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# Precautionary saving and consumption growth in Taiwan

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## Abstract

Consumption and income have both grown rapidly in Taiwan over the past forty years, with younger birth cohorts experiencing faster growth. The long upward trend in consumption presents a strong challenge to the consumption smoothing predictions of the Permanent Income Hypothesis. Household survey data from 1976–1996 are used to examine the extent to which precautionary savings behaviour can explain this rapid consumption growth in an environment with high levels of savings. We find evidence for a strong precautionary motive in Taiwan, with levels of prudence much higher than found in the United States and United Kingdom. These high rates of prudence explain much of the rapid consumption growth, while the faster consumption growth of younger cohorts is attributed in part to their greater participation in industries with more earnings risk.

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## 1. Introduction

The exceptional economic performance of Taiwan over the past four decades is well-known, resulting in rapid increases in lifetime incomes. Annual per capita real GNP growth and real consumption growth averaged 6.5% and 6.8%, respectively, over the 1976–1996 period. At the same time, Taiwan enjoyed gross savings to GNP ratios of between 0.25 and 0.40. Together, these facts challenge simple formulations of the permanent income hypothesis (PIH) in which individuals smooth their consumption over their lifetime. In particular, they pose the main question to be addressed in this paper: “Why did Taiwanese

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households have predictable consumption growth and high savings in the presence of rapid income growth?”.

This paper explores the extent to which precautionary savings behaviour can explain the rapid consumption growth. Repeated cross-sections from the Taiwan Personal Income Distribution Surveys are used for pseudo-panel estimation of dynamic consumption models. These methods are used to estimate the levels of absolute and relative prudence, which Kimball (1990) shows to be a measure of the intensity of the precautionary motive. We find that the level of prudence in Taiwan is much higher than the levels Dynan (1993), Merrigan and Normandin (1996) and McKenzie (2002) estimate in the United States, United Kingdom and Mexico, respectively. This high level of prudence results in high savings rates and rapid consumption growth. We estimate that consumption growth would have been only 1 to 2% per annum if prudence had been at the U.S. and U.K. levels.

Consumption growth is found to be faster for the younger cohorts than for older cohorts. Levels of prudence are estimated to be similar for all cohorts, so that the more rapid consumption growth of the young is due to greater earnings uncertainty. We trace some of these differences in earnings uncertainty to higher participation of younger cohorts in riskier industries.

The paper is organized as follows. Section 2 details consumption growth in Taiwan at the aggregate level. Section 3 describes the data to be used for microeconomic analysis. Section 4 explains the dynamic pseudo-panel methods to be used in this paper and uses them to test for differences in consumption growth rates across birth cohorts. Section 5 presents estimates of the rate of prudence, the level of earnings uncertainty, and the extent to which the precautionary motive explains consumption growth. Section 6 concludes the paper and an Appendix derives the results needed for pseudo-panel estimation of relative prudence.

## 2. Consumption and income at the aggregate level

Fig. 1 plots Taiwanese real consumption per capita and real GNP per capita over the period 1952–1997.<sup>1</sup> Real GNP per capita grew at an average rate of 6.5% per annum over the 1976–1996 period, while annual real consumption per capita growth averaged 6.8% over the same period. Gross national savings averaged 31% of GNP over this time (CEPD, 1999). The Current Account/GDP ratio was positive in every year but 1980 over our sample period, and averaged 6.25%, showing that the country as a whole was saving over this time period.<sup>2</sup>

Consumption growth per capita was positive in every single year over the period shown. This provides strong evidence against Hall’s (1978) martingale hypothesis of consumption. In this model, a rational, optimizing, consumer in the absence of credit market restrictions will choose to smooth consumption over his or her life-cycle. Consumption growth in this model can only occur if the real interest rate  $r$  differs from the rate of subjective time preference  $\delta$ . Hall (1978, p. 974) shows that consumption then obeys the exact regression

$$C_{t+1} = \frac{\bar{C}(r - \delta)}{1 + r} + \frac{1 + \delta}{1 + r} C_t - \varepsilon_{t+1}, \quad (1)$$

<sup>1</sup> Note that Taiwan continued to grow during the Asian Financial Crisis, with GDP growth slowing to 4.6% in 1998, before returning to 6% growth in 1999.

<sup>2</sup> Calculated from various years of *Financial Statistics Monthly, Taiwan District, Republic of China*, Economic Research Department, The Central Bank of China. In 1986 the current account surplus actually reached 20% of GDP.

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