The Impacts of Regulation Regime Changes on ChiNext IPOs: Effects of 2013 and 2020 Reforms on Initial Return, Fair Value and Overreaction (with Q. Deng, M. Hussein, et al.), *International Review of Financial Analysis*, forthcoming.

The Chinese version of NASDAQ, ChiNext has gone through three time periods with two different regulation regimes (approval versus registration) and three sets of listing day trading restrictions (trading curbs, hard return caps, and no restrictions). We hypothesize that the initial return of an IPO contains the issuer's fair value proxied by the IPO's monthly return and the investors' overreaction proxied by its intramonth return. We separate the full sample into three non-overlapping periods based on different regulatory rules, apply the Stepwise technique to identify significant variables for the return measures, and use multivariate linear regressions to estimate the signs and magnitudes of the significant variables. We observe stark contrasts among the determinants of return measures under different regulation regimes. We find that IPO pricing is mainly demand-driven under the approval regime, but switches to value-driven under the registration regime. Our findings reveal a clear pattern of evolution in investors' behavior in response to the progression of regulations along three dimensions: 1) governing regulation regimes, 2) listing day trading restrictions, and 3) issuer profile. Our findings provide insights to the continued efforts in moving the Chinese IPO market towards a more market-oriented and transparent environment with higher pricing efficiency.

Does Information Disclosed in "Use of Proceeds" from Prospectuses Affect IPO Initial Underpricing? (with W. Tang), *Asia-Pacific Journal of Financial Studies* 51, *2023, 828-858.*

We study the impact of intended use of proceeds disclosed in the section of "Use of Proceeds" in prospectuses on ChiNext IPOs' initial underpricing. After splitting the entire period into two non-overlapping sub-periods to control for regulatory changes and after controlling for the firm-level characteristics and market conditions, we find that the overall information disclosed from "Use of Proceeds" affects IPO initial underpricing significantly over the two sub-periods. Moreover, the intended use of IPO proceeds in several specific categories affects underpricing too. The proceeds raised for IPO firms' information platform and research and development over the second sub-period while the proceeds to promote marketing and sales and to expand existing products over the first sub-period are significantly and positively related to initial underpricing. The significance changes for the IPOs with the opportunity to change their use of proceeds after IPOs. We explore the causes and effects to explain our findings.

Strategic Behavior of Insiders in Initial Underpricing and Long-run Underperformance (with B. Yang and L. Zhou), *Emerging Markets Review* 53, *2022.*

We study strategic behavior of insiders in ChiNext IPOs. Since traditional initial underpricing is not appropriate due to the jawbone P/E ratio approach and maximum initial return cap we propose two alternative measures. We identify a significantly positive relationship between insiders' shareholdings and initial underpricing. With no

discretion on IPO offer price, the insiders implement earnings management to maintain higher stock prices induced by regulatory changes and high market demand and to facilitate selling their unlocked shares after lockup expiration. We confirm a negative impact from insiders' share sales on long-term performance but don't observe a dramatic underperformance as documented.

ChiNext IPOs' Initial Returns Before and After The 2013 Stock Market Reform: What Can We Learn? (with M. Hussein and Q. Deng), *Emerging Markets Review* 49, 2021

We examine ChiNext IPOs' performance before and after the 2013 stock market reform. Majority of firm-level characteristics differ significantly over the two sub-periods. The initial return looks normal before the reform. It exhibits a uniform distribution truncated at the maximum 44% initial cap imposed by the reform thereafter and the cumulative return, based on listing day closing price keeps rising at a steady pace over the 1st month. The 2013 reform pushes the ChiNext IPO market off its track of becoming more efficient. Instead, it widens income gap in China. Our findings and recommendations support the 2020 new regulatory changes.

Executive Compensation Incentives, risk Level and Corporate Innovation (with B. Zhou, Y. Li, and F. Sun), *Emerging Markets Review* 48, 2021

This paper explores the innovation of Chinese listed companies from the perspectives of CEOs' compensation and corporate risk. We find that executives' salary can effectively promote firms' investment in research and development (R&D), while equity compensation failed to promote corporate R&D investment. Besides, the level of corporate risk has a mediating effect between executives' salary and corporate R&D investment. However, corporate risk level has a moderating effect between equity compensation and corporate R&D investment. When the level of risk is higher than a certain level, the negative impact of executives' equity compensation on innovation input becomes more obvious.

Does Risk Disclosure in Prospectus Matter in ChiNext IPOs' Initial Underpricing? (with M. Hussein and Q. Deng), *Review of Quantitative Finance and Accounting* 54, 2020, 957-979

Using a unique and hand-collected dataset, we investigate the impact of the risk factors disclosed in the prospectuses on the initial returns for ChiNext IPOs. After controlling for the market-, firm- and offer-specific characteristics, we identify several significant risk factors that include "policy changes on taxation or government subsidy", "higher depreciation and/or amortization due to proposed capital expenditures", "ongoing litigation or lawsuit", and "piracy or trademark infringement". Concerns for ongoing litigation risk seem to be most important as the risk affects both the opening and closing price returns positively and significantly, indicating risk compensation through deep

underpricing. The other three risk factors only affect the closing price return. Similar to the impact from the ongoing litigation or lawsuit risk, the trademark infringement risk affects the closing price return positively. On the other hand, the risks associated with possible policy changes on taxation or government subsidy and higher depreciation and/or amortization due to proposed capital expenditures have negative impacts on the closing return. In line with our conjecture of a short-term equilibrium, none of the risk factors disclosed in the prospectuses are found significant for the 21st trading day (monthly) initial return.

IPO Pricing Efficiency in China: A ChiNext Board Focus (with Q. Deng), *Frontier of Economics in China* 12, 2017, 280-308

This paper examines what determines the offer price for ChiNext IPOs and how we can improve the current "Chinese-style" bookbuilding process. We establish that the ChiNext IPO underwriters rely on the institutional investors to discover an issuer's intrinsic value, and that they adjust the preliminary price to establish the final offer price, based on the assessment on their motivations. Since the underwriters do not have discretionary power in share allocation, this "Chinese-style" bookbuilding process contains certain pitfalls from an information asymmetry standpoint. An institutional investor mainly uses "simple and direct" variables that do not adequately reflect the true intrinsic value of the issuer to develop the preliminary price while the underwriter adjusts down that price to establish the offer price to clear the market, as a measure to counter a perceived free-ride issue among the institutional investors. This procedure, in effect, contributes to the initial IPO underpricing, causing principal-agent conflicts between the underwriter and issuer. We argue that such a pricing inefficiency could be improved by an innovative "bookbuilding plus price discretionary auction" process that is a combination of the modified OpenIPO and Taiwan-style auctioned IPO approaches.

Overreaction in ChiNext IPOs' Initial Returns: How Much and What Caused It? (with Q. Deng), *Emerging Markets Review* 29 2016, 82-103

This paper studies overreaction in initial returns for ChiNext IPOs. We hypothesize the initial return contains a fundamental underpricing and an overreaction. The fundamental is represented by the 21st day return and the difference between the initial and 21st day returns represents overreaction. We investigate this conjecture and identify the variables that are significant for both returns, for one but not for the other, and for the difference. The initial return is driven more by short-term and market factors that cause overreaction while the 21st day return is affected more by an issuer's fundamentals. The overreaction is only weakly time-varying.

The Pricing of First Day Opening Price Returns for ChiNext IPOs (with Q. Deng), *Review of Quantitative Finance and Accounting* 47, 2016, 249-271

We study the listing day opening price return and compare it with the closing price return for ChiNext IPOs after the China Securities Regulatory Commission (CSRC) adopted a new "Chinese-style" bookbuilding process. We start from a traditional OLS model by screening a set of potential variables, characterized in the existing literature. Through a variable reduction process, we identify 7 significant variables for each of the return series. We further utilize a GARCH-M model with an ARMA(1,1) adjustment in the residuals to correct possible autocorrelation in the returns and cross-correlation between the return and its conditional variance to improve the model. We find that the opening price synthesizes the overall market demand for new shares from institutional and individual investors as the subscription ratios from both sectors are highly significant (oversubscriptions). In addition, the market condition over the past 21 trading days prior to listing a ChiNext IPO (market momentum), offer size (size effect), and conditional return variance (asymmetric information) are also significant. We find similar significant variables that affect the closing price return except the subscription ratio from individual investors. Overall, the opening price return contains valuable information to predict the closing price return.

Offline Oversubscription, Issue Size, and Market Momentum: The Driving Forces for ChiNext IPOs' Initial Underpricing (with Q. Deng), *The Chinese Economy* 48, 2015, 114-129

This paper reexamines the driving forces for the 1st day initial return for ChiNext IPOs. We start from screening 29 potential explanatory variables, 4 policy break dummies and 2 intraday trading suspension dummies, using an OLS model with dimension reduction techniques to identify significant variables. We then apply a 2SLS procedure to remove endogeneity without losing any important information. With the variables identified from the 2SLS model, we further apply a GARCH-M model with an ARMA(1,1) adjustment in the residuals to correct possible autocorrelation in the regression residuals and cross-correlation between the initial return and its conditional return variance. We find that the model fits the data well. From a number of potential factors in pricing Chinese IPOs, we identify three factors that drive ChiNext IPOs' initial underpricing: the pre-issue share allocation multiplier from institutional investors (offline oversubscription), issue size (size effect), and listing day stock market condition (market momentum). We estimate the contribution to the initial underpricing from each of the significant variables.

The Initial Return and Its Conditional Return Volatility: Evidence from the Chinese IPO Market (with M. Hussein)*, Review of Pacific Basin Financial Markets and Policies* 17, 2014, 1450022-1-1450022-32

This paper investigates the monthly initial return and its conditional return volatility for Chinese IPOs. We find that the mean initial return and cross-sectional return volatility are

highly auto- and cross-correlated, and time-varying. We propose a system of two simultaneous equations: a GARCH-in-Mean (GARCH-M) process with an ARMA(1,1) adjustment in the residuals for the initial return and an EGARCH process for the conditional return volatility, assuming that the initial return and its conditional return volatility are linear functions of the same market, firm-, and offer-specific characteristics. We find that the model captures both time-series and cross-sectional correlations at the mean and variance levels. Our findings suggest that the conditional return volatility affects the initial return positively and significantly, in addition to the traditional market, firm- and offer-specific characteristics. IPOs with higher conditional return volatility, as a proxy for information asymmetry, tend to be underpriced more. The paper demonstrates the merit of using a conditional variance model, along with time series and cross-sectional analysis to price Chinese IPOs.

The Opening Price Performance of Initial Public Offerings in China, *The Chinese Economy* 47, 2014, 94-109

In studying the opening-price performance of Chinese initial public offerings, we found that more than 95% of the first-day return is earned by initial subscribers who sell the shares at the market open. Purchasing at the market open on the first trading day, investors earn 4.21% if they sell the shares at the market close on the same day (the median is 0.97%). If they sell the shares at the market close after a month (on the 21th trading day), they earn –3.41% (the median is –5.19%). This pattern is consistent over time and across the market, firms, and offer-specific characteristics, with a few exceptions for IPOs initiated during favorable stock market conditions and in certain industries. The overall results are consistent with the asymmetric information hypothesis that outside investors possess better information about the market demand for new shares and the opening price is an efficient indicator of the closing prices on the 1st and 21st trading days. Our results have policy implications.

The Pricing of Time-Varying Exchange Rate Risk in the Stock Market: A Nonparametric Approach (with P. Chung), *Studies in Nonlinear Dynamics & Econometrics* 16, 2012, 1-31

This paper reexamines the pricing of exchange rate risk in the U.S. stock market. We first construct stock portfolios based on the Foreign Exchange Income (FEI), a measure of currency exposure of firms, reported in their annual reports. We then develop two-factor and multi-factor nonparametric models that allow time variation in risk exposure and risk premium, and nonlinearity in the return generating process. When we assume that risk exposure can be time-varying but risk premium is constant, the estimated premium for exchange rate risk is significant only for the most positive FEI-ranked portfolio and marginally significant for the most negative FEI-ranked portfolio. When we further assume that both risk exposure and risk premium can be time-varying, results suggest that exchange rate risk is significantly priced for all the FEI-ranked portfolios except the one with little exposure.

Chinese IPO Market Cycles (with J. Zhou), *The Chinese Economy* 44, 2011, 55-71

With a sample of 1,376 Chinese A share IPOs over the period 1992 to 2005 we examine the relationship between monthly IPO volume and average initial returns. We find that the two series are highly auto- and cross-correlated, with average initial returns leading IPO volume. However, the unit root test and Granger causality test reject the hypotheses that there exist unit roots for both series and that there is a direct causal relation between them. Further analysis reveals that monthly IPO volume follows an AR(1) process while average initial returns follow an ARMA(1,1) process. We develop a VAR model with ARMA specification in residuals and find that the lagged average initial returns have a positive impact on IPO volume, implying that more firms tend to file for IPOs after high average initial returns in the Chinese IPO market. The lead time is around 6-9 months.

The High Volume Return Premium: Evidence from the Chinese Stock Market, *Review of Quantitative Finance and Accounting* 35, 2010, 295-313

Extreme trading activity contains valuable information about the future evolution of stock prices in the Chinese stock market. Over the next 30 trading days after the initial volume shocks, a high-low volume portfolio earns a net average cumulate return of 2.08% and a high-low volume and size portfolio earns 3.37%, suggesting that there exists a high-volume return premium and that Chinese investors favor high-volume small-size stocks. However, a volume momentum portfolio earns a -1.65% net average cumulative return, indicating that Chinese stocks exhibit a short-run reversal. Portfolio construction, market risk, and firm size do not seem to explain the results.

Chinese IPO Activity, Pricing, and Market Cycles (with J. Zhou), *Review of Quantitative Finance and Accounting* 34, 2010, 483-503

We examine the activity, pricing, and market cycles of 1,380 Chinese A share IPOs over the period 1991-2005 and find initial underpricing of 238%. The government restrictions on IPO offer price and quota allocation cause pricing structural breaks and attribute more than half of initial underpricing. A multifactor model that includes firm's characteristics, excess demand for IPO shares, and the government restrictions explains cross-sectional initial returns, after controlling for industrial differences and stock market conditions. In addition, monthly IPO volume and average initial return are highly correlated. A VAR model indicates that initial return leads IPO volume by 6 months.

The Rise and Fall of the First Financial Futures Market in China: The Case of Chinese Government Bond Futures (with C. Chen), *China & World Economy* 17, 2009, 110-124

This paper studies the rise and fall of the first financial futures market in China. We compare the characteristics in the Chinese government bond futures market with those in

the US T-bond futures market. They differ in market design and structure, market governance, margin requirements, position limits, delivery process, and the way to calculate the settlement price. Furthermore, with a unique data set, we show that prior to maturities of government bond futures, traders began to accumulate significant amount of long positions for several selected contracts without the intention to offset, forcing short position holders to either purchase deliverable bonds or offset futures at highly inflated prices, causing higher market volatility and price disequilibrium in both spot and futures markets. Arbitrage opportunity arises and the market eventually collapses. The lessons learned from the suspension of the Chinese government bond futures market offer an invaluable learning experience.

Stock Repurchase and the Role of Signaling: a Comparative Analysis between U.S. and China (with A. Huang), *Journal of Modern Accounting and Auditing* 3, 2007, 56-62

This paper compares different methods used for stock repurchase and examines the role of signaling in the U.S. and China's capital markets. We find that the ways to buyback stocks are very different in the two countries. Most U.S. stocks are repurchased through open market and the signals sent to the market through open market repurchase are getting weaker. Even though stock repurchases are at their early stage in the Chinese stock market and the dominated way to buyback is through a negotiated repurchase agreement for non-floating shares, the power of signaling seems much stronger. Examining stock prices pre- and post-repurchase, we find that stock repurchase records an average abnormal return of 3.42% on the announcement date and 3.24% on the date of actual repurchase.

Stock Returns, Volatility, and Cointegration among Chinese Stock Markets (with J. Zhou), *China & World Economy* 13, 2005, 106-122

This paper examines the impact of regime change in Hong Kong on stock returns, volatility, and cointegration among three Chinese stock markets. The average daily returns are much higher during the first sub-period (from April 1991 to June 1997) and significantly lower or even negative during the second sub-period (from July 1997 to December 2002). The mean adjusted change in volatility is negatively and significantly correlated with the lagged returns. This negative relation is mainly caused by a *contemporaneous* and significantly *positive* correlation between returns and volatility in the first sub-period. This significant relationship disappears for the Shanghai and Shenzhen Stock Exchanges and is even *negative* for the Hong Kong Stock Exchange during the second sub-period. Three Chinese stock markets are cointegrated over the entire sample period and become more closely related after Hong Kong's return to China. Our results have policy implications for both policy makers and individual investors.

Real Estate and Stock Returns: A Multivariate VAREC Model (with A. Ullah), *Property Management* 21, 2003, 8-24

In this paper we examine the dynamic relationship of three housing market variables and a stock market index in a Vector Autoregressive (VAR) model. We first find that sales volume (sales), median sales price (price), and the 30-year FHA/VA mortgage rates (mortgage rate) have unit roots but the New York Stock Exchange (NYSE) value-weighted index returns (returns) do not. After controlling for the unit root problem, we then develop a VAR model to examine the dynamic relationships among these variables. We find that price, mortgage rate and returns affect sales. We also find that returns and sales affect mortgage rate. The sensitivities (elasticities) between variables are estimated and discussed. However, we do not find significant evidence that sales, price, or mortgage rate affect returns directly.

Portfolio Returns, Market Volatility, and Seasonality (with C. Chen), *Review of Quantitative Finance and Accounting* 17, 2001, 27-43

This paper examines three important issues related to the relationship between stock returns and volatility. First, are Duffee's (1995) findings of the relationship between individual stock returns and volatility valid at the portfolio level? Second, is there a seasonality of the market return volatility? Lastly, do size portfolio returns react symmetrically to the market volatility during business cycles? We find that the market volatility exhibits strong autocorrelation and small size portfolio returns exhibit seasonality. However, this phenomenon is not present in large size portfolios. For the entire sample period of 1962-95, the highest average monthly volatility occurred in October, followed by November, and then January. Examining the two sub-sample periods, we find that the average market volatility increases by 15.4% in the second sample period of 1980-95 compared to the first sample period of 1962-79. During the contraction period, the average market volatility is 60.9% higher than that during the expansion period. Using a binary regression model, we find that size portfolio returns react asymmetrically with the market volatility during business cycles. This paper documents a strongly negative contemporaneous relationship between the size portfolio returns and the market volatility that is consistent with the previous findings at the aggregate level, but is inconsistent with the findings at the individual firm level. In contrast with the previous findings, however, we find an ambiguous relationship between the percentage change in the market volatility and the contemporaneous stock portfolio returns. This ambiguity is attributed to strongly negative contemporaneous and one-month ahead relationships between the market volatility and portfolio returns.

Stock Returns, Volatility, and Trading Volume: Evidence from Chinese Stock Markets (with C. Chen), *International Journal of Business* 6, 2001, 67-86

This paper examines three important issues in Chinese stock markets. First, we examine the behavior of stock returns, volatility, and trading volume in Chinese stock markets. Second, we investigate the contemporaneous and causality relationship among stock returns, volatility, and trading volume at the Shanghai and Shenzhen Stock Exchanges over the

period from the beginning of the Shanghai stock market in December 1990 (April 1991 for the Shenzhen stock market) to June 1999. And lastly, we examine the linkage between the Shanghai Stock Exchange and the Shenzhen Stock Exchange. We first find that monthly return volatility and trading volume volatility exhibit strong autocorrelation. However, further empirical tests reject the existence of unit roots. Monthly returns do not exhibit autocorrelation for the Shanghai Stock Exchange Index. With a three variable autoregressive (VAR) model, we then find that return volatility affects stock returns at both Chinese stock markets. There exists a bi-directional causality between return volatility and trading volume volatility. Interestingly, we further find that returns do not cause return volatility directly at both Chinese stock markets, but instead affect trading volume volatility at the Shanghai Stock Exchange. Finally, we find a strong linkage between the Shanghai Stock Exchange and the Shenzhen Stock Exchange in terms of returns, return volatility, and volume volatility.

Time-Varying Expected Stock Returns and Information in Home Prices (with Y. Li), *Journal of Real Estate Portfolio Management* 6, 2000, 61-74

This paper examines three important issues in Chinese stock markets. First, we examine the behavior of stock returns, volatility, and trading volume in Chinese stock markets. Second, we investigate the contemporaneous and causality relationship among stock returns, volatility, and trading volume at the Shanghai and Shenzhen Stock Exchanges over the period from the beginning of the Shanghai stock market in December 1990 (April 1991 for the Shenzhen stock market) to June 1999. And lastly, we examine the linkage between the Shanghai Stock Exchange and the Shenzhen Stock Exchange. We first find that monthly return volatility and trading volume volatility exhibit strong autocorrelation. However, further empirical tests reject the existence of unit roots. Monthly returns do not exhibit autocorrelation for the Shanghai Stock Exchange Index. With a three variable autoregressive (VAR) model, we then find that return volatility affects stock returns at both Chinese stock markets. There exists a bi-directional causality between return volatility and trading volume volatility. Interestingly, we further find that returns do not cause return volatility directly at both Chinese stock markets, but instead affect trading volume volatility at the Shanghai Stock Exchange. Finally, we find a strong linkage between the Shanghai Stock Exchange and the Shenzhen Stock Exchange in terms of returns, return volatility, and volume volatility.

Forecasting Sales and Price of Existing Single-Family Homes: A VAR Model with Error Correction, *Journal of Real Estate Research* 14, 1997, 155-167

In this paper we forecast demand for existing single-family housing in the United States. We first find that sales volume (sales) and median sales price (price) have unit roots. We then find that sales and price are cointegrated. We develop a vector autoregressive (VAR) model with error correction to further examine the causality relationship between sales and price. We find that there exists a bi-directional causality between sales and price. Price affects sales significantly and sales affects price weakly. With the VAR model we

then forecast sales and price for existing single-family housing during the period of 1991 to 1994 by using a recursive method. We find that our predictions for sales and price fit the actual data well.

The Predictability of Stock Returns: A Nonparametric Approach (with P. Chung), *Econometric Reviews* 15, 1996, 299-330. The abstract of the paper was published in the July 1995 issue of *Journal of Finance*, page 963

Recently there has been substantial evidence regarding the predictability of stock returns. In the existing literature, the predictability of stock returns has been examined by using either one particular factor or a few factors on an ad hoc basis. A linear model with nice properties of the regression error term is assumed. The purpose of this paper is to develop an alternative econometric model for the predictability of stock returns that is consistent with the data and considers the econometric problems associated with ad hoc linear models. We first identify, through a set of diagnostic tests, five lagged predictive factors from a linear model. Using these factors, we then predict one-month-ahead stock index returns with a nonparametric approach. We show that a nonparametric model fits the data much better than linear models. We also find that our nonparametric model can correctly predict about 74% of stock index return signs.

One can argue that the predictability of stock returns challenges market efficiency. It is important to note, however, that the predictability of stock returns is not necessarily inconsistent with market efficiency because of transaction costs and risks. We examine whether our results challenge market efficiency. With various ex ante trading rules based on nonparametric predictions and transaction cost schedules, we compare the performance of "managed" portfolios with that of the "buy and hold" portfolios. We find that the managed portfolios are mean-variance dominant over the buy-and-hold strategies when no or low transaction costs are assumed. When high transaction costs are assumed instead, the mean-variance dominance diminishes. However, the Sharpe index of risk-adjusted portfolio performance indicates that the managed portfolios significantly outperform the buy-and-hold strategies even for the high-transaction cost scenario. These results lead us to question whether the observed predictability of stock returns can be consistent with equilibrium. Nevertheless, we show that the difference in performance between the managed portfolios and the buy-and-hold strategies can be partially explained by the January effect or the small firm effect. In sum, this paper demonstrates the merits of using a nonparametric approach for predicting stock returns and testing market efficiency.

Time-Varying Coefficients in Predictive Stock Return Regressions: A Parametric and Nonparametric Analysis, *Journal of Quantitative Economics* 11, 1995, 77-99

In this paper we examine the behavior of factor coefficients in predictive regressions with parametric and nonparametric procedures. We find that the coefficients of predictive factors change in means and standard deviations over time and that the estimated empirical distributions of these coefficients are not normal. In addition, we find evidence that some of

the coefficients change with their corresponding factor values. These results cast doubt on the traditional way of making inference based on linear regressions with fixed coefficients. We provide an alternative approach based on a nonparametric procedure to deal with the time-varying coefficients.