

张一锋 / 著

股指期现货市场关系

——中国内地与海外市场比较

AN EMPIRICAL COMPARISON STUDY ON
THE RELATIONSHIP BETWEEN THE INDEX FUTURES MARKETS
AND THE SPOT MARKETS IN CHINESE AND CHINESE
NEIGHBORING MARKETS

云南财经大学前沿研究丛书



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摘 要

我国股指期货于2010年4月16日正式推出,在此背景下,股指期货及现货指数相关研究成为金融领域的研究重点与热点,而基于市场微观结构理论的股指期货市场相关研究刚刚起步。本书在金融市场微观结构理论的基础上,将股指期货现货市场关系区分为价格波动影响关系和定价效率对比关系。通过对这两个关系的实证研究,揭示股指期货现货市场的微观结构关系。

在实证方法选择上,已有研究未充分考虑多种分析方法所导致的结论差异,因此需要通过比较多方法得到的结论才能有效提高结论的可靠性。同时,实证结果与样本选择及空间大小具有紧密联系,样本选择应充分考虑实践及比较意义,样本空间也应具有一定的时间跨度才能提升实证结果的稳定性。由于我国股指期货上市时间不长,国外已有的研究还未涉及我国样本,而国内已有研究则大多以仿真交易数据和短时间跨度现实生产数据为样本,使用相对单一的方法对股指期货现货关系的某一特定方面进行实证研究,而且都未考虑在具有紧密联系的多样本市场基础上进行比较来充分说明股指期货现货市场关系以及突出我国股指期货现货市场关系的特征。

本书以实证研究为主,以比较研究为辅,采用我国沪深300、香港恒生、国企、新加坡日经225、A50指数期现货市场2010、2011两年的真实生产高低频数据,对股指期货期现货市场关系进行了多角度、多样本,基于多种统计检验和时间序列模型及改进方法的实证比较研究。研究证明了股指期货期现货市场关系的多个理论假说,并在同主要邻近市场比较研究的基础上突出了沪深300股指期货合约的运行特征。

波动影响关系是指股指期货推出对现货市场价格波动的影响关系,包括股指期货推出与现货市场价格波动的关系和合约到期日股指期货与现货市场价格波动的关系,即到期日效应。本书利用高低频数据相结合的波动率参数和非参数统计分析与改进的ARCH类模型,多方法实证了股指期货推出前后的期现货市场价格波动关系,从实证角度为这一争论热点提供了可靠的证据,得出了与已有研究不同的观点,即股指期货推出前后股票现货市场价格波动和走势变化在实证上没有一致的结论,没有完整和一致的证据支持股指期货的推出与现货市场价格波动和走势之间具有因果关系,股指期货推出并不是现货市场波动和走势变化的充分必要条件。沪深300股指期货推出在短期内加大了现货市场的波动;中期略微加大了现货市场波动,但无显著影响;从长期看,股指期货的推出充分发挥了风险规避功能,较好地平抑了现货市场的波动,降低了现货市场的波动。

同时,本书使用高低频数据相结合的交易量增长率、相对交易量、价格反转指标及波动率参数和非参数统计检验以及成交量、波动率模型检验方法,对沪深300、S&P500、日经225指数、恒生指数、国企指数、A50指数股指期货合约标的物现货市场到期日效应进行了实证分析,提出了价格反转程度检验方法。

从实证角度为又一争论热点提供了可靠的结论证据。与已有研究不同,本书认为到期日效应表现在股指期货合约到期日现货市场交易量及价格波动较非到期日的异常变动效应两个方面:一部分市场表现为其中某个方面效应显著,另一部分市场则表现为两个方面效应都显著;到期日成交量异常效应存在不一定使得到期日价格波动异常效应必然存在;国企指数现货市场具有较为显著的到期日成交量异动及价格波动效应,恒生指数、A50ETF 现货市场存在到期日效应的概率较大,但检验结果存在不确定性;沪深 300 指数、日经 225 指数均不存在到期日效应;合约到期最终结算制度的不同设计导致了到期日效应在不同市场的表现存在差异。

定价效率对比关系是指在两个市场微观结构差异基础上体现出的定价效率差异的对比关系,包括信息传递、信息含量权重对比关系和运行效率(流动性)对比关系。多数已有文献仅对一阶矩收益率关系进行了研究。本书对五个市场的信息传递关系使用了一阶矩收益率和二阶矩波动率数据的 Granger 检验、当期引导关系检验、相关性检验、隔夜收益率变化检验,并利用 VAR、VEC 模型等进行了多市场、多方法的实证研究,从局部对信息传递关系的研究方法进行了创新,即股指期货现货市场信息传递关系研究应包括非同步交易时段及同步交易时段的信息传递关系研究。非同步交易时段基于收益率序列和波动率序列的股指期货现货市场引导关系检验结果存在差异。而从序列所包含的信息量角度,即从对真实市场波动描述的精确度上看,基于波动率序列的检验结果更为可靠。从波动率引导关系角度,本书得出了新观点,即所有样本均说明日内早开盘阶段 15 分钟的股指期货价格波动率可以用于现货开盘阶段 15 分钟、30 分钟价格波动率的预测,完全证明了开盘阶段期现价格波动率的动态关系充分体现了

股指期货的价格发现功能,让投资者提前对隔夜信息做出反应并进行消化。收盘时段,也完全印证了本书的微观结构理论假设,即在现货市场收盘后,股指期货为投资者提供了依据现货市场盈亏等信息进行对冲(套期保值)的工具,并同时给予投资者充分调整套期保值、套利头寸及相关策略的机会,充分反映了股指期货的对冲功能。

同步交易时段的一阶矩收益率和二阶矩波动率实证结果具有一致性。除具体引导阶数有所不同外,所有样本市场实证结果均基本表明,股指期货市场价格引导指数现货市场价格,即使存在双向引导关系,股指期货市场对现货市场价格的引导强度也大于反向的引导关系;在比较基础上与已有研究结论不同的是沪深300、恒生、国企股指期现货市场价格表现出较为清晰和明确的引导关系特征,而从日经225、A50指数期现货市场样本实证结果看,非本土指数期货市场与本土现货指数市场的引导关系相对于本土股指期现货市场关系表现较弱且不明确。

同时,本书使用GS模型、脉冲响应函数以及方差分解方法对股指期现货市场价格一阶矩收益率和二阶矩波动率序列的信息含量对比关系进行了实证分析,较为一致的结论是股指期货市场价格信息含量占比相对于指数现货市场价格信息含量占比具有明显优势。与已有研究不同的是,从沪深300指数和恒生、国企、A50指数对应分析结果比较看,由于标的物指数相关性极强,对应于自身指数现货市场,沪深300股指期货价格信息含量略低于恒生、国企指数期货价格,而明显高于标的物极为类似的A50指数期货价格,即相对于A50指数期货,沪深300股指期货在信息效率上居主导地位。中国内地现货股票市场价格走势对国企指数,尤其是对A50指数期货价格的反向影响力较强。为弥补已

有方法的不足,本书使用 ARMA 模型和多元回归模型外推方法,对已得到的股指期货现货市场信息效率关系结论进行了补充和夯实,外推实证方法的结果与上述已有结果保持了较高的一致性。

最后,本书从宏观的成交量(额)相关指标,微观的方差比例、即时成交成本及市场深度指标多角度对股指期货现货市场的流动性对比关系进行了实证研究,从运行效率角度对股指期货现货市场的定价效率对比关系进行了研究。与已有文献不同的是不同指标所呈现的股指期货现货市场流动性对比关系不同,从成交量(额)相关指标角度分析,除 A50 指数期货市场外,其他样本股指期货现货市场的流动性远大于现货市场,而 A50 指数期货市场流动性相对较差;从市场效率系数和即时成交成本模型实证结果看,只有沪深 300 股指期货现货市场的流动性较现货市场高,恒生、国企、日经 225 及 A50 指数现货市场的流动性则比期货市场高,但恒生、国企指数期现货市场的流动性差异不显著,日经 225、A50 指数期现货市场的流动性具有较为显著的差异。本书认为,从市场深度指标实证结果看,样本各股指期货市场在深度指标上表现为比现货市场低的深度,这些结论和差异可从市场波动性程度特征、现货市场有无卖空限制、是否存在多种同标的物衍生产品,以及期现货市场地域和开放程度等方面得到解释。

关键词: 股指期货 股票指数 价格波动 到期日效应 定价效率

Abstract

The first stock index futures contract began trading in 16 April 2010 in China, and this contract based on HuShen 300 stock index. The study about index futures and spot index are becoming focus. In China, financial microstructure theory research about index futures is just beginning. This study divided the relationship between index futures and spot index markets into two aspects according to the microstructure theory: the relation between stock market volatility and the introduction of the stock index futures, and the relation about comparison of the pricing efficiency between the index futures markets and the spot markets.

A few previous studies did pay adequate attention to the distinction due to different empirical method. The using and comparison of diversified methods lead to gain more explicit and credible result. And the credible empirical results are very close to the size and selection of the sample, the sample employed should be comparable and ample size. There are not empirical studies using the data of HuShen300 index futures in abroad researches and the data of

simulation or short-term was employed for the studies in domestic. And a few studies have used the diversified methods and samples simultaneously. The study analyzed deeply the microstructure relation between the two markets through the two aspects above employed diversified empirical methods and comparative method. The daily data and the intraday data (1 - min, 5 - min) of the Hushen 300, Hang Seng, H-shares, Nikkei 225 (SGX), and the A50 index & index futures over the period 2010 to 2011 are used as the empirical samples. Empirical evidence confirms the theoretical hypothesis in chapter one and gives prominence to the features of HuShen 300 index futures markets by comparison.

The first relation is composed of the difference between spot price volatility before and after the introduction of index futures and the relation between the two markets at index futures expiration. The study examines the relation between the stock market volatility and the introduction of index futures employed parametric, non-parametric test and modified ARCH models and examines the relation between the stock market volatility and the major events in the same period. On the basis of comparison of the two tests, the study gives more credible evidence of the causality on the spot volatility and the futures. There are not unanimous conclusions about the relation. The empirical evidence did not support that there are any causalities between the stock market volatility and the introduction of index futures, as well as the introduction of index futures is a sufficient and necessary condition of the stock market volatility. The empirical analysis employed Hushen 300 sample shows that the introduction of index futures increases the

spot markets volatility in the short term, increases volatility but not significantly, and in the long term decreases volatility expelling other factors which can interfere with the observation.

The study provides the evidence on the expiration effects in the Hushen 300, Hang Seng, H-shares, Nikkei 225 (SGX), and the A50 index markets. Empirical analysis this part applies the parametric, non-parametric test of the spot trading volume rate, relative volume, price reversal index, and volatility series at index futures expiration and nonexpiration and spot trading volume, volatility series models. The part devises innovatively the index of price reversal level. The results reveal that the expiration effects ought to include the spot trading volume effects and the spot price volatility effects. Some spot markets exist abnormal changed in trading volume or in price volatility, others in both. Empirical results reveal not only a significant increase in spot trading volume, but also the existence of a significant increase in spot volatility in H-shares spot index at index futures expiration. There are not significant expiration effects in Hushen 300, Hang Seng, H-shares, Nikkei 225 (SGX), and the A50 spot markets. The dissimilarities in futures contract settlement institution between these markets lead to the difference.

The second relation is composed of the information transmission between the two markets, the comparison of the information contents and operational efficiency (liquidity) between the two markets. The study provides an innovative analysis framework on intraday dynamic relation between index futures and spot markets which must consist of the interaction on nonsynchronous and synchronous trading hours. In each stage, the relationship of the first and second moment data should

be included. This part adopts minutely high-frequency data of returns and volatility for 5 index futures and spot index markets, because that daily data does not have the ability to statistically assess such relation in most studies. The Granger test, contemporaneous lead-lag relation models, correlation test, equality test of overnight returns, VAR model and VEC model are applied to analyze the lead-lag relationship between the two markets in the intraday nonsynchronous trading stage and synchronous stage. Empirical results display that the futures price volatility before the spot market opening can predict statistically the spot price volatility after the spot market opening over 15 and 30 minutes in all market samples. Meanwhile, the spot price volatility before the spot market closing can predict statistically the futures price volatility after the spot market closing in all markets sample. The empirical results also show that the difference estimate between the using of the volatility data and the returns in the nonsynchronous trading stage. Empirical results in the synchronous stage confirm generally that futures market plays a price discovery role, implying that futures prices contain useful information about spot prices even when the spot price leads the futures price. The lead-lag relationship in the Hushen 300, Hang Seng, H-shares markets is significant but indeterminate in the Nikkei 225 (SGX) and the A50 markets. The results of the synchronous stage imply the difference between the native markets and the non-native markets as well.

The Garbade-Silber model, the impulse response function test and the variance decomposition method are employed to analyze the comparison of the information contents in the returns (volatility)

between the futures and spot markets. Empirical results show that futures prices contain more useful information about spot prices than the spot prices themselves. The information contents of Hushen 300 index futures prices contain slightly less information than the Hang Seng and H-shares index futures but significantly more than the A50 index futures. The Hushen 300 spot index prices have strong influence on the H-shares index futures and particularly on the A50 index futures prices in the opposite direction.

The ARMA model and the multivariate regression model contained the futures variable are applied to forecast the spot index price. Forecast results confirm the conclusion above.

Finally, the study examines the relation of operational efficiency (liquidity) comparison between the index futures and the spot markets using the trading volume indicators, variance ratio test, execution costs model and market depth method. Different methods have different results. The results using the trading volume indicators show the liquidity of the futures markets is greater than the spot markets except the A50 futures. The results using variance ratio test and execution costs model display that the liquidity of the futures markets is greater than the spot markets only in the Hushen 300 markets and an inverse result in others markets. These differences result from the method selection, the level of volatility, short sales constraints, the variety of derivatives and the site of the markets. These spot markets chosen as samples have higher liquidity too.

Keywords: Index Futures Spot Index Volatility Expiration
Effect Pricing Efficiency

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