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Tracing financial innovation diffusion and substitution trajectories. Recent evidence on exchange-traded funds in Japan and South Korea

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ABSTRACT

Since the rapid growth of the popularity of ETFs, the potential substitution between innovative financial products, exchange-traded funds (ETFs), and traditional investment funds (open-end and closed-end funds) is recognized as one of the most-discussed issues in the financial industry. This is the first study to empirically verify and compare the diffusion and substitution of ETFs using monthly data on their assets in two selected countries. The main aim of this paper is to provide in-depth insights into the development of innovative financial products available in two Asian economies: Japan and South Korea. The empirical study uses monthly total net assets data for 2004–2017. Our methodological framework combines models of innovation diffusion and technological substitution. The results reported in the study show that in both countries the diffusion of ETFs has occurred. The rate of diffusion and the phase of growth reached differed – in Japan the ETF market was in the early exponential growth stage, whereas in South Korea it was closer to achieving the expected maximum saturation. The results of the substitution analysis between the largest category of the innovative funds – equity ETFs and equity open-end funds clearly demonstrate that the process of “switching” from equity open-end funds into ETFs may be easily traced in both countries. Substitution processes were, however, gradual and reversals of the trajectories were noticed.

1. Introduction

Exchange-traded funds (ETFs) are recognized financial innovations and they are pervasively impacting and transforming financial markets (Agapova, 2011, Deville, 2008, Gastineau, 2010, Hill et al., 2015). They are easy to use and have rapidly gained growing popularity among investors (Ferri, 2009; Gastineau, 2010; Madhavan, 2016) – they have become competing products for well-established, traditional investment funds, i.e. open-end and closed-end funds. Until recently, due to highly similar investment aims and groups of users, ETFs were mostly considered substitutes for only one type of traditional funds – index funds. The increasing popularity and complexity of the available ETFs has led to growing interest among various participants of financial markets. ETFs are now compared not only to index funds but also to other types of traditional funds, e.g. active funds. The discussion of the relative benefits of ETFs versus other types has over the last few years been one of the key debates in the investment industry and financial research.

Dynamics of the diffusion of ETFs and substitution between ETFs and traditional investment funds constitutes a new research field – the evidence is scarce and fragmented. Moreover, the only previous research of this type which covered Japanese and South Korean ETF

markets (Lechman and Marszk, 2015), due to limited data availability, was conducted using annual observations which do not fully capture the trajectory of these processes, and did not include substitution analysis. Moreover, it did not analyse in detail the changes on those markets. Our calculations are based on more recent monthly data and values at country level are aggregated using individual fund-level data (for several thousand funds). Therefore, they show accurately the cumulated size of selected categories of investment funds in both countries. Apart from open-end funds, we consider also closed-end funds as alternatives to ETFs which were omitted in the previous research on the diffusion of innovative funds.

Fast spread of financial innovations has been observed in Asian countries and therefore this analysis covers Japan and South Korea, which are both countries with rapidly growing size of the local ETF markets (other Asian ETF markets are rather unique (e.g. Hong Kong) or much smaller (e.g. India)). This allows the comparison of diffusion and substitution trajectories of innovative financial products in two economies – one of them, Japan, being among the world pioneers in terms of the ETF's inception (first ETF was launched in 1995 – Japan was the first country outside North America with the ETF market), and second, South Korea, which initially lagged behind but later

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experienced very dynamic expansion of the innovative funds. We also trace financial substitution effects between ETFs and their open-end funds counterparts in the oldest, and at the same time, the most significant category of ETFs, i.e. funds based on equities.

As suggested in the literature, ETFs may influence financial systems in various ways and impact their stability (Foucher and Gray, 2014; Kosev and Williams, 2011), causing or magnifying some threats to the financial stability of particular sectors (at micro level) or entire system (at macro level); we therefore discuss the key issues, and evaluate their relevance for Japanese and South Korean financial systems.

Significance of the research on ETFs may also be framed in the more general context of innovations introduced in the financial system in the recent years, usually inextricably linked with adoption of information and communication technologies (ICT). Key recent system-broad innovations facilitated through the technological change in the financial industry include concepts such as the broadly discussed FinTech (Financial Technology) or cryptocurrencies (e.g. most acknowledged bitcoin), as well as relatively less recognized RegTech (new technologies used to meet increasingly complex regulatory requirements).

Innovations may be observed in all parts of the financial system but some of the most evident were introduced in the banking sector. They include, inter alia, electronic payments, mobile and online banking services for retail customers, processing of financial transactions through electronic systems, and online corporate banking services (Diaz-Rainey et al., 2015). The backbone of many modern financial innovations is big data which means that the daily operations of growing number of financial institution are based on databases gathered each day from varied resources (Chauhan et al., 2017). Another important recent financial innovation (linking in fact new developments in financial institutions and on financial markets) is robo-advisors, i.e. highly automated advisory services (with very limited human interaction) which support investment management and are available online (Hill, 2018).

Innovations in financial markets have various forms. Most importantly, they may change the ways of trading by decreasing the role of floor-based exchanges and boosting the development of electronic systems by removing some of the barriers for incumbents trying to establish such platforms. It may have profound consequences such as increased integration of capital markets (Panourgias, 2015) or new business models of the exchanges, with new categories of financial instruments available (Ernkqvist, 2015); another effect may be increased cross-listing of securities (Calamia et al., 2013). An even deeper result of technological change on the financial markets is the introduction of trading platforms in which the role of human traders is severely limited, i.e. algorithmic and high-frequency trading (HFT). The impact of these low-latency trading activities has still not been fully verified; some of the threats listed in the literature include inadequate control over such operations and risk of large and irreversible losses (Kauffman et al., 2015), or, more generally, higher fragmentation and volatility of trading (Essendorfer et al., 2015). Due to their novel features, ETFs have become one of the most prominent types of innovations in the area of both financial markets and institutions, as evidenced by their assets or turnover of their shares, especially in countries such as United States or Mexico (Kaur et al., 2017). However, despite its significance, the substitution dynamics of ETFs (in relation to comparable investment funds) had not been robustly and formally explored in the literature which substantiates the contribution of this paper. It should be added that positive feedback between different types of financial innovations may be observed, for example, robo advisers usually employ ETFs for the user's portfolio.

The main aim of this paper is to provide in-depth insights into the issues associated with the development of selected investment funds in two Asian countries: Japan and South Korea, over the period 2004–2017 (last available data are from August 2017). In this research special emphasis is put on the development patterns of ETFs, as this area is still poorly explored in empirical literature.

To ensure a logical flow in the study we define three major empirical goals:

1. To develop the diffusion trajectories of financial innovations (ETFs) and examine the dynamics of the process in Japan and South Korea;
2. To provide long-term predictions of financial innovation developments in the countries examined and to attempt to establish the possible future paths of ETF market developments in these countries;
3. To trace the unique process of substitution between equity ETFs and equity open-end funds.

In order to reach the stated aims, we first apply descriptive statistics to unveil the basic changes and trends in ETF market development between 2004 and 2017; second, we deploy a methodological framework employing innovation diffusion models, which allows for detailed analysis of ETF market development patterns, description of the past dynamics of the process, and predictions of future changes; we also use technological substitution models in order to analyse substitution between various investment funds. Additionally, we examine the impact of ETFs on the financial systems in the countries studied. With this aim, we investigate the structure of the ETF markets in the two countries analysed.

The results reported in the study show that the ETF market has been developing both in Japan and South Korea - diffusion of ETFs has occurred. One of the key factors contributing to the ETF market development was the launch of ETFs which offer investors modified returns. In Japan, ETF market development has also been influenced by the Japanese central bank. The rate of diffusion and the phase of growth reached differed in the two countries - in Japan by the end of the considered period the ETF market was still in the early fast growth stage, whereas in South Korea it was closer to achieve the expected maximum saturation. The results of the substitution analysis clearly demonstrate that the process of “switching” from equity open-end funds into equity ETFs may be easily traced in both the countries examined. Our results suggest that it is difficult to draw conclusions about the potential impact of ETFs on the local financial systems because, on the whole, ETF markets were too small to influence them significantly.

The remainder of this paper is structured as follows. The second section presents the theoretical background and explains issues associated with ETFs: their basic features, comparisons with open-end and closed-end funds, and their impact on financial systems. The third section outlines the methodological setting and the fourth presents our data sources. Section five is divided into four parts. The first of these is an overview of the ETF markets in Japan and South Korea with preliminary descriptive evidence on ETF market development. The second part discusses the major empirical results obtained from our diffusion models, the third outlines results of the substitution analysis and the fourth evaluates the impact of ETFs on the financial systems of the two countries. Section sixth concludes.

2. Theoretical background

2.1. Exchange-traded funds: basic features

Exchange-traded funds (ETFs) are innovative investment funds and in their basic form they can be defined as baskets of securities traded on a stock exchange (similar to, e.g., the shares of listed companies), usually through brokerage firms (Ferri, 2009). They were launched on the financial markets in the 1990s and 2000s and their prices closely replicate (i.e. track) the prices of financial assets, in most cases stock market indexes (Hehn, 2005). Shares (units) of ETFs can be traded during stock exchange trading hours at prices determined by the market participants. The prices of ETF shares are usually close to their net asset value.

The ETF market can be divided into two segments: primary and

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