

# **A STUDY ON THE LINKAGE BETWEEN SYSTEMIC RISK AND RATE OF RETURN AND THE IMPACT OF REGULATIONS ON SYSTEMIC RISK**

**Thejo Jose**

Assistant professor, King Abdulaziz University, Jeddah, Saudi Arabia

thejo11@gmail.com

## **Abstract**

*This paper tries to explain how the management of systemic risk affects the rate of return of financial institutions and study the impact of increased financial regulations on systemic risk. Positive comparative differences were observed in case of those institutions that complied with stringent financial regulations. It was evident that increased regulation is beneficial in a developed banking system and can help the economy in surviving the financial crisis and systemic risk challenges. It was concluded that global harmonisation of regulations is required to implement multi-layered and diverse regulations according to the individual capabilities and vulnerabilities of financial institutions.*

*Keywords: Systemic risk, Procyclicality, Macroprudential regulation, Idiosyncratic risk, Bank run*

## **INTRODUCTION**

Systemic risk and its impact on the banking and financial system is of great interest to the researchers across the world since the emergence of this discipline. As demonstrated by the global financial failure, the ripples of default in the form of bank runs and failures in an economy are far reaching and destroy the macroeconomic fabric of a country's financial structure. The cascading effect of bank runs on other banks and financial institutions, panic created in the money market and dominance of supply over demand of financial instruments are major concerns of policy makers who are bestowed with the responsibility of protecting economic system against systemic risk. Global financial regulators have introduced different regulatory requirements for banks and financial institutions to ensure safety and soundness of these institutions which are entangled in the web of interdependence. Despite the efforts taken by the

regulatory bodies, regulation arbitrage, which is due to transfer of risk from regulated to unregulated sector, ends up restoring the systemic risk. To make the situation worse, the evolution and ever changing structure of global financial system makes it problematic to predict the magnitude of systemic failure.

This paper tries to explain the impact of regulations on systemic risk and rate of return of the global financial institutions. The benefits and drawbacks of having such regulations and associated challenges in the implementation of regulations will also be examined. A sincere effort is made to understand how regulations try to eliminate or reduce financial risk in financial markets. Charles Kindleberger (2011) states that that financial intermediation has always been an essential but fragile business. Wilson et al. (2010) stresses the importance of regulation being based on sound economic analysis. In their opinion, regulators first should fully understand the driving forces behind misallocations in the market economy before they can design appropriate rules. The cost-benefit analysis that leads to selection of the optimum regulation comes second. And finally, regulators need to look beyond current crisis in designing policies and need to address the enticements to skirt regulations. It has been noted by the researchers that regulations based virtuously on the soundness of individual institutions misses a decisive fact that risky activities undertaken by individual institutions can become augmented at the aggregate level. Brunnermeier et al. (2009) and Acharya and Richardson (2009) also have emphasized the susceptibility of the global financial system based on micro-prudential regulations designed for regulating individual financial institutions. Interestingly some researchers found that there is little effect of supervision and regulation on systemic risk. Barth et al. (2004) mentions that countries with higher regulatory restrictions have a higher probability of experiencing a banking crisis by referencing to world bank survey data while Barth et al. (2013) demonstrate how banking restrictions are negatively correlated to bank efficiency.

It is in this context this paper tries to understand the desirability of reducing systemic risk and the impact of ever increasing regulations on rate of return and efficiency by examining the changes in rate of returns in the pre-and post-global financial crisis period.

## **SYSTEMIC RISK**

Systemic risk is defined by the International Monetary Fund (IMF), The Bank for International Settlements (BIS) and the Financial Stability Board (FSB) as ‘the disruption of the flow of financial services that is (i) caused by an impairment of all parts of the financial system; and (ii) has the potential to have serious negative consequences for the real economy’. Thus, failure of a Systemically Important Financial Institutions (SIFI) can cause negative externalities which may harm other institutions. The Financial Stability Board (FSB) (2011) defines Systemically

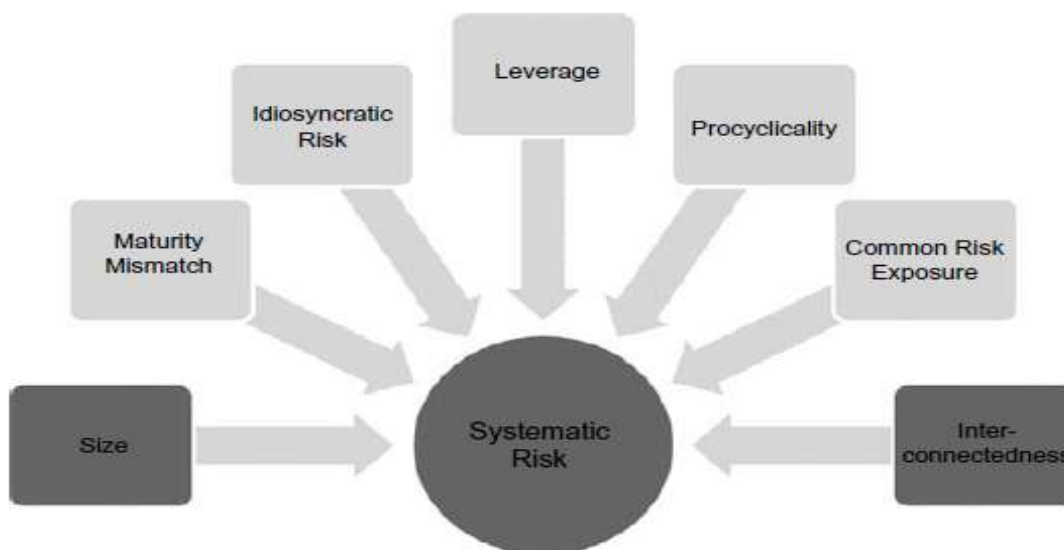
Important Financial Institutions (SIFI) as “financial institutions whose distress or disorderly failure, because of their size, complexity and systemic interconnectedness, would cause significant disruption to the wider financial system and economic activity”.

Acharya et al. (2010) observe that an individual financial institution acts to avert its own collapse but does not necessarily attempt to prevent the downfall of the whole system. Brunnermeier et al. (2009) states that systemic risk is a negative externality forced by every market participant and this risk arises endogenously in the financial system. Hence it is a necessity to regulate this risk and their implication of different types of guarantees. Acharya and Richardson (2009) states that these implicit guarantees are:

- “too-big-to-fail” (TBTF);
- “too-interconnected-to-fail” (TITF); and
- “too-many-to-fail” (TMTF) and they can create moral hazard.

Stefan Schwerter (2011), in his study on Basel III’s ability to mitigate systemic risk identifies systemic risk factors as shown in Figure 1:

Figure 1. Systemic risk factors



It is important to mention from where this systemic risk comes from and how can we regulate it? Firstly, the mechanism by which banks are led to default is through contagion. There is an interconnection between banks because of direct bilateral exposures in the form of interbank loans and derivative transactions. Secondly, if all these banks or financial institutions own portfolios which are subject to a common shock, all these institutions can be led to default.

Hence, a major responsibility of regulatory bodies is to ensure that the portfolio of these banks is diversified and making sure about the variation in the sensitivities towards common shock of these portfolios. Trapp and Wewel (2013) identifies contagion and conditional interdependence as channels for systematic risk. They demonstrate that it is practically tough to identify the responsible channels for systemic risk due to 3 reasons. First is availability of portfolio level information for supervisory authorities alone. Secondly, they say that even supervisors often do not have disaggregate information on mutual exposures at the international level. Finally, they think that even if disaggregate information on mutual exposures were available, portfolio-level information may not sufficiently reflect interbank exposures.

Many systemic risk measurement techniques have been proposed by different authors. Some of the most popular ones include distance to default ( $\log z$ ) given by Laeven and Levine (2009), Marginal expected shortfall (MES), Credit default swap (CDS) Premia and idiosyncratic risk of banks which is a market model. In order to counter the problem of systemic risk, there is an obvious demand to measure and price it. There is a popular claim to internalise the externalities and the spillover effects of a bank's failure to avoid excessive risk taking which is having a destabilizing effect on entire financial system (Adrian and Brunnermeier, 2009).

## MEASUREMENT OF SYSTEMIC RISK

The economic literature identifies two ways for measuring systemic risk from both macroeconomic and microeconomic points of view (Vallascas & Keasey, 2012). The macroeconomic viewpoint focuses on the contribution of each individual institution to the systemic risk. The microeconomic approach to measuring systemic risk focuses on how individual banks react to systemic shocks. These two approaches use various risk measures. Following table shows some of the systemic risk measures suggested by researchers across the world along with the determinants: (based on study done by Katarzyna Sum, 2015).

Table 1: Systemic risk measures

Authors	Measures	Determinants
Acharya et al. (2010)	Marginal expected shortfall- the average return of each institution, based on high frequency data, measured over the worst 5% of the sample period.	Leverage, expected loss
Acharya, Engle, & Richardson (2012)	Capital shortfall based on equity returns	Systemically risky assets, Leverage.
Adrian & Brunnermeier (2011)	CoVaR, the value at risk of the whole system conditional on the distress of single institutions. Tail covariation between the risk of single institutions and the whole system based on high and low frequency data.	Size, leverage, maturity mismatch.

Bartram, Brown & Hund (2007)	Three measures of systemic risk: 1. Equity returns of banks with no direct exposure to the crisis during the time of the crisis. 2. The likelihood of systemic failure based on a structural credit risk model and distances to default. 3. Bank default probabilities based on equity option prices.	Market value, debt, deposits, and asset volatility.	Table 1...
Vallascas & Keasey (2012)	Distance to default and tail measure conditional on the occurrence of market decline. The default risk is proxied by Merton's distance to default model.	Leverage ratio, Liquidity requirements, bank size, the share of non-interest income and asset growth.	

## REGULATING SYSTEMIC RISK

After the global financial crisis of 2008, Financial Stability Board (FSB) was established in 2009 with a mandate of systemic and proactive: in particular, to “Assess vulnerabilities affecting the financial system and identify and oversee action needed to address them”. In conjunction with BIS, FBS has taken the lead in developing the framework for global significantly important financial institutions (Financial stability board, 2009). The Bank for International settlements (BIS) is the world's oldest financial organisation having 60 central banks as members which account for 95% of world GDP. The Basel committee produced a set of recommendations commonly referred as Basel Framework which is accepted as the global standard for the financial regulation and supervision of banks. Basel 1 which came out in 1988 focussed on a minimum capital requirement for banks of 8% of the risk credit weighted assets. The development of banking business model led to the release of Basel 2 norms in 2007. It introduced 3 pillars to the Basel framework. Pillar one regulated minimum capital requirements, pillar 2 addressed monitoring and supervision and pillar 3 was connected to market disclosure. During the implementation stage of Basel 2 norms, the global financial crisis of 2008 highlighted the need to revise the regulatory framework. In 2010, they published the overhauled banking regulation as 2 documents entitled ‘Basel 3: International framework for liquidity risk measurement, standards and monitoring’ and ‘Basel 3: A global regulatory framework for more resilient banks and banking systems’.

Basel 1 established that Banks had to hold minimum capital of 8% of total risk-weighted assets. It also specified that at least 50% of Bank's capital base had to consist of Tier 1 capital which means Tier 1 capital ratio will be minimum 4% and that most of Tier 1 should be core Tier 1. Basel 2 eliminated ‘the one rule fits all’ approach of Basel 1 with standardised risk weights for all banks and introduced a choice of alternatives between coefficient-based approaches and model-based approaches, with the result that sophisticated banks could benefit from internal

data modelling to operate with lower levels of capital and high leverage than less sophisticated banks. Basel 2 norms gave more standardised definition of capital available and made a refined approach to calculation of risk weighted assets. Pillar one was modified to include credit risk, market risk, counterparty risk, securitisation exposures and operational risks. In Pillar 2 Basel 2 established that no capital can ever be enough unless banks take responsibility for monitoring, measuring and managing risks internally and unless supervisors take responsibility for auditing bank's risk management capabilities. Pillar 3 is designed to provide the market with more detailed and better disclosure as a basis for better risk analysis.

Basel 3 norms was designed to address the weaknesses in Basel 2 that came to light during the financial crisis. The implementation of Basel 3 norms is happening in a phased manner and will not be complete until January 2019. The key areas of focus of Basel 3 included capturing the risk of off-balance sheet exposures and securitisation activities, managing the risk concentrations, providing incentives for banks to better manage risk and returns over long term, valuation practices, stress testing, Accounting standards for financial instruments and Corporate Governance. Under Basel 3, Central Banks have the power to impose a requirement for banks to hold additional regulatory capital at times of excessive credit growth which creates additional systemic risk. This is referred to as Counter-cyclical Buffer and the amount imposed can be in the range of 0-2.5% of risk weighted assets. Global systemically important banks (G-SIBs) whose failure have implications beyond domestic financial system need to keep capital buffer as loss absorbency requirement. Barclays, HSBC, RBS, Standard Chartered etc. are banks designated as G-SIBs. Another capital conservation buffer of 2.5% of RWA are expected to be kept additionally under normal conditions to cover losses.

In addition to all regulations stated above, Basel 3 introduced minimum liquidity requirement for banks to overcome liquidity issues faced by banks during financial crisis. Basel committee published Principles of Sound Liquidity Risk Management and supervision in 2008. High quality liquid assets required to meet Net cash outflows over the next 30 days or above was to be kept as per the newly proposed liquidity coverage ratio. The 100% LCR threshold began to be phased in 1 January 2015 and will not be fully implemented until 1 January 2019. A Net stable funding ratio of  $\geq 100\%$  is required to mitigate risk from liquidity mismatches in the bank's statement of Financial Position which means available amount of stable funding should be more than required amount of stable funding.

## **MANAGEMENT OF SYSTEMIC RISK AND RATES OF RETURNS**

Countries whose GDP is dominated by banking sector is more vulnerable to systemic risk than countries depending more on other industries. Poor lending practices, lack of internal controls,

poor management quality, government intervention and, most importantly, excess levels of credit were the cause of an increase in the systemic risk of the country. The crisis led to the liquidation and rehabilitation of many of the country's banks, leading to the overall failure of the banking system (Bandt, D, 2000). Through systemic risk regulation, the policy makers are trying to curb unhealthy lending practices, implementing more control mechanisms and managing the exposure of credit risk. But the major question arises in this context is whether we will be able to limit or nullify systemic risk completely? The answer is a big no. Any effort to limit systemic risk will reduce the banking activities and will worsen the loan to deposit ratio which will not only affect the individual firm's profitability but also have a negative impact on the economy by reducing investments, consumption, Government revenue and GDP. The income generating non-banking activities' revenue also may be affected. Hence it is not advisable and impractical to cancel out systemic risk from the economy as it may affect the economic growth and development. Trying to eliminate the structural weaknesses of financial system may in effect impede the growth of economic system.

Jacques Prefontaine (2012), in his study on Implications Of Basel III For Capital, Liquidity, Profitability, And Solvency Of Global Systematically Important Banks, analysed the G-SIBs' Capital, Liquidity and ROE Metrics.

Table 2. GSIB's Annual report of 2011

<b>G-SIBs</b>	<b>Tier 1 CER</b>	<b>Liquidity</b>	<b>ROE</b>
Bank of America	9.86%	EXL-TRF	0.04%
Bank of NY Mellon	13.4%(B1);7.1% (B3)	?	7.50%
Citigroup	11.8%	?	6.50%
Goldman Sachs	12.1%	EXL	3.70%
JP Morgan Chase	10%; 7.9% (B3)	DLR	11%
Morgan Stanley	13%	?	8.50%
State street	12% (B3)	EXLCB	10%
Wells Fargo	9.46%; 7.49% (B3)	DLR	12%
Royal Bank of Scotland	10.6%	DLR, LB, NSFR	10.5%
Lloyds Banking Group	10.8%	DLR	-5.30%
Barclay's	11%(B 2.5); 10% (B3)	DLR, LCR, NSFR	5.80%
HSBC Holdings	10.6%; 9.2% (B3)	?	12.6%
Credit Agricole	10.2% (B 2.5)	DLR, EXL	3.43%
BNP Paribas	9.6% (B 2.5)	AGR	8.8%
Banque Populaire	9.1% (B 2.5)	DLR, EXL	5.70%

SocieteGenerale	9.0% (B 2.5)	DLR, EXL	6.10%
Deutsche Bank	9.5% (B 2.5)	LR	9.80%
Commerzbank	9.9% (B 2.5)	EXL	2.20%
Unicredit Group	8.74%	?	-16.0%
UBS	17.5%; 14.1% (B 2.5)	LCR, NSFR, B3	8.60%
Credit Suisse	10.7% (B 2.5)	DLR, LCR, NSFR	6.00%
Dexia	9.9%	GG	<b>-67.4%</b>
ING Groep	9.6%	DLR	8.70%
Banco Santander	10.02%	?	7.14%
Nordea	9.2%; 11% (B 2.5 target)	LCR, LB	11.1%
Mitsubishi UFJ	12.82%	DLR	11.3%
Mizuho FG	8.0%	DLR, EXL	6.44%
Sumitomo Mitsui FG	7.0% (B3)	DLR	9.90%
Bank of China	9.92%	?	<b>19.15%</b>

Table 2...

13 banks reported only the older Basel II version of Tier 1 CER while 10 European banks reported the newer Basel 2.5 June 2012 target of Tier 1 CER. Only 7 G-SIBs reported on achieving Basel III 2013-2019 gradual targets of Tier 1 CER. It is also seen that 7 banks didn't report any liquidity metrics while 13 banks used deposits to liabilities ratio (DLR) to illustrate the level of liquidity. Only five banks in the above table reported using the proposed Basel III short term liquidity coverage ratio (LCR) or the long-term net stable funding ratio (NSFR). It can be observed from ROE metrics that individual profitability varied from a loss of -67.4% (Dexia) to a gain of 19.15% (Bank of China) during 2011. For all banks, the ROE metric averaged 6.83%. Jacques Prefontaine (2012)

Another way in which we can ascertain the returns from the bank is from the investors point of view. The stock prices reflect the sentiments of the investors and the entire market. After all Market prices of shares is an ideal indicator as to Company's financial performance. Kunt et. al (2013), studied whether well capitalized banks experienced higher stock returns during the financial crisis using a multi country panel of banks. They found that differences in capital did not have much impact on stock returns before the crisis while a sturdier capital position was allied with healthier stock market performance during the crisis for large banks. They also found that "the relationship between stock returns and capital is stronger when capital is measured by the leverage ratio rather than the risk-adjusted capital ratio and higher quality forms of capital, such as Tier 1 capital and tangible common equity, were more relevant."

It has been understood from the above literature and various other research literature that investors feel confident about the Banks' and financial institutions' performance when they



are following regulations for controlling the systemic risk. This investor confidence is evident from the studies showing a positive comparative difference in the rates of return in case of institutions with quality capital when compared to others who failed to meet the regulatory requirements. It must be believed that stock prices are excellent indicators of firm's financial performance. Bank runs and associated liquidity crunch was a main contributor towards the global financial crisis of 2008. Hence it is understood why investors feel confident about the firms having sufficient capital backing as per regulation. At the same time the basic principles of Finance proves that keeping high level of capital and maintaining high level of liquidity will have a negative impact on the profitability of these firms. Firms are required to maintain high level of capital which remains unproductive. It must be analysed whether more capital can be freed up by sticking more on to pillars 2 and 3 of Basel 3 norms. It is logical to think that better supervision and internal risk management review assisted with better market disclosure can play a major role in reducing the systemic risk to the optimum level. The risk managers should always know financial institutions' pursuit of improved rates of return will always end up increasing the systemic risk. Increasing the systemic risk will obviously affect the returns to investors which is of prime concern as per financial management principle. To address this, we need to follow regulations which demands quality capital being tied up unproductive just as a cushion to instil confidence in investors and economy. It is interesting to note that we reach at the starting point as the discussion goes on. It is the responsibility of the bank management to device a risk-return trade-off point considering the interconnectedness of their firms with other institutions and financial system.

## **POSITIVES AND NEGATIVES OF REGULATION**

A major change that happened in the financial regulation scene over the past decade has been the increased focus on Macroprudential regulation. It is evident from the changes in the structure of Basel Accord from Micro prudential to Macroprudential and tenacious effort to address systemic instability. In this context, it is ideal to discuss on the potential benefits and shortcomings on the regulations and its effect on rate of return.

Many financial regulation including the Basel 3 norms and regulatory changes such as Volcker rule in the United States and 'retail ring fencing' in UK and Europe was found helpful in reducing interconnectedness and risk spill overs between Commercial banks and Investment banks. Many researchers found that 'there exists a growing literature which shows evidence that the transparency concerning disclosure of information to the private agents represents an important mechanism for monitoring financial institutions' (Helder et.al, 2012). Increased transparency is expected to reduce the forecast errors and expected volatility of the variables

subject to uncertainty. Hence, it can be safely assumed that the 3<sup>rd</sup> pillar in Basel norms provides market players with mechanisms to mitigate systemic risk. Consistency of risk management system and controls will improve the quality of data origination, storage and use and will eventually lead to better decision making at all levels of organisation. The empirical evidence of study by Helder et.al (2012) explains how higher extent of transparency in which financial system was more regulated, suffered comparatively few negative effects of subprime crisis. The also noted that greater supervision by authorities made the financial market less vulnerable to crisis. It was noted by many researchers that countries with over regulations and those working under leverage could tighten credit supply after crisis due to high reserves and interest rates.

It is interesting to note that Islamic banks following sharia rules came out untouched by the global financial crisis due to their stringent policies regarding Capital reserves, credit creation and liquidity. Researchers across the world point out this as a successful model to combat the systemic risk through increased regulation. Ernst & Young claimed that “Islamic banking asset grew at an annual rate of 17.6% between 2009 and 2013” when there were large bank failures in the U.S. and around the world, a natural hypothesis is that the nonbank deposits of Islamic banks are global shock insulated (Samad, 2016). The success of Islamic banking system was attributed to high liquidity and risk conscious attitude. “The Islamic finance system with proper checks and controls introduces greater discipline into the economy and links credit expansion to the growth of the real economy” (Adel, 2010).

Even when lot of arguments supporting increased regulations exist, there are demurring voices too regarding the impact of increased regulations in managing systemic risk. Maxfield et.al (2015) indicate that “strong regulation, defined as one-size-fits-all type global best practice, is not necessarily the recipe for bank resilience. In fact, it can have negative effects (at least in terms of profitability) when implemented in countries with relatively poorly developed banking systems”. It is intriguing as to why poorly developed banking system shows malicious effects when implementing strong regulatory mechanisms. It can be due to the detailed focus on the inefficiencies in the banking system and strong investor response to such inefficiencies. Another major drawback of increased regulation is due to the high level of financial supervision. Any innovation to serve the customer and economy more may be affected due to the complicated approval process of the regulatory bodies. This may hinder the growth of financial system. Cross sectional financial products like ones which affect the banking and insurance sectors may invite more trouble in getting approval and may invite duplication of supervision. Even when much is said about the relevance of interconnectedness on systemic risk, majority of the regulation is concentrating on capital adequacy requirements. The lack of cooperation and

fragmented nature of supervisory bodies may affect in pursuit of a regulated financial system. The separate input from different supervisory bodies cannot be coordinated in a proper way as there may be lack of clarity in the responsibilities of supervisory bodies.

## CONCLUSION

The world financial markets are experiencing a revolution as to emergence of new financial products, innovative management techniques and cross-border capital flows which makes the world economy connected and susceptible to risk and uncertainties. An innovative and effective supervisory and regulatory model for financial institutions is the need of the hour.

It is evident that increased regulation is beneficial in a developed banking system and can help the economy in surviving the financial crisis and systemic risk challenges. It must be noted that the existence of an efficient regulatory system is effective only if there is a strong level of market discipline exercised by the market players. There should be a system to penalise bad management practices to ensure an optimum balance of regulation and market discipline. A one-size-fits-all regulation also may not be fruitful in combating the high level systemic risk and its repercussions. Monolithic 'strong regulation' has a negative impact on bank resilience indicated by bank profitability in countries with relatively shallow banking systems" (Maxfield et.al, 2015). Hence it can safely be held that even there is a call for global harmonization of regulations, there is a need for a diverse and multi-layered banking regulation system considering the individual financial system capabilities and vulnerabilities. Finally, to conclude, we can say that a regulatory requirement to maintain capital associated with more idiosyncratic risk may have affected the profitability of the financial institutions but helped the firms not to perform worse during the crisis.

This study provides only a step towards understanding impact of regulations on systemic risk. Majority of the modern research concentrated on mechanics and channels of transmission of shocks and came up with the idea that strong regulation may lead to better management of financial institution. As there is inconclusive evidence, further research should find systematic evidence to show that stronger regulation led to better performance during the financial crisis in the past or in the future. Idiosyncratic variables of regulatory system along with deposit insurance schemes can be tested to study its relevance for creating a framework for systemic risk management.

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