

PRIVATE EQUITY

REVIEW

GOSS INSTITUTE OF RESEARCH
MANAGEMENT LIMITEDNATIONAL UNIVERSITY OF SINGAPORE
RISK MANAGEMENT INSTITUTE**HAITAO JIN****Qianhai Fund of Fund, LLP**Exploring the Business Model of
China's Private Equity/Venture Capital (PE/VC)
Fund of Funds (FOF) Investments**KATAHIRA MASAKI****Eastasia Investment
(International) Limited**New Findings on Japan's Capital Market:
A Study on Japan Post Group's
Successful Transformation
through Capital Market**WEI CUI, MIN DAI, AND STEVEN KOU**
**Risk Management Institute's New
Research Initiative**A Pricing and Risk Management System for
Chinese Bonds

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A MESSAGE FROM THE EDITORS

The year 2016 started with concerns about a weaker global growth; hard landing of Chinese economy, uncertainty of European policies, and expectations surrounding repricing of Federal rate hikes. The development of global economy continued at an unsteady pace in the first half of this year, given slow growth rates in major economies. Most of the developed economies still remain weak with low potential growth rates. The outlook on emerging markets and developing economies are different and more uncertain. During the second half of 2016, the world economy experienced two shocking events, the U.K. leaving the EU and Donald Trump winning the presidential election, both of which led to high volatilities in the financial market.

The global economy is facing more challenges and uncertainties in recent years. Especially in 2016, international political situations, which have a deep impact on the world economy, have become even more unpredictable. Private equity (PE) investors are exploring new investment opportunities, and researchers from academia are focusing on more effective risk management methods. For investment practitioners and researchers, the most important theme in 2016 is making appropriate investment decisions in light of the global economic downturn. In this regard, the Private Equity Review (PE Review) provides PE firms with approaches and measures to make more informed risk management decisions in the volatile market environment.

The third issue of PE Review includes seven articles devoted to the fields of private equity and financial risk management. In this issue, we have four sections consisting of Cover Article, Academic Insight, Case Study, and Column.

The cover article by Haitao Jin, the Chief Executive Partner of Qianhai Fund of Funds, is based on business model of renminbi (RMB) PE or Venture Capital (VC) fund of funds (FOF). China's commercial PE/VC FOF is still in the initial stage. As the first commercially funded large-scale FOF, recently Qianhai FOF has been successfully launched with total assets of 21.5 billion yuan. The article explores the business model of Qianhai FOF, which is also a new model of PE/VC FOF in the Chinese market. In the Academic Insight section, we have a contributing article by Katahira Masaki, the Chief Executive of Eastasia Investment (International) Limited in Japan. The article interprets the details of Japan Post Group's Initial Public Offering. The company used to be a Japanese state-owned conglomerate, which was divided into three units and went public last year. The article shares new findings of Japan's capital market through the successful transformation of Japan Post Group.

This issue also features two case studies focusing on China's auto consumption and telecom media technology industries. The first article, by Yankun Hou of UBS, talks

about the China's auto consumption and sales industry and analyzes the possibility of future investment from PE firms in this industry. Mr. Hou thinks that PE firms will continue to invest in China's auto consumption and sales industry, especially repair and maintenance, used car, and auto retail finance segments being the highlight. The second article, by Alex Yang, Partner of Beam Capital and Shu Yang, School of International and Public Affairs (SIPA) Master's candidate at Columbia University, aims at the quantitative approach for VC funds in Telecom Media Technology. In addition to the approach, the article lists a few examples that show how to use multi-dimensional data on sourcing deals and how to evaluate target companies using this data.

Finally, in the Column section, we have a research article based on a new research initiative that the Risk Management Institute (RMI) of National University of Singapore (NUS) is undertaking, starting in 2016. The initiative focuses on developing a pricing and risk management system for Chinese bonds based on previous research by Wei Cui of National Interbank Funding Center along with Min Dai and Steven Kou of NUS.

With the third issue of PE Review, we endeavor to provide our readers with valuable information as well as academic innovations and various perceptives on analyzing data. We hope to encourage widespread interests and discussions on the fields of PE investment and risk management. As we endeavor to improve the rigor of the publication, we hope to provide you with more valuable insights. Finally, We look forward to hearing from our readers, so please do not hesitate to contact us if you have any comments about the PE Review.



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Exploring the Business Model of China's Private Equity/Venture Capital (PE/VC) Fund of Funds (FOF) Investments

Haitao Jin, Chief Executive Partner of Qianhai Fund of Funds LLP

The financial environment and the basic purpose of a Fund of Fund (FOF) is different in China from that in the United States. The legal and personnel system of China's venture capital industry is still in the early stage. FOF fund managers play an important role in promoting the development of the industry, which requires different skills and strategies from their western peers. Obviously, China needs to develop an FOF industry with its own characteristics.

(Christopher Lane Davis, China Venture Capital Yearbook, 2011)

Private equity (PE) fund of funds (FOF) originated in the United States. After decades of development, its business model has been widely accepted by investors in the U.S. and European markets. The U.S. FOF is designed to meet the demands of portfolio diversification from institutional investors, who usually manage a huge pool of financial assets. Enjoying a higher potential rate of return as well as a more independent value system than other investments, PE/VC investments help enhance the overall yield of the portfolio and reduce risks at the same time.

China's PE FOF originated from government guided fund. In order to promote the country's scientific and technological innovation, support the development of small medium enterprises (SME) and accelerate economic restructuring, the central and local governments guide and set up a large number of government guided FOFs.

In comparison, China's commercial PE/VC FOF is still in the initial stage. Actually, FOF fund managers have presented a number of PE FOF business models with distinctive features to adapt to China's market environment, but no mainstream model has been formed yet. Recently, Qianhai FOF, the first commercially-funded large-scale FOF, has been successfully launched, with an asset under management (AUM) of 21.5 billion yuan. The success is largely attributed to the fund's innovation in business model, which has important reference value to the future design of China's FOF.

I. The Development of PE FOF in China

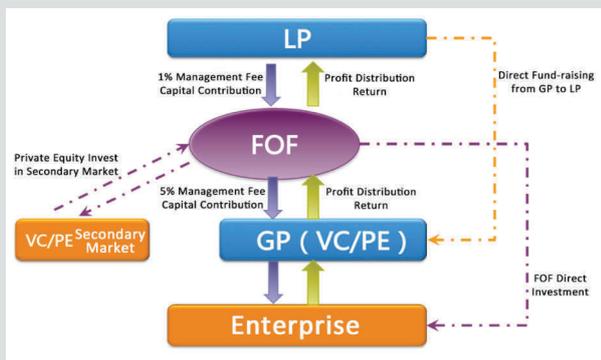
FOF is a fund structure, which can be divided into Fund of Mutual Funds, Fund of Investment Trust Funds, Fund of Hedge Funds (FOHF), and Private Equity Fund of Funds (PE FOF).

PE FOF specializes, but indirectly engages, in PE investment by holding shares of other funds. By investing in different types of private equity funds, PE FOF can achieve diversified portfolio. These days, by developing and diversifying, FOF is also involved in direct investment in enterprises, stocks or bonds. For a summary of PE FOF's operation mode, please refer to Figure 1 on page 2.

In general, PE FOF has three kinds of investment methods:

- a. Primary Investment (Sub-fund Investment): refers to the investment FOF makes during PE/VC's collect period. Primary investment is the original business of FOF. Since the PE/VC fund is newly established, with no track record of performance, FOF mainly evaluates the fund manager's team instead of their portfolio or strategies.
- b. Secondary Investment: refers to the investment FOF makes in the secondary market of PE. There are two forms of such investment; one is buying existing units and/or newly issued units of the PE fund, and the second is buying the equity portfolio held by the PE fund. There are three main reasons to carry out secondary investment: i) enjoy price

Figure 1. The operation model of PE FOF



Source: Baidu Wenku

discounts to help increase profitability; ii) shorten investment period to accelerate money payback; and iii) invest in known portfolio to get a reasonable estimate of the value and control risk.

- c. Direct Investment: refers to the fact that the FOF directly invests in target company's equities. In practice, FOF usually makes co-investment with the PE fund that the FOF has already invested in.

For investors, the advantages of investing in PE FOF include:

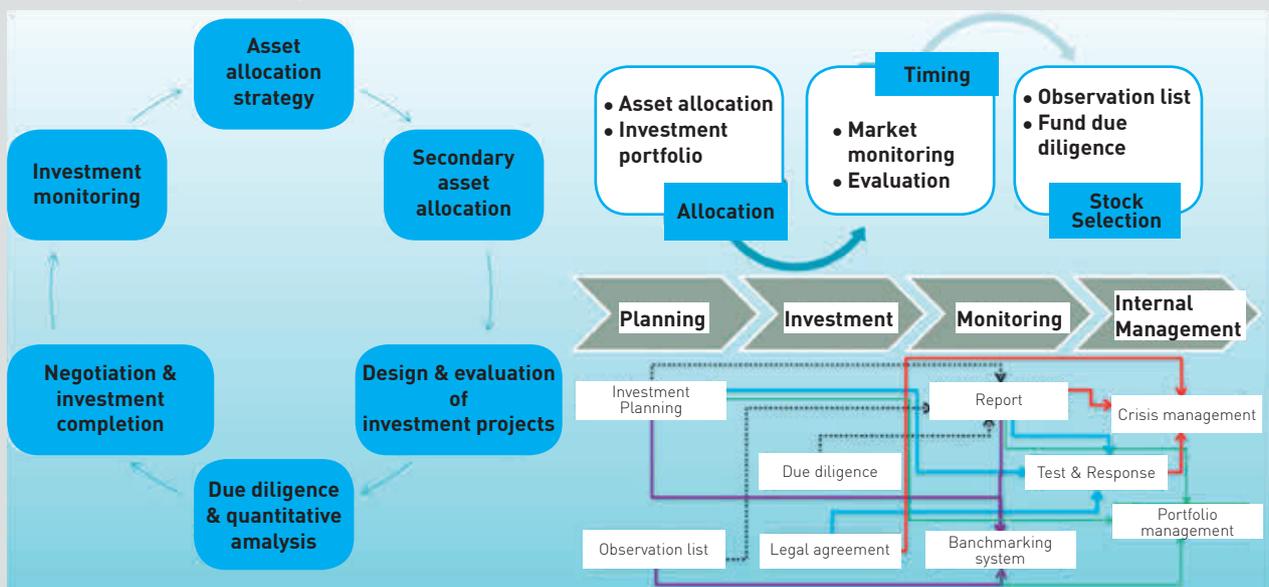
- a. Risk Diversification: FOF usually invests in 15 to 25 PEs, which avoids the single investment risk of a particular PE manager.
- b. Professional Management: FOF has comprehensive knowledge, contacts, and resources on PE investment, which is more likely to allow the FOF to

make the right investment decisions as compared to other investors.

- c. Investment Opportunities: in most cases, outstanding PE funds are usually oversubscribed, so it is quite hard for normal investors to get a unit and enjoy those excellent investment opportunities. However, FOF, as a professional PE investor, usually has good and long-term relationship with PE funds, so it has more opportunities to invest in them.
- d. Bargaining Power: FOF has more power than normal investors in terms of investment areas, contract terms, etc. FOF has a stronger bargaining power on price, has access to some of the areas with investment barriers, and thus can get more favorable investment terms.
- e. Cost and Scale: taking into account salaries, transportation, and other administrative costs, small and medium investors can achieve more cost-effective results by investing in FOF than building their own PE investment team. Investors' funds are often too big or too small to carry out a suitable investment, while FOF can solve this problem by 'scaling up' or 'scaling down' the investment size.

PE FOF's asset allocation process generally includes asset allocation, portfolio management, fund due diligence, legal provisions negotiation, investors' rights upholding, post-investment management, risk management, portfolio rebalancing, and other aspects, all of which form a complete system (please see Figure 2).

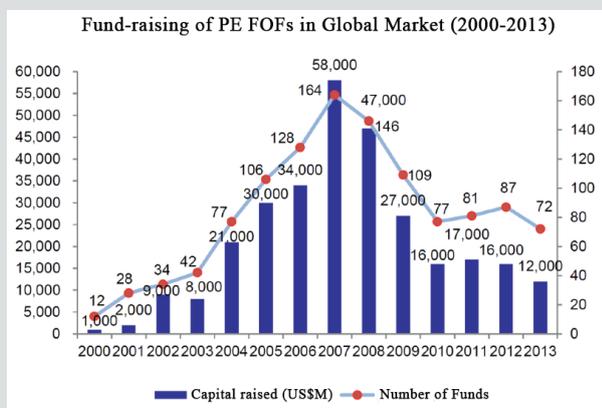
Figure 2. The asset allocation process of PE FOF



Source: Promise Advisors

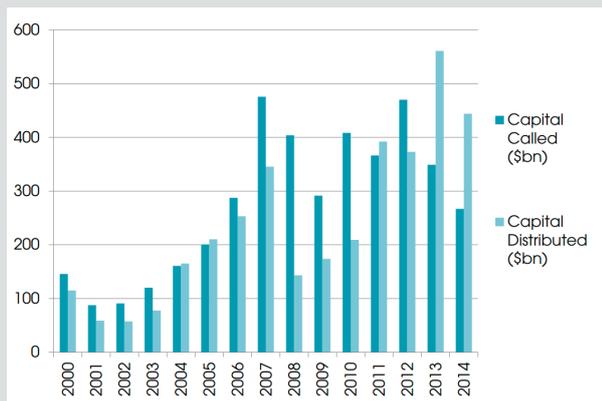
Since the 21st century, PE FOF has experienced explosive growth. According to the data from Preqin, the leading source of data and intelligence for alternative assets industry and the authoritative international equity research firm, the number of FOF funds rose from 12 in 2000 to 164 in 2007 (Preqin (a), 2014). From 2007 to 2013, FOF suffered a downward trend due to the financial crisis that occurred in September of 2008. On the contrary, the global capital raised by PE remained relatively stable, after peaking in 2007 and briefly declining afterwards. The contrast between PE FOF and PE shows that FOF has entered a transition phase in the global markets.

Figure 3. Fund-raising of PE FOF in global market (2000-2013)



Source: Preqin (a)

Figure 4. Preqin performance analyst: All private equity - annual amount called and distributed (2000-2014)



Source: Preqin (b)

PE FOF emerged when PE/VC market had developed to a certain stage. Since 1998, the introduction of the Eleventh Five Year Plan, with innovation as its core value, had significantly promoted the development of VC trend in China. China PE/VC industry began to grow. On 15 November 2005, the National Development and Reform Commission (NDRC), Ministry of Science and Technology (MOST), and the other eight

ministries jointly issued the 'Interim Measures on Venture Capital Enterprises Management' to optimize the external macro environment for PE/VC. The shareholder structure reform as well as the restart of initial public offering (IPO) as an exit channel, sped up the development of PE/VC industry. A number of domestic PE/VC institutions began to emerge, including Shenzhen Capital Group (SCGC), PKU-HKUST Shenzhen-Hong Kong Institution, Fortune Capital Management Ltd., etc. In 2009, the China Securities Regulatory Commission (CSRC) officially launched the growth enterprise market (GEM), the best channel for PE/VC to exit, further promoting the fast development of the industry.

With the rapid development of PE/VC industry, renminbi (RMB) PE FOF also quietly developed in China. At present, there are three main types of RMB FOF: government guided FOF, state-owned enterprises (SOE) funded market-oriented FOF, and private-capital-funded market-oriented FOF.

The first type is government guided FOF, which is the original form of RMB PE FOF in China. In 2008, the NDRC, Ministry of Finance, and Ministry of Commerce (MOFCOM) jointly issued the 'Guidance on the Establishment and Operation of Guided Venture Capital Funds' (hereinafter referred to as "guidance"), pointing out, "As policy funds, guided VC funds are established by the government and operated in a market-oriented manner, aiming to support the development of startups and venture capital businesses by guiding social funds into these areas. Guided funds themselves are not directly involved in the venture capital businesses" (National Emblem, 2008). According to the data from www.pedata.cn (under Zero2IPO Group), as of March 2015, government guided funds accounted for 74.8% and 63.4% of total PE FOF in China, in terms of funds number and investable amount respectively. In 2015, local governments were required to revitalize their idle financial capital, which made government guided funds an important channel for capital marketization. As a result, government guided funds achieved geometric growth. The size of a single fund expanded dramatically from several hundred million dollars to billions, and even tens of billions in some developed areas.

The second type is SOE-funded market-oriented PE FOF. As the representative of this type, Guo Chuang FOF, the first market-oriented large-scale RMB FOF, was jointly established by CDB Capital Co., Ltd (a wholly-owned subsidiary of China Development Bank (CDB)) and Suzhou Oriza Holdings Co., Ltd. in December 2010, with a total fund size of 60 billion yuan. The establishment of Guo Chuang FOF marked

an important step in the domestic PE FOF industry, especially in terms of scale and marketization. Since then, represented by E-Town Capital, Chengdu Yinke Venture Capital Ltd., and Guangdong Technology Financial Group Company Ltd., a batch of SOE-funded FOFs were successively set up. FOF scale kept expanding and the industry became more sophisticated. For this type of FOF, the source of the fund is mainly from state-owned capital, while fund management level is usually in mixed ownership. Compared with the non-profit government guided FOF, this SOE-funded FOFs profitability and degree of marketization have been further improved.

The third type is private-capital-funded market-oriented RMB PE FOF. The typical representatives include Noah's Gopher Asset Management, Heavensent Capital Management Group Co., Ltd, and CGP Investment (Holdings) Ltd. This type of FOF is mainly funded by private limited partners (LPs), so the investment preference and strategy must be differentiated.

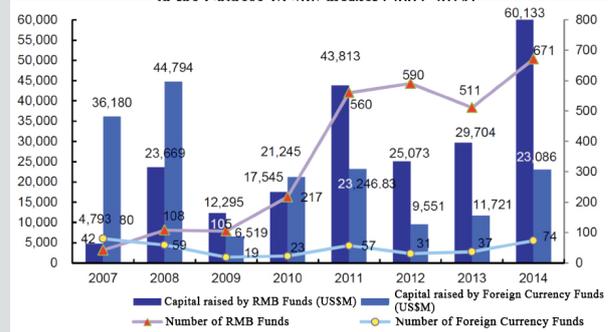
II. The Bottleneck of Large-scale Commercialized FOF's Business Model

Since 2008, with the rapid development of domestic private equity industry, the related legal and regulatory system has also been gradually improving. As a branch of private equity investment fund, FOF has cleared major obstacles in legal and regulatory aspects. In recent years, with the diversification of exit channels, the gradual opening-up of banks and insurances' investment in PE, and the growth of RMB PE/VC funds' quantity and amount (see below), PE/VC industry has gradually become an important investment area for large domestic institutional investors, which provides a good environment to cultivate large-scale commercialized PE FOF. At present, China's FOF industry is still in its infancy. The market competition is not sufficient, so the first batch of FOFs can enjoy the first-mover advantage, to get the best general partners' (GP) resources and the most favorable negotiation conditions.

Currently, private commercial FOF is mainly funded by small to medium size investors because its business model is not attractive to large institutional LPs, who usually require a higher return on their investment. As a result, it is quite difficult for private commercial FOF to expand the scale without large institutional LPs.

First, the double charging mechanism of FOF's business model has been widely criticized by LPs. Investing in PE/VC sub-funds through FOF, LPs need to pay an additional 1% management fee and 10% performance fee, which harms their returns. Especially for large institutional LPs, who not only

Figure 5. The fund-raising comparison between RMB & foreign currency funds in the Chinese VC/PE market (2007-2014)



Source: Zero2IPO [a]

have the experience in investment management and risk management, but also the bargaining power with PE/VC sub-funds, and the ability to hire a third-party to carry out screenings and due diligence. The value of a FOF, that just plays a role in asset allocation and risk diversification, is significantly reduced.

Second, lack of liquidity and short-term returns is another issue. Mainly investing in shares of PE/VC sub-funds, FOF has a longer investment period than that of PE/VC sub-funds themselves, which is generally over 10 years. On the other hand, the domestic PE secondary market is not active, known for bad liquidity, which makes it hard for LPs to achieve real cash returns in a short period of time. What's more, when doing a cash exit, FOF will not distribute profits to LPs until it gets the principal back, leading to LP's difficulty in recognizing the investment return in the short term. Institutions like insurance agencies, listed companies, and private enterprises, usually have the pressure to show their investment gains in the short term, so they tend to choose other investment channels with faster earning recognition mechanism.

The third issue is regarding returns and risks. In addition to the double charging mechanism, the dispersion of allocating assets in various types of sub-funds also hurts FOF's expected return rate, which is usually lower than that of direct investments in those sub-funds. As for risks, FOF's investment in sub-funds totally depends on its GP's ability to manage risk, with no collateral or guarantee. Domestic FOF and its GP team generally has a short operating history, so the lack of track record makes it difficult for LP to judge their ability on returns and risks.

The above issues highlight the developmental differences between government-guided FOF and commercialized FOF. The innovation of the business model is the key for commercialized FOF to solve the developmental gridlock.

III. Exploration of the Business Model of Qianhai FOF

Qianhai FOF, LLP is a large-scale commercial FOF, established according to the spirit of the 'State Council's Approval on the Support of the Opening-up of Shenzhen Qianhai', which mentions the establishment of Qianhai Equity FOF.

To address the above issues, Qianhai FOF created a brand-new business model, combining sub-fund investment and direct investment together, to avoid double charging issue and improve yield and liquidity. FOF's overall investment strategy is to pursue low-risk but high-return investments, mainly participating in high-quality venture capital and private equity funds investment, with direct investment and short-term investment as a supplement. First, on behalf of investors, FOF selects the most outstanding fund managers for equity investment. Meanwhile, within the invested portfolio, FOF further selects the best projects for direct investment so as to achieve higher returns. Second, by structuring the allocation in such an innovative way, the portfolio can enjoy short-term flexibility, creating a smooth and sustained cash flow for investors, thus to achieve a balance between yield and liquidity. Third, with no double charging burden, investors have no extra cost to invest in FOF.

The key to achieve the above is to form a stable source of direct and short-term investment projects by investing in outstanding sub-funds. Through such investment, FOF can improve the returns, which can then be used to cover the cost of investing in sub-funds, and finally eliminate double charging. This requires not only the ability to select the best sub-funds, but also the ability to try direct and short-term investment. Therefore, the GP team of Qianhai FOF has more experience in direct and short-term investment than in PE FOF.

Mr. Jin Haitao, the Managing Partner of Qianhai FOF, is in charge of the executive team. Qianhai's institutional partner is Shenzhen Capital Group Co., Ltd, the leading domestic venture capital institution for many years. Joint partners include the current leaders in financial and investment industry, such as Mr. Weihua Ma, the former Executive Director, President and CEO of China Merchants Bank Co., Ltd.; Mr. Neil Shen, Founding Managing Partner of Sequoia Capital China; Mr. Hugo Shong, Founding General Partner of IDG Capital; Mr. Wei Li, Managing Director of Green Pine Capital Partners; Mr. Gavin Ni, Founder, Chairman, and CEO of Zero2IPO Ventures, the leading VC and PE investment services company in China.

In addition, taking into account the rapid development and the huge scale of government guided FOF, Qianhai FOF designed its business model with the purpose of

giving full access to both the commercial FOF and the government guided FOF. This way joint investment and complementary advantages can be realized. Qianhai FOF has a well-designed capital structure with state-owned as well as private capital to ensure investors' requirement on both guided and market-oriented investment, in order to achieve multiple objectives from governments and social investors. The capital structure of Qianhai FOF is in mixed ownership format, with state-owned capital forming the core while private capital forming the majority. Government and state-owned capital's core role in the capital structure helps Qianhai FOF in policy-based project investments, while social capital's majority position is in favor of market-oriented operation. This design is conducive for Qianhai FOF to build partnership with various government guided FOFs.

Founded in December 2015, Qianhai FOF has raised 21.5 billion RMB and is the largest commercial FOF as well as the single largest VC and PE fund in China. Qianhai FOF has gathered the most talented, influential, and resourceful LPs, including four categories: government, insurance and financial investment institutions, well-known enterprises, listed companies, and successful entrepreneurs. Qianhai FOF's success to raise funds commercially shows that its business model has been widely recognized by large institutional LPs.

Qianhai FOF mainly invests in the following five types of projects: PE/VC sub-funds, innovative hybrid funds of equity and project-based investment, direct investment and selective co-investment, PE secondary market investment, and short-term return investment.

1. PE/VC Sub-funds

This fund type includes: integrated equity funds, government guided funds, specialized equity funds, stage investment funds, and industry buyout funds.

a. Integrated Equity Funds

Integrated equity funds refer to the funds not limited to a specific investment area. There are three criteria for selecting sub-funds: First, invest in a sub-funds with unique investment philosophy; second, invest in the sub-funds with high market reputation and good historical performance; third, invest in the sub-funds with industrial background, which can bring operational synergies. Representatives of integrated equity funds include those leading renowned institutions, such as Sequoia, Shenzhen Venture Capital, IDG, Fortune Capital, Green Pine Capital Partners, Cowin Capital, Hony Capital, CDH, NewMargin Ventures, Legend Capital, and Gold Stone, etc.

b. Government Guided Funds

Government guided funds are based on government capital, and supplemented by private capital and are managed by professional investment institutions. This type of fund not only reflects the intention of the government's guidance, investing at a particular stage or in specific industries or regions, but also delivers the rational and market-oriented investment principles through the management by professional investment managers. Government usually gives away part of the profits to the fund, sometimes even all the profits except the priority claim rights in liquidation. Government can also recommend quality projects for the fund, along with providing good services and introducing more private capital into the companies it's invested in. Although government guided funds are limited on investment regions, fund investors are able to get excess returns through negotiation with government on other investment restrictions.

c. Specialized Equity Funds

Specialized equity funds focus on a particular field of equity investment, with fund managers specializing in this professional field. The objective to invest in this type of fund is to improve the accuracy and success rate of investment. Specialized investment is the development trend of equity investment industry. Representatives include the consumer fund of Tiantu Capital Co., Ltd, the biology fund of Hotland Innovation Asset Management, etc.

d. Stage Investment Funds

Stage investment funds focus on investing in a particular stage of a project. The objective is to allocate the cash flow in a reasonable way. According to the different preferences of investors, investment portion on different stages can be structured: investors pursuing high-risk and high-return should invest in projects at relatively early stage, whereas investors pursuing low-risk and stable-return should invest in projects at relatively late stage. Classified by investment stage, these funds include angel funds, VC funds, early-stage funds, mid-late stage funds, pre-IPO funds, etc.

e. Industry Buyout Funds

Industry buyout funds are divided into two types. First, non-specific purpose buyout funds, not serving a particular company or organization, just uses buyout as an investment exit channel. Second, specific purpose buyout funds, jointly funded and managed by a listed company and VC funds, carry out buyout activities to serve the mentioned listed company.

Investing in non-specific purpose buyout funds, we can achieve industrial integration and improve industrial

efficiency through the experience and resources from the management team. Meanwhile, we can strengthen the controlling and bargaining power for the funds, thereby helping investors increase capital gains.

Investing in specific purpose buyout funds, we can combine leading listed companies' insights and VC funds' resources (such as government, industry resources) to achieve effective synergies, cross-industry cooperation, and prospective research so as to boost the growth of the acquired company. The investment has multiple channels to exit, such as IPO channel and buyout channel.

Examples: the typical non-specific purpose buyout fund is Hony buyout funds, by Hony Capital Ltd., a Chinese PE firm; the typical specific purpose buyout fund is Wisdom sports & culture buyout funds established by the listed company Wisdom Sports Group and Shenzhen Capital Group.

2. Innovative Hybrid Funds of Equity and Project-based Investment

Innovative hybrid funds of equity and project-based investment include several categories: new technology and real estate funds, energy-saving operation funds, private investment in public equity (PIPE) funds, film & culture investment funds, etc.

a. New Technology and Real Estate Funds

Traditional real estate funds gain returns by selling and leasing industrial parks or science and technology parks which are designed, constructed, and managed by real estate companies. On the contrary, new technology and real estate funds have more channels to realize capital gains. Based on the understanding of technology and the industry development, PE/VC institutions work with real estate companies to integrate all the resources, study and forecast the industry trend, and make plans. All this to create a new featured science and technology park, gathering specific industries together and achieving diversification as a result. The new technology and real estate funds can make profits by selling the property, or converting property rights or rents into the equities of the tenant enterprises. Additionally, the funds can also invest in those enterprises directly to obtain capital gains.

Knowledge of specific industry is needed to design, plan, and market new technology and real estate funds. For example, to create an "Internet Town", deep understanding of internet industry as well as practitioners' habits and preferences is necessary. To create a "Culture Park", insights about intellectuals' patterns of behavior is essential. Traditional developers do not have such specific

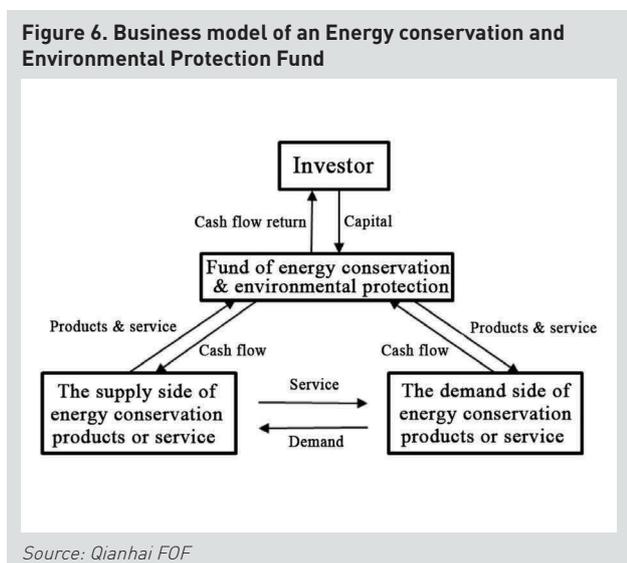
knowledge in most cases, so they need to rely on PE/VC institutions' experience and resources in the technology and culture industries. Therefore, new technology and real estate funds must be jointly established and managed by both PE/VC institutions and property developers.

The core of new technology and real estate funds is to stimulate the Industrial Agglomeration Effect. Since the funds can bring long-term economic increment, local governments are willing to give away some interests, like low land cost, in order to protect return rate of the funds and investors. On the other hand, the funds also have multiple investment instruments, such as direct investment, conversion from property rights to equity, from rents to equity, etc. At the same time, the funds can further enhance the investors' returns through financial leverage like debt financing.

b. Energy-Saving Operation Funds

Traditional Energy Management Contract (EMC) is operated by companies or by third-party operators. There are some drawbacks of EMC. First, when under a company's operation, it is very hard to expand the EMC scale due to the company's capital limitation; besides, the gains cannot be reflected forthwith because the investment period is too long. When under third-party's operation, conflicts always emerge between producers and operators, because the former's products are often divorced from the latter's real demand.

Energy-saving operation funds run as follows. The funds buy the products or services they have invested in or plan to invest in. Then, the funds are responsible for the operation. They provide products and services to the demand side, and earn revenue and returns [please see Figure 6].



The funds can fully understand the practical applications and market prospects of the products by investing in the projects they were or are going to be involved in. Therefore, they can select the right energy-saving products to operate and subsequently manage risks. The funds have strong say as they can decide whether to invest or not. They also help producers solve cash flow problems and realize profits immediately by buying the products. As a result, the funds can reduce the investment cost, to increase the returns significantly. The funds bring continuous cash flow and excess returns for investors, achieving a balance between investment return and liquidity.

c. PIPE Funds

PIPE funds specialize in the secondary market, investing in private placement of the projects that VC/PE studied and invested in before. The fund management team analyzes and evaluates the secondary market projects with PE/VC procedures and standards, exploring the reasonable valuation of the project business through past cooperative experience, deep industry analysis, and accurate future forecast. Investing in PIPE funds can enhance liquidity as well as return on the portfolio.

d. Film & Culture Investment Funds

Film & culture investment funds focus on investing in movies, TV shows, sports, and cultural projects. The funds are jointly managed by PE/VC institutions and film, media, and other project operators. The advantages are as follows:

- First, utilize the advantages of both sides to improve the success rate of investment. PE/VC institutions integrate their extensive experience in equity investment with the operation of those film and culture projects so as to manage the project risks and increase the success rate.
- Second, the short payback period creates good cash flow. The investment of cultural projects usually takes about two years to payback, which enables flexible cash flow arrangements and short-term returns.
- Third, integrate resources to improve investment efficiency. PE/VC funds have invested batches of good projects in film and culture industry, accumulating plenty of industrial and human resources, which gives them the access to numerous investment opportunities and leads to efficient and precise investment.

3. Selective Co-investment

Selective co-investment is to select the best projects within the sub-funds' portfolio and add extra direct investment into those selected projects. The procedures are as follows:

- a. Before investing in sub-funds, FOF first enters into agreements with the sub-funds that FOF has the right to co-invest certain proportions in selected projects.
- b. Upon completion of due diligence, sub-funds should invite FOF to participate in the investment into the project.
- c. When necessary, FOF will employ a professional team to evaluate the project and decide whether to co-invest according to relevant processes and standards.

The advantages of co-investment are as follows:

- First, co-investment helps LP investors to increase their return on investment. Taking advantage of the expertise of outstanding sub-funds, FOF expands the access to high-quality projects and selects from the best so as to improve investors' returns.
- Second, co-investment takes advantages of FOF GP's decision-making expertise. Engaged in frontline investment for many years, FOF GP team has extensive experience in project investment and management, which can be utilized in co-investment.
- Third, co-investment helps dilute management costs. Co-investment enjoys high return and low management costs, which helps to improve the total return of FOF and stimulates FOF GP team as a result.

4. PE Secondary Market Investment

PE secondary market investment refers to a) new investors buying equity shares of existing PE from existing LP or existing GP; or b) existing LP increases the stakes in the PE.

In the secondary market of VC/PE funds, for various reasons, a large number of GP and LP have the demand to transfer fund shares.

The reasons for LP to transfer shares include: a) optimize asset allocation; b) need cash due to capital chain tension; c) for various reasons, stop cooperation with GP; d) fund expires, do not want to renew.

The reasons for GP to transfer shares include: a) look for buyers on behalf of LP who want to sell fund shares; b) look for suitable investors; c) with good projects on hand, need to raise new funds immediately to expand the fund's scale.

5. Short-Term Return Investment

In order to design a reasonable cash flow structure according to investors' preferences, FOF usually allocates 10% to 15% of the capital in short-term return investment. Short-term return investment

implements targeted investment strategies, mainly investing in the industries and projects associated with FOF, providing value-added service to sub-funds. Short-term return investment makes short-term gains through mezzanine investment, short-term loans and supporting funds to new technology and real estate funds.

IV. The Synergy Power of Government Guided FOF and Commercialized FOF

As a result of the developing environment in China, FOF has some special characteristics, which are different from its western peers.

On one hand, government and state-owned capital will continue to be the major funding source for PE/VC industry for a period of time. Governments, by providing funds to PE/VC, can promote regional industrial development, which is expected to become an important way to revitalize their idle financial capital. The advantages of government guided funds are as follows:

- a. The large capital size helps reduce the funding cost of PE/VC
PE/VC institutions, especially small size institutions, are faced with the difficulties in fund raising and suffer from the high costs of raising this fund. The large capital size of governments can solve this problem.
- b. Wide-spread outlets facilitate resource matching, exchanging, and integrating
Government guided funds have outlets all over the country, which helps connect the funds with investment targets, facilitating resource matching, exchanging, and integrating.
- c. Government guided funds are backed by national resources, benefiting from the support of national will
Government guided funds reflect the will of the country and are backed by national resources. Therefore, the funds enjoy full support from the government.
- d. Government guided funds usually give away interests to other investors, which makes it even more attractive to PE/VC institutions

On the other hand, the advantages of commercialized FOF are as follows:

- a. The profession and philosophy is well recognized and trusted by the market
Commercialized FOF raise funds through private placement. The success of fund raising reflects the recognition and trust from all the investors.

b. Market-oriented operation with fewer policy restrictions

The biggest advantage of commercialized FOF is the purely market-oriented operation, entirely profit-oriented with no policy burden, no particular limitations on investment areas and investment scopes, which enables the full play of GP's expertise.

c. Market-oriented incentives and professional management

Commercialized FOF adopt market-oriented incentives and professional management, which helps attract and retain professional talents as well as like-minded institutional partners.

d. Stronger screening capability on investment institutions

Commercialized FOF's professional team strengthens the ability to screen good investment partners.

The complementary advantages of government guided FOF and commercialized FOF create synergies between the two parties, including: a) commercialized FOF as lead investor and government guided FOF as co-investor, jointly invest in sub-funds and projects to enhance the investment capability so as to accelerate the growth of the outstanding invested enterprises; b) share experience and project information with each other to make the industry more standardized and transparent; c) form an alliance or association, facilitating resource matching, exchanging, and integrating; d) lead and bring more social capital to participate in the emerging industries, encouraging innovation and entrepreneurship.

Qianhai FOF has pioneered cooperation with government guided funds. A large number of government guided funds and commercialized funds have also expressed a desire to invest jointly with Qianhai FOF. Preliminary estimates show that Qianhai FOF can drive hundreds of billions in capital through joint investment, and further drive trillions in capital through sub-funds investment together with loans. This will lead to the expansion of investment in emerging industries and the acceleration of growth, triggering the explosive development of China's innovation and entrepreneurship. Represented by Qianhai FOF, a large number of innovative FOF have been established, who have profound understanding of the PE/VC market in China and the capability of resource integration and innovation. With such development, China is expected to finish the construction of a qualified investors' system in two to three years. ■

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New Findings on Japan's Capital Market: A Study on Japan Post Group's Successful Transformation through the Capital Market

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Abstract: 4 November 2015 was a historic day for the Tokyo capital market, when Japan Post Group (hereinafter referred to as 'the Group'), after eight years of suffering, finally split into three companies and got listed on the Tokyo Stock Exchange (TSE). The Group had started the process of market-oriented reform since 2007, when Japan was under the administration of Prime Minister (PM) Junichiro Koizumi. Suffered from severe disputes among various parties and almost being aborted, the reform has finally achieved a breakthrough under PM Shinzo Abe's leadership, which shows Abe government's commitment and determination to open markets and promote competition. This historic move might be positive to the market sentiment index. More importantly, it proves that the capital market plays a key role in this round of economic recovery in Japan.

It is a tough reform process for the Group, a government agency, to turn into a public enterprise. The success is attributed to the government's determination as well as the powerful capital market. Although the Group has fully realized marketization, it still takes time to verify whether its previous two financial units, the post bank and the post insurance, have been enhanced, and whether its operational efficiency and market competition capability has been strengthened.

This paper is to analyze the indispensable historic role that Japan's capital market plays in Abe government's economic recovery scheme.

I. Introduction of the History of Japan Post Group

On 4 November 2015, three companies under the Group, Japan Post Holdings Co., Ltd., Japan Post Bank Co., Ltd., and Japan Post Insurance Co., Ltd. were listed on the TSE main board. Privatization of the formerly state-run postal services group began with a law enacted in October 2005 under the administration of PM Junichiro Koizumi. In October 2007, the privatization process was started. After eight years of efforts, the three companies were finally listed to become public.

Based on Koizumi's advocacy of privatization, Japan has been focusing on the implementation of postal privatization since 2000. In October 2007, the state-run postal service group, with more than 100-year old history, was divided by business classification and transformed into stock holding form, which started the privatization process. However, the transfer

of government caused a stock freeze in 2009 and the postal privatization amendment in 2012, so the privatization process became very tortuous and complex. It is really a tough process for the Group, transforming from a special government agency to an enterprise, and finally turning fully capitalized, marketized and internationalized, along with economic and social development. It is expected that the Group is likely to achieve its development strategy by means of a powerful capital market.

However, the listing is just the beginning of the Group's ultimate strategic goal. The Group has to continuously innovate its business model, business integration, cross-industry operation, and comprehensive products and services portfolio. For example, if the Group adds postal services on the basis of savings and insurance to create a new kind of universal financial service, which could help expand the service coverage

to the whole country. This reform program has yet to be defined at this stage. The original deadline to complete the privatization was end of September 2017 which was later abolished. The lack of timeline and a plan for the full privatization has created a lot of uncertainties. This urges the Group to reposition its development strategies in the future to solve this problem.

The second section of this article describes the background of the postal system, from creation to privatization; the third section discusses the disposal of non-performing loans (NPL) during the postal privatization process; the fourth section describes the background of stock listing; the fifth section describes the current status and positioning of the Group arms; the final section analyzes the future strategic direction and the government's reduction and clearance of shares.

II. The Background of Japan's Postal System, from Creation to Privatization

1. Established Time

From its inception in 1871 to becoming an enterprise in April 2003, the postal system of Japan has been operated directly by the government. The postal savings system was founded in 1875 and the life insurance system was founded in 1916, which together provide integrated social services of postal, savings, and insurance to Japanese nationals. Among them, the postal savings system copied the British model, positioning itself to raise funds for industrial development projects and playing an important role by providing small-amount savings services to nationals.

In 2003, the postal system turned itself into an enterprise, transforming into a special legal entity wholly funded by the government. The purpose was to improve operational efficiency and service quality, and to achieve fully independent accounting mechanism.

The previous Postal Savings Act regulated that postal system had the obligation to provide universal financial services, including savings, foreign exchange, etc.

2. Postal System's Privatization

After the decision of implementing a postal system reform, the Koizumi government made 'From the government to the people' as its core idea of economic and social structure reform. The three key ideas of this reform being: (1) activate and diversify the national economy; (2) improve service quality and efficiency, facilitating the nationals; (3) promote postal system privatization with minimum burden on the nationals. In October 2005, the Postal Privatization Reform Law was established. In October 2007, the Group was

transformed into a holding company (Japan Post Holdings Co., Ltd.), with four affiliated companies (Japan Post Service Co., Ltd., Japan Post Network Co., Ltd., Japan Post Bank Co., Ltd. and Japan Post Insurance Co., Ltd.), which were all shareholding companies. Thereafter in April 2012, by amending the Postal Privatization Reform Law, the Group was restructured. New Japan Post Group, with Japan Post Holdings Co., Ltd. as the holding company, Japan Post Co., Ltd. (combination of Japan Post Service Co., Ltd. and Japan Post Network Co., Ltd.), Japan Post Bank Co., Ltd., and Japan Post Insurance Co., Ltd. as affiliates. This structure could maximize the network resources of the postal system and achieve a sound and efficient operation by separating risks and audit process among the postal services, bank, and insurance businesses.

The postal privatization was regarded as the core of the reform during Koizumi's administration. The proposal went through the dissolution of parliament and got approved finally, which was a very impressive achievement of Koizumi.

Yasuhiro Nakasone, who served as PM of Japan from 27 November 1982 to 6 November 1987, advocated privatization during his administration. He promoted 'Thatcherism', the free trade and market-oriented principles pursued by British PM Margaret Thatcher. 'Thatcherism' was to privatize state-owned enterprises, relax restrictions, and reform structures to stimulate British economy. Nakasone government borrowed ideas from 'Thatcherism' and combined them with the 'Maekawa Report' (Haruo Maekawa, 1986) which promoted domestic demands. There were some successful cases where this new method was employed. For example, the state-owned railway company was transformed into privatized Japan Railway Company, tobacco company into Japan Tobacco International Pte Ltd., electric power company into NTT (Nippon Telegraph and Telephone Public Corporation), etc. Postal privatization happened against such a backdrop.

First, the primary consideration is related to economy. At that time, the postal, bank, and insurance businesses were suffering with serious inefficiency in operation as well as in capital utilization. Backed by the government, the Group absorbed huge amounts of money from the nationals and then invested it into government bonds or debts, which turned into fiscal deficit and inefficient financial investments, finally leading to a serious economic stagnation problem.

Koizumi claimed that if the three postal companies were privatized, the post bank and insurance would not be forced to entrust their funds in the Ministry

of Finance (MoF). MoF basically ran the funds with discounted interest rates, which gradually accumulated huge debts and liabilities. The amount reached over 500 billion yen under the general accounting algorithm and the burden was borne by the nationals. The postal privatization could improve the efficiency of postal administrative departments and promote the restructuring of provincial governments. The privatization would also activate fair and free competition, allow private enterprises to activate the whole economy, and finally increase the country's tax. Moreover, with the powerful functions and tools of the capital market, the privatization process could also expand the size of the companies. The estimated capital gains tax from stock trading would be more than 10 trillion yen and correspondingly also increase corporate tax and property tax revenue. Ultimately, MoF wouldn't need to rely on consumption tax and bonds issuance to enter a healthier development stage.

Second, both domestic and international political situations forced the postal system to privatize. Domestically, PM Koizumi made every effort to promote the privatization, but the internal two factions of ruling Liberal Democratic Party took opposite stance, the supportive old Tanaka faction and the opposing old Fukuda faction. At that time, backed by the postal ministers, post banks provided long-term fixed interest rate which was welcomed by depositors. This made it difficult for private financial institutions to compete and carry out deposits and loans business.

Savings in post bank systems accounted for 30% of the total individual savings in 1991. The balance amounted to 166 trillion yen by the end of 1992, about four times that of the Dai-Ichi Kangyo Bank, the top city bank in Japan. Sensing a crisis, both MoF and private financial institutions proposed to Koizumi that it is beneficial to prevent further expansion of postal savings. Based on this petition, the U.S. government suggested to Japan the spin-off and privatization of postal insurance segment. U.S. exerted pressure on Japan, aiming to promote U.S. private institutions' financial services through Japan's extensive postal network and introduce the excessive postal funds to purchase U.S. treasury bonds. Thereafter, the post bank assigned a man with Goldman Sachs background as its vice president; its holdings of foreign bonds also increased sharply.

Third, with the development of information technology, paper mails were being challenged by digital services. The nationals strongly criticized the wastage of taxes, the supreme power of the retired postal officials, and the hereditary system of postmasters.

Against such background, postal privatization began in 2007, and after a transitional period, is expected to complete in 2017. Funded by the government, the four departments of the Group, the post, post bank, post insurance, and post services, became 100% subsidiaries of the holding company in 2007.

- By the end of 2017, Japan Post Bank and Japan Post Insurance will be fully privatized by selling all their shares to the market.
 - After 2017, a third of Japan Post Network's shares will be held by the government. A standardized national postal service will be achieved.
 - Old contracts of Japan Post Bank and Japan Post Insurance are still effective.
- 1) Through the privatization of the Group, the government's workload will be reduced. The Group will transform into private companies.
 - 2) Through privatization, large sums of money can be handled much more efficiently in the market and the economy will be activated.
 - 3) With the advance of the privatization and the market-oriented operation, the number of existing employees (400,000 employees, accounting for about 30% of national civil servants) will be retrenched, under the premise of improving efficiency and reducing operating costs. The unprofitable post offices in some depopulated places will be gradually closed.

III. The Disposal of NPLs during the Postal Privatization Process

In order to increase the return for life insurance investors, Japan Post constructed many facilities for accommodation and vacation, known as Japan Post Insurance Hotels. These hotels were mostly located near popular hot springs tourist areas, well decorated and equipped, so the room occupancy rate was quite high over 70%. However, the operation was continuously incurring losses even after the privatization in October 2007 (of about four billion yen in 2007). The loss was due to expensive labor costs and consignment fee. As a result, Japan Post decided to abolish or transfer the hotels before 2012, selling a large amount of properties through two rounds of tenders.

Japan Post Transition: Japan Post was founded in April 2003, wholly owned by the government, inherited the business of postal services, postal savings, and postal insurance. But in the "Postal Election Year" when Koizumi won the election, the company was dissolved with a life of only four and a half years.

During this period, the company sold more than 600 properties, a large number, from north Hokkaido to south Okinawa, many of which were sold at a very low price or even as a part of a package.

In order to dispose these large amounts of non-performing assets quickly, banks used some methods, bundling bad properties (those that buyers were reluctant to buy) with good ones (those with a higher asset value). This program was proposed by U.S. and Japan during the period when NPL problem was becoming increasingly serious.

In October 2004, under the decision of 'Property Sales Promotion Committee', Japan Post conducted three rounds of concentrated sales. According to statistics, an estimated 60 properties were sold in March 2005, 186 in March 2006, and 178 in March 2007. The total sold 424 properties generated nearly 50 billion yen revenue.

IV. The Background of Stock Listing

The three listed companies of the Group played an important role not only in the politics but also in the national economy. They were the financial resources for the reconstruction of the great earthquake in east Japan; they also activated the whole economy by transforming into competitive companies through privatization under Koizumi's 'From the government to the people' policy. In addition, under the economy with a deteriorating primary financial balance sheet, they brought positive impact to the government's finances by avoiding the issuance of government bonds.

Due to the above mentioned political and economic implications, it was critical to ensure that the listing of the Group does not fail, or it would shake the core of the Abe regime.

In order to ensure enough funds to support the listing, the government asked the three mutual-aid organizations of civil servants (organizations of national civil servants, local civil servants, and private schools) to invest in the stock, increasing their purchasing power to two trillion yen.

In addition, after the listing of the three companies, Japanese television commercial message (TVCM) repeatedly broadcast the story to the public, offering information and a large number of securities firms explained how to subscribe to the stocks of these new listings. The cooperation between government and private enterprises made good preparation for the successful listing of the companies.

In order to get rid of deflation, Abe proposed Abenomics, integrating government and Japanese banks in the capital market, and depicting the drop

of interest rates, the depreciation of the yen, and the prospect of stock price boost. The listing of the three companies was of great significance on Abenomics, which was recently questioned widely. Therefore, it was regarded as a way to consolidate power, in a time of declining support, by means of amending the law. Nonetheless, the giant state-owned Group had achieved a magnificent transformation with the help of the capital market, and had significant positive impact on the capital market in return.

The shareholders were not only from the MoF and the Group, but also consisted of external investors. In the environment of negative interest rates, investment in government bonds was not enough to meet the expectations of shareholders. Therefore, the increase of returns was important and essential. The following table shows the change of asset investment targets before and after the privatization.

Table 1: Asset utilization before and after the privatization

More Assets than Before	Recognized Assets (After)	Non-recognized Assets
<ul style="list-style-type: none"> • Government/local government bonds • Corporate Bonds • Foreign bonds (limited to government bonds and bonds of listed companies) • Local public organization loans • Government bonds futures • Transferrable savings certificate • Commercial paper • Savings deposits in Japanese banks 	<ul style="list-style-type: none"> • Syndicated loan • Stock and trust income • Foreign bonds (excluding the left-column mentioned bonds) • Loans • Interest rate swaps 	<ul style="list-style-type: none"> • Real Estate Investment Trust (REIT) • Some of the raised funds

Suppose 30% of government bonds, worth approximately 40 trillion yen, were invested into stock market, the huge inflow of funds may stimulate the market to rise dramatically.

1. The Stock Market

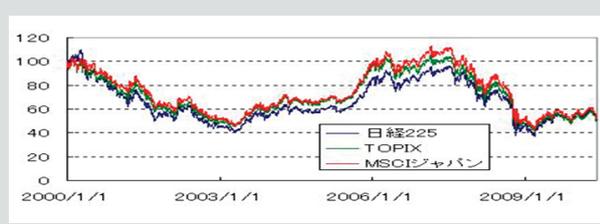
The three companies decided to be listed on 4 November 2015 when global stock markets were in a downward adjustment due to the worries on China's economic slowdown. However, the three stocks became unexpectedly popular in the market, against both institutional and individual investors' expectation, in terms of loan numbers (in September), presales, market sounding, subscription, etc. Ultimately, the listing price exceeded the original target price, and the issuing size successfully reached a total estimated

number of about 1.4 trillion yen. On the listing day, the performance of the three companies exceeded expectations. In the low interest rate environment, huge amounts of funds were concentrated in the three postal companies because of their high dividend yields. The following table shows the top 10 turnover ranking in TSE on the listing day. The three companies were ranked top one to three, whose turnover accounted for 18.29%, about 10 times of the fourth ranking Toyota.

Table 2. Top 10 turnovers on the TSE on listing day

No.	Code	Stock Name	Turnover (bn yen)	% of TSE Turnover
1	6178	Japan Post	278	8.20
2	7182	Japan Post Bank	211.4	6.23
3	7181	Japan Post Insurance	130.8	3.86
4	7203	Toyota	61.4	1.81
5	8306	Mitsubishi UFJFG	48.7	1.43
6	9984	Softbank	45.7	1.34
7	8316	Sumitomo Mitsui FG	35.8	1.05
8	6981	MuRata	35.8	1.01
9	8411	Mizuho FG	33.3	0.98
10	9983	FAST RETAILING	30.6	0.90

Figure 1. The Nikkei 225 Index, TSE's Tokyo Price Index (TOPIX) and MSCI Index (2000-2009)



Japan Post and Japan Post Bank are sure to be included on TSE's Tokyo Price Index (TOPIX) and very likely on the global MSCI World. Therefore, for the fund managers, Japan Post is a stock that cannot be ignored. The listing of Japan Post is undoubtedly a success, but still needs to be tested by the market to gauge its long-term value. On the other hand, Japan Post should work hard to explore new revenue sources in order to enhance its corporate value and meet shareholders' expectation. To facilitate the sales of the remaining government shares through investors' involvement and evaluation is the key for its future development strategy.

Table 3 shows the price comparison between Japan Post Group and previous privatized companies in a time span of three and six months. Although NTT achieved

an astonishing increase on its listing day, but the price remained lackluster afterwards due to the collapse of the bubble economy. JT and IR Japan Holdings kept a good performance thanks to their aggressive acquisition strategy overseas and development of the Chuo Shinkansen magnetic levitation line system. If Japan Post only focuses on its existing business in the domestic market, it will cause concern among investors about its future competitiveness.

Table 3. Price comparison between Japan Post Group and previous privatized companies

	Selling Price	Initial Price (vs. Selling Price)	2/4 (3 months later)	5/6 (6 months later)
Japan Post	1,400	1,631(+16.5)	1,468	1,423
Japan Post Bank	1,450	1,680(+15.9)	1,329	1,309
Japan Post Insurance	2,200	2,929(+33.1)	2,454	2,414
Nippon Telegraph and Telephone (NTT)	1,197,000	1,600,000 (+33.7)	NA	NA
IR Japan Holdings	380,000	600,000 (+57.9)	NA	NA
Japan Tobacco (JT)	1,438,000	1,190,000 (-17.2)	NA	NA

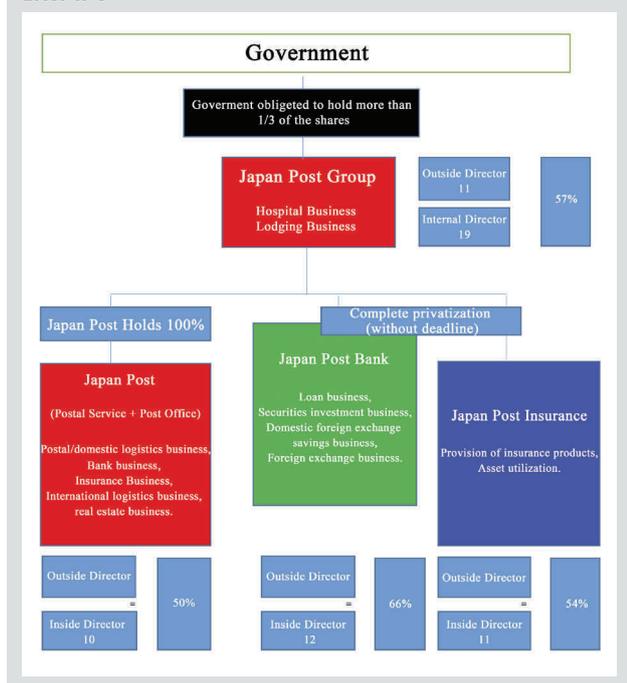
V. The Present Situation and Issues of Japan Post Group

Figure 2 on page 15 shows the organizational structure of Japan Post after its initial public offering (IPO). The Group strengthened its risk management and hired experienced professions to prepare for the listing. In order to adopt the views of its external stakeholders, the Group also hired more than half of its new directors from outside of the existing management. In addition, the Group built a fair and transparent operation organization system.

1. The Future Development Strategy and Risk Management of Japan Post Group

In April 2015, before the IPO, the Group published 'Japan Post Group's Medium-term Business Plan - the Creation of New Postal Network Program 2017'.

The Group proposed three major guidelines: 1) strengthen the profitability and operational capability of the three companies; 2) conduct compulsory universal services; 3) find the right timing for the IPO to enhance corporate value. At the same time, the Group also proposed three subjects based on its

Figure 2. Organizational structure of Japan Post Group after IPO

own characteristics: 1) pursue higher profitability; 2) improve production efficiency; 3) improve the management to suit its new status as a listed company.

In order to achieve their business strategy, the Group has made the following plans: 1) improve postal logistics; 2) activate post office network; 3) strengthen profitability of postal savings; 4) secure existing insurance contracts; 5) enhance funds efficiency to increase income. The second plan showed that the Group intended to improve income by integrated operation of banks and insurance. The third plan was not only to increase savings but also to expand portfolio into trust investment and other asset management products.

2. The Medium-term Business Plan of Japan Post

[Development Strategy] Activate Post Office Network

- Improve income by integrated operation of bank, insurance and post business

[Regional Contribution]

- Maintain and activate post, bank, and insurance services; improve safety of regional services

[Expand Portfolio of Products and Services to Increase Income]

- Diversify financial services to increase income (from 4.1 billion yen in 2013 to 20 billion yen in 2017)
- Expand post business (from 16.7 billion yen in 2013 to 20 billion yen in 2017)

Table 4. Japan Post Bank (individual)

Phase	9 th	10 th	11 th
Month / Year	March 2014	March 2015	March 2016
Recurring Revenue (million yen)	15,240,126	14,258,842	14,257,541
%	▽3.8	▽6.4	0.0
Recurring Profit (million yen)	1,103,603	1,115,823	966,240
%	▽9.9	1.1	▽13.4
Net Profit (million yen)	479,071	482,682	425,972
%	▽14.8	0.7	▽11.7
Employees (persons)	221,078	220,703	NA

Table 5. Japan Post (consolidated)

Phase	9 th	10 th	11 th
Month / Year	March 2014	March 2015	March 2016
Recurring Revenue (million yen)	2,773,958	2,819,144	3,627,005
%	▽3.8	▽6.4	23.2
Recurring Profit (million yen)	52,532	22,010	42,336
%	▽9.9	▽58.1	85.1
Net Profit (million yen)	32,911	22,174	47,247
%	▽14.8	▽32.6	113.1
Employees (persons)	194,688	193,934	NA

- Expand property business (from 11.7 billion yen in 2013 to a stable level of 25 billion yen)
- Provide products and services targeting working women. Achieve flexible working hours by smart layout of post offices

By the end of March 2016, Japan Post Bank and Japan Post Insurance, the two financial companies, had made great contribution to the Group's consolidated profit and loss (P/L) statements, where the revenue increased 72.8 billion yen from last quarter and the income turnaround from 7.4 billion yen of loss to 8.2 billion yen of profit. But how to improve profitability has become an important question for the Group's future development strategy. With the decrease of population against the increase of internet adoption, the quantity of post mails and parcels reduced by 30%, which urged Japan Post to diversify its revenue resources. As for

logistic business, in addition to its core business of mail-order, Japan Post also expanded business into parcels, mails, and overseas logistic services. Japan Post acquired an Australia logistic company as its wholly-owned subsidiary for 630 billion yen, which played a significant role in enhancing the company's international competitiveness and turning it into a multi-national corporation (MNC) in the future.

In terms of land bank, Japan Post was ranking sixth among listed companies, after Mitsui Realty. The company owned a land bank worth 1.5 trillion yen, of which about 1.2 trillion yen was owned by post offices. Historically, the development of Japan Post had been supported by railway transport network. A large number of post offices were set up in front of major stations, so Japan Post owned high-quality property assets. The medium-term plan is to double the revenue to 25 billion yen (compared with March 2014) and to stabilize the income from property segments (please refer to Tables 4 and 5 on page 15).

3. The Medium-term Business Plan of Japan Post Bank

a. Vision

- Develop Japan Post Bank into a reliable bank accessible everywhere. Provide satisfactory and customer-oriented services through extensive network of post offices
 - As the largest institutional investor in Japan, diversify investment portfolio to secure stable returns under proper risk management
- 1) Improve living quality and increase asset returns for customers (100 million customer base). Provide retail services
 - Enlarge total asset size through stable customer base
 - Expand service fee income
 - Consolidate business foundation
 - Establish customer-oriented service system
 - 2) With a stable funding source, in addition to government bonds, invest in diversified products to increase returns
 - 3) As a listed company, build strong operational management system under rules and regulations

Three directions to deliver the goals in the medium-term plan:

- 1) Intensive Investment and Risk Management
 - As the largest institutional investor in Japan, diversify investment portfolio to secure stable returns under proper risk management.

- 2) Sell quality financial products through the post office network
 - Achieve maximum reach to potential customers through the post office network
 - Improve product portfolio management system so as to introduce and launch new products quickly and efficiently
- 3) Cooperate with regional financial institutions
 - Promote strategic cooperation with regional financial institutions through the post office network, increasing the utilization rate of ATM through their customer bases

With the delivery of the above plan, the Japan Post Bank can make great contributions to Abenomics, as well as regional living quality and the capital market.

[Contribution to Abenomics]

- Achieve steady appreciation of national assets, 'from savings to investment' ideas, and positive cycle of economic development

[Contribution to Regional Living Quality]

- Cooperating with regional financial institutions, provide high-quality financial services to regional citizens

[Successful Listing]

- Become the largest institutional investor after the successful listing; bring vitality to the capital market by improving company evaluation through post office network

By the end of March 2016, the financials of Japan Post Bank were in line with the market's expectation. The gross profit reduced by 182.6 billion yen, mainly due to the increase in foreign securities investment, and the decrease in the interest rates of government bonds.

The financial report also showed that Japan Post Bank couldn't rely on its existing investment portfolio to

Table 6. Japan Post Bank (individual)

Phase	8 th	9 th	10 th
Month / Year	March 2014	March 2015	March 2016
Recurring Profit (million yen)	565,095	569,489	481,998
%	▽4.7	0.7	▽15.3
Net Profit (million yen)	354,664	369,434	325,069
%	▽5.1	4.1	▽12.0
Employees (persons)	12,963	12,889	NA

Table 7. Comparison between Japan Post Bank and its peers

Company	Net Profit (billion yen)	PER2	PBR	Interest Rate Forecast (%)
Japan Post Bank	325	16	0.42	3.91
Mitsubishi UFJ	1,033.8	6.8	0.45	3.59
Sumitomo Mitsui	753.6	6.45	0.51	4.54
Mizuho	611.9	6.82	0.51	4.55

Table 8. Comparison between Japan Post Bank and its peers

Category	Cooperative Insurance Companies	Outlets
Cancer Insurance	Aflac	20,076
Medical Insurance	Sumitomo Life Insurance	1,000
Pension Insurance	Metlife, Sumitomo Mitsui	1,079
Legal Person Insurance	ING Life, Metlife, Mitsui Life, Tokyo Marine, Nippon Life Insurance, Sumitomo Life AIOI, Meiji Yasuda Life Insurance	200
Auto Insurance	NISSAY, Fuji Fire Insurance, Nipponkoa Insurance, Tokyo Marine, Sumitomo Mitsui	1,495
Trust Investment	Tokyo Marine AM, Mitsubishi UFJ, Nikko AM, Manulife Investments Japan, etc.	1,316

increase investment returns. The portfolio should be restructured and diversified globally, investing in new products and areas such as PE, real estates, etc. The key was in the hand of investment management team from Goldman Sachs and pension funds. Because of its huge asset under management (AUM), Japan Post Bank had a significant impact on the stock market. Its move caused widespread concern in the market.

b. The Present Situation of the Post Office Network Financial Services

By the end of December 2015, there were 24,000 post office outlets, among which 20,000 were direct outlets, 4,000 were simple post offices. Universal financial services are provided by post offices, such as savings, foreign exchange, insurance, and other basic financial services.

However, it differed from post offices when it came to non-universal financial services. For example, about 20,000 outlets sold cancer insurance products, while only 1,300 outlets sold trust investment products. Post offices didn't sell credit card loans or property

Table 9. Japan Post Bank

Category	Cooperative Bank, Insurance and Investment Companies	Outlets
Mortgage	SURUGA Bank	82
Credit Card Loan	SURUGA Bank	All
Pension Insurance	Metlife, Sumitomo Mitsui Insurance	All
Trust Investment	Tokyo Marine AM, Mitsubishi UFJ, Nikko AM, Manulife Investments Japan, etc.	All

Table 10. Japan Post Insurance

Category	Cooperative Bank, Insurance and Investment Companies	Outlets
Legal Person Life Insurance	ING Life, Metlife, Mitsui Life, Tokyo Marine, Nippon Life Insurance, Sumitomo Life AIOI, Meiji Yasuda Life Insurance	All
Legal Person Cancer Insurance	Aflac	All

mortgage loans, which were only sold in Japan Post Bank's direct outlets.

Other financial products provided by Japan Post Group are listed in the tables above (please refer to Tables 8, 9, and 10).

When selling financial products, certain qualifications, sales systems, and management systems were required, which was a great burden to the post offices. There were only two to four staff in simple post offices, so lack of manpower made it difficult to meet the requirements to sell financial products.

c. The Profitability and Future Strategy of Japan Post Bank

Almost 90% of Japan Post Bank's profits were derived from investments, so sophisticated investment and stable risk management were very important. The total assets of Japan Post Bank amounted to 204 trillion yen. It was necessary to reduce the large size of the investment and to increase the investment efficiency so as to achieve more profits.

Previously, Japan Post Bank had 80 trillion yen of government bonds, but under the negative interest rate environment, Japan Post Bank almost got no income from this investment. Besides, Japan Post Bank had less exposure in equity investment than other financial institutions.

According to the latest disclosure of its investments, the proportion of government bonds have decreased significantly (24.4 trillion yen less, down 11.7%), while the proportion of foreign securities increased (11.5 trillion yen more, up 6.2%). No great change in other areas.

d. Turn Postal Savings to Financial Products Sales through the Post Office Network

The size of postal savings began to reduce from 1999, but stopped after privatization. Now the savings size is around 177 trillion yen (at the end of September 2015), 11% of the market share of Japanese household financial assets. This is very impressive when compared with other financial institutions. How to turn the postal savings into financial products sales has become a key issue.

Currently, among the post office's 24,167 outlets (wholly owned direct outlets plus simple post offices), only 1,549 sell trust investment products. There is still a lot of room for more strategic development.

In July 2015, Japan Post Bank announced a strategic cooperation with other agencies. Japan Post Bank, Japan Post, Sumitomo Mitsui Trust Holdings, and Nomura Holdings, jointly set up a trust asset management company, with a vision to build an easy-to-understand trust and investment products system and to facilitate the introduction of financial products. Japan Post Bank contributed 45% and Japan Post contributed 5% of the company.

The trust asset management company, in addition to the sales commission, can also charge management fees. In addition, Japan Post Bank can use its large number of outlets to give full play to this strategy (please refer to Tables 11 and 12).

By simple calculation, about extra four trillion yen deposits are needed to raise Japan Post Bank's ratio of net assets of trust investment sales/deposit balance to the same level of Sumitomo Mitsui Banking's three percent. The prevalent fee of trust investment is three percent, so the total fee income would amount to 120 billion yen. What's more, the increase in deposit balance can also increase the monthly trust income accordingly, which helps improve the total income as a result.

However, this is only a theoretical calculation. There are still many difficulties and issues in the actual operation.

The first is legal issues. For example, during the sale of financial products, their description and disclosure of risks is very important. When the restriction on

Table 11. Net assets of trust investment sales / deposit balance

	Deposit Balance	Net Assets of Trust Investment Sales	B/A
Japan Post Bank	178 trillion yen	1,118.7 trillion yen	0.63%
Sumitomo Mitsui Bank	105 trillion yen	3,080 trillion yen	2.93%
Bank of Yokohama	12 trillion yen	618.5 trillion yen	5.15%

Table 12. Comparison of domestic outlets in Japan (by end of March 2015)

Japan Post Bank	24,167
Average of Japan Post Holdings' Three units	750
Local Banks (64 Banks)	117
2nd tier Local Banks (41 Banks)	75
Trust Banks & Coffers (267 Banks)	28
Credit Cooperative (154)	11

trust investment sales were relaxed, problems that aroused the most were related to risks, because very little disclosure about loss had ever been mentioned before. So far, banks have been only selling deposit-based products which are relative safe and stable, and customers believe that all products offered by banks are safe, so they never consider risks. Therefore, customers with little experience in trust investment products are very likely to neglect the risks during the sales process in post offices. At this point, the priority of the post office is to find out the solution that is the best in accordance to risk management policies.

In this regard, the post office needs to train and improve the qualification of its team of practitioners, especially the sales team. In order to prevent the above problems, the post office should offer training and education on risk control regulations to those staff engaged in the front end work of its businesses. In addition, it takes time and considerable amount of resources for the trust investment company to be qualified for selling products, so the best way is to actively use experienced practitioners from banks and securities companies to establish a professional sales system as soon as possible.

People often compare the equity proportion of Japanese household financial assets with that of U.S., and conclude that the Japanese ratio is relatively low, with a potential to improve. However, it is very difficult to increase Japan's ratio to the level of U.S.'s ratio because Japanese use deposit as their major

investment channel. There is room to increase the sales of equities, but the possibility is low to those depositors who have already had equity investment in other securities companies and banks. Therefore, the expansion of this business should be targeted at new customer groups who have little experience in equity investment.

4. The Present Situation and Future Strategy of Japan Post Insurance

The Medium-term Business Plan of Japan Post Insurance

Strengthen the Major Areas

- Provide simple and small-amount insurance products through the national post office network
- Provide high-quality services for the elderly
- Strengthen the sales capability of the post office channel, by cooperating with Japan Post

Intensive Investment and Risk Management

- With proper assets and liabilities match, increase profitability through diversified investment, under allowed risk range
- Cooperate with other financial institutions to sell financial products through the post office network
- Promote the strategy of utilizing the post office network
- Achieve maximum reach to potential customers through the post office network
- Strengthen the sales of products from outside financial institutions

Saving-function insurance such as education insurance and pension insurance have a higher proportion of Japan Post Insurance's total sales, while guaranteed insurance products have a higher proportion of other private-owned life insurance companies' sales. In the future, Japan Post Insurance should strengthen its sales channel and develop new products that meet customers' demand to increase revenue. In 2016, the monthly premium of new contracts has further increased to 50 billion yen after bottoming out in 2015.

Specifically, in April, Japan Post Insurance was allowed to sell short-term pension insurance, which improved its sales capability of general insurance products including pension and life insurances. In addition, the company also proposed the legal entity operating system to strengthen its direct outlet sales (please refer to Tables 13 and 14 and Figure 3).

5. The Present and Future of Japan Post Insurance

The financial result of Japan Post Insurance is in line with expectation. Due to maturity of contracts, the total quantity of contracts decreased by 1.16 million

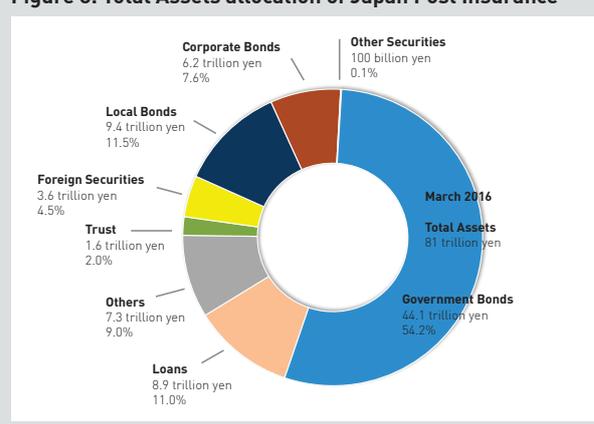
Table 13. New contracts and amounts of insurance products in 2014 (million yen)

		Japan Post Insurance	Insurance Industry	Market Share of Japan Post Insurance
Time Policy	Quantity	539	2,245,580	0%
	Amount	1,209	31,099,097	0%
Pension	Quantity	137,965	1,569,714	9%
	Amount	493,582	8,655,317	6%
Life	Quantity	590,738	3,476,758	17%
	Amount	2,054,515	15,208,373	14%
Education	Quantity	667,908	1,014,607	66%
	Amount	1,400,794	2,273,175	62%
Retirement	Quantity	1,122,792	1,347,313	83%
	Amount	3,546,071	4,653,117	76%

Table 14. Japan Post Insurance

Phase	8 th	9 th	10 th
Month / Year	March 2014	March 2015	March 2016
Recurring Profit (million yen)	463,506	493,169	411,504
%	▲12.4	6.4	▲16.5
Net Profit (million yen)	63,428	81,758	84,897
%	▲30.2	28.9	4.4
Employees (persons)	6,948	7,153	NA

Figure 3. Total Assets allocation of Japan Post Insurance



to 32.32 million. At the same time, the new contract premiums increased by six percent.

As for the investment, the proportion of total revenue has not changed much. Due to low interest rate and high exposure on government bonds, the investment returns have not met the expectation.

Table 15. Comparison between Japan Post Insurance and its peers

Company	Net Profit (billion yen)	PER	PBR	Interest Rate Forecast (%)
Japan Post Insurance	84.8	16.34	0.75	2.56
Dai-ichi Mutual Life Insurance	142.4	7.73	0.52	3.12
T & D	94.2	8.78	0.53	3.06

In the future, like the Medium-term Business Plan, whether Japan Post Insurance could increase on-site sales through outlet network by strengthening pension and life insurance is the key to their development.

In addition, Japan Post Insurance is facing the challenge that existing contracts are gradually maturing, the new contract quantities are decreasing, and the domestic market is shrinking due to decreasing population. Its competitors, the private-owned big insurance companies have started overseas acquisitions to solve these challenges. Restricted by postal privatization law, Japan Post Insurance can't set up subsidiaries, so it's very hard for the company to expand and develop through acquisitions.

Therefore, the first priority for Japan Post Insurance is that the investment department should improve the system as soon as possible so that the company could invest in a more diversified portfolio to increase profitability.

VI. Summary

Japan Post Group has successfully transformed from a state-owned-enterprise (SOE) to a private-owned group through capital market. Capital market plays a significant role in the development of the Group.

The basic idea of the privatization law is 'to promote fair and free competition, facilitate citizens through diversified and quality services'.

Taking into account the healthy development of the local community and the impact on the market, the postal privatization has successfully enabled this giant SOE to compete fairly and freely in the market, which contributes to the healthy development of national economy.

More efforts should be made to realize the real reform of the Group, step by step.

In the future, in order to achieve the Medium-term Business Plan to enhance the professionalism and the financial strength of the business, the Group has to expand the scope of its financial services. The Group

can realize the idea of 'from savings to investment' by selling trust investment products through the post office network. All of the above are of great significance to the national economy.

The most important issue facing the Group is to improve its sales and management system, allocating resources based on customers' demand. Providing high-quality financial services by professionals is the key to the development of private enterprises. These days, overseas financial services institutions are strengthening their IT technologies and applications. The Group should also increase its investment on IT infrastructure to improve the efficiency of the network operations so as to increase profitability. With the rapid development of IT technologies, it is very important to strengthen online transactions in order to expand customer base and facilitate sales. IT service is especially important to young customers with IT skills. On the other hand, innovation of financial products and services by diversifying transaction channels to offline outlets (direct post offices) is another way the Group can ensure its future development. In the future, the Group plans make efforts in the financial technologies (FinTech) area.

It produced many new shareholders in the course of the IPO of the three companies. According to CNA report, Japan Post had about 770,000 shareholders, Japan Post Bank about 740,000 shareholders, and Japan Post Insurance about 290,000 shareholders. Roughly calculated, the total number of shareholders of the three companies was about 1.8 million people (CNA, 2015).

The future development of the Group will be closely linked with the intention of these new shareholders. The Group needs to improve profitability as well as meet the obligation to provide quality financial services to the public. Meanwhile, the Group should also consider new shareholders' expectation and improve their corporate value. There are still many government shareholders in the current shareholder structure, which gives positive support to the Group to raise funds and increase sales but puts a great amount of pressure on private financial institutions. Therefore, the Group needs to reduce the government holdings below 50% so as to become a wholly private group.

As for the future sales of its shares, according to the records in January 2013, the sales of the Group's shares, used as reconstruction of financial resources, was forecasted at about four trillion yen (Nikkei Asian Review, 2015). Referring to the average internal sales of government's shares of NTT and JT, roughly once every three years, the Group's government shares could be sold three times at most till 2022. Although

this is not an industry standard, it still can be a reference because the government has not announced any plan on the sales of the shares.

In the past, the government sold the shares of the privatized enterprises based on its own interest, which aroused a lot of controversy in the private sector. The negative effects are obvious with so many failed cases. Therefore, such an action should be avoided in the privatization of the Group.

The Group must strive to improve corporate value, and form comparative competitiveness with private enterprises so as to meet the expectation of shareholders. Thus, the Group can be called a real completely privatized enterprise. The first step of the Group is to achieve its Medium-term Business Plan. It needs long-term efforts to finally become a successful listed group with the help of the capital market. ■

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Will Private Equity (PE) Firms Continue to Invest in China's Auto Consumption and Sales Industry?

Yankun Hou, UBS

We believe, PE firms will continue to invest in China's auto consumption and sales industry, and the repair and maintenance, used car, and auto retail finance segments could be the highlight.

I. The Proposed New Automobile Sales Law Should Benefit Dealers

In early January 2016, the Chinese government proposed a new automobile sales law (Ministry of Commerce, 2016). There are several highlights in the new proposal: 1) no original equipment manufacturer (OEM) authorization is needed anymore for selling new cars which implies it is now possible to have a show-room selling multi-brand cars; 2) extend the dealership authorization period from one year to at least three years, with an initial authorization period of at least five years; 3) OEMs are required to open up the auto parts supply chain which will allow dealers to purchase components directly from the auto parts manufacturers; and 4) OEMs are not allowed to force dealers to bear unreasonable inventory, advertisement, or construction costs. As a result, we believe dealers may gain a higher bargaining power against OEMs in the future if the new sales law is implemented.

When it comes to new car sales, we contemplate the reforms will not result in widespread declines in car prices. On a 12-month horizon and beyond, we expect risks to dealers' new car sales margins to be limited, as the margins are low enough and automakers still need to incentivize dealers to continue aggressive network expansion.



For after sales services, we expect diversification of business models and believe dealers are well positioned to benefit. We expect the dealers to open more 'services only' authorized outlets, which have a higher return on investment (ROI) because of lower building and operating costs and will enhance the profit contribution of services. Importantly, we think independent garages/repairers will not pose particular challenges, as their growth could be deterred by rising costs of equipment, technical expertise, and land. The dealers will continue to benefit from the higher pricing and health margins of services and sale of parts.

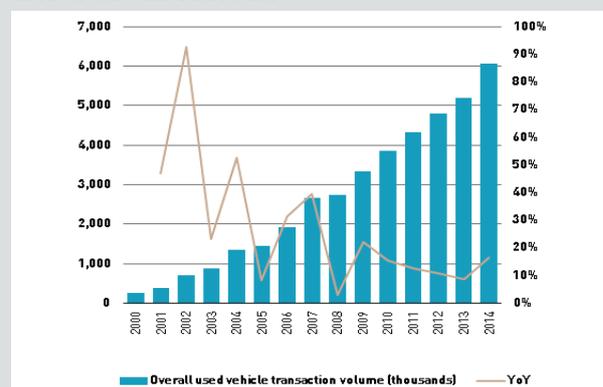
We believe more PE firms will focus on the auto after sales businesses after the opening of the supply chain.

II. Used Car Business

1. Overview

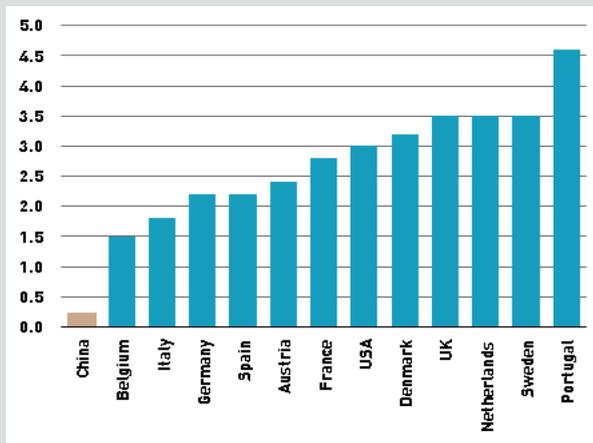
Over the past 10 years, the used vehicle market in China grew at a compound annual growth rate (CAGR) of 16%, (China Automobile Dealers Association [CADA] (a), 2014), slightly lower than the new car sales CAGR of 18% (China Association of Automobile Manufacturers [CAAM], 2014), and reached over six million reported transactions. We believe the used vehicle market in China is underpenetrated since the used-to-new car ratio was only 0.25 in 2014, below the average of 2.9 in western countries (Center of Automotive Management, 2013).

Figure 1. Used vehicle sales volume (thousand units) and used-to-new car sales ratio



Source: China Automobile Dealers Association (CADA) (b)

Figure 2. Used-to-new car sales ratios in selected developed countries



Source: European Automobile Manufacturer's Association, National Trade Bodies

2. Increasing Non-Local Transactions

During the past three years, the circulation of used vehicles in China has improved significantly. According to China Automobile Dealers Association (CADA), non-local (i.e. inter-province) transactions rose from 12% of the total transactions in 2010 to 22% in 2014 (CADA, 2014).

Among all provinces, Guangdong had the largest overall transaction volume of 18% in 2014, followed by Sichuan (11%), Beijing (9%), Shandong (9%), Henan (8%), and Shanghai (7%).

We attribute the increase in non-local used vehicle transactions to the implementation of car purchase restrictions. In 2011, Beijing became the second city in China to restrict car purchases (following Shanghai, which implemented restrictions in 1994). Five other major cities, Guiyang, Guangzhou, Tianjin, Hangzhou, and Shenzhen followed suit, implementing car purchase restrictions between 2012 and 2014. According to China Association of Automobile Manufacturers (CAAM), Chengdu, Chongqing, Wuhan, and Qingdao could be the next cities in line to implement the car-purchase restrictions.

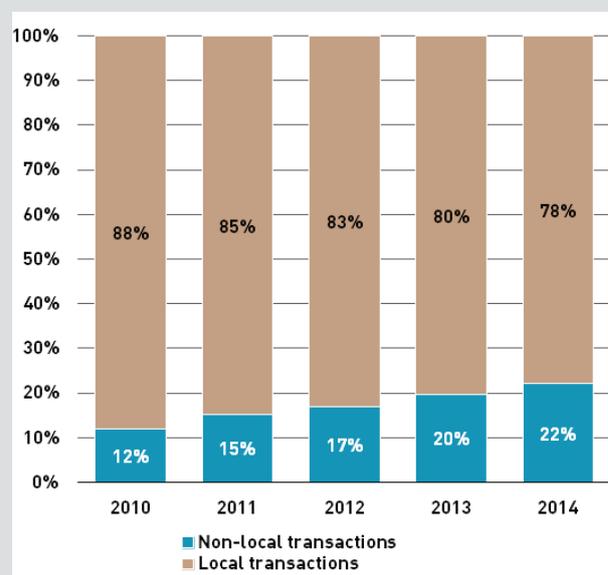
We believe the car purchase restrictions affected used car transactions as well as new car sales. Given vehicle licences are now more valuable, if a person is allotted one or bids for a car licence, we think he is more likely to purchase a new car instead of a second-hand car, lowering the demand for used vehicles in cities with purchase restrictions.

The purchase restriction orders have also created significant replacement demand, since it is easier for a car owner to get a new car using the same licence

than a new car licence. This has significantly increased the supply of used vehicles in these cities. As a result, many used vehicles from the restricted cities have been circulated to other regions where there are more potential buyers.

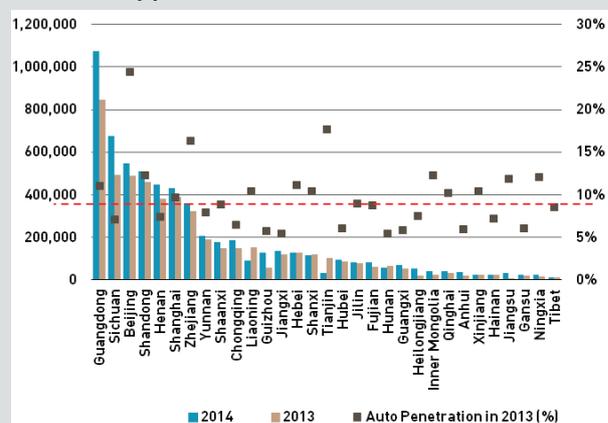
However, the purchase restrictions have also partly slowed the development of the used vehicle market since a dealer's transactions are restricted by the number of licences he possesses. In February 2014, the CADA proposed the establishment of a second-hand car temporary property rights registration system to the government. In July 2014, Hangzhou and Tianjin implemented this new registration system, which we consider likely to stimulate second-hand car circulation in these purchase restricted cities.

Figure 3. Transaction volume breakdown, local/non-local transactions



Source: CADA [c]

Figure 4. Transaction volume (units) and auto penetration breakdown by provinces



Source: China Automobile Dealers Association, CEIC [a]

3. Historical Problems for the Used Car Market in China

China's used vehicle market is highly fragmented. Traditionally, almost all transactions in China were done through small scale dealers. We believe one of the major reasons for China's fragmented used vehicle market is the tax regime. A tax, two percent of the total transaction amount is levied on used vehicle transactions involving the transfer of a vehicle title from a seller to a trader and then to a buyer. In other developed countries/regions, such as the UK and Taiwan, taxes levied on used vehicles are mostly based on the difference between purchase and selling prices. We believe this is a heavy burden for Chinese used vehicle traders, as their profit might not be as high as two percent of the transaction amount. As a result, dealers usually register the vehicles under private individual accounts to avoid the taxes. This increases the internal risk to dealers and results in a fragmented market, leading to a great number of small scale dealers or 'scalpers' locally. This has hindered the development of the used car market, taking into consideration; 1) the asymmetry of information between buyers and sellers, 2) the lack of after sales activities provided, and 3) the lengthy transaction process. As a result, Chinese customers have little confidence in buying and selling used vehicles.

4. Growth Drivers

In recent years, different online auction websites and used vehicle appraisal institutions have entered the market in China, significantly improving transaction transparency between buyers and sellers. The online appraisal websites give a preliminary price estimate to sellers once they provide the car's model, age, miles driven, and subjective condition. The online auction websites act as a trading platform, allowing buyers and sellers to access different market information. As of December 2014, transactions through online platforms had risen to 5.6% of all used vehicle transactions, almost 2.8 times higher than the two percent in January 2014 (iResearch, 2016).

Moreover, the rising disposable income in inland and rural areas in China has further supported demand for used cars. The government has also started to unify the car value appraisal methodology and the Chinese Automobile Circulation Association has proposed to the government to change the tax base from two percent of the selling price to a percentage of the value added portion.

5. Remaining Hurdles

However, we believe the obstacles posed by restrictions on cross region circulation as well as the potential increase in the number of purchase restricted cities

could potentially counteract the above mentioned positive drivers.

Since 2011, many local governments have launched environmental protection policies to prohibit the registration of non-local used vehicles. According to government statistics, 93% of the cities in China had announced their respective emission standard requirements by 2014. Although registered cars can still be used even if they do not meet the latest emission standards. However, if the car is resold, it not only has to be re-registered, but also has to meet the latest emission standards.

The CADA recently submitted a proposal to the Ministry of Environmental Protection to eliminate all discriminatory policies regarding cross region movements of used vehicles. The new proposal suggested that the local government should approve the registration request once a car meets the local emission standards.

6. Future Growth Potential

The years 2009 and 2010 were the peak of new car sales growth in China, but considering a five to eight year replacement cycle, we expect significant replacement demand in the coming few years, which should stimulate overall used vehicle transactions.

In the future, we expect the major channels for vehicle transactions to be: 1) OEM's certified pre-owned car programmes; 2) online auction websites; and 3) large-scale branded used car dealers. We think direct transactions between buyers and sellers will not be the major development trend in the short term as many used car buyers are located in lower tier cities or rural areas, where online auction platforms and branded dealers have little presence. As a result, local dealers/'scalpers' will still be necessary in the used car distribution channel.

However, we believe the earnings upside from used car transactions will be limited for traditional dealers/'scalpers', given the low entry barriers of the industry and aided by improving information transparency between buyers and sellers.

Among all the parties in the used car segment, we believe the online auction websites and large-scale branded used car dealers would attract the attention of PE firms the most.

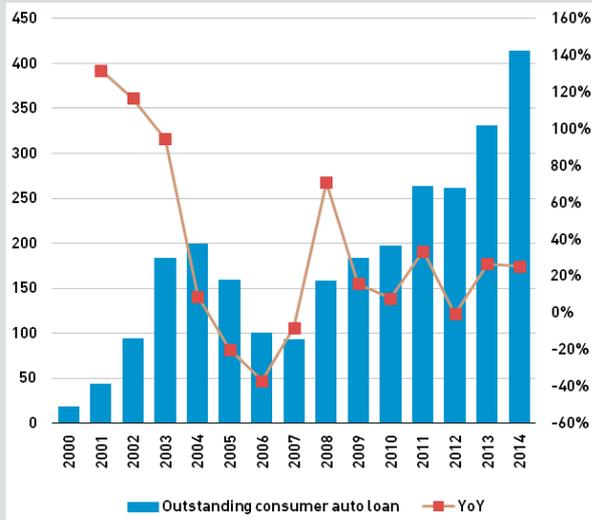
III. Auto Retail Finance Business

1. Overview

The auto retail finance sector has grown substantially in the past seven years as we can see the outstanding

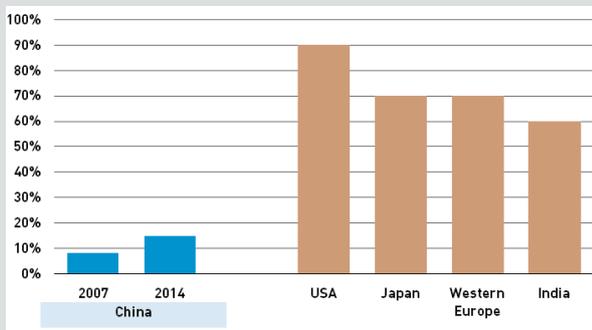
consumer auto purchase loan grew at a CAGR of 24% to RMB414.5 billion, outpacing the new passenger vehicle (PV) sales growth of 19% during the same period. Meanwhile, we also observed the auto finance penetration rate in China improved from about 8% in 2007 to around 35% in 2015.

Figure 5. Outstanding consumer auto loan (RMBbn)



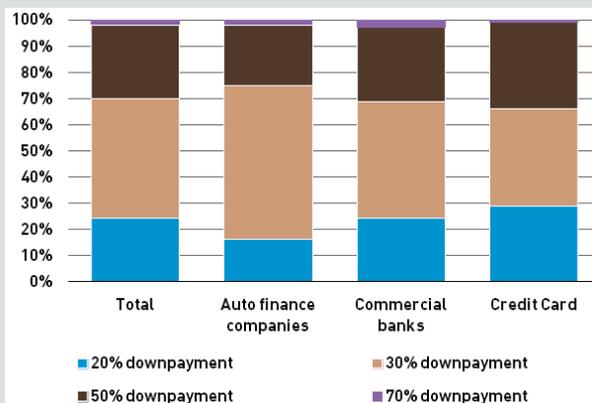
Source: CEIC (b), People's Bank of China (PBoC)

Figure 6. Auto finance penetration in China



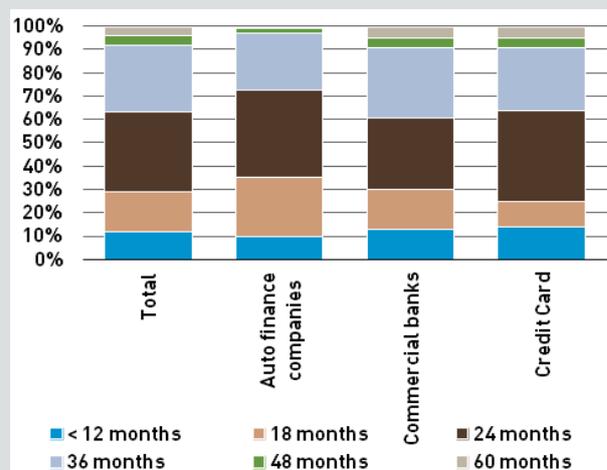
Source: Gasgoo.com

Figure 7. Down-payment structure of auto finance consumers (2014)



Source: CEIC (b), People's Bank of China (PBoC)

Figure 8. Tenor structure of auto finance consumers (2014)



Source: VW Financial Services

As of the end of 2014, banks accounted for 54% of the auto retail finance lending, followed by auto finance companies of 26% and leasing companies of 10%.

According to Volkswagen (VW) Financial Services, about 70% of auto finance retail customers choose to pay less than 30% down payment, while we saw the percentage for auto finance companies even reached 75%, higher than that of commercial banks (68%) and credit card companies (66%) (Volkswagen, 2015).

In terms of tenor structure, about 79% of the industry auto retail loan has a tenor between 18 to 36 months. Meanwhile, the auto finance companies generally have a shorter loan tenor with only three percent over 48 months, compared to nine percent of commercial banks and credit card companies.

Moreover, only 55% of customers from auto finance companies choose the classic credit repayment method, which consists of a down payment and equal monthly instalments. This percentage was lower than that of the commercial banks and credit card companies' figures of 59% and 58% respectively.

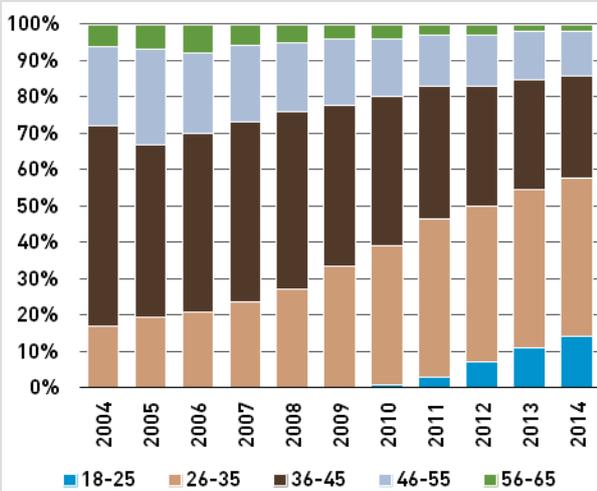
2. Growth Drivers

We expect the auto retail finance penetration will continue to improve in the next few years, while we believe the auto finance growth in the luxury car segment could be even faster since most Chinese consumers tend to trade-in their first car as down payment when upgrading to the second one. Below we have listed some of the drivers for the growth of the auto retail financing that we have identified:

- a. Rising acceptance from the youth: In recent years, we observed the acceptance level of auto financing has been increasing, while the average age of the customers going for auto financing is lowering.

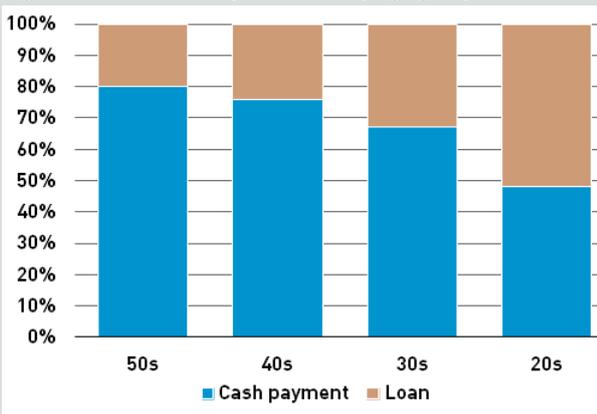
In 2014, about 57% of the customers were below the age of 35, grew significantly from only 17% in 2004. Among all the age groups in China, the auto finance penetration rate for the age groups in their 20s and 30s reached 52% and 33% respectively, as compared with age groups in their 40s and 50s with a rate of 24% and 20% respectively, according to data released by Sinotrust in 2014. We believe that rising levels of education could be one of the main drivers for more people, especially younger generation, to opt for auto financing when they make purchase decisions. This can drive up the overall auto finance penetration rate.

Figure 9. Age structure of auto finance consumers



Source: VW Financial Services

Figure 10. Auto finance penetration by age group



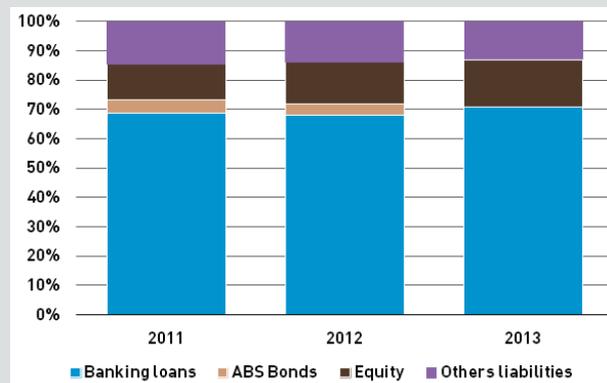
Source: Sinotrust

Note: Data as of October 2014.

- b. Diversifying funding sources after the asset backed security (ABS) issuances were permitted again: In the past few years, the auto financing companies were constrained by the source of funding and capital requirement as they could only obtain funding from capital investment of shareholders

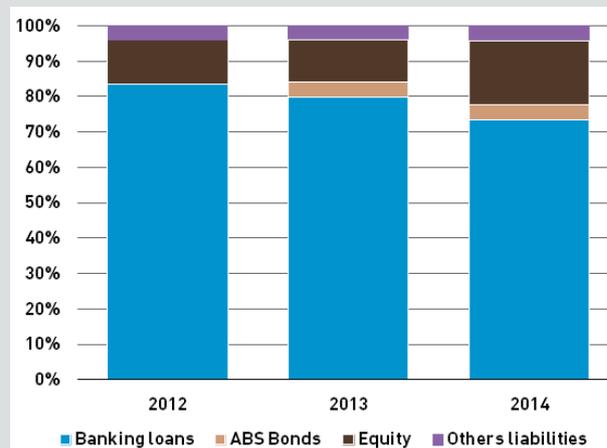
and intra-banking loans. However the former is demanding for shareholders, while the latter affects the company's balance sheet structure. Therefore, the auto financing market used to be dominated by commercial banks. However, since 2012, different auto finance companies, such as SGM Auto Finance, were allowed again to issue ABS to enhance their source of funding. We believe more auto financing companies for OEM will continue to issue ABS to enhance their source of finance given that ample liquidity is generated by the central government.

Figure 11. GMAC-SAIC's assets funding structure (% of total assets)



Source: GMAC-SAIC Audit Report

Figure 12. Toyota Finance (China)'s assets funding structure (% of total assets)



Source: Toyota Finance Audit Report

- c. Improving auto financing product varieties: In the past, the auto retail finance market was dominated by the banks whose product offerings were limited. However, with the emergence of credit card companies and auto finance companies, we observed more innovative auto financing products, such as balloon payment, tier payment, and upgrade finance, which cater to different customers' financial needs.

3. Existing Hurdles

However, we don't think penetration rate in China will be as high as the developed countries anytime soon, given the Chinese have a more conservative consumption habit compared to developed countries, while the borrowing interest rate remained high at about 6% per annum for Chinese banks and about 8% to 12% per annum Chinese auto financing companies. In our view, underdeveloped social security system, healthcare, education, and expensive property price are the main reasons pressuring auto penetration rate at low level.

4. Potential High Growth, but from a Small Base

We think the auto finance companies will continue to gain market share over banks given: (i) simpler application procedures; (ii) wider network coverage and higher synergies with new car sales; and (iii) more product varieties. At present, we estimate overall auto finance business only contributes about 3% of major OEM's earnings in China, compared to the global average of about 24%. We think the impact on OEM's overall profitability could be limited, due to small base, despite high growth.

According to us, PE firms should show a higher interest in investing in the auto financing industry in China, given its potentially large market size.

IV. Why China's Auto Sector can Sustain High Growth despite the Weak Macroeconomy?

Since 2015, the global and Chinese economies have started to record a higher downside pressure. In the second quarter of 2015, various major OEMs, such as SAIC Volkswagen (SVW), SAIC General Motors (SGM), Beijing (BJ) Hyundai, and Great Wall, started to lower their models' manufacturer's suggested retail

price (MSRP) and offer different purchase incentives to stimulate the demand. However, the sales volume did not pick up and the Chinese PV market grew by only 0.2% to 4.3 million units in the third quarter of 2015 (CADA, 2016). We attribute the weak industry sales growth to: 1) sluggish macroeconomic growth; 2) volume declining in tier-2 cities due to pre-purchasing in the fourth quarter of 2014, ahead of possible purchase restrictions; and 3) volatility in the A-share market.

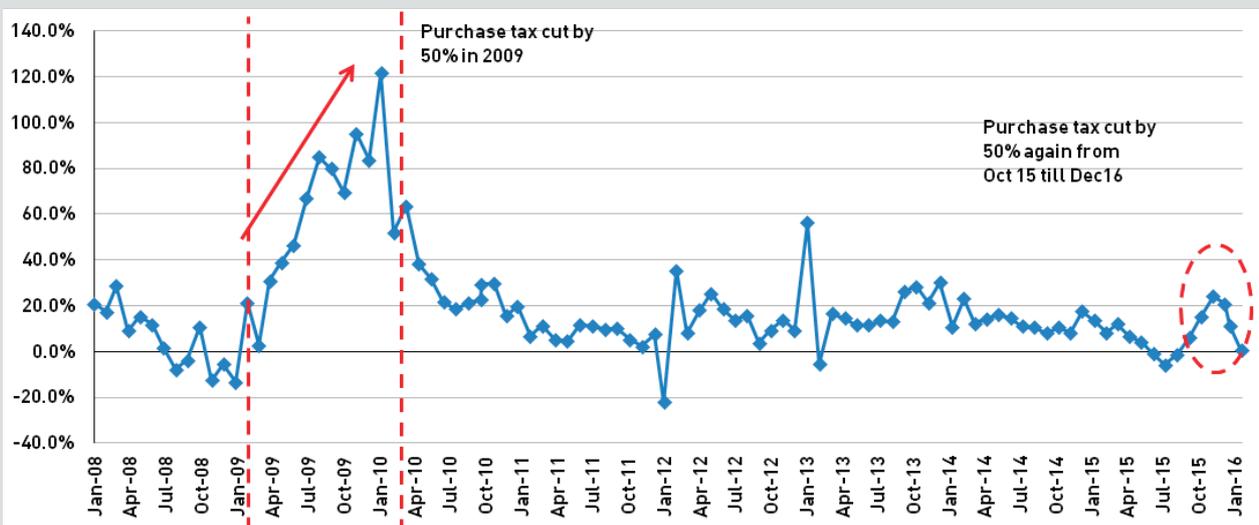
As a result, the Chinese government decided to lower the purchase tax rate for all the small engine size PVs (with an engine size of 1.6L or below) from 10% to 5%, effective from 1 October 2015 to 31 December 2016. We also observed the industry sales picking up immediately after the purchase tax cut and growing by over 20% in the fourth quarter of 2015.

In 2009, a similar policy was rolled out to stimulate the PV consumptions, leading to a surge in PV sales of 48% year-over-year (YOY). Although the macroeconomic situation becomes more challenging, we still believe sales growth in the PV industry will reach eight percent in 2016. However, the industry sales growth could slow down to only two percent YOY in 2017 due to high base and advance purchases.

So in which direction is China's auto sector headed next? Certain parallels can be drawn between the experiences shared by both South Korea and Japan.

We concluded that there is a high similarity between the popularization of PV in Japan and South Korea, with each country facing three phases: high growth, rapid growth, and marginal growth (please see Figure 14 and Figure 15 on pages 28 and 29 respectively).

Figure 13. China PV monthly sales growth YoY during 2008-16 YTD



Source: China Auto Market

- a. High growth period (South Korea – 1981 to 1990; Japan – 1961 to 1968): The popularization of PVs as a means of travelling had just begun. Given the low base, sales volume of PVs saw exponential growth. The penetration rate rose from 0.7% to about five percent in around a decade, with sales volume CAGR of roughly 30%. Chinese markets showed similar characteristics between 2000 and 2011.
- b. Rapid growth period (South Korea – 1991 to 1995; Japan – 1969 to 1973): The popularization of PVs continues as the penetration rate was still low. However, due to the higher base, PVs' sales volume growth starts to slow. The phase lasted for around five years, with the penetration rate rapidly rising from around 5% to 13%, and sales volume CAGR of 13%. China is still in the middle of the phase.
- c. Marginal growth period (South Korea – 1996 to 2002; Japan – 1974 to 1980): The high penetration rate of PVs and fluctuations in the sales volume growth of PVs, along with the macroeconomic performance of each country were the main characteristics seen, instead of continued positive growth as in the previous phases. The penetration rate rose from about 13% to 20%, and sales volume CAGR fell below five percent.



CAGR dropping to 3% (2016-2020) from 12% (2010-2015). The slower growth rate is mostly due to increase in the penetration rate as well as a growing base. We expect the total sales volume of domestic PV industry at 25m units in 2020, with total PV ownership of 203m units and penetration rate of 144/1000 persons. Such penetration rate is similar to that of Japan in 1974 and South Korea in 1996, the time that the PV industries of both these countries entered the marginal growth phase.

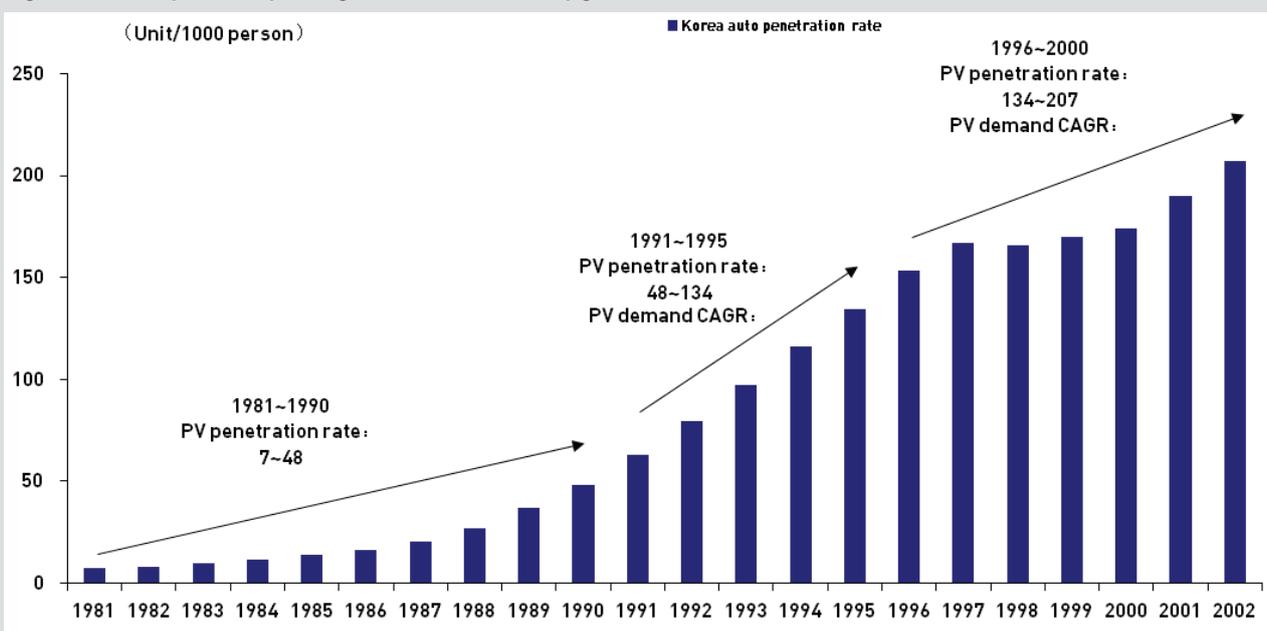
We expect China's PV industry to maintain steady growth until 2020, driven by the following four factors:

- **Growing purchasing power of residents:** R value (vehicle price/GDP per capita) is a key indicator that measures a country's purchasing power for vehicles. Based on experiences in developed countries, when a country's R value approaches two or three, it enters the

Based on the situation in China and experiences of Japan and South Korea, we believe that China is in the middle of the rapid growth period (similar to South Korea in 1993 and Japan in 1971).

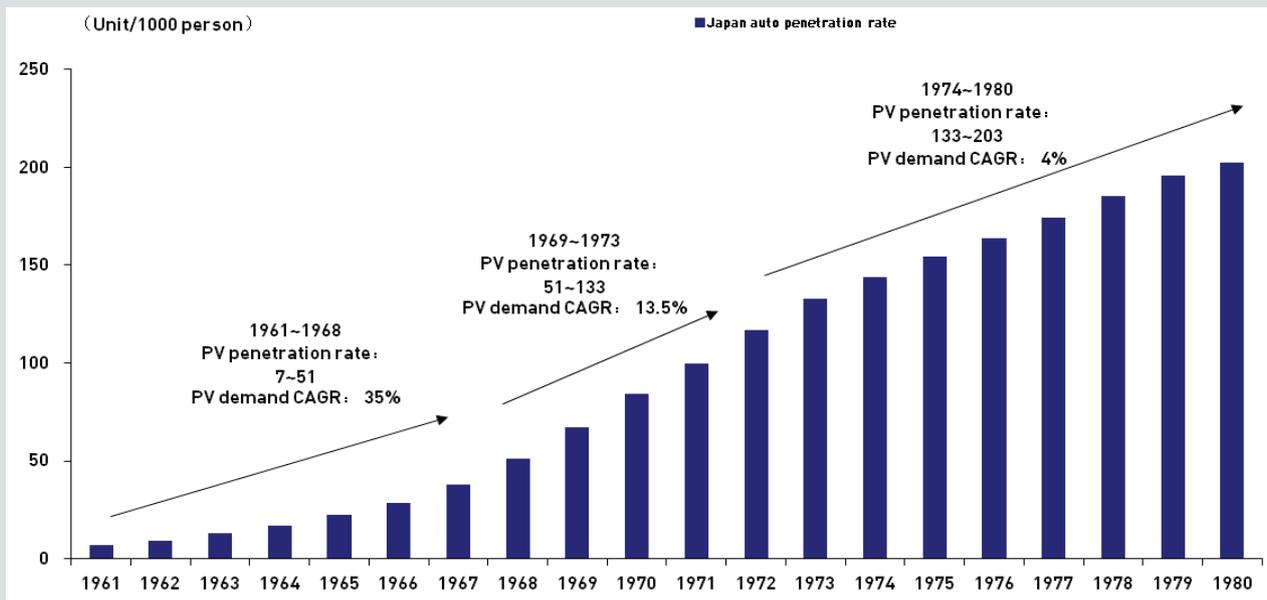
We expect continued moderate growth in the demand for China's PV industry in the next four years, with

Figure 14. Three phases of passenger vehicle (PV) industry growth in South Korea



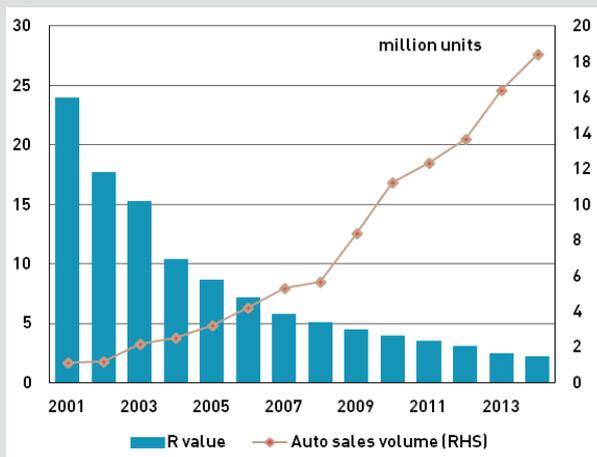
Source: CEIC (c)

Figure 15. Three phases of passenger vehicle (PV) industry growth in Japan



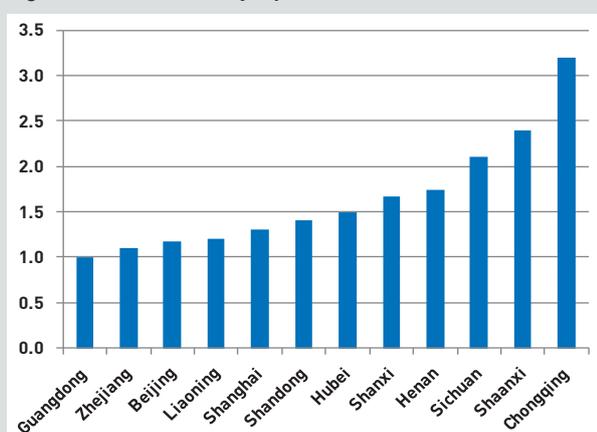
Source: CEIC (c)

Figure 16. Sales volume and R value of China's PV industry



Source: CEIC (d)

Figure 17. R value of major provinces in China (2014)



Source: CEIC (d)

rapid popularization phase, with rapid growth in both penetration rate and sales volume of vehicles. Japan and South Korea saw their R values entering this range in 1960s and 1980s, respectively, followed by CAGR of auto sales volume at above 20% in the following decade. China's R value entered the range of two to three in 2012. Based on the experiences of Japan and South Korea, China's automobile industry is likely to maintain steady growth until 2020.

- Still low automobile penetration rate:** As of the end of 2014, the ownership of PVs per 1,000 persons in China was 90, similar to that in Japan in 1970 or in South Korea in 1992. Since then, both countries have maintained double-digit growth rate for around three years. Given China's large population, the automobile sales volume is likely to maintain steady growth without significant fluctuations in the long term. We expect the automobile penetration rate in China's cities in tiers three, four, and five to further rise in the next five years, and the robust demand from the regions will reinforce the steady growth of automobile demand in China.
- Replacement demand:** As the rapid growth phase of automobile demand has started since 2002, we believe the consumers that bought vehicles around 2002 will gradually generate replacement demand. The replacement

demand is likely to kick off in China, especially in the eastern coastal regions. Currently, the replacement demand accounted for around 40% of total sales volume of automobiles, and the weighting is likely to rise further, in our view, which will help maintain steady growth in overall sales volume. Meanwhile, the replacement demand will have in-depth impacts on product mix in the long term: given stronger purchasing power, consumers will likely upgrade their automobiles to a higher-class while purchasing their second automobiles. Therefore, we believe the high-end sedan, SUV, and luxury vehicle brands will benefit in the long term.

- **Continued improvement in penetration rate of auto financing:** Currently, the penetration rate of auto financing is only about 35% in China; not only lower than that of developed countries such as Japan and U.S., but even lower than that of some developing countries including Brazil and India. Considering the younger automobile buyers and shift of consumption concept in recent years, the penetration rate of auto financing is increasing, which will strengthen the resident's purchasing power.

V. Conclusion

In our view, the repair and maintenance business will benefit dealers the most since the potential change in government regulations will force OEMs to open up the auto parts supply chain, while independent garages/repairers will not pose particular challenges to the dealers given their growth could be deterred by rising costs of equipment, technical expertise, and land. Meanwhile, we expect the online auction websites and large-scale branded used car dealers would enjoy the fast growing used car market the most, given the low entry barriers and improvements in information transparency will cap the earnings upside for traditional dealers/“scalpers”. On the other hand, we think auto finance should be the area that private equity investors should not miss. We believe OEM auto finance companies will continue to gain market share over banks on the back of (i) simpler application procedures; (ii) wider network coverage and higher synergies with new car sales; and (iii) more product varieties.

From a general auto industry perspective, we don't think negative auto sales growth will happen before 2020, while we forecast a CAGR of three percent in the next five years many thanks to (i) rising affordability; (ii) low auto penetration; (iii) strong support of replacement demand; and (iv) continued improvement in auto finance penetration. ■

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Quantitative Methods for Venture Capital Investment in Telecom Media Technology (TMT)

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Abstract: Quantitative trading, a trading strategy which relies on mathematical computations and data crunching to identify trading opportunities, has been increasingly used for the last two decades and proven to be very efficient in the secondary market which includes stocks, foreign currencies and futures market. However, it's not until recently that quantitative methodology caught the eye of the venture capital (VC) investors who invest in a company's shares in the early stages before an initial public offering (IPO). Most investors are curious about the quantitative methods, but only a few VC funds are implementing it and pure data-driven VC funds are rare.

In this article we focus on quantitative approach for VC funds in a specific area, Telecom Media Technology (TMT). With a few examples we elaborate how VC fund managers can use multi-dimensional data to source deals and how this data can help evaluate the target companies. Additionally we discuss some challenges currently faced by the quantitative methodology.

Keywords: TMT, VC, APP, CPA, DD, UV, PV, DAU, MAU, ARPU, CP, AI

I. Data-Driven Investment

The success of a venture investment begins with identifying good startups with great potentials, so the accessibility to the right targets is crucial for all VC funds. Experienced managers spend years building up strengths in spotting promising sectors and picking out future winners.

Big VC funds like Sequoia Capital or International Data Group (IDG) Ventures have little difficulty in sourcing good deals, and other VC funds like Y Combinator, organize events such as Demo Day to attract startups to form a community. Medium and small VC funds however do not have these same opportunities and often have to spend large amounts of time and effort on sourcing pipelines. Sometimes they need to pay a third party fee to get a list of fast growing startups that they can approach. Therefore big VC funds dominate both funding and deal sourcing, leading VC investments closer to a winner-takes-all deal.

Data technology, however, is changing this treasure hunting game by making VC funds more quantitative

than they have ever been. A few Silicon Valley based VC funds are among the first group to implement quantitative methods. They believe that it is possible to scout better trends, startups, and founders by researching the megabytes of data from the startups themselves, their competitors, and the upstream-downstream industries. GV, formerly known as Google Ventures, the VC arm of Alphabet Inc. (the parent company of Google), founded in 2009, believes that better data and information leads to better investment decisions. Equipped with the data from its sister company Google, GV has made 417 investments in 290 companies (Crunchbase, 2016). It has a solid team of in-house engineers and data specialist to handle the large datasets with the full statistical resources of Google. For example, they mine and work out patterns from data such as successful entrepreneur's schools, former employers, number of connections on LinkedIn, and more. This provides information for the VC fund to identify their next investment by using similar pattern. "Google is a data company, and many of us worked at Google previously, so naturally the way we look at investigating and tackling problems is from

a quantitative perspective,” says Bill Maris, Managing Director of GV (Rao, 2013).

In China, TMT VC funds have been very active for the last decade thanks to the boom of mobile internet and the popularity of smart phones. However, when it comes to deal sourcing, the domestic VC funds rely on traditional ways like government backed incubators, seasonal industry summit conferences, social networks like ex Alibaba employee club, or even personal recommendations. “If we decide to invest in a new area, we will [initially seek advice] from people who have already invested in the area. Most likely if we find their investment attractive, then we will just tag along. I know it sounds simple and maybe a bit unprofessional, but that’s the way it works here. You follow the winners,” added Eva Tu, who runs a small VC fund in Beijing without any research analysts, “After all it is hard for outsiders to know the ins and outs of something new” (Alex Yang, personal communication, March 18, 2016).

It’s a Chinese TMT organization that realized the importance of using data in making investment decisions before VC funds. One of the largest media service for startups in China, 36Kr.com, worked with Talking Data, the third largest mobile big data platform, to build up a TMT startup data pool which included team profile, number of App users, financing history, media exposure, etc. Based on this multi-dimensional matrix composed of the above data, 36Kr created a quantitative tool named Kr Index, which was calculated by the web traffic flow, app downloads, searches on engine, media exposure as well as the financing, recruitment, and size of the company. The larger the Kr index, the faster the growth of the company. The platform currently calculates Kr index for over 30,000 startups in China and has helped over 2,000 startups to successfully acquire funding.

II. The Case of YeahMobi

Market participants like YeahMobi, China’s largest data driven performance marketing network, finds the value from its huge online traffic flows. YeahMobi carries out about 250 billion impressions every month and helps over 2,000 app clients to get two to three million downloads every day. YeahMobi does not charge advertisers by the number of impressions, but the number of downloads and registrations; a format of marketing is called the cost per action (CPA) model. This model shows the importance of converting impressions to a real user is crucial and to achieve this requires advanced data technology. For the last five years YeahMobi has built a cutting edge platform of data gathering and analytics that places it as the world’s top performance based mobile marketing network.

Dr. Peter Zou, CEO of YeahMobi, is a firm believer of using data not only for advertising, but also to spot other business opportunities. “Our data also shows a great likelihood that mobile apps worldwide will be massively produced and operated by Chinese teams, especially mobile gaming and tool apps.” He adds, “In fact, we see three phases for the development of China’s internet. The first phase was Copy-US-to-China, like Taobao vs. eBay, Baidu vs. Google. The second phase was the rise of China’s mobile internet, like Cheetah, momo, and YY. We are now at the beginning of the third phase, and it can be called Copy-China-to-the-World. It’s the mobile version of One Belt, One Road” (Alex Yang, personal communication, October 12, 2016).

In fact, according to YeahMobi, Chinese teams have been increasingly active in Southern Asia, India, Middle East, Latin America, and Eastern Europe. A great number of Chinese teams have already found a way to enter developed markets like U.S. and Europe. According to reports half of the top 10 tool apps in U.S. are made in China and it is believed that soon China will dominate the mobile apps market (Baijingapp, 2016). While YeahMobi is dedicated to helping Chinese teams acquire users overseas, it also sense great investment opportunities for itself.

In the beginning of 2015, Dr. Zou noticed that overseas online video traffic increased substantially. Immediately he got his team to dig further into the video trend based on the proprietary data. In a week the team reached a conclusion that in terms of user conversion, video advertisement performed five times greater than graphic advertisement, and the research results also suggested that there were no video-based social networks running in the overseas markets, while the Chinese ones had proven to be cash cows. It was a great investment opportunity and YeahMobi wasted no time in making the most of it.

In the following months of 2015, YeahMobi’s VC fund Beam Capital, teamed up with 9158.com, a Hong Kong listed video community firm, to found four startups to run the video social networks in Indonesia, Middle East, Russia, and Latin America. It was not until early 2016 that mainstream Chinese VC funds started to invest in over a 100 live streaming video startups in China. However, Beam Capital’s portfolio companies have already been up and running for half a year, and in the TMT business six months makes a big difference and can earn the business a lot of edge.

“We are lucky to be ahead of the curve in terms of video related investment. And our decision to do it overseas also helps us to avoid the tough competition in the Chinese domestic market,” says Chris Hao, the

former COO of YeahMobi and Founding Partner of Beam Capital, which has made over 20 investments in overseas projects based on quantitative analysis of their substantial market data. He adds, "Our data analysis demonstrates its strong ability to correctly predict the trend of mobile technology and to find the less competitive market. It also helps us in due diligence and valuation of targeting companies" (Alex Yang, personal communication, January 25, 2016).

III. Operational Data for TMT

Due diligence is an investigation of a potential investment to confirm all operational data and material facts. For a traditional financial investor, the first challenge when investing in a TMT is to understand the industry glossary terms like UV, PV, DAU, MAU, ARPU etc. UV means unique visitor, a figure derived by counting the number of visits from different IP addresses. PV refers to page view, which counts the number of views garnered by a web page. DAU means daily active users, which counts the number of users who use the app at least once a day. MAU means monthly active users, which counts the number of users who use the app once in a particular month. DAU, therefore, is a better indicator of more consistent users than MAU. ARPU means average revenue per user, a number that counts the profit that users can generate for the business.

All this data, if available, can help to value TMT companies because traditional valuation metrics used by price/earnings (P/E) ratio or earnings before interest, tax, depreciation, and amortization (EBITDA) don't work well as these companies might not even be making any profit at such an early stage. In fact, when Facebook and Google launched their IPO, the investor community was fairly clueless as to how they should evaluate these TMT companies due to their then negligible profits. The valuation metric ultimately used by investors was based on a quantitative analysis of DAU/MAU because it would translate into how much traffic Facebook and Google could acquire to resell to advertisers; a better reflection of their future revenues and profits.

Set by precedence, the early TMT companies follow similar valuation metrics. It is very important for the startup founders to focus on growing solid audience data like DAU/MAU, especially if they are not able to make profits yet. The VC investors are equally interested in such operational data and it helps them and the founders understand the business' position even if there is a lack of financial data. However, as this data is directly linked to the valuation of the company, there are cases that these numbers can be manipulated and hence can be misleading. Fortunately, the VC funds can also rely on third party

tools like Google Analytics to do the due diligence for them. Google Analytics is an incredible tool that has democratized data to ensure the data available on internet traffic is accurate. It is designed for gathering important information that reflects the app audience's activity, most visited content, the frequency of the visits, and average time the visits last.

Once the data is verified, a convenient way to find out the user based valuations is to use openly invested peer data as the benchmark. For instance, below table shows MAU and valuations of a group of businesses known as social networking service or SNS. Snapchat MAU is most valuable at US\$100/MAU, likely because most of its users are Americans, while China based Momo takes US\$37/MAU at the lower end. If one wants to value a SNS app of 1 million MAU from America and China, then this app would be worth somewhere between US\$37 million and US\$100 million. Alternatively, one can even break down geographic MAU to come up with a valuation that is more accurate. Of course, the purpose of this practice is to show one way of finding an appropriate range for a TMT startup, not to prescribe an exact value per user.

Figure 1. MAU and valuation of mobile apps

Apps	MAU (million)	Valuation (million US\$)	Valuation/User (US\$/MAU)
Snapchat	100	\$10,000	\$100
Line	175	\$10,000	\$57
WhatsApp	465	\$22,000	\$47
Momo	69	\$2,574	\$37

Source: Statista.com

Although quantitative analysis has unprecedented advantages over qualitative analysis, it's unrealistic to base investment decisions on quantitative methods alone. There are empirical examples showing that valuation based only on data can be misleading as well.

IV. Moonfrog Labs: A Case Study

Moonfrog Labs, a Bengaluru-based Indian gaming company, received US\$15 million in Series A funding, the first round of VC financing, from Tiger Global and Sequoia Capital in March 2015. The valuation was estimated at US\$75 million or above, largely because Series A funding was normally raised by giving up 10% to 20% of equity shares, hence US\$15 million accounted for 20% stakes of US\$75 million (Shu, 2015). Prior to the Series A funding, the Indian gaming content provider of about 15 employees, developed and ran two major games Teen Patti Gold and Bingo Club. The total downloads of Moonfrogs Labs' gaming

apps was reported to be about three million and more than 90% of the players were from India.

The other way to tackle this valuation is to estimate the cost of acquiring three million game users in India. According to YeahMobi, the world's leading mobile user acquisition platform, the average cost to acquire one game player in India is about US\$0.5, i.e., for each download and registration of a game player acquired through the network of AdTech company like YeahMobi, the gaming company pays US\$0.5. Let's, however, double the cost to make it conservative, then it's fairly safe to say that one can achieve the same user base by less than US\$3 million.

Given the estimated company valuation of US\$75 million, the user replication cost of less than US\$3 million, and a team of 15, its potential should be worth at least US\$72 million which was not very persuasive. The compensation for gaming engineers is estimated at US\$100,000 to US\$300,000, hence it is without question that a top gaming team of 15 can be recruited within the budget of US\$4 million.

There must be some information in the valuation unknown to the public, otherwise the whole business can be replicated by US\$7 million, less than half of the US\$15 million invested by Tiger and Sequoia. This example shows us that a pure user based quantitative valuation does not make sense without a deep knowledge of the team, or else there could be good arbitrage opportunities.

V. Conclusion

As we have illustrated above, quantitative methods excel in helping to scout for better startups and better deals at an earlier stage. It also helps you to predict the trend of the industry and grab the investing opportunity faster than ever before. Last but not least, it helps to evaluate the startup in a more objective and reliable way, reducing the risk of loss due to information asymmetry. The benefits of quantitative methods in VC investments are quite obvious and we would recommend TMT VC funds to engage more data technology and employ more quantitative approaches.

On the other hand, currently quantitative methodology has its own limitations and it's smarter for investors to combine quantitative and qualitative methods before they make investment decisions than to rely solely on any one of them.

Talking about the future of the power of data, one cannot ignore the case of AlphaGo's victory over humans. In March 2016, with a decisive victory, Google DeepMind's AlphaGo, a computer program powered by over 100 scientists, defeated a world

Go champion Lee Sedol. Go, an ancient Chinese game well known for its complexity, has long been regarded as the most challenging board game for Artificial Intelligence (AI). It is widely discussed that if a machine is so advanced, it might take over more human jobs. We believe, aided by the fast developing AI, quantitative VC funds might become a major force in the primary market like the quantitative hedge funds are in the secondary market. ■

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A Pricing and Risk Management System for Chinese Bonds

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This article discusses the research undertaken by RMI on developing a pricing and risk management system for Chinese bonds. The research uses quantitative finance to study applications to Chinese markets.

I. Basics of China's Bond Market

China's bond market is one of the largest among emerging economies in Asia and the third largest in the world after U.S. and Japan. Government and quasi-government bonds greatly dominate and there are six major types of instruments traded in China's bond market: (1) Ministry of Finance (MOF)-issued China Government Bonds; (2) People's Bank of China (PBC) paper; (3) financial bonds issued by government-backed policy banks and financial institutions; (4) corporate bonds issued by domestic corporations; and (5) commercial paper, issued by either securities firms or private corporations; and (6) medium-term notes (MTNs).

In China, over 90% of bond trading takes place in the National Interbank Funding Center (NIFC), among nearly 10,000 institutional investors such as commercial banks, insurance companies, public/private offering funds, overseas central banks, sovereign wealth funds, etc, whereas less than 10% of bonds are traded over Stock Exchanges by institutional and individual investors. The interbank bond market is an over-the-counter (OTC) wholesale market, and the exchange bond market is a retail market (Asian Development Bank, 2012).



II. Changes and Challenges

The total daily volume of bond trading in China is over two trillion RMB. An article by Nicholas Borst, an analyst specializing in Greater China and South Asia regions for the Federal Reserve Bank of San Francisco, mentions the three new major changes taking place in the Chinese bond market; fast growth rate, more open to foreign investors, and riskier market conditions. Borst also points out there are three main reasons for the rapid growth of the Chinese bond market: (i) the government aims to enhance the scope of direct financing by issuing more bonds; (ii) corporations find raising money via bond market more attractive than borrowing money from the bank as a result of better funding costs in the bond market; (iii) as part of the central government's plan to restructure local debts, local governments are swapping bank loans into bonds (Borst, 2016).

Secondly, China's domestic bond market has not allowed access to most foreign investors largely due to its strict policies on capital flows in and out of the country. Although this is slowly changing as the nation is implementing new policies that will allow international investors greater access to China's bond market. In February 2016 People's Bank of China (PBoC) announced foreign entities like, commercial banks, insurance companies, securities companies, and investment funds would be allowed to invest in interbank market, given some limitations (Borst, 2016). This new policy went hand-in-hand with other reforms that foreign investors could take advantage of when investing in the Chinese market.

Finally, addressing the subject of the bond market becoming riskier, historically defaults have been quite rare in the Chinese bond market. However, there are an increasing number of defaults since 2014 that point toward increasing risks. According to Borst, 70 companies have cancelled or postponed issuing of new bonds within the first quarter this year. This has resulted in negative sentiment towards China's bond market deepened by the lack of government support (Borst, 2016).

The bigger, more open, and riskier bond market, as discussed above, is generating new challenges for Chinese regulators. According to Borst, “a large and open bond market that accurately prices risk would help the Chinese financial system to become less bank-dependent and more efficient. However, each of these trends also has the potential to contribute to financial volatility if reforms and regulation do not keep pace” (2016). Additionally the market is still in the development stage and no pricing or risk management system is currently in place to regulate the bond trading in China; this could lead to serious problems in terms of regulating, risk control, and fair trading.

Recognizing this gap in research, this new initiative at RMI will use financial data from Chinese bond markets and study interesting financial models tailored to unique financial situations in China, and will be relevant to both the public and private financial sectors. Employing quantitative finance, an interdisciplinary research area related to finance, mathematics, and statistics, this research will specifically focus on developing pricing and risk management system for bonds in Chinese interbank bond market, dual-purpose funds, and Chinese convertible bonds.

III. Interbank Bond Market in China

Currently, Wind Information Co., Ltd, is the leading provider of financial data on Chinese markets whose users include 75% institutional investors. They provide yield curves and bond prices in Chinese interbank bond market, generated by ChinaBond, China Securities Index Co., and NIFC. However, this data is either a black-box kind of data or has no theoretical models for their output. Bloomberg also provides valuation data, but only for a limited number of bond products in China. The first target of RMI’s initiative is to price all bonds in Chinese interbank market, where all models will be derived from either leading academic journals or research results published or to be published by RMI’s researchers. This study hopes to produce all credit yield curves and to price all non-standard bonds such as callable and puttable bonds, floating rate bonds, perpetual bonds, etc. For illustration, we concentrate on callable and puttable bonds.

Callable and puttable bonds are bonds with embedded options. Callable bonds give the issuers the right to redeem the bonds, while puttable bonds allow the holders to force the issuers to repurchase the securities, at specified dates before maturity, as usually stated when the bonds are issued.

In China, the National Interbank Funding Center accounts for about 90% of daily volume (more than 2000 billion RMB) of bond trading, while the bond

trading in exchanges only accounts for about 10% volume. Among all the bonds in the market, about 20% are callable and puttable bonds. Since these bonds usually have longer maturities (e.g., 5 to 10 years), interest rates must be treated as a random variable. Vasicek (1977) assumes that the instantaneous spot rate evolves according to a mean-reverting Ornstein-Uhlenbeck process. The Vasicek model has been extended by many researchers [Cox et al. (1985), Ho and Lee (1986), Hull and White (1990a, 1990b)]. In particular, Hull and White (1990a, 1990b) propose a no-arbitrage model, where the time-varying mean-reverting drift allows the model to fit yield curves.

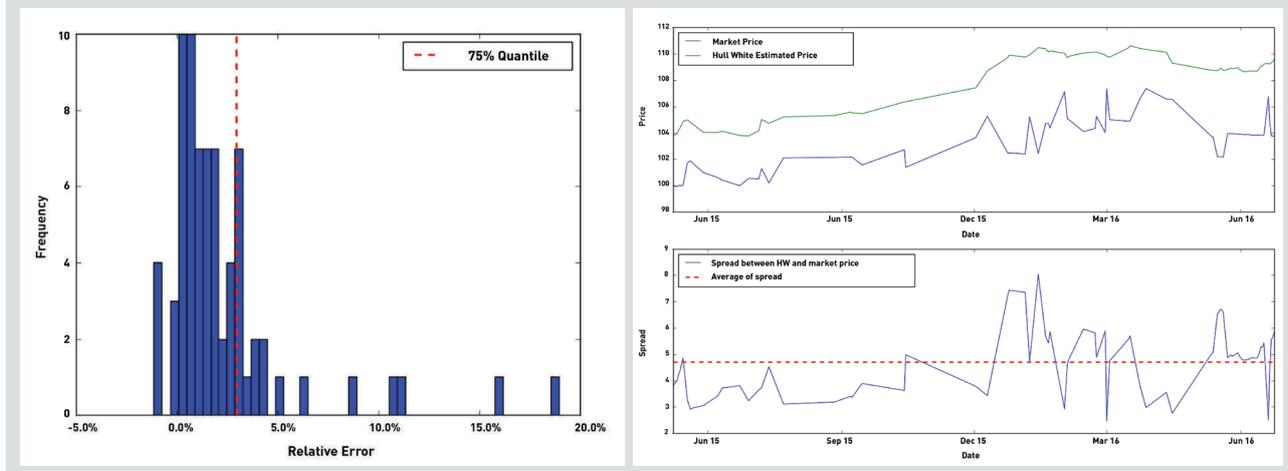
However, these standard financial models cannot price Chinese bonds accurately, due to liquidity constraints and credit considerations. There is some related literature on liquidity risk in U.S. that can help us look at the Chinese market. As pointed out in Amihud and Mendelson (1986), investors seek for a liquidity premium for illiquid assets. Chen et al. (2007) confirm that lower liquidity leads to higher yields, and thus lowers prices of the bonds. Jarrow et al. (2002) propose a bond pricing model, incorporating both liquidity risk and correlated defaults. They characterize the liquidity in the model in terms of a discounting factor that depends on the short rate and market index. However, their model is for vanilla zero-coupon bonds without call/put clause and does not fit the yield curve.

We plan to provide a pricing and risk management system for callable and puttable bonds, incorporating interest rate risk, credit risk, and liquidity risk, which is indispensable for both institutional investors and regulators. In addition to providing models and to conducting empirical studies of products, we hope to build a pricing and risk management IT system, so that the results can be readily used by regulators and institutional investors in China.

We start from the Hull-White model with credit risk but without liquidity risk. The value of the puttable bond can be decomposed into a straight bond and call option. We then look deeper into the value of the straight bond and the pricing formula of the call option. The value of the straight bond part of the equation can be then obtained by discounting the cash flows to the time of valuation.

In terms of the model described above, we have conducted an extensive empirical study for the callable/puttable bonds in China Market (Cui et al. 2016). By the end of June 2016, there are more than 900 bonds with unexpired embedded options in the China market. We first consider 73 bonds with AAA rating and find that most of relative errors between

Figure 1. Panel A (left) gives the relative errors between estimated prices and market prices of 73 bonds with AAA rating. Only bonds with trading record from 24 May, 2016 to 24 June, 2016 are included. Panel B (right) gives the market price, estimated price and price spread of an AA+ rating bond JRJTZ (bond code 1580117) from Aug 2015 to July 2016. The spread stays at the same level within the year



the market prices and our model prices are below 3% [see Figure 1 Panel A]. However, for the bonds with lower rating, we find that the relative errors can be as large as 7% [see, e.g., Figure 1 Panel B].

This suggests that liquidity risk significantly affects the prices of bonds with lower credit ratings, which is consistent with those findings in the U.S. market. To further the study, we will incorporate liquidity risk into our model in the future.

IV. Dual-Purpose Funds in China

The second focus is the pricing of dual-purpose fund in China. A dual-purpose fund is a fund created by a closed-ended investment company which offers two classes of stock, where each class offers entitlements to either income or capital appreciation (Dual Purpose Fund, 2013). It is a structured product written on an underlying mutual fund, where the underlying fund can be split into lower risk/return shares (A shares) and higher risk/return shares (B shares), each having a claim on the underlying. A shares behave like a regular bond, while B shares resemble a leveraged exchange-traded fund (ETF), a fund that uses financial derivatives and debt to augment the returns of an underlying index, taking advantage of its short-term momentum (Leveraged ETF, 2015). The dual-purpose fund was initially designed to provide investors with the opportunity of repackaging their income and capital flow in accordance with their tax brackets and risk preference, and to improve the efficiency of market recapitalization (Litzenberger, 1977).

The first dual-purposed fund in China was launched in 2007. As of June 2016, there are over 120 dual-purpose funds in China market, with total asset under management around 200 billion RMB. However

there are some unique qualities of dual-purpose funds in China. To begin with let us compare China's market to the U.S. market, whose payoff of dual-purpose funds resembles that of a European vanilla call option. However, the pricing models that work for the U.S. market are not applicable to the China market, because the dual-purpose funds in China have a much more complicated payoff structure: (1) There is usually no maturity; (2) Lower risk/return (A shares) and higher risk/return (B shares) will be partially liquidated (called "reset") if the net asset value of the underlying fund exceeds (or falls below) a predetermined upper (lower) threshold; (3) At predetermined dates, holders of A shares receive periodical interest payments that may change due to reset events. Historical data indicates that many funds experienced upward or downward reset events, especially during the mid-2015 market crash. This calls for a more sophisticated pricing model for dual-purpose funds.

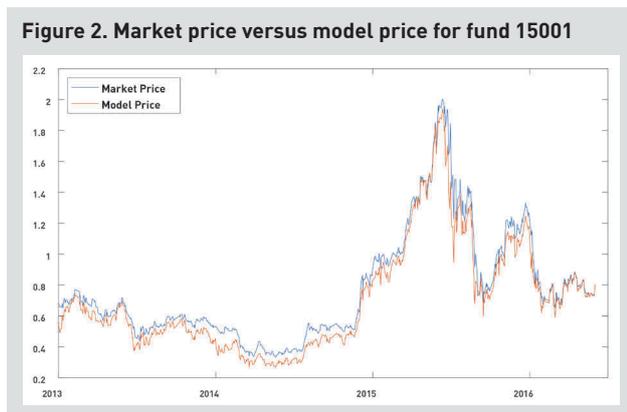
Moreover, the dual-purpose funds in China have a transparent structure: A and B shares of the funds are actively traded in stock exchanges, and the net asset values of the underlying funds are announced daily after the market closes. Therefore, although abundant data on dual-purpose fund is available, currently no accurate implied-risk free rate for these products is available in China. This research aims to conduct empirical study on these products to derive the above-mentioned implied risk-free rate.

Such studies have been previously done on other markets, however the same approaches might not be ideal for the Chinese bond market. For example, Adams (2005) and Adams and Clunie (2006) propose a Monte Carlo simulation approach to price the dual-

purpose funds in British market (also known as Split Capital Investment Trust). However, the simulation approach is too slow to be adapted to the real-time evaluation demanded by the China market in which the A and B shares of dual purposed funds are traded in exchanges. Therefore, it is more appealing to design a fast and efficient pricing algorithm that is applicable to big market data.

Although the research being conducted by the RMI team is still in its early stages, the study has yielded some preliminary findings. We started by studying the Black-Scholes framework, a model for calculating the premium of an option. The values of A and B shares are governed by a non-local partial differential equation (PDE) and we have designed an iterative algorithm to solve the equation numerically (Dai et al. 2016). Numerical results reveal that the iteration converges to a unique solution for all reasonable initial guesses. Our first goal is to establish the existence and uniqueness of solutions to this non-local PDE problem and attempt to derive a stochastic representation of the unique solution.

Figure 2 below presents the market price and our model price of B shares for a dual-purposed fund in China. Observe that our model well captures the change of the market price, but the market price is always slightly higher than the model price. This phenomena is consistent with the findings of Ingersoll (1976) in the U.S. market. We also observe that the gap between the model prices and the market prices shrinks significantly towards mid-2016. We plan to investigate the robustness of our model in terms of the data available on the exiting 120 dual-purpose funds.

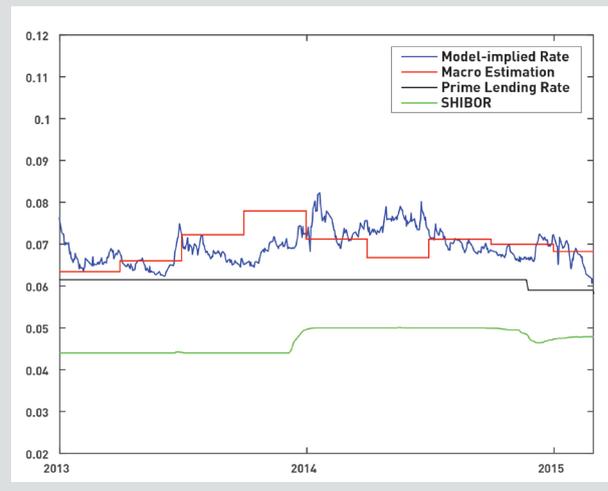


In addition, the level of risk-free rate plays a critical role in the pricing of financial derivatives and thus begs the question: what is the true level of risk-free rate in China? The existing literature shows that the U.S. market often uses T-bill yield, London Interbank Offered Rate (LIBOR), or Overnight Index Swap (OIS)

as a proxy of the risk-free rate. However, the validity of these proxies as a good representation of the risk-free rate is questionable in the Chinese market, because of the presence of financial repression such as setting a ceiling and floor on the benchmark deposit rate.

We plan to address this issue by looking into the dual-purpose fund market. Specifically, we use the market prices of dual-purpose funds as an input for our model to derive the implied risk-free rate.

Figure 3. Model-Implied Rate, Macro Estimation, Prime Lending Rate and Shanghai Interbank Offered Rate (SHIBOR)



An apparent advantage of this method is that, given the nature of A and B shares, the implied rate obtained is capable of capturing the characteristics of both bond and equity market. Using the data of the existing 120 dual-purpose funds in the Chinese market, we design an implied risk-free rate index. Figure 3 reports our preliminary result for this implied rate index, compared with a macroeconomic estimation of the risk-free rate, the five year prime lending rate, and one year Shanghai Interbank Offered Rate (SHIBOR). The result shows that the level of model-implied rate is much closer to the macro estimation and prime lending rate than to SHIBOR.

For further study of the dual-purpose funds, we plan to extend our model to stochastic interest rate model and/or stochastic volatility model. In addition, we will also improve our numerical algorithm, making it more efficient to meet the requirement of real-time pricing.

V. Chinese Convertible Bonds

Lastly the research initiative will focus on Chinese convertible bonds, where the main concern is with their pricing and hedging. Convertible bonds are hybrid securities that have the characteristics of both straight bonds and equities. The bondholder receives coupons periodically and is entitled to exchange

the security at his/her discretion for a pre-specified number of shares of the issuing company's stock. Convertible bonds are quite popular as a fund-raising tool among smaller and more speculative companies. The companies would have to pay high interest to their debt holders if they chose to raise funds through straight bonds. Nevertheless, their stocks are usually undervalued because the capital market is uncertain about the prospects of their business. Convertible bonds might help to achieve financing with lower coupon payments, which is justified by the conversion right that the bondholders are entitled to.

From the perspective of investors, convertible bonds are also attractive to some extent, because they offer equity-like returns and a bond-floor protection against the downside risk when the business of the issuing company is not doing so well.

Compared with those in the overseas over-the-counter (OTC) markets, convertible bonds in China have two distinct features:

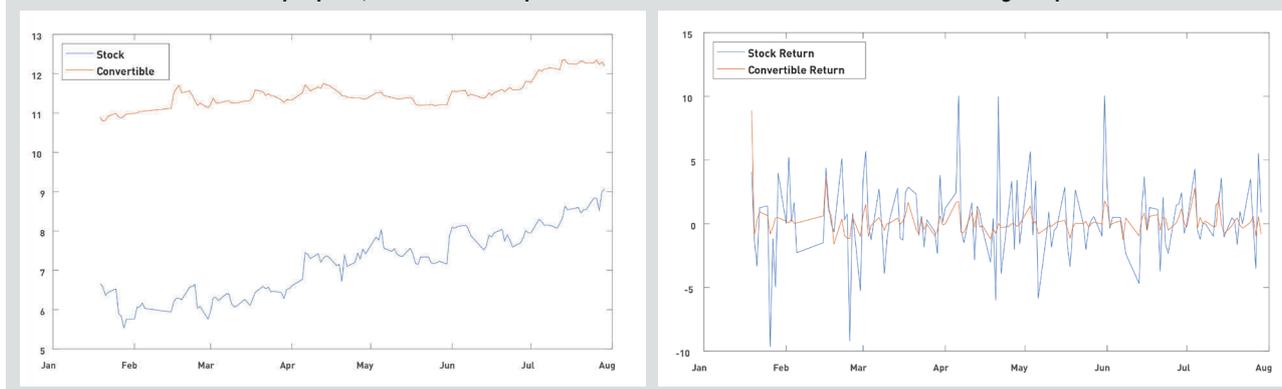
- They are traded in exchanges, so a large amount of real-time market data is available for analysis. Figure 4 below exhibits the high correlation between the daily market prices/returns of a convertible bond in China and its associated company stock. Trading on exchanges enables us to neglect counterparty risk, but this also calls for real-time valuation, which requires a fast and efficient algorithm.
- In addition to the puttable or callable provision, the conversion ratio adjustment clause is often embedded in the convertible bond contract. For example, the Nanshan convertible bond contract stipulates that the conversion ratio may be raised subject to the approval of shareholders, if the underlying stock price has stayed below the conversion price for 10 days out of the consecutive 20 trading days.

This clause is notoriously difficult to price because 1) it is highly path-dependently; 2) raising conversion ratio hurts shareholders' benefit, but keeping conversion ratio fixed may lead bondholders to exercise the puttable provision, hence, shareholders may have to seek a tradeoff. Historical data indicates that many convertible bonds were forced to raise conversion ratio during financial crisis in 2008.

The pioneering work on convertible bond pricing dates back to Brennan and Schwartz (1977, 1980) and Ingersoll (1977), where the bond is regarded as a contingent claim on the company's asset, and the pricing problem is formulated as an optimal stopping time problem. Since then, there is a large body of literature on this so-called structural approach, including works by Asquith and Mullins (1991), Asquith (1995), Altintig and Butler (2005), and references listed in their research. Recently, research by Chen et al. (2010) further extended the structural approach to a game problem between bondholders and shareholders. The main criticism for the structural approach is that the company value is not directly observable. It is more convenient to regard the bond as a contingent claim on the company's stock whose price is directly observed [McConnell and Schwartz (1986), Cheung and Nelken (1994), Tsiveriotis and Fernandes (1998)]. Recently, default risk is also incorporated into this class of models [Takahashi et al. (2001), Ayache et al. (2003), Dai and Kwok (2005)]. However, all of these models do not touch the conversion ratio adjustment clause.

As part of the initiative at RMI, we focus on the pricing of convertible bonds with the conversion ratio adjustment clause. We first formulate it as an optimal stopping time problem, where the conversion ratio is assumed to be adjusted once triggered events occur. To price the product, we plan to extend the least square Monte Carlo simulation approach developed by Longstaff and Schwartz (2001). In addition, we will also

Figure 4. The daily prices and returns of a convertible bond named "Guo Mao Convertible Bond" and its associated stock "Xiamen Guo Mao". For illustration purpose, the convertible price has been scaled down to one-tenth of its original price.



consider the extrapolation technique adopted in our recent work Dai et al. (2010) to speed up convergence. Another point to consider is, even if a triggered event occurs, shareholders may refuse to adjust the conversion ratio, and then bondholders may opt to exercise the puttable right. This can be formulated as a game problem which was studied in our recent work on convertible bonds (Chen et al., 2010). We aim to combine our model and the real market data to investigate the optimal adjustment strategy.

VI. Conclusion

The overarching goal of studying and developing a pricing and risk management system based on the above three topics is to provide industry reference prices for Chinese bonds, facilitate regulation during their trades and to detect irregular and inside trading activities in the interbank bond trading market and exchanges. The data resulting from this project could also be used in accounting, margin calculation, and auditing. ■

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