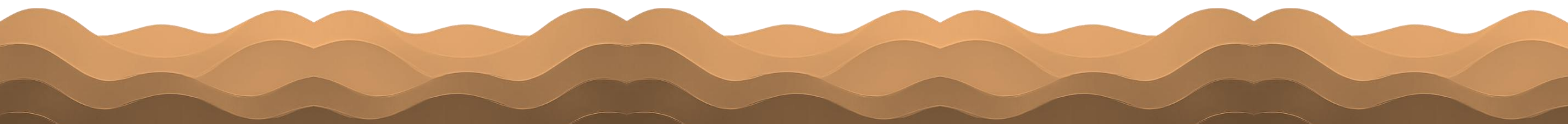




THE ANATOMY OF A FILIPINO BASKET: A Pseudo-Panel Machine Learning Approach to Household Consumption Typology and Price-Responsiveness

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***PRESENTATION
OUTLINE***

1

INTRODUCTION

2

METHODOLOGY

3

RESULTS & DISCUSSION

4

CONCLUSION

5

RECOMMENDATION

INTRODUCTION

INTRODUCTION: Context

- High inflation limits purchasing power.
- Household drastically change consumption habits in real time.
- Metrics cannot capture this crisis immediately
- We must create a dynamic framework to capture “Filipino Basket.”

INTRODUCTION: Literature Gaps

- Households are classified into profiles, but income and price responses aren't estimated alongside them.
- Philippine demand studies are cross-sectional or aggregate, so they can't trace how comparable groups adjust over time.
- FIES has no true longitudinal data, which makes consumption change hard to study.

INTRODUCTION: Methodological Gaps

- Genuine longitudinal tracking data is often unavailable.
- Hence, use of synthetic cohorts.
- Pseudo-panelling → data scarcity → measurement error
- Cohort construction must be careful

INTRODUCTION: Objectives of the Study

This aims to analyze how **inflation-induced price shocks** and **socio-demographic factors** drive **structural shifts** in Filipino **household budget allocations**, projecting their **evolution** onto the **2026 macroeconomic horizon**.

1

To classify
household
into
consumption
typologies

2

To estimate
their **income**
and **price**
elasticities

3

To train a
model that
predicts
budget
adjustments
against **price**
changes.

4

To project the
household
expenditures
for the **2026**
Filipino Basket

METHODOLOGY

METHODOLOGY: Data Pipeline

DATA ACQUISITION

- LFS-FIES Vol. 1
- Survey Rounds: 2012, 2015, 2018, 2021, 2023
- CPI Indices: OpenStat (2018-Based)
- Variables: *Commodity Expenditure Shares, Regional CPIs, Socio-Demographic Characteristics*

DATA PROCESSING

- Cohort Construction
- Pseudo-Panel Construction
- Missing Value Handling
- Quality Checks

1,793

Cohorts Constructed

89.85%

of Constructed Cohorts Retained

METHODOLOGY

DATA FRAMEWORK

Pseudo-Panel Construction



Household data from
2012 - 2023

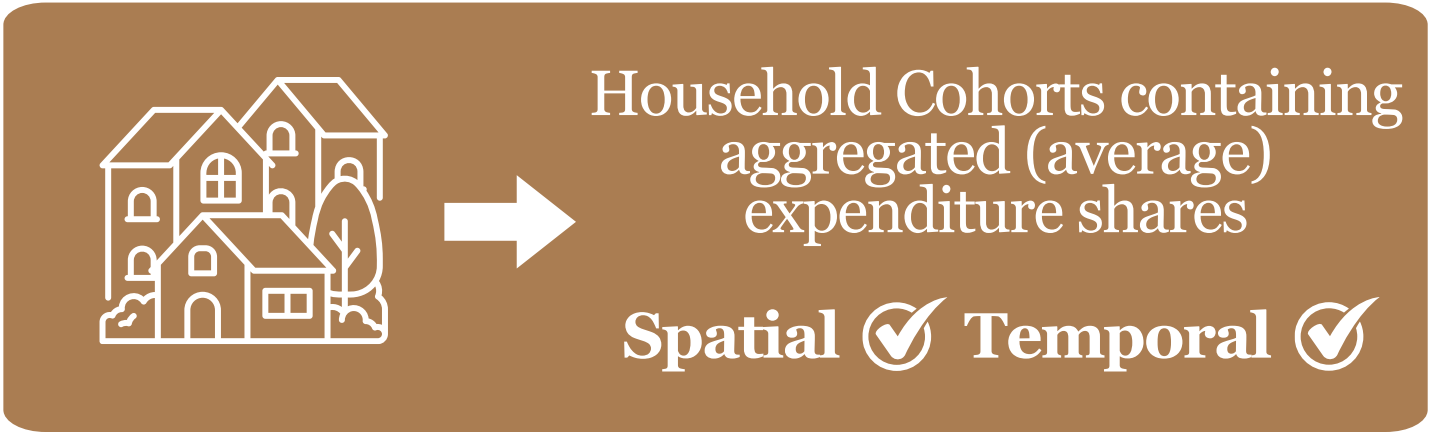


Match Households with similar
characteristics from other years



Remove Cohorts with less than
100 households

Result:



METHODOLOGY

ANALYSIS FRAMEWORK

CONSUMPTION TYPOLOGY

Latent Class – Quadratic Almost Ideal Demand System (LC-QUAIDS)



**Expenditure Shares
among different
Commodities**



**Income and Price
Responsiveness
based on inflation**

PROJECTED EXPENDITURE SHARES IN 2026

*Multivariate Elastic Net Regression
w/ CoDA ALR Transformation*

MODEL VARIABLES

Predictors:

- Cohort Demographics
- Past Values of CPI

Penalty:

- P1 – Removes Insignificant Price Variables
- P2 – Address Highly Correlated Predictors



ASSUMPTIONS

- ✓ Sum of Expenditure Shares = 100%
- ✓ No Negative Expenditure Shares

RESULTS AND DISCUSSION

RESULTS: Exploratory Data Analysis

Cohort Construction Results: Validating the Pseudo-Panel

Cohorts were retained only after meeting the 100-household validation rule

Year	Candidate Cohorts	Retained Cohorts	Retention Rate
2012	327	243	74.31%
2015	341	264	77.42%
2018	372	357	95.97%
2021	378	373	98.68%
2023	375	374	99.73%

- 1,611 valid cohort-year observations constructed from 559,423 surveyed households
- 89.85% of candidate cohort-year observations were retained
- **Average Cohort Size: 347 households**
(minimum rule: 100 households)

DISCUSSION: From Cohorts to Consumption Profiles

Pseudo-Panel Cohorts



Latent Class Model



3 Consumption Profiles



QUAIDS Elasticities

Interpretable basket behavior

Expenditure elasticity

- < 0 : inferior good
- 0 to 1: necessity
- > 1 : income-responsive / luxury good

Own-Price elasticity

- -1 to 0: inelastic
- < -1 : highly price-sensitive

Cross-price elasticity

- Positive: substitutes
- Negative: complements

RESULTS: Consumption Typologies

TYPOLOGY 1 "NECESSITY-ANCHORED HOUSEHOLDS"

"Kung ano lang kailangan ko, yun lang bibilhin ko."

When they get **richer...**

They prioritize essential needs first, then **invest in health, housing, communication**, and eventually **recreation**. Despite income growth, tobacco spending barely changes, suggesting it's habit-driven.

When **prices increase due to inflation...**

They protect essential food spending by **cutting more flexible non-food expenses first**.

When some goods become **more expensive than others...**

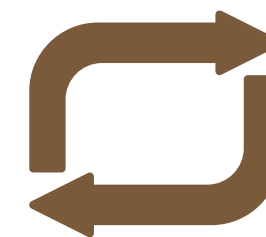
They substitute within their food basket, choosing **lower-cost alternatives** while maintaining essential food consumption. They reallocate across **protein and carbohydrate food sources**.



**RECREATION (6.03),
HEALTH, HOUSING,
COMMUNICATION**



**RICE & SUBSTITUTES
FISH, DAIRY & EGGS,
SWEETENED
PRODUCTS, ⚠ HOUSING**



**MEAT ↔ RICE
MEAT ↔ FISH**

RESULTS: Consumption Typologies

TYPOLGY 2 “UPWARDLY MOBILE HOUSEHOLDS”

“Paangat na tayo.”

When they get **richer...**

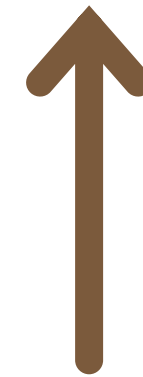
Basic food needs are already met. So, they invest in better living condition, Prioritizing **housing, transport, and communication**.

When **prices increase** due to **inflation...**

They **continue protecting the food basket** by postponing upgrades and reducing more flexible spending, while keeping **mobility and connectivity** central to their budget.

When some goods become **more expensive than others...**

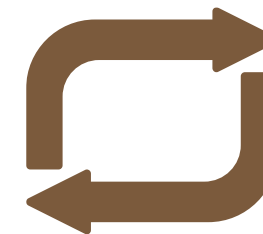
They rebalance spending across essential services, shifting between **housing, transport, and communication** as prices change.



**RECREATION (3.00),
COMMUNICATION,
HOUSING, TRANSPORT**



**⚠ HOUSING
FURNISHINGS
ALCOHOL**



**HOUSING ↔ TRANSPORT
HOUSING ↔ COMMUNICATION**

RESULTS: Consumption Typologies

TYPOLGY 3 “QUALITY-DRIVEN HOUSEHOLDS”

“Pwede na ako pumili ng gusto ko.”

When they get **richer...**

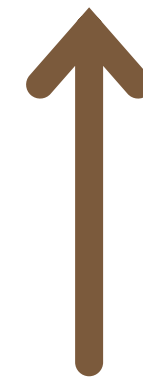
They move beyond basic needs, investing in **quality and lifestyle**. Recreation, communication, and housing continue to grow as households invest in a higher quality of life.

When **prices increase** due to **inflation...**

They protect core needs, **adjusting quality and lifestyle spending** before cutting essentials.

When some goods become **more expensive than others...**

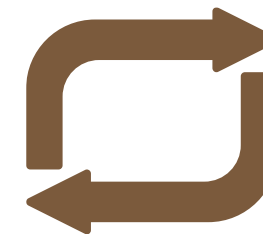
They **adjust between mobility and connectivity** to maintain their preferred lifestyle. Physical to digital access, or vice versa.



**RECREATION (4.65),
COMMUNICATION,
HOUSING**



**FRUITS,
VEGETABLES, MEAT,
⚠ HOUSING**



COMMUNICATION ↔ TRANSPORT

DISCUSSION: The Filipino Consumption Journey

TYPOLLOGY 1 "NECESSITY-ANCHORED HOUSEHOLDS"
NEED *SURVIVAL BEFORE ASPIRATION: "Kung ano lang kailangan ko, yun lang bibilhin ko."*



TYPOLLOGY 2 "UPWARDLY MOBILE HOUSEHOLDS"
PROGRESS *ACCESS OVER ABUNDANCE: "Paangat na tayo."*



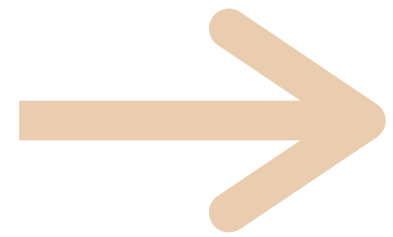
TYPOLLOGY 3 "QUALITY-DRIVEN HOUSEHOLDS"
CHOICE *PREFERENCE, NOT PRESSURE: "Pwede na ako pumili ng gusto." ko."*

*Across all 3
typologies, **Housing** is a
persistent financial burden.*

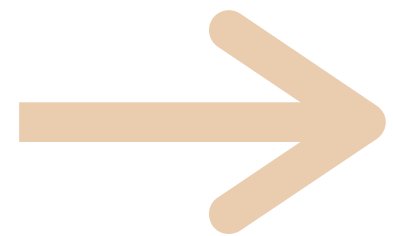
*Universal income channels:
**Health, Communication,
Housing.***

RESULTS: Model Validation

Multivariate Elastic Net Regression Model Performance Metrics



Global MAE:
1.51%



Global RMSE:
2.72%

Exceptional precision (~1.5% average error) with a uniform error distribution and no extreme outliers.

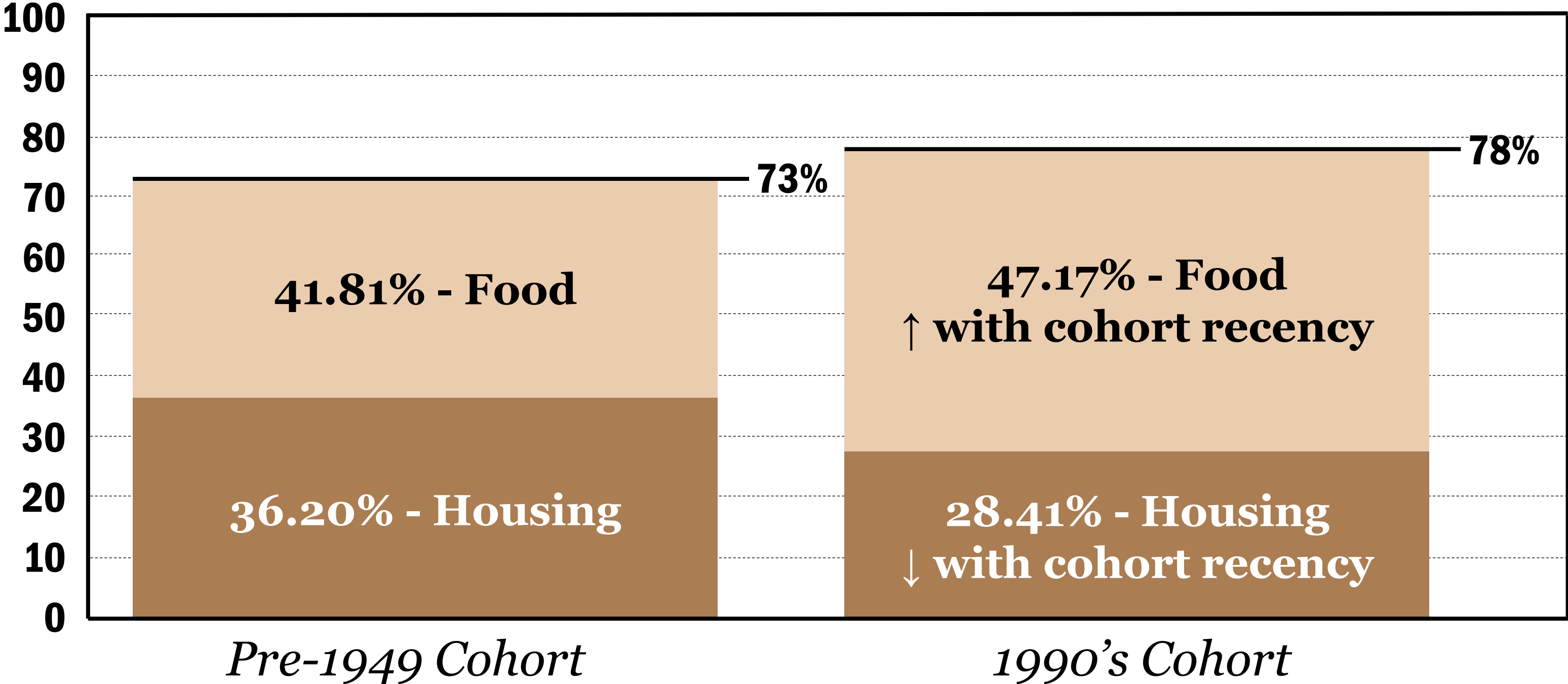
RESULTS: CPI Surge Concentration in Food

- 1 Vegetables: + 36.89%**
- 2 Fruits: + 35.65%**
- 3 Tobacco : + 34.47%,**
- 4 Sugar : + 29.92%**
- 5 Fish : + 27.48%**

*7/10 fastest-rising categories = food → inflation hits “unavoidable” goods
Housing and Water at 27%, while Communication at 6%*

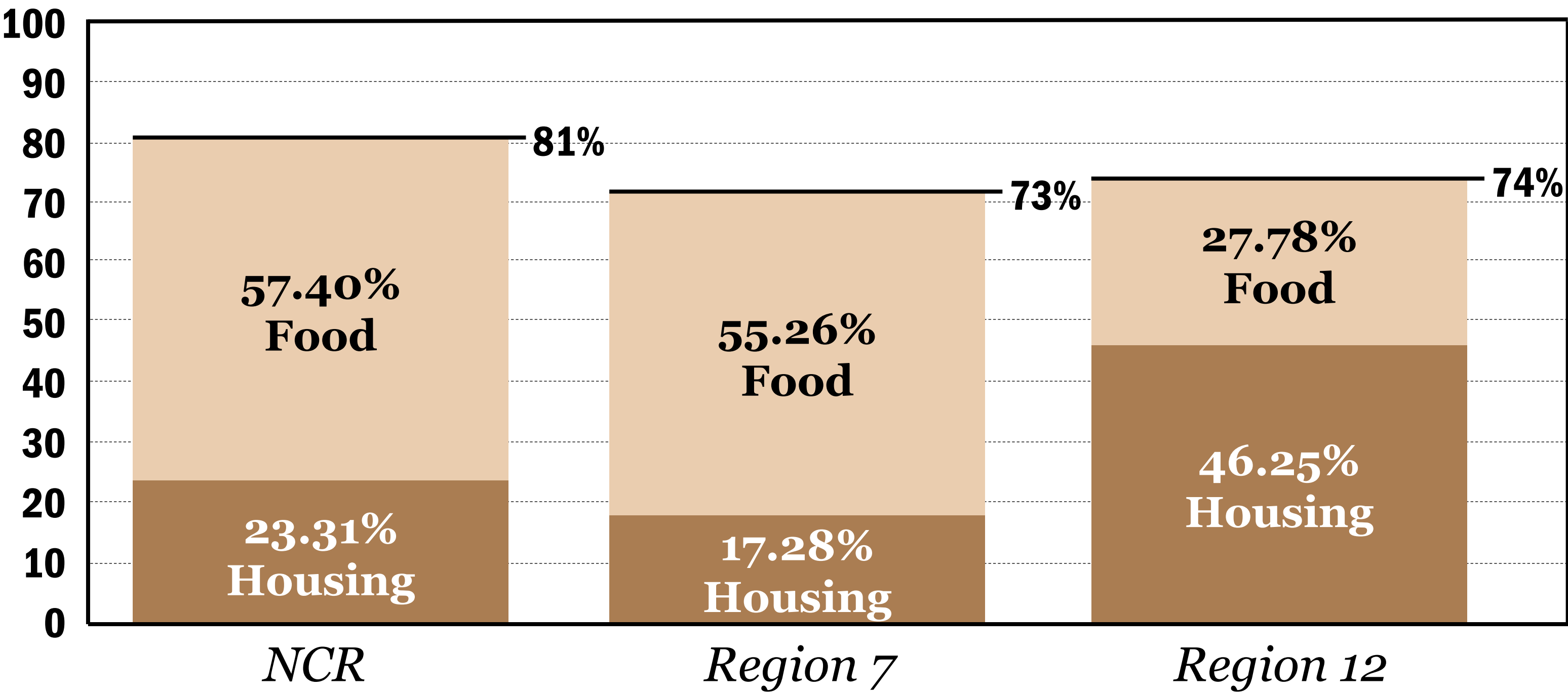
RESULTS: The Projected 2026 Basket

BY GENERATION



RESULTS: The Projected 2026 Basket

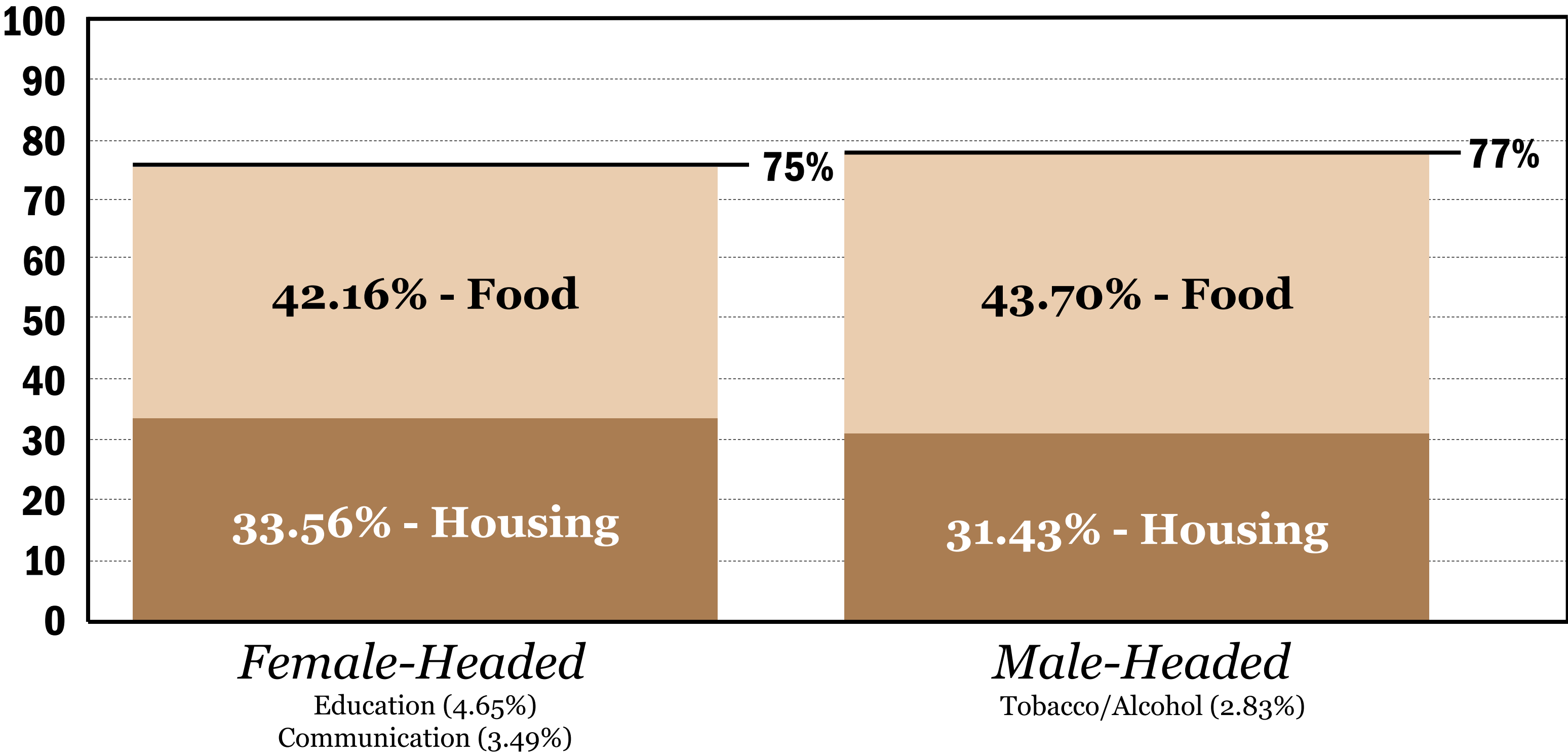
BY REGION



Food > 40% of budget in 11 out of 15 regions

RESULTS: The Projected 2026 Basket

BY GENDER OF HOUSEHOLD HEAD



DISCUSSION

- **food share should fall as income rises** — 2021–2026 inflation halted this
- **Urban/peri-urban HHs can't buffer shocks like rural farmers**
(no crops to sell) → bear full cost
- Sustained, long-term price hikes = most damaging — **budgets never rebalance**
- Life-stage strain: elderly reversal from historical food-spending norm; **young families' nutrition squeezed**
- PH evidence: **rice shocks = major inflation driver**; inelastic demand → buy worse, not less — cut education/health instead

CONCLUSION

CONCLUSION

There may be no one-basket-fits-all for the Filipino, but one thing is certain: no basket should be left empty

RECOMMENDATION

RECOMMENDATIONS

- *Stabilize food prices through targeted cash transfers and subsidies*
- *Expand housing affordability programs across all income levels*
- *Differentiate social protection by typology, lifecycle, and gender*