

金砖国家 股市关联研究

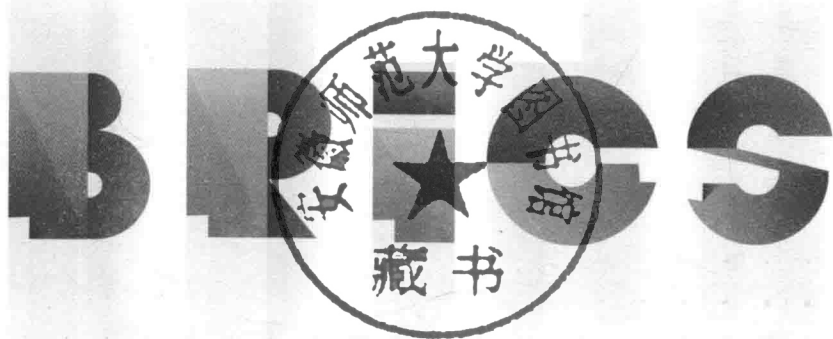
骆 嘉◇著



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序

“金砖四国”是2001年由美国高盛公司提出的经济学概念，到2008年第一次“金砖四国”峰会的召开成为一个政治学概念，再到2010年南非加入金砖合作机制并且更名为“金砖国家”，是当代中国改革开放和世界经济全球化发展进程其中的一个引人注目的现象。应此时运，新兴市场之间、新兴市场与成熟市场之间的关联必然成为人们普遍关注和深入研究的新领域。

金砖国家合作机制是一个以功能合作和新兴国家身份认同为基础的强有力的跨地区国际合作机制，金砖国家金融合作是金砖国家合作机制的重要组成部分，金砖国家股市关联又是金砖国家金融合作机制的重要有机组成部分。对这一问题开展深入研究具有重要的学术价值和现实意义。

《金砖国家股市关联研究》一书，是骆嘉在其博士论文的基础上修改而成的。该论文曾获得论文评审专家和答辩委员会专家的一致好评，后来又汲取了各位专家的宝贵意见和建议，经过一年多的认真修改、润色完善。我作为骆嘉的导师，对他的研究成果即将付梓出版感到十分高兴。

《金砖国家股市关联研究》具有如下特点：（1）选择金砖国家股市关联问题为研究对象，方向明确，在当前金砖国家股市关联方面的研究还比较少见的情况下，该选题一定程度上弥补了金砖国家金融合作机制研究以及跨境股市关联研究的不足，有创新性。（2）在金砖国家股市关联研究的过程中所采用的方法，如以金融计量经济学研究方法为基础，基于收益率的视角，从线性相关关系、均值溢出效应、波动溢出效应以及联动四个角度，使用了SVAR模型、多元波动率模型、事件研究法等数量化模型及实证方法，对金砖国家成员国股市之间关联的演变趋势及其影响因素进行了比较深入细致的刻画和研究，逻辑论证路径清晰，分析方法得当合理。（3）研究过程中所运用的文献数据，经过国内外多个渠道的独立发掘，分类整理，比较归纳，演绎推理，数据翔实，有较强说服力。（4）通过对金砖国家成员国股市之间的关联进行研究所获得的结论，不仅完善了以

往理论界对基本面因素引起的股票关联形成机理的解释,而且因为独到地借助了当代行为关联理论进行研究,充实并完善了理论界对行为因素引起的金砖国家成员国股市之间的股票关联形成机理的解释。

上述创新与独特之处,在一定程度上有助于帮助人们更好地从资本市场角度加深对金砖国家股市关联现实和机制的认识和理解;有助于帮助人们更好地全面理解金砖国家金融合作机制框架下的新兴市场关联来源及其特征;有助于帮助人们更好地实践金砖国家金融合作的发展战略;总而言之,在当代中国改革开放和经济全球化背景下,为进一步实施金砖国家合作机制提供实证资料。

当然,该书也还存在某些不足。比如:金砖国家股市关联的内在形成机制与传导路径,流动性视角下的金砖国家股市关联等问题的研究还欠深入,有待今后进一步认真探索和研究。

近年来,金砖国家在金融合作方面取得了显著进展。例如,2014年7月15—16日,中、俄、印、巴、南五国领导人在巴西福塔莱萨和巴西利亚两地举行金砖国家领导人第六次会晤,签署了成立金砖国家开发银行和应急储备安排的协议。经过友好协商,金砖国家开发银行总部设在中国上海,预计2016年投入运行。2015年4月15日,亚洲基础设施投资银行(Asian Infrastructure Investment Bank,简称“亚投行”,AIIB)意向创始成员国确定为57个。2015年5月22日,筹建亚洲基础设施投资银行第五次谈判代表会议在新加坡举行,就《亚投行章程》文本达成一致。各方商定2015年6月底在北京举行《亚投行章程》签署仪式。根据筹建工作计划,亚洲基础设施投资银行将于2015年年底之前正式成立。因此,有中国参与的金砖国家开发银行与由中国主导的亚洲基础设施投资银行之间的业务关系及其区分,金砖国家开发银行对金砖国家成员国股市的整体影响,金砖国家开发银行对金砖国家各个成员国股市的个别影响等方面,都有从宏观到微观进行深入研究的必要。

俗话说“学无止境”。在欣然看到骆嘉的研究成果《金砖国家股市关联研究》行将问世的同时,也希望骆嘉一如既往继续前进,在金砖国家金融合作乃至上述值得进一步开展学术研究的诸多方面取得新的研究成果。

严武

2015年6月12日

摘 要

20 世纪 90 年代以来,国际社会出现了大量多边合作机制。这些机制大多以共同地域为基础,是经济地区主义的一种表现形式。与现有其他多边合作机制不同,金砖国家合作机制是一个以功能合作和新兴国家身份认同为基础的强有力的跨地区国际合作机制。世界历史上,很少有哪一个国家联合体是从国际经济学概念出发,进而结成政治实体的,金砖国家便是这个特例。作为新兴经济体当中的佼佼者,得益于金砖国家概念同时具有的国际经济学属性与国际政治学属性,对金砖国家成员国股市之间的关联进行研究,有助于更好地理解金砖国家合作机制框架下的新兴市场关联特征及其来源,也有助于从资本市场角度形成对金砖国家合作机制的认同。

股票关联既存在于一国股市之内,又存在于各国股市之间。理论界对股票关联形成机理的解释不外乎两个层面,即基本面因素引起的关联和行为因素引起的关联。以有效市场假说为基础,基本面关联理论认为,股票价格由其内在价值决定,基本面关联是股票关联的根本原因。具体来看,就是股票预期现金流或预期折现率变动的相关性。然而,越来越多来自成熟市场经验性证据表明,基本面因素并不能完全解释不同股票之间的关联,这对基本面关联理论乃至有效市场假说理论提出了巨大的挑战。正因为如此,作为基本面关联理论的有益补充,行为关联理论随之出现。对于不能被基本面因素完全解释的股票关联部分,行为关联理论认为,投资者并不都是理性的,投资者的特有交易行为会形成特定交易模式,而既定模式下不同股票之间需求的相对变动,则会引起股票收益之间的行为关联,也就是所谓的“行为联动”。巴伯里斯等(Barberis et al., 2005)将行为关联区分为基于分类的关联和基于偏好的关联。

当前有关跨境股市关联研究或着重于成熟市场之间的关联,或着重于新兴市场与成熟市场之间的关联,新兴市场之间的关联相对有限。成熟市场大多有着悠久历史,关于成熟市场关联的研究也较为丰富。大量实证研

究表明,在经济全球化进程不断向前推进、全球资本市场一体化趋势不断实现的背景下,成熟市场之间的关联也在不断发生变化。尽管受到众多历史事件的影响,这一关联变化过程有所反复,但总体的变化趋势是,成熟市场之间的关联从 20 世纪 60 年代开始已经有所加强。并且随着时间的推移,这种市场关联性得到了不断增强,这种趋势变化在 21 世纪头十年里表现得尤为明显。进入 21 世纪以来,新兴市场国家积极融入经济全球化的历史进程,新兴市场的表现开始抢眼。尽管从逻辑上看,新兴市场对成熟市场应该表现出相当程度的依赖,但是,学术界对于新兴市场与成熟市场之间、新兴市场之间是否存在关联一直没有定论。部分学者认为,新兴市场之间、新兴市场与成熟市场之间不存在关联,部分学者则认为存在。特别地,对于金砖国家成员国股市之间的关联而言,通过实证研究所得到的结果也是多种多样的。即便如此,现有金砖国家股市关联研究或者没有将金砖国家视为一个有机整体,或者没有考虑南非的股市的存在。非限制性 VAR 模型的运用忽视了金砖国家成员国股市之间的当期关联,实证检验中没有考虑到格兰杰(Granger)因果检验对滞后期的敏感性。正因如此,本书基于收益率视角,从线性相关关系、均值溢出效应、波动溢出效应以及联动四个角度,使用 SVAR 模型、多元波动率模型、事件研究法等数量化模型及实证方法,对近二十年来金砖国家成员国股市之间关联的演变趋势及其可能影响因素进行了研究。

将金砖国家股市发展置于全球资本市场一体化的趋势背景下:在一个共同的交易日内,金砖国家成员国股市与美国股市基本上保持着同涨同跌的趋势,但是,美国股市对金砖国家成员国股市的当期影响并不都是人们想象中的那么显著。在高盛提出金砖四国概念之后,美国股市对金砖国家成员国股市的影响整体是下降的。与之相对,或许是得益于地缘因素,或许是得益于中国在整合金砖国家成员国资源禀赋中所发挥的重要积极作用,中国股市在金砖国家成员国股市中的地位却不断提升,特别是在金砖国家合作机制扩容之后,中国股市更是成为影响俄罗斯股市的最大因素。金砖国家成员国股市之间信息传递的渠道是畅通的,各国股市的表现主要由该国股市自身决定。由脉冲响应函数分析可知,随着时间的推移以及金砖概念的发展,对除中国股市之外的金砖国家成员国股市而言,美国股市冲击的重要性在减弱。中国股市冲击则取代了美国股市冲击,成为影响巴西、俄罗斯、印度等国股市第 1 期收益的第二大冲击来源,俄罗斯股市冲

击对巴西股市和南非股市的影响则超过了美国股市冲击的影响。巴西股市和印度股市冲击对金砖国家其他成员国股市的影响非常有限,金砖国家其他成员国在南非股市冲击下往往表现为负向响应。由方差分解可知,当前,巴西股市冲击是中国股市波动的重要来源,印度股市波动的 $1/3$ 可被来自中国、巴西的股市冲击解释,中国、印度股市冲击对俄罗斯股市波动的解释力度正在逐年加大,南非股市波动的将近一半可由来自巴西、俄罗斯、印度和中国金砖四国股市的冲击解释,金砖国家成员国股市的特征在南非股市身上得到了集中体现。中国与俄罗斯股市冲击对巴西股市的解释力度也在逐渐加强。信息传递视角下的金砖国家成员国股市关联情况,与贺书锋(2010)关于金砖国家成员国的经济周期互动情况基本相符。在大体支持基本面关联理论观点的同时,也有金砖概念发展下的进一步完善。因此,可以运用基本面关联理论解释金砖国家成员国股市之间的短期关联。

将金砖国家股市发展视为新兴市场框架下的有机整体:以代表性股指收益率的条件方差作为各国股市波动的测度,金砖国家成员国股市波动具有聚集性和持久性特征,存在明显的 ARCH 效应和 GARCH 效应,冲击对未来所有的预测都有重要作用,即便是以市场稳定著称的印度和南非的股市也不例外。多元波动率模型常常被用来捕捉多变量波动之间的关联,VAR(1) - MGARCH(1, 1) - DCC 模型的构建与运用既体现了多元波动率序列之间的动态时变特征,又较好地吸收了多元波动率序列之间的波动溢出,不失为分析金砖国家成员国股市波动溢出效应的有效框架。由各变量条件方差拟合值可知,南非股市收益率的波动幅度是金砖国家成员国中最小的,巴西、俄罗斯和中国股市的波动幅度则相对较大。与金砖国家其他成员国相比,股市收益率波动频率最高的国家是中国。巴西、俄罗斯和中国股市条件方差拟合值的变动趋势具有很高的同步性,这一点在金融危机持续期内表现得尤为明显。或许是受益于金砖国家整体经济实力及相应股市地位的提升,或许是受益于全球范围内各国反危机政策的协同,在亚洲金融危机、全球金融危机和欧洲主权债务危机三次主要金融危机持续期内,上述三国股市收益的条件方差呈现“依次递减”趋势。由各变量之间的条件相关系数拟合值可知:尽管部分金砖国家成员国股市之间曾经在1999年前后出现过短暂的负相关,不过,金砖国家成员国股市之间的条件相关性长期来看表现为正相关则是常态。俄罗斯、巴西、印度和中国金

砖四国股指之间的条件相关性从 2004 年年底开始便有了明显的加大,而南非与金砖国家其他成员国股指的条件相关性也从 2006 年中开始有了显著的提升。并且,尽管金砖国家成员国股市之间的条件相关性从 2011 年年底开始呈现出逐渐减弱的趋势,但是俄罗斯和中国股市之间的条件相关性却始终在增强。改写条件均值模型,考察一国股市波动对另一国股市收益影响的协同波动溢出效应:金砖国家股市长期内表现出“3+1+1”的划分,波动溢出效应在巴西、俄罗斯和中国股市之间存在,印度和南非股市则相对独立。其中,自 1996 年以来,巴西股市向中国股市的波动溢出延续了相当长一段时间,在 2001 年之前,中国股市向俄罗斯股市的波动溢出表现得尤为明显,且俄罗斯股市向巴西股市的波动溢出在 21 世纪的前十年当中是显著的。随着时间的推移,大多数金砖国家成员国股市独立性均有所提高,在金砖国家扩容之后,南非股市向巴西股市的波动溢出开始显现。绝大部分金砖国家成员国股市之间的波动溢出表现为负效应,可以用基本面关联理论来对其做出解释,而跨境投资者风险偏好的改变,则可能是第二阶段中国股市向巴西股市波动溢出效应为正的原因。改写条件方差模型,考察一国股市波动对另一国股市波动影响的波动溢出效应:毫无征兆的异常大幅度波动是俄罗斯股市的常态。在金砖国家成员国股市当中,巴西股市前期波动是唯一可以对中国股市当期波动产生显著预测作用的波动因素,反之则否,巴西因素对中国股市波动的影响是决定性的。南非是早期金砖国家成员国股市波动溢出的主要输出国,南非股市与俄罗斯、印度股市之间有过非常紧密的联系;相反,俄罗斯、印度和中国股市的早期影响力极其有限。2001 年年底至 2009 年年中,巴西、俄罗斯和中国股市在金砖国家成员国股市中的重要性开始显现,中国也成为股市波动溢出效应的主要输入国。金砖概念上升为国际政治学概念之后,金砖国家成员国股市之间的溢出效应明显减弱,各国股市波动的独立性再次显现出来。金砖国家成员国股市之间正向波动溢出出现的次数更为频繁,这种波动溢出更多地表现为“传染效应”。基于动态相关性的股市双边关联影响因素分析可知,国家间外贸联系以及跨境资本流动,均会对金砖国家成员国股市的双边关联产生显著的影响。更为密切的外贸联系加强了两两金砖国家成员国股市之间的关联,而当全球主要新兴市场分别面对以股权资产组合和外商直接投资形式的资本流入,以及跨境热钱流出的时候,金砖国家成员国股市之间的关联同样是加强的。相对于成员国之间的双边贸易,

以股权资产组合形式存在的外部冲击对金砖国家成员国股市双边关联的影响力更强。由此可见,与内部因素相比,外部因素对金砖国家成员国股市双边关联影响程度更高。

将金砖国家股市发展划分为先进和次级新兴市场两部分。金砖国家股市行为关联可以从金砖国家成员国股市之间的联动,以及金砖国家股市与国际分类股市之间的联动得到印证。就金砖概念发展历程中的六个典型历史事件而言,金砖四国基金出现以及金砖四国指数发布两个事件的发生,尽管可以促进金砖国家成员国股市之间联动加强,但是并不能显著改变金砖国家与国际分类股市之间的联动。相反,金砖四国概念提出与金砖概念官方认同两个事件的发生,虽然并不能显著改变金砖国家成员国股市之间的联动,但是在一定程度上改变了金砖国家与国际分类股市之间的联动。金砖国家扩容事件最为重要,它既能加强金砖国家成员国股市之间的联动,又能对金砖四国股市与国际分类股市之间的联动变化产生显著的影响,该事件在改变金砖国家股市联动趋势中起到了决定性的作用。这说明,作为国际经济学概念的金砖概念演进,要想显著影响金砖国家成员国股市之间的联动,必须伴随着跨境投资及其参与者的出现。就金砖国家扩容事件而言,与预宣告期相比,宣告期内金砖国家股市的联动在减弱。而直至生效日的到来,金砖国家股市的联动才开始得到加强。在生效日附近,金砖国家股市的联动变化不仅呈现出了过度反应的特征,而且在事后相当长的一段时间内保持了较高的水平,这无法用信息的加速扩散来解释。这说明了跨境投资者对金砖国家股市分类的存在。

构建包括南非资产在内的金砖国家投资组合:尽管从政治意义上看,南非已经成为金砖国家的新成员国,但是从经济意义上看,南非尚未得到国际投资界的广泛接受。现有绝大多数金砖指数均为金砖四国指数,现有绝大多数金砖投资组合均为不包括南非资产在内的金砖四国投资组合。当然,本书构建金砖投资组合的目的,是为了紧密跟踪特定的基准指数以最小化追踪误差。因此,本书要构建的金砖投资组合,属于以金砖国家成员国主要股指为投资标的的指数型被动管理基金组合。2009年4月至2013年11月,与金砖国家其他成员国股市相比,南非股市是金砖国家中最具效率的市场,各成员国本土投资者均能够在投资南非股市的过程中受益,且中国投资者受益最多。与金砖国家其他成员国蓝筹股指数相比,中国内地蓝筹股指数是缺乏效率的,但是,得益于港币相对美元的稳定和人民币

兑美元的升值,更加得益于金砖国家其他成员国蓝筹股的良好表现,中国香港及中国内地投资者投资金砖国家蓝筹股指数享有汇率增益。与金砖国家其他成员国投资者相比,中国投资者更加具有投资金砖国家成员国蓝筹股指数的激励,即便是构建并追踪金砖国家蓝筹股指等权重组合,同样是可以获得边际收益的。金砖国家成员国股市卖空规则不尽相同,但是卖空金砖国家成员国蓝筹股指数并不存在制度上的障碍。对中国内地投资者而言,适当卖空部分金砖国家成员国蓝筹股指数有助于投资效率的提升,但是构建杠杆头寸并不是提升投资效率合适的选项。在控制金砖国家投资组合成分股数量尝试中,香港恒生指数和南非 Top 40 指数扮演了重要的角色。中国内地投资者可以根据是否选择卖空进行杠杆投资,来确定自己所属的投资者类型,并在此基础上构建自身最优的金砖国家投资组合。与中国内地投资者类似,金砖国家其他成员国(地区)投资者也都可以在投资金砖国家股市的过程中,享受到国际化分散投资的好处。在面对卖空限制的条件下,上述投资者倾向于持有印度 SENSEX 指数、香港恒生指数以及南非 Top 40 指数。对金砖国家成员国的本土投资者来说,南非 Top 40 指数在任意最优风险投资组合中的权重均不低于 70%。南非资产的存在对构建金砖国家投资组合极其重要。金砖概念并非像境外财经媒体所炒作的那样,失去了投资价值并褪去了金色的光芒。恰恰相反,南非成为金砖国家的新成员国,不仅丰富了金砖国家合作机制的内涵,而且为投资概念存在的“金砖”注入了新的活力。南非股市的良好表现,是拉动金砖国家投资组合预期收益率上升的重要力量。认识到这一点,有助于从资本市场的角度加强对金砖国家的认同。

关键词: 金砖国家 股市关联 行为联动 投资组合

Abstract

Since the 1990s, there have been a lot of multilateral cooperation mechanisms in the international community. Most of these mechanisms are on the common geographical basis, which is a form of economic regionalism. Different from the others, the BRICs cooperation mechanism is a strong international cooperation mechanism based on functional cooperation and emerging countries identity. In the world history, there are few countries commonwealth which starts from the concept of economics into a political entity, the BRICs is the exception. As a leader in the emerging economies, due to the economics properties and politics properties that BRICs has, to study the relationship among the BRICs stock markets not only help understand the characteristics and sources of merging markets relationship under the framework of the BRICs, but also help form the recognition of the BRICs from the perspective of the capital markets.

Stock association not only exists among the stocks of one country, but also across the stock markets of different countries. The theorists' explanation about the formation of the stock associated mechanism is from two levels, which are, fundamental relevant theory and behavior co - movement theory. Based on the efficient market hypothesis, the fundamental relevant theory believes that the stock price is determined by its intrinsic value, and the fundamentals association is the root cause of stock association. Specifically, it is the correlation between the changes of a stock's expected cash flows and expected equity discount rate. However, there are more and more empirical evidences from developed markets show that fundamentals cannot fully explain the association between different stocks, which challenge the fundamental relevant theory and even EMH theory. As a useful complement to the fundamental relevant theory, the behavior co - movement theory emerged. For the association cannot be fully explained by the

fundamentals, behavioral relevance theory holds that investors are not always rational, their peculiar trading behavior will form specific trading patterns, it is the relative changes among different stocks demand under the established trading pattern that causes stock returns association. While Barberis et al. (2005) distinguish behavior co - movements into two types, which are category - based and habitat - based co - movement.

Current researches on cross - border stock markets association focus on the association among developed markets, or between emerging and developed markets, while the studies on the relationship among emerging markets are relatively limited. For most developed markets having long histories, researches on the developed markets association are abundant. A large number of empirical studies have shown that, in the context of economic globalization and integration of global capital markets, the associations between developed markets are constantly changing. Although influenced by numerous history events, the change process has been repeated, the overall trend is that, the association between developed markets has been strengthened from the beginning of the 1960s. With the time passing by, the association continues to strengthen, and the trend is especially obvious in the 21st century's first decade. Meanwhile, since emerging economies integrated into the historical process of economic globalization, the performance of emerging markets became eye - catching. From a logical point of view, the emerging market should show a considerable degree of dependence with developed markets. However, academia has been inconclusive on whether there is an association between emerging markets and developed markets. Some scholars believe that there is relationship between emerging markets, some scholars believe not. In particular, as among the BRIC or the BRICs, the results are also varied. Nevertheless, there are a few researches treat the BRICs as a whole, or did not consider the South African stock market. The usage of unrestricted VAR model ignores the current association among the five markets, and without taking into account the sensitivity of the Granger causality test lag period selection. For the above reasons, from the perspective of stock index returns, the dissertation studies the relationship among the BRICs stock markets from four angles as follows, the linear correlation, mean spillover effects, volatility spillover effects

and co – movement, using quantitative models such as SVAR model, multivariate volatility models and event study model. The possible influence factors of the BRICs stock markets linkages are also studies, as the concept of BRICs evolved from an international economics concept into the international politics concept during the past two decades.

Put the BRICs stock markets development into the context of global capital market integration. In the same trading day, although the BRICs and the U. S. stock markets basically keep up with the same trend, U. S. market current influences on the BRICs markets are not all that significant. After Goldman Sachs proposed the concept of the BRICs, U. S. overall influences on the BRICs are declining. In contrast, perhaps it is thanks to geopolitical factors, or perhaps due to the important positive roles China has played in the integration of resources endowment of the BRICs, China market's position in the BRICs has been continuously improved. Especially after the BRICs cooperation mechanism expansion, China has become the biggest factor that affects Russia. The channels of information transmission among the BRICs stock markets are open, the performance of each country stock market is mainly determined by the country's stock market itself. The impulse response function analysis shows that, as time goes on and the concept of BRICs develops, to every country except China, the importance of the impact from U. S. impulse are weakening. China impulse replaces the U. S. impulse, become the second – largest shock which affects Brazil, Russia and India stock markets in the first phase, even the shock from Russian has also exceeded the U. S. shocks, become more important to Brazil and South Africa. While the impacts of Brazil and India shocks on the other BRICs member countries are very limited, the shocks from South Africa often bring negative impact on the other BRICs member countries. Variance decomposition results show that currently the Brazilian stock market shocks are an important source of China stock market volatility, about a third of India stock market fluctuations can be explained by China and Brazil stock markets shock. Shocks from China and India stock markets could explain the volatility in Russia much better year after year. What's most, nearly half of South African stock market volatility can be explained by the impacts from Brazil, Russia, India and China stock

market shocks, the features of the other BRICs stock markets have embodied in the South African stock market. The shocks from China and Russia stock markets can also explain Brazilian market more and more effectively. The BRICs stock markets association under the perspective of information transfer is basically consistent with the findings of the BRIC economic cycles interaction by He (2010). In general, the fundamental relevant theory has been supported, and there is further improvement under the BRICs concept development. Consequently, fundamental relevant theory can be used to explain the short-term relationship among the BRICs stock markets.

Treat the BRICs stock market development as an organic whole under the framework of emerging markets. Consider the conditional variances of the representative index returns as the measure of stock market's volatility, the BRICs stock markets' volatility have the characteristics of clustered and persistence, all the markets have obvious ARCH and GARCH effects, which means shocks in the past have an important role for all future predictions. There is no exception even for such stable India and South Africa stock markets. Multivariate volatility models are often used to capture the associations among multivariate fluctuations. The construction and application of the VAR(1) - MGARCH(1, 1) - DCC model can not only reflect the dynamic time-varying features of multivariate volatility sequence, but also absorb volatility spillover between the multiple volatility series. It is an effective framework to analysis the stock market volatility spillover effects among the BRICs stock markets. As the fitted values of each variable's conditional variance show, the volatility of South Africa stock market returns is the smallest of all the BRICs member countries, while Brazil, Russia and China stock market's volatility is relatively large. Compared with the other BRICs member countries, it is China stock market that has the largest return fluctuation frequency. Brazil, Russia and China stock market conditional variances move with high synchronization, which is particularly evident during the period of financial crises. Perhaps it is benefit from the overall economic strength of the BRICs and the promotion of the corresponding stock markets status, or from the coordination of anti-crisis policies that worldwide countries agree, in the three major financial crises duration period, that is, Asian financial crisis, the global

financial crisis and the European sovereign debt crisis, the conditional variances of these three stock markets show the trends in descending order. As the fitted values of each variable's conditional correlation coefficient show, the BRICs stock markets have had a brief appearance of negative correlation around 1999, while it is normal to perform positive conditional correlation in the long term. The conditional correlations among Russia, Brazil, India and China indices have increased significantly from the end of 2004, while the correlations between South Africa index and other member countries of BRICs start to enlarge from the middle of 2006. At the same time, although the conditional correlations among BRICs show a gradual weakening trend from the end of 2011, the conditional correlation between Russia and China stock markets is still growing. Consider the common volatility spillover effect from one market's volatility to another's return, by rewriting the conditional mean model, the stock markets of the BRICs exhibit a "3 + 1 + 1" division in the long term, volatility spillovers exist among Brazil, Russia and China stock markets, while India and South Africa stock markets are relatively independent. Among them, the volatility spillover from Brazil to China has last for a long time since 1996, the one from China to Russia has shown particularly evident before 2001, while the one from Russia to Brazil is significant in the first decade of 21st Century. Most of the BRICs stock markets independence is improved over time. After the BRICs cooperation mechanism expansion, the volatility spillover from South Africa to Brazil begins to appear. Most of the volatility spillovers among the BRICs stock markets exhibit negative effects, which can be explained by the fundamental relevant theory, while it is maybe the change of the cross-border investors risk appetite that express as a positive volatility spillover. Consider the volatility spillover effect from one market's volatility to another's volatility by rewriting the conditional variance model, it is normal to witness the abnormal fluctuations without a sign in Russia stock market. Among the BRICs stock markets, Brazil stock market's early volatility is the only factor that could significantly predict China stock market's current fluctuations, otherwise no. Brazil stock market factors are decisive for China stock market's volatility. South Africa market is the main exporter of the volatility spillover in the early BRICs member countries stock markets, it

once has very close links with Russia and India ones. On the contrary, the early influence of Russia, India and China stock markets are very limited. By the end of 2001 to the middle of 2009, among the five BRICs stock markets, the importance of Brazil, Russia and China stock markets began to show, China has become a major importing country that absorbs other countries' volatility spillovers. After the BRIC becomes an international politics concept, the spillover effect between any two of BRICs member country stock markets is clearly weakened. The independence of stock market volatility is revealed again. It is more frequently to see the positive volatility spillovers among the BRICs stock markets, which looks like contagion effect. As the analysis on the influence factors of the BRICs stock markets linkages based on dynamics correlation show, both inter - state foreign trade contact and international capital flows would affect the bilateral association between any two of BRICs countries significantly. Closer foreign trade linkage has strengthened the bilateral association of two BRICs countries stock markets, while the association is still strengthened when world major emerging markets facing capital inflows in the form of equity portfolio and foreign direct investment, as well as cross - border hot money outflow. Comparing with the bilateral trade between member countries, it is the external shocks in the form of equity portfolio that influence this bilateral association much stronger. Hence, comparing with internal factors, it is the external factors that influence the bilateral association of two BRICs countries stock markets at a higher degree.

Divide the BRICs stock markets into two different parts, which are the advanced and secondary emerging markets. The behavior co - movement of the BRICs stock markets can be confirmed from two different angles, which are the co - movement among the BRICs stock markets and the co - movement between the BRICs and the international classification stock markets. Among the six typical historical events in the BRICs concept development process, although the appearances of the overseas BRIC funds and the BRIC indices can strengthen the co - movement of BRICs stock markets as a whole, it still cannot alter the BRICs and international classification stock markets linkage significantly. On the contrary, although the appearances of BRIC concept and the official recogni-