macro-Econometric model

I. The Code and Definitions of Variables

1. Endogenous Variables

No.	Type	Code	Definitions	Data processing	Data sources
1	I	CP	Private Final Consumption Expenditure	CP	NIAQ
2	I	CP01	Real Private Consumption Expenditure	CP01	NIAQ
3	I	CPBEV	Private Consumption Expenditure - Beverages	CPBEV	NIAQ
4	E	CPBEV01	Real Private Consumption Expenditure - Beverages	CPBEV01	NIAQ
5	I	CPCLFT	Private Consumption Expenditure - Clothing Footwear	CPCL&FT	NIAQ
6	E	CPCLFT01	Real Private Consumption Expenditure - Clothing Footwear	CPCL&FT01	NIAQ
7	I	CPFOOD	Private Consumption Expenditure - Food	CPFOOD	NIAQ
8	E	CPFOOD01	Real Private Consumption Expenditure - Food	CPFOOD01	NIAQ
9	I	CPFUEL	Private Consumption Expenditure - Fuel & Power	CPFUEL&P	NIAQ
10	E	CPFUEL01	Real Private Consumption Expenditure - Fuel & Power	CPFUEL&P01	NIAQ
11	I	CPFURN	Private Consumption Expenditure - Furniture & House Equip	CPFURN	NIAQ
12	E	CPFURN01	Real Private Consumption Expenditure - Furniture & House Equip	CPFURN01	NIAQ
13	I	CPHEALTH	Private Consumption Expenditure - Medicare & Health	CPHEALTH	NIAQ
14	E	CPHEALTH01	Real Private Consumption Expenditure - Medicare & Health	CPHEALTH01	NIAQ
15	I	CPHOP	Private Consumption Expenditure - Household Operation	CPHOP	NIAQ
16	E	CPHOP01	Real Private Consumption Expenditure - Household Operation	CPHOP01	NIAQ
17	E	CPI	Consumer Price Index - General Index	CPI	PRICE
18	E	CPIFOOD	Consumer Price Index - Food	CPI@FOOD	PRICE
19	E	CPIENERGY	Consumer Price Index - Energy	weight average	PRICE
20	I	CPO	Private Consumption Expenditure - Miscellaneous	CPO	NIAQ
21	E	CPO01	Real Private Consumption Expenditure - Miscellaneous	CPO01	NIAQ
22	I	CPRECED	Private Consumption Expenditure - Recreation & Education	CPREC&ED	NIAQ
23	E	CPRECED01	Real Private Consump. Expenditure - Recreation & Education	CPREC&ED01	NIAQ
24	I	CPRENTW	Private Consumption Expenditure - Rents & Water Charges	CPRENT&W	NIAQ
25	E	CPRENTW01	Real Private Consump. Expenditure - Rents & Water Charges	CPRENT&W01	NIAQ
26	E	CPTOB01	Private Consumption Expenditure - Tobacco	CPTOB	NIAQ
27	E	CPTOB01	Real Private Consumption Expenditure - Tobacco	CPTOB01	NIAQ
28	I	CPTRNCOM	Consumption Expenditure - Transport & Communication	CPTRN&COM	NIAQ
29	E	CPTRNCOM01	Real Private Consum. Expen. - Transport & Communication	CPTRN&COM01	NIAQ
30	E	ER@TW	Exchange Rate (NT$ per US$) Index	EUS/33.81*100	2001=100
31	I	EUS	Exchange Rate - NT$ per US$	RX$	FSM
32	I	EX	Exports of Goods & Services	EX	QNET
33	E	EX01	Real Exports of Goods & Services	EX01	NIAQ
34	I	GDP	Expenditure on GDP	GDP	NIAQ
35	I	GDP01	Real Gross Domestic Product	GDP01	NIAQ
36	I	GNP	Gross National Product	GNP	QNET
37	I	GNP01	Real Gross National Product	GNP01	QNET
38	I	IFIX	Gross Fixed Capital Formation - Amount at Current Prices	IFIX	NIAQ

39	E	IFIX01	Real Gross Fixed Capital Formation	IFIX01	NIAQ
40	I	M	Imports of Goods & Services	M	QNET
41	E	M01	Real Imports of Goods & Services	M01	NIAQ
42	E	M2	Monetary Aggregates - M2	M2	FSM
43	E	MPIUSD	Import Price Index on U.S.$ Basis - General Index	MPI	PRICE
44	I	PCGNP	GNP at Current Prices - per Capita	GNP/EUS/N	
45	I	PCP	Priv. Cons. Expenditure Deflator	PCP	NIAQ
46	E	PCPBEV	Private Cons. Expenditure Deflator – Beverages	PCPBEV	NIAQ
47	E	PCPCLFT	Private Cons. Expenditure. Deflator - Clothing Footwear	PCPCL&FT	NIAQ
48	E	PCPFOOD	Private Consumption Expenditure Deflator - Food	PCPFOOD	NIAQ
49	E	PCPFUEL	Private Cons. Expenditure. Deflator - Fuel & Power	PCPFUEL&P	NIAQ
50	E	PCPFURN	Priv. Cons. Expenditure. Deflator - Furn. & House Equip	PCPFURN	NIAQ
51	E	PCPHEALTH	Priv. Cons. Expenditure. Deflator - Medicare & Health	PCPHEALTH	NIAQ
52	E	PCPHOP	Priv. Cons. Expenditure. Deflator - Household Operation	PCPHOP	NIAQ
53	E	PCPO	Priv. Cons. Expenditure. Deflator – Miscellaneous	PCPO	NIAQ
54	E	PCPRECED	Priv. Cons. Expenditure. Deflator - Recreation & Education	PCPREC&ED	NIAQ
55	E	PCPRENTW	Private Cons. Expenditure. Deflator - Rents & Water Charges	PCPRENT&W	NIAQ
56	E	PCPTOB	Private Cons. Expenditure Deflator - Tobacco	PCPTOB	NIAQ
57	E	PCPTRNCOM	Priv. Cons. Expen. Deflator - Transport & Communication	PCPTRN&COM	NIAQ
58	E	PEX	Exports of Goods & Services Deflator	PEX	NIAQ
59	I	PGDP	Gross Domestic Product Deflator	PGDP	NIAQ
60	E	PIFIX	Gross Fixed Capital Formation Deflator	PIFIX	NIAQ
61	E	PM	Imports of Goods & Services Deflator	PM	NIAQ
62	E	RMCP90	Interbank Money Market Interest Rates - Total	RMIB	FSM
63	E	WPI	Wholesale Price Index - General Index	WPI	PRICE
64	E	XPIUSD	Export Price Index on U.S.$ Basis - General Index	XPI	PRICE

2. Exogenous Variables

No.	Code	Definitions	Databank code and processing	Data sources
1	CG	Government Consumption	CG	NIAQ
2	CG01	Real Government Consumption	CG01	NIAQ
3	ER@JP	Exchange Rate - Yen$ per US$	158**RF*ZF/108.78	IFS@IMF，2001=100
4	POGDP01TW	Potential Real GDP	Hodrick-Prescott filtered estimated.	
4	RGDP@US	US Real GDP	11199E*RZF	IFS@IMF
5	INVCH	Inventory Change	INVCH01	NIAQ
6	INVCH01	Real Inventory Change	INVCH01	NIAQ
7	N	Total Population	N	MAN
8	PCOMWD	All Commodities Index*	00176ACDZF	IFS@IMF
9	PENERGYWD	Global energy price index*	00176ENDZF(00176AADZF)	IFS@IMF
10	PFOODWD	Global food price index	00176EXDZF	IFS@IMF
11	REDIS	Interest Rate - Rediscount Rate	RMCEC @RDISC	FSM
12	WPI@US	US WPI	11163***ZF	IFS@IMF
13	YWN	Net Factor Income from Abroad	YWN	NIAQ
14	YWN01	Real Net Factor Income from Abroad	YWN01	NIAQ

Note: The Global energy price index is unavailable by 1992q2, the missing data is appended by average crude oil Spot Price Index. The All Commodities Index also calculated by weigh average all commodities index.

II. The Equations of Model

(I). Behavior Equations

1. Private Final Consumption Expenditure

(E1)Real Private Consumption Expenditure – Food (CPFOOD01)

Cochrane-Orcutt
QUARTERLY data for 111 periods from 1981Q1 to 2008Q3

log(cpfood01)

= 0.08085 * log(cpfood01)[-1] + 0.66624 * log(cpfood01)[-4]
(1.54245) (11.7421)

+ 0.18543 * log(gdp01) - 0.20694 * log(pcpfood/pgdp) + 0.48407
(4.81744) (7.01963) (3.07771)

- 0.00712 * SEASON_2 - 0.00813 * SEASON_3 + 0.00289 * SEASON_4
(3.03318) (2.06279) (0.79631)

Sum Sq 0.0096 Std Err 0.0097 LHS Mean 12.3144
R Sq 0.9993 R Bar Sq 0.9992 F 8,102 17529.9
D.W.(1) 2.3297 D.W.(4) 2.0144

AR_0 = + 0.61947 * AR_1
(7.43565)

(E2)Real Private Consumption Expenditure – Beverages (CPBEV01)

Cochrane-Orcutt
QUARTERLY data for 111 periods from 1981Q1 to 2008Q3

log(cpbev01)

= 0.59546 * log(cpbev01)[-4] + 0.23595 * log(gdp01)
(10.4775) (4.97252)

- 0.67401 * log(pcpbev/pgdp) + 0.77202 + 0.06767 * SEASON_2
(7.60178) (3.50092) (6.61535)

+ 0.11440 * SEASON_3 + 0.03982 * SEASON_4
(7.09673) (5.90059)

Sum Sq 0.0607 Std Err 0.0243 LHS Mean 10.1567
R Sq 0.9975 R Bar Sq 0.9973 F 7,103 5827.26
D.W.(1) 2.1402 D.W.(4) 1.8472

AR_0 = + 0.61057 * AR_1
(7.85344)

(E3)Private Consumption Expenditure – Tobacco (CPTOB01)

Ordinary Least Squares
QUARTERLY data for 111 periods from 1981Q1 to 2008Q3

log(cptob01)

= 0.32075 * log(cptob01)[-1] + 0.28454 * log(cptob01)[-4]

(4.45414) (4.51014)

- 0.21717 * log(pcptob/pgdp) + 0.16480 * log(gdp01) + 1.36997
(6.91697) (5.07922) (7.85846)

- 0.01346 * SEASON_2 - 0.04869 * SEASON_3 + 0.06731 * SEASON_4
(2.00249) (5.51434) (5.07341)

Sum Sq	0.0586	Std Err	0.0238	LHS Mean	9.3299
R Sq	0.9920	R Bar Sq	0.9914	F 7,103	1818.43
D.W.(1)	1.8195	D.W.(4)	1.7290		

(E4)Real Private Consumption Expenditure-Clothing Footwear (CPCLFT01)

Cochrane-Orcutt
QUARTERLY data for 111 periods from 1981Q1 to 2008Q3

log(cpclft01)

= 0.89368 * log(cpclft01)[-1] - 0.22453 * log(pcpclft/pgdp)
(25.9148) (3.46984)

+ 0.05721 * log(gdp01) + 0.70429 - 1.00916 * SEASON_2
(1.82852) (4.09726) (53.1367)

- 0.39314 * SEASON_3 - 0.05245 * SEASON_4
(30.3019) (4.11681)

Sum Sq	0.0798	Std Err	0.0278	LHS Mean	10.4047
R Sq	0.9985	R Bar Sq	0.9984	F 7,103	9645.92
D.W.(1)	1.9362	D.W.(4)	0.7345		
H	0.3241				

AR_0 = - 0.32974 * AR_1
(3.52193)

(E5)Real Private Consumption Expenditure-Fuel & Power (CPFUEL01)

Ordinary Least Squares
QUARTERLY data for 111 periods from 1981Q1 to 2008Q3

log(cpfuel01)

= 0.40844 * log(cpfuel01)[-1] + 0.31726 * log(cpfuel01)[-4]
(4.69144) (3.84771)

- 0.13175 * log(pcpfuel/pgdp) + 0.19247 * log(gdp01) + 0.00634
(5.27072) (2.92000) (0.03089)

+ 0.04518 * SEASON_2 + 0.01641 * SEASON_3 + 0.02456 * SEASON_4
(5.46911) (2.55291) (3.37695)

Sum Sq	0.0536	Std Err	0.0228	LHS Mean	10.0236
R Sq	0.9975	R Bar Sq	0.9973	F 7,103	5892.68
D.W.(1)	1.8270	D.W.(4)	1.7891		

(E6)Real Private Consumption Expenditure - Rents & Water Charges (CPRENTW01)

Cochrane-Orcutt
QUARTERLY data for 111 periods from 1981Q1 to 2008Q3

log(cprentw01)

= 0.39431 * log(cprentw01)[-1] + 0.53183 * log(cprentw01)[-4]
(5.03182) (7.68298)

- 0.10350 * log(pcprentw[-1]/pgdp[-1]) + 0.05721 * log(gdp01)
(1.63542) (1.06076)

+ 0.03639 * dum88q1 + 0.09304 - 0.00259 * SEASON_2
(4.32239) (0.31948) (1.13070)

+ 0.00212 * SEASON_3 - 0.00231 * SEASON_4
(0.78367) (0.87684)

Sum Sq 0.0112 Std Err 0.0106 LHS Mean 11.9385
R Sq 0.9997 R Bar Sq 0.9996 F 9,100 31798.7
D.W.(1) 2.2033 D.W.(4) 2.0114

AR_0 = + 0.85159 * AR_1
(13.6137)

(E7)Real Private Consumption Expenditure - Furniture & House Equip (CPFURN01)

Ordinary Least Squares
QUARTERLY data for 111 periods from 1981Q1 to 2008Q3

log(cpfurn01)

= 0.71350 * log(cpfurn01)[-1]
(14.8428)

- 0.71156 * log(pcpfurn[-1]/pgdp[-1]) + 0.23795 * log(gdp01)
(5.09240) (3.72226)

- 0.19814 - 0.31164 * SEASON_2 - 0.31919 * SEASON_3
(0.36489) (21.6368) (29.3591)

- 0.26967 * SEASON_4
(28.0463)

Sum Sq 0.1282 Std Err 0.0351 LHS Mean 10.0987
R Sq 0.9977 R Bar Sq 0.9975 F 6,104 7383.90
D.W.(1) 1.9485 D.W.(4) 0.7590
H 0.1138

(E8)Real Private Consumption Expenditure - Household Operation (CPHOP01)

Cochrane-Orcutt
QUARTERLY data for 111 periods from 1981Q1 to 2008Q3

log(cphop01)

= 0.51014 * log(cphop01)[-1] + 0.42015 * log(cphop01)[-4]
(7.69703) (6.72280)

- 0.26794 * log(pcphop/pgdp) + 0.12020 * log(gdp01) - 0.96107

(5.89601) (4.76608) (5.72451)

- 0.05863 * SEASON_2 - 0.07781 * SEASON_3 - 0.05786 * SEASON_4
(7.18962) (9.17847) (8.65333)

Sum Sq 0.0262 Std Err 0.0160 LHS Mean 10.0855
R Sq 0.9994 R Bar Sq 0.9993 F 7,103 23607.8
D.W.(1) 1.8361 D.W.(4) 1.1295

(E9)Real Private Consumption Expenditure - Medicare & Health (CPHEALTH01)

Cochrane-Orcutt
QUARTERLY data for 110 periods from 1981Q2 to 2008Q3
Date: 22 MAY 2009

log(cphealth01)

= 0.85016 * log(cphealth01)[-4] + 0.16761 * log(pcgnp)
(41.5948) (6.66102)

- 0.10182 * log(pcphealth[-1]/pgdp[-1]) + 0.41787
(1.23251) (5.12128)

+ 0.02647 * SEASON_2 + 0.02561 * SEASON_3 + 0.00718 * SEASON_4
(4.91156) (4.43664) (1.63924)

Sum Sq 0.0439 Std Err 0.0208 LHS Mean 11.0645
R Sq 0.9993 R Bar Sq 0.9993 F 7,102 21459.7
D.W.(1) 1.9152 D.W.(4) 2.2327

AR_0 = + 0.60812 * AR_1
(7.78984)

(E10)Real Private Consumption Expenditure - Recreation & Education (CPRECED01)

Ordinary Least Squares
QUARTERLY data for 111 periods from 1981Q1 to 2008Q3

log(cpreced01)

= 0.27668 * log(cpreced01)[-1] + 0.38361 * log(cpreced01)[-4]
(3.93210) (5.94410)

+ 0.43416 * log(gdp01) - 0.22338 * log(pcpreced[-1]/pgdp[-1])
(6.00548) (2.10816)

- 0.24598 * dum03q2 - 1.99396 - 0.31588 * SEASON_2
(8.80190) (4.56805) (8.66898)

+ 0.05383 * SEASON_3 - 0.25265 * SEASON_4
(3.65739) (8.02188)

Sum Sq 0.0731 Std Err 0.0268 LHS Mean 12.0767
R Sq 0.9980 R Bar Sq 0.9979 F 8,102 6444.59
D.W.(1) 1.7174 D.W.(4) 1.2841

(E11)Real Private Consumption Expenditure - Transport & Communication (CPTRNCOM01)

Cochrane-Orcutt
QUARTERLY data for 111 periods from 1981Q1 to 2008Q3

log(cptrncom01)

= 0.87443 * log(cptrncom01)[-1] + 0.00248 * pchya(gdp01)
(18.0992) (1.53657)

- 0.29698 * log(pcptrncom/pgdp) + 0.12525 * log(gdp01) - 0.21439
(2.34144) (1.93387) (0.49028)

- 0.34474 * SEASON_2 + 0.10007 * SEASON_3 - 0.20300 * SEASON_4
(18.4413) (6.22720) (11.3137)

Sum Sq	0.3169	Std Err	0.0557	LHS Mean	11.4680
R Sq	0.9953	R Bar Sq	0.9949	F 8,102	2684.48
D.W.(1)	2.1465	D.W.(4)	0.3656		
H	-0.8973				

AR_0 = - 0.20323 * AR_1
(2.03895)

(E12)Real Private Consumption Expenditure – Miscellaneous (CPO01)

Ordinary Least Squares
QUARTERLY data for 111 periods from 1981Q1 to 2008Q3

log(cpo01)

= 0.65335 * log(cpo01)[-1] + 0.44482 * log(gdp01)
(9.6503) (5.67507)

- 0.94682 * log(pcpo/pgdp) - 2.28480 - 0.20816 * SEASON_2
(4.18054) (5.02074) (8.57561)

- 0.20121 * SEASON_3 - 0.19744 * SEASON_4
(9.35992) (9.20957)

Sum Sq	0.5387	Std Err	0.0720	LHS Mean	11.4211
R Sq	0.9843	R Bar Sq	0.9834	F 6,104	1084.80
D.W.(1)	2.0951	D.W.(4)	1.3086		
H	-0.7842				

(E13) Private Consumption Expen. Deflator – Food (PCPFOOD)

Ordinary Least Squares
QUARTERLY data for 104 periods from 1982Q1 to 2007Q4

dlogya(pcpfood)

= + 0.82902 * dlogya(pcpfood)[-1] + 0.01257 * dlogya(pcpfood)[-2]
(7.77956) (0.09081)

- 0.13115 * dlogya(pcpfood)[-3] - 0.16294 * dlogya(pcpfood)[-4]
(0.95463) (1.72350)

+ 2.25022 * dlogya(cpi) - 2.21280 * dlogya(cpi)[-1]

(18.6360) (7.57942)

+ 0.17918 * dlogya(cpi)[-2] + 0.46736 * dlogya(cpi)[-3]
(0.47613) (1.25774)

- 0.00419 * dlogya(cpi)[-4]
(0.01952)

- 0.14951 * dlogya(gdp01)-dlogya(pogdp01tw)
(1.40891)

+ 0.09076 * dlogya(gdp01)-dlogya(pogdp01tw)[-1]
(0.64226)

- 0.02596 * dlogya(gdp01)-dlogya(pogdp01tw)[-2]
(0.18821)

+ 0.03061 * dlogya(gdp01)-dlogya(pogdp01tw)[-3]
(0.22259)

- 0.05110 * dlogya(gdp01)-dlogya(pogdp01tw)[-4] - 0.00326
(0.52517) (1.12676)

- 0.00164 * SEASON_2 + 0.00204 * SEASON_3 + 0.00279 * SEASON_4
(0.47002) (0.57844) (0.78984)

Sum Sq 0.0131 Std Err 0.0123 LHS Mean 0.0207
R Sq 0.9062 R Bar Sq 0.8876 F 17, 86 48.8509
D.W.(1) 1.8758 D.W.(4) 2.2520

(E14) Private Consumption Expen. Deflator – Beverages (PCPBEV)

Ordinary Least Squares
QUARTERLY data for 104 periods from 1982Q1 to 2007Q4

dlogya(pcpbev)

= + 0.86704 * dlogya(pcpbev)[-1] - 0.20650 * dlogya(pcpbev)[-2]
(8.00358) (1.48058)

+ 0.06048 * dlogya(pcpbev)[-3] - 0.08199 * dlogya(pcpbev)[-4]
(0.48057) (0.92286)

- 0.05427 * dlogya(cpi) - 0.01795 * dlogya(cpi)[-1]
(0.30381) (0.07888)

+ 0.09063 * dlogya(cpi)[-2] + 0.16740 * dlogya(cpi)[-3]
(0.40199) (0.73408)

- 0.13556 * dlogya(cpi)[-4]
(0.88454)

- 0.10989 * dlogya(gdp01)-dlogya(pogdp01tw)
(0.75578)

+ 0.25883 * dlogya(gdp01)-dlogya(pogdp01tw)[-1]
(1.34452)

- 0.36831 * dlogya(gdp01)-dlogya(pogdp01tw)[-2]
(1.85711)

- 0.02533 * dlogya(gdp01)-dlogya(pogdp01tw)[-3]
(0.12954)

+ 0.00399 * dlogya(gdp01)-dlogya(pogdp01tw)[-4] + 0.00116
(0.02697) (0.27332)

- 0.00077 * SEASON_2 + 0.00073 * SEASON_3 + 0.00112 * SEASON_4
(0.15229) (0.14454) (0.22010)

Sum Sq 0.0278 Std Err 0.0180 LHS Mean 0.0065
R Sq 0.6388 R Bar Sq 0.5674 F 17, 86 8.9467
D.W.(1) 1.9214 D.W.(4) 2.5526

(E15) Private Consumption Expen. Deflator– Tobacco (PCPTOB)

Cochrane-Orcutt
QUARTERLY data for 103 periods from 1982Q2 to 2007Q4

dlogya(pcptob)

= + 0.94790 * dlogya(pcptob)[-1] - 0.01021 * dlogya(pcptob)[-2]
(19.5383) (0.24528)

- 0.01588 * dlogya(pcptob)[-3] - 0.02794 * dlogya(pcptob)[-4]
(0.41449) (0.74155)

- 0.05577 * dlogya(cpi) - 0.06208 * dlogya(cpi)[-1]
(0.43677) (0.47764)

+ 0.20799 * dlogya(cpi)[-2] + 0.08092 * dlogya(cpi)[-3]
(1.58760) (0.59803)

- 0.20718 * dlogya(cpi)[-4]
(1.91621)

- 0.12047 * dlogya(gdp01)-dlogya(pogdp01tw)
(1.13199)

+ 0.12750 * dlogya(gdp01)-dlogya(pogdp01tw)[-1]
(1.13705)

+ 0.00057 * dlogya(gdp01)-dlogya(pogdp01tw)[-2]
(0.00507)

- 0.07500 * dlogya(gdp01)-dlogya(pogdp01tw)[-3]
(0.69200)

- 0.01413 * dlogya(gdp01)-dlogya(pogdp01tw)[-4]
(0.13505)

- 0.24680 * dum03q1 + 0.25971 * dum02q1 + 0.00122
(16.3556) (19.7788) (0.31182)

+ 0.00154 * SEASON_2 + 0.00196 * SEASON_3 + 0.00159 * SEASON_4
(0.51716) (0.60614) (0.53918)

Sum Sq 0.0120 Std Err 0.0121 LHS Mean 0.0168
R Sq 0.9622 R Bar Sq 0.9530 F 20, 82 104.362
D.W.(1) 1.9225 D.W.(4) 2.5963

AR_0 = + 0.40192 * AR_1
(3.57346)

(E16) Private Consumption Expen. Deflator - Clothing Footwear (PCPCLFT)

Ordinary Least Squares
QUARTERLY data for 104 periods from 1982Q1 to 2007Q4

dlogya(pcpclft)

= + 0.72680 * dlogya(pcpclft)[-1] + 0.15614 * dlogya(pcpclft)[-2]
(6.70880) (1.16225)

- 0.22317 * dlogya(pcpclft)[-3] - 0.01060 * dlogya(pcpclft)[-4]
(1.70695) (0.09912)

+ 0.41933 * dlogya(cpi) - 0.40109 * dlogya(cpi)[-1]
(2.70669) (1.92280)

- 0.01721 * dlogya(cpi)[-2] + 0.09338 * dlogya(cpi)[-3]
(0.08025) (0.43851)

+ 0.07417 * dlogya(cpi)[-4]
(0.53258)

+ 0.22030 * dlogya(gdp01)-dlogya(pogdp01tw)
(1.77195)

- 0.37531 * dlogya(gdp01)-dlogya(pogdp01tw)[-1]
(2.24816)

+ 0.30806 * dlogya(gdp01)-dlogya(pogdp01tw)[-2]
(1.76716)

- 0.02807 * dlogya(gdp01)-dlogya(pogdp01tw)[-3]
(0.16335)

- 0.00585 * dlogya(gdp01)-dlogya(pogdp01tw)[-4] - 0.00697
(0.04633) (1.85566)

+ 0.00576 * SEASON_2 + 0.00147 * SEASON_3 + 0.00666 * SEASON_4
(1.25263) (0.33460) (1.44877)

Sum Sq 0.0212 Std Err 0.0157 LHS Mean -0.0007
R Sq 0.6094 R Bar Sq 0.5322 F 17, 86 7.8916
D.W.(1) 1.9868 D.W.(4) 1.9752

(E17) Private Consumption Expen. Deflator - Fuel & Power (PCPFUEL)

Ordinary Least Squares
QUARTERLY data for 100 periods from 1983Q1 to 2007Q4

dlogya(pcpfuel)

= + 0.65166 * dlogya(pcpfuel)[-1] - 0.03965 * dlogya(pcpfuel)[-2]
(5.69210) (0.28484)

- 0.02728 * dlogya(pcpfuel)[-3] - 0.09115 * dlogya(pcpfuel)[-4]
(0.19743) (0.79348)

+ 0.52923 * dlogya(cpienergy) - 0.39140 * dlogya(cpienergy)[-1]
(11.4100) (4.12061)

+ 0.13653 * dlogya(cpienergy)[-2]
(1.25282)

- 0.04242 * dlogya(cpienergy)[-3]
(0.39135)

+ 0.07927 * dlogya(cpienergy)[-4]
(0.99850)

- 0.17039 * dlogya(gdp01)-dlogya(pogdp01tw)
(1.81489)

+ 0.35500 * dlogya(gdp01)-dlogya(pogdp01tw)[-1]
(2.81023)

- 0.24934 * dlogya(gdp01)-dlogya(pogdp01tw)[-2]
(1.92170)

+ 0.03290 * dlogya(gdp01)-dlogya(pogdp01tw)[-3]
(0.25360)

- 0.02615 * dlogya(gdp01)-dlogya(pogdp01tw)[-4] + 0.00033
(0.28573) (0.14179)

- 0.00082 * SEASON_2 - 0.00094 * SEASON_3 - 0.00295 * SEASON_4
(0.25293) (0.29132) (0.90785)

Sum Sq 0.0105 Std Err 0.0113 LHS Mean 0.0005
R Sq 0.9165 R Bar Sq 0.8992 F 17, 82 52.9391
D.W.(1) 1.9559 D.W.(4) 1.7550

(E18) Private Consumption Expen. Deflator - Rents & Water Charges (PCPRENTW)

Ordinary Least Squares
QUARTERLY data for 100 periods from 1983Q1 to 2007Q4

dlogya(pcprentw)

= + 0.92524 * dlogya(pcprentw)[-1] - 0.06461 * dlogya(pcprentw)[-2]
(10.4201) (0.54938)

+ 0.17447 * dlogya(pcprentw)[-3] - 0.12157 * dlogya(pcprentw)[-4]
(1.49846) (1.40123)

+ 0.09975 * dlogya(cpi) + 0.02834 * dlogya(cpienergy[-1])
(1.78830) (1.08242)

- 0.03257 * dlogya(cpienergy[-1])[-1]

(0.84587)

+ 0.03126 * dlogya(cpienergy[-1])[-2]
(0.80304)

- 0.03704 * dlogya(cpienergy[-1])[-3]
(1.34882)

- 0.01976 * dlogya(gdp01)-dlogya(pogdp01tw)
(0.38696)

- 0.00169 * dlogya(gdp01)-dlogya(pogdp01tw)[-1]
(0.02492)

+ 0.01467 * dlogya(gdp01)-dlogya(pogdp01tw)[-2]
(0.21393)

- 0.04625 * dlogya(gdp01)-dlogya(pogdp01tw)[-3]
(0.68388)

+ 0.02195 * dlogya(gdp01)-dlogya(pogdp01tw)[-4]
(0.43449)

+ 0.04870 * dum87q1 - 0.00167 + 0.00255 * SEASON_2
(6.61083) (1.11339) (1.38705)

+ 0.00144 * SEASON_3 + 0.00121 * SEASON_4
(0.78370) (0.65567)

Sum Sq	0.0033	Std Err	0.0063	LHS Mean	0.0220
R Sq	0.9435	R Bar Sq	0.9309	F 18, 81	75.1375
D.W.(1)	1.9252	D.W.(4)	2.5038		

(E19) Private Consumption Expen. Deflator - Furn. & House Equip (PCPFURN)

Ordinary Least Squares
QUARTERLY data for 103 periods from 1983Q1 to 2008Q3

dlogya(pcpfurn)

= + 0.79646 * dlogya(pcpfurn)[-1] + 0.08989 * dlogya(pcpfurn)[-2]
(7.35359) (0.65421)

- 0.01189 * dlogya(pcpfurn)[-3] - 0.07437 * dlogya(pcpfurn)[-4]
(0.08611) (0.70887)

+ 0.29223 * dlogya(cpi) - 0.06781 * dlogya(cpi)[-1]
(4.02097) (0.73342)

- 0.05158 * dlogya(cpi)[-2] - 0.11108 * dlogya(cpi)[-3]
(0.55265) (1.17165)

+ 0.06787 * dlogya(cpi)[-4]
(0.81284)

+ 0.01552 * dlogya(gdp01)-dlogya(pogdp01tw)
(0.28203)

+ 0.04774 * dlogya(gdp01)-dlogya(pogdp01tw)[-1]
(0.64749)

- 0.06009 * dlogya(gdp01)-dlogya(pogdp01tw)[-2]
(0.79190)

+ 0.04211 * dlogya(gdp01)-dlogya(pogdp01tw)[-3]
(0.56375)

- 0.01442 * dlogya(gdp01)-dlogya(pogdp01tw)[-4] - 0.00194
(0.26158) (1.05942)

+ 0.00019 * SEASON_2 - 0.00008 * SEASON_3 - 0.00052 * SEASON_4
(0.09464) (0.03880) (0.26021)

Sum Sq 0.0041 Std Err 0.0070 LHS Mean 0.0014
R Sq 0.8418 R Bar Sq 0.8102 F 17, 85 26.6050
D.W.(1) 1.8711 D.W.(4) 2.5250

(E20) Private Consumption Expen. Deflator - Household Operation (PCPHOP)

Ordinary Least Squares
QUARTERLY data for 103 periods from 1983Q1 to 2008Q3

dlogya(pcphop)

= + 0.43062 * dlogya(pcphop)[-1] + 0.27192 * dlogya(pcphop)[-2]
(4.42003) (2.55448)

+ 0.13716 * dlogya(pcphop)[-3] - 0.39186 * dlogya(pcphop)[-4]
(1.19701) (3.65211)

+ 0.20389 * dlogya(cpi) - 0.13342 * dlogya(cpi)[-1]
(1.21324) (0.63156)

+ 0.18781 * dlogya(cpi)[-2] + 0.25019 * dlogya(cpi)[-3]
(0.86487) (1.15768)

- 0.07662 * dlogya(cpi)[-4]
(0.40942)

+ 0.21447 * dlogya(gdp01)-dlogya(pogdp01tw)
(1.49545)

- 0.11249 * dlogya(gdp01)-dlogya(pogdp01tw)[-1]
(0.60837)

+ 0.07727 * dlogya(gdp01)-dlogya(pogdp01tw)[-2]
(0.42550)

- 0.32899 * dlogya(gdp01)-dlogya(pogdp01tw)[-3]
(1.89906)

+ 0.36443 * dlogya(gdp01)-dlogya(pogdp01tw)[-4] + 0.00542
(2.79312) (1.34614)

- 0.00049 * SEASON_2 - 0.00232 * SEASON_3 - 0.00184 * SEASON_4
(0.10868) (0.52046) (0.40417)

Sum Sq 0.0217 Std Err 0.0160 LHS Mean 0.0212
R Sq 0.6042 R Bar Sq 0.5251 F 17, 85 7.6329
D.W.(1) 1.8152 D.W.(4) 2.3442

(E21) Private Consumption Expen. Deflator - Medicare & Health (PCPHEALTH)

Ordinary Least Squares
QUARTERLY data for 103 periods from 1983Q1 to 2008Q3

dlogya(pcphealth)

= + 0.74278 * dlogya(pcphealth)[-1] + 0.10527 * dlogya(pcphealth)[-2]
(6.58529) (0.77251)

- 0.17499 * dlogya(pcphealth)[-3] - 0.16839 * dlogya(pcphealth)[-4]
(1.33821) (1.51319)

+ 0.25232 * dlogya(cpi) + 0.05069 * dlogya(cpi)[-1]
(2.19820) (0.36712)

- 0.31223 * dlogya(cpi)[-2] + 0.16334 * dlogya(cpi)[-3]
(2.25267) (1.11053)

+ 0.10893 * dlogya(cpi)[-4]
(0.87643)

- 0.07056 * dlogya(gdp01)-dlogya(pogdp01tw)
(0.84151)

+ 0.05939 * dlogya(gdp01)-dlogya(pogdp01tw)[-1]
(0.52757)

+ 0.03254 * dlogya(gdp01)-dlogya(pogdp01tw)[-2]
(0.27696)

- 0.06435 * dlogya(gdp01)-dlogya(pogdp01tw)[-3]
(0.56035)

+ 0.02574 * dlogya(gdp01)-dlogya(pogdp01tw)[-4] + 0.00548
(0.30197) (2.10886)

- 0.00132 * SEASON_2 - 0.00330 * SEASON_3 - 0.00172 * SEASON_4
(0.43880) (1.10673) (0.56472)

Sum Sq 0.0096 Std Err 0.0106 LHS Mean 0.0174
R Sq 0.7069 R Bar Sq 0.6483 F 17, 85 12.0611
D.W.(1) 1.8207 D.W.(4) 2.2987

(E22) Private Consumption Expen. Deflator - Recreation & Education (PCPRECED)

Ordinary Least Squares
QUARTERLY data for 103 periods from 1983Q1 to 2008Q3

dlogya(pcpreced)

= + 0.95189 * dlogya(pcpreced)[-1] - 0.01467 * dlogya(pcpreced)[-2]
(9.02422) (0.09980)

- 0.13537 * dlogya(pcpreced)[-3] - 0.04700 * dlogya(pcpreced)[-4]
(0.91429) (0.43231)

+ 0.14482 * dlogya(cpi) - 0.04556 * dlogya(cpi)[-1]
(1.29248) (0.34167)

- 0.05464 * dlogya(cpi)[-2] + 0.08506 * dlogya(cpi)[-3]
(0.40854) (0.62499)

+ 0.18321 * dlogya(cpi)[-4]
(1.55275)

- 0.07931 * dlogya(gdp01)-dlogya(pogdp01tw)
(0.97120)

+ 0.17869 * dlogya(gdp01)-dlogya(pogdp01tw)[-1]
(1.65256)

- 0.09721 * dlogya(gdp01)-dlogya(pogdp01tw)[-2]
(0.86394)

- 0.02145 * dlogya(gdp01)-dlogya(pogdp01tw)[-3]
(0.19299)

+ 0.09533 * dlogya(gdp01)-dlogya(pogdp01tw)[-4] + 0.00188
(1.16458) (0.75015)

+ 0.00157 * SEASON_2 - 0.00041 * SEASON_3 - 0.00071 * SEASON_4
(0.53809) (0.14064) (0.23993)

Sum Sq	0.0090	Std Err	0.0103	LHS Mean	0.0300
R Sq	0.8654	R Bar Sq	0.8385	F 17, 85	32.1539
D.W.(1)	2.0215	D.W.(4)	2.5732		

(E23) Private Consumption Expen. Deflator - Transport & Communication (PCPTRNCOM)

Ordinary Least Squares
QUARTERLY data for 103 periods from 1983Q1 to 2008Q3

dlogya(pcptrncom)

= + 0.83658 * dlogya(pcptrncom)[-1] - 0.06523 * dlogya(pcptrncom)[-2]
(7.76013) (0.45810)

- 0.15420 * dlogya(pcptrncom)[-3] - 0.15342 * dlogya(pcptrncom)[-4]
(1.04863) (1.37381)

+ 0.20728 * dlogya(cpi) + 0.13673 * dlogya(cpi)[-1]
(1.42767) (0.76042)

- 0.16826 * dlogya(cpi)[-2] - 0.05250 * dlogya(cpi)[-3]
(0.93678) (0.28534)

+ 0.24538 * dlogya(cpi)[-4]
(1.59240)

+ 0.00270 * dlogya(gdp01)-dlogya(pogdp01tw)
(0.02450)

+ 0.08786 * dlogya(gdp01)-dlogya(pogdp01tw)[-1]
(0.60065)

- 0.05745 * dlogya(gdp01)-dlogya(pogdp01tw)[-2]
(0.38008)

- 0.00992 * dlogya(gdp01)-dlogya(pogdp01tw)[-3]
(0.06628)

+ 0.01257 * dlogya(gdp01)-dlogya(pogdp01tw)[-4] - 0.00612
(0.11582) (1.84556)

+ 0.00237 * SEASON_2 + 0.00225 * SEASON_3 + 0.00181 * SEASON_4
(0.60583) (0.57982) (0.45415)

Sum Sq	0.0164	Std Err	0.0139	LHS Mean	0.0038
R Sq	0.7027	R Bar Sq	0.6432	F 17, 85	11.8182
D.W.(1)	1.9343	D.W.(4)	2.4438		

(E24) Private Consumption Expen. Deflator – Miscellaneous (PCPO)

Ordinary Least Squares
QUARTERLY data for 103 periods from 1983Q1 to 2008Q3

dlogya(pcpo)

= + 0.50999 * dlogya(pcpo)[-1] + 0.14895 * dlogya(pcpo)[-2]
(4.90577) (1.28315)

+ 0.20263 * dlogya(pcpo)[-3] - 0.22343 * dlogya(pcpo)[-4]
(1.69519) (2.15892)

+ 0.42741 * dlogya(cpi) + 0.01350 * dlogya(cpi)[-1]
(4.71445) (0.11632)

- 0.14063 * dlogya(cpi)[-2] + 0.04586 * dlogya(cpi)[-3]
(1.19831) (0.38570)

+ 0.01851 * dlogya(cpi)[-4]
(0.16847)

+ 0.02084 * dlogya(gdp01)-dlogya(pogdp01tw)
(0.30582)

+ 0.01549 * dlogya(gdp01)-dlogya(pogdp01tw)[-1]
(0.16846)

+ 0.05849 * dlogya(gdp01)-dlogya(pogdp01tw)[-2]
(0.63665)

- 0.10441 * dlogya(gdp01)-dlogya(pogdp01tw)[-3]
(1.15410)

+ 0.08814 * dlogya(gdp01)-dlogya(pogdp01tw)[-4] - 0.00283
(1.32464) (1.43939)

+ 0.00300 * SEASON_2 + 0.00273 * SEASON_3 + 0.00431 * SEASON_4
(1.25617) (1.16204) (1.78522)

Sum Sq 0.0060 Std Err 0.0084 LHS Mean 0.0167
R Sq 0.8411 R Bar Sq 0.8093 F 17, 85 26.4616
D.W.(1) 1.9673 D.W.(4) 2.0933

2. Investment Sectors

(E25)Real Gross Fixed Capital Formation (IFIX01)

Cochrane-Orcutt
QUARTERLY data for 110 periods from 1981Q2 to 2008Q3
Date: 21 MAY 2009

log(ifix01)

= 0.57219 * log(ifix01)[-4] + 0.46847 * log(gdp01)
(7.18877) (4.64392)

+ 0.01229 * pchya(gdp01) - 0.00243 * rmcp90-pchya(wpi)
(4.84797) (1.68529)

- 0.53869 * log(pifix/pgdp) - 0.13301 * dum05q4 - 1.33736
(3.10909) (4.26417) (1.67768)

+ 0.09500 * SEASON_2 + 0.04891 * SEASON_3 + 0.11231 * SEASON_4
(4.88383) (3.96673) (5.37008)

Sum Sq 0.1490 Std Err 0.0388 LHS Mean 12.7009
R Sq 0.9957 R Bar Sq 0.9953 F 10, 99 2286.66
D.W.(1) 1.8685 D.W.(4) 2.0959

AR_0 = + 0.82527 * AR_1
(14.8541)

(E26)Gross Fixed Capital Formation Deflator (PIFIX)

Ordinary Least Squares
QUARTERLY data for 107 periods from 1982Q1 to 2008Q3

dlogya(pifix)

= 0.98384 * dlogya(pifix)[-1] - 0.05298 * dlogya(pifix)[-2]
(9.6044) (0.36952)

- 0.04257 * dlogya(pifix)[-3] - 0.07050 * dlogya(pifix)[-4]
(0.29761) (0.70949)

+ 0.40589 * dlogya(wpi) - 0.45786 * dlogya(wpi)[-1]
(7.52414) (4.78613)

+ 0.12615 * dlogya(wpi)[-2] - 0.08914 * dlogya(wpi)[-3]
(1.16256) (0.83978)

+ 0.06803 * dlogya(wpi)[-4] + 0.00345 - 0.00294 * SEASON_2
(0.99843) (1.73909) (1.08922)

- 0.00370 * SEASON_3 - 0.00136 * SEASON_4
(1.35302) (0.49545)

Sum Sq	0.0091	Std Err	0.0099	LHS Mean	0.0091
R Sq	0.8394	R Bar Sq	0.8189	F 12, 94	40.9461
D.W.(1)	1.9650	D.W.(4)	2.0757		

3. Trade Sectors

(E27)Real Exports of Goods & Services (EX01)

Cochrane-Orcutt
QUARTERLY data for 115 periods from 1980Q1 to 2008Q3

log(ex01)

= 0.19589 * log(ex01)[-1] + 2.17992 * log(rgdp@us)
(2.37838) (9.5011)

- 1.02365 * log(pex/pex[-1]) + 0.70603 * log(er@tw/er@tw[-1])
(8.12076) (3.82773)

- 8.60069 + 0.07710 * SEASON_2 + 0.08035 * SEASON_3
(7.94278) (6.67869) (9.8896)

+ 0.05443 * SEASON_4
(5.74182)

Sum Sq	0.1457	Std Err	0.0378	LHS Mean	13.5528
R Sq	0.9972	R Bar Sq	0.9970	F 8,102	4608.39
D.W.(1)	2.0829	D.W.(4)	2.1351		
H	-1.3555				

AR_0 = + 0.82005 * AR_1
(13.1855)

(E28) Exports of Goods & Services Deflator (PEX)

Ordinary Least Squares
QUARTERLY data for 103 periods from 1983Q1 to 2008Q3

dlogya(pex)

= + 0.37589 * dlogya(pex)[-1] + 0.04875 * dlogya(pex)[-2]
(3.44847) (0.42229)

+ 0.19491 * dlogya(pex)[-3] - 0.31001 * dlogya(pex)[-4]
(1.71250) (2.77245)

+ 0.84877 * dlogya(xpiusd) - 0.32952 * dlogya(xpiusd)[-1]
(8.58866) (1.87859)

- 0.10162 * dlogya(xpiusd)[-2] + 0.01717 * dlogya(xpiusd)[-3]
(0.52906) (0.09289)

+ 0.17281 * dlogya(xpiusd)[-4] + 0.79514 * dlogya(er@tw)
(1.44180) (21.1161)

- 0.28629 * dlogya(er@tw)[-1]

(2.97490)

- 0.01937 * dlogya(er@tw)[-2]
(0.19035)

- 0.15971 * dlogya(er@tw)[-3] + 0.27519 * dlogya(er@tw)[-4]
(1.57661) (2.72223)

- 0.00193 + 0.00315 * SEASON_2 + 0.00546 * SEASON_3
(1.11681) (1.29916) (2.23600)

+ 0.00458 * SEASON_4
(1.86975)

Sum Sq	0.0062	Std Err	0.0086	LHS Mean	-0.0009
R Sq	0.9582	R Bar Sq	0.9498	F 17, 85	114.617
D.W.(1)	1.8971	D.W.(4)	2.0290		

(E29)Real Imports of Goods & Services (M01)

Ordinary Least Squares
QUARTERLY data for 103 periods from 1983Q1 to 2008Q3

log(m01)

= 0.55545 * log(m01)[-1] + 0.64960 * log(gdp01)
(7.61112) (6.26096)

+ 0.00583 * pchya(gdp01) - 0.44000 * log(pm/pm[-1])
(3.96963) (2.81899)

- 0.09602 * log(er@tw[-1]) - 2.97023 + 0.09673 * SEASON_2
(2.98623) (6.20815) (8.09028)

+ 0.03819 * SEASON_3 + 0.04481 * SEASON_4
(3.42554) (3.77999)

Sum Sq	0.1383	Std Err	0.0384	LHS Mean	13.5278
R Sq	0.9967	R Bar Sq	0.9965	F 8, 94	3594.61
D.W.(1)	2.0861	D.W.(4)	1.5761		
H	-0.8908				

(E30) Imports of Goods & Services Deflator (PM)

Ordinary Least Squares
QUARTERLY data for 103 periods from 1983Q1 to 2008Q3

dlogya(pm)

= + 0.45792 * dlogya(pm)[-1] + 0.26296 * dlogya(pm)[-2]
(3.81173) (1.93524)

+ 0.00195 * dlogya(pm)[-3] - 0.17556 * dlogya(pm)[-4]
(0.01459) (1.53965)

+ 0.54141 * dlogya(mpiusd) - 0.04028 * dlogya(mpiusd)[-1]
(12.7964) (0.39124)

- 0.31230 * dlogya(mpiusd)[-2] + 0.02762 * dlogya(mpiusd)[-3]
(2.86794) (0.23266)

+ 0.08991 * dlogya(mpiusd)[-4] + 0.66926 * dlogya(er@tw)
(0.93724) (17.6521)

- 0.22107 * dlogya(er@tw)[-1]
(2.13813)

- 0.24256 * dlogya(er@tw)[-2]
(2.21900)

+ 0.02229 * dlogya(er@tw)[-3] + 0.11167 * dlogya(er@tw)[-4]
(0.19637) (1.18471)

+ 0.00213 - 0.00092 * SEASON_2 - 0.00016 * SEASON_3
(1.02418) (0.31437) (0.05399)

- 0.00259 * SEASON_4
(0.87891)

Sum Sq	0.0093	Std Err	0.0105	LHS Mean	0.0062
R Sq	0.9650	R Bar Sq	0.9580	F 17, 85	137.933
D.W.(1)	1.7836	D.W.(4)	1.9747		

4. Monetary Sectors

(E31)Monetary Aggregates - M2/ Consumer Price Index - General Index (M2/CPI)

Ordinary Least Squares
QUARTERLY data for 103 periods from 1982Q2 to 2007Q4

log(m2/cpi)

= 0.97687 * log(m2/cpi)[-1] + 0.00056 * pchya(gdp01)
(456.633) (1.71104)

- 0.00410 * log(rmcp90) - 1.10772 * log(cpi/cpi[-1])
(2.07837) (10.5437)

- 0.03489 * log(er@tw) + 0.47385 - 0.02755 * SEASON_2
(3.94530) (7.46057) (10.5996)

- 0.01557 * SEASON_3 - 0.01931 * SEASON_4
(6.06851) (8.11659)

Sum Sq	0.0065	Std Err	0.0083	LHS Mean	11.5606
R Sq	0.9999	R Bar Sq	0.9999	F 8, 94	105337
D.W.(1)	1.6828	D.W.(4)	2.0653		
H	1.3865				

(E32)Money Market Rate - Interbank Money Market Interest Rates – Total (RMCP90)

Cochrane-Orcutt
QUARTERLY data for 102 periods from 1982Q3 to 2007Q4

log(rmcp90)

= 0.70614 * log(rmcp90)[-1] + 0.43038 * log(redis)
(15.7007) (6.36173)

- 1.93742 * log(m2/m2[-1]) + 0.00365 * pchya(ifix01)
(2.77032) (3.69361)

- 0.46399 * dum86q1 + 0.72012 * dum89q2 - 0.08934
(4.37835) (6.81895) (2.22498)

- 0.12862 * SEASON_2 - 0.09324 * SEASON_3 - 0.15324 * SEASON_4
(3.30812) (2.99946) (4.34868)

Sum Sq 0.9790 Std Err 0.1037 LHS Mean 1.4580
R Sq 0.9802 R Bar Sq 0.9780 F 10, 91 450.413
D.W.(1) 1.9945 D.W.(4) 1.8487
H 0.0010

AR_0 = - 0.18943 * AR_1
(1.73607)

(E33)Exchange Rate Index (ER@TW)

Cochrane-Orcutt
QUARTERLY data for 108 periods from 1981Q1 to 2007Q4

log(er@tw)

= 0.89162 * log(er@tw)[-1] + 0.12025 * log(cpi)
(25.3305) (3.04041)

+ 0.10169 * log(er@jp) - 0.06012 * log(ex[-1]/m[-1])
(3.96189) (1.83199)

- 0.04746 * log(redis/redis[-1]) - 0.51825 + 0.00128 * SEASON_2
(1.48626) (2.60890) (0.28993)

+ 0.00777 * SEASON_3 + 0.00695 * SEASON_4
(1.60279) (1.59241)

Sum Sq 0.0337 Std Err 0.0186 LHS Mean 4.5408
R Sq 0.9854 R Bar Sq 0.9840 F 9, 98 734.337
D.W.(1) 1.9663 D.W.(4) 2.6208
H 0.1240

AR_0 = + 0.32994 * AR_1
(3.24054)

5. Price Index

(E34)Import Price Index in term of US$ - General Index (MPIUSD)

Ordinary Least Squares
QUARTERLY data for 63 periods from 1992Q2 to 2007Q4

dlogya(mpiusd)

= + 1.24098 * dlogya(mpiusd)[-1] - 0.46956 * dlogya(mpiusd)[-2]
(10.4829) (2.41361)

+ 0.04506 * dlogya(mpiusd)[-3] - 0.15612 * dlogya(mpiusd)[-4]
(0.23474) (1.39129)

+ 0.11106 * dlogya(pfoodwd) - 0.00080 * dlogya(pfoodwd)[-1]
(2.93819) (0.01523)

- 0.06506 * dlogya(pfoodwd)[-2] + 0.04005 * dlogya(pfoodwd)[-3]
(1.22548) (0.76492)

+ 0.03242 * dlogya(pfoodwd)[-4] + 0.12183 * dlogya(penergywd)
(0.81017) (10.4338)

- 0.13706 * dlogya(penergywd)[-1]
(6.62423)

+ 0.03212 * dlogya(penergywd)[-2]
(1.22484)

+ 0.00956 * dlogya(penergywd)[-3] + 0.02209 * dlogya(penergywd)[-4]
(0.36793) (1.20606)

- 0.33146 * dlogya(er@tw) + 0.31347 * dlogya(er@tw)[-1]
(5.12337) (3.17177)

- 0.11378 * dlogya(er@tw)[-2] - 0.01162 * dlogya(er@tw)[-3]
(1.09022) (0.10935)

- 0.00924 * dlogya(er@tw)[-4] - 0.00028 + 0.00176 * SEASON_2
(0.13024) (0.08238) (0.36496)

- 0.00054 * SEASON_3 + 0.00060 * SEASON_4
(0.11232) (0.12426)

Sum Sq 0.0224 Std Err 0.0171 LHS Mean 0.0099
R Sq 0.9607 R Bar Sq 0.9495 F 22, 77 85.5588
D.W.(1) 1.8460 D.W.(4) 2.4442

(E35)Export Price Index in term of US$ - General Index (XPIUSD)

Ordinary Least Squares
QUARTERLY data for 63 periods from 1992Q2 to 2007Q4
dlogya(xpiusd)

= + 1.42440 * dlogya(xpiusd)[-1] - 0.63228 * dlogya(xpiusd)[-2]
(12.3263) (3.10116)

- 0.17753 * dlogya(xpiusd)[-3] + 0.13264 * dlogya(xpiusd)[-4]
(0.89539) (1.33884)

+ 0.01855 * dlogya(pfoodwd) + 0.03408 * dlogya(pfoodwd)[-1]
(0.90806) (1.17281)

- 0.02349 * dlogya(pfoodwd)[-2] + 0.01550 * dlogya(pfoodwd)[-3]
(0.78777) (0.53220)

+ 0.00470 * dlogya(pfoodwd)[-4] + 0.01259 * dlogya(penergywd)
(0.21454) (1.94418)

- 0.01483 * dlogya(penergywd)[-1]
(1.57350)

+ 0.00503 * dlogya(penergywd)[-2]

(0.49989)

- 0.00848 * dlogya(penergywd)[-3] + 0.00477 * dlogya(penergywd)[-4]
(0.87794) (0.65529)

- 0.21741 * dlogya(er@tw) + 0.20117 * dlogya(er@tw)[-1]
(6.13184) (3.67189)

- 0.08874 * dlogya(er@tw)[-2] - 0.04340 * dlogya(er@tw)[-3]
(1.49418) (0.71861)

+ 0.00602 * dlogya(er@tw)[-4] - 0.00018 + 0.00086 * SEASON_2
(0.13986) (0.09630) (0.31852)

+ 0.00009 * SEASON_3 + 0.00014 * SEASON_4
(0.03168) (0.05255)

Sum Sq	0.0070	Std Err	0.0095	LHS Mean	0.0038
R Sq	0.9699	R Bar Sq	0.9613	F 22, 77	112.850
D.W.(1)	2.0903	D.W.(4)	2.3781		

(E36)Wholesale Price Index - General Index (WPI)

Ordinary Least Squares
QUARTERLY data for 100 periods from 1983Q1 to 2007Q4

dlogya(wpi)

= + 0.94734 * dlogya(wpi)[-1] - 0.15766 * dlogya(wpi)[-2]
(8.43653) (0.97749)

- 0.10110 * dlogya(wpi)[-3] - 0.12530 * dlogya(wpi)[-4]
(0.59581) (1.09417)

+ 0.34067 * dlogya(mpiusd) - 0.15673 * dlogya(mpiusd)[-1]
(4.23379) (1.19241)

+ 0.05251 * dlogya(mpiusd)[-2] - 0.06969 * dlogya(mpiusd)[-3]
(0.38789) (0.54570)

+ 0.13806 * dlogya(mpiusd)[-4] - 0.54829 * dlogya(xpiusd)
(1.59717) (2.79887)

+ 0.46369 * dlogya(xpiusd)[-1]
(1.31972)

+ 0.02190 * dlogya(xpiusd)[-2]
(0.05919)

- 0.33705 * dlogya(xpiusd)[-3] + 0.14602 * dlogya(xpiusd)[-4]
(1.02326) (0.84965)

+ 0.00040 * dlogya(gdp01)-dlogya(pogdp01tw)
(0.00291)

+ 0.09123 * dlogya(gdp01)-dlogya(pogdp01tw)[-1]
(0.52668)

+ 0.14852 * dlogya(gdp01)-dlogya(pogdp01tw)[-2]

(0.85196)

- 0.24321 * dlogya(gdp01)-dlogya(pogdp01tw)[-3]
(1.35994)

- 0.06880 * dlogya(gdp01)-dlogya(pogdp01tw)[-4] - 0.00057
(0.47815) (0.17502)

+ 0.00159 * SEASON_2 + 0.00095 * SEASON_3 + 0.00119 * SEASON_4
(0.34288) (0.20697) (0.25658)

Sum Sq	0.0200	Std Err	0.0161	LHS Mean	0.0048
R Sq	0.8593	R Bar Sq	0.8192	F 22, 77	21.3838
D.W.(1)	1.8474	D.W.(4)	2.4118		

(E37)Consumer Price Index – Food (CPIFOOD)

Ordinary Least Squares
QUARTERLY data for 100 periods from 1983Q1 to 2007Q4

dlogya(cpifood)

= 0.60008 * dlogya(cpifood)[-1] + 0.11179 * dlogya(cpifood)[-2]
(5.72597) (0.91619)

+ 0.08818 * dlogya(cpifood)[-3] - 0.35624 * dlogya(cpifood)[-4]
(0.71570) (3.35815)

+ 0.02545 * dlogya(pfoodwd) + 0.02026 * dlogya(pfoodwd)[-1]
(0.45768) (0.25484)

+ 0.02050 * dlogya(pfoodwd)[-2] - 0.07593 * dlogya(pfoodwd)[-3]
(0.25316) (0.93747)

+ 0.08311 * dlogya(pfoodwd)[-4] + 0.01189 - 0.00050 * SEASON_2
(1.44473) (1.94675) (0.06298)

- 0.00027 * SEASON_3 + 0.00308 * SEASON_4
(0.03381) (0.38374)

Sum Sq	0.0697	Std Err	0.0283	LHS Mean	0.0212
R Sq	0.4740	R Bar Sq	0.4015	F 12, 87	6.5334
D.W.(1)	1.8113	D.W.(4)	2.2818		

(E38)Consumer Price Index – Energy (CPIENERGY)

Ordinary Least Squares
QUARTERLY data for 63 periods from 1992Q2 to 2007Q4

dlogya(cpienergy)

= + 0.80333 * dlogya(cpienergy)[-1]
(7.76179)

+ 0.24895 * dlogya(cpienergy)[-2]
(1.88550)

- 0.08376 * dlogya(cpienergy)[-3]
(0.63285)

- 0.14579 * dlogya(cpienergy)[-4] + 0.09475 * dlogya(penergywd)
(1.53637) (7.22329)

- 0.00463 * dlogya(penergywd)[-1] - 0.02827 * dlogya(penergywd)[-2]
(0.22577) (1.39179)

- 0.04470 * dlogya(penergywd)[-3]
(2.09242)
+ 0.03955 * dlogya(penergywd)[-4]
(2.51430)

- 0.00210 + 0.00217 * SEASON_2 + 0.00254 * SEASON_3
(0.54405) (0.39694) (0.46457)

- 0.00012 * SEASON_4
(0.02248)

Sum Sq 0.0322 Std Err 0.0192 LHS Mean 0.0032
R Sq 0.9034 R Bar Sq 0.8901 F 12, 87 67.7910
D.W.(1) 2.0354 D.W.(4) 2.4094

(E39)Consumer Price Index - General Index (CPI)

Ordinary Least Squares
QUARTERLY data for 100 periods from 1983Q1 to 2007Q4

dlogya(cpi)

= + 1.23338 * dlogya(cpi)[-1] - 0.35100 * dlogya(cpi)[-2]
(11.3291) (1.85029)

- 0.10632 * dlogya(cpi)[-3] + 0.14821 * dlogya(cpi)[-4]
(0.54035) (1.30135)

+ 0.34535 * dlogya(cpifood) - 0.40884 * dlogya(cpifood)[-1]
(32.7720) (10.5370)

+ 0.10626 * dlogya(cpifood)[-2] + 0.03527 * dlogya(cpifood)[-3]
(1.64521) (0.52390)

- 0.02812 * dlogya(cpifood)[-4] + 0.05089 * dlogya(cpienergy)
(0.69986) (4.70337)

- 0.04349 * dlogya(cpienergy)[-1]
(2.40273)

- 0.01886 * dlogya(cpienergy)[-2]
(0.99914)

+ 0.02885 * dlogya(cpienergy)[-3]
(1.57007)

- 0.02708 * dlogya(cpienergy)[-4]
(2.14622)

+ 0.00352 * dlogya(gdp01)-dlogya(pogdp01tw)
(0.13945)

- 0.02083 * dlogya(gdp01)-dlogya(pogdp01tw)[-1]
(0.60585)

+ 0.05459 * dlogya(gdp01)-dlogya(pogdp01tw)[-2]
(1.76639)

- 0.08314 * dlogya(gdp01)-dlogya(pogdp01tw)[-3]
(2.91915)

+ 0.04597 * dlogya(gdp01)-dlogya(pogdp01tw)[-4] + 0.00009
(2.23379) (0.14447)

+ 0.00034 * SEASON_2 - 0.00033 * SEASON_3 + 0.00043 * SEASON_4
(0.45018) (0.44625) (0.56528)

Sum Sq	0.0005	Std Err	0.0026	LHS Mean	0.0173
R Sq	0.9825	R Bar Sq	0.9775	F 22, 77	196.361
D.W.(1)	2.1551	D.W.(4)	2.5742		

(II). Identity Equations

(I1)Private Consumption Expenditure – Food (CPFOOD)

CPFOOD=CPFOOD01*PCPFOOD/100;

(I2)Private Consumption Expenditure – Beverages (CPBEV)

CPBEV=CPBEV01*PCPBEV/100;

(I3)Private Consumption Expenditure –Tobacco (CPTOB)

CPTOB=CPTOB01*PCPTOB/100;

(I4)Private Consumption Expenditure –Clothing Footwear (CPCLFT)

CPCLFT=CPCLFT01*PCPCLFT/100**;**

(I5)Private Consumption Expenditure –Fuel & Power (CPFUEL)

CPFUEL=CPFUEL01*PCPFUEL/100;

(I6)Private Consumption Expenditure –Furniture & House Equip (CPFURN)

CPFURN=CPFURN01*PCPFURN/100;

(I7)Private Consumption Expenditure –Rents & Water Charges CPRENTW)

CPRENTW=CPRENTW01*PCPRENTW/100;

(I8)Private Consumption Expenditure –Household Operation (CPHOP)

CPHOP=CPHOP01*PCPHOP/100;

(I9)Private Consumption Expenditure –Medicare & Health (CPHEALTH)

CPHEALTH=CPHEALTH01*PCPHEALTH/100;

(I10)Private Consumption Expenditure –Recreation & Education (CPRECED)

CPRECED=CPRECED01*PCPRECED/100;

(I11)Private Consumption Expenditure –Transport & Communication (CPTRNCOM)

CPTRNCOM=CPTRNCOM01*PCPTRNCOM/100;

(I12)Private Consumption Expenditure –Miscellaneous (CPO)

CPO=CPO01*PCPO/100;

(I13)Real Private Consumption Expenditure – (CP01)

CP01 = CPFOOD01+CPBEV01+CPTOB01+CPCLFT01+CPFUEL01+CPFURN01+
CPRENTW01+CPHOP01+CPHEALTH01+CPO01+CPTRNCOM01+CPRECED01;

(I14)Private Consumption Expenditure – (CP)

CP = CPFOOD+CPBEV+CPTOB+CPCLFT+CPFUEL+CPFURN+CPRENTW+
CPHOP+CPHEALTH+CPO+CPTRNCOM+CPRECED;

(I15)Private Consumption Expenditure Deflator – (PCP)

PCP=CP/CP01*100;

(I16)Gross Fixed Capital Formation (IFIX)

IFIX=IFIX01*PIFIX/100;

(I17) Exports of Goods & Services (EX)-

EX=EX01*PEX/100;

(I18) Imports of Goods & Services (M)

M=M01*PM/100;

(I19)Real Gross Domestic Product (GDP01)

GDP01 ＝ CP01 + CG01 + IFIX01 + INVCH01 + EX01 – M01；

(I20) Gross Domestic Product (GDP)

GDP ＝ CP + CG + IFIX + INVCH + EX – M；

(I21) Gross Domestic Product Deflator(PGDP)

PGDP=GDP/GDP01*100;

(I22) Real Gross National Product (GNP01)

GNP01 ＝ GDP01 + YWN01

(I23) Gross National Product (GNP)

GNP ＝ GDP +YWN

(I24)Per Capita GNP(PCGNP)

PCGNP ＝ GNP/EUS/N

(I25) Exchange Rate (NT$ per US$) Index(ER@TW)

EUS =ER@TW*33.81/100;

III. **The Performance of the Macro-Econometric Model**

(1) Static Solution

Variable Code	Theil U-Statistic	RMSE	%Mean Difference	`%RMSE
CP	0.014	14974.4	-0.048	1.491
CP01	0.012	14255.4	-0.082	1.290
CPBEV	0.027	800.1	-0.100	3.130
CPBEV01	0.033	965.5	-0.629	3.556
CPCLFT	0.037	1749.9	-0.243	3.026
CPCLFT01	0.034	1569.3	-0.144	2.738
CPFOOD	0.022	5159.2	-0.085	2.338
CPFOOD01	0.013	3029.9	-0.010	1.213
CPFUEL	0.028	720.8	-0.200	2.499
CPFUEL01	0.026	656.7	-0.203	2.150
CPFURN	0.032	1072.7	-0.066	3.393
CPFURN01	0.030	1008.3	-0.039	3.269
CPHEALTH	0.020	1805.8	0.035	2.525
CPHEALTH01	0.021	1910.1	0.019	2.442
CPHOP	0.020	596.4	0.128	2.155
CPHOP01	0.017	522.1	-0.030	1.639
CPI	0.009	0.7	-0.001	0.887
CPIFOOD	0.026	2.1	-0.009	2.524
CPIENERGY	0.016	1.4	0.007	1.730
CPO	0.067	7132.8	-0.184	6.933
CPO01	0.067	7432.6	-0.264	6.856
CPRECED	0.031	6257.4	0.117	2.850
CPRECED01	0.028	6165.6	-0.132	2.737
CPRENTW	0.011	1831.2	0.073	1.237
CPRENTW01	0.011	2029.0	0.005	1.221
CPTOB	0.024	315.2	-0.162	2.271
CPTOB01	0.023	267.1	-0.147	2.234
CPTRNCOM	0.050	6739.5	-0.233	5.192
CPTRNCOM01	0.050	6842.2	-0.149	5.189
ER@TW	0.017	1.7	-0.016	1.811
EUS	0.017	0.6	-0.016	1.811
EX	0.049	52199.9	0.199	5.803
EX01	0.047	49639.3	0.082	5.709
GDP	0.033	62280.6	-0.016	3.662
GDP01	0.031	60798.7	0.003	3.213
GNP	0.033	62245.1	-0.015	3.591
GNP01	0.031	60798.7	0.003	3.150
IFIX	0.113	46185.5	-0.220	11.305
IFIX01	0.112	45437.9	-0.229	11.129
M	0.044	42890.7	0.097	4.915
M01	0.042	39014.8	-0.125	4.754
M2	0.007	96462.0	0.017	0.788
MPIUSD	0.018	1.5	0.002	1.730
PCGNP	0.037	104.5	-0.350	4.012
PCP	0.007	0.6	0.017	0.683
PCPBEV	0.017	1.7	0.008	1.582

PCPCLFT	0.016	1.7	-0.028	1.599
PCPFOOD	0.024	2.1	-0.009	2.349
PCPFUEL	0.014	1.4	0.039	1.445
PCPFURN	0.007	0.7	0.009	0.661
PCPHEALTH	0.009	0.8	-0.006	0.927
PCPHOP	0.017	1.4	-0.020	1.563
PCPO	0.008	0.7	0.022	0.820
PCPRECED	0.009	0.7	0.076	0.898
PCPRENTW	0.005	0.4	0.016	0.539
PCPTOB	0.015	1.5	-0.022	1.208
PCPTRNCOM	0.012	1.1	-0.007	1.182
PEX	0.016	1.6	0.032	1.621
PGDP	0.008	0.7	-0.052	0.853
PIFIX	0.011	1.1	0.012	1.090
PM	0.016	1.6	0.046	1.630
RMCP90	0.091	0.6	-1.364	10.660
WPI	0.014	1.2	-0.010	1.362
XPIUSD	0.010	1.1	0.013	1.036

(2) Dynamic Solution

Variable Code	Theil U-Statistic	RMSE	%Mean Difference	`%RMSE
CP	0.119	0.1	0.119	0.119
CP01	0.083	95364.2	-5.795	8.236
CPBEV	0.172	5145.9	-12.474	12.071
CPBEV01	0.240	7123.7	-17.594	14.144
CPCLFT	0.162	7650.9	-12.125	10.184
CPCLFT01	0.176	8112.5	-14.455	10.896
CPFOOD	0.076	17790.9	-3.902	7.362
CPFOOD01	0.078	18709.3	-6.476	7.091
CPFUEL	0.071	1813.2	-3.777	6.392
CPFUEL01	0.060	1539.7	-4.528	5.938
CPFURN	0.129	4296.1	-9.011	12.483
CPFURN01	0.097	3266.8	-7.895	10.064
CPHEALTH	0.126	11576.3	-9.670	12.654
CPHEALTH01	0.113	10397.2	-8.394	10.643
CPHOP	0.137	4036.0	-5.902	12.517
CPHOP01	0.099	3060.4	0.033	7.981
CPI	0.041	3.4	-1.259	3.928
CPIFOOD	0.052	4.1	-0.200	5.428
CPIENERGY	0.053	4.4	1.344	6.115
CPO	0.137	14566.1	-3.637	13.226
CPO01	0.114	12745.0	1.437	10.914
CPRECED	0.147	30234.4	-10.586	14.472
CPRECED01	0.054	11820.6	-0.102	5.237
CPRENTW	0.165	28419.0	-10.471	14.221
CPRENTW01	0.110	20083.0	-5.190	9.988
CPTOB	0.067	859.2	4.801	6.180
CPTOB01	0.159	1873.9	-12.807	13.760
CPTRNCOM	0.149	19894.3	-13.172	12.010
CPTRNCOM01	0.157	21248.4	-14.134	12.898

ER@TW	0.064	6.1	-1.650	6.736
EUS	0.064	2.1	-1.650	6.736
EX	0.095	101000.0	-6.870	12.122
EX01	0.051	54386.2	0.085	6.604
GDP	0.099	185000.0	-6.336	9.917
GDP01	0.058	112000.0	-3.335	5.982
GNP	0.097	185000.0	-6.212	9.765
GNP01	0.056	112000.0	-3.272	5.884
IFIX	0.190	78136.9	-8.412	13.252
IFIX01	0.171	69123.1	-9.160	16.072
M	0.114	112000.0	-8.196	9.508
M01	0.074	69732.7	-4.160	9.278
M2	0.042	598000.0	0.393	3.793
MPIUSD	0.065	5.7	-1.676	6.232
PCGNP	0.109	308.8	-3.909	10.655
PCP	0.047	4.0	-1.968	4.373
PCPBEV	0.096	9.3	6.335	10.049
PCPCLFT	0.040	4.2	2.173	4.123
PCPFOOD	0.055	4.8	3.309	6.315
PCPFUEL	0.052	5.0	1.523	5.618
PCPFURN	0.045	4.4	-1.173	4.224
PCPHEALTH	0.028	2.5	-0.822	2.919
PCPHOP	0.085	6.9	-5.295	7.508
PCPO	0.078	6.7	-4.490	7.058
PCPRECED	0.137	10.8	-10.066	11.953
PCPRENTW	0.064	5.3	-4.374	5.540
PCPTOB	0.228	24.2	18.631	13.199
PCPTRNCOM	0.029	2.7	1.336	3.063
PEX	0.099	9.9	-6.879	9.786
PGDP	0.050	4.4	-2.999	4.566
PIFIX	0.039	3.8	0.322	3.776
PM	0.072	7.2	-3.470	7.259
RMCP90	0.105	0.7	-1.759	11.932
WPI	0.059	5.2	4.525	6.179
XPIUSD	0.119	12.5	-7.895	10.728

Appendix C The Simulation Results for Macro-econometric Model

Table C1 The Simulation Results for Macro-econometric Model – Difference

Scenarios	Scenarios 1 : both food and energy shock				Scenarios 1A : only energy shock				Scenarios 1B : only food shock				Scenarios 1C : nergy shock(price change as food shock)			
time periods	1993	1994	1995	1996	1993	1994	1995	1996	1993	1994	1995	1996	1993	1994	1995	1996
Real terms(NT Billions)																
Real GDP	-25.56	-75.12	-126.55	-140.55	-1.54	-21.90	-88.70	-153.45	-27.89	-47.01	-31.89	21.21	-3.34	-28.42	-67.92	-66.41
Total Invest	-16.85	-48.98	-75.23	-76.66	-2.79	-23.47	-63.90	-93.75	-24.70	-34.00	-8.95	20.78	-5.71	-23.82	-43.00	-40.93
Real Export	-74.18	-42.90	177.52	-20.46	-6.05	-3.87	101.53	-71.29	-28.21	-14.91	63.58	51.78	-12.16	44.97	-8.59	-24.86
Real Import	-109.24	-168.08	65.83	-62.33	-18.41	-77.44	12.87	-142.84	-35.22	-25.48	57.20	89.47	-37.14	2.17	-46.43	-61.64
Private Consumption(C.)	-43.79	-151.34	-163.02	-105.79	-11.11	-72.01	-113.49	-131.26	-10.19	-23.58	-29.33	38.12	-22.61	-47.42	-62.76	-62.26
Food C.	-6.40	-22.45	-24.56	-13.46	-1.35	-8.41	-11.91	-10.39	-1.42	-1.79	-1.53	-1.75	-2.74	-5.47	-5.42	-5.29
Beverage C.	-1.29	-3.47	-2.90	-2.86	-0.34	-2.17	-3.20	-4.90	-0.23	-0.70	0.73	2.54	-0.71	-1.29	-2.09	-2.86
Tobacco C.	-0.24	-0.59	-0.36	-0.31	-0.06	-0.37	-0.50	-0.80	0.06	0.00	0.21	0.56	-0.13	-0.21	-0.34	-0.46
Clothing &Foot wear C.	-1.48	-4.92	-4.41	-1.84	-0.41	-2.56	-3.82	-4.56	-0.61	-1.18	-0.08	3.26	-0.83	-1.59	-2.08	-2.33
Fuel & Power C.	-1.01	-4.52	-5.16	-3.46	-0.63	-3.85	-5.20	-4.27	-0.20	-0.11	0.17	0.97	-1.28	-2.46	-2.43	-1.72
Rent & Water Charge C.	-2.12	-11.35	-21.56	-23.34	-0.63	-5.26	-14.40	-20.14	-1.57	-4.95	-5.70	-1.23	-1.28	-5.22	-8.94	-10.64
Furniture & House Equip. C.	-1.81	-7.81	-7.96	-1.31	-0.49	-3.50	-6.20	-5.79	-0.23	-0.18	-1.08	5.19	-1.00	-2.54	-2.93	-2.62
Household Operation C.	-0.81	-2.91	-3.62	-3.08	-0.21	-1.46	-2.43	-3.10	-0.12	-0.15	-0.96	0.32	-0.44	-0.96	-1.39	-1.49
Medical Care & Health C.	-1.74	-6.05	-8.12	-8.66	-0.43	-3.01	-5.53	-8.36	-0.13	0.17	-2.15	0.25	-0.88	-2.06	-3.48	-4.59
Recreation & Education C.	-4.19	-14.81	-21.45	-25.37	-0.90	-6.24	-13.18	-22.64	-3.66	-4.44	-6.96	-1.27	-1.85	-4.67	-9.70	-11.16
Transport & Communication C.	-6.94	-25.22	-28.57	-18.26	-1.68	-11.21	-20.25	-25.31	-2.37	-4.92	-6.45	9.56	-3.42	-8.06	-11.85	-11.58
Miscellaneous	-15.75	-47.24	-34.36	-3.85	-3.98	-23.97	-26.86	-21.01	0.28	-5.35	-5.51	19.71	-8.06	-12.90	-12.12	-7.52

Price index and deflator (%)																
Export price index(XPIUSD)	7.59	19.76	0.25	-4.61	0.90	2.03	-9.44	-6.36	5.95	17.40	10.40	1.88	1.83	-3.10	-4.39	-0.96
Import price index(MPIUSD)	17.93	40.65	1.21	-7.81	3.45	14.82	-5.14	-3.13	12.74	17.56	6.59	-4.82	7.09	0.48	-2.39	0.42
Wholesale price index(WPI)	4.92	13.32	6.95	-2.46	1.36	7.07	3.99	-0.09	0.89	2.22	2.78	-2.40	2.77	2.84	0.65	-0.11
Consumer price index(CPI)	1.38	3.12	0.94	-1.19	0.25	1.12	-0.24	-1.52	0.26	-0.68	1.18	0.33	0.51	0.20	-0.55	-0.81
CPI-Food	2.89	4.56	1.52	-0.85	0.00	0.00	0.00	0.00	1.59	-0.78	1.52	-0.85	0.00	0.00	0.00	0.00
CPI-Energy	3.76	19.89	11.34	3.16	3.76	19.89	11.34	3.16	-2.57	-4.60	0.00	0.00	7.79	7.48	3.13	0.56
Ex.rate Index (er@tw)	0.62	2.48	2.86	0.87	0.15	0.93	1.35	0.45	-1.53	-0.90	1.52	0.47	0.30	0.70	0.44	-0.02
GDP Deflator (PGDP)	-5.86	-8.45	5.59	2.70	-1.68	-8.36	-3.80	-7.02	-9.22	-2.88	9.76	10.20	-3.43	-2.34	-3.04	-3.85
Invest Deflator (PIFIX)	2.30	5.57	1.94	-2.00	0.64	3.14	1.21	-0.54	0.11	2.91	0.70	-1.48	1.30	1.09	-0.01	-0.16
Export Deflator (PEX)	5.53	16.03	4.07	-2.38	0.73	2.30	-4.57	-4.14	2.17	8.89	9.07	1.92	1.47	-1.22	-2.52	-0.74
Export Deflator (PM)	11.85	28.95	4.24	-5.64	2.40	10.55	-1.77	-2.33	6.47	10.21	6.04	-3.35	4.90	1.17	-1.41	0.22
Private C Deflator	1.05	2.90	1.65	-0.47	0.25	1.23	0.33	-1.12	-0.08	-0.16	-0.12	-0.09	0.50	0.42	-0.29	-0.75
Food deflator	2.88	6.06	0.41	-2.72	0.52	2.23	-0.93	-2.72	0.88	2.45	0.01	-0.01	1.05	0.21	-1.16	-1.10
Beverage Deflator	-0.10	0.62	1.69	1.25	-0.02	0.03	0.74	0.82	1.23	5.07	0.02	0.02	-0.05	0.25	0.39	0.49
Tobacco Deflator	-0.10	0.18	0.56	0.18	-0.02	-0.02	0.34	0.32	-1.42	-4.17	0.08	0.08	-0.04	0.12	0.14	0.28
Clothing & Foot wear Deflator	0.54	1.13	0.17	-0.58	0.11	0.44	-0.32	-0.96	-0.50	-1.00	0.04	0.05	0.23	0.01	-0.35	-0.67
Fuel & Power Deflator	2.47	13.08	9.75	3.38	2.45	13.04	9.67	3.34	-0.69	-0.32	-0.04	-0.05	5.01	5.86	2.96	0.73
Rent & Water Charge Deflator	0.38	1.72	2.04	0.06	0.14	0.82	0.67	-1.17	2.12	4.44	0.02	0.01	0.28	0.49	-0.23	-0.86
Furniture & H. Equip. Deflator	0.71	1.77	1.01	-0.68	0.13	0.61	0.06	-1.05	1.14	2.11	0.02	0.01	0.26	0.21	-0.33	-0.64
Household Operation Deflator	0.28	1.65	1.63	-1.03	0.06	0.42	0.44	-1.33	2.86	5.91	-0.02	-0.03	0.13	0.35	-0.31	-0.98
Medical Care & Health Deflator	0.60	1.53	1.10	-0.32	0.10	0.52	0.19	-0.60	1.16	3.47	-0.02	-0.04	0.21	0.21	-0.14	-0.45
Recreation & Edu. etc. Deflator	0.30	1.50	2.69	1.35	0.05	0.41	0.78	-0.19	0.90	0.70	0.01	0.01	0.11	0.38	0.21	-0.71
Transport & Comm. Deflator	0.70	1.93	1.45	-0.72	0.13	0.64	0.21	-1.11	0.67	2.09	0.00	-0.03	0.26	0.28	-0.32	-0.71
Miscellaneous	0.88	2.48	1.75	-0.86	0.16	0.82	0.26	-1.40	0.16	-0.41	0.00	-0.01	0.32	0.35	-0.39	-0.94

Table C2 The Simulation Results for Macro-econometric Model – Percentage Change(%)

Scenarios	Scenarios 1 : both food and energy shock				Scenarios 1A : only energy shock				Scenarios 1B : only food shock				Scenarios 1C : nergy shock(price change as food shock)			
time periods	1993	1994	1995	1996	1993	1994	1995	1996	1993	1994	1995	1996	1993	1994	1995	1996
Real terms(NT Billions)																
Real GDP	-0.38	-1.05	-1.66	-1.74	-0.02	-0.31	-1.17	-1.90	-0.42	-0.66	-0.42	0.26	-0.04	-0.32	-0.71	-0.66
Total Invest	-1.13	-3.05	-4.35	-4.36	-0.19	-1.46	-3.70	-5.33	-1.66	-2.12	-0.52	1.18	-0.29	-1.12	-1.97	-1.72
Real Export	-2.60	-1.43	5.25	-0.57	-0.21	-0.13	3.00	-1.98	-0.99	-0.50	1.88	1.43	-0.31	1.11	-0.19	-0.46
Real Import	-3.76	-5.59	1.99	-1.78	-0.63	-2.58	0.39	-4.08	-1.21	-0.85	1.73	2.55	-0.93	0.05	-1.05	-1.21
Private Consumption(C.)	-1.10	-3.51	-3.58	-2.18	-0.28	-1.67	-2.49	-2.71	-0.26	-0.55	-0.64	0.79	-0.44	-0.86	-1.08	-1.02
Food C.	-0.72	-2.43	-2.57	-1.35	-0.15	-0.91	-1.24	-1.04	-0.16	-0.19	-0.16	-0.18	-0.26	-0.49	-0.46	-0.43
Beverage C.	-1.12	-2.76	-2.16	-2.00	-0.30	-1.72	-2.38	-3.42	-0.19	-0.56	0.54	1.78	-0.47	-0.83	-1.34	-1.80
Tobacco C.	-0.52	-1.22	-0.70	-0.58	-0.13	-0.77	-0.99	-1.50	0.12	0.01	0.42	1.05	-0.23	-0.36	-0.59	-0.76
Clothing &Foot wear C.	-0.97	-2.94	-2.42	-0.94	-0.27	-1.53	-2.10	-2.33	-0.40	-0.71	-0.05	1.66	-0.39	-0.70	-0.87	-0.95
Fuel & Power C.	-1.10	-4.65	-5.07	-3.24	-0.69	-3.97	-5.10	-4.00	-0.22	-0.11	0.17	0.91	-1.13	-2.01	-1.93	-1.32
Rent & Water Charge C.	-0.32	-1.54	-2.71	-2.72	-0.09	-0.72	-1.81	-2.35	-0.23	-0.67	-0.72	-0.14	-0.15	-0.58	-0.95	-1.11
Furniture & House Equip. C.	-1.85	-7.21	-6.58	-0.95	-0.51	-3.23	-5.13	-4.21	-0.23	-0.17	-0.90	3.78	-0.67	-1.58	-1.75	-1.49
Household Operation C.	-0.87	-2.84	-3.21	-2.41	-0.23	-1.42	-2.16	-2.43	-0.12	-0.14	-0.86	0.25	-0.32	-0.63	-0.87	-0.88
Medical Care & Health C.	-0.66	-2.08	-2.40	-2.29	-0.16	-1.04	-1.63	-2.21	-0.05	0.06	-0.64	0.07	-0.21	-0.46	-0.72	-0.92
Recreation & Education C.	-0.56	-1.90	-2.57	-2.91	-0.12	-0.80	-1.58	-2.60	-0.49	-0.57	-0.84	-0.15	-0.20	-0.47	-0.91	-0.98
Transport & Communication C.	-1.55	-5.20	-5.69	-3.52	-0.37	-2.31	-4.04	-4.87	-0.53	-1.01	-1.28	1.84	-0.63	-1.35	-1.78	-1.63
Miscellaneous	-4.43	-10.69	-8.20	-0.82	-1.12	-5.42	-6.41	-4.49	0.08	-1.21	-1.32	4.21	-1.45	-2.17	-2.07	-1.22

Price index and deflator (%)																
Export price index(XPIUSD)	6.49	16.86	0.20	-3.76	0.77	1.73	-7.54	-5.18	5.09	14.84	8.31	1.53	1.57	-2.64	-3.51	-0.78
Import price index(MPIUSD)	20.64	44.64	1.21	-8.29	3.97	16.27	-5.13	-3.32	14.67	19.28	6.57	-5.11	8.16	0.53	-2.38	0.45
Wholesale price index(WPI)	5.98	15.86	7.71	-2.75	1.65	8.42	4.42	-0.10	1.08	2.64	3.08	-2.69	3.37	3.38	0.72	-0.12
Consumer price index(CPI)	1.66	3.61	1.05	-1.29	0.30	1.30	-0.27	-1.65	0.31	-0.79	1.32	0.36	0.61	0.23	-0.61	-0.88
CPI-Food	3.78	5.60	1.79	-0.96	0.00	0.00	0.00	0.00	2.08	-0.96	1.79	-0.96	0.00	0.00	0.00	0.00
CPI-Energy	5.12	27.48	15.13	4.18	5.12	27.48	15.13	4.18	-3.50	-6.35	0.00	0.00	10.61	10.33	4.18	0.74
Ex.rate Index (er@tw)	0.79	3.17	3.65	1.07	0.19	1.19	1.72	0.55	-1.96	-1.15	1.94	0.58	0.38	0.89	0.56	-0.02
GDP Deflator (PGDP)	-1.60	-2.26	1.47	0.69	-0.46	-2.24	-1.00	-1.79	-2.52	-0.77	2.56	2.60	-0.94	-0.63	-0.80	-0.98
Invest Deflator (PIFIX)	2.24	5.46	1.86	-1.97	0.62	3.08	1.16	-0.53	0.11	2.85	0.67	-1.45	1.27	1.07	-0.01	-0.16
Export Deflator (PEX)	5.97	16.82	4.02	-2.32	0.79	2.41	-4.52	-4.04	2.34	9.33	8.96	1.87	1.59	-1.28	-2.49	-0.72
Export Deflator (PM)	13.52	31.60	4.24	-5.74	2.74	11.52	-1.77	-2.37	7.38	11.15	6.04	-3.41	5.59	1.28	-1.41	0.22
Private C Deflator	1.22	3.23	1.78	-0.49	0.29	1.37	0.36	-1.17	-0.09	-0.18	-0.13	-0.09	0.58	0.47	-0.31	-0.78
Food deflator	3.38	6.66	0.43	-2.76	0.61	2.45	-0.98	-2.76	1.03	2.69	0.01	-0.01	1.23	0.23	-1.22	-1.12
Beverage Deflator	-0.11	0.69	1.85	1.31	-0.02	0.03	0.81	0.86	1.36	5.62	0.02	0.02	-0.06	0.28	0.43	0.51
Tobacco Deflator	-0.11	0.19	0.58	0.18	-0.02	-0.02	0.35	0.33	-1.51	-4.40	0.08	0.08	-0.04	0.13	0.15	0.29
Clothing & Foot wear Deflator	0.52	1.10	0.16	-0.53	0.11	0.43	-0.30	-0.88	-0.48	-0.97	0.04	0.05	0.22	0.01	-0.33	-0.62
Fuel & Power Deflator	2.73	14.41	10.47	3.58	2.71	14.37	10.39	3.54	-0.76	-0.35	-0.04	-0.05	5.53	6.46	3.18	0.77
Rent & Water Charge Deflator	0.45	1.92	2.21	0.06	0.16	0.92	0.72	-1.23	2.49	4.96	0.02	0.01	0.33	0.55	-0.25	-0.91
Furniture & H. Equip. Deflator	0.71	1.72	0.96	-0.64	0.13	0.59	0.06	-0.99	1.14	2.05	0.02	0.01	0.26	0.20	-0.31	-0.60
Household Operation Deflator	0.36	2.06	1.89	-1.17	0.08	0.52	0.51	-1.52	3.70	7.37	-0.02	-0.03	0.17	0.44	-0.36	-1.12
Medical Care & Health Deflator	0.68	1.69	1.19	-0.34	0.11	0.58	0.21	-0.64	1.31	3.84	-0.02	-0.04	0.24	0.23	-0.15	-0.48
Recreation & Edu. etc. Deflator	0.39	1.85	3.19	1.51	0.07	0.51	0.92	-0.21	1.17	0.87	0.01	0.01	0.14	0.47	0.25	-0.79
Transport & Comm. Deflator	0.74	2.03	1.49	-0.73	0.14	0.67	0.22	-1.12	0.71	2.19	0.00	-0.03	0.27	0.29	-0.33	-0.72
Miscellaneous	1.02	2.76	1.90	-0.90	0.19	0.91	0.28	-1.47	0.19	-0.46	0.00	-0.01	0.37	0.39	-0.42	-0.98

Table C3 The Simulation Results for Macro-econometric Model

Scenarios 2:	Difference (simulation-baseline)				Percentage Change (%)			
time periods	2004	2005	2006	2007	2004	2005	2006	2007
Real terms(NT Billions)								
Real GDP	-67.20	-190.63	-217.91	-236.49	-0.59	-1.61	-1.76	-1.81
Total Invest	41.29	-109.39	-156.47	-152.86	1.76	-4.61	-6.54	-6.27
Real Export	-205.52	-115.67	459.87	-54.35	-2.96	-1.55	5.59	-0.61
Real Import	-291.21	-424.39	176.59	-127.09	-4.76	-6.68	2.63	-1.83
Private Consumption(C.)	-194.14	-389.91	-344.71	-156.37	-2.91	-5.68	-4.93	-2.19
Food C.	-73.15	-93.63	-94.32	-73.48	-5.58	-7.08	-6.98	-5.38
Beverage C.	-7.42	-7.67	-3.15	1.00	-5.01	-5.16	-2.08	0.65
Tabaco C.	-7.08	-6.11	-4.54	-3.43	-12.85	-11.04	-8.38	-6.42
Clothing &Foot wear C.	-18.82	-28.44	-28.87	-23.05	-7.44	-11.16	-11.30	-8.78
Fuel & Power C.	-4.35	-6.71	-6.07	-2.37	-3.04	-4.45	-4.08	-1.57
Rent&Water Charge C.	-20.47	-27.72	-39.94	-35.50	-2.01	-2.67	-3.76	-3.26
Furniture & House Equip. C.	-21.78	-39.96	-40.97	-24.06	-10.20	-18.44	-18.25	-10.38
Househole Operation C.	21.93	21.66	26.01	33.24	11.84	11.25	12.80	15.95
Medical Care & Health C.	-32.24	-35.70	-32.37	-25.53	-5.70	-6.09	-5.40	-4.13
Recreation & Education etc. C.	47.06	29.33	25.42	29.79	3.63	2.18	1.80	2.06
Transport & Communication C.	-135.99	-160.05	-143.41	-101.98	-15.80	-17.46	-16.43	-11.55
Miscellaneous	58.17	-34.90	-2.50	68.99	9.44	-5.48	-0.38	10.04
Price index and deflator (%)								
Export price index(XPIUSD)	10.79	21.21	4.27	0.26	11.08	21.49	4.27	0.25
Import price index(MPIUSD)	25.82	52.04	7.89	-1.60	29.56	56.00	7.89	-1.48
Wholesale price index(WPI)	10.38	20.48	13.56	1.70	11.03	21.63	13.56	1.60
Cosumer price index(CPI)	2.22	4.98	3.02	0.89	2.28	5.01	3.02	0.87
CPI-Food	5.90	7.58	4.01	1.06	6.29	7.53	4.01	1.03
CPI-Energy	2.62	26.40	15.31	2.97	2.94	28.31	15.31	2.84
Ex.rateIndex(er@tw)	-3.57	0.45	2.43	1.12	-3.61	0.47	2.53	1.15
GDP Deflator (PGDP)	-6.78	-10.20	13.37	15.84	-1.74	-2.63	3.47	4.10
Invest Deflator (PIFIX)	6.35	9.53	6.11	1.85	6.13	9.26	5.77	1.69
Export Deflator (PEX)	5.93	18.58	6.91	1.17	5.89	18.86	6.85	1.13
Export Deflator (PM)	14.40	37.00	7.28	-3.97	13.35	34.19	6.40	-3.32
Private C Deflator	0.69	3.91	3.23	1.25	0.68	3.82	3.14	1.20
Food deflator	10.19	15.89	9.69	6.18	9.82	14.39	8.80	5.49
Beverage Deflator	-1.42	-0.04	1.40	0.64	-1.29	-0.04	1.27	0.58
Tabaco Deflator	25.72	20.61	17.92	15.27	19.74	15.81	12.37	10.09
Clothing &Foot wear Deflator	5.29	6.38	5.69	5.21	5.02	6.05	5.52	4.94
Fuel & Power Deflator	0.09	13.39	10.03	1.84	0.09	12.96	9.30	1.65
Rent&Water Charge Deflator	-2.17	1.02	2.70	1.60	-2.23	1.05	2.77	1.64
Furniture & H. Equip. Deflator	5.27	6.98	6.68	5.24	5.58	7.35	6.99	5.42
Househole Operation Deflator	-6.81	-5.02	-4.94	-7.83	-6.75	-4.99	-4.92	-7.74
Medical Care & Health Deflator	0.64	2.33	1.97	0.62	0.62	2.22	1.84	0.57
Recreation & Edu. etc. Deflator	-7.78	-5.06	-3.14	-4.18	-7.86	-5.12	-3.17	-4.12
Transport & Comm. Deflator	4.39	6.01	5.83	3.99	4.40	6.00	5.77	3.97
Miscellaneous	-1.90	0.74	0.42	-2.13	-1.92	0.74	0.42	-2.13

Appendix D The Estimation Results for AIDS Model

Dep. \ Indep.	Constant	Food Exp. Deflator	Beverages Exp. Deflator	Tobacco Exp. Deflator	Clothing Exp. Deflator	Fuel & Power Exp. Deflator	Rents & Water Exp. Deflator	House Equip Exp. Deflator	Household Operation Exp. Deflator	Medicare & Health Exp. Deflator	Recreation & Education Exp. Deflator	Transport & Comm. Exp. Deflator	Mis. Exp. Deflator	Real expenditure
Ratio of Food Exp.	2.01 ***	0.36 ***	-0.03	-0.01	-0.06 *	0.07 **	-0.07	0.01	0.02	-0.03	0.08	-0.11	-0.23	-0.09 ***
	7.34	13.17	-0.85	-0.52	-1.82	2.55	-1.05	0.29	0.58	-0.53	1.39	-1.60		-6.37
Ratio of Beverages Exp.	0.08	-0.03	0.07 ***	-0.01	0.00	-0.01	0.04	0.01	-0.01	-0.05 **	-0.02	0.02	-0.01	0.00
	0.73	-0.85	5.31	-1.45	-0.31	-0.59	1.59	0.75	-0.86	-2.36	-1.05	0.75		-0.35
Ratio of Tobacco Exp.	0.13 **	-0.01	-0.01	0.02 ***	0.00	0.03 ***	-0.01	0.03 ***	0.01 *	-0.01	0.01	-0.03 **	-0.03	-0.01 *
	2.52	-0.52	-1.45	6.48	-0.50	5.72	-0.63	4.66	2.05	-1.08	0.69	-2.50		-2.10
Ratio of Clothing Footwear Exp.	0.18	-0.06 *	0.00	0.00	0.12 ***	0.02 *	0.05 *	-0.01	-0.02	-0.03	0.03	-0.04	-0.04	-0.01
	1.51	-1.82	-0.31	-0.50	8.10	1.90	1.78	-0.99	-1.24	-1.63	1.11	-1.51		-0.96
Ratio of Fuel & Power Exp.	0.32 ***	0.07 **	-0.01	0.03 ***	0.02 *	0.11 ***	-0.02	-0.01	0.01	-0.02	0.02	-0.07 **	-0.14	-0.01 ***
	3.54	2.55	-0.59	5.72	1.90	12.12	-0.85	-1.09	1.21	-1.12	1.14	-3.01		-3.12
Ratio of Rents & Water Charges Exp.	1.54 ***	-0.07	0.04	-0.01	0.05 *	-0.02	0.43 ***	0.07	-0.10 *	-0.05	0.39 ***	-0.28 **	-0.45	-0.07 ***
	3.83	-1.05	1.59	-0.63	1.78	-0.85	4.34	1.45	-1.95	-0.75	4.65	-2.86		-3.40
Ratio of House Equip Exp.	-0.05	0.01	0.01	0.03 ***	-0.01	-0.01	0.07	0.06 ***	-0.01	-0.03	0.02	-0.07 **	-0.06	0.00
	-0.45	0.29	0.75	4.66	-0.99	-1.09	1.45	4.65	-0.84	-1.31	0.75	-2.61		0.82
Ratio of Household Operation Exp.	0.10 *	0.02	-0.01	0.01 *	-0.02	0.01	-0.10 *	-0.01	0.05 ***	-0.02 *	0.02 *	-0.03 **	0.08	0.00
	1.85	0.58	-0.86	2.05	-1.24	1.21	-1.95	-0.84	6.82	-1.85	2.04	-2.72		-1.36
Ratio of Medicare & Health Exp.	0.34	-0.03	-0.05 **	-0.01	-0.03	-0.02	-0.05	-0.03	-0.02 *	0.05	0.13 **	-0.06	0.11	-0.01
	1.34	-0.53	-2.36	-1.08	-1.63	-1.12	-0.75	-1.31	-1.85	1.03	2.53	-1.05		-1.01
Ratio of Recreation & Education Exp.	0.09	0.08	-0.02	0.01	0.03	0.02	0.39 ***	0.02	0.02 *	0.13 **	0.20 **	-0.01	-0.86	0.00
	0.27	1.39	-1.05	0.69	1.11	1.14	4.65	0.75	2.04	2.53	3.01	-0.18		0.26
Ratio of Transport & Comm. Exp.	-1.26 **	-0.11	0.02	-0.03 **	-0.04	-0.07 **	-0.28 **	-0.07 **	-0.03 **	-0.06	-0.01	0.56 ***	0.14	0.07 **
	-2.31	-1.60	0.75	-2.50	-1.51	-3.01	-2.86	-2.61	-2.72	-1.05	-0.18	4.15		2.56
Ratio of Mis. Exp.	-2.47	-0.23	-0.01	-0.03	-0.04	-0.14	-0.45	-0.06	0.08	0.11	-0.86	0.14	1.49	0.12

Note:1.*** is denoted as 1% significance level; ** is denoted as 5% significance level; * is denoted as 10% significance level.

2. the 2nd row of each variable is t-Value.

Appendix E the Matches for Sector in Input-Output tables

I. The matches for 49-Sectors with 10-Sectors

10-Sectors		49-Sectors	
No.	Definitions	No.	Definitions
1	Agriculture	1	Agricultural Products
		2	Livestock
		3	Forest Products
		4	Fisheries
2	Minerals	5	Minerals
3	Manufacturing—Traditional Industries	6	Process Foods
		7	Beverage
		8	Tobacco
		9	Textile Mill Products
		10	Wearing Apparel and Accessories
		11	Leather & Leather Products
		12	Wood & Wood Products
		13	Paper & Paper Products & Printed Matter
4	Manufacturing—Chemical and petroleum-related industries	14	Industrial Chemicals
		15	Artificial Fibers
		16	Plastic
		17	Plastic & Rubber Products
		18	Misc. Chemical Manufactures
		19	Petroleum Refining Products
		20	Non-metallic Mineral Products Manufacturing
5	Manufacturing—Heavy Industries	21	Iron and Steel Products
		22	Miscellaneous Metals
		23	Metallic Products
		24	Machinery
		25	Household Electrical, Electronic Products
		26	Information Products
		27	Communication Equipment
		28	Electronic Components & Parts
		29	Electrical Machinery & Other Appliances
		30	Transport Equipment
		31	Other Manufactures
6	Construction	32	Residential Building Construction
		33	Public & Other Construction
7	Electricity, Gas and Water	34	Electricity
		35	Gas
		36	City Water
8	Transportation, Telecommunication & Wholesales, Tradindg	37	Transportation and Warehousing
		38	Post & Telecommunication Services
		39	Commodities Trading
9	Finance, Insurance and Real Estate Services	40	Finance & Insurance Services
		41	Real Estate Services
		42	Restaurant & Hotel Services
10	The other services	45	Public Adminstration Services
		43	Information Services
		44	Other Business Services
		46	Education Services
		47	Medical Services
		48	Broadcasting, Recreational & Cultural Services
		49	Other Social, Personal and Related Community Services

http://www.stat.gov.tw/ct.asp?xItem=17204&ctNode=2107。
http://eng.stat.gov.tw/ct.asp?xItem=8488&ctNode=1650

II. The matches for 49 Sectors with 161 Sector

49-Sectors		161-Sectors		49 Sectors		161Sectors	
No.	Definitions	No.	Definitions	No.	Definitions	No.	Definitions
1	Agricultural Products	1	Paddy Rice	24	Machinery	86	General-Purpose Industrial Machinery
		2	Coarse Grain Crops			87	Metal Processing Machinery
		3	Sugarcane			88	Industrial Machinery
		4	Other Special Crops			89	Other Machinery
		5	Fruits			90	Machinery Parts,Repair & Maintenance
		6	Vegetables	25	Household Electrical, Electronic Products	91	Household Electrical Appliances
		7	Other Horticultural Crops			92	Electric lamps & Lighting Equipment
		10	Agricultural Services			100	Video and Radio Electronic Products
2	Livestock	8	Hogs	26	Information Products	96	Computer Products
		9	Other Poultry & Livestock			97	Computer Peripheral Equipment
3	Forest Products	11	Forestry			98	Data Storage Media
4	Fisheries	12	Fishery Products			99	Computer Components
5	Minerals	13	Energy Minerals	27	Communication Equipment	101	Communication Equipment
		14	Metallic Minerals	28	Electronic Components & Parts	102	Semiconductors
		15	Salt			103	Optoeletronic Components & Materials
		16	Other Non-Metallic Minerals			104	Electronic Components & Parts
6	Process Foods	17	Slaughtering & By-Products	29	Electrical Machinery & Other Appliances	93	Power Generation, Transmission and Distribution Machinery
		18	Edible Oil & Fat By-Products			94	Wires & Cables
		19	Flour			95	Other Electrical Materials
		20	Rice	30	Transport Equipment	105	Ships
		21	Sugar			106	Motor Vehicles
		22	Animal Feeds			107	Motorcycles
		23	Canned Foods			108	Bicycles
		24	Frozen Foods			109	Other Transport Equitment
		25	Monosodium Glutamate	31	Other Manufactures	110	Precision Instruments & Apparatus
		26	Other Seasonings			111	Education & Entertainment Articles
		27	Dairy Products			112	Other Manufactures
		28	Sugar Confectionery &	32	Residential	116	Residential Building

49-Sectors		161-Sectors		49 Sectors		161Sectors	
No.	Definitions	No.	Definitions	No.	Definitions	No.	Definitions
			Bakery Products		Building Construction		Construction
		29	Other Foods			117	Nonresidential Building Construction
7	Beverage	30	Non-Alcoholic Beverages	33	Public & Other Construction	118	Public Works
		31	Alcoholic Beverages			119	Other Construction
8	Tobacco	32	Tobacco	34		113	Electricity
9	Textile Mill Products	33	Cotton & Cotton Fabrics	35	Electricity	114	Gas
		34	Wool & Worsted Fabrics	36	Gas	115	City Water, Steam & Hot Water
		35	Artificial Fabrics	37	City Water Transportation and Warehousing	126	Railroad Vehicle Transportation
		36	Knitted Fabrics			127	Other Land Transportation
		37	Other Fabrics			128	Water Transportation
		38	Printing, Dyeing & Finishing			129	Air Transportation
10	Wearing Apparel and Accessories	39	Tatted Garments			130	Services Incidental to Transport
		40	Knitted Garments			131	Travel Agency Services
		41	Fabric Products, Wearing Apparel & Accessories			132	Warehousing
11	Leather & Leather Products	42	Leather	38	Electricity	133	Postal Services
		43	Leather Footwear			134	Telecommunication Services
		44	Other Leather Products	39	Commodities Trading	120	Wholesale Trade
12	Wood & Wood Products	45	Lumber			121	Retail Trade
		46	Plywood			122	International Trade
		47	Wood,Bamboo & Rattan Products	40	Finance & Insurance Services	135	Finance
		48	Non-Metallic Furniture			136	Securities & Futures
13	Paper & Paper Products & Printed Matter	49	Pulp & Paper			137	Insurance
		50	Paper Products	41	Real Estate Services	138	House Services
		51	Newspapers, Books & Magazines			139	Real Estate Services
		52	Other Printed Matters & Bookbinding	42	Restaurant & Hotel Services	124	Hotel Services
14	Industrial Chemicals	53	Basic Industrial Chemicals			125	Restaurant Services
		54	Petrochemical Raw Materials	43		143	Information Services
		59	Other Chemical Materials	44	Information Services Other Business Services	123	Commodity Brokerage
15	Artificial Fibers	56	Synthetic Fibers			140	Renting & Leasing Services
		57	Other Artificial Fibers			141	Legal and Accounting Services
16	Plastic	58	Plastics (Synthetic Resins)			142	Consulting Services
17	Plastic & Rubber	67	Rubber Products			144	Research & Development Services

49-Sectors		161-Sectors		49 Sectors		161Sectors	
No.	Definitions	No.	Definitions	No.	Definitions	No.	Definitions
	Products	68	Plastic & Rubber Footwear			145	Advertising Services
		69	Other Plastic Products			146	Other Specialized and Technologic Services
18	Misc. Chemical Manufactures	55	Chemical Fertilizers			152	Support Services
		60	Coatings	45	Public Adminstration Services	160	Public Administration Services
		61	Medicines	46	Education Services	147	Educational Training Services
		62	Pesticides and Herbicides	47	Medical Services	148	Medical & Health Services
		63	Cleaning Preparations and Cosmetics	48	Broadcasting, Recreational & Cultural Services	150	Radio, Television & Movies Services
		64	Other Chemical products			151	Recreational & Cultural Services
19	Petroleum Refining Products	65	Petroleum Refining Products	49	Other Social, Personal and Related Community Services	149	Social Welfare Services
		66	Coal Products			153	Environmental Sanitary Services
20	Non-metallic Mineral Products Manufacturing	70	Ceramic Products			154	Services of Civil Association
		71	Glass & Glass Products			155	Other Social Services
		72	Cement			156	Repair and Maintenance of Motor Vehicles
		73	Cement Products			157	Other Repair Services
		74	Other Non-Metallic Mineral Products			158	Household Services
21	Iron and Steel Products	75	Pig Iron & Crude Steel			159	Other Personal Services
		76	Primary Iron & Steel Products			161	Undistributed
22	Miscellaneous Metals	77	Aluminum				
		78	Other Metals				
23	Metallic Products	79	Metal Forging & Powder Metallurgy				
		80	Metallic Products for Household Use				
		81	Metallic Hand Tools				
		82	Metal Structure & Architectural Components				
		83	Metal Containers				
		84	Other Metal Products				
		85	Surface Treating of Metal Products				

Data Dource:http://www.stat.gov.tw/ct.asp?xItem=17204&ctNode=2107。
http://eng.stat.gov.tw/ct.asp?xItem=8488&ctNode=1650

III. The Simulation Results of Industrial Linkage Model for Scenarios 1A, 1B and 1C

	Final Demand	Based 1996	Change					
No.	Industries	(millions)	Scenario 1A	(%)	Scenario 1B	(%)	Scenario 1C	(%)
1	Agriculture	258188	-4472	-1.732	-448	-0.174	-1804	-0.699
2	Minerals	4824	-16	-0.330	0	-0.004	-6	-0.126
3	Manufacturing—Traditional Industries	1213545	-20813	-1.715	7904	0.651	-9056	-0.746
4	Manufacturing—Chemical and petroleum-related industries	583044	-7334	-1.258	2070	0.355	-2721	-0.467
5	Manufacturing—Heavy Industries	3232880	-27004	-0.835	11128	0.344	-9338	-0.289
6	Construction	861800	0	0.000	0	0.000	0	0.000
7	Electricity, Gas and Water	87044	-3998	-4.593	809	0.929	-1364	-1.567
8	Transport.Telecom &Wholesales, Tradindg	1483245	-11033	-0.744	3467	0.234	-3761	-0.254
9	Finance, Insurance and Real Estate Services	1317928	-33340	-2.530	6422	0.487	-13690	-1.039
10	Others. services	1928251	-24216	-1.256	8324	0.432	-8386	-0.435
	Total	10970749	-132226	-1.205	39675	0.362	-50125	-0.457
	Output	Based 1996	Change					
No.	Industries	(millions)	Scenario 1A	(%)	Scenario 1B	(%)	Scenario 1C	(%)
1	Agriculture	420355	-11621	-2.764	-399	-0.095	-4755	-1.131
2	Minerals	68539	-13763	-20.081	4751	6.932	-4913	-7.169
3	Manufacturing—Traditional Industries	1690809	-36361	-0.490	13884	0.187	-15140	-0.204
4	Manufacturing—Chemical and petroleum-related industries	1662753	-40585	-4.005	13973	1.379	-15053	-1.485
5	Manufacturing—Heavy Industries	4060134	-70736	-19.312	27726	7.570	-25078	-6.847
6	Construction	1013445	-2729	-0.205	183	0.014	-1193	-0.089
7	Electricity, Gas and Water	366281	-9473	-0.607	2773	0.178	-3367	-0.216

8	Transport.Telecom &Wholesales, Tradindg	2894714	-26360	-1.730	8963	0.588	-9389	-0.616
9	Finance, Insurance and Real Estate Services	1523656	-49834	-37.293	13105	9.807	-19616	-14.679
10	Others. services	2549009	-44897	-1.859	16089	0.666	-15863	-0.657
	Total	16249695	-306358	-1.885	101048	0.622	-114366	-0.704
	Value Added	Based 1996	Change					
No.	Industries	(millions)	Scenario 1A	(%)	Scenario 1B	(%)	Scenario 1C	(%)
1	Agriculture	138045	-5896	-4.271	-60	-0.043	-2401	-1.739
2	Minerals	42669	-8898	-20.855	2995	7.019	-3168	-7.425
3	Manufacturing—Traditional Industries	455928	-10668	-2.340	4806	1.054	-4653	-1.020
4	Manufacturing—Chemical and petroleum-related industries	492224	-9414	-1.913	3034	0.616	-3502	-0.712
5	Manufacturing—Heavy Industries	1083427	-15514	-1.432	6079	0.561	-5476	-0.505
6	Construction	350008	-768	-0.219	44	0.013	-337	-0.096
7	Electricity, Gas and Water	174621	-3638	-2.083	1051	0.602	-1308	-0.749
8	Transport.Telecom &Wholesales, Tradindg	2053243	-14878	-0.725	5035	0.245	-5337	-0.260
9	Finance, Insurance and Real Estate Services	1051525	-35859	-3.410	7787	0.741	-14502	-1.379
10	Others. services	1714111	-25933	-1.513	8623	0.503	-9162	-0.535
	Total	7555801	-131467	-1.740	39395	0.521	-49847	-0.660