

The Pacific Food System Outlook

Market Volatility and the Food System

Chinese Taipei Report

By

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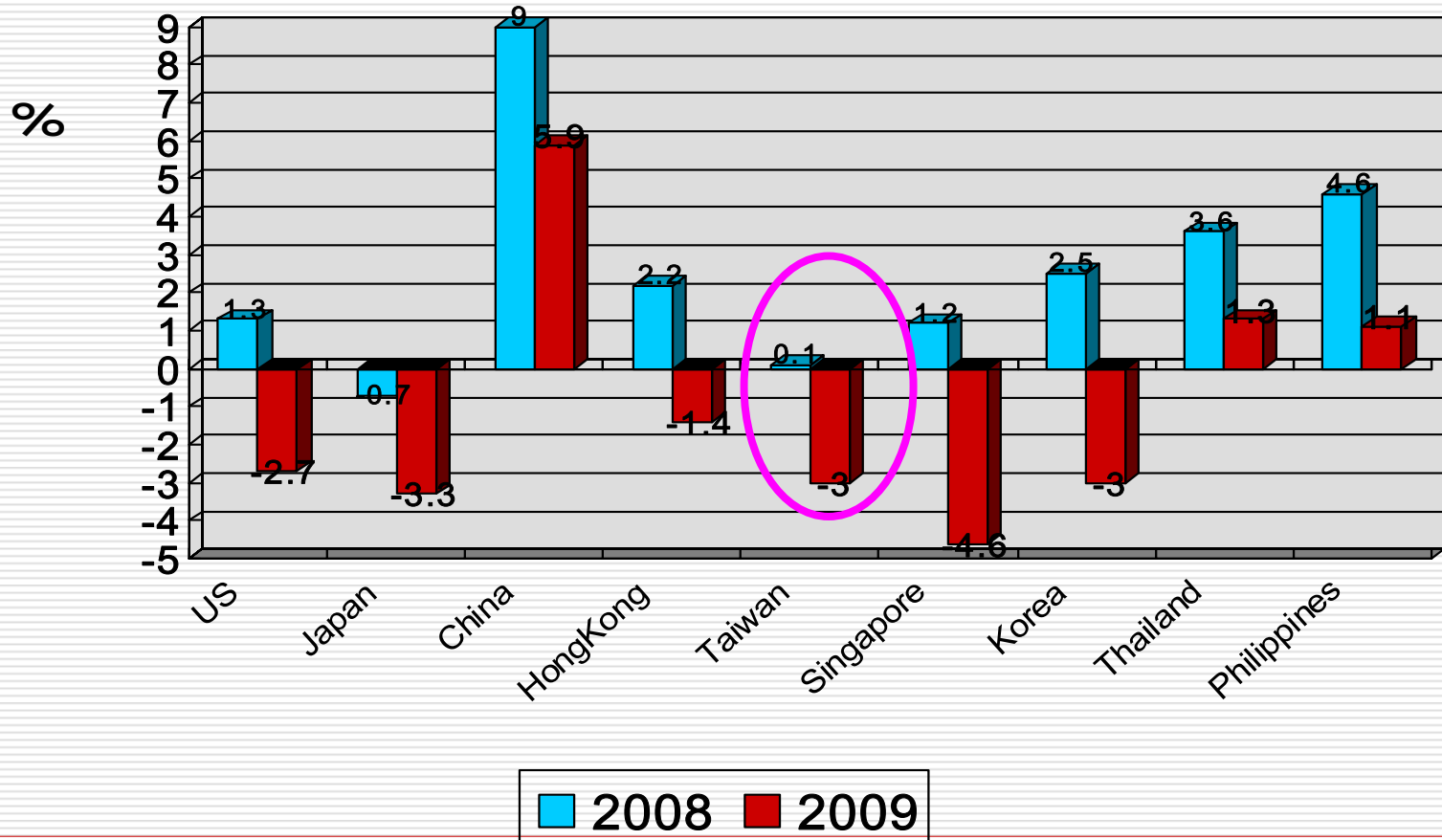
May 13 ~ 14, 2009, Washington DC

Outline

- Current Situation
 - Macro-economy
 - Food Prices
 - Causes & Consequences
 - Policy Responses
-

Current Situation

Real GDP Growth 2008-2009



Source: 2008-mostly from country pub. statistics.
2009-from Global Insight, 2009, Feb forecast.

Macro-economy- by component

	Trade		Trade balance	Real Private Consumption	Real Investment		
	Export	Import			Private	Govt	Pub. Ent
	(%)	(%)	(USD Bil)	(%)	(%)	(%)	
2007	10.12	8.17	27.4	2.31	3.25	-5.28	1.42
2008	3.64	9.84	14.8	-0.29	-13.47	0.34	-2.58
2009	-20.10	-26.20	26.5	0.82	-28.07	22.14	4.91

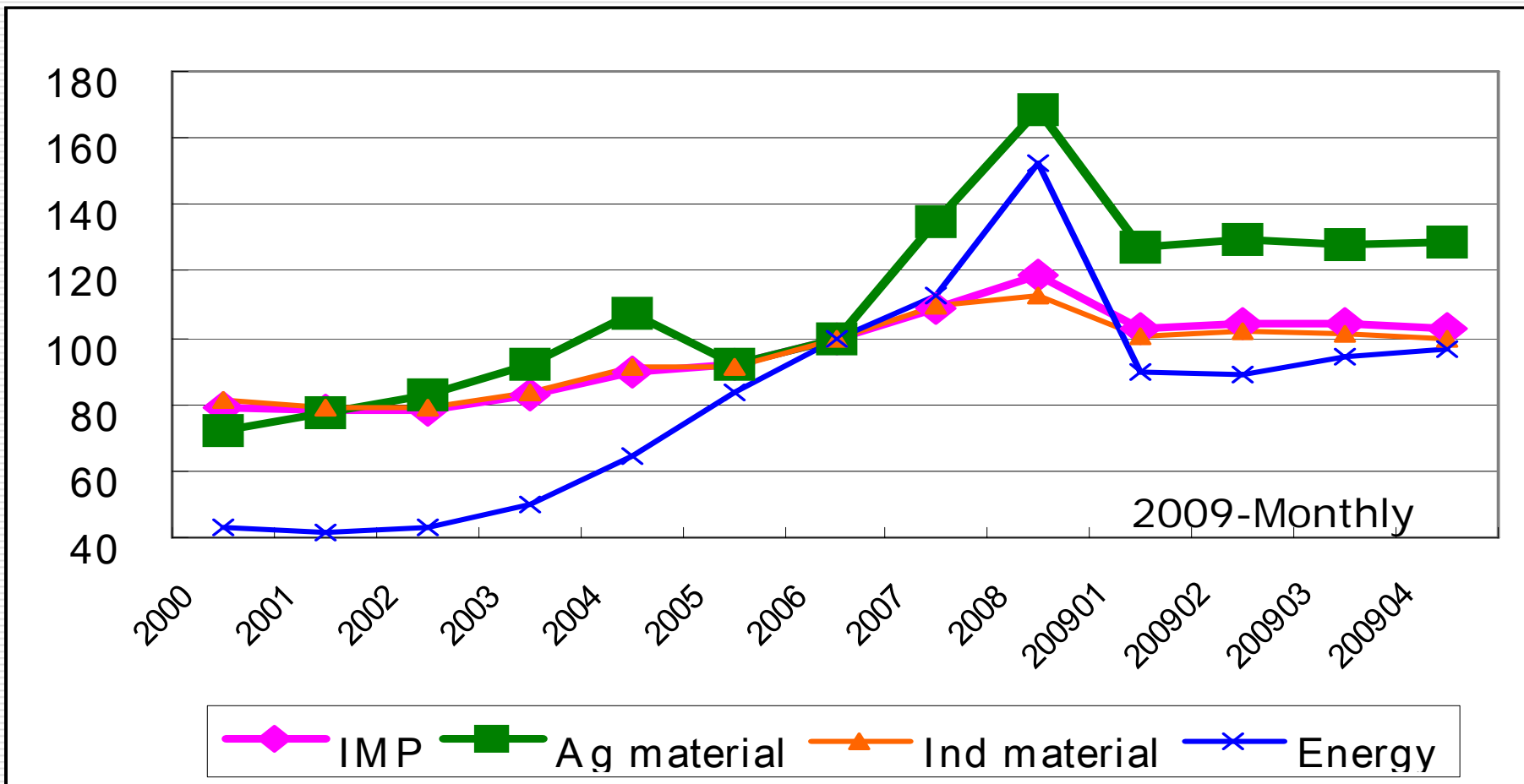
Outlooks

Stagflation?

	Real GDP	Inflation	
	Growth(%)	CPI (%)	WPI
2008	0.12	3.53	5.17
Q1	6.25	3.58	8.68
Q2	4.56	4.19	8.05
Q3	-1.05	4.52	8.95
Q4	-8.36	1.87	-4.55
2009	-2.97	-0.82	-6.36
Q1	-6.51	-0.23	-8.96
Q2	-6.85	-0.77	-8.78
Q3	-2.67	-1.76	-9.05
Q4	4.50	-0.53	2.04

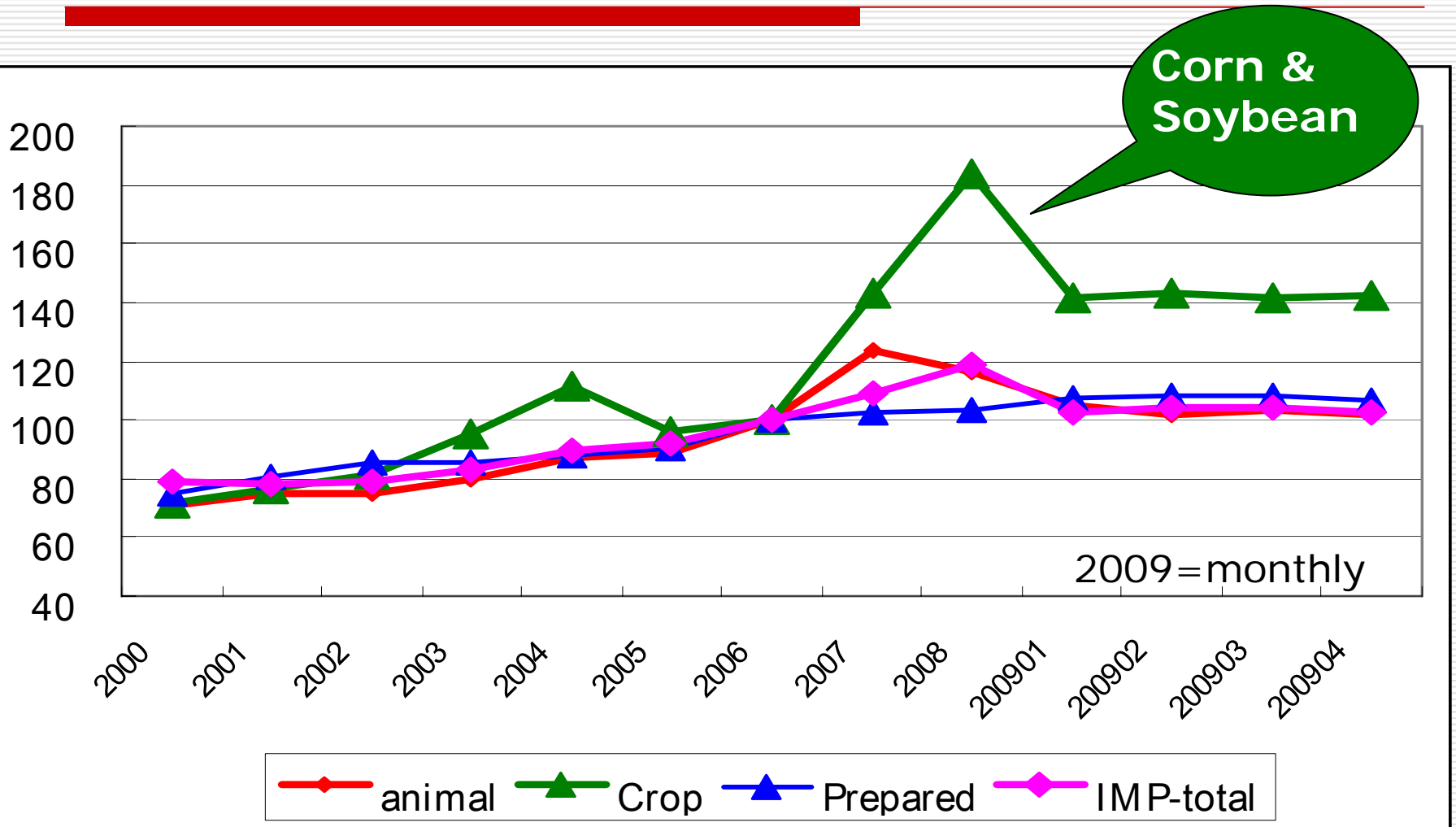
Import price index by usage

(2000~2009, 2006=100)



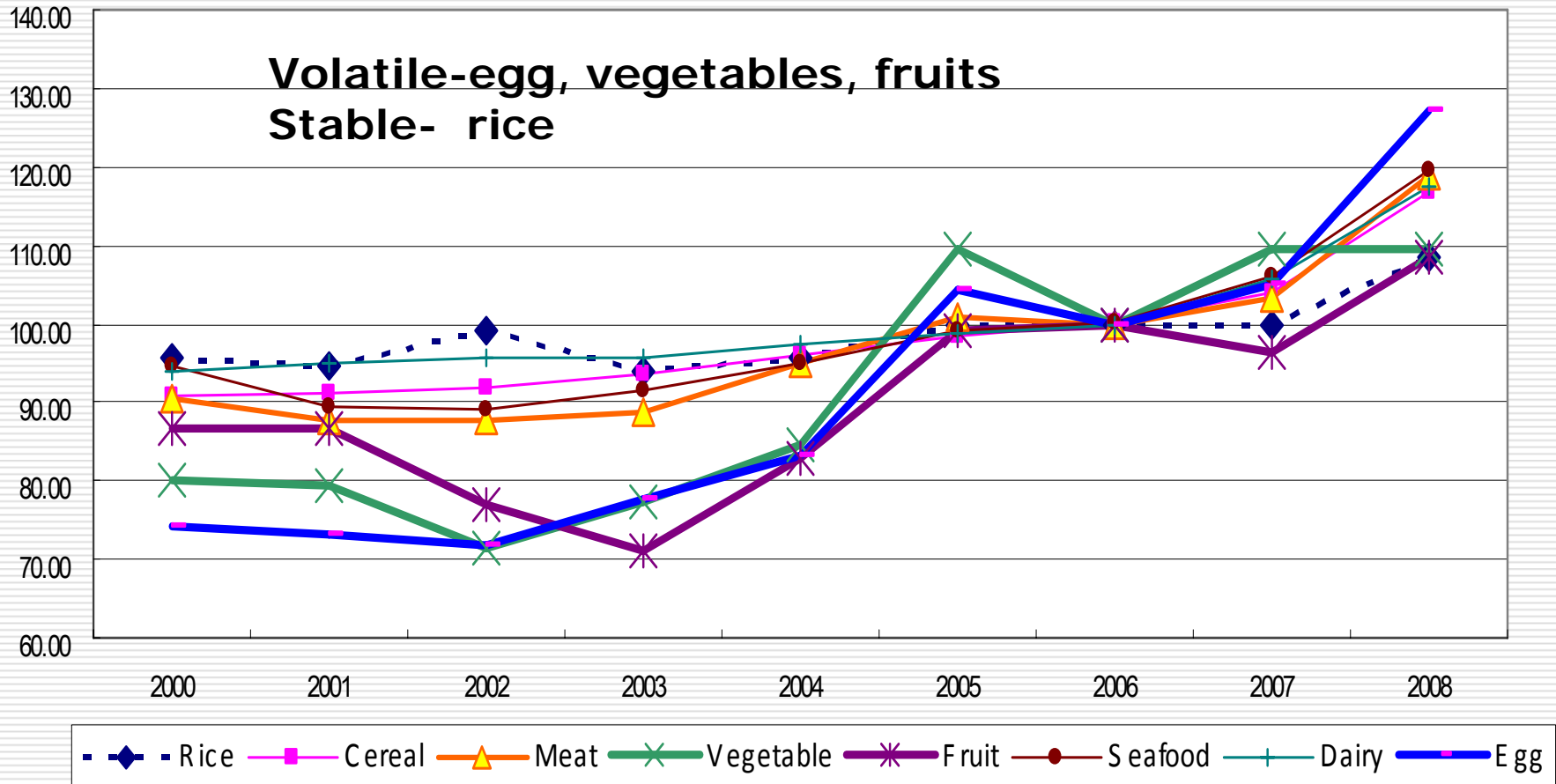
Import price index by SITC

(2000 ~ 2009, 2006=100)



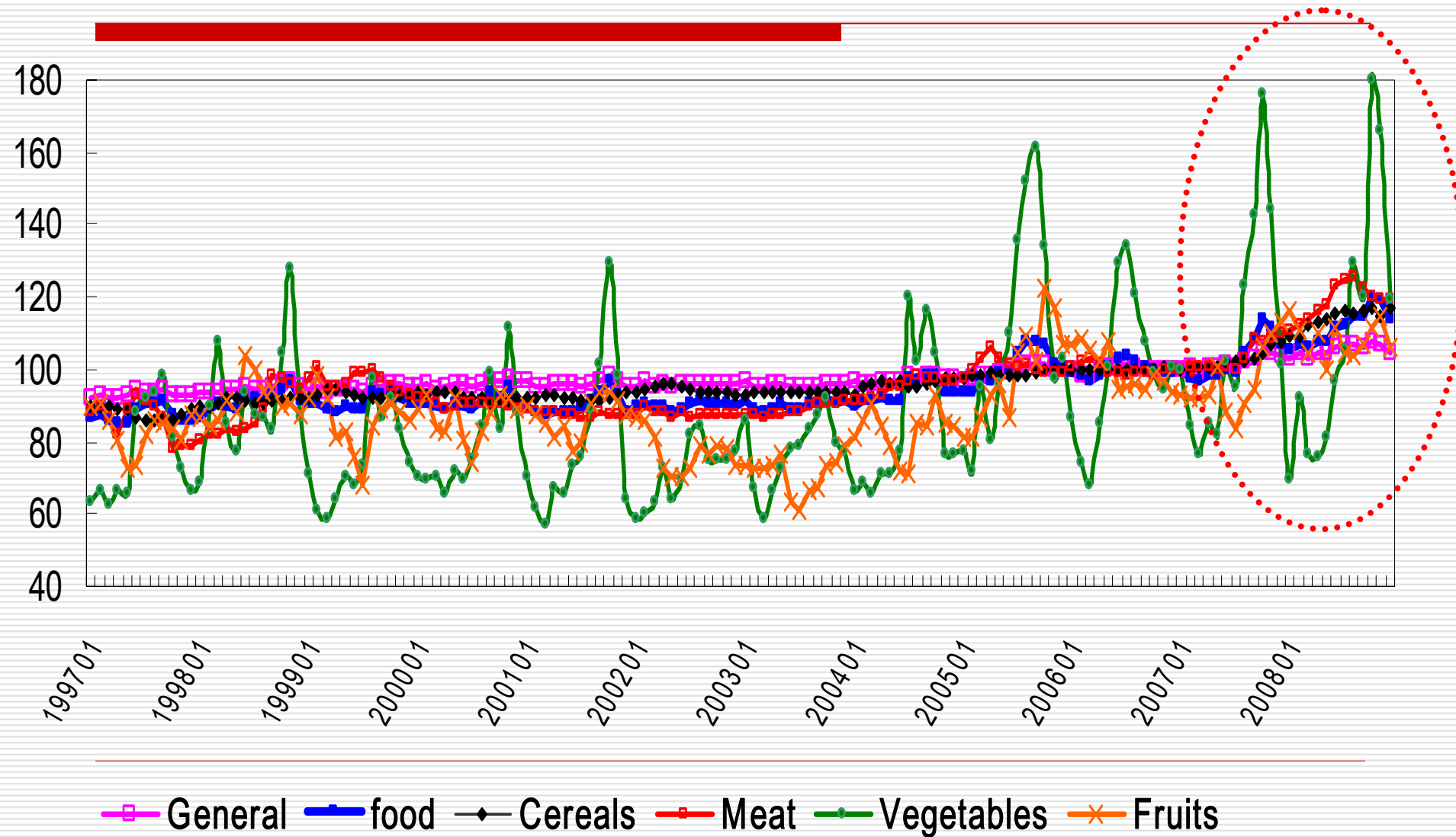
CPI on Food by Item

(2000 ~ 2008, 2006 = 100)



CPI on Food by Item

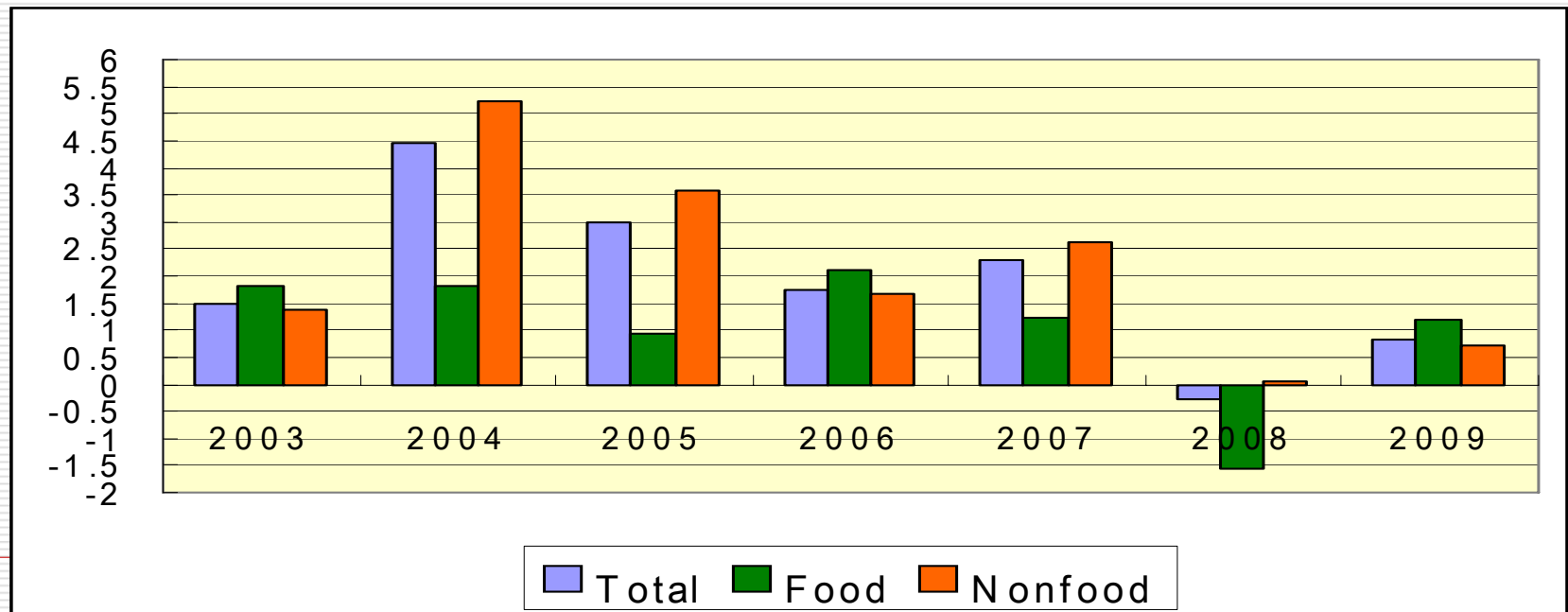
(1997~2008, monthly, 2006=100)



Food consumption

- More dramatic than nonfood
 - Decrease due to high price and recession (income)
 - Rebound due to price decline and govt stimulus package (eg. consumer voucher, hiring, investment)

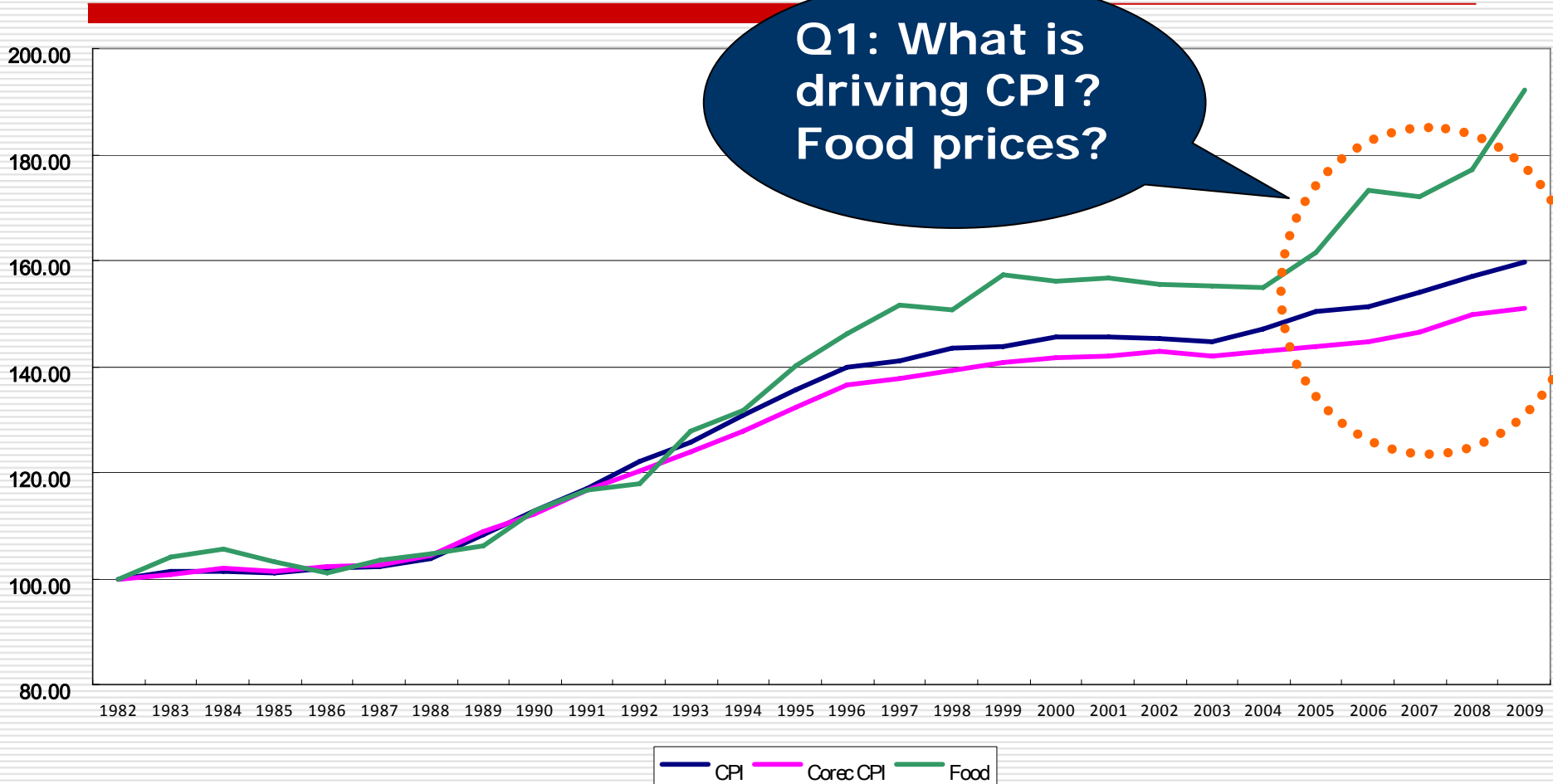
% in real



Source: Directorate-General of Budget, Accounting, and Statistics, Executive Yuan

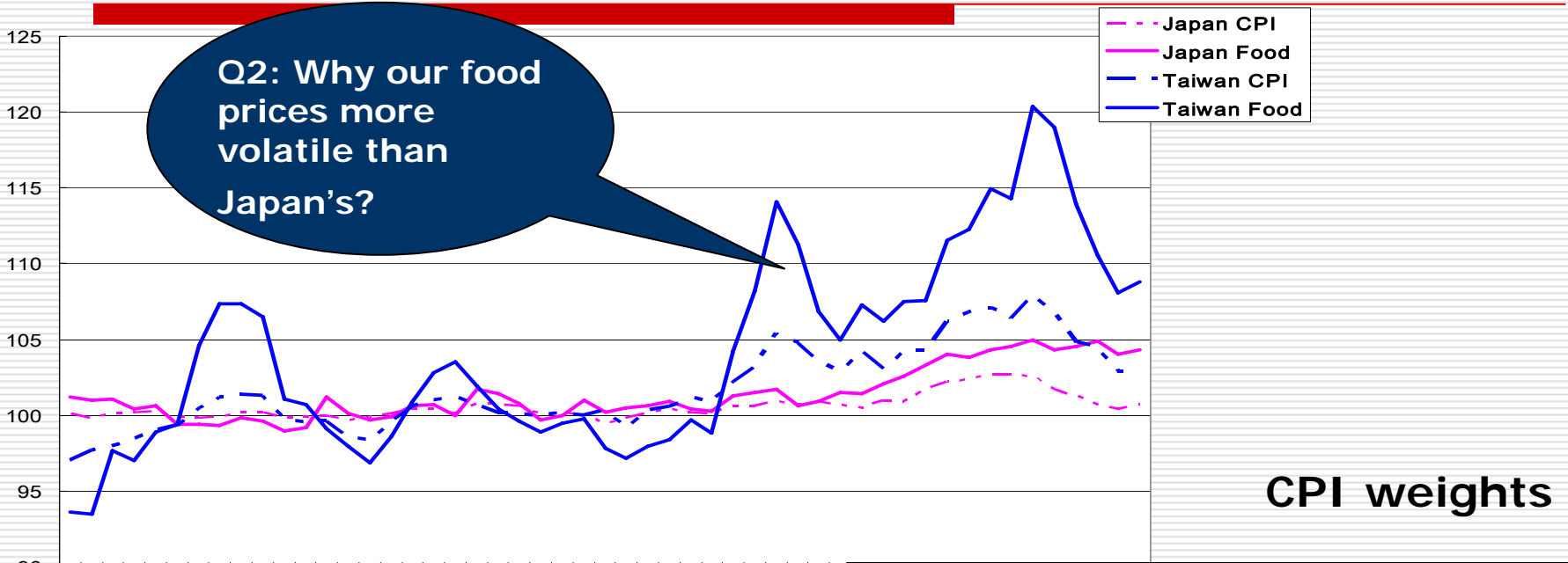
CPI and Food Price

(1982~2008, annual, 1982=100)

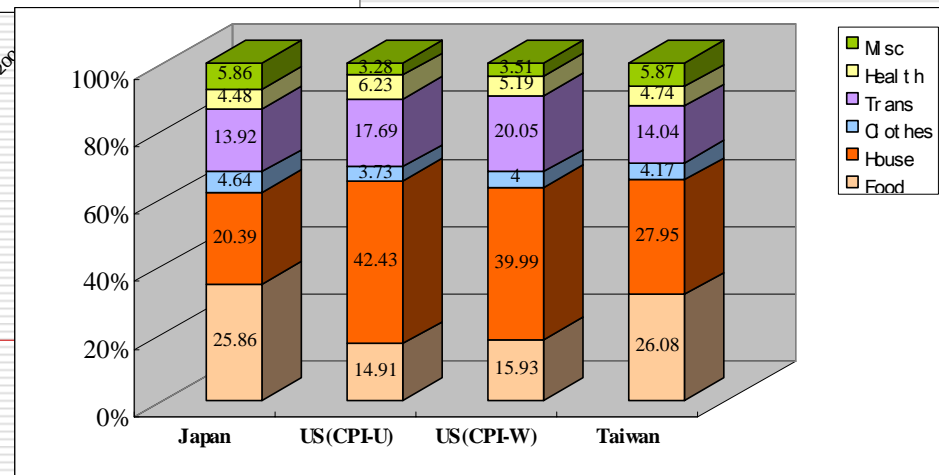


CPI and Food Price

Taiwan vs Japan, 2005 ~ 2009 (Monthly, 2006=100)



CPI weights



Source: 1. Directorate-General of Budget, Accounting, and Statistics, Executive Yuan.
 2. Bank of Japan, Consumer Price Index

Causes

- Expenditure share of food
 - Weather
 - Import prices
 - CPI formulae
-

Food Price Contribution to CPI

(from 2007 Feb to 2008 Feb)

	Total CPI % change	Food Price inflation (bev&tob inclu)	Expenditure share of food	Food contribution to CPI change (absolute)	Food contribution to CPI change (relative)
Taiwan	3.9	9.8	26.1	2.6	66.7
USA	4.0	5.1	9.8	0.5	12.5
France	2.8	5.0	16.3	0.8	28.6
Germany	2.8	7.4	10.4	0.8	28.6
UK	2.5	5.6	11.8	0.7	28.0
Japan	1.0	1.4	19.0	0.3	30.0
Greek	4.4	6.6	17.8	1.2	27.3
Spain	4.4	7.1	21.9	1.6	36.4
Switzerland	2.4	2.2	11.0	0.2	8.3
Poland	4.3	7.1	30.4	2.2	51.2
Sweden	3.1	5.9	13.4	0.8	25.8
Average	3.2	5.3	16.2	0.9	27.7

Source: OECD&FAO, OECD-FAO Agricultural Outlook 2008-2017, Table 2.1

Taiwan and last Column: own calculation (column 5=column 4/column *100)

	Total CPI % change	Food Price inflation	Expenditure share of food	Food contribution to CPI change (absolute)	Food contribution to CPI change (relative)
Taiwan	3.9	9.8	26.1	2.6	66.7
Guatemala	8.0	11.6	38.9	4.5	56.3
Sri Lanka	19.4	25.6	62.0	15.9	82.0
Botswana	7.7	18.3	21.8	4.0	51.9
India	4.6	5.8	33.4	1.9	41.3
Indonesia	6.8	11.4	26.7	3.0	44.1
Pakistan	10.6	18.2	41.5	7.6	71.7
South Africa	8.6	13.6	21.0	2.9	33.7
Jordan	5.4	9.1	39.7	3.6	66.7
Peru	4.0	6.4	29.6	1.9	47.5
Senegal	5.8	10.9	40.3	4.4	75.9
Egypt	9.5	13.5	41.5	5.6	58.9
Haiti	9.9	11.8	50.3	5.9	59.6
Kenya	15.4	24.6	50.5	12.4	80.5
Bangladesh	10.3	14.2	64.5	9.2	89.3
China	8.7	23.3	27.8	6.5	74.7
Average	9.0	14.6	39.3	6.0	62.3

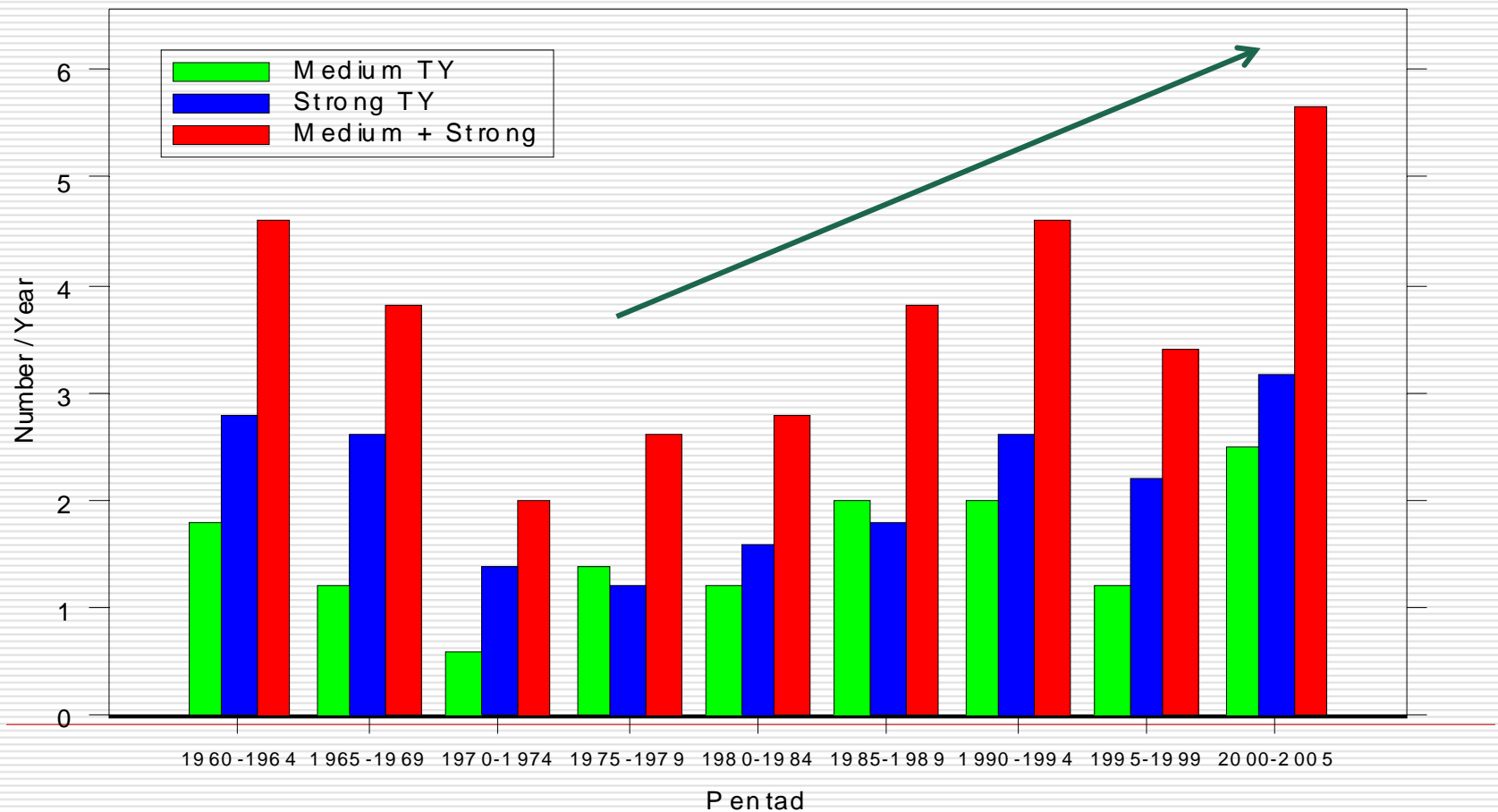
Estimated Production Loss of Major Ag Disasters (1991-2007)

Unit: NT\$ million

Typhoon		Flood	
Aug. Herb,1996	18 076	June Flood,2005	4 846
July Haitang,2005	7 742	May Flood,2006	2 233
Oct. Zeb,1998	6 670	June Flood,1998	1 913
Aug. Bilis,2000	6 119	June Flood,1997	1 048
July Midulle,2004	4 660	May Flood,2005	439
July Tim,1994	3 794	Feb. Flood,2000	395
Aug. Doug,1994	3 443	Aug. Flood,1999	333
Aug. Talim,2005	3 090	Average	1 601
Aug. Amber,1997	2 751		
Oct. Xangsane,2000	2 694		
Average	5 904		

No of Typhoon Invasion in Taiwan 1960-2005

Statistics of CWB-warned TCs (1960-2005)



Import

- Causality analysis
 - Volatility analysis
-

Co-integration Analysis (Error-correction model)

$$\nabla CPI_t = \alpha_{10} + \sum_{i=1}^{L_{11}} \alpha_{11i} \nabla CPI_{t-i} + \sum_{j=1}^{L_{12}} \alpha_{12j} \nabla AWPI_{t-j} + \alpha_{13} \varepsilon_{1t-1} + \mu_{1t}$$

$$\nabla AWPI_t = \alpha_{20} + \sum_{i=1}^{L_{21}} \alpha_{21i} \nabla AWPI_{t-i} + \sum_{j=1}^{L_{22}} \alpha_{22j} \nabla CPI_{t-j} + \alpha_{23} \varepsilon_{2t-1} + \mu_{2t}$$



**Add: Imported Ag price (AIMPI) and
Oil Price indexes (OILIMPI)**


$$\nabla CPI_t = \alpha_{10} + \sum_{i=1}^{L_{11}} \alpha_{11i} \nabla CPI_{t-i} + \sum_{j=1}^{L_{12}} \alpha_{12j} \nabla AWPI_{t-j} + \alpha_{13} \varepsilon_{1t-1} + \beta_1 \nabla AIMPI + \beta_2 \nabla OILIMPI + \mu_{1t}$$

$$\nabla AWPI_t = \alpha_{20} + \sum_{i=1}^{L_{21}} \alpha_{21i} \nabla AWPI_{t-i} + \sum_{j=1}^{L_{22}} \alpha_{22j} \nabla CPI_{t-j} + \alpha_{23} \varepsilon_{2t-1} + \gamma_1 \nabla AIMPI + \gamma_2 \nabla OILIMPI + \mu_{2t}$$

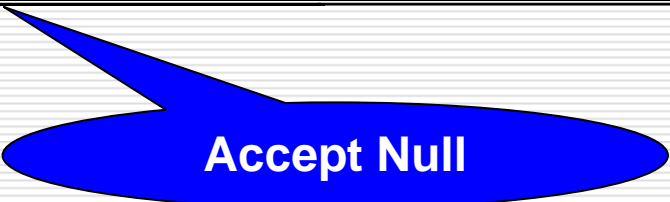
Source: Chang and Chen, COA project report, 2008

Causality between CPI and AWPI

(Data: 1997 ~ 2008)



	F-Statistic	Prob.
AWPI does not Granger Cause CPI	3.59734	0.0303
CPI does not Granger Cause AWPI	1.47598	0.2325



F test results:

- **AWPI causes CPI**

- CPI is not caused by import price directly, but by oil price and AWPI
- AWPI is affected by CPI, import ag prices and oil prices

		∇CPI	$\nabla AWPI$
	α_{10}, α_{20}	-0.104437 [-1.01790]	-0.781337 [-1.80947]
LAG	$\alpha_{111}, \alpha_{211}$	0.232895 [0.64794]	-0.602269 [-3.80241]
	$\alpha_{112}, \alpha_{212}$	0.238792 [0.63891]	-0.560708 [-2.54925]
	$\alpha_{121}, \alpha_{221}$	0.148883 [3.95595]	6.641610 [4.39049]
	$\alpha_{122}, \alpha_{222}$	0.164309 [3.14392]	6.144214 [3.90618]
	α_{13}, α_{23}	-1.370412 [-4.01100]	-6.930569 [-4.81986]
AIMPI	β_1, γ_1	-0.011145 [-0.39028]	0.276325 [2.29925]
OILIMPI	β_2, γ_2	0.036863 [1.56496]	0.189006 [1.90659]

Source: Chang and Chen, COA project report, 2008.

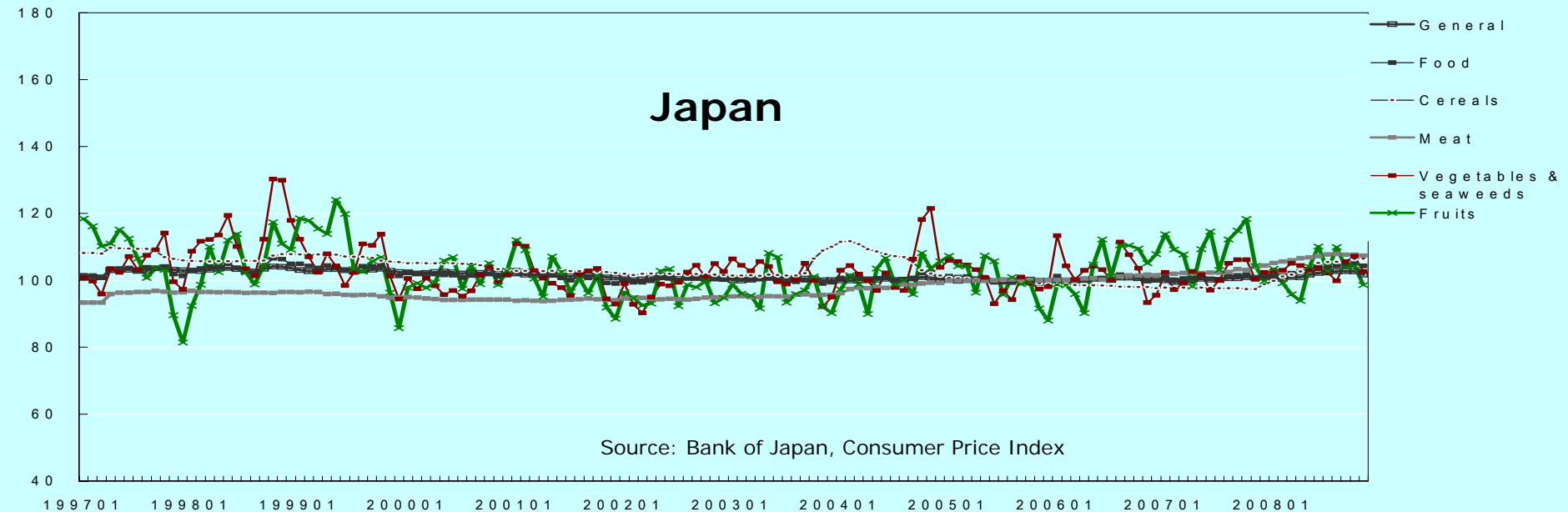
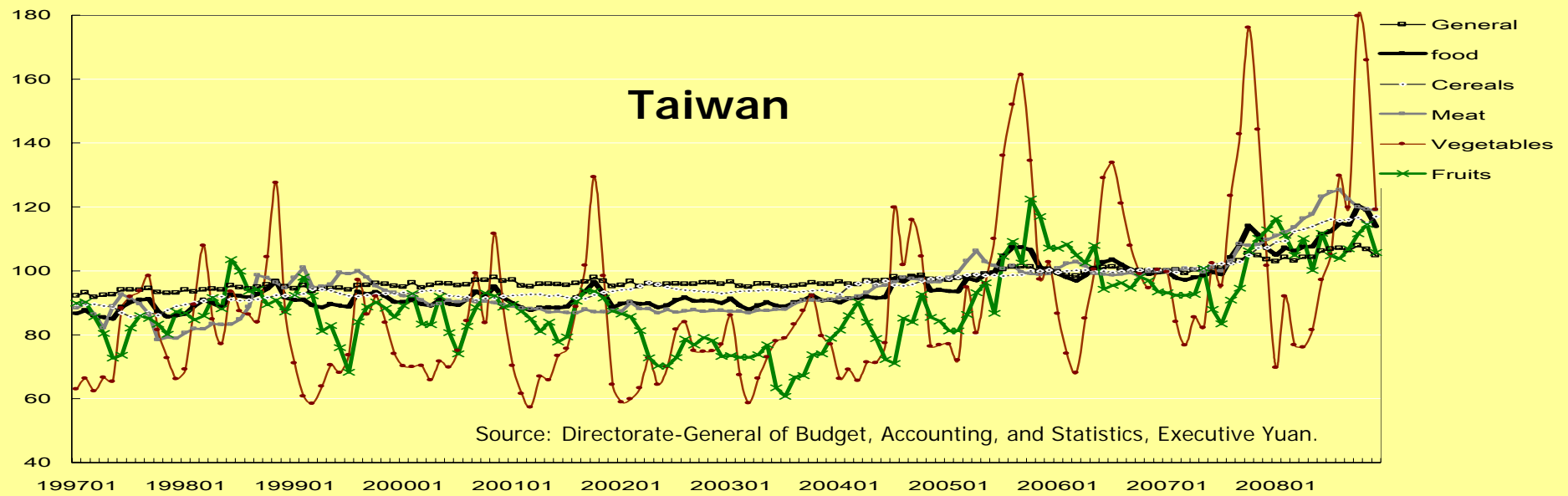
Note: Number in parenthesis are t-values.

Causality on Volatility

Autoregressive Conditional Heteroskedasticity (ARCH) model

- Short-term impact
 - Largely from AIMPI, followed by AWPI
 - Smallest from CPI and OILIMPI
 - Long-term impact
 - Mostly from AIMPI and OILIMPI
 - **Summary**
 - **International** prices have **longer** impact on volatility.
 - **Domestic** prices have **shorter** impact on volatility.
-

CPI on Food by Group: Taiwan vs Japan (1997 ~ 2008, 2006=100)



CPI formulae on Food

□ Comparing Taiwan and Japan

■ **Weight**

- Total weight on food is similar
- But differs in fresh vs prepared food
- Taiwan consumes more fresh veg & fruit

■ **Formula**

- Both use arithmetic mean
- Overestimate price increase because do not allow for substitution effect

■ Need to update weights more frequently

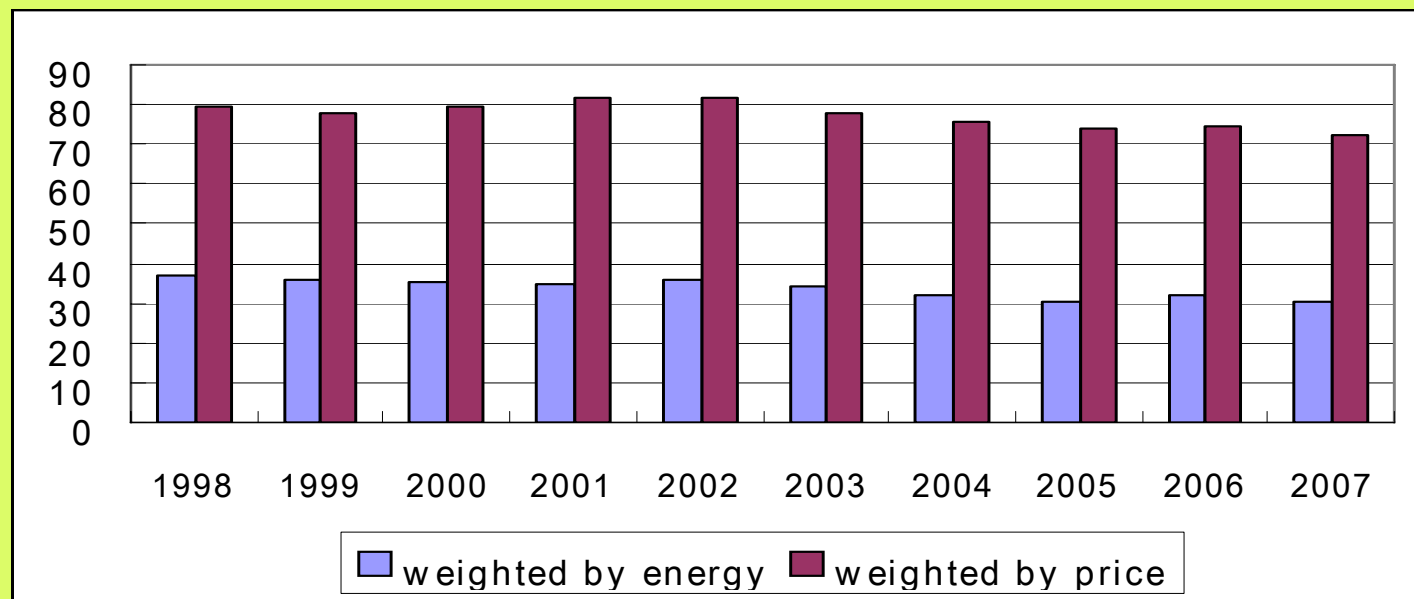
Consequences

- Food security
 - Production and Price
 - Farm income (rice)
 - Employment
-

Food Security

(Business as usual---Abundant but Insecure)

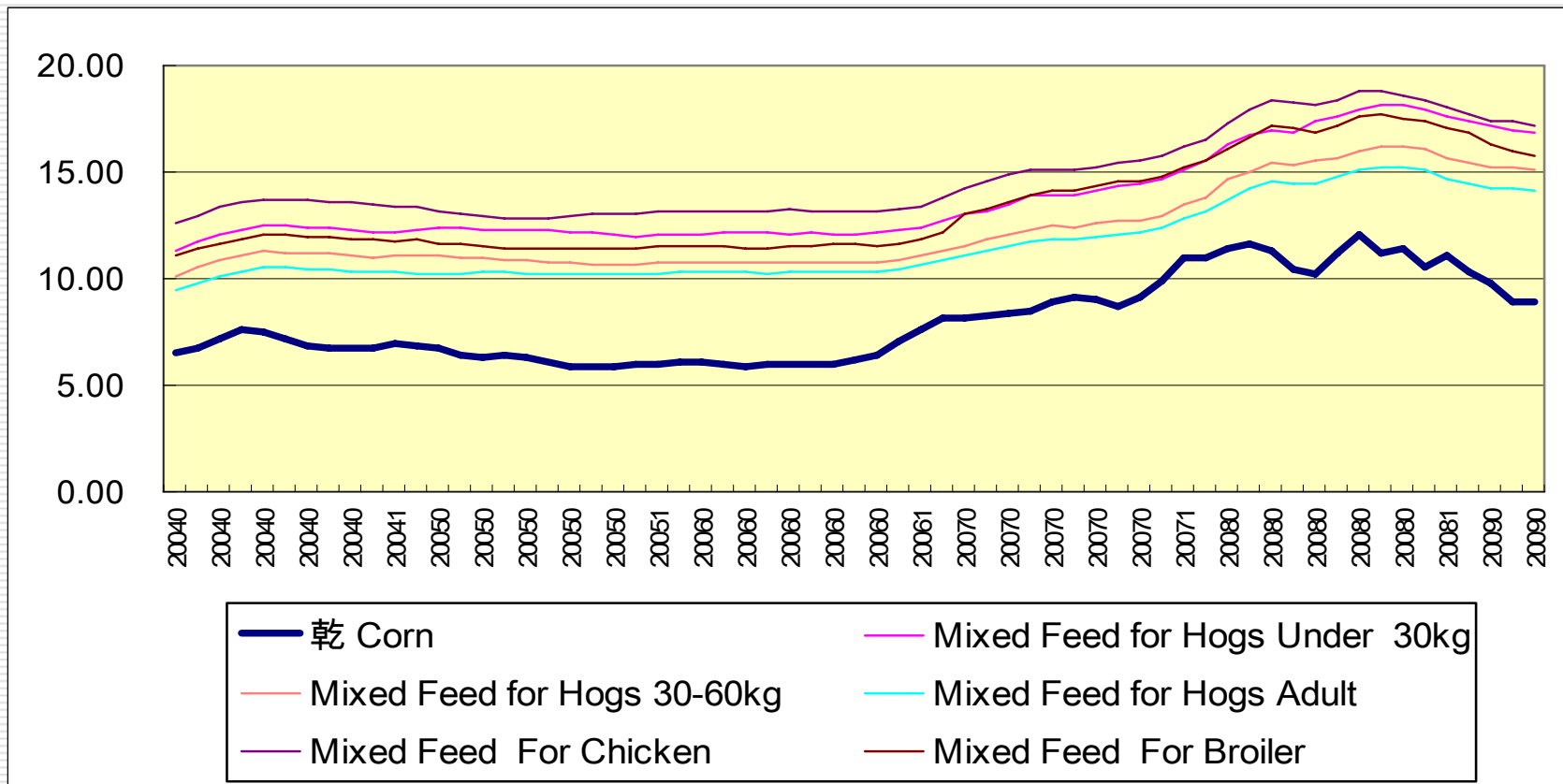
- Rice stock exceeds FAO 17~18% res level
- Surplus on rice, onion, peanut, orange etc
- High import dependency
 - 95% of wheat and feed grain are imported
- Low food self-sufficiency ratio
 - 72% in price weighted base, but 31% in energy basis



Source: Council of Agriculture, 2009.

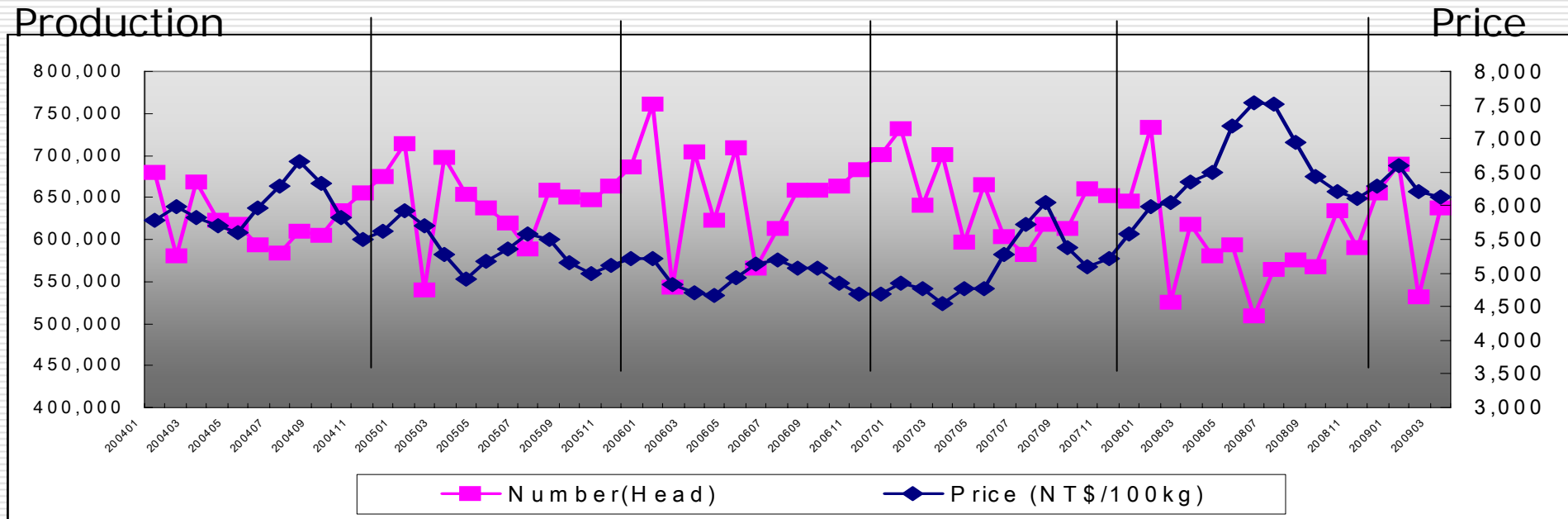
Domestic Feed Prices (2004 ~ 2009, monthly)

(NT\$/kg)

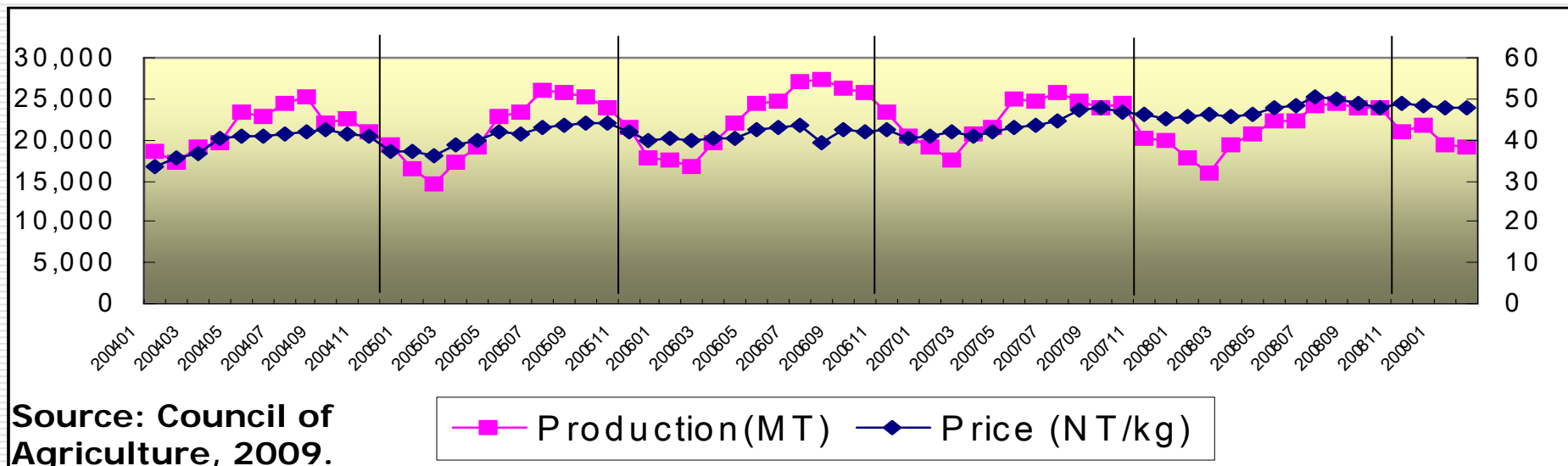


Source: Council of Agriculture, 2009.

Hog production and wholesale price(2004~2009, monthly)

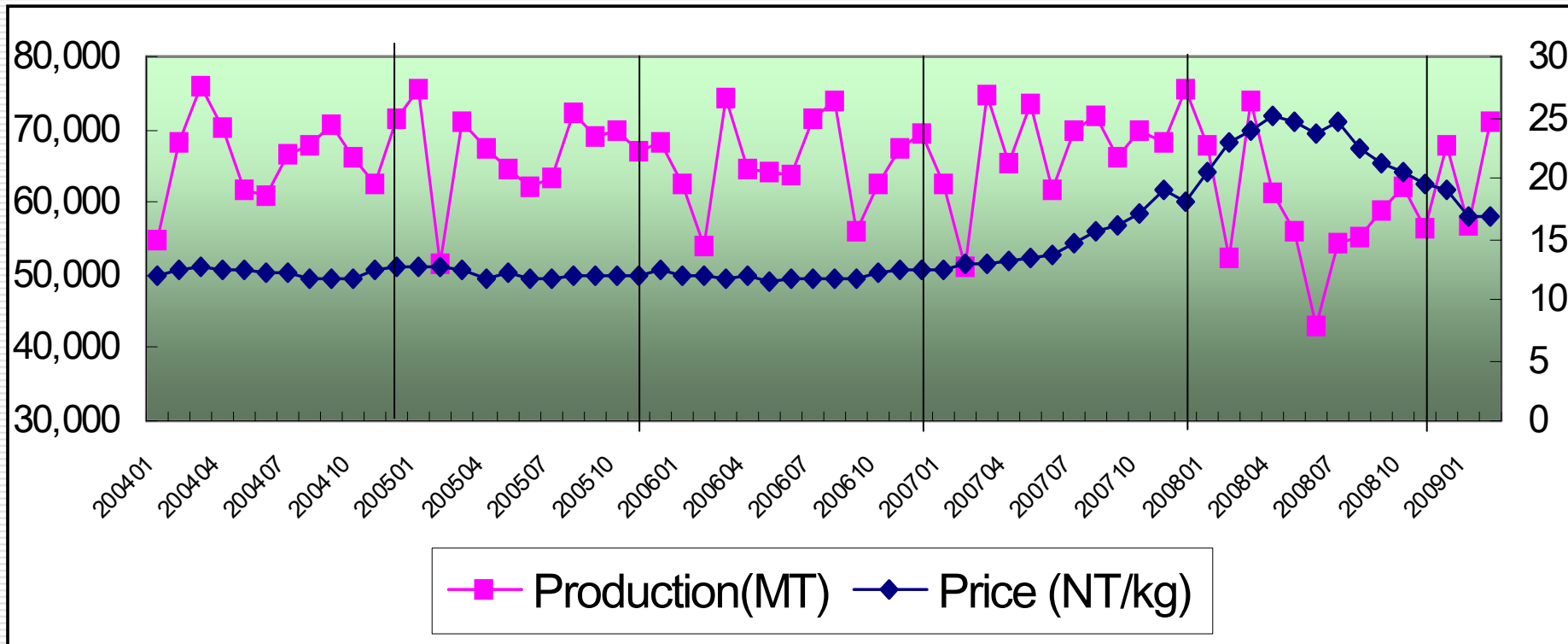


Fresh milk production and wholesale price(2004~2009, monthly)



Source: Council of Agriculture, 2009.

Wheat Flour production and wholesale price (2004 ~ 2009, monthly)

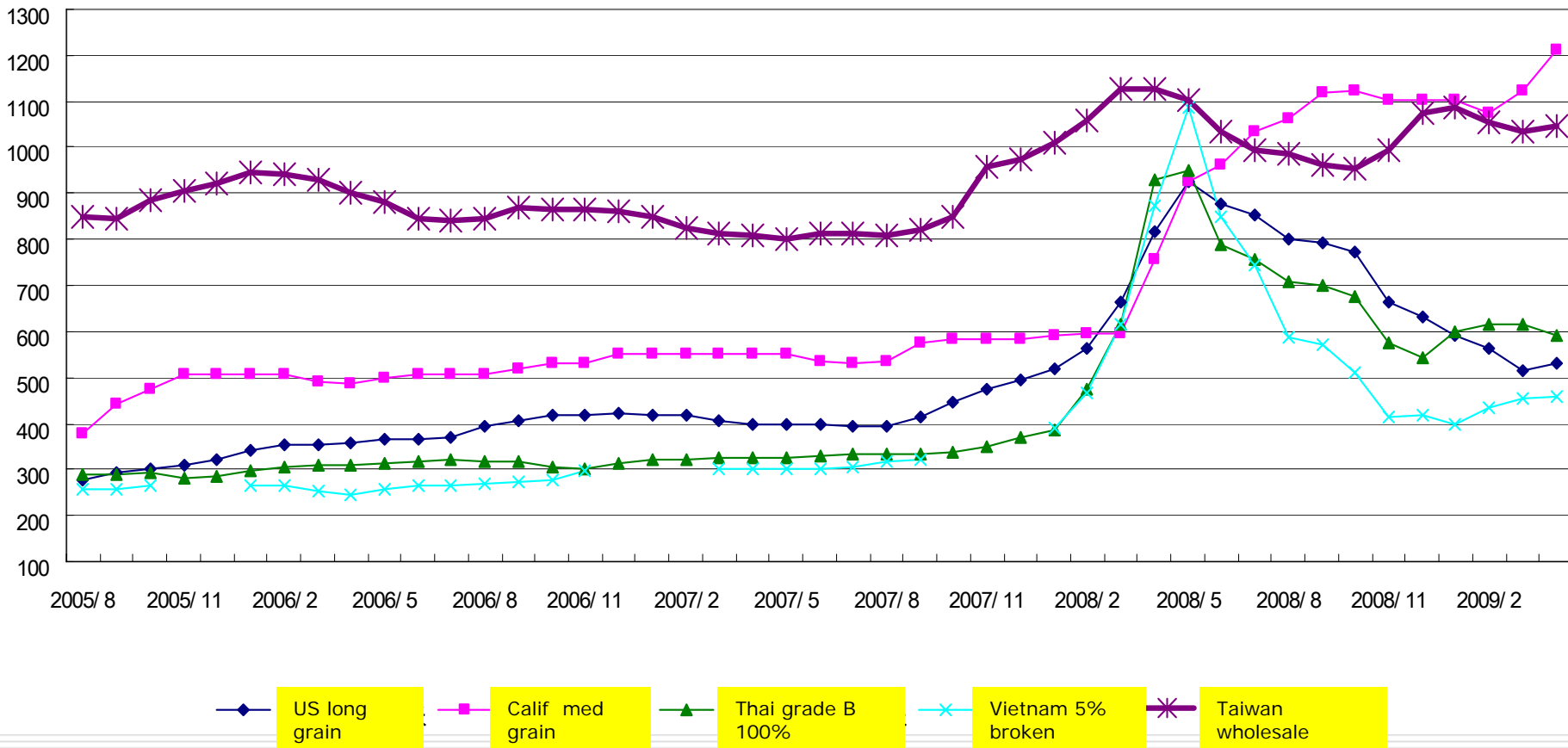


Source: Council of Agriculture, 2009.

International Rice Price

(2005 ~ 2009, monthly)

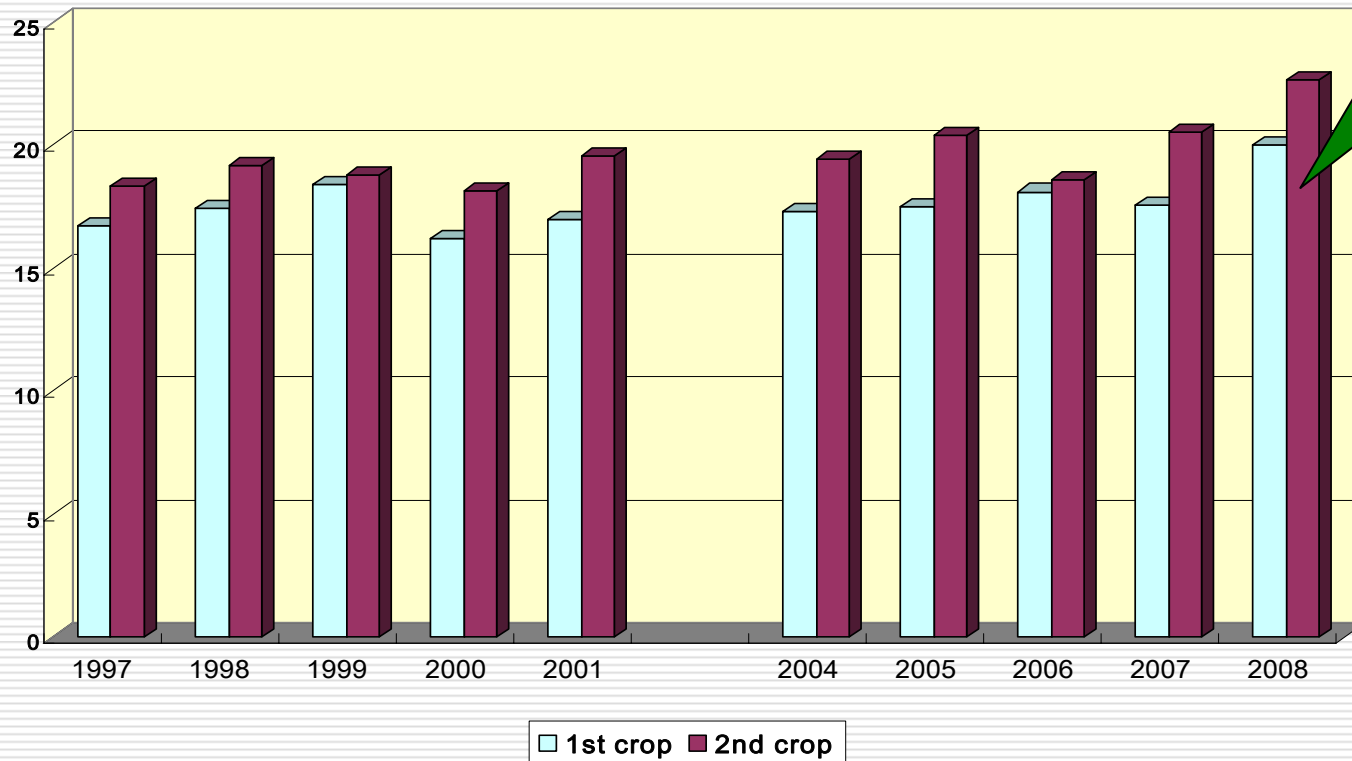
Unit: FOB US\$/ton, milled



Source: Council of Agriculture, 2009

Rice Farm-gate Price

(1997 ~ 2008, Husked, NT\$/Kg)

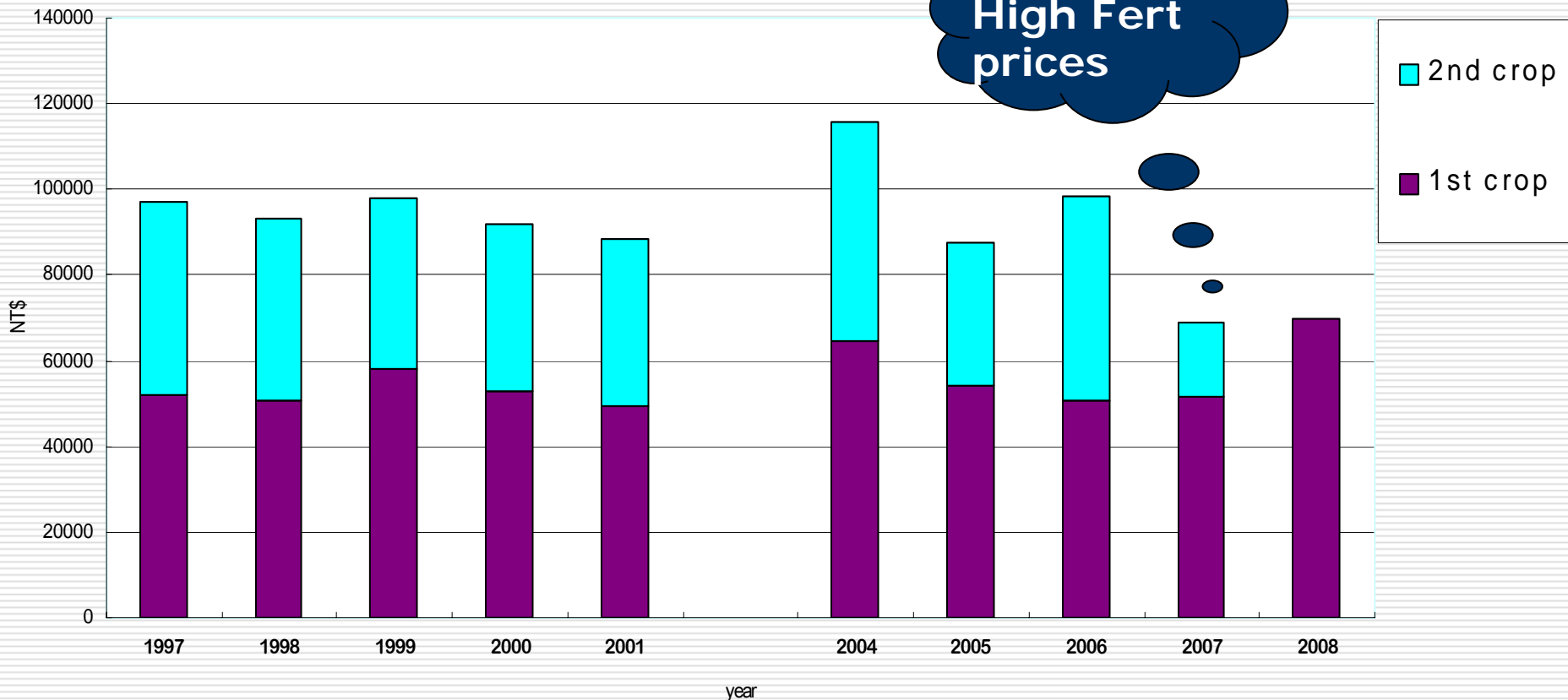


Govt raises support price by NT\$2/kg

Source: Council of Agriculture

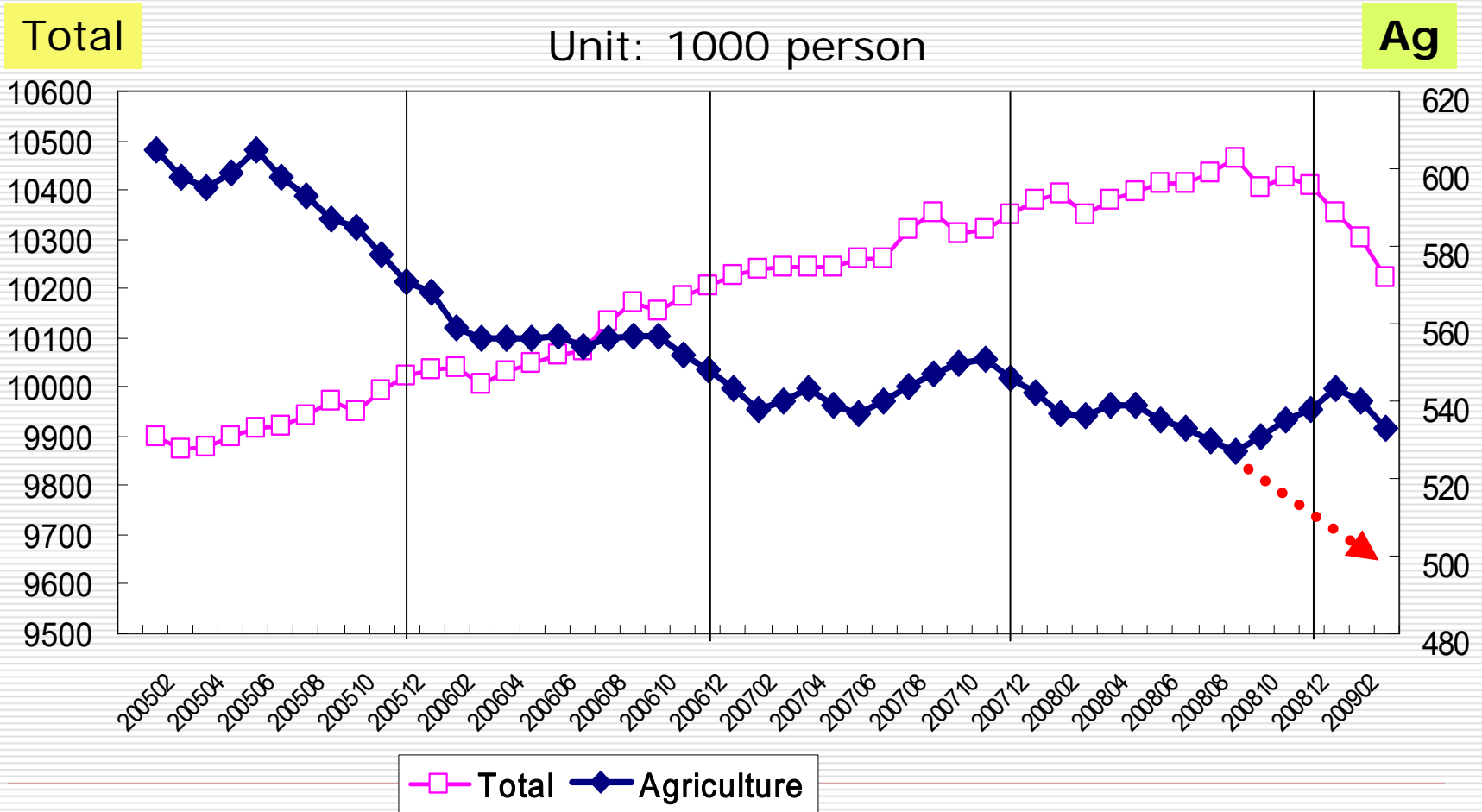
Net Earning of Rice Farm (1997~2007)

Unit: NT\$ per ha



Source: Council of Agriculture, 2009.

Employment (2005 ~ 2009, monthly)



Source: Directorate-General of Budget, Accounting, and Statistics, Executive Yuan.

Policy Response-1

□ **Crop sector:**

- Revitalize idled and set-aside rice paddy
- Small Landlord Large Tenant program (Farmer Ass.)
- Rural Village Reconstruction project (bottom-up)
- Promote High-Value-Added Ag Production
- Do not encourage bioenergy crop

□ **Livestock sector:**

- Joint procurement & future trading on feedgrain
- R&D on feed & breeding

□ **Objectives:**

- Short-term: reduce unemployment
 - Long-term: improve food security, safety, and aging problem
-

Policy Response-2

Free Trade Agreement

- WTO Pending
 - Slow down adjustment on rice subsidy
 - Increase fertilizer subsidy
 - Cross Strait
 - ECFA (framework agreement)
 - SPS, IPR issues
 - FTA
 - ASEAN plus
 - Trans-Pacific, APEC
-

Future Challenges for APEC Food System

- Food security & WTO compliances
 - Should govt remove price support and buy rice in the free market?
 - How to maintain price stabilization?
 - Bilateral & Multilateral trade agreement
 - Harmonization of SPS
 - Food safety
 - Infectious Disease (avian flu, swine flu etc)
 - Climate change
 - Adaptation measures on water conservation, pest management, heat-resistant variety, etc
 - Disaster mitigation measures
-

Comment Welcome

Small landlord, Large tenant



Source: Council of Agriculture, 2009.
