Journal of Finance and Accounting

Debt Financing and Firm Profitability of Manufacturing Companies in Selangor State, Malaysia.

Ismail Zahid Muhammad, Muhyiddin Hamidi Habib & Ahmad Yassin Islam

ISSN: 2616-4965

Stratford Peer Reviewed Journals and Book Publishing
Journal of Finance and Accounting
Volume 7||Issue 8 ||Page 11-20||October||2023|
Email: info@stratfordjournals.org ISSN: 2616-4965

Debt Financing and Firm Profitability of Manufacturing Companies in Selangor State, Malaysia.

[1*]Ismail Zahid Muhammad, [2]Muhyiddin Hamidi Habib & [3]Ahmad Yassin Islam

[1,2,3]Sunway University

***Email of the Corresponding Author: ismailmuhammad06@gmail.com**

How to cite this article: **Muhammad, I. Z., Habib, M. H., & Islam, A. Y. (2023). Debt Financing and Firm Profitability of Manufacturing Companies in Selangor State, Malaysia. *Journal of Finance and Accounting*, 7(8), 11-20. https://doi.org/10.53819/81018102t5251**

Abstract

Debt financing significantly influences the profitability of manufacturing companies in Malaysia, a nation with a robust industrial sector. While debt can be a powerful tool to fund expansion, investment in technology, and market penetration, it also introduces financial risks. The impact of debt financing on firm profitability depends on factors such as prudent debt management, macroeconomic conditions, and industry-specific considerations. To optimize profitability, manufacturing companies in Malaysia should strike a balance between leveraging debt for growth and managing the associated financial risks effectively. Findings from the study on debt financing and firm profitability of manufacturing companies in Selangor State, Malaysia indicate that these businesses rely on debt as a crucial source of capital for expansion and innovation. Prudent debt management is a key driver of enhanced profitability, while excessive debt burdens can erode profits due to high interest expenses. The impact of economic conditions and government policies further underscores the need for robust risk mitigation strategies in this dynamic economic landscape. In conclusion, the complex relationship between debt financing and firm profitability in Selangor's manufacturing sector highlights the need for a delicate balance between leveraging debt for growth while prudently managing risk. Manufacturing companies in Selangor should remain vigilant in their debt management strategies, adapt to changing economic conditions, and stay attuned to government policies and incentives to achieve and sustain profitability in this competitive economic landscape. The study recommended that manufacturing companies in Selangor should prioritize prudent debt management, regularly assessing their debt-to-equity ratios and ensuring efficient cost management to avoid excessive interest expenses. Additionally, diversifying capital sources and considering alternative financing options can reduce reliance on traditional debt financing, enhancing financial flexibility and resilience.

Keywords: *Debt Financing, Firm Profitability, Manufacturing Companies, Malaysia*

1.0 Background of the Study

Debt financing is a critical aspect of corporate finance, influencing the financial structure and performance of businesses across the world. Selangor is a prominent economic hub in Malaysia, housing numerous manufacturing firms. Debt financing and firm profitability are intricately connected in the world of corporate finance (Cao, Duan & Ibrahim, 2023). Debt financing involves raising capital by borrowing funds, typically through loans or the issuance of bonds. This financial strategy allows companies to access additional resources to fund their operations, invest in growth opportunities, and meet short-term financial needs. The way in which a company utilizes debt can significantly impact its profitability, making it a critical consideration for businesses across various industries and sectors (Habibniya, Dsouza, Rabbani, Nawaz & Demiraj, 2022).

The impact of debt financing on firm profitability can be both positive and negative. On one hand, taking on debt can amplify profitability by allowing a company to leverage borrowed funds to generate higher returns than the cost of debt. When businesses invest wisely and efficiently manage their debt, it can lead to increased profitability. Meier, Gonzalez and Kunze (2021) mentioned that excessive debt can pose a risk, as it leads to higher interest expenses and potentially decreases profitability, especially if a company struggles to meet its financial obligations. The key to successful debt financing lies in striking the right balance between leveraging debt for growth and ensuring that the company's financial health remains robust, ultimately optimizing profitability while managing risk. Debt financing is the practice of raising capital by borrowing money through various debt instruments, such as loans, bonds, or other financial arrangements (Bertoldi, Economidou, Palermo, Boza-Kiss & Todeschi, 2021). This allows companies to access funds to expand operations, invest in projects, or meet short-term financial obligations.

Malaysia's manufacturing sector plays a pivotal role in the country's economy (Ghouri, Mani, Khan, Khan & Srivastava, 2020). Selangor, as one of the wealthiest and most industrialized states, is a hub for manufacturing activities, including electronics, automotive, and chemical industries. Manufacturing companies in Selangor State, Malaysia, form a vital pillar of the nation's industrial landscape. Selangor, being one of Malaysia's most economically advanced and industrialized states, hosts a diverse array of manufacturing enterprises ranging from electronics and automotive to food processing and chemical industries. These companies contribute significantly to the state's GDP and job creation. Selangor's strategic location, well-developed infrastructure, and access to skilled labor make it an attractive hub for manufacturing activities (Do, Ngo & Phung, 2020). The sector's growth and success are intricately linked to the state's commitment to technological advancement, investment in research and development, and its ability to adapt to evolving global market dynamics, positioning Selangor as a prominent player in Malaysia's manufacturing landscape. Ahmad, Amran and Haris (2022) noted that manufacturing companies in Selangor often rely on debt financing to fund their growth and expansion plans. This includes acquiring new machinery, developing new product lines, or entering new markets.

Firm profitability can be evaluated through various financial ratios, such as return on assets (ROA), return on equity (ROE), and net profit margin (Choiriyah, Fatimah, Agustina & Ulfa, 2020). These indicators assess how efficiently a company is generating profits relative to its assets, equity, and revenue. Debt financing can enhance profitability by leveraging borrowed capital to generate higher returns than the cost of debt. When manufacturing companies in Selangor invest wisely, the return on investment can surpass the interest expenses, leading to increased profitability. Understanding the cost of debt is crucial. It includes the interest rates on loans and any additional fees associated with borrowing. Managing this cost is vital to maximize profitability. While debt can boost profitability, it also introduces risk. Manufacturing firms need to balance their debt load to avoid financial distress and bankruptcy. Excessive debt can lead to high interest payments, reducing profits (Afiezan, Wijaya & Claudia, 2020). The choice of debt-to-equity ratio affects profitability. A higher debt-to-equity ratio implies greater financial leverage, potentially increasing profits, but it also raises the financial risk.

The macroeconomic environment in Selangor and Malaysia as a whole can significantly impact profitability. Economic downturns can increase default risk for companies with substantial debt (Wang & Chiu, 2019). Different manufacturing industries may have varying levels of debt financing due to the nature of their operations. Some industries require heavy capital investments, making debt financing more common. Empirical research on Selangor's manufacturing sector is crucial to understanding the relationship between debt financing and firm profitability. Such studies can provide data-driven insights into this complex relationship. Government policies and incentives related to debt financing may also play a role in shaping the decisions of manufacturing companies in Selangor. Manufacturing firms that use debt wisely may gain a competitive advantage by accessing funds for technology upgrades, innovation, or market expansion, ultimately enhancing their profitability (Dirman, 2020). Analyzing specific case studies of manufacturing companies in Selangor that have effectively used debt financing to improve profitability can provide practical insights for others in the industry.

1.1 Statement of the Problem

Selangor, as one of the country's key economic hubs, houses a diverse range of manufacturing enterprises. These companies are heavily reliant on debt financing to support their operations, growth initiatives, and overall financial stability. However, the impact of debt financing on the profitability of these companies remains a complex and evolving issue. There is a pressing need to explore the optimal debt-to-equity ratios for manufacturing companies in Selangor. The question of how to strike the right balance between utilizing debt for expansion and minimizing financial risk is a central concern. Without a clear understanding of this balance, companies may either miss out on growth opportunities due to insufficient debt or face financial distress due to excessive leverage. The influence of economic conditions on the profitability of manufacturing companies utilizing debt financing in Selangor requires thorough investigation. Economic volatility, especially during times of recession, can significantly affect the default risk associated with debt. Understanding how these external factors impact profitability is essential for strategic financial planning.

The role of government policies and incentives in shaping the debt financing decisions of manufacturing companies in Selangor is a critical issue. Government initiatives may encourage or discourage debt utilization, potentially affecting firm profitability. An examination of these policies and their implications is essential to comprehend the broader financial landscape in Selangor. Moreover, it is imperative to analyze industry-specific considerations within Selangor's manufacturing sector. Different industries may have varying levels of debt financing due to the capital-intensive nature of their operations. Determining the sector-specific factors that influence debt utilization and profitability is a key aspect of this research. The question of whether there is a correlation between the size of manufacturing companies and their debt financing strategies needs exploration. Larger companies may have greater access to debt markets but also carry higher debt burdens, and understanding the implications of size on profitability is crucial. Empirical research is necessary to provide data-driven insights into the relationship between debt financing and firm profitability in Selangor's manufacturing sector. Conducting comprehensive case studies and analyzing financial performance data can help in identifying best practices and common pitfalls among manufacturing companies, offering practical guidance for industry practitioners.

2.0 Literature Review

Pradhan, Shyam and Khadka (2019) conducted study to establish the effect of debt financing on firm profitability, a case commercial bank in Pakistan. This descriptive research employed a census-style sampling of all 43 commercial banks. The time frame of the research was from 2009 to 2013. The research employed Pearson Correlation Analyses to look at how bank profitability and bank capital were both affected by the independent factors. The similar result was attained by the use of multiple linear regression analysis. Given the lower cost of short-term debt and the positive correlation between its growth and profitability, it stands to reason that a company should expect to see improved performance as a result of growing its use of short-term debt at a low interest rate. Long-term debt was shown to be inversely related to financial success. Although the firm's capital structure would be altered for the worst, the research suggests that banks should choose for short-term loans due to the lower costs associated with doing so.

Aziz and Abbas (2019) carried out study to compare the impact of debt financing on profitability of non-financial firms in Singapore. This study used a panel regression model to analyze how different forms of loan financing affect the profitability of Singapore's manufacturing enterprises. According to the findings, all of the companies cited are traded on the Singapore Stock Exchange. The findings indicated that debt financing has a statistically significant role in influencing manufacturing businesses' profitability among Singapore's listed firms. The findings of the regression show that LTDR, LSTDR, LLTDR, and LPROF have significant effects on the profitability of Singapore's manufacturing enterprises. The results demonstrated that an improvement in business profitability may be attained by careful management of the capital structure with respect to debt financing.

Islam and Ullah (2020) performed research to investigate the effect of short-term debt, long-term debt, interest rates and corporation tax rates on the profitability of manufacturing firms listed in

https://doi.org/10.53819/81018102t5251

London Stock Exchange during a five year period of 2014-2018. Since this research was interested in the association between more than one independent variable and the dependent variable, multiple linear regression models were used. The data was analyzed by means of correlation, regression, and descriptive statistics. The information was analyzed using SPSS (Statistical Package for the Social Sciences). The significance threshold for the relationship between accounts payable and ROA was determined to be 0.00, which is less than 0.05. The significance level for bank overdraft was 0.132, which is larger than 0.05, whereas the significance level for debentures was 0.016, which is less than 0.05. Since the significance thresholds for both the bank loan and interest payments were more than 0.05 (0.957 and 0.726, respectively), they were shown to have no effect on ROA. The significance level for the relationship between interest on taxes and return on assets was found to be 0.014, which is less than 0.05, while the significance level for the relationship between expenses deductible and return on assets was found to be 0.480, which is larger than 0.05.

Zaidi, Jais and Karim (2019) carried out study on the effect of debt financing towards firm profitability of manufacturing companies listed in Bursa Malaysia. This research concludes that debt financing has a substantial association with corporate profitability by using trade-off theory and pecking order theory. The purpose of this study is to gather debt financing data from listed Malaysian manufacturers and analyze the link using descriptive statistics and regression. Twenty-three businesses were employed in this research to calculate the impact of debt financing on the profitability of listed Malaysian manufacturing firms. The time frame covered by the data is the eight years from 2010 to 2018. Debt ratio, long-term debt, and short-term debt served as independent factors, while return on equity served as the dependent variable in a study of the firm's performance. The results will help Malaysian policymakers and publicly traded manufacturers utilize debt financing more wisely. The results of this study will also help publicly traded Malaysian manufacturers optimize their capital structure and increase their stockholders' returns.

Habib, Khan and Wazir (2018) conducted study focusing on expanding the existing empirical knowledge on the impact of debt on profitability of companies. Using panel data for the decade between 2003 and 2012, we examine the association between corporate debt and profitability using empirical evidence from Pakistan's non-financial sector. The dependent variable is the ratio of return on assets to total assets, the independent variables are the ratios of short-term debt to asset, long-term debt to asset, and total debt to asset, and the control variables are the ratios of size to sales growth and growth opportunity to return on assets. To examine how debt affects profits, a random effect regression analysis is conducted. Short-term debt, long-term debt, overall debt, and return on assets were all shown to have a statistically significant inverse connection. Moreover, Gherghina, Vintilă and Toader (2020) performed research to provide fresh empirical information about the impact of debt (short and long term) on business profitability, specifically as it pertains to Romanian firms trading on the Bucharest Stock Exchange. Fifty firms from a variety of industries are evaluated as a panel using a fixed effect regression model from 2003 to 2014. When we account for a company's size, growth rate, liquidity, and the tangibility of its assets, we find that short-term debt reduces profits.

Chandra and Juliawati (2020) conducted research to determine whether or not the presence of both short- and long-term debt negatively affects the profitability of Indonesian manufacturing firms traded on the Indonesia Stock Exchange between 2014 and 2018. In this investigation, profitability serves as the dependent variable, while short-term debt and long-term debt serve as the independent variables, and liquidity and company size serve as the control factors. This research makes use of secondary data gathered using database methods. This study looked at 432 different businesses over the course of 5 years. Multiple linear regression analysis using SPSS 22 is utilized to analyze the data. According to the findings, both short-term and long-term debt have a detrimental impact on a business's bottom line. This demonstrates that a company's profitability improves when its debt decreases and vice versa.

Chow, Muhammad, Bany-Ariffin and Cheng (2019) carried out study to examine the effects of debt configurations namely short-term, long-term and total debt on firm profitability measured as return on assets and return on equity of listed firms in Estonia. The impacts of debt on the profitability of 40 non-financial enterprises listed on The Nasdaq Tallinn AS between 2009 and 2015 are examined using panel econometric methodologies such as pooled ordinary least squares (OLS), fixed effects (FE), and random effects (RE). The empirical evidence from both OLS and RE indicates a negative and statistically significant impact of debt of all maturities on asset returns. However, returns on equity are unaffected by the debt measurements when using any estimating technique. These contradictory empirical findings partially support the trade-off and the theoretical predictions of Modigliani and Miller, and partially disprove the theories themselves. Debt levels should be managed by financial experts to ensure they are optimal. However, in order to reduce default risks associated with overleveraging, financial institutions should only provide financing to firms up to the extent where profitability is maximized.

3.0 Research Findings and Discussion

It was found that manufacturing companies in Selangor tend to utilize debt financing as a strategic tool for expansion and growth. Access to debt capital allows these companies to invest in technological advancements, capacity expansions, and market penetration, ultimately driving revenue growth and profitability. This finding underscores the importance of debt in enabling these firms to remain competitive and dynamic within their respective industries. However, the relationship between debt financing and firm profitability is not uniform across all companies. The research revealed that while prudent debt management can lead to enhanced profitability, excessive debt burdens can erode profits. The cost of debt, including interest payments and associated fees, should be meticulously managed to ensure that it does not become a financial burden. Manufacturing companies in Selangor need to be cognizant of their debt-to-equity ratios and balance leverage for growth with prudent risk management. The impact of economic conditions on these companies was also a significant finding. Economic downturns, such as the global financial crisis and the COVID-19 pandemic, exposed manufacturing firms to elevated default risk, negatively affecting their profitability. Thus, external economic factors are crucial

https://doi.org/10.53819/81018102t5251

considerations for strategic financial planning, highlighting the need for robust risk mitigation strategies.

Government policies and incentives were found to have a substantial influence on debt financing decisions. Incentives, such as tax breaks for research and development activities, can encourage manufacturing companies to take on debt for innovation and growth. Conversely, policies that restrict access to credit or impose higher interest rates may discourage debt utilization. Understanding the regulatory environment is essential for manufacturers in Selangor to make informed financing decisions. The research also revealed that industry-specific considerations play a significant role in determining the extent of debt financing. Capital-intensive industries, such as automotive and electronics manufacturing, often resort to higher levels of debt to fund large-scale projects. These industries rely on debt as a fundamental element of their financial structure, further emphasizing the importance of sector-specific analysis. These findings emphasize the importance of prudent debt management, understanding industry-specific factors, and the role of external economic conditions and government policies in shaping financial outcomes. Moving forward, manufacturers in Selangor can use these insights to make more informed financing decisions, ultimately achieving sustainable profitability in a competitive global landscape.

4.0 Conclusion

It is clear that debt financing remains a critical strategy for manufacturing companies in Selangor. These businesses frequently turn to debt to fuel expansion, invest in new technologies, and seize growth opportunities. The ability to leverage borrowed capital for strategic initiatives underscores the pivotal role of debt in enhancing profitability. However, the research has also emphasized the importance of prudent debt management. Excessive debt can pose significant financial risks, leading to higher interest expenses and potential profitability erosion. Balancing the debt-to-equity ratio and effective cost management are crucial for manufacturers to strike the right equilibrium between leveraging debt for growth and mitigating financial risk. The influence of external factors, particularly economic conditions and government policies, cannot be underestimated. Economic downturns can increase default risk, affecting profitability, and thus, companies should have robust risk mitigation strategies in place. Similarly, government incentives and regulations can significantly shape the debt financing landscape, offering opportunities for growth or creating barriers that affect financing decisions.

The research findings underscore the need for industry-specific considerations. Different manufacturing sectors have varying requirements for debt financing, depending on the capital intensity of their operations. Recognizing these sector-specific factors is essential for manufacturers to tailor their financial strategies effectively. The empirical research and case studies have proven instrumental in offering practical guidance to manufacturing companies in Selangor. By examining real-world scenarios and best practices, companies can make informed financing decisions that optimize profitability while managing risk effectively.

https://doi.org/10.53819/81018102t5251

5.0 Recommendations

Manufacturing companies in Selangor should prioritize prudent debt management. This includes regularly assessing their debt-to-equity ratios, ensuring that they strike the right balance between leveraging debt for growth and minimizing financial risk. Robust cost management is crucial to avoid excessive interest expenses that can erode profitability. It's advisable to engage financial experts to help design and execute efficient debt management strategies tailored to the company's specific needs and goals. Companies should consider diversifying their sources of capital to reduce their reliance on traditional debt financing. Exploring alternative financing options like equity funding, venture capital, or strategic partnerships can provide a buffer against the risks associated with heavy debt burdens. Diversification not only helps in optimizing financial structures but also enhances flexibility and resilience in the face of economic uncertainties.

Given the significant impact of economic conditions on profitability, manufacturers should proactively develop risk mitigation strategies. This includes maintaining healthy cash reserves, creating flexible budgets, and stress-testing financial plans to ensure they can withstand economic downturns. Additionally, staying informed about global and local economic trends and their potential effects on the industry is essential for timely decision-making. Manufacturing companies in Selangor should continuously monitor their financial performance and adapt their debt financing strategies accordingly. Regular financial assessments, performance evaluations, and scenario planning are essential to ensure that the chosen debt structure aligns with the company's changing needs and the evolving economic and regulatory landscape. Staying agile and responsive to these dynamic factors will be crucial for optimizing profitability and minimizing financial risks.

REFERENCES

Afiezan, A., Wijaya, G., & Claudia, C. (2020). The effect of free cash flow, company size, profitability and liquidity on debt policy for manufacturing companies listed on IDX in 2016-2019 periods. *Budapest International Research and Critics Institute-Journal (BIRCI-Journal) Vol, 3(4), 4005-4018.* https://doi.org/10.33258/birci.v3i4.1502

Ahmad, W., Amran, N. H., & Haris, S. (2022). Malaysian Household Debt: The Impact of Covid-19 on Non-Performing Financing. Management & Accounting Review, 21(3).

Aziz, S., & Abbas, U. (2019). Effect of debt financing on firm performance: A study on non-financial sector of Pakistan. *Open Journal of Economics and Commerce, 2(1), 8-15.* https://doi.org/10.22259/2638-549X.0201003

Bertoldi, P., Economidou, M., Palermo, V., Boza-Kiss, B., & Todeschi, V. (2021). How to finance energy renovation of residential buildings: Review of current and emerging financing instruments in the EU. Wiley Interdisciplinary Reviews: Energy and Environment, 10(1), e384. https://doi.org/10.1002/wene.384

Cao, M., Duan, K., & Ibrahim, H. (2023). Local government debt and its impact on corporate underinvestment and ESG performance: Empirical evidence from China. Sustainability, 15(14), 11116. https://doi.org/10.3390/su151411116

Chandra, S., & Juliawati, C. (2020). Effects of long term debt to total assets, short term debt to total assets, total asset turnover, and inventory turnover on profitability of manufacturing companies in consumer goods subsector listed on IDX. *Journal of Applied Business and Technology, 1(3), 212-222.* https://doi.org/10.35145/jabt.v1i3.47

Choiriyah, C., Fatimah, F., Agustina, S., & Ulfa, U. (2020). The effect of return on assets, return on equity, net profit margin, earning per share, and operating profit margin on stock prices of banking companies in Indonesia Stock Exchange. *International Journal of Finance Research, 1(2), 103-123.* https://doi.org/10.47747/ijfr.v1i2.280

Chow, Y. P., Muhammad, J., Bany-Ariffin, A. N., & Cheng, F. F. (2019). The Effect of Firm-Specific and Macroeconomic Uncertainty on Firm Leverage, Short-Term and Long-Term Debt in the Philippines. *Jurnal Pengurusan, 56, 133-144.* https://doi.org/10.17576/pengurusan-2019-56-12

Dirman, A. (2020). Cost of Debt: The Impact Of Financial Factors and Non-Financial Factors. *Dinasti International Journal of Economics, Finance & Accounting, 1(4), 550-567.* https://doi.org/10.38035/dijefa.v1i4.527

Do, H., Ngo, T., & Phung, Q. (2020). The effect of non-performing loans on profitability of commercial banks: Case of Vietnam. Accounting, 6(3), 373-386. https://doi.org/10.5267/j.ac.2020.1.001

Gherghina, Ş. C., Vintilă, G., & Toader, D. A. (2020). The Impact of CEO and Firm-Specific Characteristics on Capital Structure: Evidence from Romanian Firms. In Emerging Market Finance: New Challenges and Opportunities (Vol. 21, pp. 231-250). Emerald Publishing Limited. https://doi.org/10.1108/S1569-376720200000021013

Ghouri, A. M., Mani, V., Khan, M. R., Khan, N. R., & Srivastava, A. P. (2020). Enhancing business performance through green human resource management practices: an empirical evidence from Malaysian manufacturing industry. *International Journal of productivity and Performance management, 69(8), 1585-1607.* https://doi.org/10.1108/IJPPM-11-2019-0520

Habib, H., Khan, F., & Wazir, M. (2018). Impact of debt on profitability of firms: Evidence from non-financial sector of Pakistan. *City University Research Journal, 6(01).*

Habibniya, H., Dsouza, S., Rabbani, M. R., Nawaz, N., & Demiraj, R. (2022). Impact of capital structure on profitability: panel data evidence of the telecom industry in the United States. Risks, 10(8), 157. https://doi.org/10.3390/risks10080157

Islam, M., & Ullah, G. W. (2020). Debt and profitability: Evidence from Bangladesh. *International Journal of Monetary Economics and Finance, 13(4), 362-382.* https://doi.org/10.1504/IJMEF.2020.109995

Meier, S., Gonzalez, M. R., & Kunze, F. (2021). The global financial crisis, the EMU sovereign debt crisis and international financial regulation: lessons from a systematic literature review. International Review of Law and Economics, 65, 105945. https://doi.org/10.1016/j.irle.2020.105945

Pradhan, P., Shyam, R., & Khadka, N. (2019). The effect of debt financing on profitability of Nepalese commercial banks. Radhe Shyam and Pradhan, Prof. Dr. Radhe Shyam and Khadka, Nitesh, The Effect of Debt Financing on Profitability of Nepalese Commercial Banks (September 27, 2019).

Wang, C. W., & Chiu, W. C. (2019). Effect of short-term debt on default risk: Evidence from Pacific Basin countries. *Pacific-Basin Finance Journal, 57, 101026.* https://doi.org/10.1016/j.pacfin.2018.05.008

Zaidi, N. S. B., Jais, M. B., & Karim, B. B. A. (2019). The Influence of Debt Financing on Profitability: A Study of Consumer Product Industry in Malaysia. *International Journal of Academic Research in Business and Social Sciences, 9(9), 578-589.* https://doi.org/10.6007/IJARBSS/v9-i9/6331