

Way Down in the Hole: Adaptation to Long-Term Water Loss in Rural India

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Introduction

- ▶ Israeli Arabs and ultra-Orthodox Jews have distinct consumption patterns
- ▶ Why is it important?
 - * Price increases may affect them differently ⇒
 - * Some groups may be more vulnerable to inflation of certain goods and services
- ▶ Methodology:
 - * Use CES and CPI data to estimate group expenditure shares
 - * Estimate price index for each group
- ▶ Does inflation impact different demographic groups in Israel unequally?

Data and Methodology

- ▶ Using household-level and individual level data from the Israeli Central Bureau of Statistics, we group individuals into three groups:
 - * Ultra-Orthodox
 - * Israeli Arabs
 - * Jews (excluding ultra-Orthodox)
- ▶ For each of these groups, we estimate the expenditure share of each good in their consumption basket
- ▶ Using prices data, we estimate the price index for each group
- ▶ We then compare the price indexes of these groups, along with the overall price index
- ▶ In progress:

Results

- ▶ Different inflation for Arabs, Jews, and ultra-Orthodox
- ▶ These differences are driven by differences in consumption patterns
- ▶ In fact, they are more general, and can be grouped into food, goods, and services
- ▶ Potential results

Literature Review

- ▶ Innovation benefits high-income consumers more; inflation heterogeneity across income.
 - * Jaravel (2021), Jaravel (2016)
- ▶ Trade shifts relative prices, reallocates labor across sectors.
 - * Cravino, Levchenko, and Rojas (2022)
- ▶ Income-driven demand + sectoral productivity explain service sector rise.
 - * Comin, Lashkari, and Mestieri (2022)
- ▶ Preferences, technology, prices explain structural transformation.
 - * Herrendorf, Rogerson, and Valentinyi (2013)
- ▶ Non-homothetic preferences explain sectoral shifts in spending and labor.
 - * Boppart (2014)
- ▶ Rising income shifts spending from goods to services.
 - * Aguiar and Bilal (2015)

Overview

1. Background
2. Data
3. Empirical Strategy
4. Results
5. Conclusion
6. Thesis

Background

- ▶ Israel exhibits significant consumption inequality among its main population groups: Arabs, Jews, and Ultra-Orthodox Jews.
- ▶ Such differences in consumption baskets lead to group-specific inflation experiences, resulting in inequality in unequal cost-of-living trends.
- ▶ Recent trends highlight persistent economic disparities; ultra-Orthodox and Arab households have lower average incomes compared to the general Jewish population.
- ▶ Therefore, they face higher poverty risks and financial vulnerabilities.

Background

- ▶ In addition, demographic differences are central: Arabs and Ultra-Orthodox Jews have significantly higher natural population growth rates than non-Ultra-Orthodox Jews.
- ▶ Arabs and Ultra-orthodox consume more food and goods, and less services compared to the general Jewish population.
- ▶ Over time, these shifts are likely to reshape the structure of demand in the Israeli economy—placing growing weight on goods and food sectors relative to services.
- ▶ Understanding these trends is critical for anticipating structural transformation and assessing policy impacts on inequality and inflation.
- ▶ These patterns have significant implications for welfare, monetary policy transmission, and long-term economic development.

► Consumer Expenditure Survey (CES) - 2014-2022

- * Public use files (PUF) provided by the CBS
- * Between 900 and 1400 products per year
- * Between 5000 and 9000 households per year
- * Indicators of the CBS to identify Arab and ultra-Orthodox households
- * Age group of the household head, income decile, number of household members, number of household earners, region of residence
- * Expenditure data (from the consumption survey): total expenditure and quantities, per product, per household.

► Consumer Price Index (CPI) - 2014-2022

- * Public use files (PUF) provided by the Bank of Israel
- * Monthly prices for 38 categories of goods and services
- * Weights per category for verification and comparison

Laspeyres Index

$$I_t = \frac{\sum_{j \in L} \frac{P_{tj}}{P_{oj}} (P_{oj} Q_{oj})}{\sum_{j \in L} P_{oj} Q_{oj}} \times 100$$

Alternatively,

$$I_t = \sum_{j \in L} W_{oj} I_{tj} \times 100$$

- ▶ Where: $I_{tj} = \frac{P_{tj}}{P_{oj}}$, $W_{oj} = \frac{P_{oj} Q_{oj}}{\sum_{j \in L} P_{oj} Q_{oj}}$
- ▶ I_t - Index for period t
- ▶ Q_{oj} - Quantity of the good or service in the base period
- ▶ P_{oj} - Price of the good or service in the base period
- ▶ P_{tj} - Price of the good or service in period t
- ▶ L - The set of all goods and services in the index basket

Structural Model

The following utility function belongs to a subclass of Price Independent Generalized Linearity (PIGL) preferences (Muellbauer, 1975, 1976; Boppart, 2014; Cravino, Levchenko, and Rojas, 2022). The indirect utility of household h is:

$$v^h(p_t^s, p_t^g, e_t^h) = \frac{1}{\epsilon} \left[\frac{e_t^h}{p_t^s} \right]^\epsilon - \frac{\nu_t^h}{\gamma} \left[\frac{p_t^g}{p_t^s} \right]^\gamma - \frac{1}{\epsilon} + \frac{\nu_t^h}{\gamma},$$

Where:

- ▶ p_t^s and p_t^g are the prices of goods and services.
- ▶ $0 \leq \epsilon \leq \gamma \leq 1$ are parameters
- ▶ $\nu_t^h \geq 0$ denotes household-specific age shifters
 - * $\nu_t^h = \nu_t \mu^a \mu_t^h$, where $\frac{1}{N_t} \sum_h \mu_t^h = 1$
 - * The household-specific taste shifter has an aggregate component ν_t , an age-specific component μ^a , and an idiosyncratic component μ_t^h .
- ▶ e^t denotes expenditure.

Structural Model

$$\omega_t^{g,h} \equiv \frac{e_t^{g,h}}{e_t^h} = v_t^h \left[\frac{p_t^s}{e_t^h} \right]^\epsilon \left[\frac{p_t^g}{p_t^s} \right]^\gamma,$$

Structural Model

$$\Omega_t^g \equiv \frac{\sum_h e_t^{g,h}}{\sum_h e_t^h} = \left[\frac{p_t^s}{e_t} \right]^c \left[\frac{p_t^g}{p_t^s} \right]^\gamma \frac{1}{N_t} \sum_h \nu_t^h \left[\frac{e_t^h}{e_t} \right]^{1-c},$$

Structural Model

$$\Omega_t^g = \left[\frac{p_t^s}{e_t} \right]^c \left[\frac{p_t^g}{p_t^s} \right]^\gamma \bar{\mu}_t \phi_t \nu_t.$$

Structural Model

$$\ln \alpha_i^{y,h} = \beta_0 + \beta_1 \ln e_i^h + D^a + \delta_{r,t} + e_i^h,$$

Structural Model

Price elasticity γ is estimated using the regression:

$$\ln \Omega_t^g = b_1 \ln P_t^g + b_2 \ln P_t^s + b_3 X_t + \ln \nu_t,$$

- ▶ Ω_t^g is the aggregate expenditure share on goods.
- ▶ $X_t \equiv \ln(e_t^{-\epsilon} \bar{\mu}_t \phi_t)$, where:
 - * $e_t = \frac{1}{N_t} \sum_h e_t^h$ denotes average expenditures per household.
 - * $\bar{\mu}_t \equiv \sum_a s_t^a \mu^a$ is the weighted average of the age-specific taste shifters, with weights given by expenditure shares $s_t^a = \frac{e_t^a N_t^a}{e_t N_t}$, where a denotes that the variable is grouped by age group; $\sum_a N_t^a = N_t$ is the total number of households in the economy.
 - * $\phi_t \equiv \frac{1}{N_t} \sum_h N_t^h \frac{\mu^a}{\bar{\mu}_t} \left[\frac{e_t^h}{e_t} \right]^{1-\epsilon}$ is a measure of the inequality in the economy, weighted by household preferences.
- ▶ $b_1 = \gamma$ (price elasticity).
- ▶ The other coefficients satisfy the restrictions $b_3 = 1$, and $b_2 = \epsilon - b_1$.
- ▶ ν_t is the aggregate taste shifter.