Competition in the Israeli Economy and its Effects on Prices: a Sector- Based Phillips Curve Analysis

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Introduction

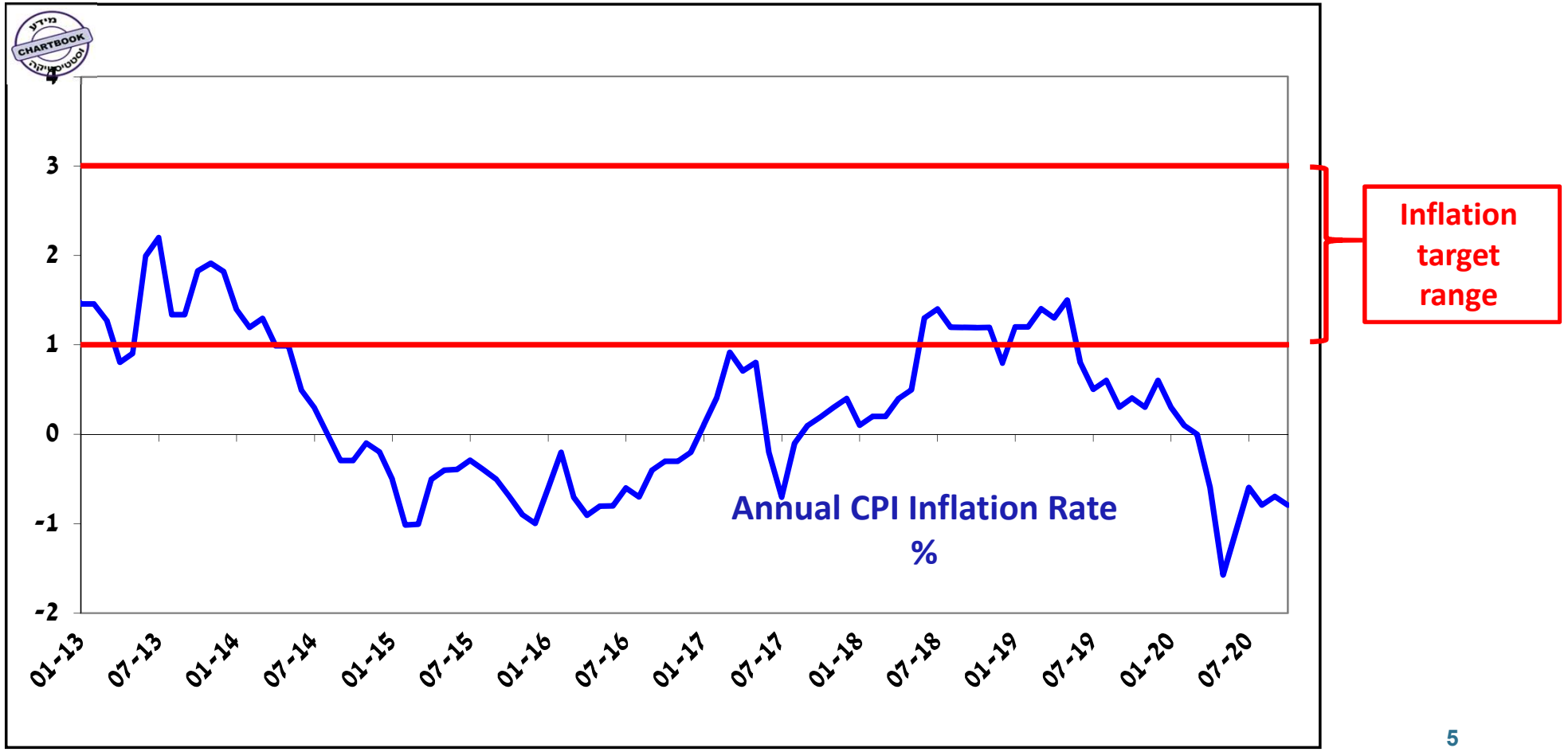
- This paper presents an analysis of the factors that affect price levels in the Israeli economy on a sectoral basis, with an emphasis on ***the effect of competition***.
- We use two alternative measures for the level of competition: ***markup*** ratio and ***expenses*** ratio
- We find a ***negative relationship*** between a sector's increase in competition and its rate of inflation.
- The evidence for the negative relationship is mostly present in the ***apparel sector.***

Outline

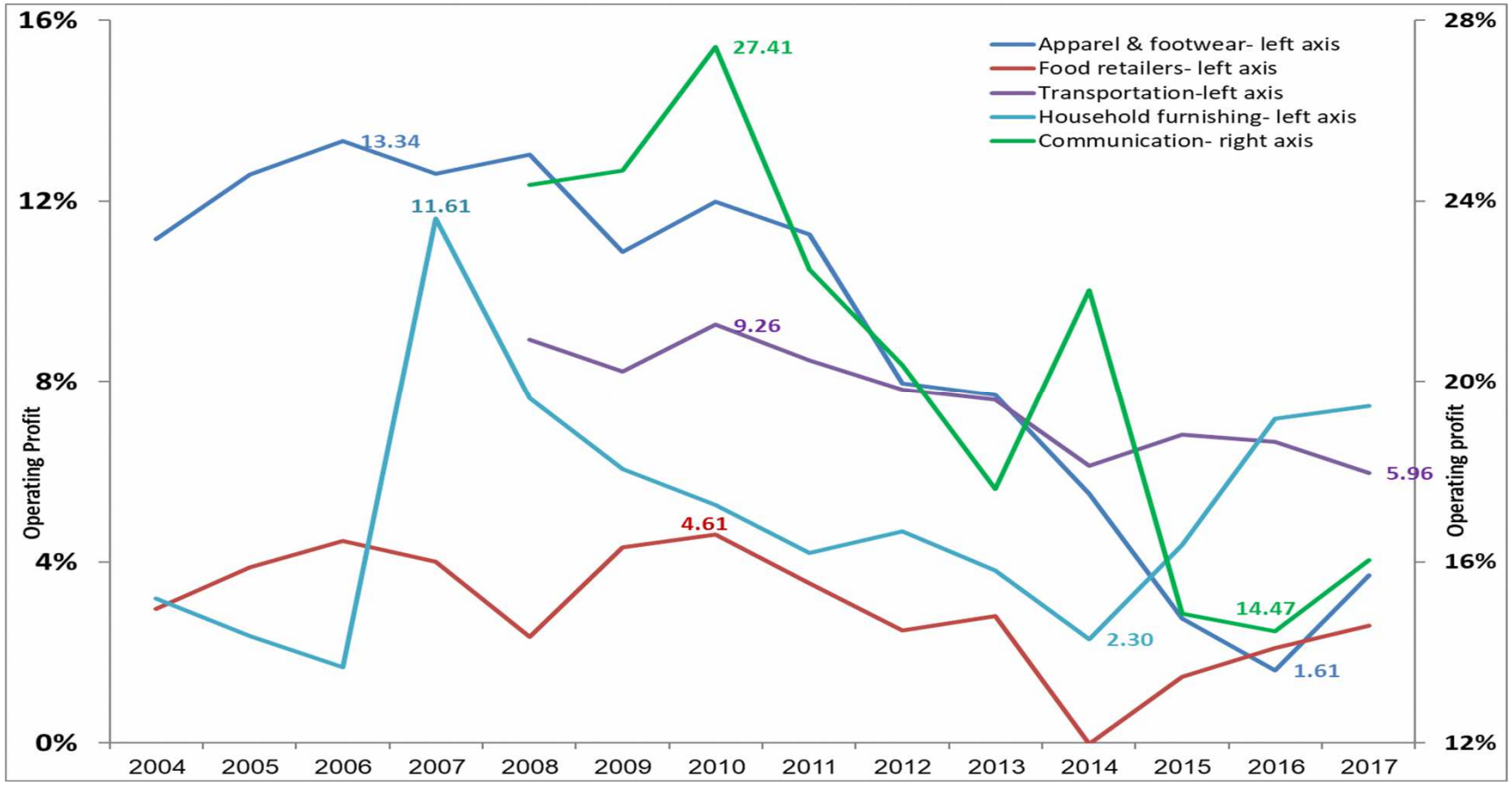
1. Background and previous literature
2. Phillips curve modelling
3. Competition variables
4. Sectoral analysis: estimation and results
5. Summary and conclusions

Background and previous literature

During the last few years, the annual rate of inflation in Israel deviated downwards from the boundaries of the target inflation range, for much of the time...



… and firms profitability among a wide range of sectors has been eroded…



Note: The sectoral operating profit rate is calculated as the weighted average (by sales turnover) of the operating profit of all public companies in the sector traded on the Tel Aviv Stock Exchange (TASE) that provide financial reports. The operating profit rate is defined as the ratio of operating profit (sales minus cost of goods sold and operating costs to sales). The data were taken from TASE website.

A Bird's Eye View of the Literature

- Sectoral analysis of price dynamics using Phillips curve
  - Structural estimation: Imbs, Jondeau & Pelegrin(2011), Byrne, Kontonikas & Montagnoli (2013), Norkute (2015)
  - Gordon's Econometric approach: Lanau et al (2018)
- Competition measurement using profitability ratios at sectoral level
  - Data from the national accounts: Neiss (2001), Cavelaars (2002), Roma & Przbyla (2005)
  - Data from public companies' financial statements: De Loecker & Warzynski (2012), De Loecker & Eeckhout (2017), Traina (2018)
- The intensity of advertising: Bain (1956), Miller (1969)

Phillips Curve Modelling

The Gordon Triangle

- We will estimate a sector-based Phillips curve for Israel using the econometric approach of Gordon (2011).

- Evidence of a high degree of **flexibility in price setting** in some sectors in Israel justifies the use of this modelling method, in contrast to the Neo-Keynesian structural approach.

- The Gordon Triangle consists of three elements: (a)Inertia, (b) Demand and (c)Supply, that make up the rate of inflation in sector j in period t

$$\Pi_t = \alpha_{0\mathrm{j}} + \alpha_j(\mathrm{L})\Pi_{j,t-1} + \beta_j(L)D_{j,t} + \gamma_j(L)S_{j,t} + \varepsilon_{j,t}$$

Where $\Pi_{j,t}$ is the rate of inflation in period t ,$D_{j,t}$is a demand variable , and $S_{j,t}$are supply factors

Data and Methodology

- 5 sectors: apparel, food, communications, toiletries & cosmetics, and tours & recreation which account for **about 21% of the CPI weight.**

- Estimation method: OLS, quarterly data from 2002 through 2018

$$\Pi_t = \alpha_{0j} + \alpha_j(L)\Pi_{j,t-1} + \beta_j(L)D_{j,t} + \gamma_j(L)S_{j,t} + \varepsilon_{j,t}$$

- Where $D_{j,t}$ =
  - Quantity gap

and $S_{j,t}$ =
  - Import prices
  - Foreign exchange rate
  - **Competition variable**
  - Dummy variables: "*Neto Hozalot*" program, Food law, "cellular" reform, national security conflicts

- **Heterogeneity** among sectors

Competition variables

Markup ratio

$$Markup\ ratio = \frac{Sales}{COGS + SG\&A}$$

- Where “COGS” is the cost of good sold and “SG&A” is the sum of selling, general & administration costs.

Expenses ratio

$$Expenses\ ratio = \frac{Selling\ \&\ Marketing\ costs}{Sales}$$

- The variable we propose is similar to Bain's "intensity of advertising" (1956)
- Apart from advertising expenses, we also include in the numerator all other selling expenses incurred by the company until the product reaches the end customer given that these components are also an **entry barrier and a way of promoting sales.**

What results do we expect to obtain?

- A **positive relation between markup and sectoral inflation rate**. The increased competition is reflected in a decline in markup due to the loss of market power that leads to a drop in prices.

- A **negative relation between expenses ratio and sectoral inflation rate** as long as the major driver of stronger competition is an **exogenous shock**, which is reflected in an increase in selling & marketing expenses relative to sales (a proxy for competition…).

- Two sectors in which competition increased as a results of an exogenous shock: **apparel and communications**.

Sectoral analysis: estimation and results

Apparel Sector

Sector: Apparel Dependent variable: Apparel inflation t qoq Sample period: 2003Q2:2018Q2 | 61 observations	Competition variables: based on 5 clothing retailers 1	2	3
Δ Expenses ratio $_{t-4}$			-1.15** (0.456)
Δ Markup $_{t-2}$		0.32* (0.164)	
Dummy "neto hozalot"	-2.99** (1.168)	-3.17*** (1.142)	-3.28*** (1.119)
Control variables	√	√	√
Adjusted R^2	0.53	0.56	0.58

Communication Sector

Sector: Communication Dependent variable: Communication inflation t qoq Sample period: 2003Q1:2018Q4 | 64 observations	1	2	3
$(1-\text{Dummy\_Reform}) * \Delta\text{Expenses ratio}_{(t-3)}$			1.297* (0.697)
$(\text{Dummy\_Reform}) * \Delta\text{Expenses ratio}_{(t-3)}$			-0.847* (0.526)
Δ Markup $_{(t-3)}$		0.165* (0.099)	
Dummy "reform"			-1.053*** (0.366)
Control variables	√	√	√
Adjusted R^2	0.33	0.35	0.44

Food Sector

Sector: Food Retailers	Sample period: 2002Q1:2018Q4		Sample period: 2007Q1:2018Q4	
Dependent variable: Food inflation t qoq	68 observations		48 observations	
Competition variables: based on 3 food retail firms	1	2	3	4
Δ Expenses ratio $_{(t-4)}$				0.529*
				(0.262)
Δ Markup $_{(t-1)}$		0.309*		
		(0.187)		
Dummy food law	-0.241	-0.272	-0.349	-0.426*
	(0.220)	(0.218)	(0.241)	(0.235)
Control variables	√	√	√	√
Adjusted R^2	0.53	0.54	0.64	0.66

Toiletries & Cosmetics Sector

Sector: Personal care products	Sample period: 2002Q1:2018Q4		Sample period: 2006Q3:2018Q4	
Dependent variable: Toiletries and Cosmestics inflation	68 observations		50 observations	
Competition variables: based on 4 firms	1	2	3	4
ΔExpenses ratio $_{(t-2)}$				0.377*
				(0.213)
Δ Markup $_{(t-2)}$		0.573*		
		(0.286)		
Dummy "neto hozalot"	-1.051	-1.074	-1.16*	-1.211**
	(0.753)	(0.735)	(0.611)	(0.597)
Control variables	√	√	√	√
Adjusted R^2	0.22	0.26	0.13	0.18

Tours & Recreation Sector

Sector: Tours and recreation Dependent variable: Tours and recreation inflation Sample period: 2003Q1:2018Q4 | 64 observations	Competition variables: based on 2 firms 1	2	3
Δ Expenses ratio $_{(t-2)}$		-0.430 (0.285)	
Δ Markup $_{(t-2)}$			0.419** (0.183)
Dummy "War"	-1.312* (0.706)	-1.285* (0.699)	-1.148* (0.685)
Control variables	√	√	√
Adjusted R^2	0.21	0.23	0.27

Contribution of competition to inflation- measured by markup

Competition index: Markup ratio	(1) Competition contribution to sectoral inflation 2012-2017	(2) Sectorial inflation 2012-2017
Apparel (2.5%)	-2.5 %	-11.20%
Food- retail (13.7%)	-5.31 %	3.51%
Communication (2.5%)	-3.5 %	-30.30%
Personal Care (1.5%)	-0.93 %	-14.70%
Tours & Recreation (0.8%)	2.51 %	29.75%

Contribution of competition to inflation- measured by expenses ratio

Competition index: Expenses ratio	(1) Competition contribution to sectoral inflation 2012-2017	(2) Sectorial inflation 2012-2017
Apparel (2.5%)	-8.3 %	-11.20%
Food- retail (13.7%)	0.9 %	3.51%
Communication (2.5%)	-1.14 %	-30.30%
Personal Care (1.5%)	1.1 %	-14.70%
Tours & Recreation (0.8%)	-1.45 %	29.75%

Summary and conclusions

- In this paper we modeled the development of the rate of inflation in five different sectors in the Israeli economy, while trying to **identify the effect of changes in competition**.
- We reflected changes in the level of competition by using two indices : a conventional index -*markup ratio* and a **novel index - *expenses ratio.***
- In the period under study, we found that an **increase in competition** measured by markup is consistent with a **decline in the rate of inflation** in the sector.
- In sectors affected by large **exogenous shocks to competition** (apparel and communications), an **increase in expenses ratio** corresponds with a decline in the sectoral rate of inflation.
- The negative relationship between the level of competition and the rate of inflation is **mostly present in the apparel sector**.
- A great part of the variation in prices in the sectors under study, was not explained in the analysis of this work.

Thanks!

Comments:

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