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International oil shocks and household consumption in China

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HIGHLIGHTS

- We study the impact of oil price shocks on residential consumption in China.
- The most immediate effect passes through expenditure on transportation.
- Effects also appear for health, education and food and clothing expenditure.
- Existing price regulation offers no great benefit.
- We argue that a compelling case for removing current price regulation exists.

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ABSTRACT

We investigate the impacts that oil price shocks have on residential consumption in China. While it is well understood that oil prices affect consumption in a multitude of ways, the timing and directness of these effects on specific consumption categories is not clear. We demonstrate that the most immediate and direct effect passes through transportation consumption, as might be expected. But we also show that significant effects pass through consumption in other sectors—including "food and clothes", "medical expenditure", and other general "living expenditure"—with less immediacy. Given the results, particularly observed asymmetries with respect to rises and falls in international oil prices, we discuss some implications for future adjustments to domestic price policies, in particular the case for removal of domestic price regulation.

1. Introduction

> *"China is now at such a crucial stage that without structural transformation and upgrading, we will not be able to achieve a sustained economic growth. In readjusting the structure, the most important aspect is to expand domestic demand …."*

(Li Keqiang, Summer Davos opening ceremony, September 11th, 2013)[1]

China has experienced more than 20 years of persistent high-paced economic growth, driven among other things by continued corporate and government investment, high levels of exports, and historically cheap labor. The Chinese government has openly set forth policy objectives designed to continue recent economic trends.[2] There is a general consensus that to complete this process and further stimulate domestic demand, and by implication the level of household consumption, China will undergo significant structural transformation. On the surface, this appears to be a natural progression for the Chinese economy. Growth in the demand for all goods and services, however, will necessarily increase the level of energy consumed in the economy. This follows immediately from two facts: (a) energy is a critical factor of production and (b) transportation is required, to a greater or lesser degree, for the consumption of all goods and services, and transportation is an energy-intensive (and emissions-intensive) activity. In this regard, the stated objective of growing domestic demand is somewhat at odds with targets on the reduction of emissions and energy consumption that were committed to in the Chinese government's 12th five-year plan.

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[1] The full speech is available from the Xinhua News Agency at: ⟨http://news.xinhuanet.com/english/china/2013-09/12/c_125371685.htm⟩.

[2] This is, for example, a stated objective in the recent 12th five-year plan of the Chinese government.

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Growth of the Chinese economy during recent years has coincided with huge increases in the consumption of oil, underpinned by a surge in the rates of private car ownership, which have increased more than 30-fold, from 0.6 cars per 100 urban households in 2000 to 18.28 in 2011. The consumption of oil used for transportation in China doubled in the decade between 2000 and 2010.[3] The growth in car ownership increases demand for and consumption of oil, posing genuine policy concerns since the domestic consumption of oil far exceeds domestic production. Although China does produce oil, for many years now the economy has been a net importer and it is already among the top three global importers of oil, with 68% of total oil consumed in 2010 being from imported sources. With an oil supply gap that continues to grow, China is unavoidably affected by international energy markets, meaning that international oil price shocks can pass through to domestic activity.

That rising oil prices can impact transportation costs is quite straight-forward, however there are further mechanisms by which changing international oil prices can impact upon the wider range of prices that consumers see. This is discussed in some detail for the Chinese context by Tang et al. (2010) who, following Brown and Yucel (2002), attribute the transmission mechanisms in to six general channels of effect: supply side effects; wealth transfers; general price inflation; real balance effects (as a result of changes in the demand for money); sector adjustments/re-structuring; and effects from increased uncertainty in the oil price. For example, a rise in the price of oil generates inflation and pushes up the producer price index—the price faced by industrial consumers—which is in general then passed on to the consumer via an increase in the consumer price index—the price that consumers pay. The price changes will intuitively have some consequence upon the consumption expenditures of households in the short-run. In addition, the changing prices will further impact upon firm profits and investment, leading to lower levels of activity throughout the economy in the long-run.

To shield domestic consumers against often volatile international oil prices, domestic retail oil prices in China are regulated. The pricing system currently follows a form of floating-peg regulation (see next section for further detail) against a bundle of international market prices. The trend of regulation has been to increasingly normalize domestic prices against a bundle of international prices, moving from a centrally controlled price in the 1970s toward something today that quite closely reflects a market mechanism. In light of the rapid growth of car ownership, it stands to reason that international oil shocks could play an increasingly important role in domestic household consumption decisions. Investigating the nature, strength, and timing of these price pass-through effects therefore seems of interest and relevance to policy debates, particularly regarding price regulation.

A number of studies, both for China (e.g., Fan et al., 2007; Du et al., 2010) and elsewhere (e.g., Brown and Yucel, 2002; Hamilton and Herrera, 2004; Kilian, 2008), have already established the predominantly negative influence of oil shocks to the macroeconomy. However, largely due to data availability, the impact of oil shocks to household consumption in China has remained an under-researched phenomenon. This is a significant omission since it is important to understand the household sector when considering the welfare implications of exposure to international oil shocks. In this paper, we therefore aim to assess whether and to what extent oil shocks pass through to consumption by the Chinese household sector, looking at aggregate consumption as well as consumption within specific expenditure categories, including "transportation and communication," "food and clothing," "medical expenditure", "education and entertainment," and general "living expenditure." In this regard, we follow a series of studies by Mehra and Peterson (2005), Edelstein and Kilian (2009), Odusami (2010), and Wang (2013), which define the linkages between international oil shocks and household consumption under a permanent income hypothesis (PIH).

Considering the results carefully, they indicate that household consumption expenditure is not adversely affected by rising oil prices; while falling oil prices seem to stimulate overall consumption to increase. The nuances of these effects, including timing, asymmetry and transmission routes (through alternative consumption categories) are all interesting, and each discussed in the main results. But more interesting is that, taken together, our results point towards the conclusion that lifting the domestic oil price policy is a very serious option that domestic policy makers should entertain.

The paper is organized as follows. Section 2 presents a general background discussion, outlining the nature of the oil pricing system in China and offering discussion of the literature on oil shocks and the economy. Section 3 describes the methodology, establishing the context of the planned consumption model under a PIH along with the econometric formulation. Data are presented in Section 4, with the analysis results and discussion offered in Section 5. The paper concludes in Section 6.

2. Background

Despite an ongoing debate as to the specific role of oil in shaping household consumption, the general mechanisms by which it contributes to the economy are reasonably straightforward. Consider a rise in the price of oil. Scholars widely agree that oil is needed to support most economic activities, underpinning the energy requirements of transportation needed to move both goods and the individuals who provide services. Bhattacharyya (2011), for example, provides a succinct review of these mechanisms, highlighting that a rise in the price of oil effectively increases the costs of all consumption, thereby reducing the quantity demanded by consumers for all goods and services. At the same time, an increase in energy prices makes energy a less desirable factor of production for firms, causing firms to substitute energy for other factor inputs, such as capital investment or more labor intensive production processes, see for example Broadstock et al. (2007) for a global review of capital-energy substitution or Su et al. (2012) for a China specific example looking at capital, labor and energy, where further discussion on such types of substitution effects is available.

To establish the importance of oil shocks on consumption in the household sector of China, we first give some context to the Chinese oil pricing system. In so doing, we firmly establish the nature of price regulation and that international oil shocks do have a route through to domestic oil prices. We then provide a more general discussion of the existing literature on how oil shocks pass throughout the economy.

2.1. The oil pricing system in China: an overview

China's oil pricing system has gone through three broad phases since the People's Republic of China was established. The first phase, which was in place primarily during the purely central planned political system, ended in 1981. In this phase, the price of oil was set by the central government, with no scope for international prices to pass through.

[3] Similarly, ownership of air conditioning units has increased fourfold, from 30 units per 100 households in 2000 to 121 in 2011 (China statistical yearbook, 2011), reflecting the increased desire of Chinese households to complement their growing incomes with high energy–consuming luxury items.

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