



Portfolio choice and asset prices when preferences are interdependent



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ARTICLE INFO

Article history:

Received 19 July 2016

Received in revised form 17 January 2017

Accepted 31 May 2017

Available online 10 June 2017

JEL classification:

D51

D91

E20

G12

Keywords:

Asset pricing

General equilibrium

Heterogeneous investors

Interdependent preferences

Portfolio choice

ABSTRACT

This paper studies the implications of interdependent preferences for investors' portfolios and the dynamics of asset prices. Individual preferences are interdependent because they depend on other people's consumption and, thus, change over time. In equilibrium, investors herd and hold the same portfolio of risky assets, which is biased toward stocks of sectors that produce a socially preferred good. Price-dividend ratios, expected returns, and return volatility are time-varying, and their dynamics are directly linked to changes in preferences. These results hold even in economies with very simple ingredients, such as logarithmic preferences, and are in stark contrast with those obtained in standard models where preferences are not interdependent.

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1. Introduction

Traditional economic analysis stems from the assumption that individuals' preferences are exogenously given and remain unchanged over time. Conversely, I assume that preferences are interdependent and change over time as a function of other people's consumption. The idea that individual preference change over time in reaction to other people's consumption choice

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¹ I would like to thank Julien Hugonnier for his continual support and advice throughout this work. I also thank two anonymous referees for their extremely helpful comments, Tony Berrada, Nicole Branger, Andrea Buraschi, Enrico De Giorgi, Jérôme Detemple, Pierre Collin-Dufresne, Diego Garcia, Alessandro Giorfré, Martin Herdegen, Yigitcan Karabulut, Leonid Kogan, Matti Keloharju, Holger Kraft, Marco Pagano, Roberto Marfé, Claudia Ravanelli, Jacob Sagi, Christian Schlag and David Solomon for stimulating discussions and suggestions. All the participants to the 33rd French Finance Association Conference, the 2nd Research in Behavioral Finance Conference, the Spring 2016 Conference of the Multinational Finance Society, the 2016 Annual Meeting of the Academy of Behavioral Finance and Economics, the XXIV Rome Conference on Money Banking and Finance, the VI workshop on Strategic Interaction and General Equilibrium: theory and applications, the XXI Finance Forum and the 2012 Gerzensee doctoral workshop are gratefully acknowledged. Ilya Dergunov provided excellent research assistance. All errors are my own. I gratefully acknowledge financial support from the Research Center SAFE, funded by the State of Hessen initiative for research LOEWE. Previous title: Preference evolution and the dynamics of capital markets.

is already well established in the economic literature (Pollak, 1979; Bell, 2002), but its implications for the dynamics of the financial market have never been investigated.

Motivated by this observation, I incorporate preference interdependence into a Lucas-type exchange economy and characterize its implications for agents' trading strategy, asset prices and return dynamics. There are two categories of agents, conformist and anti-conformist, both equipped with separable log utility over two consumption goods and a time-varying preference attached to each good. The preferences of conformist agents evolve in favor of fashionable consumption goods, while the preferences of anti-conformist agents evolve in favor of out-of-fashion consumption goods. Despite the assumption of log utility, the interaction of preference interdependence and standard market forces of pure-exchange economies generates equilibrium dynamics of portfolios and asset prices that markedly differ from those of an economy with standard log-linear preferences over multiple goods. First, fashion waves in the demand of consumption goods are transmitted to the financial market and agents in my economy show a bias toward the stocks of companies (or sectors) that produce the socially preferred good. The preference for popular stocks implies that financial wealth fluctuates across sectors irrespective of expected returns and Sharpe ratios. As a result, there are regions of the state space in which expanding sectors have the lowest expected returns/Sharpe ratios, which is in line with the empirical evidence of Bansal et al. (2005). It is worth mentioning that it is not so straightforward to characterize the effect of interdependent preferences for optimal portfolios. In fact Cass and Pavlova (2004) show that in a pure-exchange economy with multiple consumption goods and log utility, financial markets are incomplete even if there are as many sources of risk as risky assets. In this perspective, my paper offers a technical contribution and shows that when preferences are interdependent, financial markets are complete even if investors are equipped with log utility over multiple consumption goods.

Concerning aggregate quantities, preference interdependence implies that price-dividend ratios and expected stock returns vary non-monotonically with the popularity of consumption goods. Stock returns and return volatility fluctuate over time due to the time-varying perception of consumption risk induced by conformist and anti-conformist behavior. Conformist agents dislike states of the world where it is relatively difficult to imitate the consumption basket of other agents. This happens when one of the two consumption goods becomes extremely popular and all conformist agents desire to buy that good. Therefore, when the majority of agents in the economy are conformist, the equity premium and the return volatility are high when one of the two goods becomes more popular relatively to the other. Vice-versa, anti-conformist agents dislike states of the world in which it is relatively difficult to make non-conformist choices which allow for differentiation from others. This happens when the two goods have similar popularity. Therefore, when the majority of agents are anti-conformist, the equity premium and the return volatility are high when the two goods are equally popular among agents in the economy.

This paper is related to the literature describing asset-pricing models with multiple risky assets. Cochrane et al. (2008) consider an economy with two stocks and log-preferences when dividends are driven by geometric Brownian motions. Martin (2013) studies the general case of $N \geq 2$ stocks and power utility. Branger et al. (2011) analyze an economy with two stocks, log-preferences and stochastic drift for one of the two stock. Chabakauri (2013) considers the case of two stocks, power utility and portfolio constraints. These papers are characterized by a single consumption good whose supply is determined by the sum of all dividend payments and, therefore, investors do not trade goods but only financial assets. Non-trivial implications follow by introducing trade in goods and preference interdependence. Indeed, when preferences are interdependent, the relative price of available goods depends not only on their supply, as customary in multi-good economies, but also on the time-varying aggregate preference for consumption goods. Because of its effect on the relative price of consumption goods, time-variation in aggregate preferences alters the composition of the agents' consumption basket and, thus, their desire to smooth consumption over time. As a result, agents modify their holdings of risky assets to offset changes in their consumption basket induced by time-variation in aggregate preferences. In summary, this paper shows that a simple modification of the standard multi-good economy, that accounts for interdependent preferences, can generate complex dynamics of asset prices and portfolios that stand in contrast with standard multi-good models based on log-linear preferences where price-dividend ratios and return volatility are constant over time and optimal portfolios are not defined.

The rest of the article is structured as follows. Section 2 deals with the background assumptions and provides a review of the empirical evidence of interdependent preferences. Section 3 describes the primitives of the economy, the financial market and investors' preferences. Section 4 presents the competitive equilibrium. The quantitative implications for stock prices, portfolios and returns are analyzed in Section 5. Section 6 concludes.

2. Motivation and economic background

Consider the standard model with log linear preferences over two consumption goods:

$$U(c_1, c_2) = \alpha \log(c_1) + (1 - \alpha) \log(c_2) \quad (1)$$

where c_1 and c_2 represent the two consumption goods and α is a constant that captures preferences for the two consumption goods. This specification is popular in two-country models (see Zapatero, 1995 and Pavlova and Rigobon, 2007 among others) where c_1 and c_2 represent consumption of home and foreign goods and α is selected to capture home bias in consumption. The key novelty of my approach is to make α time-varying. I assume that α is heterogeneous across agents and, for each agent, depends on other people's consumption. The dependence of α from other people's consumption implies that preferences are

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