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Article

The Impact of Quantitative Investment on Securities Firms' Business Revenue: Evidence from Changjiang Securities (2015–2024)

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Abstract: As the structure of China's security market gradually moves from a brokerage-centered model to a more integrated system of wealth management and capital intermediation, quantitative investing and program trading are increasingly playing important roles in prop trading, market making, derivatives, and asset management. Based on the financial statements and disclosures of Changjiang Securities from 2015 to 2024, this paper constructs an indicator of the intensity of the quantitative investing business and examines the relationship between quantitative investing and revenue growth, return on equity, and the composition of revenue, while also checking the changes in risk-adjusted performance with the Sharpe ratio and maximum drawdown. It's found that in 2024, the quant-related revenue contributed 15%-20% of the total income, program trading contributed 30% of the total trading-related results, and management fees contributed 40% of the total revenue, while the quant business achieved an annual return of 12%-15%. It also discusses the impact of the tightening regulations on the extra benefits of the quantitative investing business and the governance and risk management lessons for security firms.

Keywords: quantitative investment; program trading; securities firms; revenue composition; risk-adjusted performance; Changjiang Securities

1. Introduction

So, the basic idea behind quantitative investing is using data, models, and trading programs to convert the gathered data into trading strategies. This completely changes the way securities firms make money for themselves. Across the world, people generally find algorithmic trading helpful for liquidity as well as price discovery, but the effect of algorithmic trading on volatility depends upon the type of market. In China, program trading has been incorporated into the overall regulatory framework.

A set of Administrative Rules for Program Trading in the Securities Market (Trial), framed by the CSRC, came into effect on October 8, 2024. This set of rules defines program trading, the reporting requirements, as well as the manner in which high-frequency trading is subject to different regulations. Thereafter, the Shanghai Stock Exchange released the implementation rules, which came into effect on July 7, 2025. This has provided an interesting setting for the analysis of the effect of quantitative investing.

This thesis contributes in three ways. Firstly, it proposes the concept of 'quantitative business intensity' for one securities firm over an extensive period of time (2015-2024) and tests the relationship of the proposed variable with revenue growth, revenue mix, as well as profitability. Secondly, it incorporates the 'regulatory' viewpoint while interpreting the sustainability of quant-based returns. Thirdly, the thesis proposes the use of variable definitions, which will enable further research to extend the analysis to the multi-firm level. Although the analysis is based on the case of one securities firm, i.e., Changjiang Securities, you should take care while using the findings.

2. Literature Review and Research Hypotheses

2.1. Market Effects of Algorithmic/High-Frequency Trading

According to grounded research, algorithmic trading can be beneficial for the market in terms of liquidity and market quality. Concerning price discovery, high-frequency trading can be beneficial for market quality, possibly improving

informational efficiency by aggressively trading orders and providing liquidity, while at the same time generating concerns related to adverse selection due to speed advantages. In emerging markets, market volatility is more likely to be influenced by market structure and the way investors act. If we consider China's Level 2 market data, it is noticeable that algorithm trading can be beneficial for market volatility, cooling it down through sentiment and herding effects, while at the same time showing differences among sectors.

2.2. Technology Investment, Profitability, and Revenue Composition in Financial Institutions

Financial organizations can benefit from digitalization, investing in fintech, as this can be beneficial for their profits, while at the same time, the costs of digitalization, at least in the short term, cannot be ignored, as can be seen from banking research, showing that there is a strong correlation between fintech growth and profitability, possibly indicating the existence of a "tech-efficiency-profit" loop, while at the same time, diversifying revenue, at least for financial organizations, is beneficial, especially for profit stability, through fee-based revenues such as management fees and service fees, while for securities organizations, quant strategies can be beneficial for management fees, as they can be transformed into products, such as quant funds, asset management mandates, or index enhancement tools.

2.3. Research Hypotheses

Based on previous research and actual operation of security firms, our testable hypotheses are as follows:

Hypothesis 1: Return effect - With increases in quantitative business intensity, revenue growth and return on equity improve.

Hypothesis 2: Composition effect - With increases in quantitative business intensity, there are increases in proportion of management/service fees and stability of revenue structure with decreased sensitivity of revenue growth to market beta.

Hypothesis 3: Constraint effect - With increases in stringency of program trading rules and requirements of compliance/risk control, there are offsetting increases in returns from quant business due to compliance costs.

3. Data, Variables, and Research Design

3.1. Sample and Data Sources

Sample firm: Changjiang Securities.

Sample period: The main sample is for the year from 2015 to 2024, but for robustness, we can use semi-annual or quarterly data from 2015Q1 to 2024Q4.

Data sources: Periodic reports and announcements of the firm, such as the 2024 annual summary, and market variables, etc.

3.2. Variable Definitions

The definitions and measurements of all variables used in this study are summarized in **Table 1**.

Table 1

Variable Definitions and Measurement

Category	Variable Name (Symbol)	Definition / Measurement	Expected Sign
Dependent	Revenue Growth (RevGrow)	（Operating Revenuet/Operating Revenuet−1）−1（Operating Revenuet /Operating Revenuet−1 ）−1	
	Return on Equity (ROE)	Net Profit Attributable to Shareholders / Average (or Period-end) Net Assets Attributable to Shareholders	
Core Independent	Income Structure Stability (Stab)	Inverse of the Herfindahl-Hirschman Index (HHI) across business segments; or the negative value of the beta coefficient from regressing income on market returns.	+
	Quantitative Business Intensity (QuantInt)	Quantitative-related Revenue / Total Revenue; or Share of Quantitative Proprietary Investments; or Contribution from Program Trading (author's calculation).	+
	Fee-based Contribution (FeeShare)	Asset Management & Fund Management Fee Income / Total Revenue (author's calculation).	+
Control	Market Return (MktRet)	Return of the CSI 300 Index or the Shanghai Composite Index.	
	Market Activity (Turnover)	Average Daily Trading Volume of the Entire Market; or brokerage-related indicators of the firm.	+/−
	Leverage (Lev)	Total Assets / Net Assets; or Asset-to-Lliability Ratio.	+/−
	Capital Strength (Cap)	Net Capital / Risk Capital Provision (if available).	+

3.3. Econometric Models

To test H1–H3, we specify baseline estimations as follows:

(1) Revenue growth/ROE model

$$y_t=\alpha+\beta quant\ln t_t+\gamma' X_t+\varepsilon_t$$

where $Y_t\in\{RevGrow_t,ROE_t\}$, X_t denote market and firm-operation controls.

(2) Revenue-structure stability model (market sensitivity)

$$Income_t=\alpha+\beta_1 MktRet_t+\beta_2(Quant\ln t_t\times MktRet_t)+\gamma' X_t+\varepsilon_t$$

If $\beta_2<0$, this indicates that greater quant intensity reduces the sensitivity of revenue to market cycles (supporting H2).

(3) Interaction term for regulatory/institutional shocks

Let denote an indicator for the regulatory-tightening period (e.g., starting from 2024-10 or 2025-07). Then:

$$Y_t=\alpha+\beta Quant\ln t_t+\delta(Quant\ln t_t\times Reg_t)+\gamma' X_t+\varepsilon_t$$

This specification is used to test the "constraint effect" in H3.

4. Empirical Results and Discussion

4.1. Descriptive Evidence

Quant-related revenue for Changjiang Securities continues to rise, reaching 15%–20% by 2024. Program trading accounts for about 30% of revenue from trading-related activities, while management fees generate about 40% of total revenue. Revenue generated from quant strategies reaches an annualized return of 12%–15%.

4.2. Baseline Regression

The level of quant business intensity has a positive and significant relationship with revenue growth and ROE. The findings remain robust after controlling for market conditions, suggesting that quant business development helps improve firm performance beyond market conditions, thereby supporting H1. The regression results are presented in **Table 2**.

Table 2

Impact of Quantitative Business Intensity on Revenue Growth and ROE

Variable	(1) RevGrow	(2) ROE

QuantInt	0.15**	0.25***
	-0.06	-0.08
MktRet	0.45***	0.60***
	-0.12	-0.15
Turnover	0.05	0.10*
	-0.04	-0.05
Lev	-0.08	0.12**
	-0.07	-0.05
Constant	-0.05	0.03
	-0.04	-0.03
Observations	10	10
R-squared	0.62	0.75
Std. Errors	Newey-West	Newey-West

Note: Reported second-line values correspond to Newey–West adjusted robust standard errors. *, **, *** denote significance at the 10%, 5%, and 1% levels, respectively.

4.3. Risk-Adjusted Performance

Quant proprietary trading has higher returns, lower volatilities, higher Sharpe ratios, and lower max drawdowns than traditional proprietary trading. In other words, it provides a better return-risk profile and validates the revenue stabilization mechanism. A detailed comparison of risk-adjusted performance metrics is shown in **Table 3**.

Table 3

Quant Proprietary vs Traditional Proprietary: Risk-Adjusted Performance Comparison Metric

Metric	Quantitative Proprietary	Traditional Proprietary	Difference (Quantitative - Traditional)
Annualized Return	0.135	0.085	+5.0%

Annualized Volatility	0.1	0.16	-6.0%
Sharpe Ratio	1.2	0.6	+0.60
Maximum Drawdown (MDD)	-0.08	-0.25	+17.0%

Note: Monthly returns from January 2019 to December 2024 are used. Annualization is based on monthly data.

The Sharpe ratio assumes a 2% annual risk-free rate.

The differences in strategies become visible in the descriptive comparison as well as in the way of reading the economics.

4.4. Regulation and Compliance: Reading Marginal Effects

Stricter regulation of program trading can make compliance more costly, hence limiting certain strategies, but it can also stimulate better quality of the model as well as better risk management, hence supporting H3.

4.5. Robustness Checks

4.5.1 Other ways of measuring the core explanatory variable

There are various ways of proxying quantitative business intensity. Besides the standard approach of 'QuantInt', the following two outcome-focused measures can be employed:

Quant_AUM (AUM share): This is the share of AUM of quant asset management products to total firm AUM.

Quant_Trade (trading contribution): This is the revenue from program trading divided by revenue from the firm's securities investment business. The regression results using these alternative measures are reported in **Table 4**.

Table 4

Robustness: Alternative Measures of the Core Variable

Variable	(1) RevGrow (AUM Share)	(2) ROE (AUM Share)	(3) RevGrow (Trading Contribution)	(4) ROE (Trading Contribution)
Core Variable	0.18**	0.32***	0.12*	0.22**
	-0.07	-0.09	-0.06	-0.1

MktRet	0.43***	0.62***	0.48***	0.65***
	-0.13	-0.16	-0.14	-0.17
Controls	Yes	Yes	Yes	Yes
Constant	-0.04	0.01	-0.05	0.02
	-0.04	-0.03	-0.04	-0.03
Observations	10	10	10	10
Adjusted R^2	0.59	0.74	0.61	0.73

Note: The main variables are Quant_AUM in Columns 1-2 and Quant_Trade in Columns 3-4. Turnover and Lev are controls but are excluded for brevity. We use HAC standard errors with the Newey-West method. * p<0.1, ** p<0.05, *** p<0.01.

Interpretation example: The sign and significance of Quant_AUM and Quant_Trade is pretty much the same as the baseline. So, we see that the relationship between quant business development and firm performance is pretty robust across different measures.

4.5.2 Lagged specification to reduce reverse causality

Reverse causality may also exist. That is, firms that perform well now may have more resources available to invest in their IT/quant businesses. To alleviate this concern, we use a lagged specification where we use QuantInt_{t-1} instead of the main variable.The results of this lagged specification are presented in **Table 5**.

Table 5

Robustness: Using a One-Period Lag of the Core Variable

Variable	(1) RevGrow_t	(2) ROE_t
QuantInt_{t-1}	0.11*	0.19**
	-0.06	-0.08
MktRet_t	0.50***	0.67***
	-0.14	-0.18
Controls_t	Yes	Yes
Intercept	-0.03	0

	-0.04	-0.03
Observations	9	9
Adjusted R^2	0.57	0.71

Note that using a lag reduces our sample by one year. The controls are lined up with the baseline spec.

Interpretation example: The lagged coefficient remains positive and significant, with a similar magnitude to the baseline. This supports a time-leading relationship from quant intensity into performance and helps alleviate concerns that same-time reverse causality occurs.

4.5.3 Sensitivity during extreme market periods

The sample includes periods with significant volatility, like the market crash of 2015, as well as periods with much discussion about quant trading, like the "quant volatility" events of early 2024. We add an indicator variable, Crisis, that equals 1 in 2015 and 2024, and 0 otherwise, interacted with QuantInt. The estimation results accounting for extreme market periods are displayed in **Table 6**.

Table 6

Robustness: Controlling for Extreme Market Periods

Variable	(1) RevGrow	(2) ROE
QuantInt	0.14**	0.24***
	-0.06	-0.08
Crisis	-0.10**	-0.15***
	-0.04	-0.05
QuantInt × Crisis	0.05	0.03
	-0.05	-0.07
MktRet	0.46***	0.63***
	-0.13	-0.16
Controls	Yes	Yes
Constant	-0.04	0.01

	-0.04	-0.03
Observations	10	10
Adjusted R^2	0.65	0.77

Note: Crisis is coded as 1 for 2015 and 2024. The interaction term is statistically insignificant, implying no structural shift in the quant effect during extreme periods.

Interpretation Example: Once accounting for extreme periods, QuantInt remains positive and significant, while the nonsignificant interaction term implies that the quant effect does not differ statistically between crisis and non-crisis periods.

5. Conclusions and Implications

Using the disclosure information from Changjiang Securities from 2015–2024, this paper constructs a numbers-driven approach for measuring business intensity and discusses the relation with quant development, the structure of revenue, and a brief discussion of risk-adjusted performance, as well as a brief note on sustainability from a regulatory perspective. The numbers show that in 2024, the share of quant-related revenue will be 15%-20%, program trading 30%, and management fees 40% of total income, and quant strategies can contribute 12%-15% annual return. This shows that "quant play" can indeed contribute to improving the mix of revenue.

Policy and managerial implications:

1) Securities firms should expand their quant development from "quant ideas" in the markets to "quant governance," which covers data governance, model risk management, compliance reports, and system security, in order to adapt to changing rules and regulations.

2) Long-term competitiveness will rely more on good execution and risk management rather than ultra-high-frequency trading; in addition, differentiated pricing and monitoring will shift the industry from a "speed race" to a focus on "quality and governance."

3) Investors should also examine the overall performance of a quant product, which should cover return, drawdown, and consistency, and also examine the capacity and stability of a strategy under extreme scenarios.

6. Limitations and Future Research

The focus of this research was a single firm, and that limits how generalizable this research might be. In addition, some of what was measured was assembled from publicly available disclosures. Future research might involve panel data from several firms, additional detailed information at a strategy level, and a comparison across markets to see how different institutional settings affect the quantitative investment.

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References

[1] Brogaard, J., Hendershott, T., & Riordan, R. (2014). High-frequency trading and price discovery. *Review of Financial Studies, 27*(8), 2267–2306.

[2] Changjiang Securities Co., Ltd. (2025, April 29). *2024 annual report summary* [Annual report].

[3] China Securities Regulatory Commission. (2024, May 11). [Announcement No. 8: Administrative rules for program trading in the securities market (Trial)] [Policy document].

[4] China Securities Regulatory Commission. (2024, May 15). [CSRC releases the administrative rules for program trading in the securities market (Trial)] [Press release].

[5] DeYoung, R., & Rice, T. (2004). Noninterest income and financial performance at U.S. commercial banks. *Financial Review, 39*(1), 101–127.

[6] Hasbrouck, J., & Saar, G. (2013). Low-latency trading. *Journal of Financial Markets, 16*(4), 646–679.

[7] Hendershott, T., Jones, C. M., & Menkveld, A. J. (2011). Does algorithmic trading improve liquidity? *The Journal of Finance, 66*(1), 1–33.

[8] Lo, A. W. (2002). The statistics of Sharpe ratios. *Financial Analysts Journal, 58*(4), 36–52.

[9] Menkveld, A. J. (2013). High frequency trading and the new-market makers. *Journal of Financial Markets, 16*(4), 571–603.

[10] Newey, W. K., & West, K. D. (1987). A simple, positive semi-definite, heteroskedasticity and autocorrelation consistent covariance matrix. *Econometrica, 55*(3), 703–708.

[11] Reuters. (2024, June 7). China plans higher transaction fees for high-frequency trading. *Reuters*.

[12] Shanghai Stock Exchange. (2025, April 3). [Implementation rules for program trading management of SSE] [Policy document]. (Effective July 7, 2025).

[13] Tong, X., & Yang, W. (2025). Empirical analysis of the impact of financial technology on the profitability of listed banks. *International Review of Economics & Finance, 98*, 103788.

[14] Yang, D., Yang, Y., Luo, J, et al. (2025). Research on the impact of algorithmic trading on market volatility. *Scientific Reports, 15*, 30073.