What Drives China's Food Price Inflation and How does it Affect the Aggregate Inflation?

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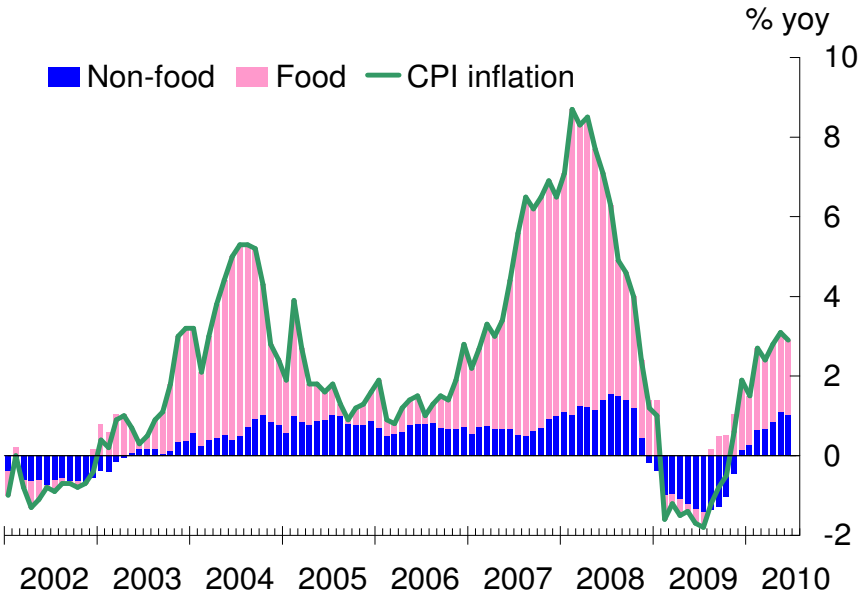
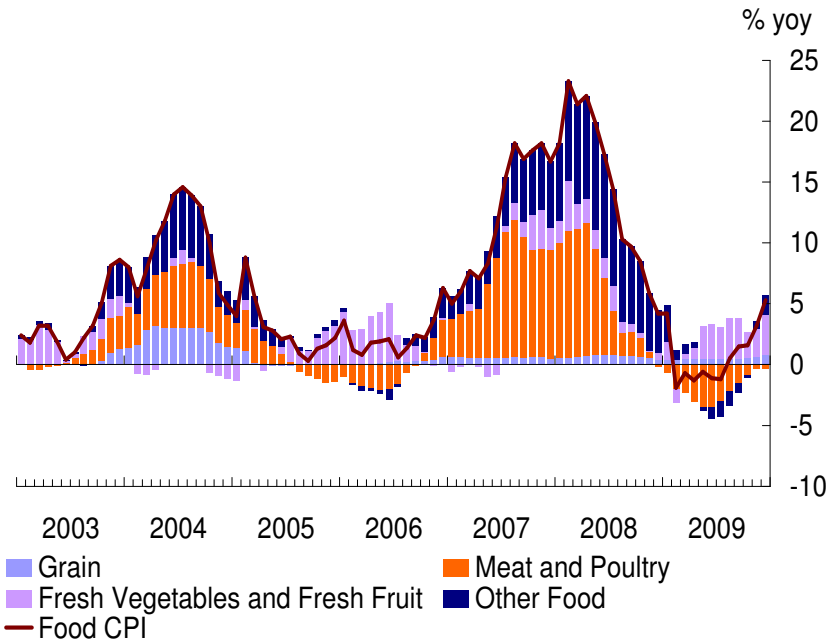
Outline

- Motives
- Demand- and supply-side determinants of China's food price inflation
  - Household-level data
  - National and provincial data
- How does food price inflation affect aggregate inflation?
- Conclusions

Motives

- Stylised facts
  - Aggregate inflation mainly contributed by food price inflation
  - Food price inflation mainly driven by meat and poultry price inflation





Motives

- Questions to answer
  - Why is food price inflation the major contributor to aggregate inflation?
  - What determines China's food price inflation?
    - It is typically argued that China's food price inflation has been mainly determined by supply-side factors (e.g. natural disasters and international food price inflation)
  - How does food price inflation affect China's aggregate inflation?
  - Policy implications?

Why is food price inflation a major contributor to aggregate inflation?

- Expenditure elasticity of various food items (Working-Leser model)

$$w_i = \alpha_0 + \alpha_i \log x + \sum_j \beta_{ij} \log p_j \qquad (1)$$

$$x = \varphi_0 + \varphi_1 \log X + \varphi_2 \log P \qquad (2)$$

w_i share food *i* in total food expenditure
x total food expenditure
p_j price of food *j*
X total expenditure of food and non-food items
P L-price index of food items

Why is food price inflation a major contributor to aggregate inflation?

- Estimation using provincial household data of 1995-2007
  - China's food expenditure elasticity larger than other economies
  - Expenditure elasticity of meat and poultry larger than unity

	Bread & cereals	Meat	Fish	Dairy	Fats & oil	Fruit & vegetables
Brazil	0.17	1.01	-	1.05	-	-
Canada	0.15	0.30	0.33	0.32	0.17	0.24
France	0.16	0.35	0.39	0.38	0.19	0.28
Germany	0.15	0.33	0.36	0.35	0.18	0.26
Hong Kong	0.14	0.27	0.30	0.29	0.15	0.21
India	0.17	1.30	-	-	-	-
Indonesia	0.02	2.30	-	0.62	-	-
Japan	0.16	0.31	0.35	0.33	0.18	0.25
Russia	0.11	0.82	-	-	-	-
UK	0.17	0.35	0.39	0.38	0.19	0.28
US	0.05	0.11	0.12	0.12	0.06	0.09
China	**0.10**	**1.15**	**0.42**	**1.12**	**0.30**	**0.47**

Why is food price inflation a major contributor to aggregate inflation?

- Demand- and supply-side effects
  - Expenditure elasticity relatively high, particularly for meat and poultry products
  - Rigidity in supply
- As a result, food price inflation may change more quickly and significantly than other goods when demand rises

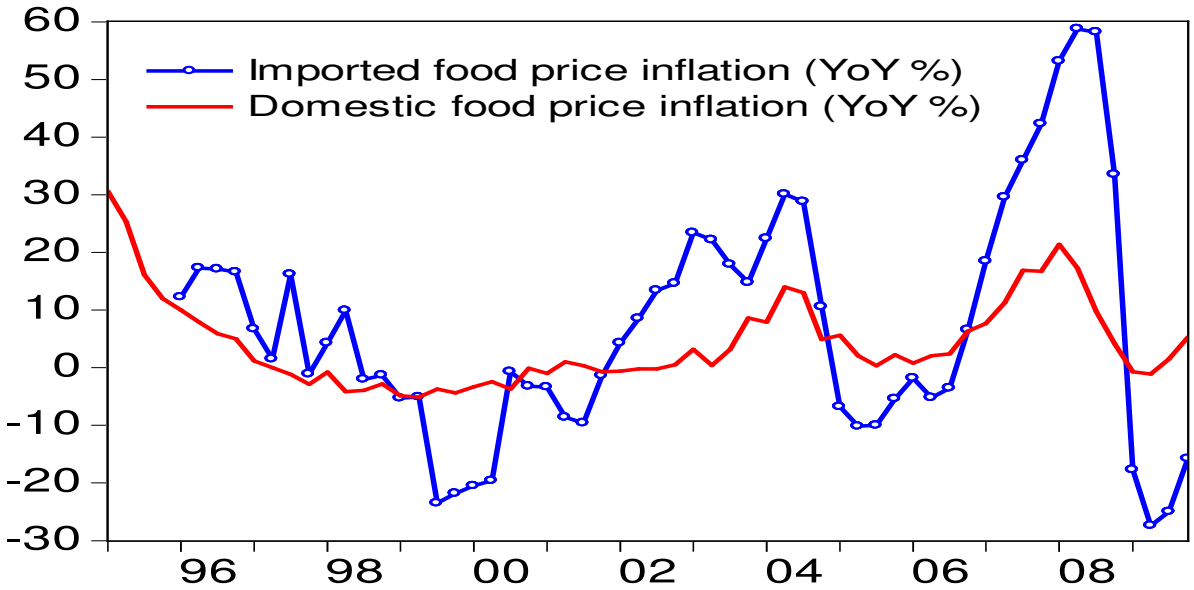
What determines China's food price inflation?

- Triangle model (Gordon, 1985)
  - Inflation inertial
  - Demand-side factors
    - Output gap and excess money
  - Supply-side factors
    - Natural disasters, food yield, production costs, and imported food price inflation

What determines China's food price inflation?

- Is international food price inflation a driving force for China's food price inflation?

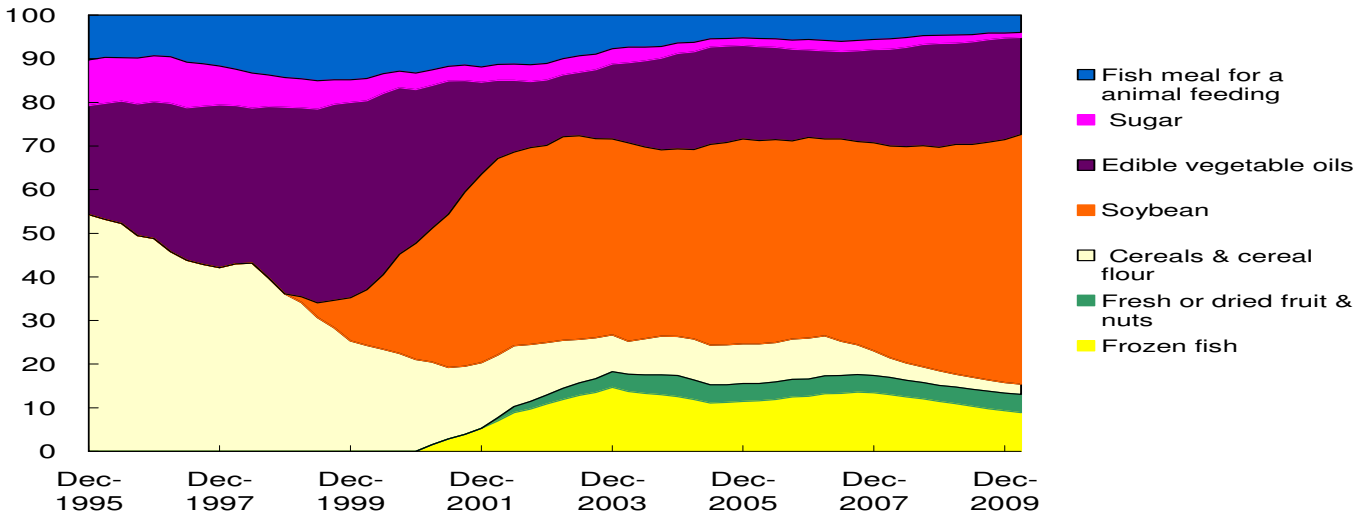
High correlation between domestic and imported food price inflation



What determines China's food price inflation?

- Our analysis shows international food price inflation is not a major determinant of domestic food price inflation
  - Soy bean products account for a large part of China's food imports
  - China is the largest importer of soy bean products, suggesting soy bean price inflation has likely been endogenous

Share of major food items in China's food imports



What determines China's food price inflation?

- China is a net exporter of major food items

Foodstuff	1995-2000	2001-2005	2008	2010-2015*
	(yearly average, units: 1,000 tons)			
Beef and veal	75	43	50	33
Coarse grains	2,828	6,672	-823	-1,429
Eggs	48	55	43	36
Oilseeds	-6,732	-20,616	-34,578	-42,918
Pork	88	206	-282	-50
Rice	1,714	870	850	1,737
Vegetable oils	-2,554	-4,823	-9,138	-8,903
Wheat	-2,475	-880	1,939	2,518

What determines China's food price inflation?

- Explanatory variables in our model
  - Inflation inertial, output gap, excess money, natural disasters, food yields, production costs
- Analysis using various sets of data
  - National-level data
  - National-level food panel data
  - Provincial-level various food panel data

What determines China's food price inflation?

- Estimates using 1996Q1-2009Q2data:demand pressures more important

		Estimation A		Estimation B	
Variable		Coefficient	T-statistic	coefficient	T-statistic
Persistence effect		0.101	2.049	0.120	2.583
Demand pressures	Output gap	0.592	1.900	1.966	2.403
	Excess money	0.257	3.037	0.287	3.755
Supply effect	Food yield or natural disasters	-0.891	-1.551	2.340	0.912
	Production costs	0.182	1.467	0.228	1.877
R^2		0.618		0.739	

- Variance decomposition
  - (A) contributions by demand and supply factors:24% vs. 17%
  - (B) contributions by demand and supply factors:32% vs. 17%

What determines China's food price inflation?

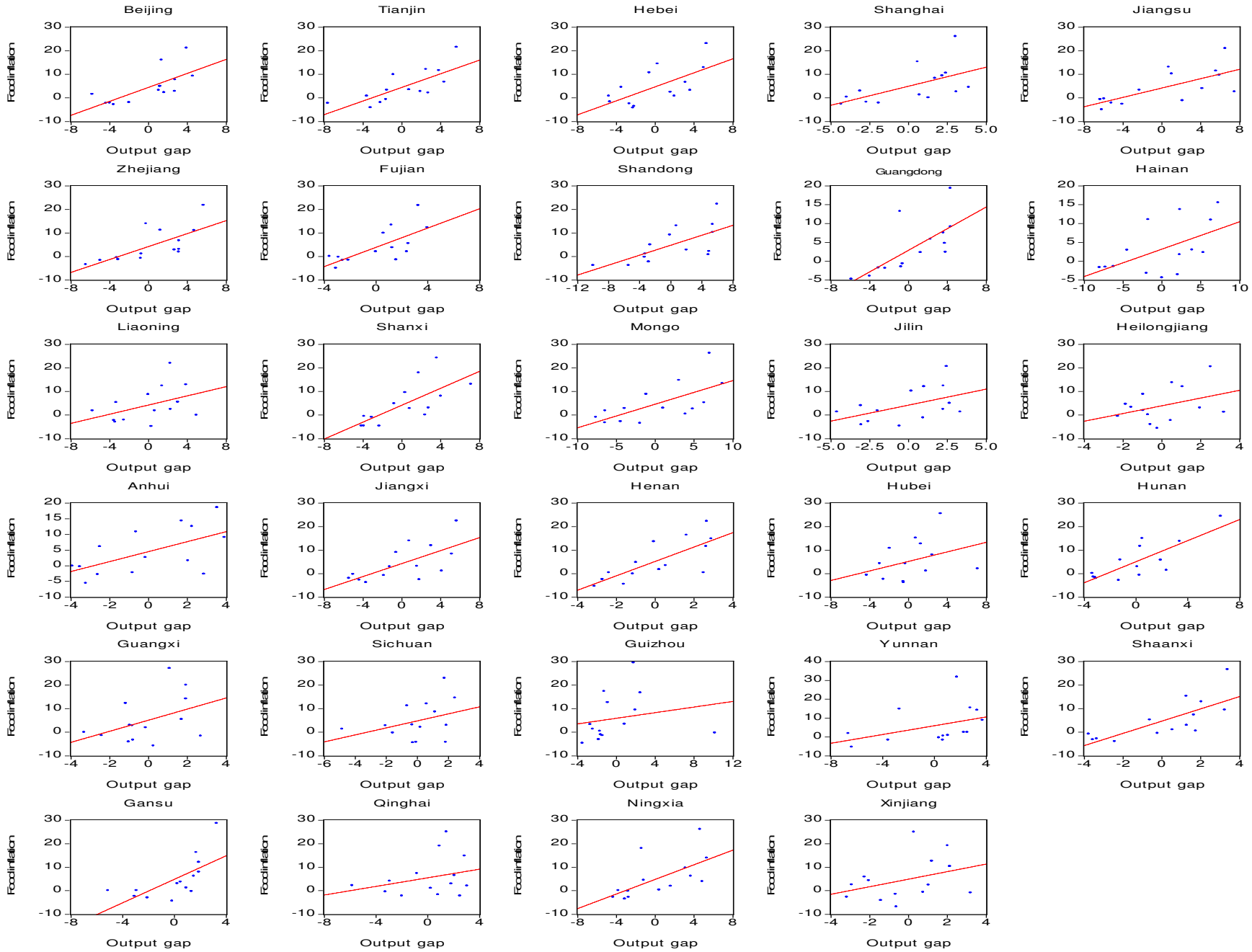
- National-level food panel data (1994-2008)

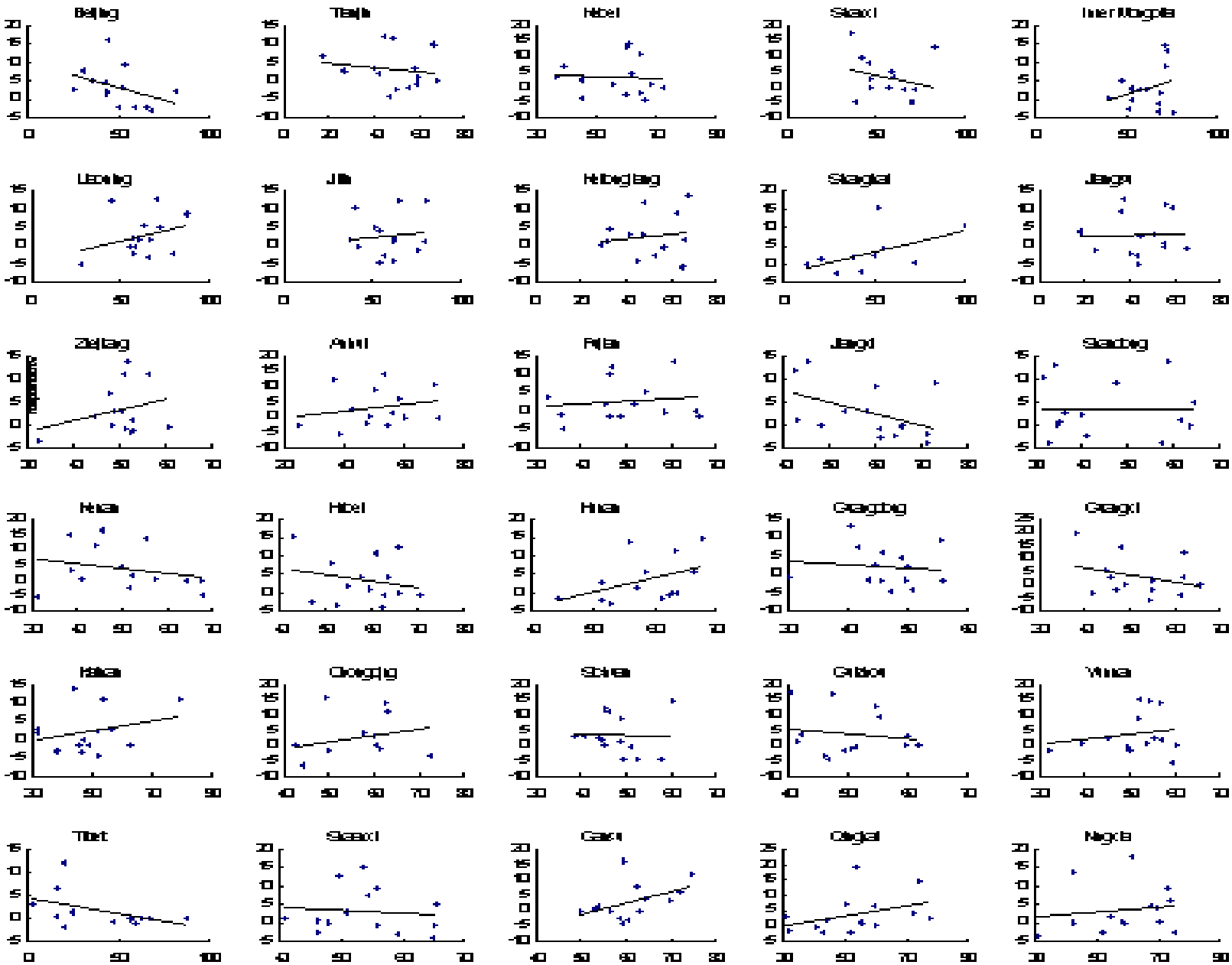
		Estimation A		Estimation B	
Variable		Coefficient	T-statistic	Coefficient	T-statistic
Demand pressures	Output gap	0.690	1.900	0.692	1.952
	Excess money	0.429	2.100	0.532	2.625
Supply effect	Food yield or natural disasters	-0.612	-2.880	0.490	2.604
	Production costs	0.590	2.886	0.433	2.062
R^2		0.596		0.566	

- Variance decomposition: demand pressures more important
  - (A) contributions by demand and supply factors: 29% vs. 27%
  - (B) contributions by demand and supply factors: 35% vs. 22%

What determines China's food price inflation?

- Provincial-level panel data (1995-2008)
  - Grains, meat and poultry, fruits and vegetables
  - Provincial-level output gap and food price inflation
  - Provincial-level natural disasters and food price inflation


Beijing
Tianjin
Hebei
Shanghai
Jiangsu
Zhejiang
Fujian
Shandong
Guangdong
Hainan
Liaoning
Shanxi
Mongo
Jilin
Heilongjiang
Anhui
Jiangxi
Henan
Hubei
Hunan
Guangxi
Sichuan
Guizhou
Yunnan
Shaanxi
Gansu
Qinghai
Ningxia
Xinjiang
Foodinflation
Output gap



What determines China's food price inflation?

- Estimates

		Grain		Meat		Fruit		Vegetables	
Variable		Coef.	T-st.	Coef.	T-st.	Coef.	T-st.	Coef.	T-st.
Demand pressures	Output gap	0.675	4.247	0.661	4.004	0.690	4.987	0.480	2.866
	Money	0.331	6.201	0.484	8.410	0.230	4.844	0.264	4.428
Supply effect	Food yield or natural disasters	-0.116	-3.201	-0.052	-1.661	0.087	2.560	0.118	2.658
	Production costs	0.548	5.752	0.065	2.670	0.247	2.983	0.367	5.424
R^2		0.578		0.555		0.326		0.317	

What determines China's food price inflation?

- Estimates

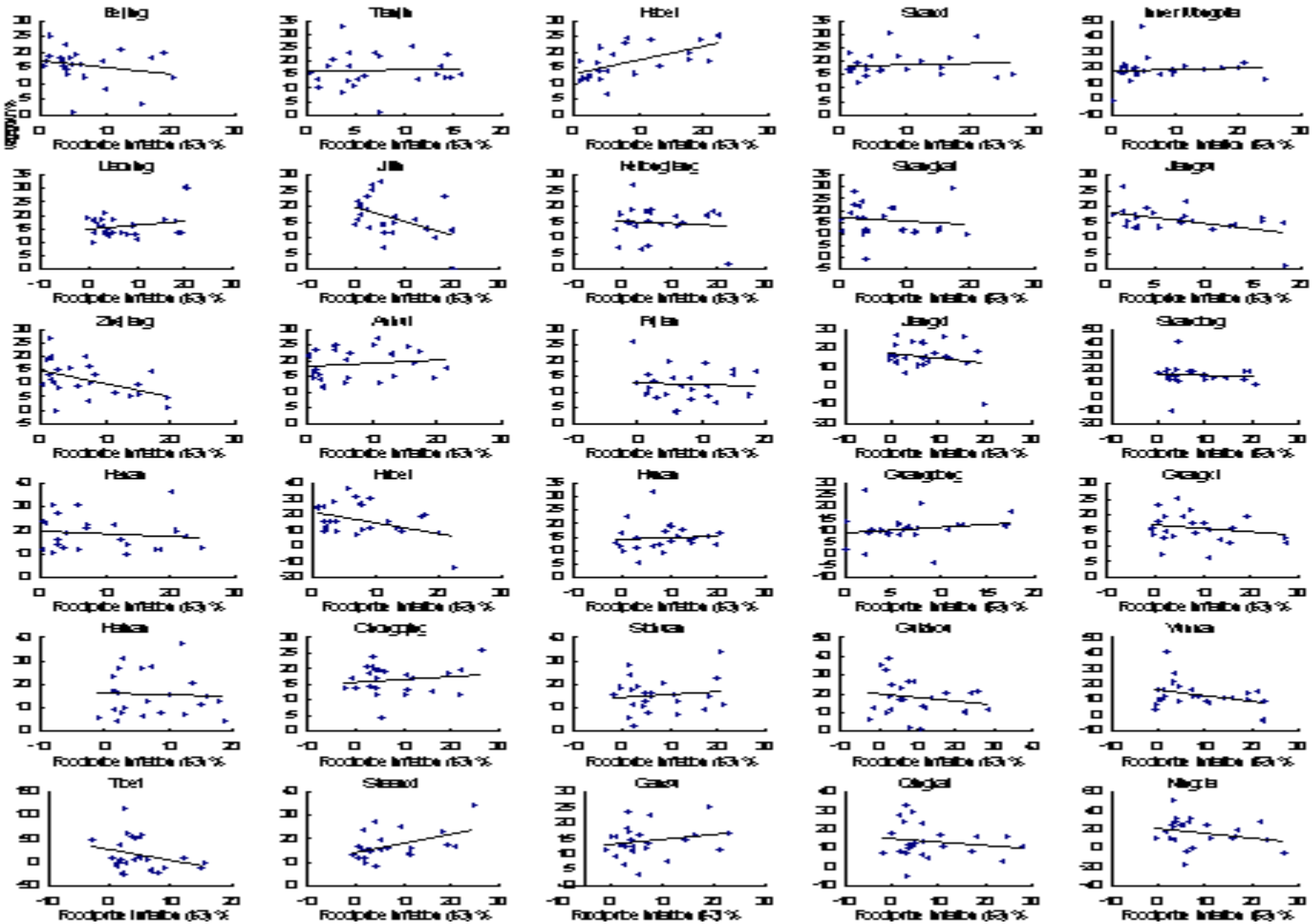
Variance decomposition (%)

	Grain	Meat	Fruit	Vegetables
Demand pressures	13.3	29.0	22.0	7.8
Supply effect	9.0	5.0	8.5	6.7

How does food price inflation affect aggregate inflation?

- Three channels
  - Direct effect
  - Wage growth
  - Inflation expectation

Did food price inflation push up wages?



Did food price inflation push up wages?

- Provincial-level panel data (2003-2009)
  - Food price inflation did not push up wages
  - Why? Abundant labour forces

Variable	Coefficient	T-statistic
Persistence effect	0.045	6.173
Employment ratio	0.273	0.860
Productivity	0.213	2.494
Food-price inflation	0.001	0.050
J-statistic	27.450	

Did food price inflation affect inflation expectation?

- Food price inflation affected inflation expectation

Granger-causality tests

Null hypothesis	F-statistic	Remark
Food-price inflation does not Granger-cause (GC) expected inflation of t+1	10.248	Reject*
Food-price inflation does not GC expected inflation of t+2	7.697	Reject*
Food-price inflation does not GC expected inflation of t+3	6.458	Reject**
Food-price inflation does not GC expected inflation of t+4	9.795	Reject*

Non-food price inflation and aggregate inflation

- Two questions
  - Did aggregate inflation revert to non-food price inflation?

$$\pi_t^{head} - \pi_{t-12}^{head} = \alpha + \beta(\pi_{t-12}^{head} - \pi_{t-12}^{non-food})$$

    - Aggregate inflation partly reverts to non-food price inflation within 12 months

  - Did non-food price inflation revert to aggregate inflation?

$$\pi_t^{non-food} - \pi_{t-12}^{non-food} = \varphi + \delta(\pi_{t-12}^{non-food} - \pi_{t-12}^{head})$$

    - Non-food price inflation did not revert to aggregate inflation

Policy implications

- Food price inflation reflects demand pressures

- Food price inflation does not necessarily transmit to non-food price inflation

  - When food price inflation rises fast, policy actions are necessary even if non-food price inflation is tame

Concluding remarks

- Expenditure elasticity explains why
  - Aggregate inflation is mainly contributed by food price inflation
  - Food price inflation mainly driven by meat and poultry inflation
- Determinants of China's food price inflation
  - Demand pressures more important on the whole
- Food-price inflation did not drive up wages but affected inflation expectations
- Food-price inflation did not transmit to non-food price inflation
- Policy implications