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## Research Articles

**The Effect of Key Macroeconomic Variables on Market Capitalization in Selected Emerging Markets: Post 2007-08 Crisis Era**
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**The Effect of Biodiesel Market on Economic Growth: Policies in the European Union & Turkey**
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# Abstracting & Indexing

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BİL TÜRK Ekonomi ve İlişkili Çalışmalar Dergisi

# The Effects of Key Macroeconomic Variables on Market Capitalization in Selected Emerging Markets: Post 2007-08 Crisis Era

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***The Effects of Key Macroeconomic Variables on Market Capitalization in Selected Emerging Markets: Post 2007-08 Crisis Era***

***Abstract***

*Stock market developments are of high importance both for developed and developing countries. Determinants of stock market development are studied under two different sets of variables in the literature: institutional structure and key macroeconomic variables. While the studies regarding the first provided rather consistent results, the studies regarding the second have not come to a well-accepted consensus, at least for the majority of the key macroeconomic variables. This study aims to find out post-crisis determinants of stock market development between 2009-2018 for 31 emerging markets, using generalized method of moments (GMM) technique in three separate models. The estimation results show that the exchange rate and financial development index have positive relation with market capitalization ratio along with the rule of law index as an institutional factor.*

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## 1. Introduction

Stock markets are particularly important for emerging markets as they provide the opportunity of a fruitful platform for long-term economic growth. That platform is materialized through increases in market liquidity and more efficient mobilization of savings in an economy (Jensen and Murphy, 1990; Levine, 1991; Greenwood and Smith, 1997). The literature on stock market development has mainly focused on two perspectives in terms of determinants: macroeconomic variables and qualitative measures of institutions.

Scores of macroeconomic variables have been used in literature to find out the relationship between those and stock market development including economic development, interest rate, inflation rate, level of openness, exchange rate and capital flows. In contrast to institutional measures the literature presents inconsistent results in terms of macroeconomic determinants depending on corresponding subjects, time period and methodology. Thus, an effort to increase the information stock on this topic seems necessary and valuable.

It is an important fact that the literature on stock market development consists of mainly panel data analysis, which generally comes with the cost of loss in country-specific effects while providing information on mutual characteristics of certain country groups. However, generalized method of moments (GMM) being one of the panel data techniques, makes it possible to derive information from shorter time periods while tackling possible endogeneity problem.

This study focuses on key macroeconomic variables of interest rate, inflation rate, trade openness and credit in determination of stock market capitalization ratio for the 2009-2018 period and 31 emerging countries using system GMM technique.

## 2. Literature

The literature on stock market development has mainly focused on two kind of variable sets in terms of determinants: macroeconomic variables and qualitative measures of institutions. In terms of the macroeconomic perspective economic growth, economic development, maturity of banking sector, interest rates, inflation rates, exchange rates, trade openness and foreign direct investment flows constitute the largest part of the related literature as determinants of stock market development (Dornbusch and Fisher, 1980; Boyd et al., 1996; Levine 1997, 2005; Niroomand et al., 2014; Ho, 2017, 2018). The literature, in contrast to the qualitative measures, is far from reaching a consensus on the directional and magnitudinal effects of certain macroeconomic variables, as Ho and Iyke (2017) put. While empirical research on the topic present inconclusive results probably varying due to i) type of data, ii) time period, iii) estimation technique and iv) subjects, there stands an expected effect of every macroeconomic variable on stock market development under certain conditions.

The effects of economic growth and economic development on stock market are expected to be positive. The reason is that while economy grows the fixed costs of running a financial system decreases either as per capita or as proportion of GDP. Similarly, economic development brings a deeper financial system that increases the effectiveness of the system thereby again decreasing the relative fixed cost (Greenwood and Smith, 1997; Boyd and Smith 1998).

The maturity of banking sector and financial development is expected to be an important variable regarding the fact that both banking sector and stock market are important parts of a financial system. However, this often creates the impression of possible rivalry, making banking sector and stock market substitutes (see DeAngelo and Rice, 1983; Stiglitz, 1985 and Bhide, 1993). Under such an assumption the expected effect of the maturity of banking system on stock market becomes negative. An exactly opposite perspective of banking sector and stock market being complementary is also possible as Levine (2005) put. Of course, under that assumption the expected effect is also reversed.

In terms of interest rates, the results presented in different studies seem to be consistent. The theoretical expectation is a negative relationship between interest rates and stock prices based on the assumption that when central banks increase interest rates the cost of borrowing increases, causing a fall in demand for bonds with lower yield rates and vice versa (Spiro, 1990; Mok, 1993). Still, there are completely different cases as there are various factors affecting expectations and therefore market reactions (Shiller, 1988; Asprem, 1989; Barsky, 1989).

Inflation is expected to create disinclining effects on stock market because of the uncertainty and the disruption in price signals. A possible explanation for non-linear effects stated in the literature (see Choi et al., 1996; Boyd et al., 2001) in terms of inflation may be stemming from the phenomenon that the level of disruption increases exponentially as inflation rate increases. On the contrary, decreases in inflation are often achieved by well-designed macroeconomic policies.

A strong relation between exchange rates and stock market development is the standard expectation. That is because as a currency appreciates foreign investors' expected return decreases and vice versa as Dornbusch and Fisher (1980) put. Currency appreciation causes an increase in the capital outflow, thus reducing the effect of monetary policy on real exchange rate. However, there is the possibility that the effect of monetary policy on real exchange rate may be reversed under the condition of strong link between stock prices and aggregate demand, as Gavin (1989) stressed.

## 3. Variables and Methodology

This study aims on the macroeconomic determinants of stock market capitalization ratio (gathered from the World Bank databank online) for the 10-year period of 2009-2018 using annual data and for 31 emerging markets, namely Argentina, Brazil, Chile, China, Colombia, Croatia, Egypt, Greece, Hungary, India, Indonesia, Kazakhstan, Korea, Malaysia, Mauritius, Mexico, Morocco, Nigeria, Oman, Panama, Peru, Poland, Portugal, Russia, Saudi Arabia, Singapore, South Africa, Spain, Thailand, Turkey and Vietnam. The country selection was made regarding solely to the availability of data.

Due to the limitation arising from limited observations, only a couple of explanatory variables were to be chosen to be included in a single model. Thus, some of the explanatory variables were introduced into models one-by-one while others were kept fixed as key determinants. To prevent omitted variable bias, the rule of law index was introduced into estimated models. Fixed and partially introduced variables are shown in the table below.

**Table 1:** Fixed and partially introduced variables

| | |
|---|---|
| Fixed Variables | GDP Per Capita Growth<br>Rule of Law Index<br>Exchange Rate |
| Partially Introduced Variables | Financial Development Index<br>Consumer Price Index<br>Lending Rate of Interest |

All the variables used in estimations were in natural logarithm form. Three models with the following mathematical forms were estimated;

**Model I:** $$lnMCR = \beta_1 + \beta_2 lnGDPPCg_{it} + \beta_3 lnRoL_{it} + \beta_4 lnExc_{it} + \beta_5 lnFinDev_{it} + \beta_6 X'_{it} + \varphi_t + u_{it}$$

**Model II:** $$lnMCR = \beta_1 + \beta_2 lnGDPPCg_{it} + \beta_3 lnRoL_{it} + \beta_4 lnExc_{it} + \beta_5 lnCPI_{it} + \beta_6 X'_{it} + \varphi_t + u_{it}$$

**Model III:** $$lnMCR = \beta_1 + \beta_2 lnGDPPCg_{it} + \beta_3 lnRoL_{it} + \beta_4 lnExc_{it} + \beta_5 lnLRI_{it} + \beta_6 X'_{it} + \varphi_t + u_{it}$$

where the MCR is the market capitalization ratio, the GDPPCg is the growth rate of GDP per capita, the RoL is the Rule of Law Index, the Exc is the official exchange rate as local currency unit per USD (period average), the FinDev is the Financial Development Index, the CPI is the consumer price index and lastly the LRI is the lending rate of interest. The terms $X'_{it}$, $\varphi_{it}$ and $u_{it}$ represent the vector of control variables, the year dummies and the error term, respectively. The data for MCR, GDPPCg, RoL, Exc, CPI and LRI data were gathered from World Bank Databank while FinDev series were gathered from International Monetary Fund Database.

The number of groups being greater than the time period and the number of observations being relatively smaller necessitated the utilization of GMM method (Arellano and Bond, 1991; Arellano and Bover, 1995 and Blundell and Bond, 1998). As the number of observations are limited to 10 years, tests for cross-sectional dependency were not considered. STATA 15.1 software with the command xtabond2 (see Roodman, 2009) was used for the estimations and the corresponding diagnostics.

## 4. Estimation Results

To determine whether difference GMM or system GMM to be employed, the specified model was estimated using fixed effects (FE) estimation and pooled OLS estimation (P-OLS) for comparison with difference GMM estimation results.

**Table 2:** lnMCR Coefficient estimation results for FE, POLS and Diff. GMM

| | Model I | | Model II | | Model III | |
|---|---|---|---|---|---|---|
| **Estimated Model** | **Coefficient for lnMCR** | **P > \|t\|** | **Coefficient for lnMCR** | **P > \|t\|** | **Coefficient for lnMCR** | **P > \|t\|** |
| **P-OLS** | .9623211 (.0236083) | .000 | .9771527 (.0207258) | .000 | .973082 (.0219043) | .000 |
| **FE** | .4526313 (.0732781) | .000 | .4480983 (.0720204) | .000 | .4011884 (.0691765) | .000 |
| **Diff. GMM** | .6717632 (.1280909) | .000 | .5043553 (.1069882) | .000 | .5347545 (.1149079) | .000 |

Heteroskedasticity consistent standard errors are in parentheses.

The comparison of the results revealed that the estimated coefficient of lnMCR in difference GMM method is much closer to the one of FE estimation, making the selection of system GMM method reasonable. The utilization of system GMM also prevented data loss that would happen otherwise due to differencing. The estimated one-step system GMM results are represented below. The code for the estimation included correction to overcome heteroskedasticity and autocorrelation while using orthogonal deviations to further minimize data loss. Also, the estimations were limited to one instrument for each variable and lag distance in order to overcome the large number of instruments problem. Along with lagged series of the dependent variable, the growth rate of GDP per capita was treated as endogenous as it is expected to have correlation with the dependent variable in terms of past and possibly present errors.

The estimation results showed that for the 2009-2018 period in the countries in hand, ceteris paribus, the rule of law index and exchange rate were positively

associated with market capitalization ratio at 95% level while the index for financial development was estimated to be in positive relation with the MCR at the 90% level. A percentage increase in the rule of law index created .17 and .18 percent increase in MCR according to Model II and Model III respectively. Similarly, a percentage increase in exchange rate created .03, .02 and .03 increase in MCR in Model I, Model II and Model III respectively.

**Table 3:** The system GMM estimation results

| **Model I** | | | **Model II** | | | **Model III** | | |
|---|---|---|---|---|---|---|---|---|
| Wald $Chi^2$=155526.25 | | | Wald $Chi^2$=93845.73 | | | Wald $Chi^2$=87289.26 | | |
| ($P>Chi^2$=.000) | | | ($P>Chi^2$=.000) | | | ($P>Chi^2$=.000) | | |
| Instruments/Groups: 31/31 | | | Instruments/Groups: 31/31 | | | Instruments/Groups: 31/31 | | |
| **Variable** | **Coefficient** | **z** | **Variable** | **Coefficient** | **z** | **Variable** | **Coefficient** | **z** |
| lnMCR (L1) | .8676915* (.0679389) | 12.77 | lnMCR (L1) | .8398715* (.0795993) | 10.55 | lnMCR (L1) | .830273 (.0719723) | 11.54 |
| lnFinDev | .1758031*** (.0972294) | 1.81 | lnRoL | .1750026** (.0880494) | 1.99 | lnRoL** | .1867912 (.0917711) | 2.04 |
| lnExc | .0305836** (.0140409) | 2.18 | lnExc | .0293047** (.0147968) | 1.98 | lnExc** | .0346287 (.0148338) | 2.33 |
| y1 | Omitted | | y1 | Omitted | | y1 | Omitted | |
| y2 | .0806657 (.0506407) | 1.59 | y2 | .1090446 (.0463098) | 2.35 | y2 | .1047487 (.0588166) | 1.78 |
| y3 | -.2591051 (.0582176) | -4.45 | y3 | -.2392978 (.0567137) | -4.22 | y3 | -.2418782 (.0690974) | -3.50 |
| y4 | .1499911 (.053111) | 2.82 | y4 | .1620627 (.0479684) | 3.38 | y4 | .160622 (.0587427) | 2.73 |
| y5 | -.0266924 (.0576571) | -0.46 | y5 | -.0159554 (.060037) | -0.27 | y5 | -.0132177 (.0653112) | -0.20 |
| y6 | -.0310443 (.0557347) | -0.56 | y6 | -.0282334 (.056435) | -0.50 | y6 | -.0248616 (.0617197) | -0.40 |
| y7 | -.0567177 (.0474456) | -1.20 | y7 | -.0473836 (.0479855) | -0.99 | y7 | -.0573249 (.0534271) | -1.07 |
| y8 | Omitted | | y8 | Omitted | | y8 | Omitted | |
| y9 | .1796992 (.0588181) | 3.06 | y9 | .1821675 (.0647413) | 2.81 | y9 | .2187012 (.0655632) | 3.34 |
| y10 | Omitted | | y10 | -.1573604 (.0482352) | -3.26 | y10 | -.1384289 (.0516076) | -2.68 |

**DIAGNOSTICS**

| **Test** | **Model I** | **Model II** | **Model III** |
|---|---|---|---|
| **Arellano-Bond AR(1)** | P > z = .001 | P > z = .001 | P > z = .001 |
| **Arellano-Bond AR(2)** | P > z = .132 | P > z = .129 | P > z = .166 |
| **Sargan Test of Rest.** | P > $Chi^2$ = .043 | P > $Chi^2$ = .012 | P > $Chi^2$ = .030 |
| **Hansen Test of Rest.** | P > $Chi^2$ = .323 | P > $Chi^2$ = .158 | P > $Chi^2$ = .178 |

1) * p<0.01 ; ** p<0.05 ; *** p<0.10
2) Only statistically significant values were represented.
3) Heteroskedasticity consistent standard errors are in parentheses.

It is worth noting that according to the models, in 2011 (y3), MCR was 29.57%, 27.02% and 27.35% lower than the year before, most probably because of the fall in stock markets around the world in August that year due to European sovereign debt crisis to Spain and Italy. The highest jump was caught in the year 2017 (y9) with 19.67%, 19.97% and 24.44% increase according to the models[1]. Wald chi-squared values showed that the best model was Model I in terms of overall explanatory power.

The diagnostics proved that there was no second-order serial correlation in error term implying that the moment conditions were correctly specified. Hansen and Sargan test results produced good results in terms of overidentification problems.

## 5. Conclusion

Among the fundamental macroeconomic variables, only the institutional factors proxied as rule of law index and exchange rate proxied by official rate (LCU per USD) were found to be highly significant and in positive relation with market capitalization ratio. In addition, financial development index was also found to be in positive relation with MCR but at a weaker significancy level. The results showed that institutional factors and exchange rates are particularly important for emerging markets. This may be interpreted as investors both from local and foreign origins pay higher attention to risks in emerging markets and presumably the strong need for foreign investments in those countries makes institutional factors and exchange rates much more important for them.

The results, in consistency with the literature proved that the process of institutionalization is an important part of structural reforms in emerging countries. Also, the results regarding the exchange rate seem to be sufficient to conclude that countries with overvalued currencies are more likely to suffer from the losses in effecting market capitalization.

[1] The formula used for the calculation is: $\left(e^{\beta} - 1\right) x\ 100$.

## References

Arellano, M. and Bond, S. (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations, *Review of Economic Studies 58: 277–297.*

Arellano, M. and Bover, O. (1995). Another look at the instrumental variable estimation of error-components models, *Journal of Econometrics 68: 29–51.*

Asprem, M. (1989). Stock prices, asset portfolios and macroeconomic variables in ten European countries. *Journal of Banking and Finance 13(4): 589-612.*

Barsky, R. (1989). Why don't the prices of stocks and bonds move together? *American Economic Review 79(5): 1132-1145.*

Bhide, A. (1993). The hidden costs of stock market liquidity, *Journal of Financial Economics 34: 1-51.*

Blundell, R., and Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models, *Journal of Econometrics 87: 115–143.*

Boyd, J. H., Levine, R. and Smith, B.D. (1996). Inflation and financial market performance, Manuscript, *Federal Reserve Bank of Minneapolis.*

Boyd, J. H. and Smith, B. D. (1998). Capital market imperfections in a monetary growth model, *Economic Theory 11: 241-273.*

Boyd, J. H., Levine, R., & Smith, B. D. (2001). The impact of inflation on financial sector performance. *Journal of Monetary Economics, 47(2), 221-248.*

Choi, S., Smith, B. and Boyd, J. H. (1996). Inflation, Financial Markets, and Capital Formation. *Federal Reserve Bank of St. Louis Review 78, 41- 58.*

DeAngelo, H. and Rice, E. (1983). Anti-takeover amendments and stockholder wealth, *Journal of Financial Economics 11: 329-360.*

Dornbusch, R. and S. Fisher, (1980). Exchange Rates and the Current Account, *American Economic Review 70, No. 5, December 960-971.*

Eisenhauer, J. G. (2003) Regression through the origin, *Teaching Statistics 25:3.*

Gavin, M. (1989). The stock market and exchange rate dynamics, Journal of *International Money and Finance Vol 8: 2, Elsevier.*

Greenwood, J. and Smith, B. (1997). Financial markets in development, and the development of financial markets, *Journal of Economic Dynamics and Control 21(1): 145-181.*

Ho, Sin-Yu. and Iyke, N. B. (2017). Determinants of stock market development: a review of the literature, *Studies in Economics and Finance 34(1): 143-164.*

Jensen, M. C. and Murphy, K. J. (1990). Performance pay and top-management incentives, *Journal of Political Economy 98(2): 225-264.*

Levine, R. (1991). Stock markets, growth, and tax policy, *Journal of Finance 46, pages 1445-1465.*

Levine, R. (1997). Financial development and economic growth: Views and agenda, *Journal of Economic Literature 35: 688-726*.

Levine, R. (2005). *Finance and growth: Theory and evidence.* Philippe Aghion and Steven Durlauf (ed.), 2005. Handbook of Economic Growth, vol. 1:1.

Mok, H. M. K. (1993). Causality of interest rate, exchange rate and stock prices at stock market open and close in Hong Kong. Asia *Pacific Journal of Management 10: 123-143.*

Niroomand, F., Hajilee, M. and Al-Nasser, O. M. (2014). Financial market development and trade openness: evidence from emerging economies, *Applied Economics 46(13): 1490-1498.*

Roodman, D. (2009). How to do Xtabond2: An Introduction to Difference and System GMM in Stata, *The STATA Journal 9: 1.*

Shiller, R. J. (1988). Causes of changing in financial market volatility, *The Federal Reserve Bank of Kansas City 2(1): 1-22.*

Spiro, P. S. (1990). The impact of interest rate changes on stock prices volatility, Journal of Portfolio Management 16(2): 63-68.

Stiglitz, J. E. (1985). Credit markets and the control of capital, *Journal of Money, Credit, Banking 17(2): 133-152.*

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# The Effect of Biodiesel Market on Economic Growth: Policies in the European Union & Turkey

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***The Effect of Biodiesel Market on Economic Growth: Policies in the European Union & Turkey***

***Abstract***

*Energy is one of the main inputs of economic growth. The energy supply will become secure, in the fight against agricultural development and global warming, biodiesel, which increases the production of vegetable oil and the recovery of waste vegetable oils, has started to take a large place in energy and agriculture policies. The European Union and Turkey implemented various incentives and support policies for biodiesel and oil seeds planted that are made compulsory mixed prepared. The aim of this study is the structure of the EU and biodiesel fuel production with markets in Turkey and analyzed using panel data to examine the relationship between economic growth and assessing the impact of policies. This study biodiesel for 29 countries from 2008 to 2016 between the years including Turkey found (thousand tonnes) Production and Gross Domestic Product (GDP Million Euro) were examined through the relationship between the annual series of panel data analysis. According to CD test results, cross-sectional dependence exists for biodiesel production. IPS (Im, Peseran and Shin) and ADF-Fisher unit root test was applied for economic growth and biodiesel production series As a result of the econometric analysis, it is seen that the fixed effects model is valid for GDP-Biodiesel models. Accordingly, the biodiesel series has a positive effect on the GDP and the increase in biodiesel production affects the GDP in the direction of increase.*

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## 1. Introduction

Fossil fuels such as oil, natural gas and coal constitute 80 % of total energy resources consumed in the world economy. Along with these resources being on the edge of depletion, environmental problems caused by the overuse of the resources has accelerated the efforts to find alternative energy resources for the countries and aroused the interest in renewable energy resources. Biomass energy, which composes most parts of renewable energy resources, consists of non-fossil biologic-based organic materials.

Biomass energy is defined as plant-based energy resources which can be in solid, liquid or gas forms having commercial value and certain standards, and these resources are produced through various physical, chemical and biological reactions of agricultural and animal based products existing in nature.

Biodiesel, in biofuels group constituting biomass energy resources in liquid form, is now named as the fuel of the third millennium. Agricultural products are the raw materials for biodiesel, and this places emphasis on achieving rural development from the point of agricultural sector and producers. Moreover, as being quickly and easily degradable in nature, biodiesel does not cause any toxic effects and contributes to the reduction of green house effect since CO2 is used for photosynthesis while getting biodiesel out of agricultural products.

At first, high costs of biofuels, which emerged as a new industrial sector, made the competition with the classic liquid fuels such as petrol and diesel difficult. For this reason, government should support the raw material production with low costs for biofuels besides the necessary fuel processing plants for consumption, and structure logistics like distribution-transportation and storage. The countries' being aware of this fact have put some support policies into practice to increase biofuel production and consumption.

In this study, after discussing the biodiesel market structure and implemented policies in the EU and Turkey, the relationship between fuel production and economic growth is examined with panel data analysis and the implemented policies are evaluated.

## 2. Biodiesel and Its Properties

Biodiesel is a reneweable and energy-efficient fuel that is non-toxic, biodegradable in water and has lesser exhaust emission. It can also reduce greenhouse gas effect and does not contribute to global warming due to lesser emission. Because it does not contain carcinogens and its sulphur content is also lower than the mineral diesel. Biodiesel can be used, storage safely and easily as a fuel besides its environmental benefits (https://www.intechopen.com/books/biofuel-s-

engineering-process-technology/novel-methods-in-biodiesel-production, date of access: 04.08.2018).

Biodiesel is an eco-friendly and renewable liquid biofuel which is produced from fresh or waste oils, or animal fats through various chemical processes (Aransiola etc., 2014; 276). In practice, it is also called as biodiesel, green energy, green diesel, super diesel, diesel-bi, or as in colloquial speech, oil diesel. The prefix bio- means related to or using living things, and the root "diesel" means it is a diesel fuel.

Biodiesel is a renewable liquid biofuel produced from oily seeds such as canola (rapeseed), sunflower, cotton, palm oil, cottonseed, corn, soy, safflower, and jatropha, and wastes of these oils (waste oils from homes, industrial places, cafeterias, and etc.) as well as animal fats (such as slaughterhouse, fish, chicken fats) through chemical methods (Dağdelen, 2015; 7). Biodiesel is mostly produced from soy in the USA, and in Europe from canola. In tropical regions, palm, coconut and jatropha oils are made use of for biodiesel production. Apart from these, sunflower, corn, safflower, cotton and peanut are among alternative biodiesel raw materials. In the last years, seaweed has also been used to make biodiesel. However, as it costs high to produce biodiesel from seaweed, nowadays it is not widely used. In today's conditions, mostly vegetable oils are favored as raw materials for biodiesel.

Biodiesel is used in diesel cars as motor fuel, in heating systems like heating boiler, stove, etc., while wiping off paints as solvent, cleaning up engine parts as engine oils, producing brick and terra cotta, cleaning petrol spilled on water or land, coating building forms and as hydraulic liquid. The properties of biodiesel vary according to oil source and alcohol type used in the production, and the top-quality biodiesel is obtained from vegetable oils.

In the world economy, biodiesel is considered to be a new area of investment which is eco-friendly, hinges on domestic raw material, has an important place in integrating agriculture with industry, and has the potential to enable new job opportunities and employment areas. As biodiesel production requires a low production technology, it has been spreading rapidly in the country. Biodiesel's having higher oxygen makes combustion easier, and so this decreases carbon monoxide and hydrocarbon amounts which are released as a result of burning and which cause global warming. Also, it minimizes the damage to the environment, like bioethanol, due to including low sulphur.

Biodiesel can be used as pure fuel or after blending it with diesel fuels produced from petroleum. Biodiesel which gives 88-95 % of the energy amount provided by diesel increases the oil ratio and amount of fuel when mixed with diesel, and this improves the engine's performance. In practice, biodiesel is usually mixed with diesel from petroleum, and is called as B2: 2 % Biodiesel + 98 % Diesel, B5: 5 % Biodiesel + 95 % Diesel, B20: 20 % Biodiesel + 80 % Diesel, B100: 100 % Biodiesel

(Pure Biodiesel). Moreover, in some scientific research, it is also described as B50 (50 % biodiesel + 50 % diesel) (Karaosmanoğlu, 2002, 52).

Pure biodiesel and diesel-biodiesel mixtures can be used in any diesel engines without any necessary changes or after some minor modifications. For biodiesel, EN 14214 and EN 14213 EU Standards and ASTM D 6751 American Standard are valid. In Turkey, TS EN 14214 based on EN 14214 is in effect for Autobiodiesel Standard in transportation, and TS EN 14213 Fuel Biodiesel Standard is for using biodiesel for heating (Yaşar, 2009; 66).

One of the biggest obstacles to large scale biofuel production is high costs when compared to conventional fuels. To IEA, with today's technology biodiesel production cost twice, three times more than petrol and diesel. For this reason, it is stated that the problem caused by differences in costs can be eliminated by governmental incentives. In order to develop their own industries and to make biofuels compete with conventional fuels, developing countries should specify which incentives and subventions they will provide and deal with the problems in the process. Socio-economically, biofuel is a line of business which can present a number of job opportunities and income to thousands of people as a result of oily seed cultivation with the sustainable development in the country. Growing oily seeds and programs targeting biofuel production specifically facilitates the use of idle lands.

Comparing biodiesel fuels with diesel fuels, generally both fuels are spotted to have similar properties in common in structure. However, due to some properties such as boiling and flash point and high cetane number, biodiesel is accepted to be more advantageous. Especially, elevation of boiling and flash point is important for safety conditions such as transportation and storage, and also high cetane number contributes engine's performance with the energy provided.

## 3. Biofuels and biodiesel market and policies in EU and Turkey

EU energy policies mainly hinge on the thought of providing cheaper, better quality and sustainable service to the consumers. While performing this, it is aimed to allow energy market to be competitive, ensure the security of supply and save the environment on the basis of sustainable development (Yorkan, 2009; 31).

Despite being one of the areas with the most energy consumption in the world, the EU is dependent on outside energy resources due to lack of domestic energy resources. The EU's energy dependency in 2010 was 52, 6 %, and this percentage steadily increased as 53,4 % in 2014 and 54 % in 2015. The percentage is estimated to be 57,4%-59,1% until 2030 (http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=tsdcc310&plugin=1). To reduce energy dependency and switch to low carbon

economy, the EU has decided to save coals' share in total energy consumption, to increase natural gas' share, to create maximum safety conditions for nuclear power plants and to increase renewable energy resources' share as principal implementation tools (Aytüre, 2013; 37).

According to "20-20-20 Goals", which were designated regarding renewable energy resources directive dated June 2009 (2009/28/EC) and in a way bind all the members of the EU, in 2020 all across the union, it is stipulated that 20 % of the energy consumption must be provided from renewable sources (the EU council revised this goal as 27 % for 2030 in October, 2014), energy productivity must be increased 20 %, and finally energy consumption must be decreased 20 %. In the same document, it is also aimed to derive 10 % of the energy used in transportation in the EU from renewable energy resources (Bayraç vd., 2018; 83) and this was proposed to be obtained highly from biofuels. To reach the goals set, most of the union members have put numerous encouraging and incentive implementations into practice since 2003. A wide variety of direct or indirect policies such as tax exemption, tax immunity, quotas, compulsory mixture ratios have been carried out to influence biofuel production (Wetterlund vd., 2012; 462).

While establishing biofuel policies, indicators such as GDP's of countries, cultivated lands, yields from lands, the share of agricultural employment in labor force, transportation demand per capita, fuel import dependency, number of cars per capita and carbon emission are taken into consideration (Çelebi ve Uğur, 2015; 28). In the last periods, the biggest factor in the dramatic rise of biofuels production and consumption has been the country's encouraging production and consumption through supports in this sector. By setting biofuel production and consumption goals, the countries want to reach these goals with various support tools.

Biofuels are liquid fuels made from biomass. The major raw material of these fuels which are regarded as first generation biofuels including biodiesel and bioethanol is agricultural product. Bioethanol is produced by fermenting and distilling sugar beet and sugar cane and also by first saccharizing plants including corn, wheat, barley, rye, and potato and then fermenting and distilling them. However, biodiesel is made from oily plants, for instance canola, soy, safflower, cotton, palm, sunflower. C4 energy plants to be used as biofuel raw material are especially grown on lands unsuitable for agricultural production. In modern agriculture plans, it is aimed to allocate 30 % of agricultural lands for feed and 20 % for energy plants (Horuz vd, 2015; 69).

Second generation biofuels are produced by means of high technology generally from woody and carboniferous lignocellulozic materials which are agricultural products grown as food but noncompetitive in production and consumption. During the production of these fuels,

Cellulose-intensive organic materials and fibers, including seaweeds, meadow, grass, weed, poplar, willow, eucalyptus, switchgrass, miscanthus are utilized along with industrial waste and city solid waste (Özertan, 2008; 21).

Biofuel production enables both assisting rural development and creating employment by giving preference to domestic agricultural products of the country as raw materials for the production. Countries usually give weight to one kind of biofuel production. Generally, focusing only on bioethanol or biodiesel production is preferred to ensure economic efficiency. Thus, countries specialize in one kind of agricultural product appropriate to climate conditions and they make use of this product in biofuel production.

Both the USA and Brazil prefer bioethanol as biofuel, but while corn is favored in the USA, in Brazil sugar cane is mostly opted for bioethanol production. In countries such as Indonesia and Malaysia, biodiesel are mostly produced from palm oil.

Biofuel consumption policies differ among countries. Some implement various incentive policies aiming at biofuel consumption, whereas the others make biofuel consumption mandatory by means of law enforcements and struggle to increase biofuel consumption with the determined numerical goals.

## 3.1. In the European Union Biodiesel Market and Policies

In the EU, biodiesel production was small-scaled and nonstandard in the 1980s, but today the EU has become the world leader in biodiesel production. Main reasons why biodiesel production has developed so quickly in the union are development in diesel technology, increase in demand for diesel vehicles, increase in the number of diesel cars in transportation and having more environmental problems resulting from energy.

Every year, transportation sector emits 14 % of the greenhouse gases released to the atmosphere. ¾ of the greenhouse gas emission in this sector is because of road transportation (Bayraç vd., 2018; 41). Particularly, as the increase in greenhouse gases substantially results from transportation sector, and due to having more environmental problems and external dependency's being around 54 %, the union has shown special interest in biodiesel.

After the EU's signing Kyoto Protocol, in order to decrease emission resulting from greenhouse gases, biodiesel, which is relatively more eco-friendly than diesel, has been given prominence. Supports given to agricultural products as a consequence of Common Agriculture Policy (CAP) reforms has also influenced the production of energy plants positively (Yaşar, 2009; 69). Thus, it has become compulsory to allocate 15 % of the cultivation sites for pulses and oily seed plants, and moreover

tax exemptions and other incentives for biofuels have been applied around the union.

As a result of CAP, notably oil production for food has been increased by supporting oily seed plants and biodiesel sector has started to improve in parallel with sufficient and regular raw material supply for biodiesel production. To the EU's 2020 goal of 10 % biofuel in transportation, 1 % in 2004 reached 5,4 % in 2013 and 5,9 % in 2014 (Eurostat, 2016). The EU has decided on 20 % in 2020, and 30 % in 2030 for biofuel consumption.

In the success of the Union biofuel strategy; raw material supply was determined as the main element and raw material supply was increased with CAP tools. Tools including premiums (45 euro) and supports given for energy plants per hectare, training- extension works, using idle agricultural lands for this purpose and introducing new technologies to industrialists and producers and etc. has been widely used by the EU. To preclude unstable production numbers among countries, production quotas for biodiesel have been set.

With the intend of having members achieve EU biofuel goals, tax reduction is made at the national level and various tax concessions for producers are provided. Furthermore, R&D studies are focused on and cost-efficient biofuel production is rapidly going on. The European Biodiesel Board (EBB), which consists of biodiesel producers and directs the biodiesel production around the EU, is an institute that has played an important role in the development of biofuel production and use (Yaşar, 2009; 89).

Germany has a leading role in biodiesel in the EU. Biodiesel is considered within the scope of "Recognition Law for Renewable Energy Resources". As of 2007, 5 % mixture obligation was imposed in biodiesel and gradual taxation was introduced, but by applying tax exemption for biodiesel's being used as farming fuel, farming for energy was also supported. In France, biodiesel is used with tax-free 5 % blending. (http://www.albiyobir.org.tr/dunyada_b2.htm, Date of Access: 18.08.2018).

## 3.2. In Turkey Biodiesel Market and Policies

Our country has also been affected positively by the rapidly growing biofuel energy in the world economy, and studies on biodiesels have begun to accelerate since the 2000s, especially in biodiesel. In this context, in 2008, the Ministry of Agriculture and Rural Affairs, General Directorate of Agricultural Research Institute has established the "Reseach Center for Energy Crops Cultivation" within the body of Black Sea Agricultural Research Institute, and the research center has been assigned to carry out research and basic projects throughout the country. Supported projects with the establishment of the center vary according to years, while a total of 1.950.000 TL has been given as support and is still funding (www.tarım.gov.tr).

As a result of the studies carried out, significant developments related to biodiesel have been recorded due to the increase in the activities in universities and R & D institutions as well as the increase in energy prices in the world economy. The primary cause of the rapid development of biodiesel in Turkey is that fast-growing diesel technology is able to compete with gasoline-powered vehicles, and that biodiesel compared to diesel fuel is cheaper. Despite the power provided by diesel technology, the fuel cost is less than that of gasoline, and so this cause to prefer diesel in passenger cars.

The first legal regulation of biofuels in Turkey was Petroleum Market Law No. 5015. The law expressed products blended with fuel; products such as methyl tertiary butyl ether (MTBE), ethanol etc. which are and will be subject to equal taxation like fuel, national marker, and additive to be added to the fuel at the refinery exit or at the customs entrance. It also stated that the products obtained from domestic agricultural products and that are blended with fuel cannot be subject to an equivalent tax rate. As a result of the exclusion of excise tax on biodiesel in the law, investments have increased in parallel with the world.

According to the Technical Regulation Communiqué on Diesel Types and the Communiqué on Making Amendments to the Technical Regulation Communiqué on Fuel Oil Types (Fuel Oil Serial No: 22), which entered into force after being published in the Official Gazette dated 27.09.2011 and numbered 28067, the content of fatty acid methyl ester produced from domestic agricultural products of diesel types offered to the market as fuel has to be at least 1 % as of 1.1.2014, at least 2 % as of 1.1.2015 and at least 3 % as of 1.1.2016 (Saraçoğlu, 2017; 148).

Nowadays, there are approximately 1.5 million tons of installed biodiesel in our country. That Turkey's annual consumption of diesel and fuel oil is 18-19 million tons clearly shows the size of the total capacity. With this capacity, Turkey ranks second after Germany in the world's biodiesel production capacity considering the installation. In Turkey, with the Decree of the Council of Ministers and the Communiqué of the Ministry of Finance even if entirely domestic agricultural products were used in biodiesel production, a 98 % excise tax on 100 % biodiesel use is practiced. As opposed to petroleum products which are subject to excise tax but free of customs duty, biodiesel is subject to customs duty and, in that way, subject to a high rate of excise duty. Thus, this makes an impact on the development of biofuel sector (http://www.albiyobir.org.tr/).

The amount of biodiesel production in the EU and in Turkey in 2017 and cultivable sites are shown in Table 1. Considering the lands Turkey has and its production capacity, with the right policy, it is feasible to grow adequate oily seeds both for food and fuel. Although Turkey has 23 million 830 thousand hectares of cultivable sites, biodiesel production is only 74 thousand tons. On the contrary, Greece has 2

million 630 thousand hectares, that is only 10 % of what Turkey has, but can produce 138 thousand tons of biodiesel, which is nearly twice as much as Turkey's. Germany, which is the leader in the EU in biodiesel production, has 11 million 900 thousand hectares of agricultural lands and produces 3 million 17 thousand tons of biodiesel. Another EU member, France has 1 million 703 thousand tons of biodiesel production on its 18 million 510 thousand hectares of cultivable sites. Thereafter comes Spain, Poland and Italy in turn.

**Table 1:** Biodiesel Production in EU and Turkey (2017)

| Country | Amount of Biodiesel Production (Million Tons) | Agricultural Areas in Total (Hectares) |
|---|---|---|
| Turkey | 74.000 | 23.830.000 |
| Germany | 3.017.000 | 11.900.000 |
| France | 1.703.000 | 18.510.000 |
| Spain | 1.105.000 | 13.700.000 |
| Poland | 779.000 | 12.140.000 |
| Italy | 503.000 | 6.280.000 |
| Greece | 138.000 | 2.630.000 |

**Source:** https://www.dunya.com/kose-yazisi/enerji-tarimi-sozlesmeli-uretimle-gelisiyor/411895.

Biodiesel blending ratio for the countries are presented in Table2. According to Table 2, it can seen that biodiesel blending ratios in the EU are rather high. In Germany, biodiesel blending around 8 % means carbon emmission at the rate of 4.4 %. Biodiesel blending ratio is 7.7% in France, while biodiesel and bioethanol blending ratios are 5 % in Spain, 7.1 % in Poland, 6.5 % in Italy and 5.75 % in Greece.

**Table 2:** Biodiesel Blending Ratios in the EU

| Country | Blending Ratio |
|---|---|
| Austria | 6.3 % Biodiesel |
| Germany | 8 % Biodiesel |
| France | 7.7 % Biodiesel |
| Spain | 5 % Biodiesel+Bioethanol |
| Poland | 7.1 % Biodiesel + Bioethanol |
| Italy | 6.5 % Biodiesel + Bioethanol |
| Greece | 5.75 % Biodiesel + Bioethanol |

**Source:**https://www.dunya.com/kose-yazisi/enerji-tarimi-sozlesmeli-uretimle-gelisiyor/411895.

As of 1.1.2018, with the decision of Energy Market Regulatory Committee (EMRC) in Turkey, it has been made compulsory to blend biodiesel in the ratio of 5 ‰. According to this, it is a must to mix each 200 liters of diesel oil with 1 liter of biodiesel, and it is also required to add biodiesel derived from domestic agricultural products or waste oils. By means of this implementation, it is aimed to decrease foreign dependency, to improve resource variety, to recycle waste vegetable oils efficiently, to reduce environmental pollution and to comply with the EU renewable

energy policies. Biodiesel production of Turkey for the period 2010-2018 is presented in Table 3.

**Table 3:** Biodiesel Production Amount in Turkey (Million Tons)

| Years | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 (target) |
|---|---|---|---|---|---|---|---|---|---|
| Biodiesel Production | 7.46 | 11.73 | 17.73 | 21.38 | 32.88 | 60.95 | 64.10 | 74.00 | 105.00 |

**Source:** epdk.gov.tr.

As shown in Table 3, biodiesel production in Turkey, which is 7 million 46 thousand liters in 2010, has been steadily increasing. Biodiesel production reached 74 million tons in 2017 and is expected to be 105 million tons in 2018.

## 4. Literature Review

Al-Mulali (2015) investigated the impact of biofuel energy on economic growth, pollution, agriculture price level, and total agriculture production in 16 major biofuel energy consuming countries. The panel model was used in this study for period of 2000–2010. The results showed that biofuel energy increases GDP growth and reduces the level of pollution.

Sen et al (2016), examined the relationships of biofuels production with sustainable development in China by panel data analysis for the 2003 through 2012 periods. They were concluded that the development of biofuel energy production integrated with the consideration of the improvement of income per capita, and the attraction of more capital investment, does make a significant contribution to economic growth.

Zaman et al (2016), empirically measured the environmental impacts of biofuel production in the panel of six largest regions of the World including East Asia & Pacific, Europe & Central Asia, Latin America & Caribbean, Middle East & North Africa (MENA), South Asia, and Sub Saharan African region, over the period of 1990e2013. Results of study showed that production of biofuels exuberate the Hydrochlorofluorocarbons (HCFCs) in East Asia & Pacific region, Latin America & Caribbean region, South Asia, and Sub Saharan African region, while in Europe & Central Asia, biofuels production significantly lessen the amount of HCFCs in the region.

Alsaleh and Abdul-Rahim (2020), examined the correlation between the bioenergy industry and economic outgrowth. It was found that bioenergy sector factors have a positive and significant impact on economic growth. Also, that there is a longterm

stable relation among the bioenergy consumption and economic outgrowth. Also, it was derived from the study, there was a significant influence from the bioenergy industry on economic growth in EU-28 region.

Xu et al (2020), examined the nexus among economicg rowth, biofuel consumption, urbanization rate, and CO2 emissions in seven selected Group of Twenty countries (G20) over 2001–2017. The results of study suggested that the environmental Kuznets curve (EKC) exists between economic growth and CO2 emissions, and the impact of biofuel consumption and the urbanization rate on CO2 emissions is negative and positive, respectively.

## 5. Methodology, Data and Analysis

In econometric studies, three types of data are used: time series data, cross-sectional data, and mixed data which is combination of time series data and cross-sectional data. If the same sectional unit is tracked over time, such mixed data is called panel data. As a result of the measurement of specific sampling units such as individuals, firms, households, cities and countries over time, the panel data structure that expresses data sets for the same audience is reached in different time periods (Baltagi, 2001: 1).

Economic relations are tried to be estimated by using the cross-sectional data of time dimension with panel data analysis (Greene, 1993: 464). Therefore, panel data analysis combines time series and horizontal cross-section series, and allows the creation of a data set with both time and section size.

The results of the study based on the cross-sectional data reveal only the differences between the units. However, in studies using panel data, changes occurring over time in both units and a unit can be revealed.

A simple linear panel data regression model is generally expressed as follows:

$$Y_{it} = \beta_{1it} + \beta_{2it}X_{2it} + \ldots + \beta_{kit}X_{kit} + \varepsilon_{it} \quad \textbf{(1)}$$

i= 1….N; t= 1….N

There are three methods that can be used in the prediction phase with pooled regression as a method of estimation in the adaptation of both time and section data of the model. These methods are:

1. Classic Model
2. Fixed Effects Model
3. Random Effects Model

Classic model is a model where both constant and slope coefficients are fixed to units and time. This model is written as follows,

$$Y_{it} = \beta_o + \sum_{k=1}^{k} \beta_k X_{kit} + e_{it} \quad \textbf{(2)}$$

and the parameters can be estimated by the Least Squares Method. Below is the general representation of fixed effects model.

$$Y_{it} = \beta_{1it} + \beta_{2it}X_{2it} + \ldots + \beta_{kit}X_{kit} + \varepsilon_{it} \quad \textbf{(3)}$$

Random Effects Model is stated as follows;

$$Y_{it} = \beta_{1it} + \beta_{2it}X_{2it} + \ldots + \beta_{kit}X_{kit} + \varepsilon_{it} + \mu_i \quad \textbf{(4)}$$

(Greene, 2003; Gujarati, 2004; Narayan and Narayan, 2010; Baltagi, 2001).

## 5.1. The Aim of the Study

This study examined the relationship between the annual series of biodiesel production (thousand tons) and Gross Domestic Product (GDP Million Euro) for 29 countries including Turkey between the years 2008 to 2016 through panel data analysis. Descriptive statistics for the series are given below. These countries are: Belgium, Bulgaria, Czech Republic, Denmark, Germany, Estonia, Ireland, Greece, Spain, France, Croatia, Italy, Cyprus, Latvia, Lithuania, Luxembourg, Hungary, Malta, Netherlands, Austria, Poland, Portugal, Romania, Slovenia, Slovakia, Finland, Sweden, the United Kingdom and Turkey. Data were obtained from Eurostat.

## 5.2. Data and Empirical Results

In this study, it was used annual data for the period 2008-2016 using the Euroean Union and Turkey. Data on biodiesel production are expressed in terms of 1000 tonnes and real GDP series in constant 2010 milyon Euro is used for the economic growth. Descriptive statistics for the relevant series are given in Table 4.

**Table 4:** Descriptive Statistics for Variables

| Statistics | GDP | Biodiesel (DIESEL) |
|---|---|---|
| Average | 443620.1 | 339.4125 |
| Highest | 2855352. | 2630.900 |
| Lowest | 6373.700 | 0.000000 |
| Standart Deviation | 670799.5 | 566.2255 |
| Skewness | 2.035396 | 2.430750 |
| Kurtosis | 6.145747 | 8.253657 |
| Jarque-Bera | 317.6049 | 614.8212 |
| J&B p. | <0,05 | <0,05 |
| N | 288 | |

Cross sectional dependence must be analyzed. With the existence of cross sectional dependence, unit root tests taking into account this dependence are required to be

used. Cross-sectional dependence analyzed by Peseran (2004) Cross-Section Dependence (CD) test. In Peseran CD Test, H0: no cross-sectional dependence

The result of Peseran CD Test was given in Table 5.

**Table 5:** Peseran CD Test Results

| | CD Test Statistics | r | P |
|---|---|---|---|
| **Pesaran CD test** | 13.35 | 0.537 | 0.0001 |

According to CD test results, cross-sectional dependence exists for biodiesel production. Therefore, unit root test for cross-sectional dependent panel data will be used.

If there are cross-sectional dependence between series, then second generation unit root tests must be used for cross sectional dependent series.

IPS (Im, Peseran and Shin) and ADF-Fisher unit root test was applied for economic growth and biodiesel production series and results on unit root tests were given in Table 6.

**Table 6:** Panel Unit Root Test Results

| Series | Model | Test | p |
|---|---|---|---|
| **Biodiesel** | At the Level | IPS | 0.4727 |
| | At the Level | ADF - Fisher | 0.6319 |
| **Biodiesel** | first differenced | IPS | <0.05 |
| | first differenced | ADF - Fisher | <0.05 |
| **GDP** | At the Level | IPS | 0,8756 |
| | At the Level | ADF - Fisher | 0,9650 |
| **GDP** | first differenced | IPS | <0.05 |
| | first differenced | ADF - Fisher | <0.05 |

When Table 6 is examined, it can be seen that the hypothesis for the biodiesel and GDP series for each of the three tests is not to be rejected with 95 % reliability. Therefore, it can be said that both series are not stationary at the level. However, it is seen that all three series have stabilized after first differentiation process. In the next analysis, it was studied with the series which were stabilized with first difference.

After the unit root tests are applied, it is necessary to perform the cointegration analysis of the panel to determine the long-term relationships between the series (Arouri et al, 2012; 344). According to the results, Westerlund cointegration test

(the second generation panel cointegration test) should be applied. However, since there were not enough observations, one of the first generation tests, Kao cointegration tests were applied. Kao cointegration test results for the related series were given in Table 7.

**Table 7:** Kao Cointegration Test Results

| | **t-statistics** | **p** |
|---|---|---|
| Kao Cointegration Test | 6.0077 | <0,05 |
| Error variance | 2.0649 | |
| HAC Variance | 1.7188 | |

According to the Kao cointegration test, there is a cointegration between the series.

Hausmann Test to examine which panel regression model is valid is given in Table 8.

**Table 8:** Hausmann Test Results

| Variable | Chi-Square Value | Statistics | Prob. |
|---|---|---|---|
| Biodiesel | 4.97 | | 0.0258 |

**H0:** valid for random effects model

As a result of the Hausmann test for the hypothesis testing, it is seen that the model of random effects is not valid for GDP-Biodiesel models. It is concluded that unobserved unit effects are fixed effect for the selected country group.

A unit effect model was chosen for the selected country group, however, it was concluded that unobserved unit effects were fixed. Parks-Kmenta estimation method was used for the coefficient estimation and the results are given in Table 9.

**Table 9:** Parks- Kmenta Estimation Results

**Dependent Variable GDP**
**Wald Chi-Square Statistics = 51.70**
**Sig.: 0.0001**

| Independent Variable | Coeff. | Standart Error | t | Sig. |
|---|---|---|---|---|
| Biodiesel | 805.5129 | 112.0245 | 7.19 | 0.0001 |

When the fixed effects models are examined, biodiesel series has a positive effect on GDP. Accordingly, the increase in biodiesel production affects the GDP in an upward direction.

## 6. Conclusion and policy implications

Nowadays, due to the reasons such as the decrease in oil reserves, the rapid increase in prices of petroleum products, the reduction of pollutant exhaust gases as a result of the combustion of them and the standards developed related to air pollution control, and reducing the dependence on the outside, etc, the studies for the development of alternative fuels have gained speed. One of the alternative fuels investigated for diesel engines is biodiesel. Biodiesel is obtained from waste frying oil from agricultural products such as canola, rapeseed, soy, safflower, flax, sunflower, and corn, or from animal fats. In addition, low-cost raw materials such as yellow grease and brown grease, which include waste frying oils, animal fats and various waste oils, can be used. As biodiesel properties vary depending on the oil source used and the type of alcohol used in production, the ignition, combustion and emission values for each biodiesel are different from each other.

Biodiesel is produced from high quality vegetable oils. Prices of vegetable oils used as food being high and the cost of biodiesel production depending largely on the price of raw materials increase the price of biodiesel unit and, despite its many advantages, it prevents the widespread use of biodiesel. In order to reduce the high price of biodiesel and enable it to compete with diesel fuel, various biodiesel incentive programs have been introduced in the countries. Incentives have been applied in the biofuel industry, include various subsidies to agricultural products to be used in biodiesel production, grants and loans to projects for development of second generation biofuels, opening of marginal lands to production, application of base price to C4 energy crop producers, low interest loan supports for R & D activities, various tax deductions and subsidies,

As a result of the econometric analysis carried out, a cointegration between the series was determined by Kao cointegration method. After the cointegration structure was revealed, by accepting GDP as dependent variable, it was found that the effect was positive in all models according to the panel model estimation results. Then as a result of Hausmann test, it was seen that the model of random

effects is valid for GDP-Biodiesel models. Examining the fixed effects models, it was determined that biodiesel series has a positive effect on GDP. As biodiesel fuel is a completely domestic source of energy in terms of raw material, it will reduce foreign dependency in energy, and thus decrease in energy import costs will lead to an increase in GDP.

Biodiesel sector will make great contributions to the provision of sustainable energy in the EU and Turkey which meet a significant part of energy demand through imports and to the goal of reaching low-carbon economy in the future. To achieve this, the incentives given by the state for biodiesel production, processing and consumption stages must be maintained because of favorable climatic conditions, the amount of land, soil and agricultural potential in terms of the EU and Turkey.

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## References

Al-Mulali U. (2015). The Impact of Biofuel Energy Consumption on GDP Growth, Co2 Emission, Agricultural Crop Prices, and Agricultural Production, *International Journal of Green Energy,* 12(11), 1100-1106

Alsaleh M. and A. S. Abdul-Rahim A.S. (2020). Bioenergy Consumption and Economic Growth in the EU-28 Region: Evidence from a Panel Cointegration Model, *GeoJournal, 1-16.*

Aransiola, E.F., Ojumu T.V., Oyekola, O.O., Madzimbamuto and Iknu-Omoregbei D.I.O. (2014). A Rewiev of Current Technology for Biodiesel Production: State of the art, *Bıomass and Bıoenergy, 61, 276-297.*

Arouri, M. El H., Youssef, A.B., M'hennş, H. and Rault C. (2012). Energy consumption, economic growth and CO2 emission in Middle East and North African countries, *Energy Policy, 45, 342-349*.

Aytüre, S. (2013). Avrupa Birliğinin Enerji Politikasında Son Gelişmeler ve Türkiye'ye Yansımaları, Nevşehir Hacı Bektaş Veli Üniversitesi, *Sosyal Bilimler Enstitüsü Dergisi, 3, 35-51.*

Baltagi, B (2001). *Econometric Analysis of Panel Data,* 2nd Ed., UK: John Wiley & Sons Ltd.

Bayraç, H. N. ve Çelikay, F. ve Çildir, M. (2018). *Küreselleşme Sürecinde Sürdürülebilir Enerji Politikaları,* Ekin Yayınları, Bursa.

Çelebi, K. A. ve Uğur A. (2015). Biyoyakıtlara Yönelik Mali Teşvikler: Türkiye Açısından Bir Değerlendirme, *Hacettepe Üniversitesi İİBF Dergisi, 33 (2), 25-45.*

Dağdelen D. (2015). *Küresel Biyoyakıt Politikalarının AB ve Türkiye Açısından İncelenmesi,* T.C. Gıda Tarım ve Hayvancılık Bakanlığı, Avrupa Birliği ve Dış İlişkiler Genel Müdürlüğü, AB Uzmanlık Tezi, Ankara.

Eurostat (2016). *2020 Climate and Energy Package*, (https://ec.europa.eu/clima/policies/energy-stragety/2030-energy-strategy, Date of Access: 18.08.2018).

Greene, W. H. (2003). *Econometric analysis*. Pearson Education India.

Gujarati, D. (2004). *Basic Econometrics.* United States Military Academy, West Point.

Horuz, A. ve Korkmaz A, ve Akınoğlu, G. (2015). Biyoyakıt Bitkileri ve Teknolojisi, *Toprak Bilimi ve Bitki Besleme Dergisi, 3 (2), 69-81.*

Karaosmanoğlu, F. (2002). Ekojenerasyon Dünyası, *Ekojenerasyon Dergisi, ICCI Özel Sayısı, 10, 50-56.*

Narayan, P. K. and Narayan, SD. (2010). Carbon Dioxside Emission and Economic Growth: Panel Data Evidence from Developing Countries, *Energy Policy, 38, 661-666.*

Özertan G. (2008). Biyoyakıtların Türkiye'nin Enerji, Tarım, Çevre ve Kırsal Kalkınma Politikaları İçin Önemi, *İktisat-İşletme ve Finans Dergisi, 23 (262), 17-34.*

Pesaran, M. H. (2004). *General Diagnostic Tests for Cross Section Dependence in Panels.* University of Cambridge, Faculty of Economics, Cambridge Working Papers in Economics No. 0435.

Saraçoğlu, S. (2017). Yenilenebilir Enerji Kaynağı Olarak Biyokütle Üretiminin Dünyada ve Türkiye'de Durumu, *Fiscaoeconomia, 1 (3), 126-155*.

Sen Qiao, Xin-long Xu, Cheng Kun Liu and Hsing Hung Chen (2016). A Panel Study on the Relationship Between Biofuels Production and Sustainable Development, *International Journal of Green Energy, 13 (1), 94-101*.

Wetterlund, E.ve Leduc. S.ve Dotzauer, E. and Kindermann, G. (2012). Optimal Localisation of Biofuel Production on a European Scale, *Energy, 41, 789-800*.

Xu B., Zhong R. and Qiao H. (2020). The Impact of Biofuel Consumption on CO2 Emissions: A Panel Data Analysis for Seven Selected G20 Countries*, Energy and Environment, 31(8), 1498–1514.*

Yaşar, B. (2009). *Alternatif Enerji Kaynağı Olarak Biyodizel Üretim ve Kullanım Olanaklarının Türkiye Tarımı ve Ab Uyum Süreci Açısından Değerlendirilmesi, Çukurova Üniversitesi,* FBE, Tarım Ekonomisi ABD, Doktora Tezi, Adana.

Yorkan, A. (2009). AB'nin Enerji Politikası ve Türkiye'ye Etkileri, *Bilge Strateji, 1 (1), 24-39.*

Zaman K., Awan U., Islam T., Paidi R., Hassan and A., Alias bin Abdullah, (2016). Econometric Applications for Measuring The Environmental Impacts of Biofuel Production in The Panel Of Worlds' Largest Region, International Journal of *Hydrogen Energy, 41(7), 4305-4325*.

http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=tsdcc310&plugin=1/ Date of Access: 14.08.2018.

https://www.intechopen.com/books/biofuel-s-engineering-process-technology/novel-methods-in-biodiesel-production/ Date of Access: 04.08.2018.

http://www.albiyobir.org.tr/dunyada_b2.htm/date of access: 18.08.2018.

https://www.dunya.com/kose-yazisi/enerji-tarimi-sozlesmeli-uretimle-gelisiyor/411895/ Date of Access: 18.08.2018.

www.tarım.gov.tr/ Date of Access: 18.08.2018.

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# Factors Affecting Muslim Students Repurchase Intention of Halal Food in Yogyakarta, Indonesia

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***Factors Affecting Muslim Students Repurchase Intention of Halal Food in Yogyakarta, Indonesia***

***Abstract***

*In general, previous research on the topic of halal focused on consumer purchase intentions. Thus, this study aims to broaden the issue in this field by examining the factors that influence the intention to repurchase Muslim students on halal-labeled foods. The perceived halal label, brand image, perceived product quality, and religious belief are hypothesized to influence the repurchase intention on halal food.*
*This study uses a quantitative approach. The data used are primary data collected through the distribution of questionnaires to 194 students from four campuses in Sleman district, namely Universitas Islam Indonesia, Universitas Pembangunan Nasional "Veteran" Yogyakarta, Institut Pertanian "stiper" Yogyakarta, and Universitas Amikom Yogyakarta Data in this study were collected through survey methods. The total respondents collected were 194 students from four universities in Sleman, Yogyakarta. Data were processed using SPSS analysis tools with multiple linear regression techniques.*
*This study's results indicate that the perceived halal label and religious beliefs do not affect repurchase intention. Conversely, brand image, and perceived product quality affect student repurchase intentions.*

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## 1. Introduction

Islam is a religion adopted by the majority of the Indonesian. According to the official census of BPS (Indonesian Central Statistics Agency) in 2010, there were 87.18% of Muslims, while the non-Muslim population was 12.82% (Na'im & Syaputra, 2011). Thus, the culture and habits of Indonesian in meeting their daily needs cannot be separated from the influence of Islamic teachings.

Islam is related not only to spirituality but rather a system of life (way of life) because it regulates worship rituals and provides a method of rules or procedures for human beings as well (Team of Writers of P3EI, 2013). These include regulations on food consumption according to Islamic teachings, known as halal concepts.

Halal means it is allowed. Halal food means food that is allowed to be consumed according to Islamic teachings. Specific criteria must be met for food products to be declared halal. To guarantee the halal status of a product, the Indonesian government, through the Halal Product Guarantee Act, requires all food companies to put halal labels on their product packaging. A product is declared halal, if it has been through a series of tests in a laboratory, thus guaranteed halal objectively.

Generally, previous research on halal-labeled food focused on factors that influenced the intention to buy halal food (Alam & Sayuti, 2011; Ali et al., 2018; Hayat M. Awan et al., 2015; Ishak et al., 2016; Mukhtar & Mohsin Butt, 2012). Research on factors that influence consumers' intention to repurchase halal food products is still limited in number, especially in the Indonesian context. Therefore, this study examines the factors that influence Muslim consumers' repurchase intentions on food products labeled as halal.

Prior research showed that Muslim consumers buying halal food were influenced by factors related to religious values, such as religious beliefs and perceived halal labels (Yasid et al., 2016; Yoga, 2019). Besides, consumers' intention to repurchase halal food products is affected by brand image and perceived product quality (Soleha et al., 2017). Based on the preceding description, it is interesting to examine whether the intention to repurchase halal food products is still influenced by religious factors and perceived halal labels or more influenced by the product factors. Specifically, this study examines whether Muslim consumers' intention to repurchase food labeled as halal is influenced by perceived halal labels, brand image, product quality, and religious beliefs.

## 2. Lıterature Review

### 2.1. Halal Concept

The origin of something created by God is valid and permitted according to Islamic teachings. Nothing is unlawful, except there is a legitimate and firm argument derived from the Koran and hadith. If there is no firm argument that shows haram, it is still as it was initially, mubah (allowed). Thus, Halal is permissible or legal, according to Islamic law. If it is associated with food, halal means food that is permitted or valid according to Islamic law. The halal food products, according to MUI (Yasid et al., 2016), are products that meet the halal requirements following Islamic law, namely:

1. Do not contain pork and ingredients derived from pigs or animals or other illicit goods
2. Do not provide khamr (alcohol) and its derivative products
3. All ingredients of animal origin must come from halal animals which are slaughtered according to Islamic Sharia procedures
4. It does not contain other ingredients prohibited or classified as unclean, such as carcasses, blood, materials derived from human organs, feces, and so forth.
5. All storage, sales, processing, processing, and transportation facilities for halal products must not be used for pigs or other non-halal goods. If the facility has been used for pigs or other non-halal goods will be used for halal products, it must first be cleaned following the procedures regulated according to Islamic law. The use of facilities for halal and non-halal products, in turn, is not permitted.

### 2.2. Halal label

The halal label is a logo given by certain authorities which guarantees the suitability of the product with the concept of halal according to Islamic teachings. The halal label is printed on food packaging, which indicates that a product has undergone a halal inspection process and has been declared halal. In various countries, an agency/institution has been formed to check the halal status of a product. Malaysia has its own Islamic Department to control the Halal process named JAKIM (Ishak et al., 2016). Singapore has the Islamic Religious Council of Singapore (MUIS), and Thailand has the Central Islamic Committee of Thailand(CICOT) (Ahadi et al., 2017). Specific in the Indonesian context, to ensure legal certainty and protect Muslim consumers, a regulation regarding halal food products is regulated in the Halal Product Guarantee Act (Law JPH) No. 33 of 2014. Halal product guarantees in Indonesia are proven by obtaining halal certificates and halal logos on the Halal Product Guarantee Agency (BPJPH) based on a written halal fatwa issued by the Indonesian Ulema Council (MUI). This institution oversees products that are circulating in the community by providing halal certificates. Products that have halal certificates can put halal labels on their products. This certificate means that the products have been passed through the process, and its contents have been examined. They must be free from elements that are prohibited by the teachings of Islam, or the product has become a category of halal products does not contain illicit ingredients, and can be consumed safely by Muslim consumers.

## 3. Hypothesis Development

### 3.1. Perceived Halal Label and Repurchase Intention

The perceived halal label is an impression that has been analyzed, interpreted, and evaluated by individuals, which results in a meaning that whatever is labeled halal

has been guaranteed halal and permitted according to Islamic law. The existence of halal labels on the packaging of a product affects the intention to repurchase Muslim consumers on the product, (Anggraeni et al., 2016) states that perceived halal labels have a positive effect on repurchase intentions. This study is strengthened by research conducted by (Jeddi & Zaiem, 2010) that the perception of halal labels has a positive influence on consumer repurchase intentions. Therefore, based on the argumentation, the author formulates that:

**H1:** Perceived halal label affects repurchase intentions

### 3.2. Brand Image and Repurchase Intention

Brand image is a collection of perceptions and trust held by consumers, which are reflected in the associations that are remembered in the minds of consumers when remembering a brand. Aaker (1991) defines brand image as a series of brand associations stored in consumers' memory. Keller (1993) defines brand image as the total number of brand associations in consumers' minds, which causes perceptions about brands. Brand image is one of the reasons consumers buy a product (Aaker 1992). Brand image has a positive effect on consumer repurchase intentions (Riki Wijayajaya & Tri Astuti, 2018). Furthermore, (Sidi Izzudin & Novandari, 2018) show that a brand image that is perceived well by consumers influences repurchase intentions on the same brand. Therefore, based on the argumentation, the author formulates that:

**H2:** Brand image affects repurchase intention

### 3.3. Perceived Product Quality and Repurchase Intention

Quality refers to the ability of a product or service to meet or exceed customers' requirements or expectations consistently. Perceived quality means consumers' perceptions about the quality of a product. It represents the overall assessment of consumers about the superiority of a product (Parasuraman et al., 1988). Research shows that perceived product quality affects the consumer's desire to buy products (Tsiotsou, 2006). It also has a positive effect on consumer repurchase intentions (Ariffin et al., 2016; Zhang et al., 2011). That means the higher the perceived product quality, the higher the consumer's intention to buy it. Based on the argumentation, the author formulates that:

**H3:** Perceived product quality affects Repurchase Intention

### 3.4. Religious Beliefs and Repurchase Intention

Religions have rules that contain specific prohibitions and orders which must be obeyed by their members. This rule affects the various behaviors of adherents, including their conduct in consumption. Schiffman & Kanuk (2007) state that purchasing decisions from members of different religious groups are influenced by

their religious identity, orientation, knowledge, and beliefs. Commonly, consumer behavior is directly affected by religion in terms of products that are symbolically and ritualistically associated with their religion (L. G. Schiffman & Wisenblit, 2015). Consumers consider buying new products if they do not violate or contradict ideas that are considered sacred by their religion (Yun et al., 2008).

Explicitly, in Islam, it is clearly stated that halal food and beverage products are permitted while those which are not halal are forbidden for human consumption. Based on the argument before, the fourth hypothesis in this study is:

**H4:** Religious belief affects Repurchase Intention

## 4. Research Method

This study uses a quantitative approach. The data used are primary data collected through the distribution of questionnaires to 194 students from four campuses in Sleman district, namely Universitas Islam Indonesia, Universitas Pembangunan Nasional "Veteran" Yogyakarta, Institut Pertanian "stiper" Yogyakarta, and Universitas Amikom Yogyakarta. The type of data used in this study is cross-sectional, data collected at one particular point in time through answering questions or statements in the questionnaire (Cooper & Schindler, 2014). Measurement scales of answers in the questionnaire follow the Likert scale, consisting of 1) score 5 for strongly agree to answers; 2) score 4 for agreeing answers; (3) score 3 for neutral answers; 4) score 2 for disagreeing answers;5) score 1 for the answer strongly disagree. Finally, to test the hypothesis, the data is processed using SPSS analysis tools with multiple regression analysis techniques.

## 5. Results and Discussion

### 5.1. Profile of Respondents

Data collected from questionnaires were 194 respondents from 4 campuses in Sleman, Yogyakarta, namely Universitas Islam Indonesia, Universitas Pembangunan Nasional "Veteran" Yogyakarta, Institut Pertanian "stiper" Yogyakarta, and Universitas Amikom Yogyakarta. There were more male students in this study (56%) than female students (44%). In terms of the origin of the campus students who were respondents of this study, the distribution of questionnaires was quite evenly distributed, UII 32.47%, UPN 27.85%, INSTIPER 21.65%, and AMIKOM 18.03%. Finally, when viewed from the semester of study, most students were 5th-semester students (31.4%), the second-highest was 7th-semester students (25.8%), and followed by 3rd-semester students (22.2%). Complete information on respondents can be seen in Table 1.

**Table 1:** Demographics Data of Respondents

| Characteristics | Total | Percentage (%) |
|---|---|---|
| **Gender** | | |
| Male | 108 | 56% |
| Female | 86 | 44% |
| **Campus** | | |
| UII | 63 | 32,47 |
| UPN | 54 | 27,85 |
| INSTIPER | 42 | 21,65 |
| AMIKOM | 35 | 18,03 |
| **Semester** | | |
| 1 | 27 | 13,9% |
| 3 | 43 | 22,2% |
| 5 | 61 | 31,4% |
| 7 | 50 | 25,8% |
| 8 | 6 | 3,10% |
| 9 | 4 | 2,10% |

## 5.2. Validity Testing

A validity test is used to test whether a questionnaire is valid or not, how well an instrument was developed to measure certain concepts(Sekaran & Bougie, 2016. Testing is done by counting with the Pearson product-moment correlation formula, and the results are seen from the coefficient figures that show the results of these correlations. If the r in table r is smaller than the correlation result, then the question instrument is valid. To determine the value of r in the table the formula df (degree of freedom) is used, namely df = n – 2, in this study, there are 194 respondents, then n = 194 so df = 194-2 = 192. Based on the r table with a 5% significance, the result of r table is 0.1409. Table 2 shows the Pearson Correlation value above r table 0.1409. Therefore, it can be concluded that the instrument questions in this research variable are valid. Complete information about the validity test can be seen in Table 2.

**Tabel 2:** Validity Test Results

| Variable | Items | Pearson Correlation Value | R Table | Keterangan |
|---|---|---|---|---|
| Peceived Halal Label | LH1 | 0,688 | 0,1409 | **Valid** |
| | LH2 | 0,829 | 0,1409 | **Valid** |
| | LH3 | 0,737 | 0,1409 | **Valid** |
| | LH4 | 0,789 | 0,1409 | **Valid** |
| | LH5 | 0,810 | 0,1409 | **Valid** |
| Brand Image | CM1 | 0,786 | 0,1409 | **Valid** |
| | CM2 | 0,638 | 0,1409 | **Valid** |
| | CM3 | 0,826 | 0,1409 | **Valid** |
| | CM4 | 0,838 | 0,1409 | **Valid** |
| | CM5 | 0,738 | 0,1409 | **Valid** |
| Perceived Product Quality | KP1 | 0,671 | 0,1409 | **Valid** |
| | KP2 | 0,675 | 0,1409 | **Valid** |
| | KP3 | 0,704 | 0,1409 | **Valid** |
| | KP4 | 0,604 | 0,1409 | **Valid** |
| | KP5 | 0,677 | 0,1409 | **Valid** |
| Religious Belief | RB1 | 0,554 | 0,1409 | **Valid** |
| | RB2 | 0,719 | 0,1409 | **Valid** |
| | RB3 | 0,775 | 0,1409 | **Valid** |
| | RB4 | 0,824 | 0,1409 | **Valid** |
| | RB5 | 0,874 | 0,1409 | **Valid** |
| | RB6 | 0,824 | 0,1409 | **Valid** |
| Repurchase Intention | MBU1 | 0,707 | 0,1409 | **Valid** |
| | MBU2 | 0,712 | 0,1409 | **Valid** |
| | MBU3 | 0,828 | 0,1409 | **Valid** |
| | MBU4 | 0,849 | 0,1409 | **Valid** |
| | MBU5 | 0,844 | 0,1409 | **Valid** |

## 5.3. Reliability Testing

A reliability test is a test to measure whether a research instrument has consistency or reliability in measuring variables or constructs used in research (Neuman, 2014). Cronbach's alpha is used to measure instrument reliability in this research. The critical value of Cronbach's alpha score is ≤ 0.7 (Hair et al., 2009). Table 3 shows the Cronbach's alpha value of all variables ≥ 0.7. Thus, the instruments used in this study are reliable. The complete information about the reliability test can be seen in Table 3.

**Table 3:** Reliability Test Result

| Variable | Cronbach's Alpha | Critical Value | Keterangan |
|---|---|---|---|
| Perceived Halal label | 0,826 | 0,7 | **Reliabel** |
| Brand Image | 0,826 | 0,7 | **Reliabel** |
| Perceived Product Quality | 0,781 | 0,7 | **Reliabel** |
| Religious Belief | 0,857 | 0,7 | **Reliabel** |
| Perceived Halal label | 0,894 | 0,7 | **Reliabel** |

## 5.4. Hypothesis testing

The results of data processing using SPSS show interesting results; the perceived halal label does not significantly affect consumer repurchase intention (β = -0.018, p = 0.861> 0.05). Thus, (H1) in this study was not supported. Brand image influences consumer repurchase intention on halal food products (β = 0.516, p = 0.000 <0.05), therefore (H2) is supported. Likewise, perceived product quality influences consumer repurchase intention on halal food (β = 0.231, p = 0.011> 0.05), thus (H3) Supported. Finally, religious belief has a negative but not significant effect on consumer repurchase intention (β=-0.55,p=0.595>0.05), thus (H4) is not supported. More complete, the results of hypothesis testing can be seen in Table 4.

**Table 4:** Hypothesis Testing Results

| Variable | Coefficients of regression | Sig. | Results |
|---|---|---|---|
| Perceived Halal label - RI | -0,018 | 0,861 | **Not Supported** |
| Brand Image-RI | 0,516 | 0,000 | **Supported** |
| Perceived Product Quality-RI | 0,231 | 0,011 | **Supported** |
| Religious Belief-RI | -0,55 | 0,595 | **Not Supported** |

RI: Repurchase Intention

## 5.5. Discussion

Research on factors that influence consumers' repurchase intention on halal food products is still limited in number, especially in the Indonesian context. Therefore, this study examines the factors that influence Muslim consumers' repurchase intentions on halal food products. Four variables are hypothesized to influence the repurchase intention, namely, perceived halal label, brand image, perception of product quality, and religious belief.

Statistical test results indicate there are two supported hypotheses (H2 and H3). More specifically, this study's findings show that brand image has a positive and significant effect on consumer repurchase intention (H2). Thus, the higher the brand image, the higher the intention to repurchase consumers on halal food products. The results of this study are in line with previous research, which states that brand image influences repurchase intentions (Riki Wijayajaya & Tri Astuti, 2018; Sidi Izzudin & Novandari, 2018).

The results of this study are also consistent with previous research (Ariffin et al., 2016; Zhang et al., 2011), which states that perceived product quality influences consumer repurchase intention (H3). This result means that the higher the perceived product quality, the higher the intention to repurchase consumers on halal food products

There are two unsupported hypotheses in this study (H1 and H4). The results of the hypothesis test showed that the perceived halal label and religious beliefs did not have a positive effect on consumers' repurchase intentions on halal labeled food. This finding is interesting, generally when a person buys a halal product is influenced by the perceived halal label (Abdul Khalek & Mohd Mokhtar, 2016; Hayat Muhammad Awan et al., 2015) and their religious belief. Consumers consider buying new products if they do not violate or contradict ideas that are considered sacred by their religion (Yun et al., 2008).

In our opinion, this happens because consumers have already bought food products labeled as halal. So that when consumers are asked to repurchase the same product, they no longer make the halal label and religious beliefs as factors that influence them repurchase because they have experienced buying these food products. Their experience in buying shows that food products are halal and following the criteria of their religious teachings.

## 6. Conclusions

This research contributes to the Halal marketing literature, more specifically on the factors that affect consumers' intention to repurchase halal food in Indonesia. This study's results indicate the intention to repurchase halal-labeled food products is influenced by product factors, namely, brand image and perceived product quality. On the contrary, it is not influenced by religious factors (religious beliefs and perceived halal label).

The managerial implication in this research is halal-labeled food companies should be more focused on their brand image and perceived product quality when they want to increase consumer repurchase intentions. Because these two variables are proven in research influencing the repurchase intention of Muslim consumers on halal food. But that does not mean religious factors, such as halal labels and religious beliefs, are not necessary. These two factors are more influential on purchase intention rather than repurchase intention.

However, this research has limitations, especially in the sample involved in the study. The study only consisted of 136 student respondents. Although the number is relatively adequate for academic inquiry, the bigger figure should be addressed in future work. Finally, future studies should research why religious factors (perceived halal labels and religious beliefs) have no effect on the repurchase intention of Muslim consumers in Muslim-majority countries for halal food.

## References

Aaker, D. A. (1991). *Managing Brand Equity*. The Free Press.

Abdul Khalek, A., & Mohd Mokhtar, R. A. (2016). With or Without Halal Logo? A Descriptive Analysis of the Generation Y Perceptions on the National Halal Certification Malaysia. *Third Asia Pacific Conference on Advanced Research.* https://doi.org/10.1039/c1cs15159b

Ahadi, N., Taghipour, A., Deebhijarn, S., & Sornsaruht, P. (2017). Effects of Thai Muslim Purchasing Behavior Towards Foreign Brands Usage of the Halal Sign of Imported Goods in Thailand. *PEOPLE: International Journal of Social Sciences, 1(2), 54–65*. https://doi.org/10.20319/pijss.2015.12.5465

Alam, S. S., & Sayuti, N. M. (2011). Applying the Theory of Planned Behavior (TPB) in halal food purchasing. *International Journal of Commerce and Management, 21(1), 8–20.* https://doi.org/10.1108/10569211111111676

Ali, A., Ali, A., Xiaoling, G., Sherwani, M., & Hussain, S. (2018). Expanding the theory of planned behaviour to predict Chinese Muslims halal meat purchase intention. *British Food Journal, 120(1), 2–17.* https://doi.org/10.1108/BFJ-05-2017-0278

Anggraeni, M., Farida, N., & Listyorini, S. (2016). Pengaruh Perceived Value dan Brand Image Terhadap Repurchase Intention Melalui Word of Mouth Sebagai Variabel Intervening Smartphone Samsung Galaxy Series. *Diponegoro Journal of Social and Political of Science*.

Ariffin, S., Yusof, J. M., Putit, L., & Shah, M. I. A. (2016). Factors Influencing Perceived Quality and Repurchase Intention Towards Green Products. *Procedia Economics and Finance.* https://doi.org/10.1016/s2212-5671(16)30142-3

Awan, Hayat M., Siddiquei, A. N., & Haider, Z. (2015). Factors affecting Halal purchase intention – evidence from Pakistan's Halal food sector. Management *Research Review, 38(6), 640–660.* https://doi.org/10.1108/MRR-01-2014-0022

Awan, Hayat Muhammad, Siddiquei, A. N., Haider, Z., Sarkis, J., Sarkis, J., Alon, a, & Dwyer, P. (2015). Factors affecting Halal purchase intention-evidence from Pakistan's Halal food sector. *Management Research Review, 38(6).* https://doi.org/10.1108/MRR-01-2014-0022

Cooper, D. R., & Schindler, P. S. (2014). *Business Research Methods (12th ed.).* McGraw-Hill.

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2009). *Multivariate Data Analysis (7th ed.).* Prentice Hall.

Ishak, S., Awang, A. H., Hussain, M. Y., Ramli, Z., Md Sum, S., Saad, S., & Abd Manaf, A. (2016). A study on the mediating role of halal perception: determinants and consequence reflections. *Journal of Islamic Marketing, 7(3), 288–302.* https://doi.org/10.1108/JIMA-02-2015-0010

Jeddi, N., & Zaiem, I. (2010). The impact of label perception on the consumer's purchase intention: An application on food products. *IBIMA Business Review.*

Keller, K. L. (1993). Conceptualizing, Measuring, and Managing Customer-Based Brand Equity. *Journal of Marketing*. https://doi.org/10.2307/1252054

Mukhtar, A., & Mohsin Butt, M. (2012). Intention to choose Halal products: the role of religiosity. *Journal of Islamic Marketing, 3(2), 108–120.* https://doi.org/10.1108/17590831211232519

Na'im, A., & Syaputra, H. (2011). Kewarganegaraan, Suku Bangsa, Agama, dan Bahasa Sehari-hari Penduduk Indonesia. *Badan Pusat Statistik.* https://www.bps.go.id/publication/2012/05/23/55eca38b7fe0830834605b35/kewarganegaraan-suku-bangsa-agama-dan-bahasa-sehari-hari-penduduk indonesia.htm

Neuman, W. L. (2014). *Social research methods: qualitative and quantitative approaches (Seventh ed).* Pearson Education Limited.

Parasuraman, A., Zeithaml, V. A., & Berry, L. L. (1988). Servqual: A Multiple-Item Scale For Measuring Consumer Perc. *Journal of Retailing, 64(1), 12.* https://doi.org/10.1108/02640470210447801

Riki Wijayajaya, H., & Tri Astuti, S. R. (2018). The Effect of Trust and Brand Image to Repurchase Intention in Online Shopping. *KnE Social Sciences, 3(10), 915.* https://doi.org/10.18502/kss.v3i10.3182

Schiffman, L. G., & Wisenblit, J. (2015). *Consumer Behavior (11th ed.).* Pearson Education.

Schiffman, L., & Kanuk, L. L. (2007). *Consumer Behavior (7th ed.).* Pearson Education.

Sekaran, U., & Bougie, R. (2016). *Research methods for business: a skill-building approach (Seventh Ed).* John Wiley & Sons.

Sidi Izzudin, M., & Novandari, W. (2018). The Effect of Perceived Quality, Brand Image On Customer Satisfaction and Brand Awareness Toward Repurchase Intention. *Journal of Research in Management, 1(3), 32–43*. https://doi.org/10.32424/jorim.v1i3.44

Soleha, I., Arifin, R., & Rachmat, A. S. (2017). Pengaruh Citra Merek Dan Persepsi Label Halal Terhadap Minat Pembelian Ulang Produk Kosmetik Zoya Malang. *Journal Ilmiah Riset Manajemen, 06(2), 166–176.* http://riset.unisma.ac.id/index.php/jrm/article/view/443/478

Team of Writers of P3EI. (2013). *Ekonomi Islam. [Islamic Economics].* Rajawali Pers.

Tsiotsou, R. (2006). The role of perceived product quality and overall satisfaction on purchase intentions. *International Journal of Consumer Studies.* https://doi.org/10.1111/j.1470-6431.2005.00477.x

Yasid, Farhan, F., & Andriansyah, Y. . (2016). Factors affecting Muslim students awareness of halal products in Yogyakarta, Indonesia. *International Review of Management and Marketing, 6(4), 27–31.* https://www.scopus.com/inward/record.uri?eid=2-s2.0-84970023704&partnerID=40&md5=7d3b6f69888fb66cf45a38a7693df407

Yoga, I. (2019). Halal Emotional Attachment on Repurchase Intention. Shirkah: *Journal of Economics and Business.* https://doi.org/10.22515/shirkah.v3i1.206

Yun, Z.-S., Verma, S., Pysarchik, D. T., Yu, J.-P., & Chowdhury, S. (2008). Cultural influences on new product adoption of affluent consumers in India. *The International Review of Retail, Distribution and Consumer Research, 18(2), 203–220.* https://doi.org/10.1080/09593960701868464

Zhang, Y., Fang, Y., Wei, K. K., Ramsey, E., McCole, P., & Chen, H. (2011). Repurchase intention in B2C e-commerce - A relationship quality perspective. *Information and Management.* https://doi.org/10.1016/j.im.2011.05.003

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# Financial Inclusion Case Study: Case of Turkey

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*Abstract*

*Financial inclusion studies became a popular topic nowadays since; the new era development goals are mainly focus on the development of the under developed countries. Particularly, accessing to any form finance is called financial inclusion. Hence this study aims to examine to financial inclusion for women in Turkey. The main conclusion of the paper is that the people especially women who are in the lowest income level are more likely to be financially included to the fourth and third quartile income level. Furthermore, educated people tend to be financially included compere to the others. Lastly, age group of 25-50 are more likely to be financially included.*

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## 1. Introduction

Financial inclusion has been one of the most important determinant of development in developing countries. Simply, people who have access to financial services (deposit accounts, loans, insurance etc.) are considered as financially included and others who do not have access to these services are considered as financially excluded. There are 2.5B people around the world who are financially excluded and estimated number of people who have bank account in developed countries is more than twice of the people who have bank account in developing countries (Hanning and Jansen,2010, World Bank). Demirgunc - Kunt and Klapper (2012) also stated that, portion of the people (older than 15 years) who are financially included is less than 25% in Africa. Remaining 75% of people are using informal institutions to borrow or save.

### 1.1. Relevance and Other Studies

Being financially included is important in aggregate level as a community. Financial inclusion determinants have been one of the most researched topic in economics. Indeed, after the success of Professor Muhammad Yunus, founder of Grameen Bank, microfinance became a popular topic among researchers. Generally, financial institutions quality's is related with financial inclusion in both developed and developing countries, in particular, the importance of micro-finance institutions is much more important in developing countries. Being financially excluded also implies that people have numerous disadvantages, such as, facing with high cost of borrowing or saving (Gross et al, 2012; Barr, 2004).

A good financial system (FS) (markets or/and banks) is a key element of financial inclusion (Levine, 2004; Honohan,2008). Levine (2004) identified and summarized five key functions that a financial system provides in facilitating growth hence poverty reduction. A good FS provides 1) Mobilizing and pooling savings, 2) production information ex ante about possible investments and allocating capital, 3) Monitoring investments and exerting corporate governance, 4) Facilitating the trading, diversification, and management of risks and 5) Facilitating the exchange of goods and services (Zhuang et al, 2009).

Indeed, Turkey is one of the countries which saw the importance of financial inclusion in growth process. Thus, policy makers and politics have focused on increasing financial inclusion within the country by considering all population. Beside achieving growth, poverty reduction is another target in Turkey. Improving financial inclusion among a country level is not an easy task. There are lots of obstacles for both demand and supply side. One possible solution to these obstacles, a study by Nobel Laureate Muhammad Yunus has proved that an institution can lend to poor people without any collateral. With this success in mind, some people had a head-start to improve financial inclusion in early 1980s in Turkey. The first institution was "Foundation for The Support of Women's Work" and also known as "FSWW". FSWW was founded as a non-profit civil society organization in 1986 to support improving the quality of life and economic situation of low-income women and strengthen their leadership in local development. The foundation also subsidized by government. In July 2003, "Turkey Grameen Microfinance Program (TGMP)" was founded by the Turkish Foundation for Waste Reduction as a BOT(Build-Operate-Transfer) in partnership with Grameen Trust. So far, TGMP has disbursed over 92.4 million $ (164.5 Millions TL) to over 93,000 borrowers. TGMP currently has 90 branches throughout Turkey, with a high concentration in the higher-poverty regions of the south and east. Both FSWW and TGMP have a common target borrowers' which are women. Furthermore, there are some government banks which support micro-credit for small enterprises and poor

people as well. The common and most popular banks are; Ziraat Bank for farmers and HalkBank for enterprises.

### 1.2. Research Objective and Questions

The main purpose of this study is to examine the financial inclusion in Turkey and specifically, aims to answer following research questions:

1- Does the gender an obstacle for financial inclusion?
2- If yes, does income level of women affect her financial inclusion?

### 1.3. The Study Area- Turkey

Turkey is a transcontinental country in Eurasia, mainly in Anatolia in Wester Asia with smaller portion on the Southeast Europe. Turkey is bordered by eight countries: Greece to the west; Bulgaria to the northwest; Georgia to the northeast; Armenia, the Azerbaijani exclave of Nakhichevan and Iran to the east; and Iraq and Syria to the south. Turkey has the world's 18th largest nominal GDP and the country is among the founding members of the OECD and The G-20. By 2015, Turkey has 717.88 Billion GDP (current US$) and 78,665,835 populations in total.

## 2. Method

This part of the study describes the methodology and the sources of secondary data to be used. It also presents the econometric model and explanation of estimation method of the study.

### 2.1. Data Type and Source

Global Financial Inclusion Database (FINDEX) is a data set to be used in this study. The indicators in the 2014 FINDEX database are drawn from survey data covering almost 150,00 people in more than 140 economies, representing more than 97 percent of the world's population. The survey was carried out over the 2014 calendar year by Gallup, Inc. as part of its Gallup World Poll, which since 2005 has continually conducted surveys of approxi-mately 1,000 people in each of more than 160 economies and in over 140 languages, using randomly selected, nationally representative samples. The target population is the entire civilian, noninstitutionalized population age 15 and above (The World Bank, 2016).

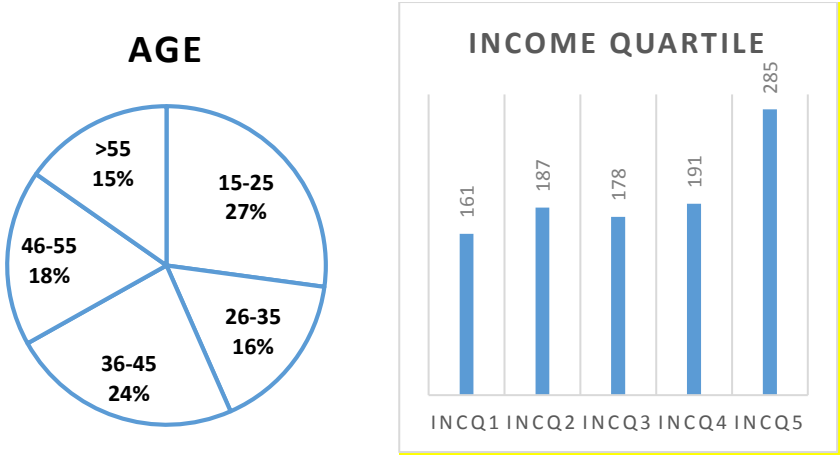
### 2.2.Descriptive Statistics

To understand and analyze the nature of the date this section illustrates some descriptive statics about independent variable.

The data set includes 1002 individuals across Turkey. People who are between the age of 15-25 are 272 which makes roughly 27%. The pie chart below gives the percentage of the individuals who belong to given age group. Similarly, there are 163,235,179 and 153 people in the age interval 26-35, 36-45, 46-55 and more than 55 respectively. The data set is nearly normally distributed, it contains 502 females

and 500 males. Thirdly, it has been assumed that, people who has education level more than secondary school considered to be educated and others who do not have education level more than secondary level considered to be uneducated. Therefore, under this assumption, percentage of people who attended the secondary school or more, is 80% and others 20%. From given results, it is clear that people in Turkey usually complete, at least secondary school. Finally, to compare income level of the respondents, the data set gives that; 16.07%, 18.66%, 17.76%, 19.06%, and 28.45% of the respondents belongs to Income Quartile 1,2,3,4 and 5 respectively. The bar chart below, also represents the number of people in each income quartile.

**Figure 1:** Descriptive Statics




**Source:** Researcher's own construct, 2017.

## 2.3. Econometric Model and Explanation Of Estimation Method

In some cases, dependent and independent variables have quantitative meaning, such as; hourly wage rate, years of education etc. In each case, the magnitude of the variable gives useful information. However, on the other hand, sometimes qualitative variables can be included in the model. For example, the gender or race of an individual or an individual has bank account or has not.

Qualitative factors often come in the form of binary information: as explained above, gender of an individual can be either male or female. The relevant information can be captured by defining a binary variable or a zero-one variable (variable can only take values 1 and 0). In econometrics, binary variables are commonly called dummy variable (Wooldridge, 2013).

In this study, Logit Model is going to be used as an estimation method. These methods also known as binary response models and are modified versions of linear probability model (LPM). The reason Logit model to be used is because LPM has some drawbacks such as, fitted probabilities can be less than zero or greater than one and the partial effect of any explanatory variable is constant (Wooldrige,2013). By using Logit estimation method, the possibility of these problems will be minimized.

The possible model for this specific research will be;

**P (Y = 1|x) = G (Age, Age2, Female, Literacy, IncQ1, IncQ2, IncQ3, IncQ4)** **(1)**

Where;

Y Represent: Financial inclusion level, or an individual has bank account or not.

$IncQ_1$represent: Within - economy household income quintile, Poorest 20%

$IncQ_2$ represent: Within - economy household income quintile, Second 20%

$IncQ_3$ represent: Within - economy household income quintile, Third 20%

$IncQ_4$ represent: Within - economy household income quintile, Forth 20%

Table 1 represents model of measurement of each variable, and expectations.

**Table 1:** Measurement of Each Variable and Expectations

| Dependent Variable | Measurement | Expectation |
|---|---|---|
| P (Y = 1\|x) | 1 or 0 | -------- |
| Independent Variable | | |
| Age | Years | Positive |
| Age2 | Years | Negative |
| Female | 1 or 0 | Negative |
| Literacy | 1 or 0 | Positive |
| IncQ1 | 1 or 0 | Negative |
| IncQ2 | 1 or 0 | Negative |
| IncQ3 | 1 or 0 | Negative |
| IncQ4 | 1 or 0 | Negative |

**Source:** Researcher's own construct, 2017.

In more specific way, Model 1 can be written as:

$$\mathbf{P(Y=1|x)= \beta_0 + \beta_1 Age + \beta_2 Age^2 + \beta_3 Female + \beta_4 Literacy + \beta_5 IncQ_1 + \beta_6 IncQ_2 + \beta_7 IncQ_3 + \beta_7 IncQ_4 + \mu} \quad \mathbf{(2)}$$

In the nature of binary response models, the primary goal is to explain the effect of the $x_j$ on the response probability $P(y = 1|x)$. (Wooldridge, 2013). Equation 2, aims to capture, at least, the part of the independent variables that affects financial inclusion. As it is not possible to include all variables in the model, the assumption will be, the error term (μ) captures other independent variables that might affect

the financial inclusion. As shown in Table 1, most of the variables that included to the model are binary independent variables which can only take values of 1 or 0. Income quartile 5, also known as richest 20% of the population has not included the model because, it considered as a base category. Therefore, each coefficient for income quartiles will give a comparison between richest 20% and given income quartile. Being female also included to model as binary independent variable, and aims to capture difference between males and female. Similarly, male has not included to model and considered as a base category for gender. Age is the only continuous independent variable in this model, however, in order to capture any diminishing effect age_sq has to be included. It is likely to observe that age has a diminishing effect on any model. Lastly, education is also considered as a dummy variable in the model. It is also possible to change education to categorical variable if the results will not significant.

## 3. Results

This section aims to provide an overview of the output which obtained from Gretl. The results that going to be discussed in this section only reflect a descriptive statistics and outcome. The detailed version of the results will be discussed in the "Discussion" section.

In overall, it has been found that, all independent variables are statistically significant at 5%. The model also gives Likelihood Ratio (LR) of 161,972 which is statistically significant at 5%. Significance of LR means that independent variables which included to the logit regression are jointly affect the probability of financial inclusion. Another important finding is that, the regression gives 0.1227 McFadden R-squared which means that, the independent variables which included to model are able to explain 12.27% of variations in probability of Financial Inclusion.

Therefore, equation (2) becomes as follows;

$$\mathbf{P(Y=1|x) = -1.558 + 0.1163Age - 0.0011Age^2 - 1.1931Female + 0.976Literacy - 0.7724IncQ_1 - 0.8837IncQ_2 - 8439IncQ_3 - 0.704IncQ_4} \quad \mathbf{(3)}$$

As mentioned before, age, age2, gender, literacy and income quintiles are all statistically significant at 5%. As expected, age has positive effect on probability of financial inclusion and age2 has negative effect on probability of FI. This relationship can be described by quadratic functions definition. As individuals grow, they reach the peak point of the FI probability, at this point an individual has the highest probability that being financially included. However, once an individual become older than that age, the probability of being financially included start to diminish hence reduce. To capture any diminishing effects, age2 has to be included

in the model. The probability of an educated male who has high income (richest 20%) is about 88.14% at the age of 32.

Secondly, being female also has a negative effect on probability of FI and this result also support the initial expectation about gender issue. The regression results show that, females are 26.40% less likely to be financially included compare to males when all other variables are fixed.

Thirdly, education is another important determinant of FI in Turkey. From given regression results, educated respondents are 23.26% more likely to be financially included compare to non-educated people, when all other variables are fixed. This result also supports the initial expectations. In terms of education, it has been assumed that people who have education level more than secondary education, considered to be educated and take value of 1, others considered to be uneducated and take value of 0.

Last but not least, it has also been found that level of income also negatively correlated with the probability of FI. Respondents who are at the lowest income quartile are 18.43% less likely to be financially included compare to highest income quartile respondents. Similarly, people in second, third and fourth income quartile are 19.86%, 20.13% and 16.69% less likely to be financially included compare to highest income quartile when all other variables fixed.

Lastly, to understand how high and low the actual population value of the independent parameter can be, confidence interval gives useful information. Table 2 illustrates the confidence interval for each coefficient. It is important to note that, confidence intervals do not reflect the marginal effects but give useful information about the direction of the marginal effect.

**Table 2:** Logit Regression

| | **Coefficient** | **P-Value** | **Slope** | **95% Conf. İnterval** | |
|---|---|---|---|---|---|
| cons | -1,5577 | 0,0033 | _ _ _ _ | -2,67709 | -0,4445 |
| Female | -1,193 | 0 | -0,264 | -1,479 | -0,9071 |
| Age | 0,1163 | 0,0001 | 0,0263 | 0,0688 | -0,1637 |
| Age_sq | -0,0011 | 0 | -0,0003 | -0,0017 | -0,0006 |
| Edu | 0,976 | 0 | 0,2326 | 0,6044 | 1,3476 |
| lncQ1 | -0,7724 | 0,0009 | -0,1843 | -1,2277 | -0,3171 |
| lncQ2 | -0,8337 | 0,0002 | -0,1986 | -1,2865 | -0,3809 |
| lncQ3 | -0,844 | 0,0002 | -0,2013 | -1,2847 | -0,4033 |
| lncQ4 | -0,704 | 0,00012 | -0,1669 | -1,1271 | -0,2808 |
| McFadden R-squared | | | 0,1227 | | |
| LR test | | | 161,972 | | |
| Correctly predicted | | | 674(67,3%) | | |

**Source:** Researcher's own construct, 2017.

## 4. Discussion

As a main objective of this study, the aim is to identify whether women face with financial exclusion in Turkey or not. Furthermore, study aims to answer whether income level of women related to financial inclusion. In other words, the study seeks to answer how likely is a low income woman tends to be financially included.

The estimated Logit model gives an idea about these issues. It has been found that women tend to be less likely to have a bank account hence financially included in Turkey compare to men. From given results, as discussed in former section, women are 26.40% less likely to have a bank account. This finding is consistent with study done by Olga Tomilova, 2015. Tomilova 2015, reported that, number of women among account holders is about 44% while number of men who have bank account is 69%. This finding clearly answers the first hypotheses question.

In terms of income level, it has been found that income level has negative effect on financial inclusion for both females and males. Second and third poorest income levels have the biggest negative effect on financial inclusion. Poorest income group tend to be less likely to be financially excluded compare to second and third income quartile groups. This finding might sounds odd but in practice it is true and consistent with Tomilova, 2015. In 2014, Turkey launched the development of the "Financial Inclusion Strategy" which aims to improve access to finance for youth and vulnerable groups such as women and migrants (Tomilova, 2015). These people, mainly, form the poorest 20% and since the "Financial Inclusion Strategy" focuses on these groups, it is possible to say that the regression results are acceptable for income level.

In overall, income level of women is negatively correlated with probability of financial inclusion in Turkey. If a woman belongs to second and third income level, she is 20% less likely to have an account when all other variables are fixed.

On the other hand, education as a second important element of the estimated model is significant at 5%. Education increases probability of financial inclusion by 23.26% which is the second highest marginal effect among independent variables. However, as discussed former section, education variable considers people who have education at secondary level or more as educated or vice versa. Therefore, the given coefficient only captures the marginal effect of education in aggregate level rather than in detail so it can be discussed further but since the aim of this study addressed to gender and income level issues, education will not be reassessed in this study.

Secondly, an additional test has been done in order to check, if independent variables are simultaneously significant or not. To carry out this, "Wald test" has been done with Gretl. As a result of the test, null hypothesis rejected and

independent variables are not simultaneously equal to zero. Therefore, removing an independent variable from the model means that the predicted value of Financial Inclusion will be less accurate.

On one hand, heteroscedasticity could be a serious problem for logit model, since it renders parameter estimates inconsistent. Moreover, because logit model is usually estimated with cross-section data, it is a problem which is likely to be encountered quite often. On the other hand, heteroscedasticity cannot properly be tested but some forms of LM tests can be used test for heteroscedasticity. However, these tests can behave very differently from each other, therefore, heteroscedasticity cannot properly be identified in logit models (Davidson and MacKinnon,1984).

Lastly, there could be some database specific limitations to this study. Indeed, Demiguç - Kunt and Klapper, (2012) have reported that "indicators based on data collected from financial service providers have several important limitations". First, regulated financial institutions supply the data and thus this give fragmented view of financial access. However, Global Findex database formed via individual respondents from segments of the population across 148 economies hence this give a broad overview of the data. Therefore, first limitation does not seem as a problem for this study. Second, aggregation can be misleading because of multiple accounts or dormant account. Multiple accounts are common in worldwide, for example, an individual could have saving accounts at more than one institution, hence, it is possible to overestimate per capita account hence financial inclusion. This option does not seem as a problem for this study since the data reflects individual respondents. In contrast, some people could have joint ownership of an account, which could lead to underestimation of per capita account. Indeed, this could be a possible limitation for this study, for example, if data collected from a couple who has one joint ownership of an account, both female and male are likely to report that, they have an account. But, it is also possible to argue that, she has been forced by her husband to apply a loan account (ie. some institutions give loans to females easier than males) but she does not have an access to finance for herself hence could be classified as financially excluded in practice. But, in the regression this possibility will increase probability of FI for females. Therefore, it is difficult to measure the net effects of these kind of problems.

To conclude, all independent variables found to be jointly significant in this study, but there are some database specific limitations which discussed above. These limitations cannot be solved by using econometric tools, but more complex models might give more accurate result. Global Findex database is the best available secondary data for this kind of studies. Therefore, it is fair to say that, database specific limitations have been minimized.

## 5. Conclusion and Recommendations

This paper aims to answer two main questions about financial inclusion in Turkey. In other words, it seeks to find if women are financially excluded or not in Turkey. The Global Findex database (2014) has been used as a secondary data source. Global Findex is the most reliable database among others and it gives data about financial inclusion indicators for 140 countries.

In overall, it has been found that women are 26.40% less likely to be financially included in Turkey. Indeed, World Bank and Tomilova (2015) have reported that 44% of women are financially included while 69% of men are financially included in Turkey. Moreover, income level also plays important role on financial inclusion. Regardless the gender of a person, people who are in the poorest income quartile are 18.43% less likely to be financially included compare to richest 20% of the population. However, an interesting finding is that, second and third 20% income levels are found to be the most financially excluded groups. Both second and third 20% of the people are nearly 20% less likely to be financially included compare to richest 20%. At this point, it is possible to make few recommendations for those groups who are less likely to be financially included. The possible recommendations are as follows:

- These people are usually active workers at the younger ages (20-55) therefore more likely to be financially included at those ages. However, when they became older, they do not earn as much as money as before so they became more likely to be financially excluded. At this point, government or other authorities should support these people by making access to finance easy. Government could expand micro finance institutions to wider sections of the population rather than only poorest 20%.
- There should be some saving banks within the country. The main objective of these banks should be help the people to save for their future, so older people can enjoy their retirement.

To conclude, nearly more than the half of the women are financially excluded in Turkey and there is a significant difference between females and males. However, this gap is relatively small compare to other developing countries and probably will decrease in the future.

## References

Barr, M. (2004). Banking the Poor, *Yale Journal of Regulation*, 21(1), pp. 121–237.

Davidson, R. and MacKinnon, J.G. (1984). Convenient specification tests for logit and probit models, *Journal of Econometrics,* 25(3), pp. 241–262.

Demirguc-Kunt, A. and Klapper, L. (2012). *Measuring financial inclusion: The global Findex database.* The World Bank.

Gross, M. and Hogarth, J. (2012. *Use of Financial services by the Unbanked and Underbanked and the Potential for Mobile Financial Services Adoption. Board of Governors of the Federal Reserve System.* Federal Reserve Bulletin, 9 (4).

Group, T.W.B. (2016). Global financial inclusion (global Findex) database. Available at: http://data.worldbank.org/data-catalog/financial_inclusion (Accessed: 28 February 2017).

Hannig, A. and Jansen, S. (2010). Financial inclusion and financial stability: Current policy issues, *SSRN Electronic Journal*.

Honohan, P. (2008). Cross-country variation in household access to financial services, *Journal of Banking & Finance*, 32(11), pp. 2493–2500.

Levine, R. (2004). Finance and Growth: Theory and Evidence. *NBER Working Paper* No. 10766, National Bureau of Economic Research, Cambridge, MA. Available: www.nber.org/papers/ w10766.

Tomilova, O. (2015). *Progress and opportunities for financial inclusion in Turkey*. Available at: http://www.cgap.org/blog/progress-and-opportunities-financial-inclusion-turkey (Accessed: 22 February 2017).

Wooldridge, J.M. (2013). *Introductory econometrics: A modern approach*. 5th edn. Melbourne: South-Western College Publishing.

Zhuang, J., Gunatilake, H.M., Niimi, Y., Khan, M.E., Jiang, Y., Hasan, R., Khor, N., Martin, A.L., Bracey, P. and Huang, B. (2004). Financial sector development, economic growth, and poverty reduction: A literature review, *SSRN Electronic Journal, .*