Journal of International Economics 91 (2013) 275–289

Contents lists available at ScienceDirect

Journal of International Economics

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

A theory of the competitive saving motive

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ARTICLE INFO

Article history:
Received 21 August 2012
Received in revised form 13 September 2013
Accepted 16 September 2013
Available online 28 September 2013

JEL classification:
F3
F4
J1
J7

Keywords:
Surplus men
Savings race
Trade surplus
Global imbalances

ABSTRACT

Motivated by recent empirical work, this paper formalizes a theory of competitive savings — an arms race in household savings for mating competition that is made more fierce by an increase in the male-to-female ratio in the pre-marital cohort. Relative to the empirical work, the theory can clarify a number of important questions: What determines the strength of the savings response by males (or households with a son)? Can women (or households with a daughter) dis-save? What are the conditions under which aggregate savings would go up in response to a higher sex ratio? This theory can potentially help to understand the savings patterns in China, India, Vietnam, Singapore, Hong Kong, and other economies that have experienced a dramatic increase in the pre-marital sex ratio.

1. Introduction

Recent empirical work suggests that one explanation for the rapid rise in the household savings rate in China, India, Singapore, Vietnam and several other economies is an arms race in savings for competition for marriage partners triggered by a rise in the pre-marital sex ratio, a phenomenon that has erupted vigorously since the beginning of the 21st century (Wei and Zhang, 2011a,b). This source of incremental savings – dubbed as the competitive saving motive – is distinct from the precautionary saving motive or savings for life-cycle reasons, the relatively more standard explanations for household savings. The competitive saving motive can be quantitatively important. It is estimated by Wei and Zhang (2011a,b) to account for half of the observed increase in the Chinese household savings rate in recent years. Without taking this into account, one would not have a complete picture of the underlying causes for the global current account imbalances, and might be prone to write incorrect prescriptions for the problem.

Because the existing empirical work is not accompanied by a formal theory, it leaves many important questions unanswered. For example, what determines the strength of the competitive savings motive by males (when there is a relative surplus of males)? What is the effect of a higher sex ratio on the aggregate savings given the potential that females may under-save? The goal of this paper is to develop a formal theory of the competitive saving motive that can clarify these questions. With the theory, we can also assess welfare implications of the competitive saving motive.

We construct a simple overlapping generations (OLG) model with two sexes and a desire to marry. To focus on the macroeconomic implications of sex ratio imbalances, we intentionally shut down channels such as the usual precautionary savings motive, habit formation, culture, and financial development. Because it is an OLG model, there are still life-cycle considerations, which, however, do not lead to current account imbalances on their own.

Under reasonable conditions, we show that men respond to a rise in the sex ratio by raising their savings rates. Moreover, the increment in their savings is always enough to offset any decrease in women's savings. As a result, the aggregate savings rise with the sex ratio. We also discuss a number of extensions that aim to allow for additional realism: (a) incorporate parental savings for children, (c) introduce intra-household bargaining, (c) consider an OLG structure in which each generation lives for 50 periods and makes savings decisions in multiple periods, and (d) allow for income inequality. In each case, under reasonably general conditions, both the aggregate savings rate and the current account rise in response to a rise in the sex ratio. (Some of the extensions are reported in online appendices.)

To check if the model can deliver an effect that is economically significant, we employ quantitative calibrations. In the benchmark case, for a small open economy, as the sex ratio rises from 1 to 1.15, the

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http://dx.doi.org/10.1016/j.jinteco.2013.09.003

economy-wide savings rate and the current account will both rise by more than 6% of GDP. We also consider a case of two large economies, whose relative sizes and income levels are calibrated to mimic China and the United States. The synthetic United States is assumed to always have a balanced sex ratio, while the synthetic China experiences a significant rise in the sex ratio. The rise in China's sex ratio produces a rise in its current account surplus, and a corresponding rise in the current account deficit for the United States. The magnitudes of the current account imbalances in the simulations (about 4.4% of GDP for China and −1.5% of GDP for the United States when China's sex ratio rises from 1 to 1.15) are around one-half of the actual current account imbalances observed in the data. While the sex ratio imbalance is not the only factor affecting the global current account imbalances in recent years, it could be one of the significant, and yet thus far unrecognized, factors. (This extension is also reported in an Online Appendix.)

A desire to enhance one's prospects in the marriage market through a higher level of wealth could be a motive for savings even in countries with a balanced sex ratio. But such a motive is not as easy to detect when the competition is modest. When the sex ratio gets out of balance, obtaining a marriage partner becomes much less assured. A host of behaviors that are motivated by a desire to succeed in the marriage market may become magnified. But sex ratio imbalances so far have not been investigated by macroeconomists. This may be a serious omission. A sex ratio imbalance at birth and in the marriage age cohort is a common demographic feature in many economies, especially in Asia, such as Korea, India, Vietnam, Singapore, Taiwan and Hong Kong, in addition to China. In many economies, parents have a preference for a son over a daughter. This used to lead to large families, not necessarily an unbalanced sex ratio. However, in the last three decades, as the technology to detect the gender of a fetus (Ultrasound B) has become less expensive and more widely available, many more parents engage in selective abortions in favor of a son, resulting in an increasing relative surplus of men. The spread of technology started in the early 1980s and accelerated quickly afterwards. 1985 was the first year in which half of the hospitals in China had acquired at least one Ultrasound B machine. By the early 1990s, all county-level hospitals had at least one such machine (Ebenstein et al., 2010). The strict family planning policy in China, introduced in the early 1980s, has induced Chinese parents to engage in sex-selective abortions more aggressively than their counterparts in other countries. The sex ratio at birth in China rose from 106 boys per hundred girls in 1980 to 122 boys per hundred girls in 1997 (see Wei and Zhang, 2011, for more detail). It may not be a coincidence that the Chinese current account surplus started to garner international attention around 2002 just when the first cohort born after the implementation of the strict family planning policy was entering the marriage market.

In the benchmark model and numerical examples, we assume an exogenous sex ratio. While the sex ratio is endogenous in the long-run as parental preference evolves, the assumption of an exogenous sex ratio can be defended on two grounds. First, the technology that enables the rapid rise in the sex ratio has only become inexpensive and widely accessible in developing countries within the last 25 years or so. As a result, it is reasonable to think that the rising sex ratio affects only the relatively young cohorts' savings decisions, but not those who have passed half of their working careers. Second, data suggests that if the preference for a son has a mean-reverting property, it must be a very slow-moving process. Almost all countries that have a skewed sex ratio today have exhibited a gradual climb over the last decade or two. This suggests that a systematic reversal of the sex ratio is unlikely to happen in most economies in the short run. In any case, we also consider endogenous sex ratios in an extension and find that all qualitative results still hold.

To see if the theoretical prediction has any support in the data, we check if a country's savings rate is systematically linked to its sex ratio. After controlling for the effects on the savings rate from income, the share of working age people in the population (i.e., a proxy for the life cycle theory), the ratio of private bank credit to GDP (a proxy for financial development), and social security expenditure as a share of GDP (a proxy for the precautionary savings motive), we find that the sex ratio, the savings rate, and the current account as a share of GDP are strongly positively correlated.

There are three bodies of work that are related to the current paper. First, the literature on status goods, positional goods, and social norms (e.g., Cole et al., 1992; Corneo and Jeanne, 1999; Hopkins, 2009; Hopkins and Kornienko, 2004; Bhaskar and Hopkins, 2011) has offered many useful insights. One key point is that when wealth can improve one's social status (including improving one's standing in the marriage market), in addition to affording a greater amount of consumption goods, there is an extra incentive to save. This element is in our model as well. However, all existing theories on status goods feature a balanced sex ratio. Yet, an unbalanced sex ratio presents some non-trivial challenges. In particular, while a rise in the sex ratio is an unfavorable shock to men (or parents with sons), it is a favorable shock to women (or parents with daughters). Could the latter group strategically reduce their savings so as to completely offset whatever increments in savings men or parents with sons may have? In other words, the impact on aggregate savings appears ambiguous. Our model will address this question. In any case, the literature on status goods has no discernible impact in policy circles. For example, while there are voluminous documents produced by the International Monetary Fund or speeches by U.S. officials on China's high savings rate and large current account surplus, no single paper or speech thus far has pointed to a possible connection with its high sex ratio imbalance.

A second related literature is the economics of family, which is too vast to be summarized here comprehensively. One interesting insight of this literature is that a married couple's consumption has a partial public goods feature (Browning et al., 1994; Donni, 2006). We make use of this feature in our model as well. None of the papers in this literature explores the general equilibrium implications for aggregate savings from a change in the sex ratio.

The third literature examines empirically the causes of a rise in the sex ratio. The key insight is that the proximate cause responsible for a majority of the recent rise in the sex ratio imbalance is sex-selective abortions, which have been made increasingly possible by the spread of Ultrasound B machines. There are two deeper causes for parental willingness to disproportionately abort female fetuses. The first is the parental preference for sons, which in part has to do with the relatively inferior economic status of women. When the economic status of women improves, sex-selective abortions appear to decline (Qian, 2008). The second is either something that leads parents to voluntarily choose to have fewer children than earlier generations, or a government policy that limits the number of children a couple can have. In regions of China where the family planning policy is less strictly enforced, there is also less sex ratio imbalance (Wei and Zhang, 2011a,b). Bhaskar (2011) examines parental sex selections and their welfare consequences.

The rest of the paper is organized as follows: in Section 2, we provide some suggestive data patterns that motivate the theory. In Section 3, we present a benchmark model that delivers the main mechanism. In Section 4, we consider an extension that allows for parental savings and endogenous sex ratios. In Section 5, we also calibrate the model to see if the sex ratio imbalance can produce changes in the aggregate savings rate and current account whose magnitudes are economically significant. Finally, in Section 6, we offer concluding remarks and discuss possible future research.

2. Some data patterns

To motivate the theory, we discuss two types of empirical approaches that allow us to check for plausibility and empirical importance of the theory. First, we provide some cross-country evidence on the relationships between a country's sex ratio and its savings rate, and between the sex ratio and its current account. Second, we review