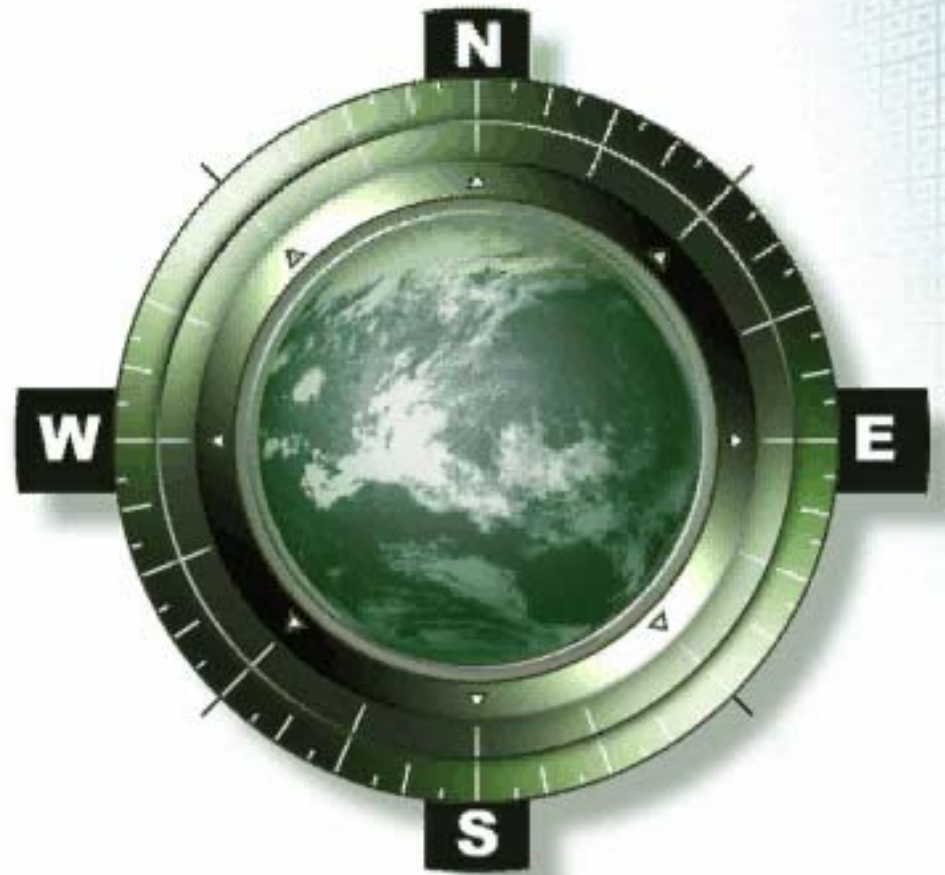


Price Transmission and Rural Poverty: An empirical application to Anhui province




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Contents

- I. Introduction and Motivation
 - II. Anhui SAM Overview
 - III. Path Multiplier Decomposition
 - IV. Conclusions
- 

I. Introduction

- Question

When there is an exogenous price (cost) varies of some sector, what are the price transmission effects on other sectors, on factors, and eventually, on the living standard of rural households

Sources of exogenous price changes

- Transition to a market economy.
- Exogenous shock, such as world petroleum price rise, WTO
- Government policy, such as taxes

Motivation

- As linkages between the rural sector and the rest of the domestic and even international economy grow, China's rural poor majority will increasingly see prices influence their incomes and costs, both as individuals and enterprises.
- In this paper, we use multiplier decomposition methods to shed light on detailed linkages between economywide costs and the prices faced by rural households.

Food Prices are Rising in China

Annual CPI change by commodity, 2004

	<i>Percent</i>
Consumer price index, all items	5.0
Consumer price index, by item:	
1. Food items	14.0
Grain	32.0
Meat	22.1
Eggs	30.3
Fish	18.5
Vegetables	10.2
Fruit	-0.9
2. Tobacco, alcohol	1.5
4. Clothing	-1.5
5. Household items	-1.4
6. Health	-1.4
7. Transport, communication	-1.3
8. Recreation, culture	0.7
9. Housing	4.9

In an otherwise deflationary environment, national food prices are exerting favorable pressures on *agtot*

Methods

- the majority of the rural poor are still farmers
- The gain from agriculture is a major income source
- So, the agricultural terms of trade (*agtot*) are a convenient indicator of economic well-being for this group.

Agricultural Terms of Trade

Generally speaking, *agtot* can be characterized by a ratio of two price indices:

1. Producer prices (numerator) measure income/revenue components for farmers
2. Prices of agricultural inputs (denominator) measure cost components

Since a farm enterprise will see its economic well-being vary with this ratio, a better understanding of its determinants is essential to understanding rural poverty.



Methods

On the other side, we identify the main influences on consumption prices faced by rural households in Anhui province,

Our analysis are based on a social accounting matrix (SAM) developed for this purpose.

II. Overview of the Anhui SAM

1997 Anhui Sam (77×77)	I Product	II Factors	III House	IV. Ent,Gov	V. Taxes	VI. Row	VII. Total
I. Production (53 sectors)	T_{11}	O	T_{13}	T_{14}	O	T_{16}	Y_1
II. Factors (Lab,Cap,Land)	T_{21}	O	O	O	O	O	Y_2
III. Households (Rur, Urb)	O	T_{32}	O	T_{34}	O	O	Y_3
IV. Enter, Gov (Cen, Loc,Ext)	O	O	O	O	T_{45}	O	Y_4
V. Taxes (9 types)	T_{51}	T_{52}	T_{53}	T_{41}	O	O	T_{41}
VI. Row, Cap	T_{61}	T_{62}	T_{63}	T_{64}	O	T_{66}	T_{41}
VII. Total	Y_1	Y_2	Y_3	Y_4	Y_3	Y_4	Y_4

Sectoral Aggregation

- 5 Agricultural sectors
- 6 Mining sectors \Rightarrow 1 Mining
- 28 Manufactory sectors \Rightarrow 17 sectors
- 3 sectors of Electricity, Gas, Water was aggregated
- 3 types of Governments and 9 Taxes \Rightarrow 1 Gov
- A 41 \times 41 SAM, including 34 production, 3 kind of labor, capital, land, 2 household, enterprises, Government, Row & Roc

III. Multiplier Decomposition Analysis

- In a market economy, a web of interactions delineate the path from initial expenditure to ultimate incomes.
- Multiplier decomposition methods can shed light on these complex linkages.
- In the complete Anhui report, we get detailed path decomposition result, but report only one here because of time constraints.

Path Decomposition

- To elucidate the complex chains of price interaction, we use path decomposition analysis.
- To summarize the methodology:
 - An **arc** is a pair $\langle i, j \rangle$ of indices in the SAM accounts
 - A **path** is a sequence s of indices $s = \langle i, k, l, \dots, m, j \rangle$ decomposable into consecutive arcs $\langle i, k \rangle, \langle k, l \rangle, \dots, \langle m, j \rangle$.
 - The influence of i on j through path s is denoted $(i \rightarrow j)_s$
 - To estimate the price influence of account i on account j along $\langle i, j \rangle$, before economywide linkages are taken into account, we have:

$$\frac{\partial P_j}{\partial P_i} = a_{ij}$$

Path Decomposition

- For any given path $s = \langle i, k, \dots, m, j \rangle$ the **Direct** price influence the composite

$$D_{(i \rightarrow j)s} = a_{ki} \dots a_{jm}$$

- In any given path s there may exist feedback effects among its indices, each of which can be represented by a multiplier μ_s (actually the ji entry in the multiplier matrix M).
- All of these feedback effects taking place along the path amplify the direct influence to produce **Total** influence:

$$T_{(i \rightarrow j)s} = D_{(i \rightarrow j)s} \mu_s$$

Path Decomposition

- Finally, note that more than one elementary path may span two indices i, j . Therefore the **Global** income effect must sum total effects over all paths:

$$G_{(i \rightarrow j)s} = \sum_{s \in S} T_{(i \rightarrow j)s} = \sum_{s \in S} D_{(i \rightarrow j)s} \mu_s$$

- Direct, Total** and **Global** influence are three distinct components that make up the transmission mechanism underlying income determination.

Price Transmission from Products to Producers

	Crops	Livesto	Mining	FoodProc	Textile	Chemical	Utility	Commerce
Agriculture	0.52	0.30	0.03	0.27	0.05	0.15	0.05	0.10
Mining	0.10	0.05	1.13	0.12	0.03	0.09	0.14	0.06
manufacturing	0.14	0.07	0.09	0.19	0.16	0.21	0.08	0.09
Utility	0.03	0.01	0.08	0.04	0.01	0.02	1.04	0.02
Construction	0.13	0.06	0.11	0.15	0.04	0.12	0.09	0.12
Teritary Industry	0.12	0.06	0.03	0.15	0.03	0.07	0.04	0.18
Average	0.18	0.10	0.10	0.18	0.10	0.15	0.10	0.11

The results show what product's price should be paid most attention in order to keep the price stable

Price Transmission efforts for agricultural terms of trade

	Crops	Restaur	RefPet	Utility	Transport	Capital
Agriculture Prices	0.87	0.02	0.03	0.05	0.04	0.17
Agriculture Input Price	0.51	0.02	0.06	0.08	0.08	0.20
agtot	1.72	1.14	0.51	0.58	0.54	0.82

Price Transmission from Products to Households

	Crops	Livesto	Fish	FoodProc	Textile	Apparel	Chemical	Utility	Commerce	SocServ
HH Rural	0.35	0.14	0.07	0.36			0.13		0.11	
HH Urban	0.26	0.16		0.36	0.08	0.12	0.12	0.07	0.11	0.07

Rural households are about equally price dependent on raw Crop and Food Processing.

Path Linkages from Producers to Rural Households

Path	Global Effect	Total Effect	% of Global	Cum %
HH01Rural<-crops	0.351	0.207	58.9	58.9
HH01Rural<-Livesto<-crops		0.022	6.2	65.1
HH01Rural<-Fish<-crops		0.003	0.7	65.9
HH01Rural<-Othcrop<-crops		0.003	0.9	66.8
HH01Rural<-FoodProc<-crops		0.084	24.0	90.8
HH01Rural<-Livesto<-FoodProc<-crops		0.005	1.4	92.1
HH01Rural<-Restaurant<-FoodProc<-crops		0.002	0.5	92.7
HH01Rural<-Livesto	0.135	0.109	80.6	80.6
HH01Rural<-FoodProc<-Livesto		0.006	4.8	85.3
HH01Rural<-Apparel<-Livesto		0.002	1.3	86.6
HH01Rural<-Restaurant<-Livesto		0.002	1.4	88.0
HH01Rural<-FoodProc	0.356	0.301	84.6	84.6
HH01Rural<-crops<-FoodProc		0.002	0.6	85.2
HH01Rural<-Livesto<-FoodProc		0.017	4.8	90.0
HH01Rural<-Fish<-FoodProc		0.003	0.9	90.9
HH01Rural<-Restaurant<-FoodProc		0.006	1.8	92.7
HH01Rural<-RealEstate<-Capital, E01Enterp<-HH02Urban<-FoodProc		.002	0.5	93.1

CPI risk comes through all major product categories, but is largest for basic crops, sold both to Food Processors and retail

Path Linkages from Producers to Urban Households

Path	Global Effect	Total Effect	% of Global	Cum %
HH02Urban<-crops	0.257	0.068	26.4	26.4
HH02Urban<-Livesto<-crops		0.027	10.6	37.1
HH02Urban<-Fish<-crops		0.002	0.6	37.7
HH02Urban<-Othcrop<-crops		0.003	1.2	38.9
HH02Urban<-FoodProc<-crops		0.082	32.1	71.0
HH02Urban<-Textile<-crops		0.002	0.8	71.8
HH02Urban<-Livesto<-FoodProc, crops		0.006	2.3	74.1
HH02Urban<-Apparel<-Textile, crops		0.004	1.7	75.8
HH02Urban<-Restaurant<-FoodProc<-crops		0.002	0.9	76.7
HH02Urban<-Livesto<-L01Farmer<-HH01Rural<-crops		0.008	3.2	80
HH02Urban<-Fish<-L01Farmer<-HH01Rural<-crops		0.003	1.1	81.1
HH02Urban<-Othcrop<-L01Farmer<-HH01Rural<-crops		0.002	0.7	81.8
HH02Urban<-Apparel<-L02worker<-HH01Rural<-crops		0.002	0.7	82.5
HH02Urban<-Livesto<-L01Farmer<-HH01Rural<-FoodProc<-crops		0.003	1.3	83.8

By comparison, Urban households face less consumer price risk, and this is diversified across more extensive product and intermediary groups

Path Linkages from Factors to Rural Households

Path	Global Effect	Total Effect	% of Global	Cum %
HH01Rural<-crops<-Capital	0.168	0.006	3.5	3.5
HH01Rural<-Livesto<-Capital		0.002	0.9	4.4
HH01Rural<-Fish<-Capital		0.003	2	6.4
HH01Rural<-FoodProc<-Capital		0.018	10.6	17
HH01Rural<-Apparel<-Capital		0.004	2.3	19.3
HH01Rural<-Chemical<-Capital		0.003	1.9	21.2
HH01Rural<-medicine<-Capital		0.002	1	22.2
HH01Rural<-Nonmetal<-Capital		0.002	1.3	23.5
HH01Rural<-Transport<-Capital		0.003	2	25.5
HH01Rural<-Commerce<-Capital		0.009	5.2	30.7
HH01Rural<-Restaurant<-Capital		0.002	1.1	31.8
HH01Rural<-RealEstate<-Capital		0.036	21.6	53.4
HH01Rural<-EduSciHel<-Capital		0.003	2	55.4
HH01Rural<-crops<-Chemical<-Capital		0.003	1.7	57.0
HH01Rural<-FoodProc<-crops<-Capital		0.002	1.4	58.4
HH01Rural<-crops<-Land	0.008	0.004	48	48

For rural household producers, capital cost risk is small and varies with capital intensity of the relevant path (e.g. Food Processing vs. Livestock).

IV. Conclusions

1. The absolute price variations can be estimated by the method of price decomposition based on SAM, Also the price transmission paths can be clearly found
2. Some sectors, such as crops, food product, Chemical, Utility have much greater price transmission effects on the economy, and Households, and the effects to different groups of households are not equally, the poorest households may be more sensitive to price change of some products.
3. There may be many price transmission paths, so the indirect price effects are important and should be carefully analyzed for policy makers to minimize undesirable welfare distortions

IV. Conclusions

Thank you very much

