Economics Letters 171 (2018) 119–122

Contents lists available at ScienceDirect

Economics Letters

journal homepage: www.elsevier.com/locate/ecolet

Search costs and cost pass-through: Evidence for the Iranian poultry market

Omid Zamani, Thomas Bittmann, Jens-Peter Loy*

Department of Agricultural Market Analysis, Institute of Agricultural Economics, Christian-Albrechts-University Kiel, Olshausenstraße 40, 24118 Kiel, Germany

HIGHLIGHTS

- Mobile internet is widely used to retrieve market information in Iran.
- Mobile internet usage can reduce search costs.
- Lower search costs may increase market performance.
- Mobile internet usage lowered prices and fastened price dynamics for poultry in Iran.

ARTICLE INFO

Article history:
Received 26 February 2018
Received in revised form 13 June 2018
Accepted 13 July 2018
Available online xxxx

JEL classification:
C33
D82
L11
L81

Keywords:
Information technology
Cost pass-through
Search cost
Poultry market
Iran

ABSTRACT

This study employs the per capita number of mobile internet users as a proxy for search costs to examine the potential impact of new information technologies on cost pass-through on the Iranian poultry market. We find that the per capita number of mobile internet users in space and time leads to lower prices and a higher cost pass-through. Deviations from the price-cost equilibrium reduce more quickly when access to the mobile internet becomes more widespread. All results support the hypothesis that new information technologies have positive effects on market competition.

> "I have neither PC nor laptop, I don't even know how to turn them on, but every day I receive daily prices [of the poultry market] through my smartphone and my Telegram Messenger".
>
> (An Iranian poultry producer)

1. Introduction

Timeliness of price information may improve competition and market performance, and new information technologies can significantly decrease the cost of information and increase its timeliness (Clarke et al., 2015; Hübler and Hartje, 2016).[1] The per capita number of mobile internet users measures the distribution of access to information available online and transmitted through various social-media channels. In Iran, the per capita number of mobile internet users increased from 2% to nearly 40% from 2010 to 2016 (Statistical Center of Iran (SCI), 2016).[2] This may affect the temporal, spatial, and vertical dispersion of prices toward more competitive patterns, leading to lower real prices and full cost pass-through (Stiglitz, 1979; Varian, 1980; Salop and Stiglitz, 1982; Perloff and Salop, 1986; Tappata, 2009). Empirical evidence shows that a wider distribution of new information technologies lowers transaction costs (e.g., search costs) and fosters competition, stimulating market efficiency (Jensen, 2007). Aker and Fafchamps (2015) report that mobile-phone coverage reduces search costs and price dispersion in agricultural markets. Mobile internet access, in particular, increases the timeliness of information (Ghose

* Corresponding author.
E-mail addresses: omid.zamani@ae.uni-kiel.de (O. Zamani), thomas.bittmann@ae.uni-kiel.de (T. Bittmann), jploy@ae.uni-kiel.de (J.-P. Loy).

[1] New information technologies cover various digital-communication technologies. In this paper, we focus on mobile internet devices, which have become increasingly popular in many less-developed and transitional countries.

[2] Statistical Center of Iran.

https://doi.org/10.1016/j.econlet.2018.07.022
0165-1765/

Table 1
Descriptive statistics of model variables.
Source: Data from State Livestock Affairs Logistics of Iran (2017) and Statistical Center of Iran (SCI) (2017).

Measure	Definition	Mean	Std. D.	Min.	Max.
$\ln P^r_{i,t}$	Logarithm of real retail price	6.622	.157	6.110	7.082
$\ln P^f_{i,t}$	Logarithm of real farm-gate price	6.273	.191	5.715	6.895
$PCNIU_{i,t}$	Per capita number of mobile internet users	0.098	.102	0.006	0.642
$PCNIU_{i,t} \cdot \ln P^f_{i,t}$	Interaction term	0.607	.614	0.045	3.985

Notes: Prices in Iranian rials (IRR) per kg of poultry meat. The exchange rate depreciated from 0.0001 to 0.00003 USD per IRR from 2010 to 2016.

et al., 2012). We employ the per capita number of mobile internet users as a proxy for search costs to examine the impact of new information technologies on prices and cost pass-through on the Iranian poultry market. The cost pass-through is analyzed using retail and farm prices of poultry in Iran. We estimate the long-term cost pass-through and the speed of the price-cost adjustment.

2. Data and model specification

We use weekly farm-gate and retail prices for all of the 30 provinces of Iran from May 2010 to July 2016 (t = 324). The State Livestock Affairs Logistics collected the panel dataset of 9720 observations. To compare prices in time, we deflate nominal prices using the consumer price index for retail prices and the producer price index for farm-gate prices. We use logarithms of real prices ($\ln P^r_{i,t}$, $\ln P^f_{i,t}$). The data on mobile internet users and population numbers for each province come from the Statistical Center of Iran (SCI).[3] Table 1 provides summary statistics of all model variables.

PCNIU measures the number of mobile internet users per capita of the population in each region and over time.[4] PCNIU represents the portion of the population with easy access to (price) information (Jensen, 2007; Aker and Fafchamps, 2015; Hübler and Hartje, 2016). We assume search costs to decline with increasing PCNIU. In our sample, search costs vary between regions and over time.

According to a survey by the Statistical Center of Iran (SCI) (2016), one of the main purposes of internet usage in Iran is to receive timely information on commodities and markets. PCNIU significantly increased during the study period, while other sources of information, such as landline internet access, were almost unchanged or even declined in numbers. In 2015, 30% of the population used mobile internet, while 9% had access via landline (Statistical Center of Iran (SCI), 2017). Mobile-internet coverage differs across regions; in 2016, Tehran province showed the highest PCNIU (64.2%), while Sistan-o-Bluchestan showed the lowest PCNIU at 12.8% (Statistical Center of Iran (SCI), 2017).

To test the impact of search costs on long-term cost pass-through, we estimate the following model specification:

$$\ln P^R_{it} = \alpha_{1i} + \alpha_2 \ln P^F_{it} + \alpha_3 PCNIU_{it} + \alpha_4 \left(\ln P^F_{it} \cdot PCNIU_{it}\right) + \varepsilon_{it} \quad (1)$$

Alpha 2 measures long-term cost pass-through elasticity, which under perfect competition is 1 (e.g., Gardner, 1975). Alpha 3 estimates the impact of search costs on retail prices. We assume that lower search costs or better access to information leads to lower retail prices (Perloff and Salop, 1986). Alpha 4 measures the impact of search costs on cost pass-through elasticity. We assume that better access to information will lead to a more competitive situation with a higher cost pass-through.[5]

In a second stage, we estimate a restricted panel error-correction representation to test the effect of search costs on the speed of dynamic cost-price adjustment by including the estimated error term of Eq. (1) in the following specification:

$$d \ln P^R_{it} = \beta_{1i} + \beta_2 d \ln P^F_{it} + \beta_3 \varepsilon_{it-1} + \beta_4 \left(\varepsilon_{it-1} \cdot PCNIU_{it-1}\right) + \cdots + u_{it} \quad (2)$$

Beta 2 measures short-term cost pass-through elasticity. Beta 3 represents the speed of adjustment of deviations from the long-term cost pass-through equilibrium, and beta 4 measures the effect of search costs on the speed of adjustment, which is expected to be negative, indicating that the speed of adjustment increases with better access to information (Tappata, 2009).

In both model specifications, farm-gate prices are assumed to be exogenous; this is supported by the results of Granger-causality tests. In all cases, the farm-gate prices Granger-cause retail prices, and the reverse is rejected for at least half of the cases. We also test all model variables for stationarity. Results for the Hadri (2000) panel unit-root test indicate that at least some of the panel series of the retail prices, of the farm-gate price, and of the per capita number of mobile internet users contain a unit root.[6] We additionally apply standard stationarity tests (ADF and KPSS) to individual panel series. For all series, we do not reject the null hypothesis of an integrated time series (ADF), and we reject the null hypothesis for the KPSS test at the 5% significance level. The first differences of all model variables are stationary. From these results, we assume that all panel series are integrated of order 1, and we test for the panel cointegration of Eq. (1). We apply the Westerlund (2007) test, and the result is that the null hypothesis of no panel cointegration is rejected for all test variants (see Table 2).

In accordance with the test results, we can assume panel cointegration. This allows us to estimate and test the long-term relationship shown in Eq. (1) and gives evidence for the existence of a panel error-correction mechanism indicated by Eq. (2).

3. Estimation results

We estimate fixed- and random-effects models of Eq. (1) and apply the Hausman test, which does not reject the hypothesis that parameters do not differ. Thus, the random-effects model is valid. We also estimate a mean-group estimator to allow for individual variations of parameters and to demonstrate the robustness of the results (Pesaran et al., 1999). We further show robust standard errors; Table 3 shows the estimation results.

We find a reasonable coefficient of about 0.6 for the cost pass-through elasticity, indicating that 60% of farm-price changes transmit to the retail price. The first two hypotheses are supported by the data for all estimators presented. The per capita number of mobile internet users has a negative impact on real prices, indicating that prices go down with search costs. For the average per capita number of internet users, we predict that real prices are 18% lower. The interaction term $PCNIU_{i,t} \cdot \ln P^f_{i,t}$ shows a positive estimate, indicating that the cost pass-through elasticity increases

[3] The National Internet Development Management Center of Iran collected the primary data on mobile internet users.

[4] Annual population data are available. The number of mobile internet users is collected on a weekly basis.

[5] "Many theoretical models indicate that pass-through of industry-wide cost changes increases with the intensity of competition" (RBB Economics, 2014, p. 4).

[6] The test assumes no cross-sectional correlation. We determine the optimal lag length based on information criteria (AIS, HQ, BIC).