



# Food Consumption Trends in Urban China: Opportunities and Implications for Mekong Region Agriculture

by

James Seale, Jr., Junfei Bai, Tom Wahl, and Bryan Lohmar\*

Presentation at Workshop,

*Partnering for Smallholder Inclusive Market Opportunities  
in the Mekong,*

Hanoi, Vietnam

\*University of Florida, China Agricultural University, North Dakota State University, and  
U.S. Grains Council, China

This project was jointly funded by U.S. Department of Agriculture (USDA) AFRI and Emerging Markets Program (EMP) grants, Chinese Academy of Sciences, and the National Foundation of Sciences, China

- Team includes:
  - Center for China Agricultural Policy (CCAP)
  - China Academy of Sciences
  - China Agricultural University
  - Economic Research Service, USDA
  - Foreign Agricultural Service, USDA
  - North Dakota State University
  - Washington State University
  - University of Florida

# Geographic Distribution



# Data

- Overview of the survey—subset of NBS-UHIE households by stratified and random sampling in 11 cities:

---

City	Year	Sample Size	City	Year	Sample Size
Beijing	2007	315/1,000HH	Harbin	2012	200HH
Nanjing	2009	246/700HH	Taiyuan	2012	200HH
Chengdu	2010	208/700HH	Nanning	2012	200HH
Xi'an	2011	215/600HH	Taizhou	2012	180HH
Shenyang	2011	149/300HH	Lanzhou	2012	200HH
Xiamen	2011	207/600HH			

---

- Diary-based household survey, 2007-2012
  - 11 different cities
  - 2342 total households
  - 3-meal/7-day diary record

# Survey Coverage

	National Bureau of Statistics, China	Survey
<b><i>Food At Home (FAH ):</i></b>		
What was eaten (commodities)	Yes	79
How much: Quantity & Exp.& Price	E&Q – no prices	Yes
When	Monthly	Meal
Where (purchase venue)	NO	Yes
Processed degree	NO	Yes
<b><i>Food Away From Home (FAFH ):</i></b>		
Dishes (commodities)	No	79
How much: Quantity & Exp.	Exp. only	Q&E
When	Monthly	Meal
Where (food outlets)	No	Yes
Who paid	No	Yes

# Survey Coverage

	National Bureau of Statistics, China	Beijing	10 Other Cities
<i>Demographics Etc.:</i>			
Demographics	Yes	Yes	Yes
Preference for food safety	No	Yes	Yes
WTP for traceability	No	No	Yes
Knowledge of certification	No	No	Yes
School meal & Children Health	No	Yes	Yes
Food establishment census survey	No	No	No
Phase II food establishment survey	No	No	No

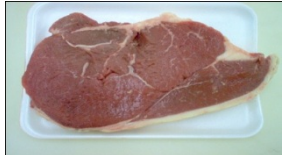
Food quantity data were converted to nutritional elements for each kind of food consumed based on the China Food Composition Book from Institute of Nutrition and Food Safety China CDC, Beijing 2009

# MAPPING DISHES INTO 79 COMMODITIES & NUTRIENTS



(BJ: 2,900+)  
(NJ: 2,000+)  
(CD: 2,000+)

**Recipe Matrix**  
(1) 32 different cook books, about 9000+ recipes  
(2) 50 chef survey for unknown recipes & parameter estimation to adjust weight by type of food facility



# We Know that Income Growth and Urbanization in China are Causing:

## 1) ***Demand growth for food grain to slow***

*=> Or reversing - urban residents consume about half the food grain of their rural counterparts*

## 2) ***Demand for animal proteins to rise***

*=> Animal production is not only growing but consolidating into large, modern operations*

## 3) ***Demand for fruit and vegetables to rise***

*=> Along with animal proteins, demand for other non-grain foods is rising*

## 4) ***Demand for other attributes to rise***

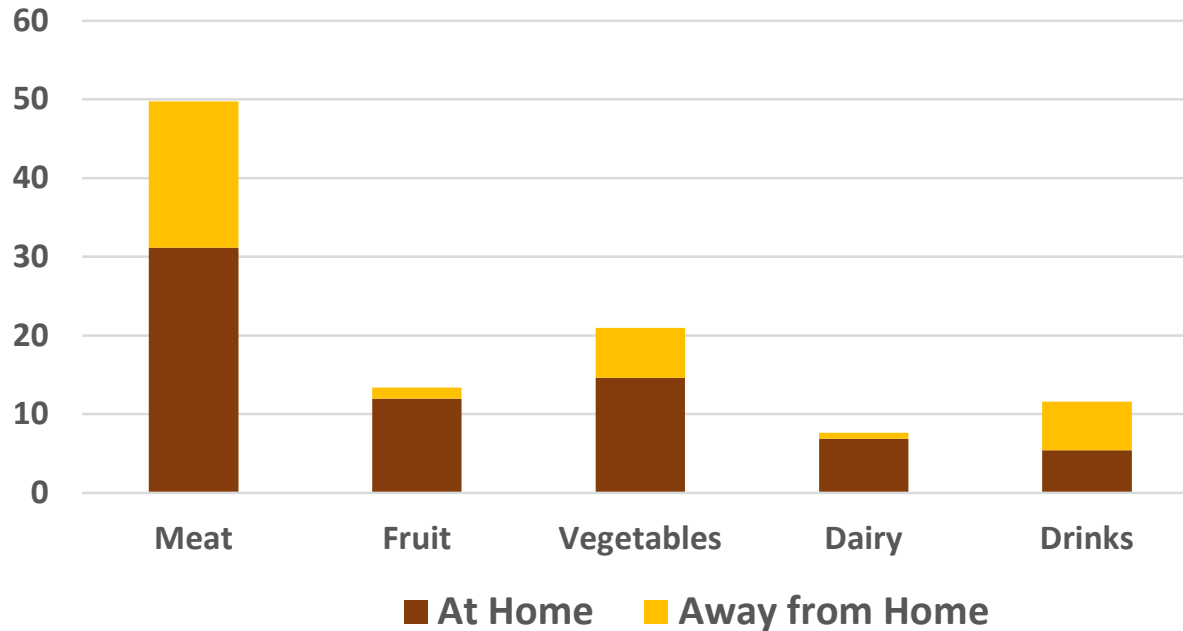
*=> Demand for variety, convenience, quality, and, above all, food safety is growing*



# Expenditures on Food Away from Home are Significant

## Estimates of Expenditures on Food Consumed at and away from Home

(RMB/Week)

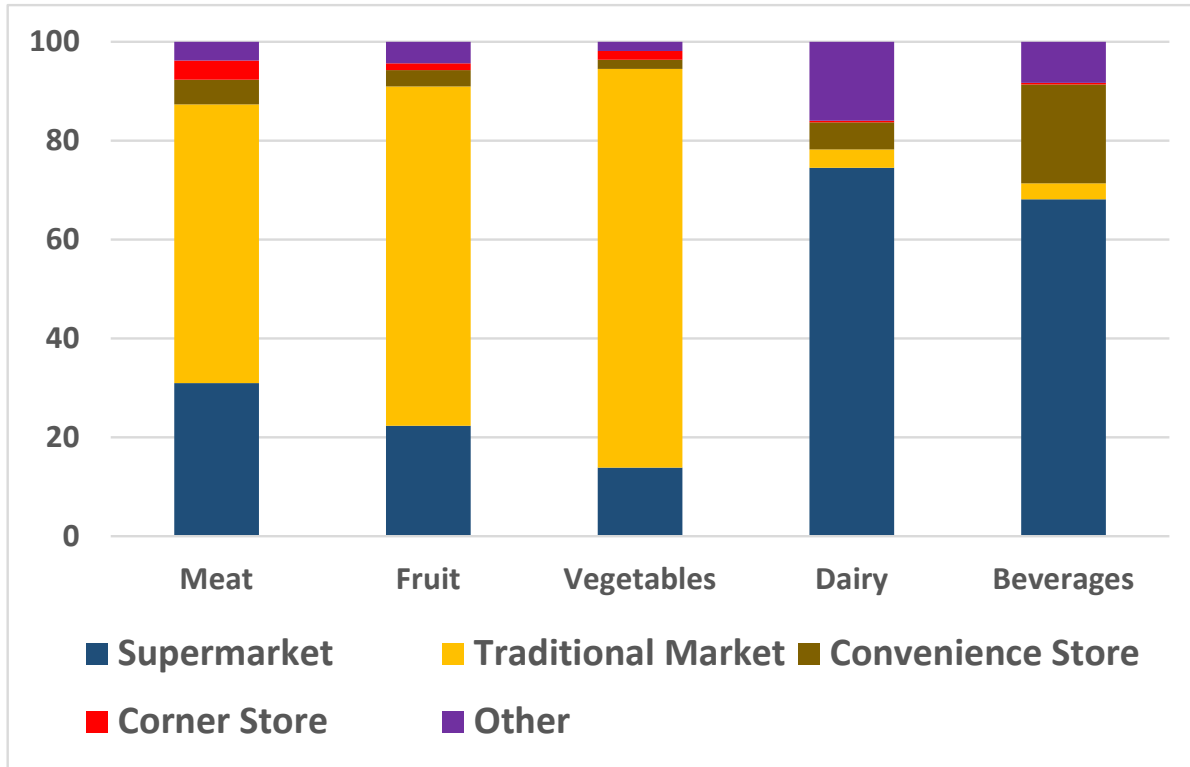


*A significant share of meat, drinks, and vegetable expenditures are on food away from home*

*This does not take “hosted” food consumption into consideration*

# Purchasing Venue Varies by Product

## Venue for Purchasing Various Food Products

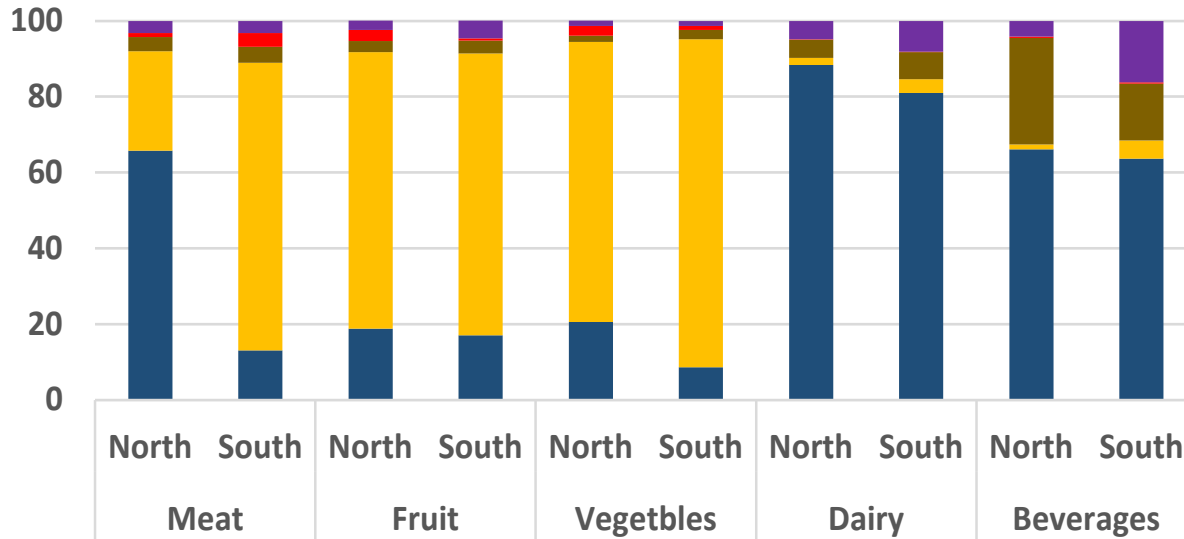


*Traditional “wet” markets still common for fresh goods*

*Supermarkets popular for processed products*

# Regional Variation in Consumer Purchasing Venues

## North-South Difference in Purchasing Venues



*Traditional “wet” markets more common in the South*

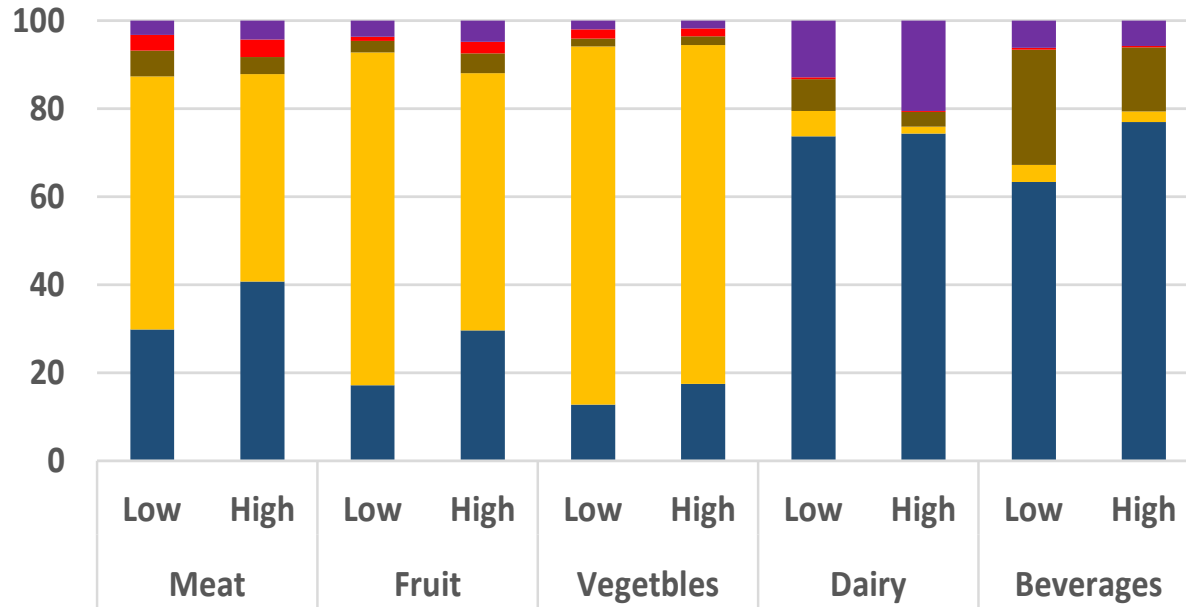
*Supermarkets more common in the North*

*Particularly for meat!*

- Supermarket*
- Traditional Market*
- Convenience Store*
- Corner Store*
- Other*

# Income Variation in Food Purchasing Venue

## High-Low Income Difference in Purchasing Venues

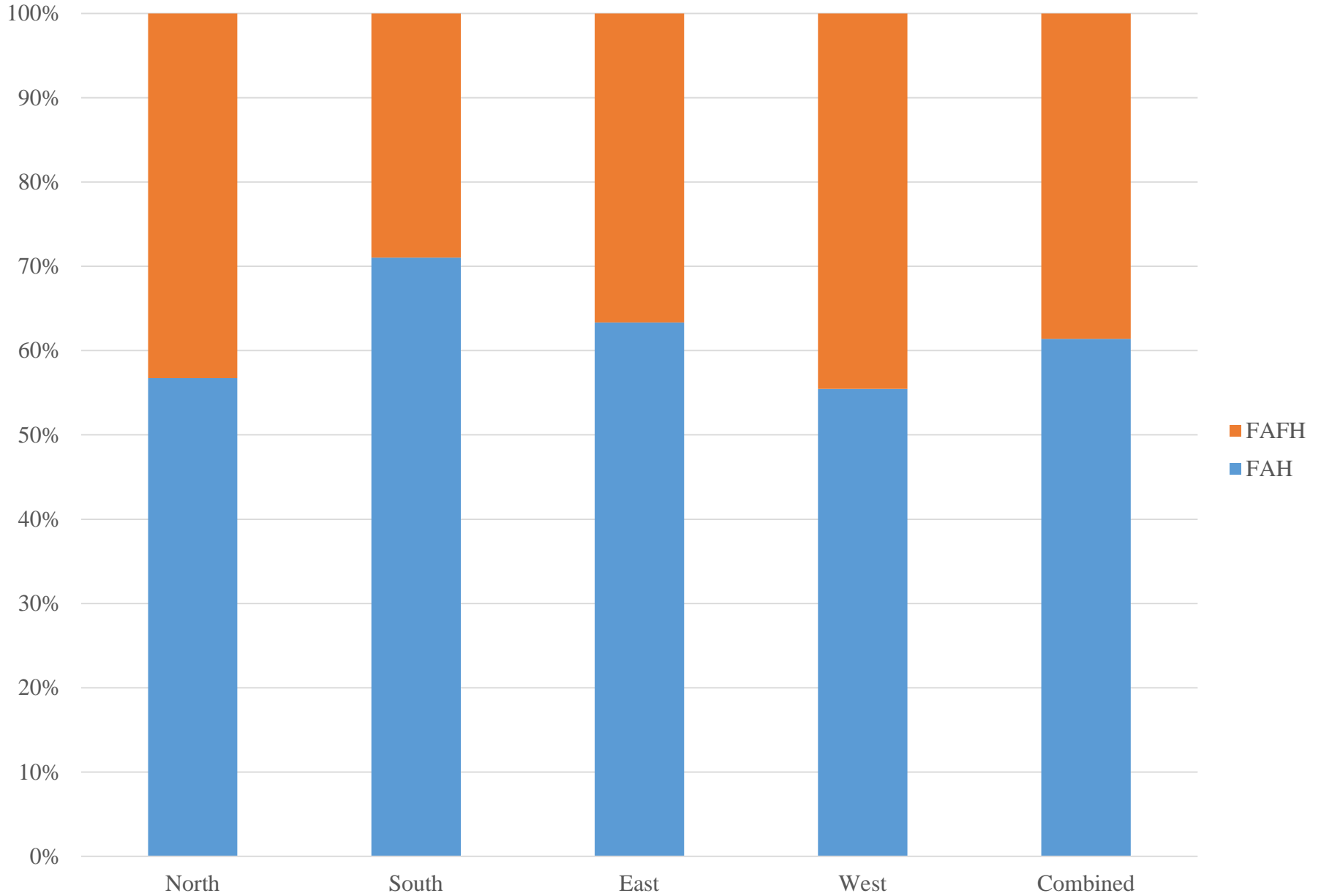


*Supermarkets  
more common as  
Incomes go up*

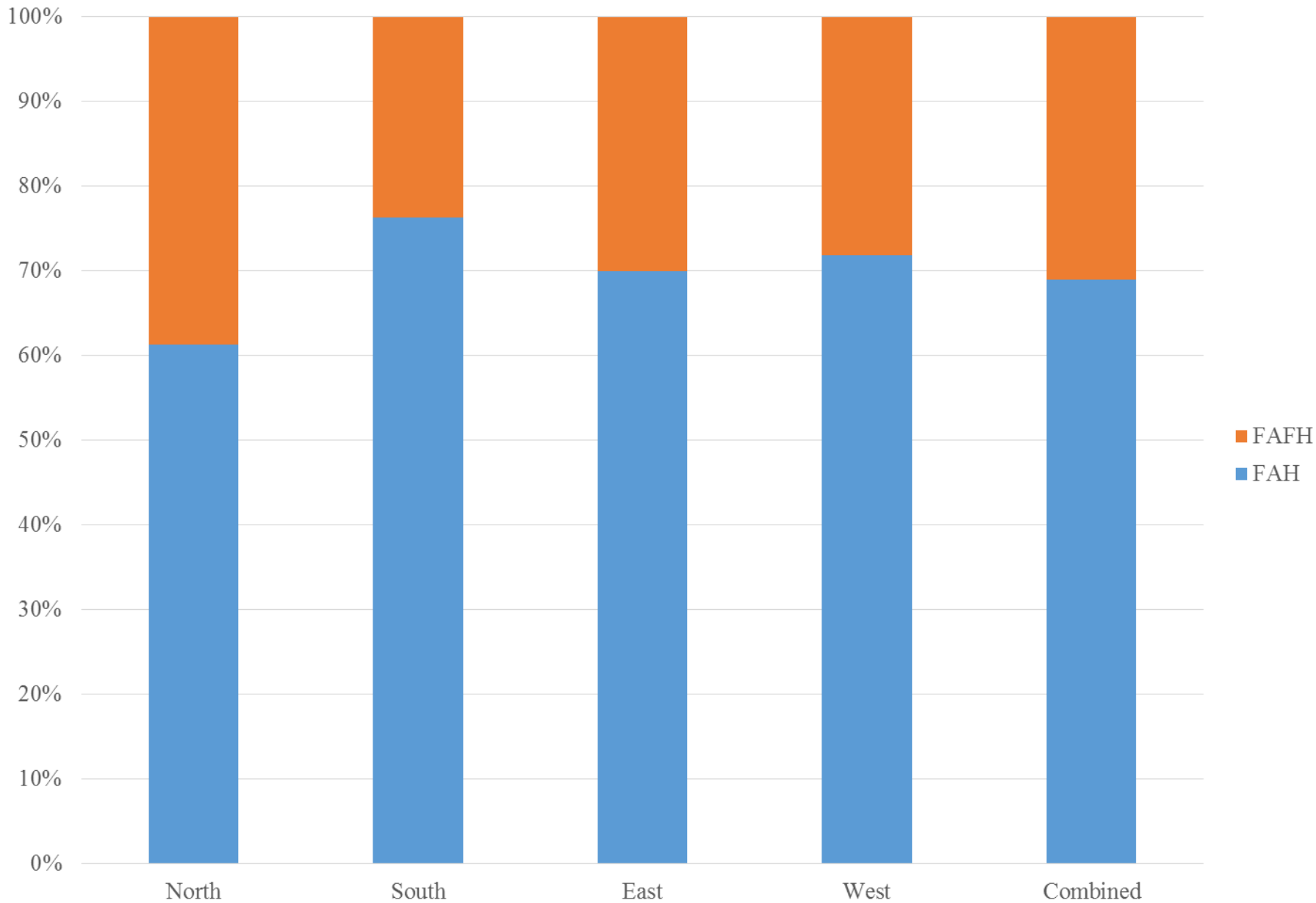
*Convenience stores  
go down as incomes  
go up*

- Supermarket
- Traditional Market
- Convenience Store
- Corner Store
- Other

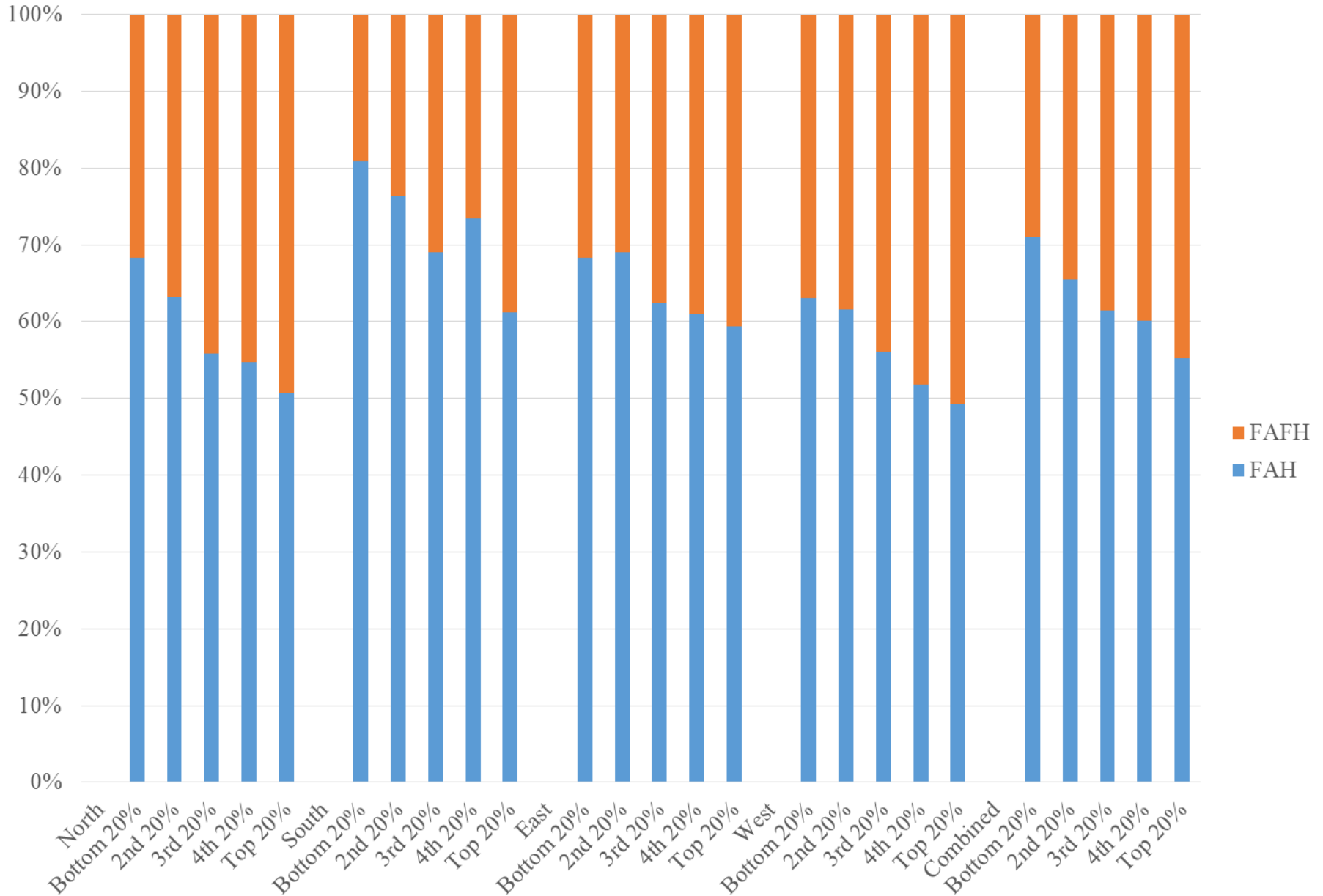
Chinese Urban Meat Expenditure by Region



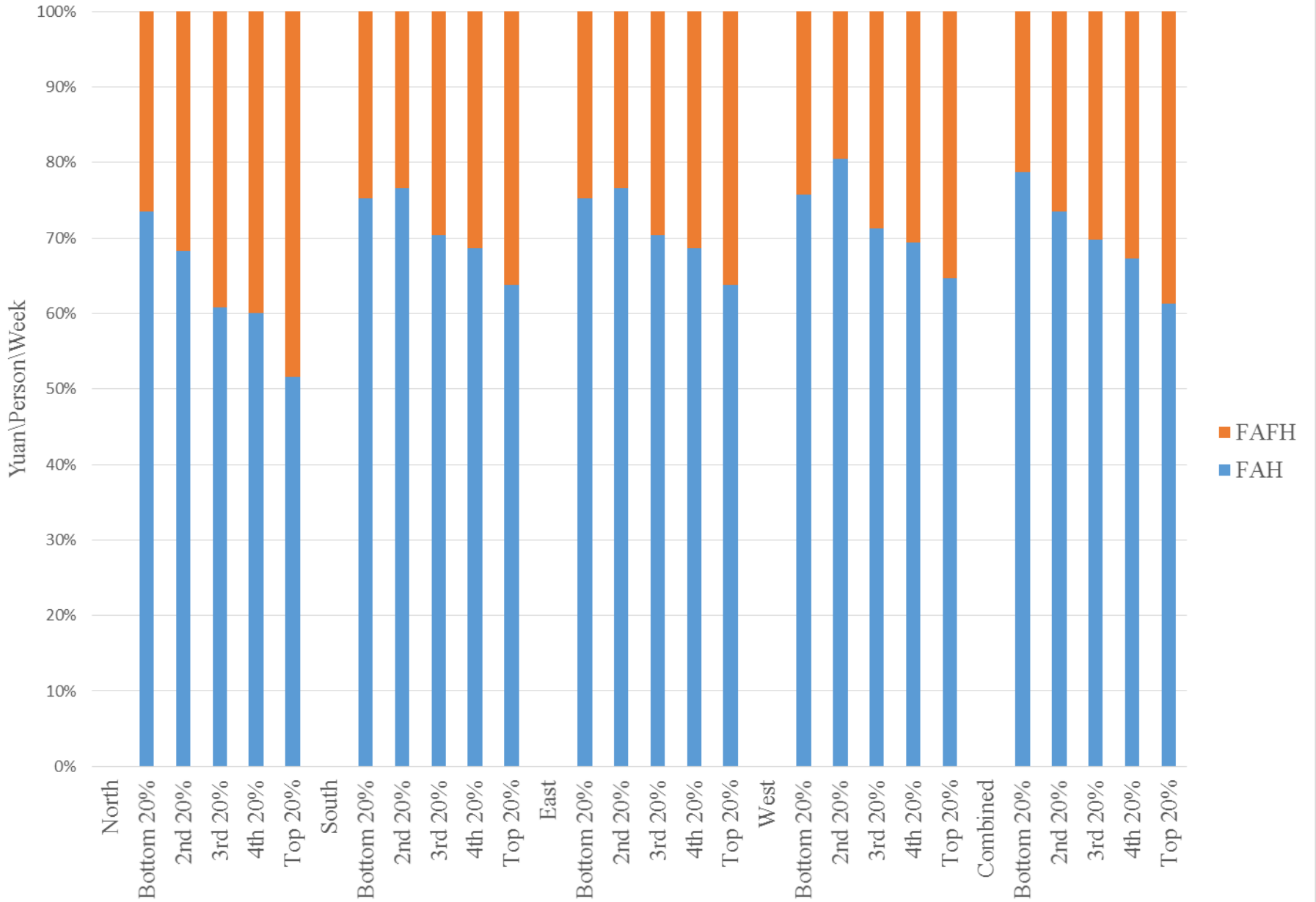
Chinese Regional Urban Vegetable Expenditure



Chinese Regional Urban Meat Expenditures by Income Group

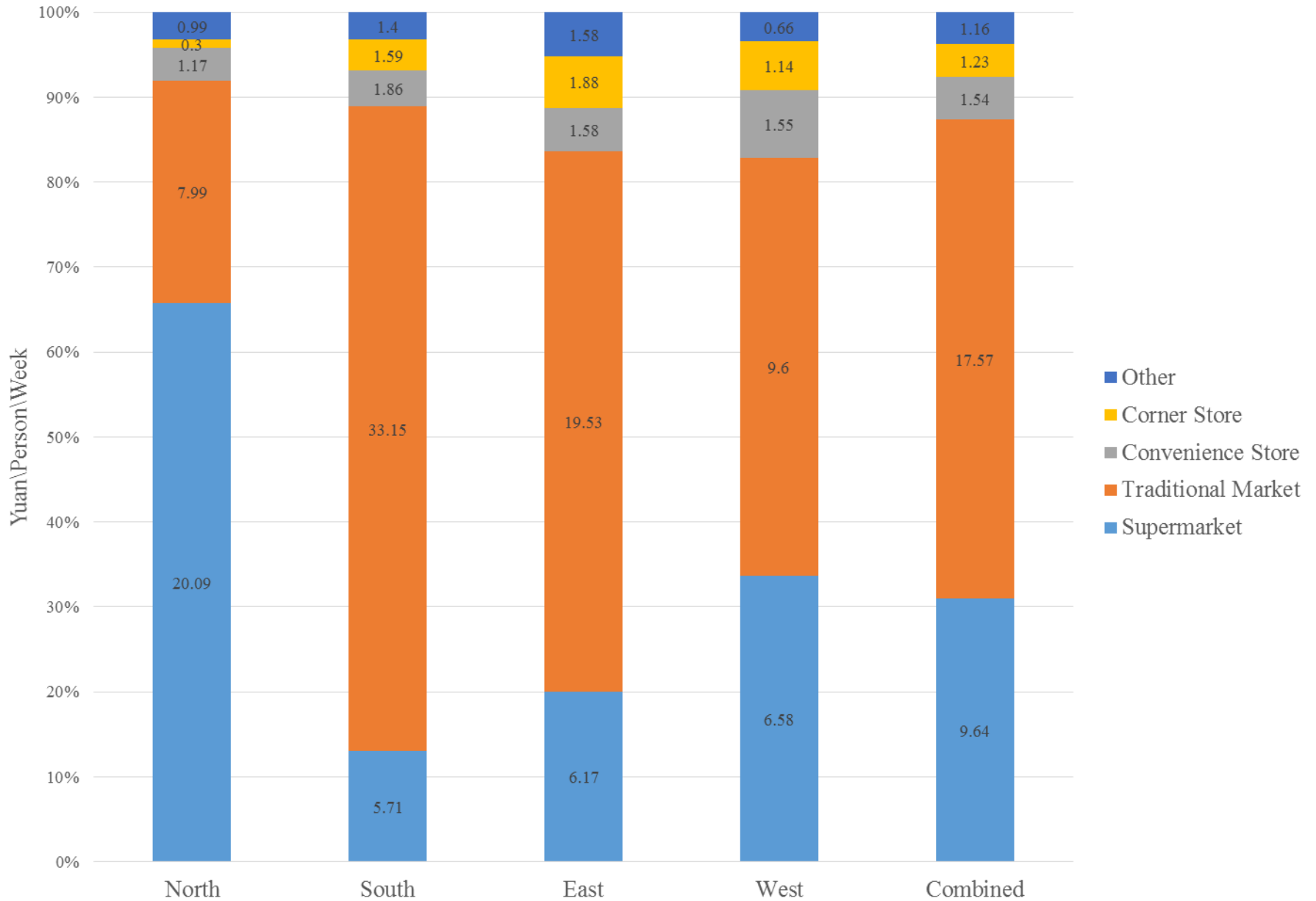


Chinese Urban Vegetable Expenditure by Income Groups

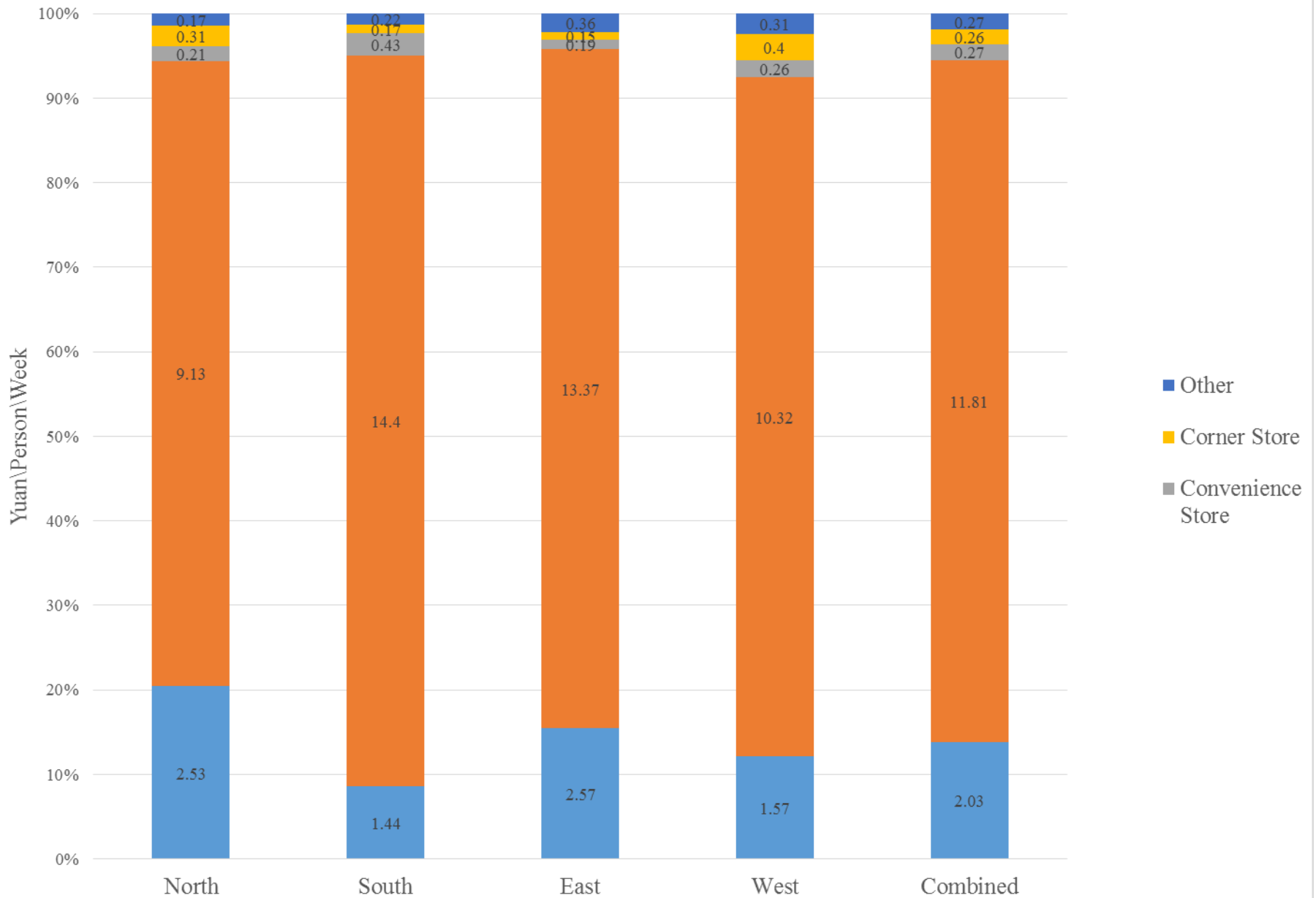




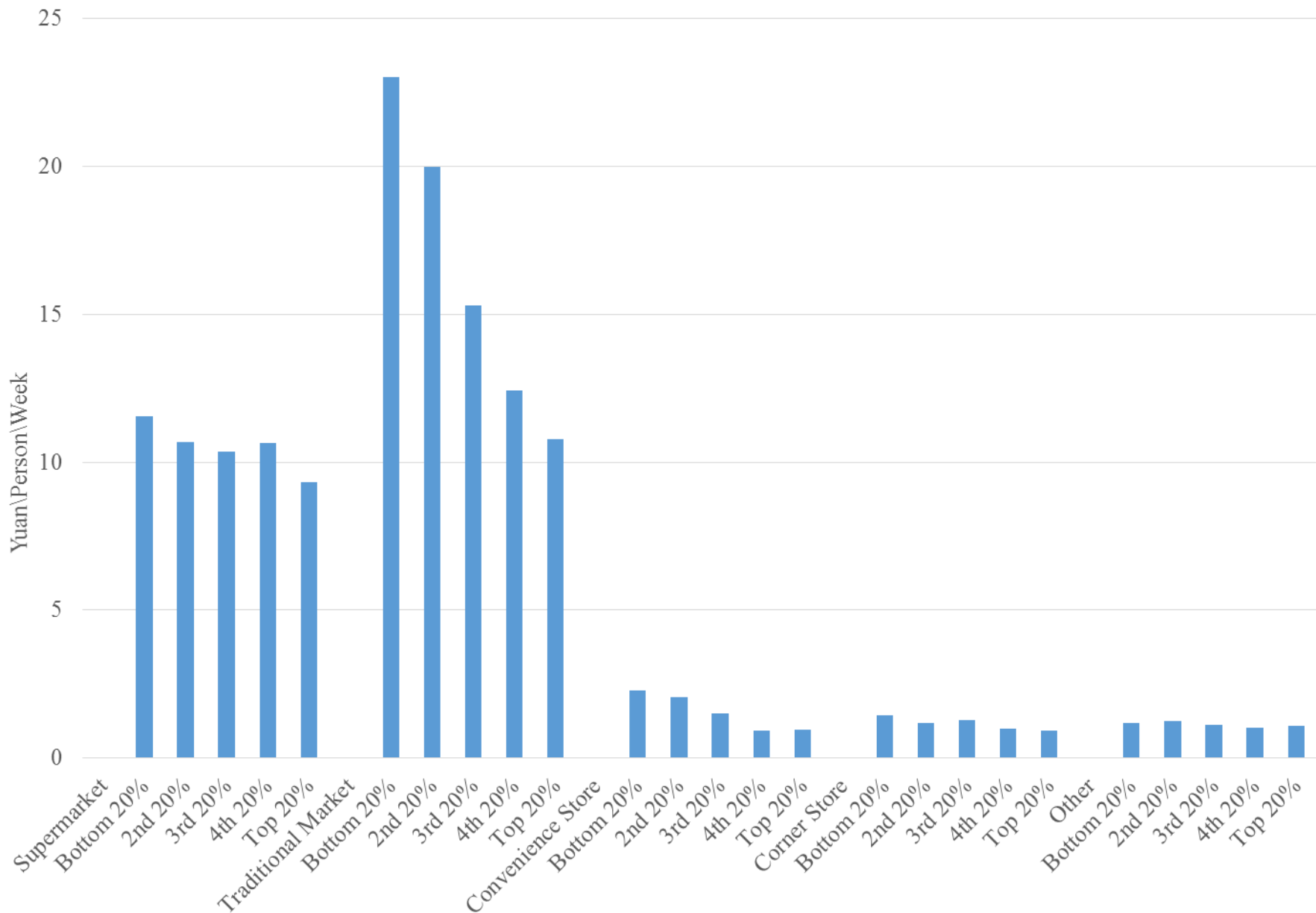
Chinese Regional Urban Meat Expenditures for FAH by Place of Purchase



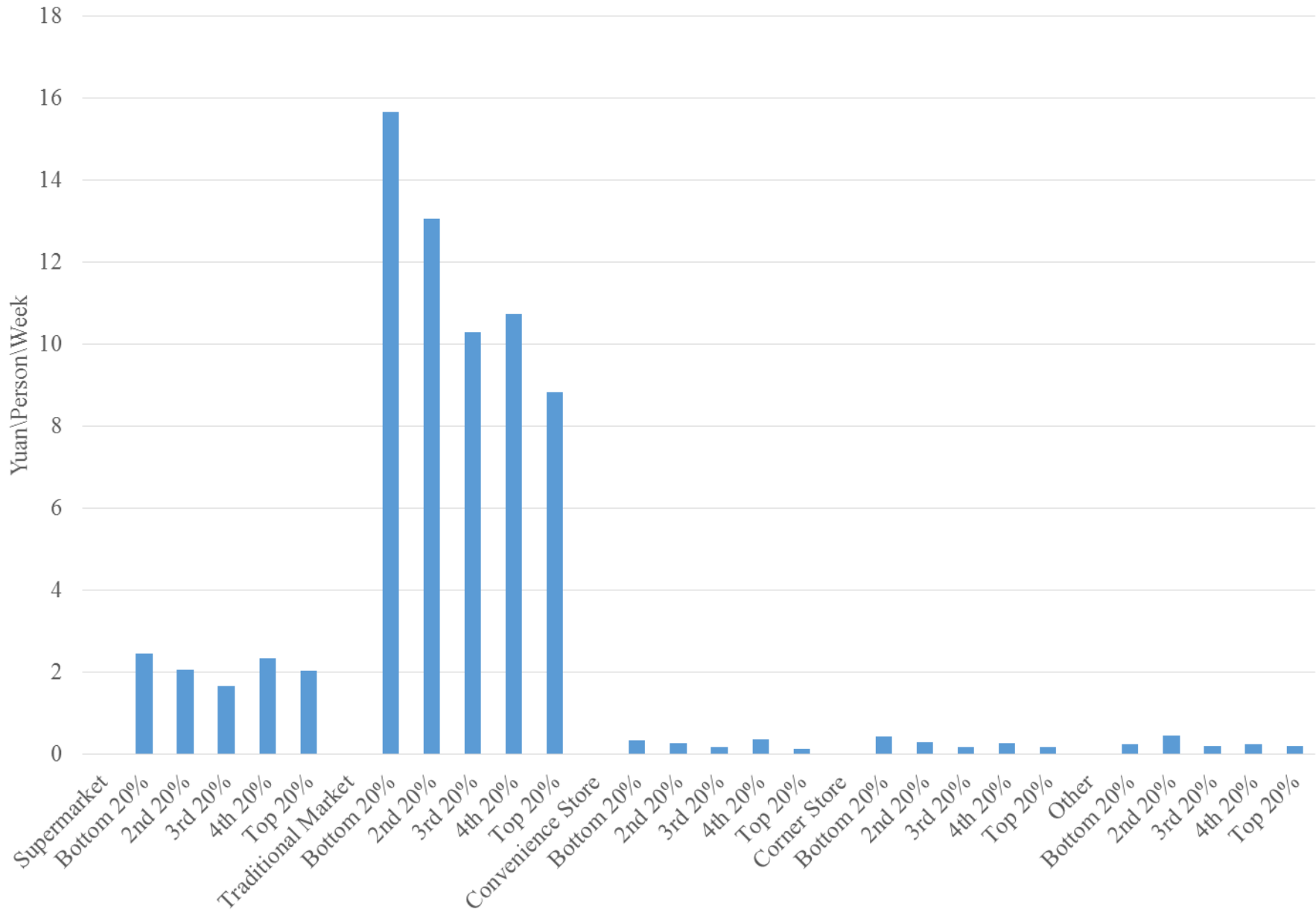
Chinese Regional Urban Vegetables Expenditure for FAH by Place of Purchase



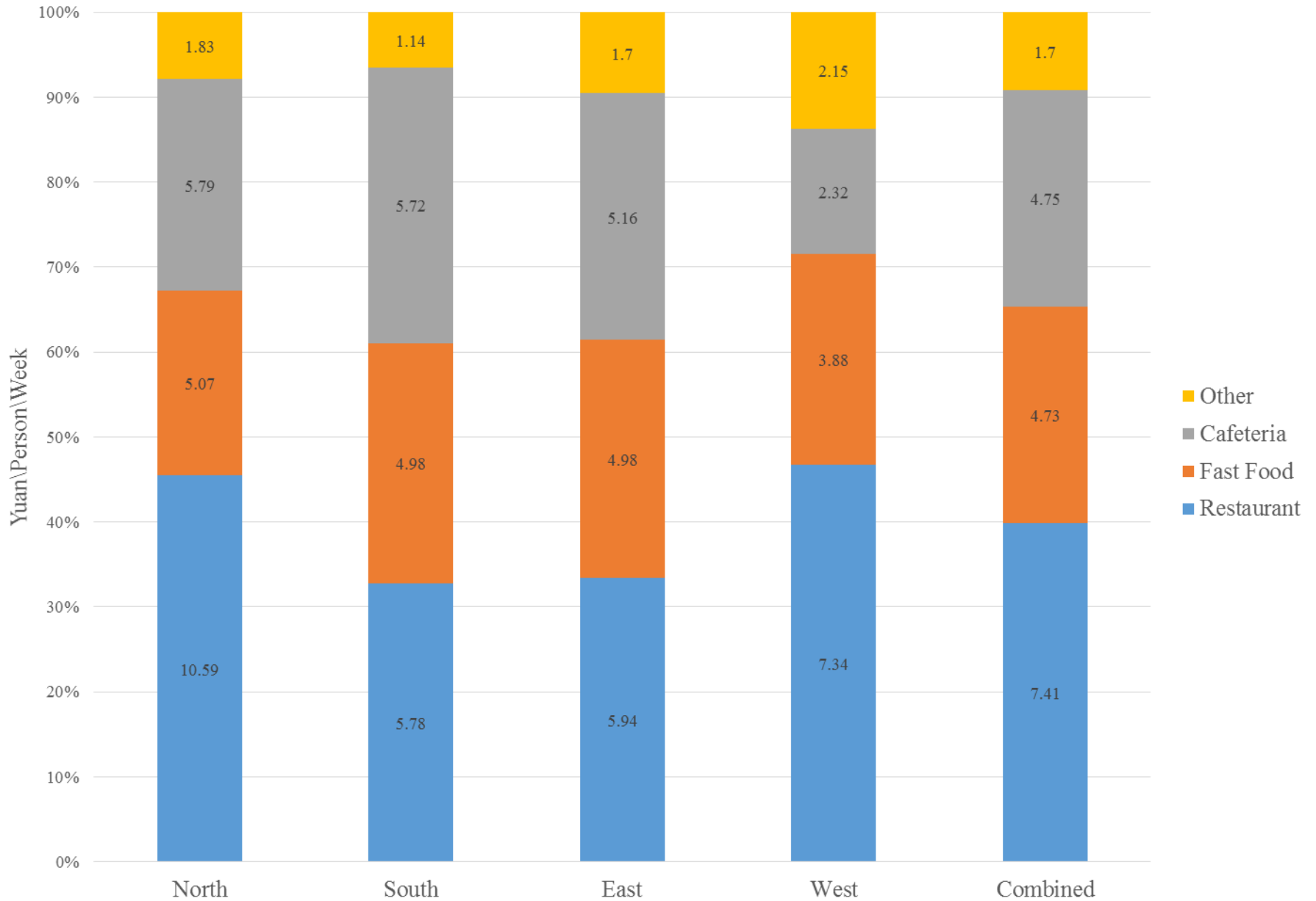
Chinese Urban Meat Expenditures for FAH by Income Groups and Place of Purchase



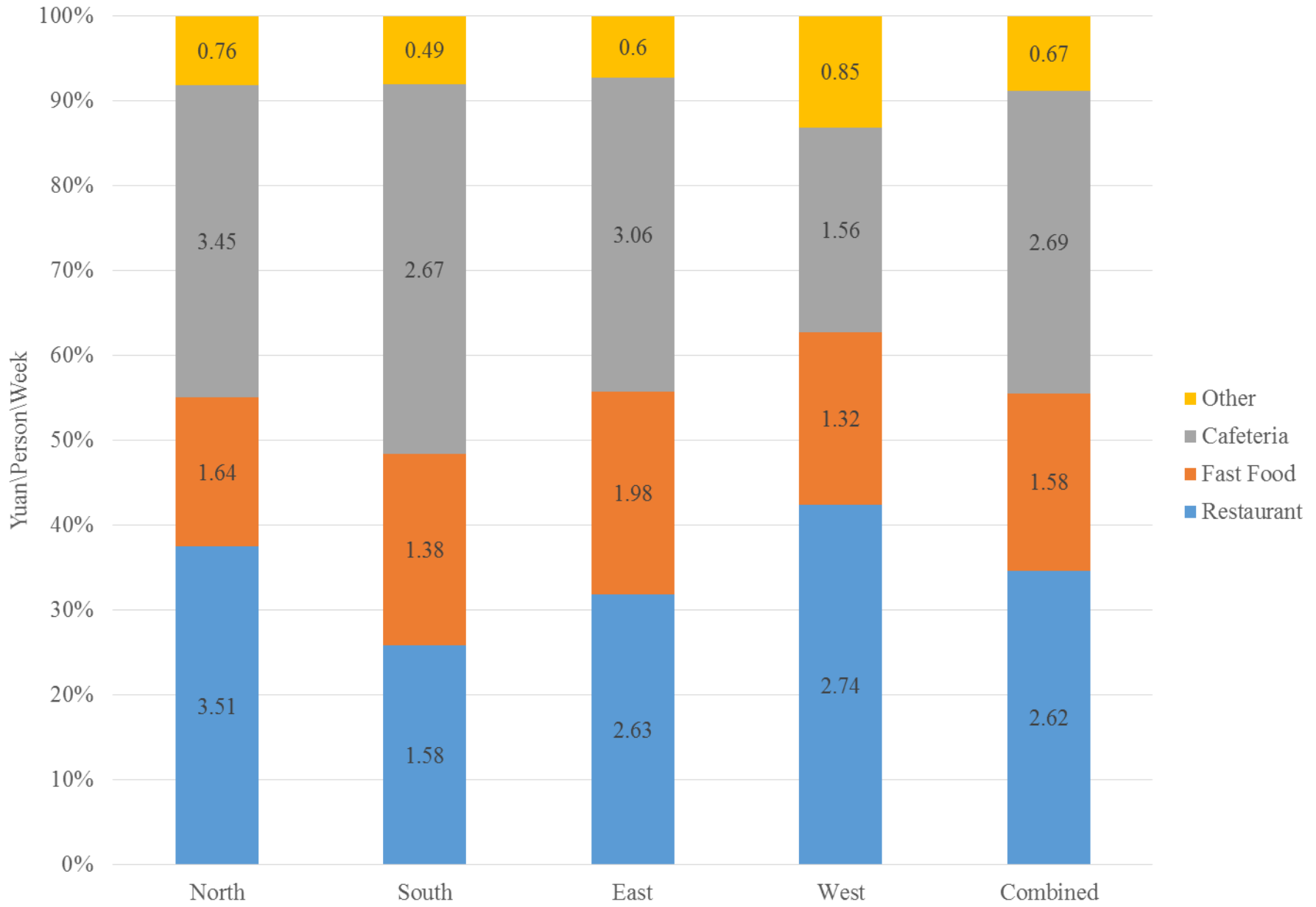
Chinese Urban Vegetable Expenditure for FAH by Income Groups and Place of Purchase



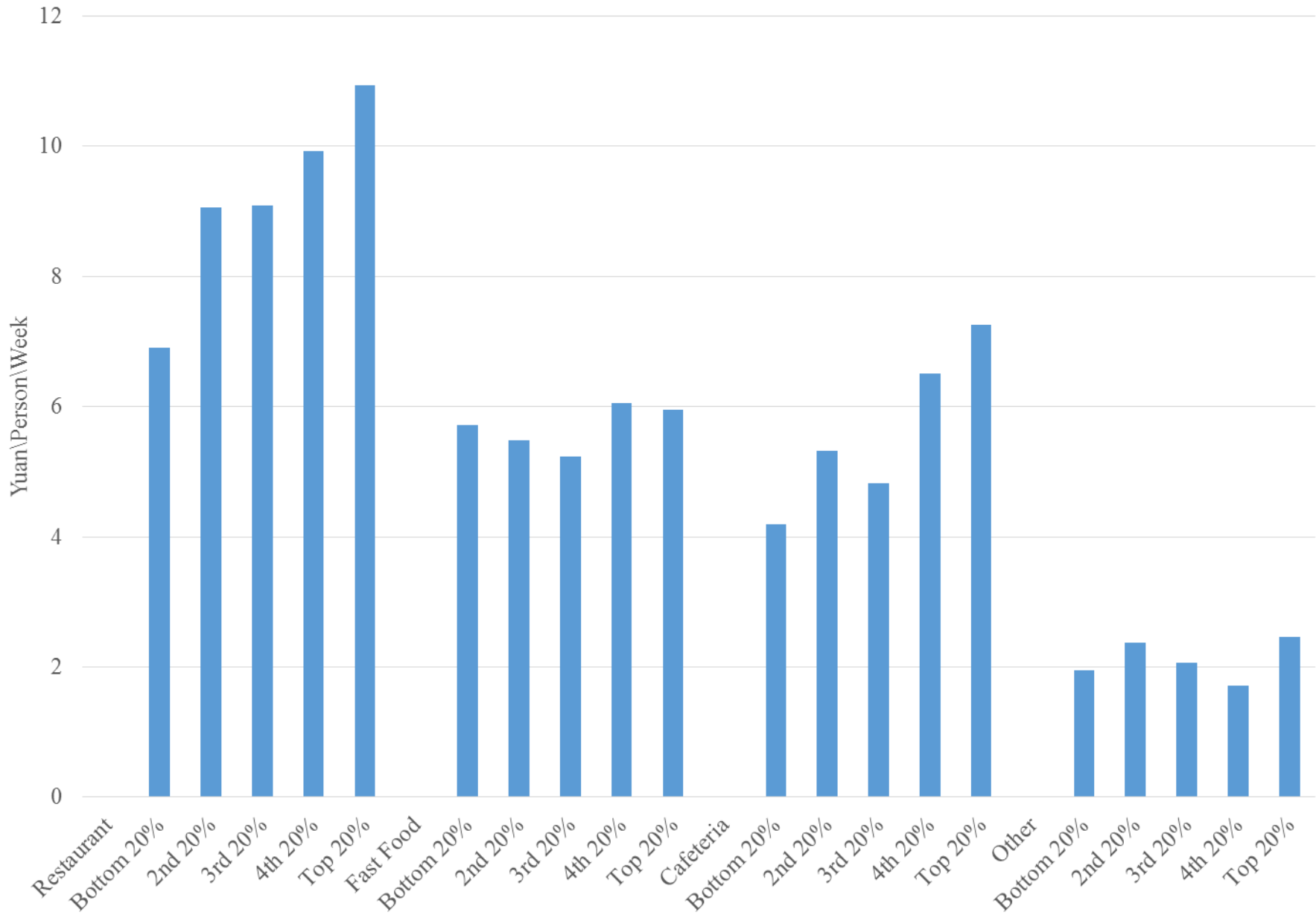
### Chinese Regional Urban Meat Expenditures for FAFH by Outlets



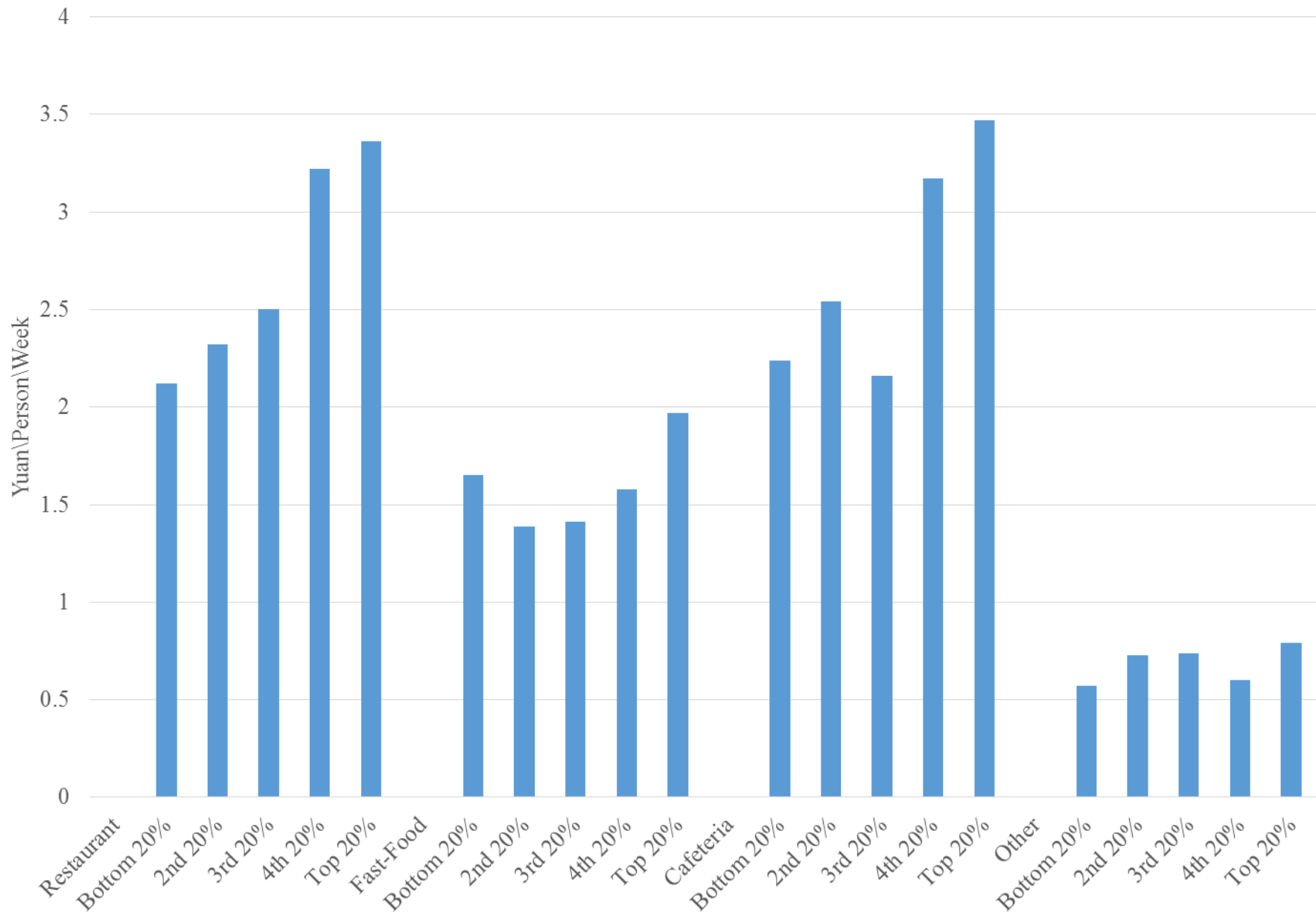
Chinese Regional Urban Vegetable Expenditure for FAFH by Outlets



Chinese Urban Meat Expenditure for FAFH by Income Groups and Outlets

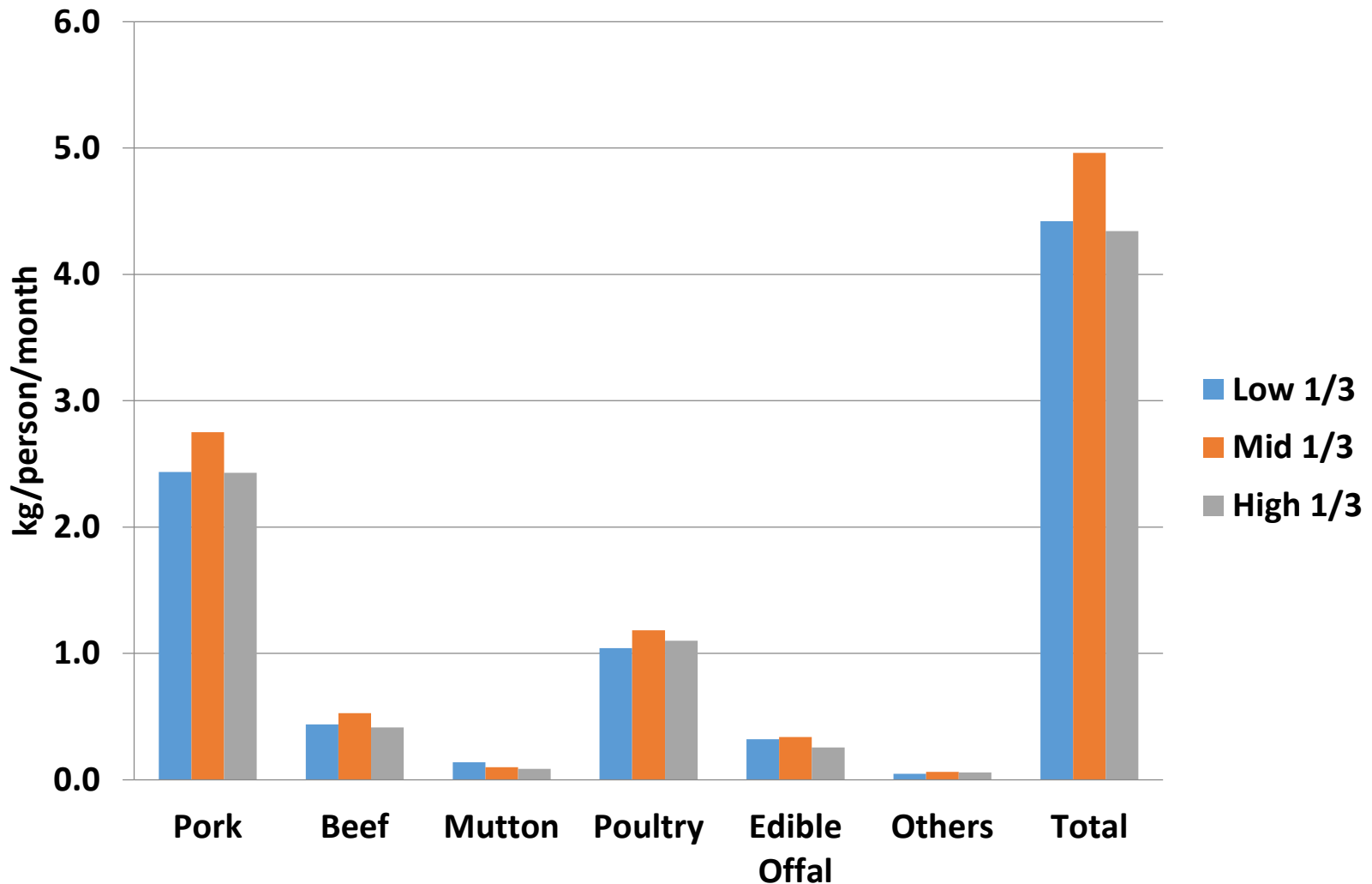


Chinese Urban Vegetable Expenditure for FAFH by Income Groups and Outlets



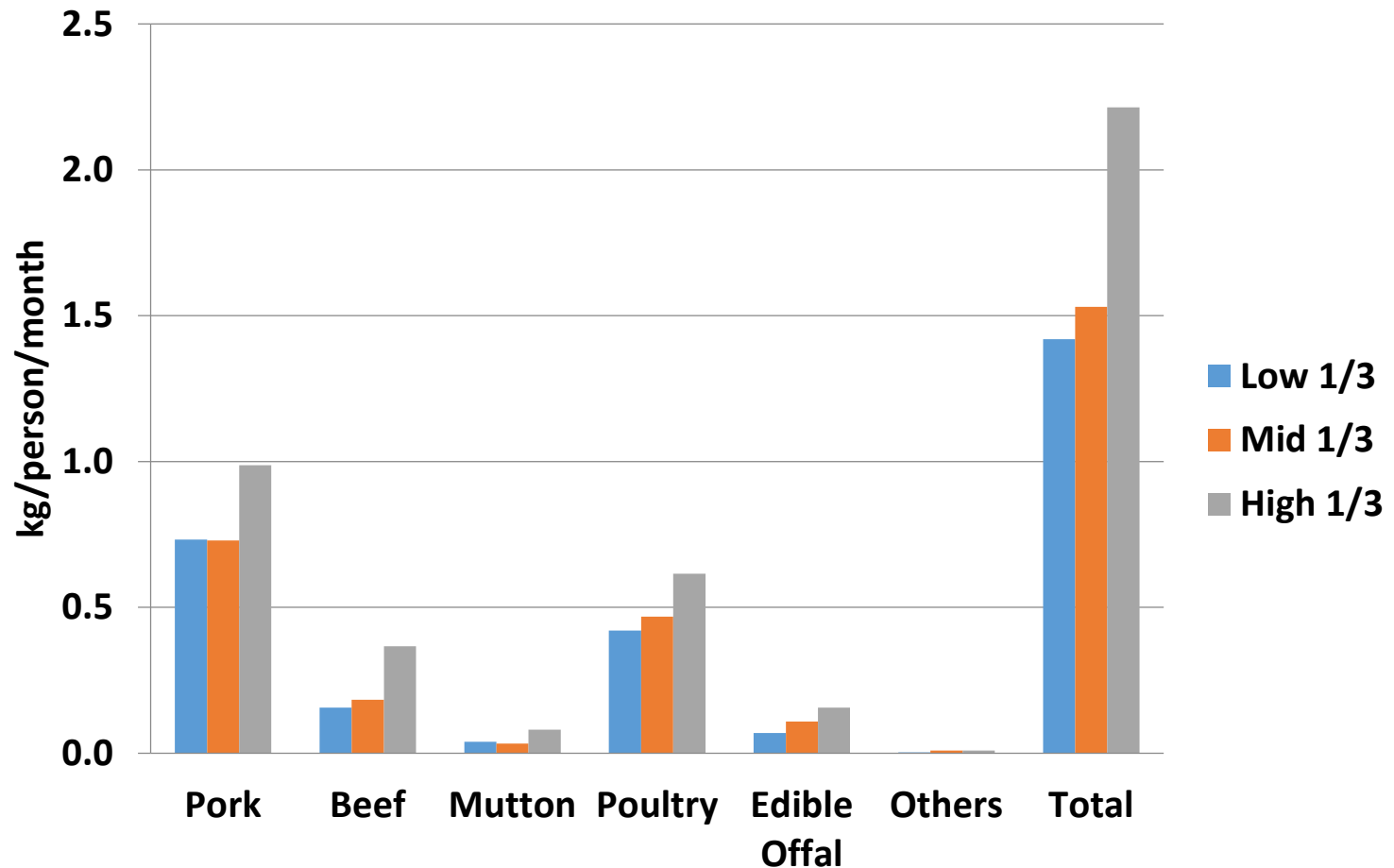


# Income Effect: Inverted-U shape for MAH

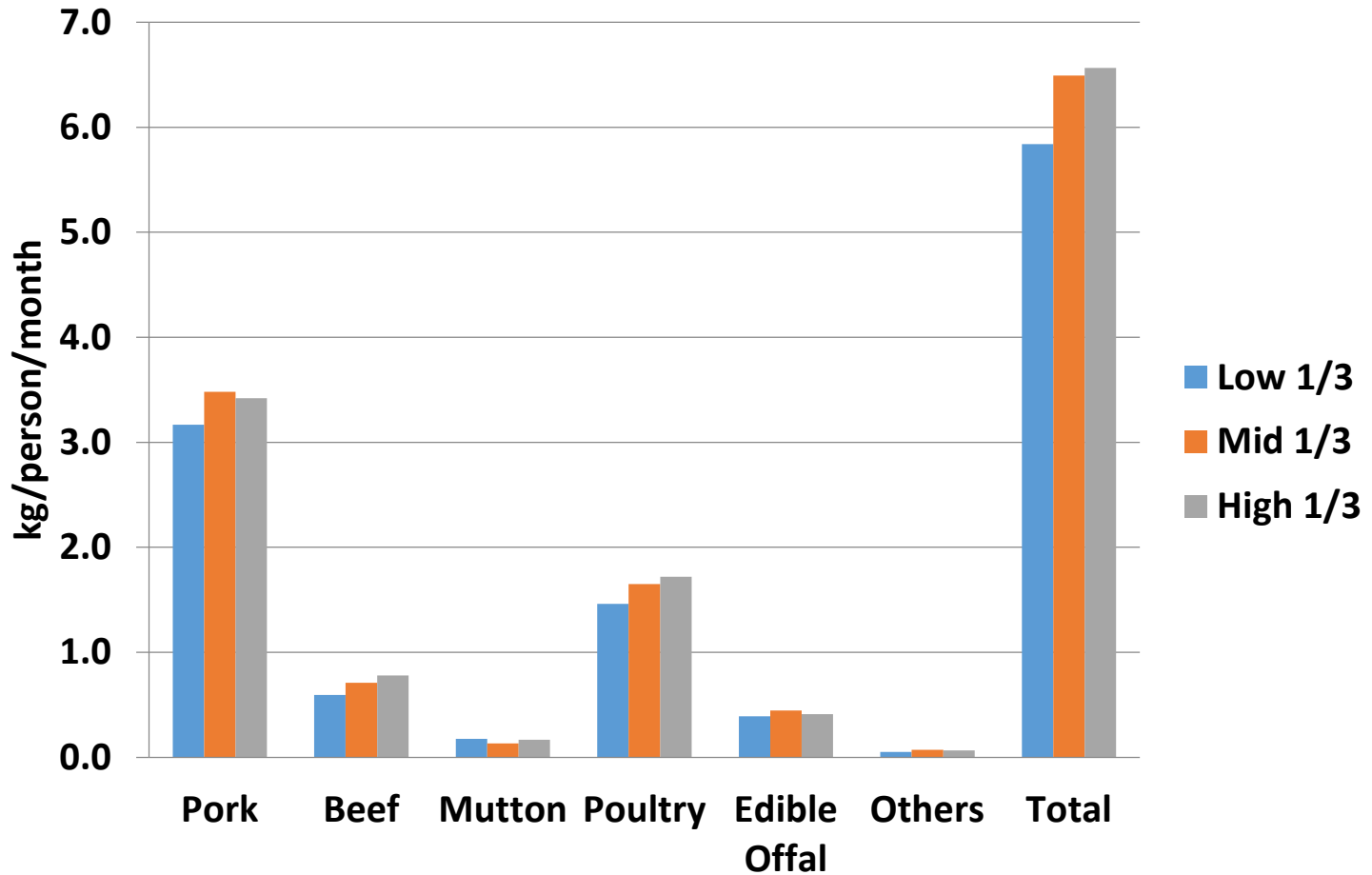


# Income Effect:

**Monotonously increasing** for MAFH



# Income Effect: Increasing for MAH & MAFH



# Estimated Exp. & Own-price Elasticities

	8-equation system		4-equation system	
	Expenditure	Unconditional Marshallian	Expenditure	Unconditional Marshallian
<i>FAH</i>				
Pork	0.676*** (0.02)	-0.814*** (0.02)	0.871*** (0.01)	-0.856*** (0.02)
Beef & Mutton	0.936*** (0.06)	-1.266*** (0.13)	1.408*** (0.04)	-1.553*** (0.11)
Poultry	1.239*** (0.06)	-0.453*** (0.07)	1.280*** (0.04)	-0.634*** (0.07)
Othermeat	0.784*** (0.12)	-0.623*** (0.19)	1.030*** (0.06)	-1.639*** (0.23)
<i>FAFH</i>				
Pork	1.129*** (0.03)	-0.998*** (0.06)		
Beef & Mutton	1.624*** (0.06)	-1.310*** (0.13)		
Poultry	1.601*** (0.07)	-0.878*** (0.12)		
Othermeat	1.887*** (0.16)	-1.014*** (0.27)		

# Comparison of Expenditure Elasticities

---

	Exp. Elas. (4-eq.)	Weighted Exp. Elas. (8-eq.)
Pork	0.871	0.861
Beef & Mutton	1.408	1.330
Poultry	1.280	1.435
Other meat	1.030	1.367

---

# Cross-price Elasticities

	Pork	Beef& Mutton	Poultry	Other meat	Pork	Beef& Mutton	Poultry	Other meat
Pork	-0.553***	1.510***	0.157	2.218***	0.677***	1.143***	1.308***	1.867***
Beef&Mutton	0.138***	-1.185***	0.045	-1.076***	0.117**	-0.022	0.021	-0.956***
Poultry	-0.026	0.406**	-0.308***	-0.070	0.123**	0.350**	0.255**	0.723*
Other meat	0.049**	-0.598***	-0.348***	-0.590***	0.016	-0.289**	-0.220**	-1.283***
Pork	0.092***	0.164*	-0.082	0.100	-0.795***	-0.191*	-0.470***	-0.609*
Beef&Mutton	0.094***	0.071	0.106*	-0.128	-0.025	-1.178***	-0.092	-0.046
Poultry	0.138***	0.244**	0.164**	0.315**	-0.063	0.109	-0.752***	0.303
Other meat	0.057***	-0.103	0.119***	-0.223*	0.027	0.070	-0.003	-0.960***

# Summary of Meat Analysis

- MAFH accounts for a significant proportion of meat consumption. Projection based on data excluding MAFH could mislead the understanding.
- MAFH have consistently higher expenditure elasticities and own-price elasticities, suggesting that with income and total meat expenditure increases, MAFH consumption will increase more than proportionately to total meat expenditure.
- Household expenditure on poultry, beef and mutton will increase more than proportionately to total meat expenditure with income increases.
- MAFH consumption is more price-responsive than MAH, especially for beef & mutton

# Mean Beverage Elasticities

Variable	Expenditure	Own-price (Marshallian)
B(AH)	<b>0.92</b>	<b>-1.54</b>
W&L(AH)	<b>0.69</b>	<b>-2.47</b>
SD(AH)	<b>0.59</b>	<b>-0.92</b>
HD(AH)	<b>1.03</b>	<b>-1.06</b>
B(AFH)	<b>0.78</b>	<b>-2.41</b>
W&L(AFH)	<b>0.85</b>	<b>-2.28</b>
SD(AFH)	<b>1.11</b>	<b>-0.21</b>
HD(AFH)	0.66	-0.97



## Regional Beverage Expenditure Elasticities

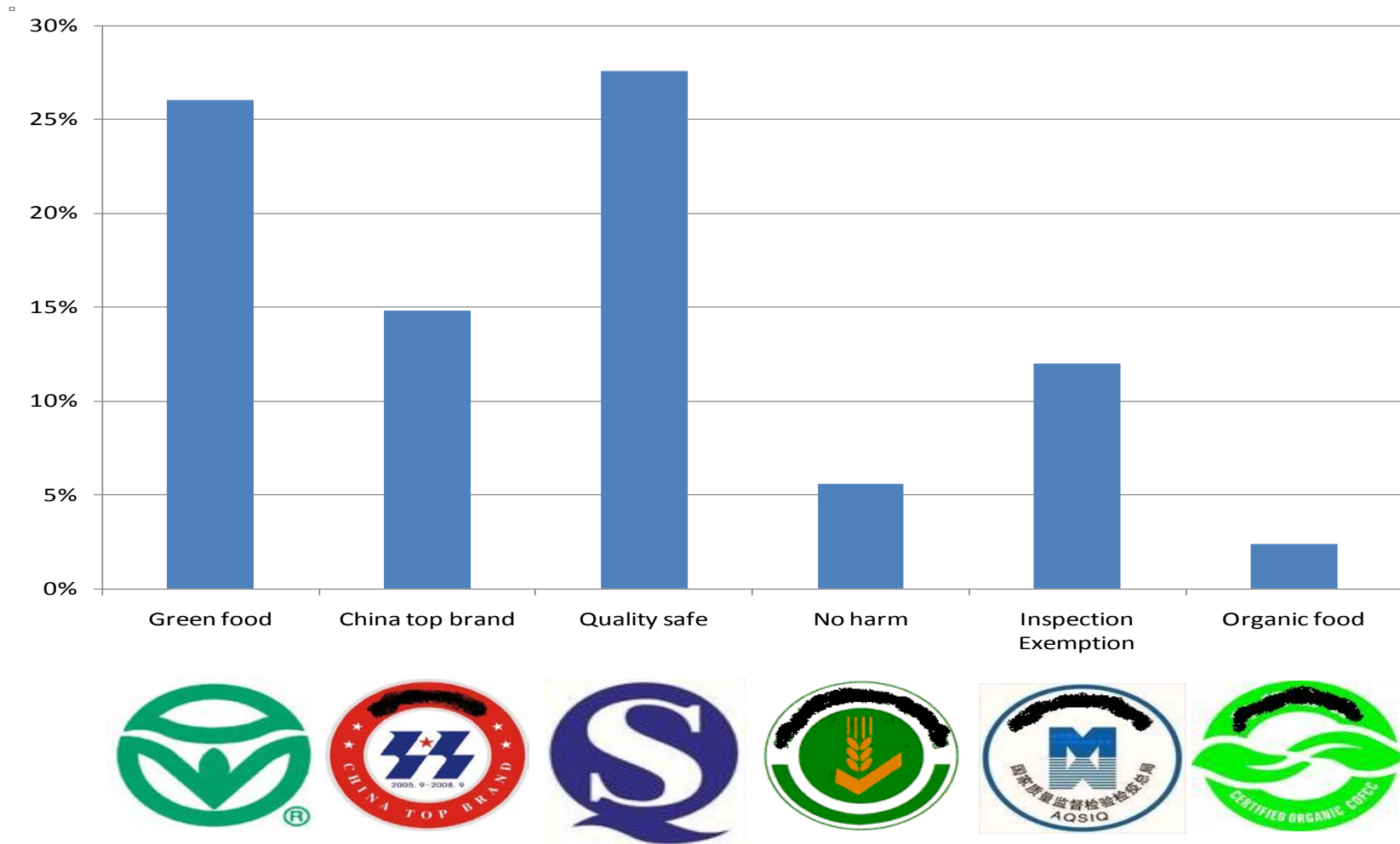
Region	B	WL	SD	HD	BAFH	WLAFH	SDAFH	HDAFH
North	0.94	0.44	0.49	1.05	0.80	0.93	1.16	0.64
West	1.22	0.70	0.26	1.03	0.61	0.68	1.23	0.55
East	1.07	0.66	0.29	1.08	0.72	0.72	1.13	0.61
South	1.08	0.61	0.75	1.06	0.72	0.66	1.27	0.64

# What do these logos represent?



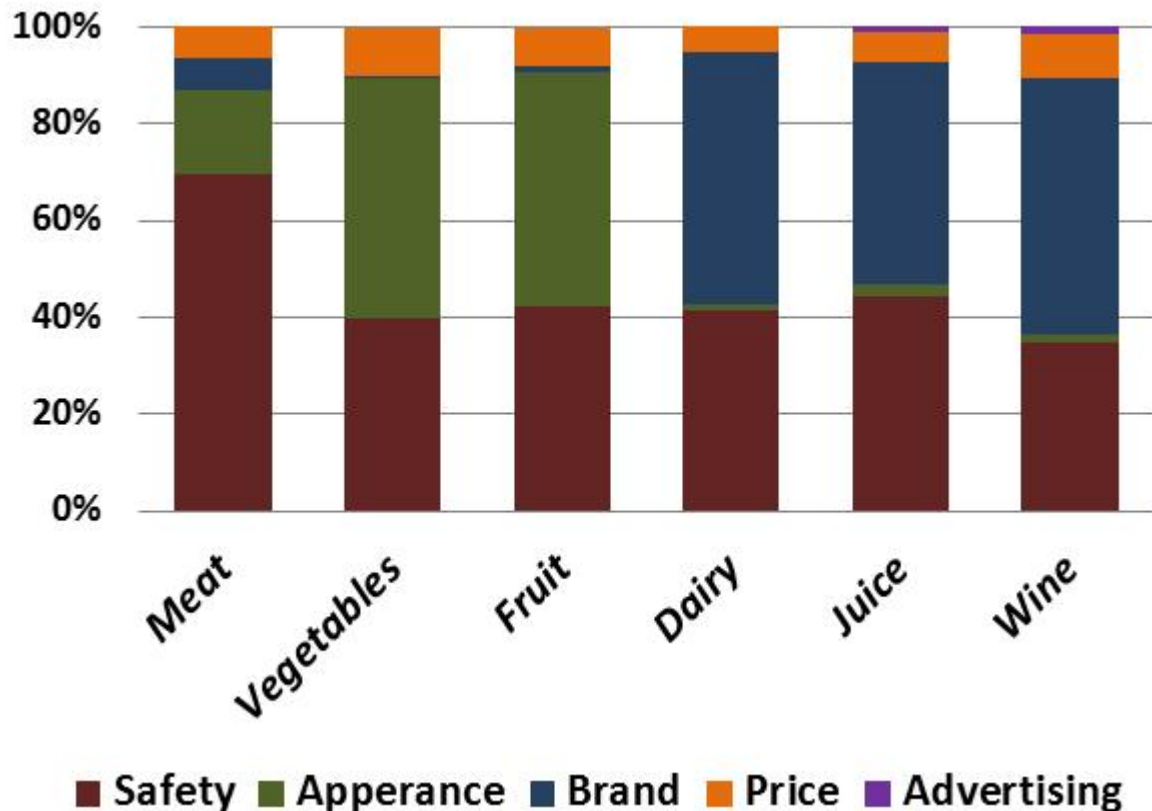
1. 无公害农产品 (No Harm Ag-product)
2. 质量三包 (Service promised: repair, refund, exchange)
3. 放心食品 (No worry/Quality-assured food)
4. 质量安全 (Quality Safe)
5. 中国名牌 (China Top Brand)
6. 绿色食品 (Green Food)
7. 国家免检品 (Inspection Exemption)
8. 转基因食品 (Genetically Modified Food)
9. 环境友好食品 (Eco-friendly Food)
10. 有机食品 (Organic Food)
11. 不知道答案 (Don't know)

# Apparently, consumers lack knowledge about these certificates



# Food Consumption and Food Safety

**What is the most important thing you take into consideration when making purchasing decisions?**

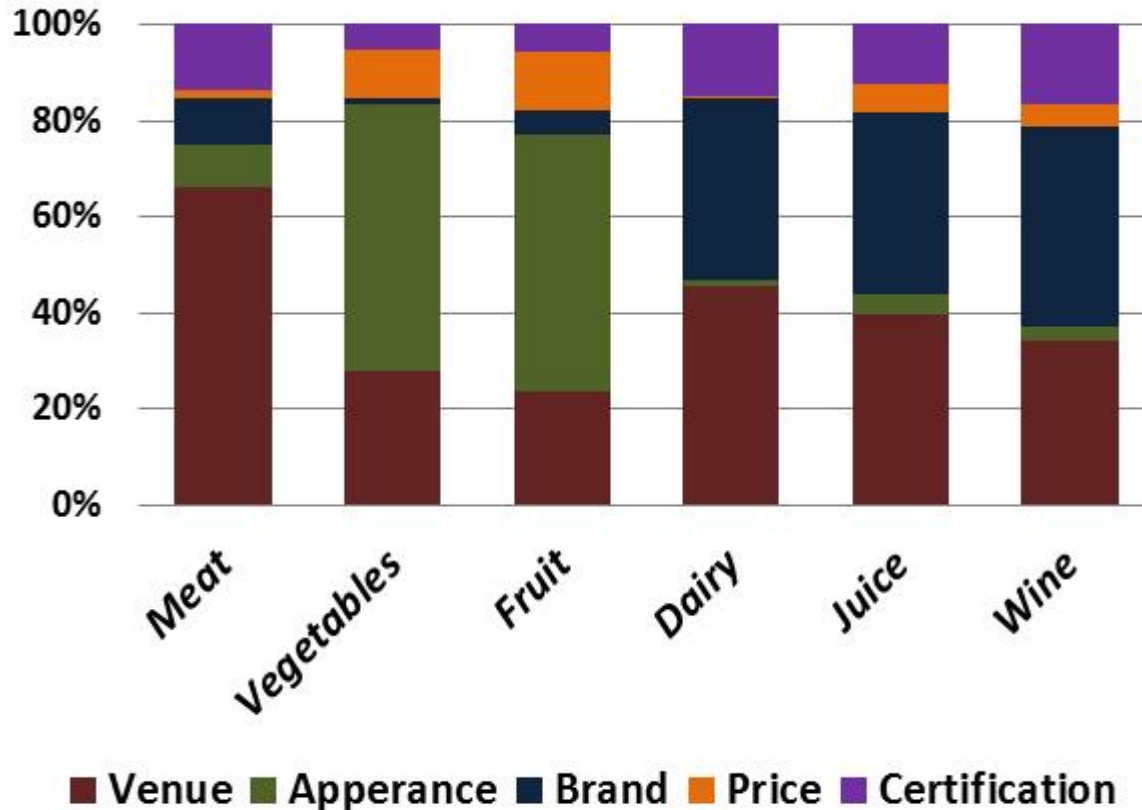


*Safety is an important factor in consumers' purchasing decisions*

*So are "appearance" and "brand"*

# How Consumers Determine Safety

**What is the most important thing you take into consideration to determine food safety?**



*Consumers use a variety of strategies to determine food safety*

*With “appearance” and “brand” among them*

# Obesity Study

## Summary

- Average median BMI of the urban Chinese is 22.86 for men and 21.76 for women.
- 26.6% of the urban Chinese are overweight ( $24.0 \leq BMI < 28.0$ ) and 5% are obese ( $BMI \geq 28.0$ ).
- Food eating locations have significant effects on the BMI levels of urban Chinese.

## Conclusions

- Meals eaten at full service restaurants, fast food outlets, cafeterias have significant and positive effects on BMI, meals at other outlets have no significant effect BMI increase.
- Fast food has largest effect at the lower and upper tail of BMI distribution.
- Fast food has the largest marginal effect on the likelihood of becoming overweight.

# Weight Grouping Criteria

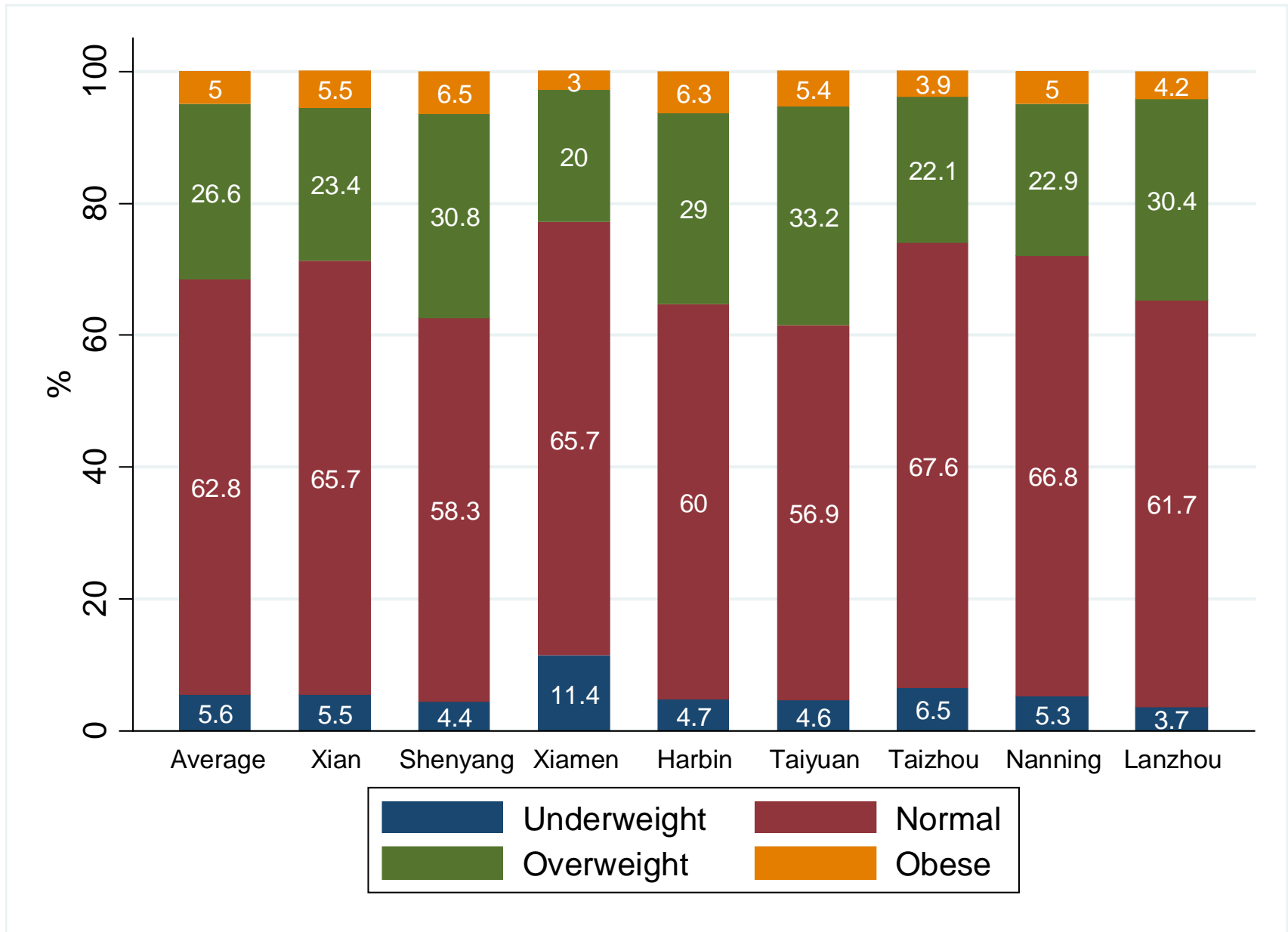
---

	Children (Age $\leq$ 20)	Adult (Age $>$ 20)
Underweight	<i>BMI &lt; 5th percentile</i>	<i>BMI &lt; 18.5</i>
Normal	<i>5th percentile <math>\leq</math> BMI &lt; 85th percentile</i>	<i>18.5 <math>\leq</math> BMI &lt; 24.0</i>
Overweight	<i>85th percentile <math>\leq</math> BMI &lt; 95th percentile</i>	<i>24.0 <math>\leq</math> BMI &lt; 28.0</i>
Obese	<i>BMI <math>\geq</math> 95th percentile</i>	<i>BMI &gt; 28.0</i>

---

Source: Ministry of Health of the People's republic of China; Center for Disease Control and Prevention

# Prevalence of Obesity





# Take away Messages

1. FAFH consumption is significant in urban households, suggesting any exclusion of FAFH may mislead the understanding of food security challenges in a nation.
2. FAFH shares in terms of both volume and value increase with income growth, suggesting a growing market for food catering industry.

## Take away Messages, cont.

3. Food composition differs between FAFH and FAH, suggesting that we cannot extrapolate one by weighting the other.
4. Per capita demand for many food commodities such as meat, aquatic products, eggs, and vegetables are still rising with income when one takes FAFH into consideration, but it shows an inverted U-shape for FAH alone.

## Take away Messages, cont.

5. In addition to income, household demographics and time opportunity cost are important factors influencing FAFH in both market participation and expenditure levels.
6. Food safety has become an important concern in urban China when people buy food. It is likely the case in many other developing countries, including Vietnam.



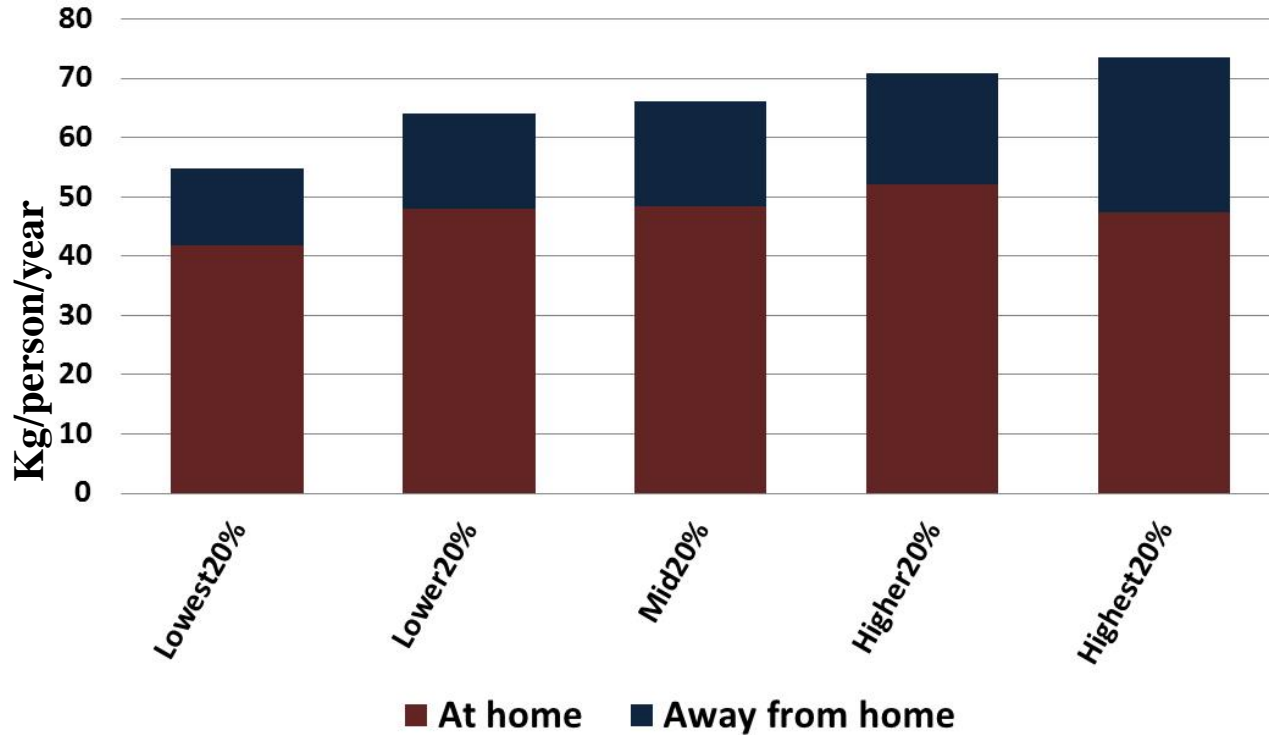


Thank You!



# A Significant Share of Meat Consumption is Away from Home

## Urban Meat Consumption at and Away from Home by Income Quintile, Beijing, 2007



*Data on meat consumption at home shows little or no income effect*

*Including consumption away from home captures income effect*

Source: Survey by Center for Chinese Agricultural Policy