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CONTENT

THE US FISCAL MULTIPLIER AND INCOME-DRIVEN TAXES AND IMPORTS

Samih Antoine Azar
Haigazian University, Faculty of Business Administration & Economics, Mexique Street, Kantari, Beirut, Lebanon.
samih.azar@haigazian.edu.lb , ORCID: 0000-0003-4111-797X

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ABSTRACT

Purpose – This paper aims to develop an equation for the government budget multiplier that does not require the input of the marginal propensity to consume. In parallel, the paper computes from this equation the actual value of the budget multiplier for the US.
Methodology – The paper starts from the premise that taxes and imports are income-driven, and that the level of investment is equal to the level of saving. This leads to a theoretical model that is characterized solely by two parameters: the marginal income tax rate, and the marginal propensity to import. Noteworthy the marginal propensity to consume does not appear in the equation. Subsequently, the paper estimates the empirical marginal income tax rate by regression analysis, and the marginal propensity to import by relying on general import demand functions, the latter in order to avoid having an omitted variable bias with a simple linear regression.
Findings – The paper finds that the theoretical balanced budget multiplier is nil while the straight multiplier is demonstrated to be equal to the ratio of the sum of the marginal income tax rate to the marginal propensity to consume. The analysis shows that the US multiplier is estimated to be between 2.27 and 3.20, depending upon the empirical results.
Conclusion – The paper concludes that the marginal propensity to consume is not needed for identifying the government multiplier. Only the marginal tax rate and the marginal propensity to import are needed. And although the balanced budget multiplier is demonstrated theoretically to be zero, the straight fiscal multiplier is found to be higher than the usual in classic models, but more in line with the recent empirical findings. Governments have therefore a powerful policy tool, and investment in infrastructure and in scientific research are forecast to be unequivocally effective. At the very least, this is true unmistakably in theory.

Keywords: Fiscal multiplier, balanced budget multiplier, marginal propensity to import, marginal income tax rate, USA
JEL Codes: E62, F41

1. INTRODUCTION

Public authorities have a panoply of policies to enhance the well-being of their people. Among these is fiscal policy, which is one of the most visible and widely scrutinized policy. Governments choose the size and composition of their expenditures, and conduct the imposition and collection of taxes. For macroeconomists fiscal policy is understood to consist of affecting final output by controlling the level of government spending or taxes. The inherent notion is that a given change in spending (taxation) propels (reduces) aggregate income. The relation is described by a multiplier effect, which means that the national aggregates change by a multiple of the change in spending. By definition a multiplier is a figure higher than 1, and this is a condition for success for fiscal policy, and determines the extent of its effectiveness. If the multiplier is higher than 1 spending on public works and infrastructure, or on any other similar stimuli, are worthwhile, and will spur growth. The question, which is addressed in this paper, is how much is the US fiscal multiplier? A related question is how can this multiplier be measured without resorting to the marginal propensity to consume (MPC)? Is there an alternative method to the use of the MPC? Finally, what is the magnitude of the balanced budget multiplier, or the actual impact from additional spending, occurring with an equal amount of additional income or distortionary taxes. Answers to these questions will be proposed.

In the second section, the paper lists some of the literature on the topic. There are 3 parts: a survey of the literature on the multiplier, a survey of empirical import demand functions, and an account of the Lebanese experience. In section 3, a

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theoretical model for the multiplier, that is characterized by the absence of the marginal propensity to consume (MPC), but to depend on the marginal tax rate (t), and the marginal propensity to import (m). What is left to do is estimating the two parameters t and m. This is done in the following section, section 4. Subsection 4.1 is for t, and subsection 2 is for m. Section 4 ends with the computation of the US fiscal multiplier implied by the theoretical model developed in section 3. Section 5 is the conclusion.

2. LITERATURE SURVEY

A brief purview of the literature on the spending multiplier, that has appeared in the last decade, is offered now. On the theoretical front, Christiano et al. (2011) have argued, by using a new Keynesian model, that the government spending multiplier is "large" when there is a zero lower bound on the nominal interest rate. Empirically, Qazizada and Stockhammer (2015) have disputed this fact. However, they find that the multipliers are much higher in contraction episodes, relative to expansion ones. They ascribe that to a Keynesian legacy. Owyang et al. (2013) have surprisingly not reported a differential multiplier for periods of high unemployment or slack in the economy. By contrast, Gabriel et al. (2020) have studied the Eurozone, and they concluded from their sample that the multiplier is between 1.9 and 2.9 and that it is indeed larger in recessions. Bernardini et al. (2020) concur with this proposition, and they state that the multiplier can reach 4, in times of recession. Evidence that a higher level of private nonfinancial debt produces greater multipliers is presented in Bernardini and Peersman (2018). And Fritsche et al. (2021) document that the multiplier is relatively small for economies witnessing high volatility.

Table 1 lists a series of research papers on the subject of the marginal propensity to import. The intent of the literature was in fitting an import demand function. However, a byproduct of this is an estimate of m. If m needs to be evaluated the ceteris paribus condition must prevail and all variables that determine imports should be considered. This explains why in this paper no disaggregate regressions of expenditures are utilized because it becomes difficult to retrieve a value for m. The explanatory variables for the import demand function, from which the marginal propensity to import (m) is estimated, are GDP, DEF (GDP deflator), and IMPDEF (imports price index). To this list is added the variable TAX. See Table 1 for some of the literature. It is noticeable that there are papers on almost total countries.

As an introduction to the empirics a related research paper applied to Lebanon is summarized (Azar, 2021a). To ensure the robustness of the results 8 different econometric procedures were applied in this study. The two crucial models are the regressions of taxes and imports over aggregate output. The slopes of these models are the estimates of t and m. The paper lists estimates from annual and monthly samples. What is remarkable in the estimates is the statistical precision of the two parameters. Whatever the sample frequency, whatever the size of the samples, and whatever the econometric procedure the results come very close. With annual samples the marginal propensity to tax is between 0.1545 and 0.1714, and the marginal propensity to import is between 0.5038 and 0.5217. These ranges are small, exact, and reasonable, because Lebanon experiences a relatively low proportion of income taxes and is a highly open economy. The implied spending multiplier is between 1.411 and 1.519, and has an average of 1.470. With monthly samples the marginal propensity to tax is between 0.1651 and 0.1816, and the marginal propensity to import is between 0.4572 and 0.4755. Again these ranges are small, exact, and reasonable. The implied spending multiplier is between 1.542 and 1.594, and is on average 1.561. Overall the grand average is 1.515.

Table 1: Some Literature on Import Demand

Author(s)	Variables	Country	Econometric procedure	Elasticities
Arize & Walker (1992)	P^f, P^d, Y, E	Japan	Engle-Granger 2-step test	1.22, 1.306, 1.17, 0.988, -0.50, -.33
Doroodian et al. (1994)	$P^f/P^d, Y$	KSA	Lag of dependent variable	0.47, 2.86, -1.45
Dutta & Ahmed (1999)	$P^f/P^d, Y, R$	Bangladesh	ECM UECM	1.63, 2.58
Tang & Nair (2002)	$P^f/P^d, Y$	Malaysia	Cointegration & Bounds test	1.267, 1.06
Matsubayashi & Hamori (2003)	$P^f/P^d, Y$	G7	Engle-Granger 2-step test	None
Tang (2004)		ASEAN-5	Cointegration	None
Islam & Hassan (2004)	$P^f/P^d, Y, R/Y$	Bangladesh	Cointegration Johanssen & Juselius	1.833, 0.542, -0.401

Tsionas & Christopoulos (2004)	$P^f/P^d, Y$	5 industrials	DOLS, FM	0.98-2.43, 0.07-1.54
Narayan & Narayan (2005)	$P^f/P^d, Y$	Fiji	ARDL, DOLS, & Bounds test	1.89-1.85, 0.07-1.54
Chang et al. (2005)	$P^f/P^d, Y$	South Korea	Bounds test & ECM	1.86, 0.20
Kalyoncu, (2006)	$P^f/P^d, Y$	Turkey	Cointegration, ECM	-0.88, 1.07
Katsimi & Moutos (2006)	$P^f/P^d, Y, REER$	US	Cointegration	1.98, -0.35
Ozturk and Acaravci (2009)	$P^f/P^d, Y$	Latin America & Caribeans	Panel cointegration	1.38 -0.7
Emran & Shilpi (2010)	$P^f/P^d, C$	India Sri Lanka	ARDL	
Chani et al. (2011)	$P^f/P^d, C, I, X$	Pakistan	Johansen & Juselius	2.67, -0.14
Yin & Hamori (2011)	$P^f/P^d, Y$	China	ARDL	1.524-2.661, 0.34-0.397
Hibbert et al. (2012)	$P^f/P^d, Y, R, V$	Jamaica	Cointegration, ECM	0.68-5.8, 0.93-2.4
Doroodian et al. (2015)	P^f, P^d, C, I, X	Turkey	ARDL Bounds test	-0.065
Hor et al. (2018)	$P^f/P^d, C, I, X, E$	Cambodia	ARDL	-0.252
Yoon & Kim (2019)	P^f, P^d, C, I, X, G	US	Cointegration, ECM, & Johansen Juselius	0.91, 0.28
Katuria & Kumar (2021)	$P^f/P^d, C, I, X, E$	India	Non-linear ARDL Bounds test & cointegtaion	0.77-1.78, 0.2-0.286

Notes: P^f is import price; P^d is domestic price; P^f/P^d is the ratio of foreign price to domestic price; Y is aggregate output; C, I, X are respectively consumption, investment and exports; , E is the foreign exchange rate; R is foreign reserves; $REER$ is the real effective foreign exchange rate; and V is a measure of volatility.

3. THE MODEL

The usual macroeconomic accounting identity is stated as:

$$Y \equiv C + I + G + X - M \tag{1}$$

Where Y is output, C consumption, I investment, G government spending, X exports and M imports. The levels of G and X are considered autonomous and exogenous. The behavior of the household is to choose consumption out of the amount of disposable income. If t is the income tax rate, then total taxes are tY. Hence:

$$C = c_o + c(Y - tY) \tag{2}$$

where c is the marginal propensity to consume and is less than 1, and c_o is autonomous consumption. In this model, investment equals saving:

$$I = S \tag{3}$$

And saving is described by the following behavioral function out of disposable income, given that what is not consumed is saved.

$$S = s_o + s(Y - tY) = s_o + (1 - c)(Y - tY) \tag{4}$$

Also it is assumed that output Y drives imports:

$$M = m_o + mY \tag{5}$$

With m being the marginal propensity to import. Replacing all the above equations (2), (3), (4), and (5) inside the first identity (1) one obtains the following equilibrium relation:

$$Y = \alpha_o + c(1 - t)Y + (1 - c)(1 - t)Y + G + X - mY \tag{6}$$

Where α_o is total net autonomous spending. Moving the terms in Y in equation (6) to the left hand side of the equation, and solving for Y, then one finds:

$$Y = \frac{a_o + G + X}{1 - c(1-t) - (1-c)(1-t) + m} = \frac{a_o + G + X}{t + m} \tag{7}$$

The spending multiplier is hence $1/(t+m)$, which is the inverse of the sum of the marginal propensities to tax and to import. This multiplier applies also to autonomous exports X, and to other autonomous expenditures. If exports go up, then the economy will grow by the same multiple. This result does not necessitate the measurement of the marginal propensity to consume c, which is usually difficult to measure.

Using equation (7) one can solve for the balanced budget multiplier where the additional government spending is covered by additional taxes. Hence t is made higher. First, the full derivative of equation (7) with respect to the tax rate t and to government spending G is made equal to:

$$\Delta Y = -\frac{a_o + G + X}{(t+m)^2} \Delta t + \frac{1}{(t+m)} \Delta G = -\frac{Y}{(t+m)} \Delta t + \frac{1}{(t+m)} \Delta G = -\frac{Y \Delta t}{(t+m)} + \frac{1}{(t+m)} \Delta G \tag{8}$$

If the budget is balanced, then the change in spending is equal to the change in taxes:

$$\Delta G = \Delta t Y = Y \Delta t + t \Delta Y \Rightarrow Y \Delta t = \Delta G - t \Delta Y \tag{9}$$

Replacing the last term of equation (9) into (8) the balanced budget multiplier becomes as follows and is found to be equal to zero:

$$\Delta Y = -\frac{1}{(t+m)} (\Delta G - t \Delta Y) + \frac{1}{(t+m)} \Delta G = \frac{1}{t+m} t \Delta Y \tag{10}$$

$$\Delta Y - \frac{1}{t+m} t \Delta Y = \Delta Y \left(1 - \frac{t}{t+m} \right) = 0 \quad \text{which implies that } \Delta Y = 0 \tag{11}$$

In the literature the fiscal multiplier is calculated as follows, with the same model except that equation (3) is not imposed:

$$Y = \frac{a_o + G + X}{1 - (1-t)c + m} \tag{12}$$

which is equivalent to equation (7) if c=1. In fact, c is very close to 1, and has been estimated lately at around 0.918605 (Azar, 2021b).

4. THE EMPIRICAL RESULTS

Real tax receipts (TAX), real GDP (GDP), real imports (IMP), real government expenditures (GOV), the level of market stock prices (STOCK), and the ratio of the GDP deflator on the imports price index fail all Phillips-Perron stationarity tests in levels but are stationary in first differences. These data are quarterly and vary between 1947Q1 to 2021Q2, with 296 observations, except STOCK which is available from 1960Q1 to 2021Q2, with 246 observations, and the series are all retrieved from the web page of the Federal Reserve Bank of Saint Louis (FRED).

4.1. Estimating the Tax Rate t

Since the purpose is to measure the marginal tax rate, or the marginal propensity to tax out of income, the first candidate to be an explanatory variable is GDP. The selected control variables are imports (IMP), government spending (GOV), and the stock market (STOCK). The relation between these four explanatory variables against the amount of tax receipts is estimated by the ARDL method (Auto Regressive Distributed Lag). The F-bounds test has a value of 7.270, well above the critical value at 1% of 4.787 for a finite sample of 80. Therefore, the five variables are co-integrated. The slope of the long run estimate of the marginal tax rate is 0.2324. There is no short run estimate. Other results are in Tables 2 and 3.

There are no short run estimates for GOV, and for STOCK (Table 3). As for the short run slopes on the current IMP variable (0.3027) and its quarterly lag (0.1488) they sum up to 0.4515 (Table 4). The long run effect of IMP on TAX is -0.3510, that for GOV is -4.5146, and for STOCK is 6.2559 (Table 3). It is unclear why the two long run slope estimates on IMP and GOV are negative. One can say that the higher are imports, the lower is output, and hence the lower are income taxes. Similarly, the higher is public spending, the higher are interest rates, the lower is consumption and investment, the lower is aggregate output, and the lower are income taxes. This is referred to as a crowding-out. The impact of STOCK measures a wealth effect, and is understandably positive. All four variables enter the long run regression with statistical significance with the highest p-value at 0.0040 (Table 3). The speed of adjustment to the long run takes around 1.16 years, which denotes a fast speed.

There is evidence of a break in the GDP series. The Quandt-Andrews unknown breakpoint test for a 15% trimming indicates a significant break on 1994Q1. The test involved 239 comparisons. A categorical variable is constructed that takes the value 1 from 1947Q1 till 1993Q4, and zero otherwise. This variable is multiplied interactively with GDP, producing two interactive

variables on GDP, and the same regression is re-estimated. The results (Tables 4, and 5) are very close to the previous evidence in Tables 2 & 3.

Table 2: Co-Integration and Long-Run Regression of TAX on GDP, IMP, STOCK and GOV by ARDL Estimation

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP	0.232422	0.015129	15.36290	0.0000
IMP	-0.350961	0.126629	-2.771570	0.0060
STOCK	6.255912	2.214364	2.825150	0.0051
GOV	-4.514573	1.522088	-2.966039	0.0033
C	-91.80539	72.33138	-1.269233	0.2056

Table 3: Error-Correction (EC) Model of the Regression in Table 1 by ARDL Estimation

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-19.74301	4.438523	-4.448104	0.0000
D(TAX(-1))	-0.097979	0.059556	-1.645169	0.1013
D(TAX(-2))	0.233503	0.050670	4.608303	0.0000
D(TAX(-3))	0.188044	0.052385	3.589670	0.0004
D(IMP)	0.302698	0.051675	5.857753	0.0000
D(IMP(-1))	0.148762	0.053038	2.804835	0.0055
EC(-1)	-0.215053	0.032517	-6.613528	0.0000
R-squared	0.423235	Mean dependent variable		12.15505
Adjusted R-squared	0.408756	S.D. dependent variable		54.67141
S.E. of regression	42.03815	Akaike info criterion		10.34307
Sum squared residual	422362.3	Schwarz criterion		10.44282
Log likelihood	-1265.198	Hannan-Quinn criterion		10.38324
F-statistic	29.23009	Durbin-Watson stat		2.053651
Prob. (F-statistic)	0.000000			

Table 4: Co-integration and long run regression of TAX on GDP, IMP, STOCK, and GOV, by ARDL Estimation, including interactive dummies (DUM)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP*DUM	0.237573	0.015735	15.09802	0.0000
GDP*(1-DUM)	0.232306	0.014691	15.81232	0.0000
IMP	-0.382551	0.128794	-2.970246	0.0033
STOCK	6.211408	2.149069	2.890278	0.0042
GOV	-4.559965	1.477361	-3.086561	0.0023
C	-81.20887	71.11336	-1.141964	0.2546
R-squared	0.425260	Mean dependent variable		12.15505
Adjusted R-squared	0.410831	S.D. dependent variable		54.67141
S.E. of regression	41.96431	Akaike info criterion		10.33956
Sum squared residual	420879.7	Schwarz criterion		10.43930
Log likelihood	-1264.766	Hannan-Quinn criterion		10.37972
F-statistic	29.47337	Durbin-Watson stat		2.055506
Prob. (F-statistic)	0.000000			

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The relation between these five explanatory variables is estimated by replacing GDP with the two interactive GDP variables, which are defined with the categorical variable, against the amount of tax receipts and the whole system is estimated by ARDL (Auto Regressive Distributed Lag). The F-bounds test has a value of 6.3443, with a critical value of 4.587 at the 1% marginal significance level. The marginal tax rate is 0.2376 before 1994Q1 and 0.2323 after. There is no short run estimate. Other results are in Tables 4 and 5. There are no short run estimates for GOV, and STOCK (Table 5). As for the short run slopes on the current IMP variable (0.2897) and its quarterly lag (0.1475) they sum up to 0.4372 (Table 5). The long run effect of IMP on TAX is -0.3826, that for GOV is -4.5600, and for STOCK is 6.2114 (Table 4). It is unclear why the two long run slope estimates on IMP and GOV are negative, but can be rationalized as above. However, all five variables enter the long run regression with statistical significance with the highest p-value at 0.0020 (Table 4). The speed of adjustment to the long run takes around 1.129 years, which denotes a fast speed.

Table 5: Error-Correction (EC) Model of the Regression in Table 4 by ARDL Estimation

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-17.99067	4.214700	-4.268553	0.0000
D(TAX(-1))	-0.094430	0.059535	-1.586133	0.1141
D(TAX(-2))	0.234988	0.050604	4.643617	0.0000
D(TAX(-3))	0.189010	0.052301	3.613906	0.0004
D(IMP)	0.289737	0.052412	5.528029	0.0000
D(IMP(-1))	0.147431	0.052951	2.784302	0.0058
EC(-1)	-0.221536	0.033122	-6.688404	0.0000

4.2. Estimating the Marginal Propensity to Import (m)

Table 1 lists a series of research papers on the subject of the marginal propensity to import. The intent of the literature was in fitting an import demand function. However, a byproduct of this is an estimate of m. If m needs to be evaluated the ceteris paribus condition must prevail and all variables that determine imports should be considered. This explains why in this paper no disaggregate regressions of expenditures are utilized because it becomes difficult to retrieve a value for m. The explanatory variables for the import demand function, from which the marginal propensity to import (m) is estimated, are GDP, DEF (GDP deflator), and IMPDEF (imports price index). To this list is added the variable TAX. See Table 1 for some of the literature. It is noticeable that there are papers on almost total countries.

In the literature the TAX variable is omitted. A linear relation is postulated. The regression's co-integration test, with variables in levels, do not support co-integration. Therefore, the regression was estimated with first differences of the variables. It is expected that the coefficient on ΔGDP is an estimate of the marginal propensity to import (m), and is positive with a value between 0 and 1. The coefficient on ΔDEF is expected to be positive because local consumer goods are substitutes to imports, and the coefficient on ΔIMPDEF is negative, because of an own price effect. The coefficient on ΔTAX is found to be positive, for no obvious reason. Higher taxes reduce GDP, which reduces imports. Therefore, the relation is negative. Moreover, higher taxes reduce interest rates, which induces a capital outflow, and a depreciation of the dollar, and this leads to encourage exports, and discourage imports, and the relation is still negative. However, because of the crowding-in effect of lower interest rates, investment is higher, leading to an increase in GDP and consequently in imports, and the relation is positive. It seems that the net effect is a positive relation. The regression results, by applying robust least squares, are in Table 7. The signs of all three variables, ΔGDP, ΔDEF, and ΔIMPDEF, are according to expectations. The marginal propensity to import (m) is estimated to be 0.09689, an estimate which denotes that the US is relatively a closed economy. All coefficients are statistically highly significant with a p-value less than 0.00005.

Table 7: Robust Least Squares of real imports as a function of GDP, TAX, DEF, and IMPDEF
      (All variables are in first differences)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-2.015106	1.121729	-1.796429	0.0724
D(GDP)	0.096892	0.004844	20.00279	0.0000
D(TAX(-1))	0.131988	0.013375	9.868179	0.0000
D(DEF)	17.08119	2.736884	6.241108	0.0000
D(IMPDEF)	-5.872272	0.426743	-13.76066	0.0000

Robust Statistics			
R-squared	0.228107	Adjusted R-squared	0.217497
Scale	13.21473	Deviance	174.6290
Rn-squared statistic	699.9081	Prob. (Rn-squared stat.)	0.000000
Non-robust Statistics			
Mean dependent variable	11.77068	S.D. dependent variable	54.33318
S.E. of regression	44.72904	Sum squared residual	582199.8

When the same regression is estimated by replacing GDP with the two interactive GDP variables, which are defined with the same categorical variable as above, the results are in Table 8. Two estimates of the marginal propensity to import are obtained. The first one for the period before 1994Q1, and which equals 0.08035. The second is for the period after 1994Q1, and which is 0.20971. It seems that the US has witnessed a gradual increase in trade and openness. All other coefficients have the correct expected sign, and are highly statistically significant, with the smallest p-value being less than 0.00005.

Table 8: Robust Least Squares of Real Imports of the Regression in Table 5, including interactive dummies (DUM)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-1.514483	1.162575	-1.302697	0.1927
D(GDP)*DUM	0.210169	0.004783	43.94136	0.0000
D(GDP)*(1-DUM)	0.082116	0.013705	5.991598	0.0000
D(TAX(-1))	0.068471	0.012845	5.330475	0.0000
D(DEF)	16.18804	2.654213	6.098996	0.0000
D(IMPDEF)	-4.766585	0.409322	-11.64507	0.0000

Robust Statistics			
R-squared	0.269024	Adjusted R-squared	0.256421
Scale	12.55752	Deviance	157.6914
Rn-squared statistic	2337.076	Prob. (Rn-squared stat.)	0.000000
Non-robust Statistics			
Mean dependent variable	11.77068	S.D. dependent variable	54.33318
S.E. of regression	33.06920	Sum squared residual	317135.9

4.3. Estimates of the US Fiscal Multiplier

The estimate of the tax rate in the previous subsection 4.2 is close to 0.23. The estimate of the marginal propensity to import is on average 0.097, but is lower at 0.0804 for the period before 1994Q1, and is higher at 0.210 for the following period. Therefore, there are three estimates for the sum t+m. These are 0.327 on average, 0.314 for the period before 1994Q1, and 0.440 for the period after 1994Q1. The implied government spending multipliers are: 3.054, 3.185, and 2.273. The latter figure is low because of a higher amount of import leakage. These figures are compared against the multiplier that includes the MPC. The latter is based on the following equilibrium equation (Equation (12)), and is repeated here:

$$Y = \frac{a_o + G + X}{1 - (1-t)c + m} \tag{12}$$

The three estimates are: 1.614, 1.648, and 1.365, which are substantially lower than the estimates in this paper. It is as if the multiplier in the literature is understated.

5. CONCLUSION

This paper attempts to develop an alternative derivation of the government budget multiplier, and to provide for estimates for the US. The paper has two parts. Both parts are about the fiscal budget. The first part is theoretical and aims to find a fiscal multiplier that does not depend on the marginal propensity to consume, and the second part is empirical, through estimating the multiplier for the US. The theory revolves on the equality between saving and investment, starts from the premise of income-driven income taxes and imports, and produces the fiscal multiplier without resorting to the marginal propensity to consume. The empirics delve on estimating, for the US, the two crucial parameters in the model's formula, which are the marginal income tax rate and the marginal propensity to import. The multiplier equals the ratio of the sum. On the negative side the model predicts a zero figure for the balanced budget multiplier. In the statistical literature a low such multiplier is the norm, which means that a zero figure is not preposterous. However, the paper delivers a multiplier that is higher than what is usually specified, and stands at around 3, and maybe less, but no less than 2. Government investment in infrastructure and in research activities are deemed to be quite worthwhile at least theoretically. An avenue for future research is to apply the paper's model to other countries, both developed and developing. In this way the model will be more vindicated. One limitation to all studies of fiscal multipliers is that the actual multiplier is difficult to gauge because of policy, implementation, and political lags, and because there is no way to disentangle the effect of the government expenditures from other economy-wide shocks that occur simultaneously in the interim. Maybe it is for this reason that the estimated multiplier in some of the literature is way below the predicted value in this paper. However, recent applied research, especially during and after the zero lower bound of nominal interest rates, has found even higher multiplier than the one in this paper.

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A NOVEL APPROACH TO THE FINANCIALIZATION OF REAL SECTOR

Bulent Hoca
Istanbul Okan University, Department of International Trade, Tuzla Campus, Istanbul, Turkey.
bulent.hoca@okan.edu.tr, ORCID: 0000-0001-9093-9887

ABSTRACT

Purpose- Finance is a very important sector both for real sector, economic growth and development, and as a potential source of instability. The relatively new term of financialization is used to denote the increasing role of finance in the economy. In this context, our main purpose is to make a novel contribution to the explanation of the financialization of the real sector. Literature points out the profitability problem of real sector in the crisis of 1970s and ensuing political, legal and institutional changes described as neo-liberalism. Hence, we investigate the relationship between profit rate and financialization of real sector and we argue a long-term relationship between them that goes beyond the crisis of 1970s.
Methodology- We constructed profit rate series and financialization series starting from 1948 for real sector in the USA, because it is the country providing the longest and most detailed data. Since the series are integrated of different orders, the ARDL Bounds Test approach is used to test the long-term relationship between profit rate and ratio of financial assets in total assets as a measure of financialization.
Findings- The results indicate that there is a long-term relationship between financialization and profit rate. Also, the relationship is negative. Thus, profit rate decreases are related to increased ratio of financial assets in total assets in long-term.
Conclusion- Our results imply that confronting profitability problem real sector directs its sources to finance. Despite the common view in the literature that this relation has started around 1970s, our analysis indicate that this relationship goes beyond the changes that took place in 1970s or 1980s which are considered as leading to neoliberalism.

Keywords: Financialization, profit rate, real sector, political economy, Bounds test
JEL Codes: B51, O16, P16

1. INTRODUCTION

Financialization is a relatively new term. The literature on financialization goes back to early 2000s (Goldstein, 2009), so it is almost two decades old. The term came out of heterodox economics literature, gained popularity and essentially reflects the ascendancy of finance (Lapavitsas, 2013). As Gerald Epstein, a leading political economist at University of Massachusetts Amherst who edited a pioneering book about financialization, denotes, financialization is seen as one of the most important dimensions of not only numerous financial crises but also a whole recent period, which is called globalization or neo-liberalism period:

"...[S]ometime in the mid- to late 1970s or early 1980s, structural shifts of dramatic proportions took place in a number of countries that led to significant increases in financial transactions, real interest rates, the profitability of financial firms, and the shares of national income accruing to the holders of financial assets. This set of phenomena reflects the processes of financialization in the world economy." (Epstein, 2005: 4)

The term of financializaton is used to refer to several indicators: "Financialisation, refers to the increasing dominance of the finance industry in the sum total of economic activity, of financial controllers in the management of corporations, of financial assets among total assets, of marketed securities, and particularly of equities, among financial assets, of the stock market as a market for corporate control in determining corporate strategies, and of fluctuations in the stock market as a determinant of business cycles." (Dore, 2002: 116-117).

While Epstein (2005) provides evidence of financialization in terms of increasing rentier share in national incomes in several countries (e.g., in the US from 16.93% in 1960s to 35.24% in 1990s), and Orhangazi (2008) points out the increasing ratio of financial income in national income in the USA (from 12 and 14% in the 1952–1980 period to 20% in 2000s), Philippon in his American Economic Review article demonstrates historically highest levels of share of financial sector in GDP in 2000s in the USA with a dataset he constructed starting from 1859 (Philippon, 2015).

Although financialization is important and several explanations of it have been suggested so far, according to Costas Lapavitsas, a leading political economist at University of London, "to be sure the concept is still raw and undeveloped, but its power cannot be denied" (Lapavitsas, 2011: 611). This study specifically prefers to concentrate on the financialization of the real sector and suggests an explanation. More clearly, the purpose of this study is to provide a novel and econometrically tested explanation of this type of financialization, and to contribute to the clarification of the term. It shows that beyond recent neo-liberal period there is a long-run relationship between profit rate and financialization using a constructed dataset starting from 1948. The rest of the paper is organized as section 2 gives a brief information about related literature of explanations of financialization. In section 3, we introduce data and chosen methodology of econometrics briefly. Section 4 introduces econometric analysis results. In Section 5 we conclude and summarize important outcomes of the paper.

2. LITERATURE REVIEW

Several explanations of financialization have been proposed so far. Despite their variations, they relate financialization to the crisis of 1970s and ensuing successful implementation of neo-liberal policies. For example, according to David Harvey, a leading political economist and geographer who was among the top 20 most cited author in humanities in 2007 (Times Higher Education, 2009), there are two main reasons of financialization. One reason is the overaccumulation crisis of capital in 1970s and the US response to the crisis (Harvey, 2003: 62): "Threatened in the realm of production, the US had countered by asserting its hegemony through finance". The other reason is struggle of capitalist class for restoring its power after 1970s, of which financialization is the first component (Harvey, 2005).

Likewise, Dumenil and Levy, two French economists at CEPREMAP (Center for Economic Research and its Applications) in Paris, sees financialization as a result of a class struggle of finance capital that was heightened by the crisis of 1970s (Dumenil and Levy, 2005). Another explanation provided by Lapavitsas (2009) relates financialization also to the 1970s crisis and ensuing political, institutional changes like deregulation of financial markets, and technological changes. Lapavitsas (2013) specifically places the start of financialization in the late 1970s as well.

Paul Sweezy, an economist well-known with his kinked-demand model of oligopoly, also sees financialization as a reflection of the problems in the real sector that were stiffened in the 1970s. For example, Sweezy (1994) explains financialization with the stagnation that reemerged in the 1970s: "they [oligopolists] should invest in financial, not real productive assets. And that, I think, is just what they began to do on an increasing scale as the economy sank once again into stagnation in the 1970s."

Samir Amin (2011: 28), a pioneer of Dependency theory in development economics, explains financialization by two contingent factors pertaining to neoliberalism: "This financialisation has been made possible both by the generalization of the flexible exchange system (the rates of which are determined each day by what is called "the market") and by the parallel deregulation of the rates of interest (also abandoned to supply and demand)." He adds that the oligopolies deliberately chosen financialization path for the system as a whole.

Analyzing these and some other studies Orhangazi (2008: 56) concludes that "the rise of the financialized neoliberal regime was not necessarily the only available road following the accumulation crisis of the 1970s but it was in many aspects the result of deliberate policy interventions in the benefit of the wealthier capitalists".

Indeed, at first glance globalization, concurrent neo-liberal financial deregulation policies and soaring financial transactions might give the impression that financialization started with them and the start was in the 1970s. It seems that financialization was a new and contingent response of capital to profitability problems. However, some factors lead us to argue that there can be an inner and structural relationship between profitability problems and financialization beyond 1970s crisis. First of all, profitability problems in the real sector are not specific to 1970s. Profit rate data constructed by us given below in Figure 3 supports this argument. Secondly, long-term data provided by Philippon (2015) shown in Figure 1 points out an increase in financialization measured as share of financial sector in national income in the USA long before 1970s.

Figure 1: GDP Share of Finance
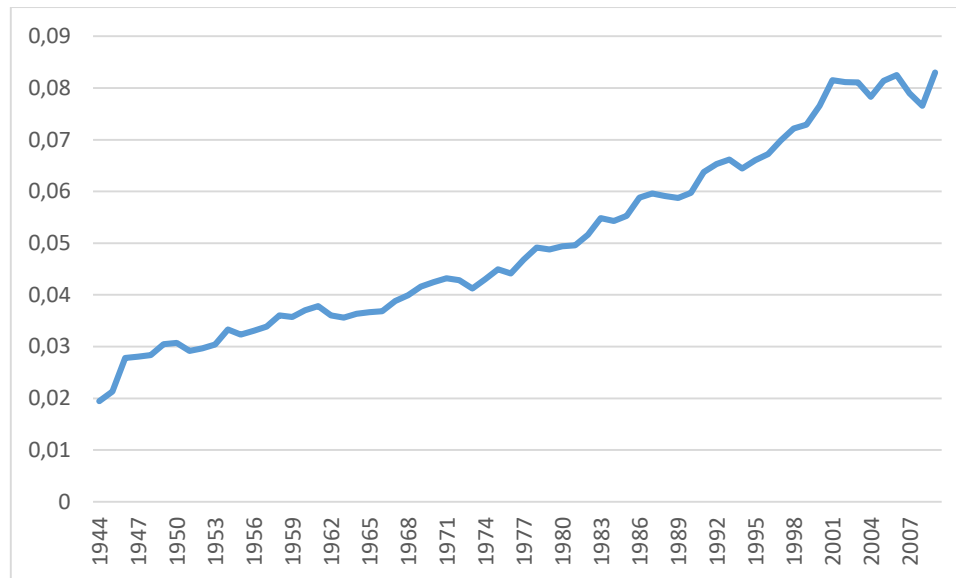
Source: Philippon (2015)

Thirdly, as Hoca argues in his Cambridge Journal of Economics article (Hoca, 2012), there are theoretical grounds to suggest a long-term relationship related to the functioning of capitalism. Especially finance is a force for the centralization of capital, acceleration of capitalist development especially by providing the necessary funds for big real investments, and hence overcoming the existing barriers of real capital accumulation in capitalism. Starting from railroad industry, large-scale investments have usually required the involvement of force of finance.

At the same time finance has a speculative aspect and can become a source of instability so we frequently see calls for curbing it. Actually, finance was restrained somewhat first during the New Deal after the Great Depression, and then during the following Keynesian period right after the Second World War (Golden Age) (Orhangazi, 2008). However, it did not take long to regain its importance in the 1960s, as epitomized with the rise of the Eurodollar market: "Beginning in the late 1950s … private international financial activity increased at a phenomenal rate" (Helleiner, 1994: 1).

3. DATA AND METHODOLOGY

The variable we try to explain is financialization of the real sector and the explanatory variable we suggest is profit rate of the real sector. Because we suggest a long-run relationship between financialization and profit rate rather than a contingent relationship for a recent specific period, to investigate the existence of this long-run relationship we constructed two-time series for financialization and profit rate as long as possible. Since longest time series data is provided in the case of USA, only the USA data is considered.

3.1. Financialization Data

To calculate the financialization of real sector, the total financial assets of nonfinancial corporate business is divided by total assets of this sector. Hence, it is the ratio of total financial assets in total assets. Both total financial assets and total assets are given for nonfinancial corporate business by Fed. Total financial assets is the most general indicator of financial involvement of the real sector. Data is taken from the Financial Accounts of the United States - Z.1 of Fed, which starts in 1945, and logarithmic transformation is applied as shown in Figure 2. As will be explained below, since profit rate data can only be calculated after 1948, financialization data is also started in this year. Despite some ebbs and flows, an upward historical trend from the beginning can be discerned.

Figure 2: Financialization in Nonfinancial Corporate Business of USA (logarithmic) (LRFA)

LRFA

Source: Federal Reserve (2021)
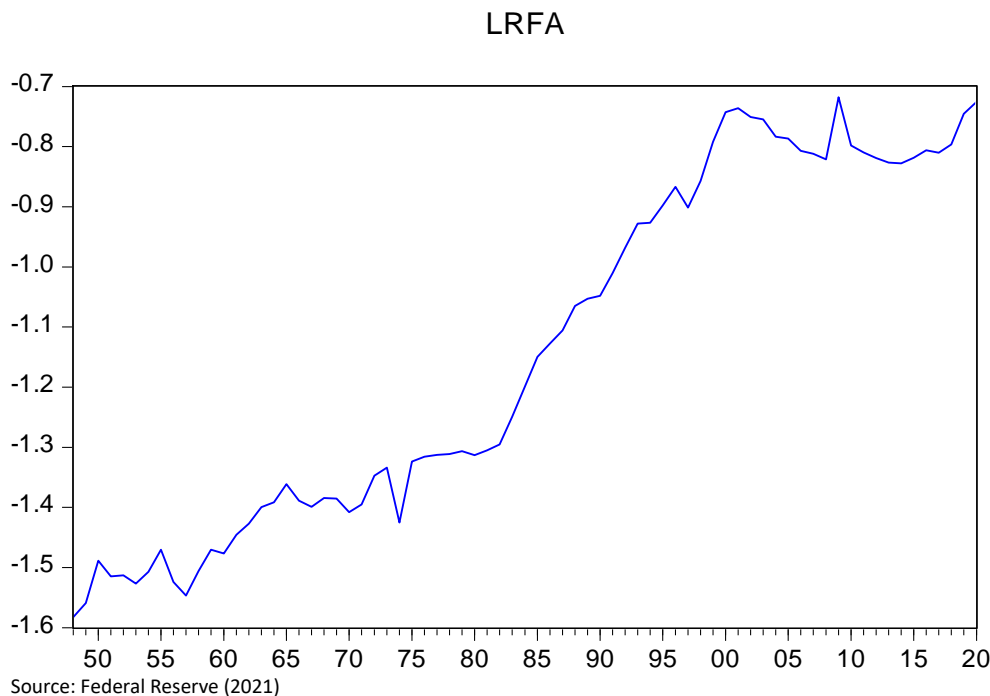
3.2. Profit Rate Data

For the definition of profit rate, heterodox approach of Guglielmo Carchedi, a leading heterodox economist at University of Amsterdam, in his book (2018) is followed. Only those sectors that are considered to be productive (surplus-value producing) real sector by Carchedi (2018) are included in the calculation of profits, namely: Agriculture, forestry, and fishing, Mining, Construction and Manufacturing. Profits are corporate profits before tax taken from Bureau of Economic Analysis (BEA) National Income and Product Accounts (NIPA) Tables 6.17A, 6.17B, 6.17C and 6.17D. To get the profit rate, profits are divided by capital invested. In the calculation of capital invested, two components of capital are considered: Fixed and Variable. For variable capital, Wages and Salaries of Goods Producing Industries are taken from NIPA Table 2.2A and 2.2B of BEA and for fixed capital, Historical-Cost Net Stock of Private Fixed Assets in aforementioned industries are taken from Fixed Assets by Type Table 3.3ESI of BEA, which are only provided for after 1947. However, because temporalist approach of Carchedi requires profits to be divided by the previous year's capital, profit rate series start in 1948. Logarithmic transformation is applied and shown in Figure 3. As mentioned above, profit rate decline goes back to long before 1970s. A downward trend is clearly discernible since 1950s.

Figure 3: Profit Rate in Nonfinancial Corporate Business of USA (logarithmic) (LPR)
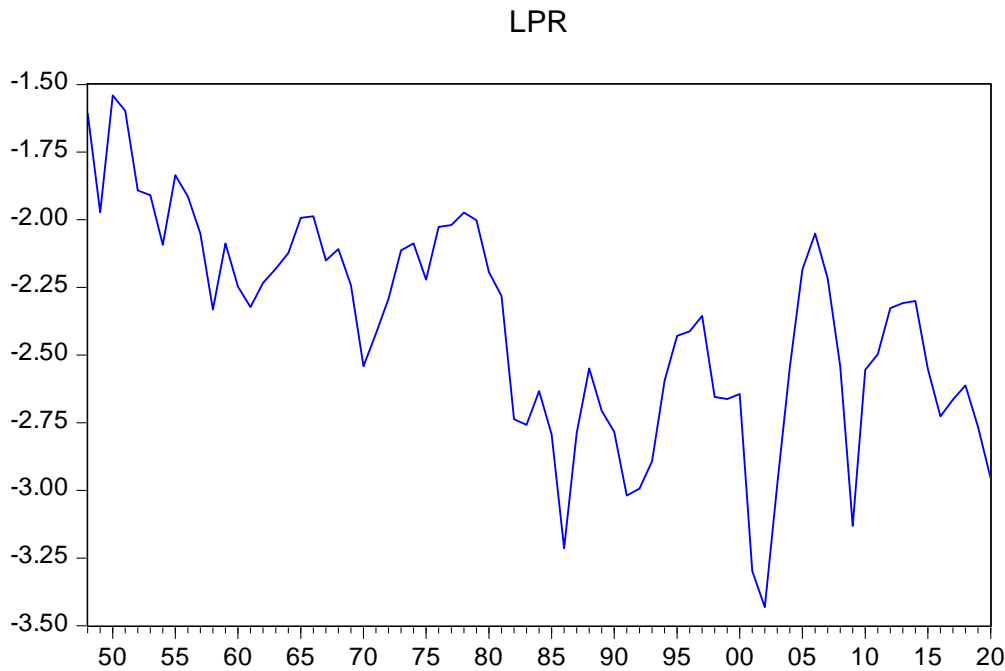
Source: Bureau of Economic Analysis (2021), Table 6.17, 3.3ESI, 2.2

3.3. Econometric Methodology

To test the existence of long-run relationships such as the one we are looking in this paper, the literature often uses Johansen cointegration test. However, this and other cointegration methods requires that "the underlying variables are integrated of order one", I(1) (Pesaran, Shin and Smith, 2001, p.289). Pesaran, Shin and Smith (2001) offers, instead, ARDL Bounds Test to test long-run relationships, which allows variables to be integrated of different orders like I(0) or I(1), except I(2).

Related unit root test results with intercept and trend from Eviews 9 are given below in Table 1 and 2. Profit rate series (LPR) constructed above is trend stationary in level (hence, I(0)) and this reinforces our argument above that profitability problem is earlier than 1970s.

Table 1: Unit Root Tests for LPR

ADF Test	Phillips-Perron Test
-3.982652 * (p= 0.0136)	-3.614491 * (p= 0.0355)

*The null hypothesis that LPR has a unit root is rejected at 5%.

On the other hand, ratio of financial assets (LRFA) is not stationary in level as shown below in Table 2.

Table 2: Unit Root Tests for LRFA

ADF Test	Phillips-Perron Test
-1.735876* (p=0.7250)	-1.658416* (p= 0.7594)

*The null hypothesis that LPR has a unit root is not rejected at 5%.

However, LRFA becomes intercept and trend stationary at first difference as shown below in Table 3, hence I(1).

Table 3: Unit Root Tests for D(LRFA)

ADF Test	Phillips-Perron Test
-9.091878* (p=0.0000)	-9.097898* (p= 0.0000)

* The null hypothesis that LPR has a unit root is rejected at 1%.

These results show that LPR is I(0) and LRFA is I(1). This leads us to use ARDL Bounds Test as econometric method to investigate the existence of long-run relationship between them.

4. FINDINGS AND DISCUSSIONS

Eviews can automatically select the appropriate number of lags for each variable in ARDL model. Using Akaike Information Criterion Eviews picks ARDL model with three lags for LFRA and zero lag for LPR, hence ARDL(3, 0).

Diagnostic tests of the selected ARDL model are shown below in Table 4. By failing to reject null hypothesis of no serial correlation, Breusch-Godfrey Serial Correlation LM Test shows evidence that there is no serial correlation in the model. By failing to reject null hypothesis of no heteroskedasticity, Breusch-Pagan-Godfrey Test supports no heteroskedasticity. By failing to reject null hypothesis of correct specification, Ramsey RESET test gives evidence that model form is correct.

Table 4: Diagnostic Tests of ARDL Model

	LM Test	Breusch-Pagan-Godfrey Test	Ramsey RESET Test
Test statistic	0.206029	0.224248	2.240458
p-value	0.8919	0.9239	0.1394

Two more diagnostics test result about stability of the model provided below in Figure 4 and 5 support the stability of the ARDL model.

Figure 4: CUSUM Stability Test of ARDL Model
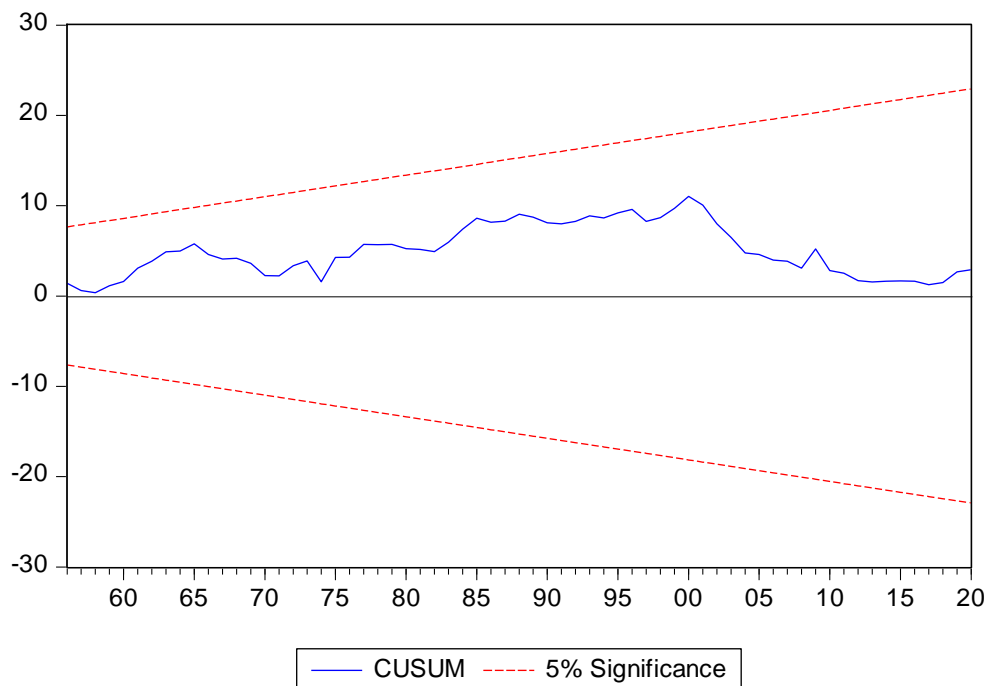
Figure 5: CUSUM of Squares Stability Test of the ARDL Model
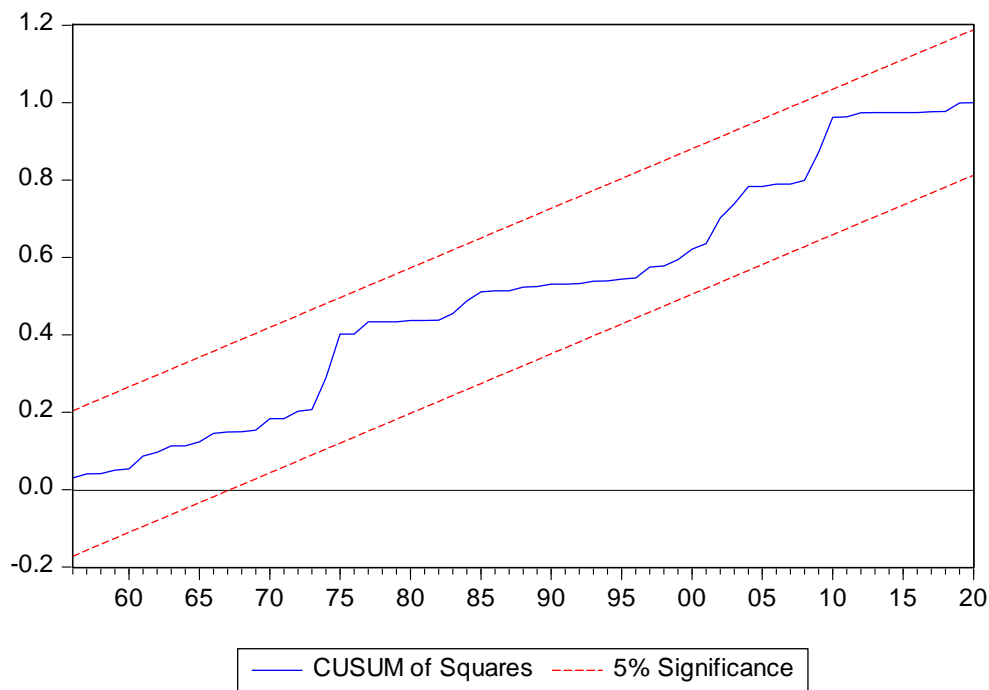
As given below in Table 5, Bounds test applied to this model shows that F-statistic is beyond upper bound critical value at 2.5% significance and null hypothesis of no long-run relationship exist is rejected. Thus, this supports the existence of the long-run relationship. These two variables are cointegrated at 2.5% significance level.

Table 5: ARDL Bounds Test

Test Statistics	Value	k
F-statistic	5.545573	1
Critical Value Bounds		
Significance	**I0 Bound**	**I1 Bound**
10%	3.02	3.51
5%	3.62	4.16
2.50%	4.18	4.79
1%	4.94	5.58

In addition, the long-run coefficients of the selected ARDL model, which is given below in Table 6.

Table 6: Long Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LPR	-1.14965	0.302242	-3.80374	0.0003
C	-3.59675	0.657789	-5.46794	0.0000

Coefficients in Table 6 are significant and LPR has a negative coefficient. This negative relation is expected by our argument because parallel to the literature we suggested financialization is related to the profitability and hence to capital accumulation problems of real sector.

5. CONCLUSION AND IMPLICATIONS

Financial system and its products are very crucial both for their role in economic development and as a source of instability in the economy as seen in the recent mortgage crisis of 2008. In addition, as pointed out by financialization literature and our data, finance is increasing its role. Our results indicate that confronting profitability problem real sector directs its sources to finance. Despite the common view that this relation has started around 1970s, our analysis imply that this relationship goes deeper than political choices or struggles, legal and institutional changes that took place in 1970s or 1980s which are considered as leading to neo-liberalism. This is not to deny the role of these struggles or changes. However, understanding economic relationships underpinning these just as important as. We hope that this study is a contribution to this end: "A common theme in the literature is the role of the accumulation crisis of the 1970s. Many in the literature argue that financialization, together with liberalization and deregulation, was a response to this crisis. However, there are not many studies that theoretically or empirically discuss the relationship between capital accumulation and financialization." (Orhangazi, 2008, 131).

This long-term relationship can have implications both for real sector and financial sector and bring up questions for further studies, upon which we can only touch here. Is there a way other than financialization that real sector can confront profitability problems? Are more regulations possible on the side of financial sector which increasingly attracts the resources from real sector? These questions are on the agenda especially following the mortgage crisis of 2008.

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THE EFFECTS OF FINANCIAL DEVELOPMENT ON ECONOMIC GROWTH IN AFRICA: DOES THE QUALITY OF INSTITUTIONS MATTER?

Nega Muhabaw Kassie
Marmara University, Department of Economics, Goztepe Campus, Istanbul, Turkey.
nmuhaba@gmail.com, ORCID: 0000-0003-0416-6588

ABSTRACT

Purpose- The main objective of this paper is twofold. First, the paper aims to examine the effect of financial development on the economic growth of African countries. Second, the paper also aims to examine if institutional quality moderates the nexus between financial development and growth.

Methodology- A panel dataset of 35 African countries over the period from 1985 through 2018 is used and to handle the problem of endogeneity and reverse causality the dynamic panel estimation method, GMM estimation, was employed to estimate the relationship while accounting for other control variables that affect economic growth. The data set was retrieved from World Bank world development indicators, international monetary fund, and International Country Risk Guide (ICRG).

Findings- The empirical results of the study indicate that financial development has an ambiguous impact on the economic growth of African countries, but it has a significant positive effect on growth if interacted with the institutional quality index such as government stability, rule of law, and corruption. The interaction term between finance and institutional quality indicator is positive and significant, implying that the positive effect of financial development depends on the level of institutional quality of the country.

Conclusion- To sum up, in countries where institutional quality is high, the effect of financial development on growth is higher compared to countries where institutional quality is low. This indicates that improving institutional quality is essential to reap the benefit of financial development in Africa. It is thus vital for African countries to engage in drafting various programs and strategies to improve institutional quality so as to improve growth.

Keywords: Financial development, economic growth, Africa, institutional quality
JEL codes: G10, G20, E44

1. INTRODUCTION

Ever since Bagehot (1873), the nexus between finance and economic growth has been a widely researched area in development economics. It has been argued that a developed financial system can facilitate industrialization by enabling capital mobilization and allocating it to the productive investment sector. In the same vein, Schumpeter (1911) highlighted the eminent role of the country's financial system for economic development as it distributes funds to productive investment. Well-developed financial institutions like banks and financial markets have a great contribution to bringing domestic savers and investors together and conveying information. Likewise, Levine (2005) suggested that financial development enhances economic growth through mobilization of savings, improving capital accumulation, optimizing resource allocation, and facilitating innovation. The developed financial sector is said to reduce costs by producing information ex-ante about possible investments and improving resource allocation, monitoring investments and exerting corporate governance, and facilitating trade and asset diversification. It is in this respect that several empirical studies indicated a positive relationship between economic growth and financial development indicators[1].

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[1] See King and Levine (1993), R. G. Rajan and Zingales (1996), Levine (1999),Arestis, Demetriades, and Luintel (2001), Beck and Levine (2002)

Although earlier studies documented empirical evidence in favor of the positive effect of finance on growth, recent studies have produced mixed results. More specifically, the overwhelming majority of the studies indicated that the positive effect of financial sector development on economic growth depends upon the presence of other complementary environments in the country such as human capital, good governance, and institutional quality (Ibrahim & Alagidede, 2018). In this regard, it has been argued that in countries where institutional quality is high, financial development has a significant positive effect on economic growth while it has a negative impact in countries where institutional quality is low (Demetriades and Hook Law (2006); (Kutan, Samargandi, & Sohag, 2017). Although studies on this realm have increased significantly in the last decades, the debate still continues as to which of the complementary environment is important. In addition, it is also unclear whether the mediating role of institutional quality on the nexus between financial development and growth varies depending on the type of financial development indicators considered: financial institutions Vs financial market. It is more pronounced in Africa, where empirical studies in this matter are extremely limited. It is against this backdrop that this paper examines the relationship between financial development and economic growth of sub-Saharan African countries focusing on the moderating role of institutional quality. More specifically, this paper attempts to answer the following research questions: (1) Does financial development promote economic growth in Africa; and (2) Does the quality of institutions matter in the nexus between finance and growth. To this end, a secondary dataset from WDI, IMF, and ICRG was collected for a panel of 35 African countries over the period 1985 to 2018, and the GMM estimation method was employed to handle the problem of endogeneity and reverse causality. The empirical results of the study indicate that financial development has an ambiguous impact on the economic growth of African countries. Most of the models considered financial development has an insignificant impact on growth, even it has a significant negative impact when institutional quality is included in the growth model. The interaction term between finance and institutional quality indicator is positive and significant, implying that the positive effect of financial development depends on the level of institutional quality of the country. Therefore, it can be concluded that not only that the quality of the institutions is vital for the economic growth of African countries but it is also essential for reinforcing the positive effect of finance on economic growth.

The current study contributes to the existing literature in many ways. First, unlike most of the previous studies that used a single measure of financial development, this study analyzed the effect of financial development on economic growth using a recently developed financial development proxy that takes into account the multidimensional nature of financial development. The financial development proxy variable developed by (Sahay et al., 2015) and then (Svirydzenka, 2016) accounts for the depth, access, and efficiency of both financial institutions and markets.[2] So far, very few studies have used this indicator to analyze the nexus between finance and growth, ignoring the multifaceted nature of financial development. Second, this study focuses on the sample of African countries to examine the effect of finance and economic growth. The overwhelming majority of previous studies in this realm has emphasized in the case of developed and emerging countries. As such, little is yet known for the case of developing countries, more specifically Africa. Therefore, the current study adds to the scant literature available. The remainder of this paper is organized as follows. The next section discusses the literature review while the third section presents the data and the empirical methodology used in this study. The fourth section presents the discussion of empirical results and the last section provides a conclusion and policy recommendation.

2. LITERATURE REVIEW

There is an enormous theoretical and empirical study that demonstrates the positive impact of financial development on the economic growth of countries. Well-functioning financial institutions and markets are believed to enhance economic growth through lowering transaction costs, fastening transactions, improving capital accumulation, and allocating investments into the most productive sector of the economy (Choong & Chan, 2011; Fernández & Tamayo, 2017; Levine, 1997). The pioneering empirical study by King and Levine (1993) indicates that financial development indicators such as percentage of credit allocated to private firms, the size of the formal financial intermediary sector relative to GDP, the ratio of credit issued to private firms to GDP, and the importance of banks relative to the central bank has a significant positive effect on economic growth using a sample of 80 countries over the period 1960 to 1989. Likewise, Arestis et al. (2001) found that financial development promotes economic growth for five developed economies, namely Germany, the United States, Japan, the United Kingdom, and France. Other pertinent studies, such as (Beck & Levine, 2002; Levine, 1999; R. G. Rajan & Zingales, 1996) found a significant positive relationship between financial development and economic growth. In the same vein, Levine (2002) Provides further evidence on the overall financial development robustly linked with economic growth. Levine, Loayza, and Beck (2000) showed that exogenous components of financial intermediary development are positively associated with economic growth. Along similar lines, Beck, Levine, and Loayza (2000) suggested that financial intermediaries exert a large, positive impact on total factor productivity growth, which feeds through to overall GDP growth. R. G. Rajan and Zingales (1996) also revealed that financial development has

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[2] We adapted the work of Svirydzenka (2016) to demonstrate the financial development index triquetral presented in the appendix 1, that accounts for both financial institutions and financial market with several classifications.

a substantial supportive influence on the rate of economic growth and this works, at least partly, by reducing the cost of external finance to financially dependent firms.

Despite the fact that previous empirical studies suggested the positive and significant impact of financial development on economic growth, recent studies challenge the previous findings. For instance, Rousseau and Wachtel (2011) reexamine the effect of financial depth on economic growth using both panel and cross-sectional approaches for the period 1965 to 2004 and find that financial development proxied by credit to the private sector and financial depth does not have a statistically significant impact on economic growth. The other strand of literature highlighted a "hump-shaped" linkage between finance and economic growth (Deidda & Fattouh, 2002; Law, Azman-Saini, & Ibrahim, 2013; Law & Singh, 2014; Rioja & Valev, 2004; Shen & Lee, 2006). For instance, Rioja and Valev (2004) conducted an empirical investigation on the nexus between financial development and economic growth using a sample of 74 countries over the period 1960 to 1995 by dividing countries into three groups (high, intermediate, low levels of financial development). The author found a strong positive relationship between finance and growth for countries at the intermediate level of financial development. For countries at a higher level of financial development, the author found a positive but weak relationship and uncertain effect of financial market improvement on growth in countries where financial development is at a low level of financial development. In the same vein, Deidda and Fattouh (2002) revealed that there is no significant relationship between financial development and economic growth in low-income countries whereas a positive and significant relationship was found in high-income countries. This implies that the effect of financial development varies depending on the economic level of countries. In the same line of argument, Huang and Lin (2009) employed a threshold regression to reexamine how the stage of economic development of the country affects the nexus between finance and growth. The author found a significant positive effect of financial development on economic growth in both low and high-income countries but its effect is higher in low-income countries than in developed countries. Another line of studies found that financial development has a positive effect on growth up to a certain threshold beyond which it has no significant impact. For instance, Cecchetti and Kharroubi (2012) found that financial development is good only up to a certain level, after that it has a negative effect on growth, implying an inverted U-shape relationship between finance and growth.

The other strand of the literature indicated that the effect of finance on economic growth is mediated by the country-specific environment such as inflation level, governance, and institutional quality, to mention a few. This line of studies argued that for financial development to be useful for the economic transformation of the country, there should be other pertinent macroeconomic factors to be present. For instance, Rousseau and Wachtel (2002) indicated that the positive effect of finance on economic growth is dependent on the rate of inflation. Using a panel dataset of 84 countries for the period 1960-1995, the author found that in countries where the inflation rate is one-digit, financial development has a significant positive effect. In countries where the inflation rate is two digits, financial depth does not have a significant impact on economic growth of countries. . In a similar vein, Shen and Lee (2006) investigate how financial and economic conditional variables affect the link between financial development and real GDP per capita growth on 48 developed and developing countries, The author found an inverted U shape relationship between financial development and economic growth. Employing a panel threshold regression for 71 countries over the period 1960 to 2004. Jude (2010) noted that the relationship between financial development and growth is non-linear and the relationship is significantly moderated by openness, government consumption, and inflation rate.

A recent study by Arcand et al. (2015) also indicates that the inverted U shape relationship between financial development and economic growth. The author employed different empirical approaches and used various datasets to assess the threshold level in which financial depth has no effect on economic growth. The author found that financial development has a positive effect on growth to the point where private sector credit to a percentage of GDP reaches 100. According to the author, beyond this point, further development of the financial sector has a significant negative impact on growth. Similar results were found by Law and Singh (2014). The authors employed a dynamic panel threshold technique for a sample of 87 developing and developed countries and found that the level of financial development has a positive impact on growth only within a certain threshold level; apart from that finance affects growth negatively Aizenman, Jinjarak, and Park (2015) analyze the nexus between finance and growth in 41 countries, specifically comparing the outcome of Latin American economies and east Asia, at a sectoral level, and finds anon linear link between financial development and sectoral output growth. De Gregorio and Guidotti (1995) investigate the link between financial development and long-run growth in a large cross-country sample. The author found that financial development positively related to the long-run growth of real GDP per capita in low and middle-income economies but a fragile relationship in high-income countries. They also noticed a negative relationship between variables in panel data from Latin American countries. The negative relationship is attributed to financial liberalization in poor regulation. Using a sample of 43 developing and advanced economies for the period 1975 to 2009 Doumbia (2016) has also suggested that financial development has a positive and significant impact on growth in low income and lower-middle-income economies through facilitating saving and investment but it has a weaker effect in more developed economies.

Demetriades and Hook Law (2006) used data from 72 countries for the period 1978–2000 and found that financial development has a greater impact on economic growth when the financial system is entrenched with good institutions. In countries with low

institutional quality, more finance doesn't produce more economic growth. Recently, Botev, Égert, and Jawadi (2019) estimated a nonlinear threshold regression model to investigate the nexus between financial development and economic growth \ found that the effect of financial development on economic growth is determined by the level of trade openness and overall economic development. In countries where the level of trade openness is higher, financial development has a significant positive effect while no significant effect in countries where trade oneness is low, using the threshold estimation method Law et al. (2013) also reach the same conclusion that the positive and significant effect of finance on growth occurs only countries with a higher level of institutional quality but no significant impact in countries with a low level of institutional quality, implying that the nexus between finance and economic growth is dependent on the level of institutional quality.

To conclude, several empirical studies have provided substantial evidence on the positive relationship between financial development and economic growth. However, absence of general consent on the factors that leads to this finance-growth nexus. This study assesses the importance of institutional quality on the linkage between finance and growth in Africa and brings attention to future research.

3. DATA AND EMPIRICAL METHODOLOGY

3.1. Data Description

We relied on the secondary data source to examine the impact of financial development on the economic growth of African countries. The data is retrieved from three sources: (i) data on macroeconomic variables such as GDP per capita, saving, human capital, which is from WB's WDI; (ii) Financial Development Index is from IMF; (iii) and the institutional variables are retrieved from ICRG. The study utilizes a panel data set of 35 African countries over the period from 1985 through 2018

3.2. Empirical Model

To examine the moderating role of institutional quality on the nexus between finance and growth, we use the following regression model following recent studies in this realm (King & Levine, 1993; Levine & Zervos, 1998; Cecchetti & Kharroubi, 2012; Law et al., 2013). Thus the linear model in our case is given by:

$$y_{it} = \pi_i + \rho y_{it-1} + \beta_0 + \beta_1 FD_{it} + \beta_2 IQ_{it} + \beta_3 FD_{it} * IQ_{it} + \beta_3 X_{it} + \varepsilon_{it} \tag{1}$$

Where, y_{it} is the GDP per capita, π_i is country-specific fixed effect term, β_0 is the constant term, FD_{it} is financial development indicators, IQ_{it} reflects institutional quality indicator variables, X_{it} is a vector of control variables that determine economic growth, namely population, openness, investment, government expenditure, human capital, and inflation and ε_{it} is the error term.

A significant and positive coefficient of FD (β_1) indicates the positive effect of financial development on economic growth. Although most of the previous studies have indicated the positive effect of financial development, there is a counter-argument to this claim. Therefore, our prior expectation is not inconclusive. It is empirically and theoretically argued that financial development can influence economic growth through institutional quality (Ibrahim & Alagidede, 2018). In this regard, good institutional has a significant contribution to enhancing the positive effect of financial development on growth. To test this hypothesis, the interaction term between financial development and institutional quality has been included. In the same vein, a significant and positive value of β_3 is an indication that the nexus between finance and growth is moderated by country-level institutional quality.

Previous literature suggested various methods of estimation of the growth equation including, but not limited to, pooled OLS, fixed effect, and GMM. In our model (see equation 1), the lag of the dependent variable is included as one control variable to test for the convergence hypothesis. It also indicates that today's economic growth is affected by the growth rate of last year. Estimating such kind of econometric specification using pooled OLS produces a biased estimate because the lagged value of GDP growth is correlated to the error term. As indicated in Roodman (2009), pooled OLS attributes to the country fixed effect to the lagged dependent variable. To circumvent this problem, one can account for country fixed effect using a panel fixed effect estimator. The panel fixed effect estimator will still be biased if one of the independent variables is endogenous because the endogenous variable will be correlated with the error term. In fact, the lagged dependent variable is endogenous and it is possible that it is correlated to the error term. This results in a lower coefficient of the lag dependent variable compared to the true value.

The estimator that addresses both heterogeneity and endogeneity is GMM. Two types of GMM are suggested in the literature. The first is difference GMM that employs data transformation into its first difference to get rid of the problem of heterogeneity and uses lagged value of the endogenous variable to remove the problem of endogeneity. Although this estimator addresses the limitation of both pooled OLS and fixed effect estimation, it has one major limitation i.e. the lagged value of the variables are poor instruments. The second estimator is System GMM. System GMM uses both the lagged value of the endogenous variables and also the lag of the first difference of endogenous as an additional instrument. The use of the lagged value of endogenous

variable improves the efficiency of the estimator. As suggested in the literature (Roodman, 2009), this study relies on system GMM estimation to drive conclusions and recommendations but present the result of the other estimators for the purpose of comparisons.

The following table (Table 1) provides the list of variables used in this study and its description.

Table 1: Description of Variables

Variable	Description	Expected sign
L.lngdppcw	log of GDP per capita growth	Inconclusive
FD	Financial development	Positive
lnopen	log of trade openness as percentage of GDP	Positive
lninv	log of investment as percentage of GDP	Positive
hc	Human capital indicator	Positive
Gov_Stab	Government stability	Positive
Inv_Pro	Investment profile	Positive
Corr	Corruption	Positive
Law_Order	Law and order	Positive
Mil_Pol	Military in politics	Positive
Demo_Acc	Democratic Accountability	Positive
Bure_Qua	Bureaucratic Quality	Positive

4. DISCUSSION AND EMPIRICAL RESULTS

4.1. Descriptive statistics

Table 2 below demonstrates the descriptive statistics for all macroeconomic, financial, and institutional quality variables. As shown in the table, the mean log of real GDP per capita is 7.05 and the minimum and the maximum are 5.2 and 9.34 respectively. It should be noted that the indicator of financial development is between 0 and 1. The higher the value, the higher level of financial development it represents. As shown in Table 2.2 the average level of financial development for the sample is 0.14 while the minimum being 0 and the maximum 0.6, indicating that most countries in Africa are at the lower level of the financial development stage. The mean value of the log of trade openness, which is measured as the ratio of import and export to GDP, is 4.05 with a standard deviation of 0.41. Looking into indicators of institutional quality indicates that the average value of government stability is 7.5 with a standard deviation of 2.04. In the same vein, the average value of the investment profile is 6.7, and the standard deviation 1.81.

Table 2: Summary Statistics

Variable	Mean	Standard deviation	Minimum	Maximum
lngdppcw	7.054	0.999	5.215	9.344
FD	0.140	0.094	0	0.609
lnopen	4.059	0.412	2.626	5.042
lninv	2.952	0.425	0.730	3.915
hc	1.649	0.425	1.026	2.848
Institutional quality variables				
Gov_Stab	7.576	2.014	2.167	11
Inv_Pro	6.747	1.810	1.542	11.438
Corr	2.318	0.873	0	5.334
Law_Order	2.904	1.018	0.667	6
Mil_Pol	2.557	1.524	0	6
Demo_Acc	2.977	1.070	0	5.407
Bure_Qua	1.442	0.869	0	4

4.2. Correlation matrix

Table 3 presents the correlation matrix, the linear association between two variables. As indicated in the correlation matrix, most of the variables have a significant positive correlation between financial development and its correlates. Referring to the correlation matrix, the insightful association is detected for financial development and its correlates. This is in line with empirical studies discussed in the literature part (see, Beck & Levine, 2002; Levine, 1999; R. G. Rajan & Zingales, 1996).

Table 3: Correlation Matrix

Variables		(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1) L.lngdppcw	1.000									
(2) lninv	0.412*	1.000								
(3) FD	0.517*	0.227*	1.000							
(4) Gov_Stab	0.121	0.148*	0.152*	1.000						
(5) Inv_Pro	0.281*	0.370*	0.344*	0.633*	1.000					
(6) Corr	0.155*	0.000	0.213*	-0.105	-0.029	1.000				
(7) Law_Order	0.072	0.148*	0.231*	0.318*	0.374*	0.264*	1.000			
(8) Mil_Pol	0.304*	0.218*	0.410*	0.034	0.411*	0.433*	0.372*	1.000		
(9) Demo_Acc	0.167*	0.243*	0.334*	0.151*	0.412*	0.154*	0.243*	0.499*	1.000	
(10) Bure_Qua	0.452*	0.202*	0.336*	-0.064	0.205*	0.414*	0.245*	0.465*	0.309*	1.000

*** p<0.01, ** p<0.05, * p<0.1

4.3. EMPIRICAL RESULTS

4.3.1. Financial Development and Economic Growth

The regression results of the study are presented in Table 4. The first column of Table 4 presents the estimation result using pooled OLS; column two presents fixed effect estimation results; column three reports the estimation results of difference GMM, and column four of Table 4 reports the results of estimation results. As discussed earlier, the OLS estimation method is biased because of the lag of the dependent variable. However, it is presented here for the purpose of comparison. It indicates that financial development has a significant positive impact on economic growth. This result is not reliable because it ignores country heterogeneity and the dynamic nature of the growth equation. In order to account for country heterogeneity using country dummies, the same growth equation is estimated using fixed effect and the result is presented in the second column. The coefficient of FD using fixed effect is negative and insignificant at the conventional significance level, indicating the fact that the importance of financial development dwindles as country heterogeneity is taken into consideration.

Despite its superiority over OLS, the fixed effect estimation method is also subjected to an endogeneity problem. The estimation result from the fixed effect is biased if one of the independent variables is endogenous. In our case, both the lag of the dependent variable and financial development are endogenous. The most widely approach to circumvent the endogeneity problem is the GMM estimation method. The endogeneity problem is alleviated through instrumental estimation techniques. In the GMM environment often we use lag values of the endogenous variables as instruments. There are two types of GMM estimation methods: Difference GMM and system GMM. In this study, we used system GMM instead of difference GMM to capture endogeneity through forwarding orthogonal deviation transformation and to eliminate the serial correlation between transformed errors. Column 3 of the following table presents the estimation results of difference GMM and indicates that financial development has no significant impact on the economic growth of SSA countries. In the same vein, the result of system GMM estimation is presented in column 4. Although the coefficient of financial development is positive, it is insignificant at a conventional significance level.

Table 4: Estimation Results of the Growth Equation

VARIABLES	(1) pooled_OLS	(2) fixed	(3) diff_GMM	(4) sys_GMM
		Dependent variable: lngdppcw		
L.lngdppcw	0.987***	0.936***	0.924***	0.961***
	(0.00217)	(0.00907)	(0.0149)	(0.0101)
FD	0.0558***	-0.00464	-0.0446	0.0398
	(0.0177)	(0.0448)	(0.0695)	(0.100)
Lnopen	0.00195	0.0327***	0.0323***	0.00585
	(0.00365)	(0.00633)	(0.00645)	(0.00806)
Lninv	0.0204***	0.00901**	0.00965**	0.0257***
	(0.00337)	(0.00415)	(0.00418)	(0.00494)
Hc	0.0119***	0.0483***	0.0675***	0.0470**
	(0.00455)	(0.00915)	(0.0123)	(0.0186)
Constant	0.00798	0.227***		0.102*
	(0.0154)	(0.0572)		(0.0543)
Observations	818	818	790	818
R-squared	0.998	0.964		
Number of code1		28	28	28

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The significance and the sign of the remaining coefficients are as expected. As can be seen from the table, investment has a significant and positive impact on economic growth. Similarly, human capital has a significant and positive impact on the economic growth of the region, implying enhancing human capital and boosting the level of investment would improve the economic performance of African countries, and this, in turn, reduces poverty.

To conclude, our empirical investigation indicates that there is no statistically significant relationship between financial development and economic growth if both endogeneity and country heterogeneity is taken into account. Parallel with that, our results are consistent with the findings of Deidda & Fattouh, 2002. Implying that, the estimation results nullify the financial development economic growth linkages. The only difference noted is in our study results corroborates that the link varies when institutional variables are considered as Law, 2013 explained.

4.3.2. Financial Development, Institutional Quality and Economic Growth

Our empirical investigation so far examines the impact of financial development and other control variables on economic growth. It has been suggested in growth literature that institutional quality is one of the main determinants of growth. Thus, an empirical investigation is done including the measure of institutional quality variable in the growth equation and the results are presented in the appendix (appendix 2). It is to be noted that each institutional indicator is included separately in the growth equation because institutional variables are highly correlated to each other and including them simultaneously will result in a multicollinearity problem. The following table presents the empirical results of the system GMM estimation. As shown in the table, all of the institutional variables, except democratic accountability and bureaucratic quality, have a significant positive coefficient, implying the positive effect of institutions on economic growth.

Our variable of interest, FD, is positive but insignificant at the usual significance level. This implies there is no significant relationship between financial development and economic growth even after controlling for a wide range of control variables including intuitional, human capital, physical capital, and trade openness. The sign and the significance of other control variables remain the same as our previous estimation results.

4.3.3. The Moderating Effect of Institutional Quality on the Nexus between Financial Development and Economic Growth

The second aim of the study is to investigate if the effect of financial development on economic growth is moderated by institutional quality. To this end, the financial development variable has interacted with the institutional variable in the growth equation and the results are presented in the appendix (appendix 3). The first column of the following table presents the results of the growth equation with the inclusion of the interaction between financial development and government stability. The coefficient is positive and significant, implying financial development has a profound positive impact on economic growth in countries where government stability is higher. The second column presents the GMM estimation results when the investment profile has interacted with financial development. As expected, the estimation results indicated that financial development has

a significant positive impact on growth in countries where the investment profile is higher. In addition to these institutional variables, the study finds that law and order, military in politics, and bureaucratic quality moderate the effect of financial development on economic growth.

5. CONCLUSIONS AND RECOMMENDATION

Earlier studies indicated that financial development significantly improves the economic development of the country. Recent studies, however, showed that the positive effect of the financial sector is dependent on the presence of other complementary environments in the country such as human capital, good governance, and institutional quality. The main aim of the current study is thus to empirically verify the hypothesis that institutional quality moderates the nexus between financial development and economic growth. For this purpose, panel data of SSA countries were used and the secondary data obtained from the World development indicator and ICRG datasets is estimated using the dynamic panel estimation method.

The findings of the study indicate that financial development does not have a significant impact on economic growth, regardless of whether the institutional quality index is included in the regression as one control variable or not. However, when interacted with institutional quality indicators such as government stability, rule of law, and corruption, it has a significant positive effect on economic growth. This indicates that the effect of financial development on economic growth is dependent on the level of institutional quality of the country. In countries where institutional quality is high, the effect of financial development on growth is higher compared to countries where institutional quality is low.
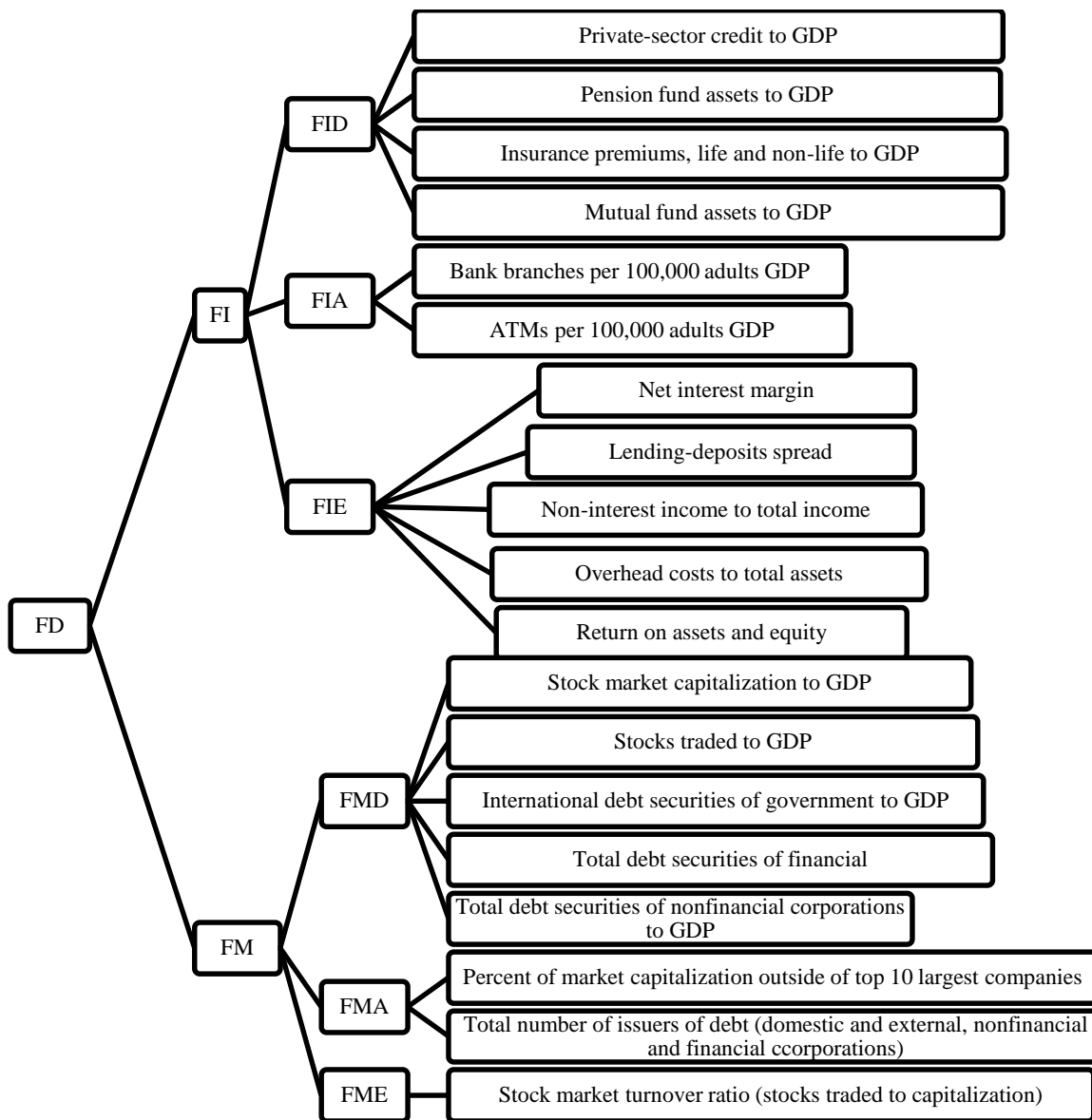
The evidence from this study suggests that countries in SSA should exert more effort to improve institutional quality in order to reap the benefit of financial development. Not only that institutional quality moderate the nexus between financial development and economic growth but also institutions have a direct impact on economic growth as evidenced by the significant positive value of the institutional indicator in the estimation. The result of this study supports the idea that investment in human and physical capital is also important to accelerate economic growth in the region.

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Appendix 1: Financial Development Index Triquetral

		Private-sector credit to GDP
	FID	Pension fund assets to GDP
		Insurance premiums, life and non-life to GDP
		Mutual fund assets to GDP
FI	FIA	Bank branches per 100,000 adults GDP
		ATMs per 100,000 adults GDP
		Net interest margin
		Lending-deposits spread
	FIE	Non-interest income to total income
		Overhead costs to total assets
		Return on assets and equity
		Stock market capitalization to GDP
		Stocks traded to GDP
	FMD	International debt securities of government to GDP
		Total debt securities of financial
		Total debt securities of nonfinancial corporations to GDP
FM	FMA	Percent of market capitalization outside of top 10 largest companies
		Total number of issuers of debt (domestic and external, nonfinancial and financial ccorporations)
	FME	Stock market turnover ratio (stocks traded to capitalization)

(FD → FI, FM)

Note: FD = financial development; FI = financial institutions; FM = financial markets; FID = financial institutions depth; FIA = financial institutions access; FIE = financial institutions efficiency; FMD = financial markets depth; FMA = financial markets access; FME financial markets efficiency.

Appendix 2: System GMM Estimation with Institutional Variables

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)
			Dependent Variable: lngdppcw				
L.lngdppcw	0.980***	1.013***	0.788***	0.976***	0.896***	1.000***	0.856***
	(0.00796)	(0.0189)	(0.0823)	(0.0152)	(0.0458)	(0.0422)	(0.105)
FD	0.0537	0.0130	-0.0720	0.00262	-0.334	-0.0638	0.149
	(0.0741)	(0.0831)	(0.194)	(0.0792)	(0.223)	(0.221)	(0.303)
lnopen	-0.00197	-0.00550	0.0397	-0.00471	-0.0350	-0.0138	0.0498
	(0.00915)	(0.0102)	(0.0337)	(0.0108)	(0.0328)	(0.0262)	(0.0453)
lninv	0.0204***	-0.00909	0.0911**	0.0226***	0.0332	-0.00598	0.0449
	(0.00507)	(0.0114)	(0.0390)	(0.00855)	(0.0224)	(0.0221)	(0.0283)
hc	0.0137	-0.0446	0.280***	0.0254	0.119**	-0.0136	0.125
	(0.0154)	(0.0273)	(0.107)	(0.0251)	(0.0537)	(0.0625)	(0.106)
Gov_Stab	0.00856***						
	(0.00210)						
Inv_Pro		0.0183***					
		(0.00558)					
Corr			0.101**				
			(0.0402)				
Law_Order				0.0398***			
				(0.00972)			
Mil_Pol					0.0623**		
					(0.0247)		
Demo_Acc						0.0404	
						(0.0426)	
Bure_Qua							0.0703
							(0.0572)
Constant	0.00767	-0.0822	0.394	-0.0201	0.479**	-0.0100	0.368
	(0.0476)	(0.0648)	(0.259)	(0.0619)	(0.219)	(0.146)	(0.335)
Observations	818	818	818	818	818	818	818
Number of code1	28	28	28	28	28	28	28

Standard errors in parentheses, ***p<0.01, ** p<0.05, * p<0.1

Appendix 3: FD Growth Nexus with Interaction Institutional Quality

Standard errors in parentheses, ***p<0.01, ** p<0.05, * p<0.1

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)
			Dependent Variable: lngdppcw				
L.lngdppcw	0.968***	0.975***	0.962***	0.965***	0.945***	0.966***	0.923***
	(0.00917)	(0.00919)	(0.0112)	(0.00944)	(0.0136)	(0.00915)	(0.0207)
FD	-0.134**	-0.201***	0.116**	-0.211**	-0.365**	-0.0120	0.0113
	(0.0553)	(0.0554)	(0.0552)	(0.0890)	(0.176)	(0.108)	(0.0572)
lnopen	0.00324	0.00413	0.00727	0.00160	0.00629	0.00516	0.0201**
	(0.00713)	(0.00678)	(0.00812)	(0.00720)	(0.0101)	(0.00749)	(0.00978)
lninv	0.0237***	0.0205***	0.0229***	0.0235***	0.0295***	0.0243***	0.0363***
	(0.00452)	(0.00461)	(0.00497)	(0.00496)	(0.00795)	(0.00460)	(0.00824)
hc	0.0382**	0.0156	0.0352***	0.0460***	0.0721***	0.0394***	0.0573***
	(0.0155)	(0.0130)	(0.00968)	(0.0148)	(0.0214)	(0.0142)	(0.0218)
Gov_Stab_FD	0.0198***						
	(0.00211)						
Inv_Pro_FD		0.0340***					
		(0.00312)					
Corr_FD			0.000587				
			(0.0158)				
Law_Order_FD				0.0818***			
				(0.0126)			
Mil_Pol_FD					0.0643**		
					(0.0256)		
Demo_Acc_FD						0.0149	
						(0.0154)	
Bure_Qua_FD							0.116***
							(0.0431)
Constant	0.0863*	0.0776*	0.105*	0.104**	0.196***	0.0910*	0.248***
	(0.0495)	(0.0435)	(0.0547)	(0.0437)	(0.0746)	(0.0486)	(0.0950)
Observations	818	818	818	818	818	818	818
Number of code1	28	28	28	28	28	28	28

A RESEARCH ON THE FACTORS AFFECTING CRYPTOCURRENCY INVESTMENTS WITHIN THE GENDER CONTEXT

Cagla Gul Senkardes[1], Ozan Akadur[2]
[1]Istanbul Bilgi University, Department of Engineering and Natural Sciences, Istanbul, Turkey.
 caglasenkardes@gmail.com , ORCID: 0000-0002-3109-3268
[2]Bahcesehir University, Institute of Social Sciences, Istanbul, Turkey.
 ozanakadur@hotmail.com , ORCID: 0000-0002-5483-8330

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ABSTRACT

Purpose- Cryptocurrency, which is one of the first products of blockchain technology, is preferred by more and more actors in addition to traditional investment tools. One of the factors over demographic and psychological factors that affect the financial investment decisions of individuals is gender. Although there are many studies in the academic literature on gender-related financial investment decisions, there is no research and data on cryptocurrencies. In this study, the factors affecting cryptocurrency investments are examined within the context of gender.

Methodology- Survey model was used as a quantitative research method. With the computer aided survey research conductd Turkey, gender-related behavioral and psychological differences in cryptocurrency investments were revealed and the survey findings were discussed over the information obtained from the literature review.

Findings- With this research, it was seen that the gender factor was associated with both psychological and demographic factors. Cryptocurrencies are in the top 5 in men's financial investment instruments portfolio while 32.6 percent of women invest in cryptocurrencies. The level of knowledge about cryptocurrencies, which is effective in investment preferences, is at medium and high level at the rate of 64 percent for men however 60 percent of women have very limited or no knowledge about this investment tool. The first two of the factors that affect cryptocurrency investment decisions which are confidence and volatility also differ in terms of rank and proportion. Age-related cryptocurrency investment preferences do not differ by gender. This study shows that men follow their investments more frequently than women and do not avoid taking risks.

Conclusion- With this research, gender-based main preference differences in cryptocurrency investments are revealed and an important resource is provided in this field, which has limited research, and contributes to the literature. It has been observed that women prefer different investment tools primarily due to lower income and lower level of knowledge about cryptocurrencies. Factors showing similarity based on gender were also found by this research.

Keywords: Cryptocurrencies, blockchain technology, financial ınvestments, female ınvestors, gender
JEL Codes: D31, G11, G41, J16

1. INTRODUCTION

The real and legal actors in the economy that invest with the unspent portion of their income are called investors. (Usul et al., 2002) Today, investors are examined in two categories as individual and institutional investors, and the subject of this study is individual investors who invest by themselves without outside support. (Yılmaz, 2009) The main reasons for investing in terms of investors can be expressed as protecting their resources, creating an increase in their resources, obtaining a regular income and realizing the benefit they expect from their investments. (Usul et al., 2002). Studies in the field of behavioral finance show that personality traits, socio-economic and demographic conditions, and some psychological and emotional factors affect investors' perceived risk. (Kahyaoğlu, 2011) There are many studies in the academic literature on the gender factor, which is one of the effective factors in investment decisions based on demographic and psychological factors. Many studies have focused on the effect of gender on financial risk taking and it has been revealed that women exhibit less risky behaviours than men. (Fehr-Duda et al., 2006; Anbar & Eker, 2009; Wang et al., 2011; Uluyol, 2019). Developing technologies affect investment products and the preferences of individual investors. Cryptocurrencies, which is one of the first products of blockchain technology that allows data to be transferred in

a distributed structure with encryption and timestamping, are digital currencies that can be used without intermediaries. Today more than 10 thousand cryptocurrencies, which started to become widespread with the blockchain technology, has reached a large market volume and became one of the important investment tools. (CoinMarketCap, 2021; CoinGecko, 2021)

In the literature review section of this research, in which the factors affecting cryptocurrency investments are examined in the context of gender, cryptocurrencies, the cryptocurrency market in investment focus, and the factors affecting cryptocurrency investments are examined. In the second part of the study, research findings on the analysis of the factors affecting the decisions of cryptocurrency investors in the context of gender are presented. The findings of the research conducted in the sample of Turkey with 399 participants are discussed through the literature on investment decisions in the context of gender. With this research, it is aimed to contribute to the academic literature, which has very limited resources within the framework of the factors affecting cryptocurrency investments, and investor dynamics that differ in terms of gender.

2. A GENERAL PERSPECTIVE FOR CRYPTOCURRENCY MARKET

2.1. Cryptocurrencies

Cryptocurrencies entered the literature in 2008 as digital data that can be produced and transferred on blockchain technology. The word blockchain was first used in discussions that started over the article "Bitcoin: A Peer-to-Peer Electronic Cash System" published by an author named Satoshi Nakamoto (2008). Blockchain is a technology that provides a secure, transparent digital transaction ledger that allows data to be recorded and transferred over the internet as time-stamped, in a distributed structure, encrypted, and unalterable. (Gül Şenkardeş, 2021) The first cryptocurrency produced after Bitcoin was developed on the Ethereum protocol, which was introduced in 2015. The ready-made software called smart contract, presented with the Ethereum blockchain, whose technical information document called whitepaper was published on November 27, 2013, made it possible to produce different cryptocurrencies on this network. Cryptocurrencies are defined by Güleç et al. (2018) as cryptography based, mathematically encrypted digital currencies that are suitable for use in digital mediums. Cryptology is a science that aims to keep data confidential through encryption and at the same time to protect data integrity (Yılmaz, 2007). According to another definition, cryptology is the sum of the methods used to transform a data that is not desired to be read and cannot be understood by other users (Doğan, 2020). Due to the features of the blockchain technology and cryptology on which they are developed, security can be provided without any intermediary or central authority in cryptocurrencies.

Cryptocurrencies are followed by more and more users all over the world. As an indicator of the increase in interest in cryptocurrencies, the increase in searches with the phrase "Cryptocurrency" from Google can be seen as a data. Google search engine is the world's most visited website and search engine according to Similarweb, Semruah and Alexa reports . (Hootsuite, 2021) The increase in worldwide searches for cryptocurrencies on Google between 2009, when the first cryptocurrency was transferred, and 2021, when this article was written, is given in Figure 1. The increase in similar calls made within the scope of Turkey for the same period is given in Figure 2.

Figure 1: Google Search Engine "cryptocurrency" Search (Worldwide)
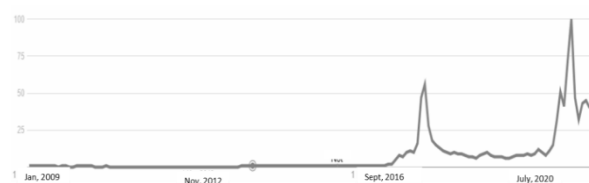
Source: Google Trends, Accessed: 08.10.2021

Figure 2: Google Search Engine "cryptocurrency" Search (Turkey)
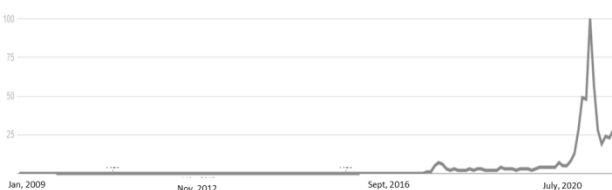
Source: Google Trends, Accessed: 08.10.2021

It is seen in the figures that the interest in cryptocurrencies has increased globally as well as locally in Turkey since 2016. The reflection of this interest in cryptocurrency investments has started in 2015 and continued with an increasing volume. Global data on the use of cryptocurrencies for different purposes are given in Figure 3. This chart has been prepared by the authors of this article, based on weekly cryptocurrency market volume forecast data published by Statista (2021), a globally independent research and reporting company, and daily cryptocurrency market cap data shared by CoinMarketCap. Cryptocurrency market cap chart shown in Figure 3 has been prepared by calculating the data for the same period every year as of October 2010.

Figure 3: **Cryptocurrency Market Cap**
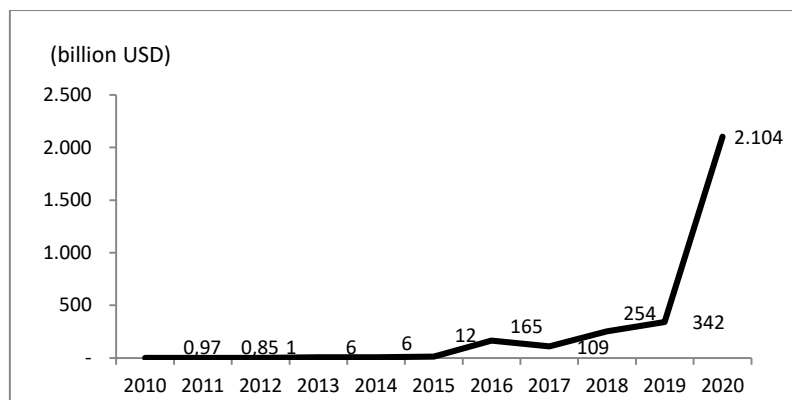
The total trade volume of approximately 10 thousand cryptocurrencies traded on a global scale as of October 2021 is over 2.1 trillion USD. (CoinMarketCap 2021; Coingecko 2021) Detailed information on the cryptocurrency market will be given in the next section, however it is seen that cryptocurrency investments are increasing day by day in line with this data provided by Figure 3. One of the most important debates about cryptocurrencies, which continues to become widespread in a graphic that is rapidly increasing in both interest and usage, is the phenomenon of whether they are money or not. Unlike traditional currencies, cryptocurrencies are not tied to a central authority. The fact that it is not under the control of individuals or institutions is the most distinctive feature that distinguishes cryptocurrencies from traditional currencies. According to Ecom World (2021), it is not essential for something to be a banknote or a coin in order to be considered a currency. In addition, for something to be considered a currency, it must fulfill the functions of exchange, unit of account, and wealth accumulation. (Ülgen, 2010) Today, while there are different opinions about the fact that cryptocurrency, which is not a banknote or a coin type, has these three functions, cryptocurrencies can be used for investment and savings together with traditional money.

2.2. Cryptocurrency Market

The market is the name given to the environments where buyers and sellers come together physically, over computers or other mobile devices, to buy or sell. Cryptocurrency market, on the other hand, is the market where cryptocurrencies are bought and sold. In the cryptocurrency markets, uninterrupted transactions can be made 7 days a week and 24 hours a day (Yılmaz and Akkaya, 2020). Manipulative movements or many irrational buying-selling movements can affect the markets. These movements are one of the main reasons for the fluctuations in the market (Güleç and Aktaş 2019). Cryptocurrency market is one of the markets that react most quickly and strongly to hot information. According to the data of CoinMarketCap (2021), which is one of the most comprehensive information platforms about the cryptocurrency market, a total of 12,282 cryptocurrencies are traded on 418 exchanges on October 4, 2021. The market value was 2.11 trillion USD as of the same date. In terms of market cap, the market is dominated by Bitcoin with a 42.5 percent share. Ethereum is the second most valuable cryptocurrency in the market, with a share of 18 percent. According to the data of the same date, over 93 billion US dollars were traded in all exchanges in the last 24 hours. The value of cryptocurrencies can be measured over the amounts reached by their market values and their market shares (Deniz, 2020). As of October 4, 2021, the top 20 cryptocurrencies with the highest market value and their market shares are given in Table 1.

Table 1: Top 20 Cryptocurrencies with the Highest Market Caps and their Market Volumes

Order	Cryptocurrency	Price (USD)	Market Cap (USD)
1	Bitcoin	54,272.73	1,023,489,349,878
2	Ethereum	3,601.23	424,818,311,786
3	Cardano	2.26	72,559,411,434

4	Binance Coin	421.26	70,915,305,357
5	Tether	one	68,238,973,823
6	Ripple	1.07	50,073,832,904
7	Wither	165.78	49,743,963,684
8	Polkadot	33.76	33,316,915,209
9	USD Coins	one	32,840,941,204
10	Dogecoin	0.24	32,224,740,755
11	Terra	44.5	17,878,841,984
12	Uniswap	25.41	15,560,735,141
13	Avalanche	62.9	13,851,740,933
14	Binance USD	one	13,033,693,937
15	Litecoin	180.96	12,429,717,095
16	Chainlink	26.92	12,288,329,516
17	Algorand	1.93	11,844,646,432
18	Wrapped Bitcoin	54,412.78	11,389,461,175
19	Bitcoin Cash	602.69	11,361,620,972
20	SHIBA INU	0	10,131,125,834

Source: CoinMarketCap, Accessed: 08.10.2021

The total market value in cryptocurrencies is calculated with the following formula.

(Cryptocurrency Market Cap = Total Number of Cryptocurrencies * Market Price)

According to Deniz (2020), cryptocurrencies can be viewed in three categories according to the size of their market values, namely large, medium and small capital value. Cryptocurrencies with a market value of less than 1 billion USD are in the small capital category according to Deniz's (2020) definition. As of October 2021, there are 12,420 cryptocurrencies in this category. Deniz defined it as the large capitalization value for cryptocurrencies with a market value of 10 billion USD and above from these categories. According to this definition, 20 cryptocurrencies with the largest market capitalization seen in Table 1 fall into the category of large capital. Although market value information does not provide clear and precise information about the direction of the prices of cryptocurrencies, its development over the years guides investment decisions. (Deniz, 2020) The total market size of cryptocurrencies shown in Table 1 is 1.98 trillion USD. The total market capitalization of these cryptocurrencies constitutes 86 percent of the total size of the market.

3. LITERATURE REVIEW

The concept of investment, which has given different meanings in the fields of business, economy and finance, is a general and inclusive expression by Özdaş (2009) as "firms or individuals directing and/or evaluating their economic assets with the aim of profit, and depositors depositing their savings in banks, bonds, stocks or gold, real estate, etc. by evaluating it as a purchase of goods and having an income expectation from these investments in the future". Based on this definition, individuals who direct some of their income to investment instruments can be called individual investors. Investments made by individual investors are personal. (Yılmaz, 2009) The main motivation in individual investments is to provide maximum return with minimum risk factor. (Jones, 1999) There are many different investment instruments that can be invested by individual investors. It can be said that the most invested instruments in Turkey are Turkish Lira deposits, foreign currency deposits, precious metals, fixed-income securities and mutual funds, according to the household data from the Central Bank of the Republic of Turkey. (CBRT, 2021) Although there are very limited studies on cryptocurrency investments in the academic literature and research reports, cryptocurrencies have become an important investment tool with a market volume of over 2 million USD, the details of which were shared in the previous section. In their study, Sütçü and Aytekin (2018) examined the miners of Bitcoin and the trade in the context of entrepreneurship. Pelster, Breitmayer, and Hasso (2019) examined the reasons of investment for individual cryptocurrency investors. In the study, the first crypto investments of these investors were examined and it was concluded that the first crypto investments were made with a sense of excitement seeking. In the research conducted by Yılmaz and Hazar (2018), return on cryptocurrency investments, user experience, security, anonymity, security, and accounting were examined as effective factors.

The factors affecting the traditional financial investment decisions of individuals can be basically examined in two parts as demographic and psychological factors. In this research, individual cryptocurrency investments are also discussed according to these factors.

3.1. Demographic Factors Affecting Cryptocurrency Investments

In this section, age, gender, education and income status will be discussed respectively as demographic factors that affect cryptocurrency investments.

3.1.1. Age

The risk that can be taken in terms of investment decisions and investment types varies according to the age of the investor. Korniotis and Kumar (2011) examined whether older investors make better investment decisions and showed in their research that older investors have more knowledge and experience in portfolio management, but their investment skill deteriorates with age. Hallahan et al. (2004) found that age and risk tolerance were inversely correlated with each other. Accordingly, as the age of the individuals increases, they stay away from risky behaviors. Age emerges as an important factor affecting the decision-making mechanism. Since the volatility of crypto money prices is high, they can be considered as a riskier investment tool when compared to other investment instruments. One of the most important factors affecting the prices of cryptocurrencies that increase this risk is positive or negative news. E.g.; The exposure of a cryptocurrency exchange to a hacking attack or a negative news about the stock market may cause investors to fear losing all their money. This, in turn, creates selling pressure in the cryptocurrency market, affecting prices negatively. On the other hand, business partnerships or announcements of important developments in infrastructure by crypto projects will increase the faith and trust of the investors, which may create an upward momentum on the by cryptocurrency prices. Investors closely follow those and similar hot news as well as price performances about cryptocurrencies. Today, most information and news about cryptocurrencies are shared through digital channels and social media. In particular, people and institutions that analyse cryptocurrencies share the results of their analysis mainly on social media. Especially the younger generation has the advantage of being more active in crypto investments in the context of social media interaction experience. Social media channels are mostly followed by young people aged 18-34 across the world. (Hootsuite, 2021) Particularly, 28.9 percent of the user profile of Twitter, which is one of the channels where written and verbal information about crypto money is shared, is in the 23-34 age group. (Hootsuite, 2021) It can be said that the age group with the highest access to information about cryptocurrencies is young people in the light of these data.

3.1.2. Gender

Gender, one of the demographic features, is a phenomenon that individuals are born with and shapes the opportunities and threats that they may encounter throughout their lives. Different studies in the academic literature focus on the variability of investment decisions in the context of gender. Some studies have focused on the effect of gender on financial risk taking. For example, Fehr-Duda, de Gennaro and Schubert (2006) examined the relationship between gender, financial risk and probability weight in their studies and stated that women exhibit less risky behaviors than men. Considering other views on gender in the literature; Anbar and Eker (2009) stated that women are more cautious than men because they are more sensitive to violence, have maternal instincts and act more responsibly. Wang, Keller, and Siegrist (2011) concluded in their research on gender-based financial investment preferences that women see art, antiques and precious metal investments as alternative investments, and they see these investment alternatives as less risky compared to men. Women's passion for these alternatives affects their investment decisions. Uluyol (2019) conducted a study on academics. According to the results of this research, it was found that women tend to invest less in risky investment instruments, while men's income and savings level increase, such as stocks, housing, land, etc. stated that their preferences for immovables and precious metals (gold, silver) have increased.

3.1.3. Education and Income Status

It is known that the level of education affects the social environment of individuals and at the same time, individuals often act according to the social environment they are in. It is known that individuals with a high level of education make many analyses and examinations before making investment decisions in relation to their social environment and education level. (Usul et al., 2002). Income status of individual investors is one of the factors affecting investment decisions. As mentioned in the introduction, in order for individuals to invest, they must have income that can be directed to investment. Individuals with fixed or sustainable income can direct their savings to investment instruments more effectively. One of the factors affecting the fixed income of individuals is their educational status. Highly educated individuals can earn regular income as professionals. An individual with a low income and unable to save will not be able to invest, even if he or she has the desire to invest. (Aşıkoğlu, 1983) Alpay et al. (2015), in their study examining the effect of income level on other socio-economic and demographic factors that affect risk perception, found that the effects of gender, occupation and financial knowledge level factors on risk perception are strong for individuals with high income level. they detected. Since the income status of individual investors is influential on investment decisions, the low level of income associated with women's low participation in the labour force and economic production causes financial investments to be more limited. (ILO, 2019) The inability of women to take a sufficient place in working life and thus not earning income is one of the biggest barriers to investment. Although important policies are followed by international platforms and governments to increase the employment of female workforce, the role of women in the economy is still lower than men. According to

the labour force statistics announced by the Turkish Statistical Institute (TUIK), 68.2 percent of men participate in the labour force, while this rate is 30.9 percent for women. According to TUIK data, the proportion of women between the ages of 15-24 who are not in education or employment among the young population is approximately twice that of men. According to the World Economic Forum (WEF) Global Gender Gap report (2021), when the share of women in the workforce between 2014 and 2019 is examined, it is seen that their share has increased, but this rate has decreased sharply in both men and women in 2020. With the consequences of the crisis based on the workforce on a global scale due to Covid-19 and the pandemic, it was again against women. While the rate of men who lost their jobs was 3.9, the rate of women was 5%. Within the framework of an inclusive sustainable economy and participation, it is possible to say that the disadvantaged position of women continues today and in the near future.

3.2. Psychological Factors Affecting Cryptocurrency Investments

In this section, the psychological factors affecting cryptocurrency investments will be discussed as perception, learning, motivation, emotions and stress.

3.2.1. Perception

Perception is to be aware of and evaluate the activities taking place around us with our sense organs (Karafakıoğlu, 2006). Factors affecting the level of perception; previous experience, level of knowledge, perception and ability to learn. (Ozer, 2009). Individuals with high perceptions in a particular area can make investment decisions faster, and the level of knowledge varies depending on the level of perception. The level of knowledge can be effective in cryptocurrency investments, which is a relatively new investment tool, as one of the factors that have an important effect on investment preferences. Among the sectors in which women are involved in employment, technology and related fields are the sectors with the widest gender gap. It can be said that women's level of knowledge and perceptions in the fields of blockchain technology and cryptocurrencies are low in parallel with their participation in the sector, which can be effective in investment decisions and preferences.

3.2.2. Level of Knowledge

Investor behaviour, like many other behaviors, can change through learning. Investors reflect the knowledge and experiences they have gained during their learning periods in life to their investment decisions (Tavşancı and Örücü, 2001). Financial information owned affects the decisions of investors. It is seen that women avoid risky investments due to the fact that women's financial knowledge level is generally lower than men. However, it is also seen that male investors with relatively high financial knowledge make erroneous financial decisions due to overconfidence. In addition to many traditional investment tools regarding cryptocurrency investments, this investment tool requires digital literacy. It is one of the important barriers to be able to understand and use this technology, which is effective in the analysis of cryptocurrencies produced on blockchain technology. Digital literacy requirements are most effective in cryptocurrency investments for the holding, storing and realization of the investment. Cryptocurrency investments that are traded in digital environments and stored in digital wallets must be carried out by the investor, especially due to security factors. The investor is responsible for all transactions in cryptocurrency investments, where all transactions are realized without intermediaries. For these reasons, individuals who invest in cryptocurrencies should have high digital literacy and learning capacity as well as financial literacy.

3.2.3. Motivation

The motivation of the individual investor is very effective in the decision process. People act according to their instincts for everything they need in life. (Celtek, 2004). It is seen that individuals with low motivation do not act sufficiently willingly and inquisitively in their investment decisions. Cryptocurrency trading requires close monitoring due to constantly changing prices, so an unmotivated investor may have low returns or even make a loss. The number of cryptocurrencies, which is a new investment tool, is increasing day by day. The requirement to do pre-investment research on each cryptocurrency that offers different value propositions can be challenging for many investors. As can be seen in the detailed information about the cryptocurrency market in the previous section, the number of cryptocurrencies above 10 thousand is a very high number for individuals with low motivation to research and follow. In this research focus, the subject of individual motivation can be considered as a psychological factor that is especially effective in cryptocurrency investments.

3.2.4. Emotions and Stress

Emotions can be basically listed as joy, anger, interest, disgust, surprise, sadness and fear. Each of these emotions can have different effects on investor behaviour. In addition, changes in stress level will also affect investor behaviour. Stressed individuals may not be able to make rational decisions in case of possible financial loss and may deepen their financial losses. Cryptocurrency investments, like other traditional investment tools, can be affected by emotions and stress. Rapid price changes can be an important source of stress, especially in cryptocurrency investments with high price volatility. One of the most important factors affecting the prices of cryptocurrencies is the supply and demand situation. The supply and

demand amounts of cryptocurrencies are an important indicator in measuring the level of interest in cryptocurrencies. Since traditional currencies are under the control of the government and Central Banks, they are printed and put on the market whenever they want. The supply of cryptocurrencies is limited. (Deniz, 2020) It is likely that the prices of cryptocurrencies, which are produced in small quantities and with limited supply, will increase. As the interest in cryptocurrencies increases and the demand to buy increases, the prices of cryptocurrencies are on the rise. The increase in demand, in turn, causes a decrease in the amount of cryptocurrencies circulating in the market and therefore a decrease in the supply level. On the other hand, it is seen that the prices of cryptocurrencies decrease as the sales decisions and the amount of circulation in the market increase. The value of the cryptocurrency, which becomes easily accessible in the market by increasing its supply, may decrease. Similarly, the necessity of managing the cryptocurrency investment process by the individual investor can often cause emotional difficulties for individuals who complete their investment processes with intermediaries. Cryptocurrency investments made entirely in the digital environment and using technology carry different sources of stress, including security.

4. DATA AND METHODOLOGY

In this quantitative research on the examination of the factors affecting cryptocurrency investments in the context of gender, the screening model was used as a method. Data were collected from 399 participants through a computer-assisted survey. The questionnaire questions applied in this study were included in the literature section, and the demographic factors affecting the investment decisions of individuals such as age, gender, income status, marital status, and educational status, and psychological factors such as perception, learning, motivation, emotions, and stress were included. The survey study starts with questions to measure the demographic information of the participants and their level of knowledge about cryptocurrencies, and continues with questions about the analysis of investment preferences. There are a total of 21 questions in the survey, and the survey questions were created through Google Forms. The survey link was sent to the participants via different social media accounts on the internet, and no personal information (name, surname, e-mail address, telephone, etc.) was requested for the accuracy of the study results, taking into account the participants' reservations about answering. The questionnaire was directed to male and female participants simultaneously, and the results were analysed on a gender basis. The survey study applied to the sample of Turkey was carried out between 23-30 August 2021.

Based on the demographic factors that affect the investment decisions of individuals mentioned in the previous sections, the basic data about the participants of the research survey applied are as follows:

- Gender: 57.6% of the participants are female; 42.4 percent are men.

- Marital Status: 66.7 percent of the participants are married; 33.3 percent of them are single.

- Income status: 86 percent of the participants are actively working. The percentage of participants who own their own house is 49.6.

- Educational Status: While 7 percent of the participants have a high school education level or below, 93 percent have a bachelor's degree or higher.

- Age: The age distribution of the participants was broken down as 20-30, 30-40, 40-50, and 50 and over, respectively, and the distribution of the research participants by age breakdown is shown in Table 2.

Table 2: Distribution of Research Participants by Age Breakdown

	20 - 30	30 - 40	40 - 50	50 and above
Woman	33	119	58	20
Man	30	87	40	12
Total	63	206	98	32

The participants of the survey consist of men and women in a close percentage. Cryptocurrency is included in the investment portfolios of 27 percent of the total participants. These basic demographic data show that the research sample is in an appropriate distribution according to the factors affecting the investments.

5. FINDINGS AND DISCUSSION

5.1 Findings Related to Psychological Factors

Cryptocurrency is included in the investment portfolios of the research participants. Considering the number of participants investing in cryptocurrencies by gender, shown in Table 3, 32.6% of women and 53.2% of men invest in cryptocurrencies.

Table 3: Distribution of Research Participants by Cryptocurrency Investments

	Woman	Man
Total number of participants	230	169
Number of participants investing in cryptocurrencies	75	90

Based on the findings, it is seen that men include more cryptocurrencies in their investment portfolios. Figure 4 shows the preference rates of instruments and cryptocurrencies in investment portfolios based on gender.

Figure 4: Investors' Investment Instrument Preference Chart
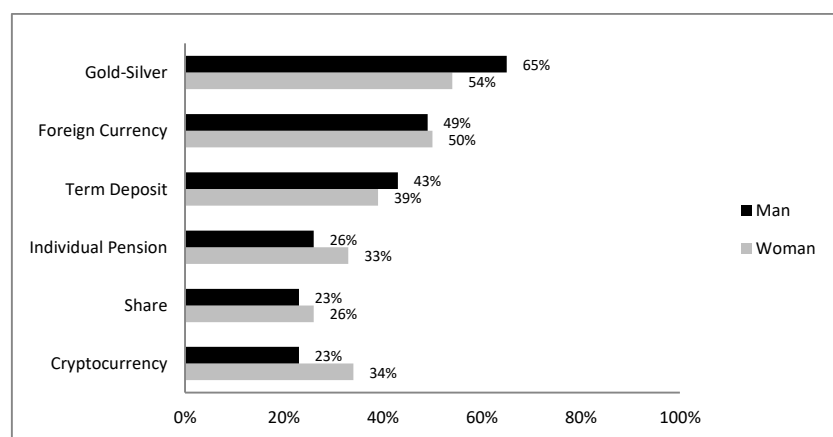
When the survey results related to the study are examined, the percentage distributions of 109 participants who prefer cryptocurrencies in their investment portfolios based on age ranges are given in Table 4. While it is observed that 74.3 percent of the total investors are between the ages of 20-40, it is observed that the age breakdown by gender is similar. It is seen that female investors between the ages of 20-40, which we can consider as young and middle-aged, have a high share of 73.1 percent. It is observed from the survey findings that among female investors, cryptocurrencies are mostly preferred by the young and middle-aged groups, and that those who are older are more distant to cryptocurrencies. This finding is compatible with the literature.

Table 4: Age Distribution Percentages of Cryptocurrency Investors

	20 - 30	30 - 40	40 - 50	50 and above
Woman	15.4%	57.7%	25%	1.9%
Man	22.8%	52.6%	21.1%	3.5%
Total	19.3%	55%	22.9%	2.8%

Another demographic factor that affects investment decisions is income. Information on the effects of individual investors' income levels on their investment decisions has been shared in detail in the literature section. When the income status is analysed according to the survey data, employment status and home ownership data, it is seen that it is in parallel with the cryptocurrency investments. When the survey results are read on the basis of household income, it is seen that as the income of individuals increases, their monthly savings opportunities increase. The distribution of the research participants by household income is shown in Table 5. If we look at the relationship between household income and cryptocurrency trading experience; While 37.8 percent of those with a monthly household income between 0-5,000 TL have traded cryptocurrencies before, 45.9 percent of those with a household income of 20,000 TL or more declared that they had previously traded cryptocurrencies. It is observed that individuals with higher monthly incomes invest in cryptocurrencies more for a part of their savings, compared to individuals with low income.

Table 5: Distribution of Participants by Household Income

| Household income (TL)	0 - 5000	5000 - 10000	10000 - 15000	20000 and above
Participants	11.3%	32.6%	31.6%	24.6%

When we look at the gender breakdown of the research participants who are not actively working, 78 percent of the women are not working. Depending on the finding of cryptocurrency investment preference increasing in parallel with income, it can be said that one of the main factors in the low rate of female investors is income. According to Hicks' (1946) approach, income in the context of the individual investor can be defined as the highest amount that can be consumed in a given time period and at the end of that time period, the initial level of welfare can be maintained. (Procházka, 2009) Labour force participation rate is an important economic indicator found with the ratio of the total workforce to the working population. Based on the survey findings in the focus of crypto money investments, the rate of female investors, which is low, can be predicted to continue in this course depending on this information.

5.2. Findings Related to Psychological Factors

Among the research findings, perception and learning, which are the psychological factors affecting cryptocurrency investments, were examined through the level of knowledge. Motivation, emotions and stress factors, which are other psychological factors, were examined through the investment experiences of the participants and discussed mainly on the risk factor and rationality. Findings related to psychological factors affecting cryptocurrency investments under both main headings are presented with gender-based data and discussed in this section.

Cryptocurrency, which is a relatively new investment tool, requires digital literacy as well as financial literacy compared to many other investment tools. One of the important factors affecting the motivation to invest in cryptocurrencies, which is an investment tool with high volatility, is the level of knowledge. One of the most gender-related differences in cryptocurrency investments is the level of knowledge. According to the research data, 11.5 percent of the participants think that they do not have enough information about cryptocurrencies. 56 percent of women have never heard of cryptocurrencies or have very limited knowledge about cryptocurrencies. The level of knowledge of female and male participants about cryptocurrencies is shown in detail in Figure 5. The level of knowledge, which is lower than that of men, stands out as an important factor in investment decisions. It is one of the research findings that the sources of information related to knowledge ownership do not differ depending on gender. From the answers to the questions asked about the knowledge of the details of the investment instruments in the cryptocurrency market, it is seen that there is no gender-related differentiation. The top five cryptocurrencies that crypto investors have heard of do not show gender-related variability.

**Figure 5: Level of Knowledge about Cryptocurrencies**
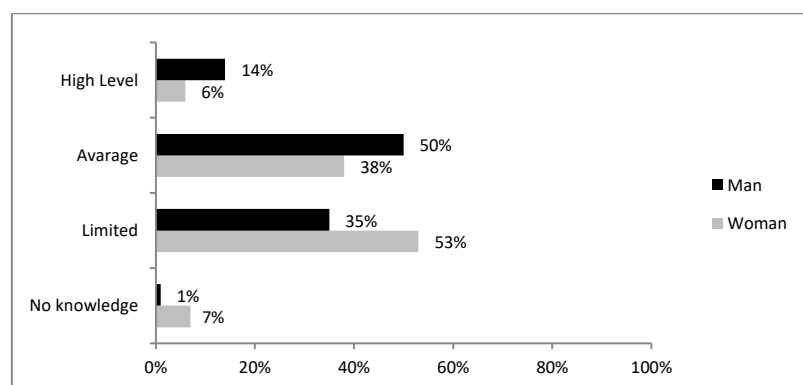
According to the research findings, cryptocurrency investment motivation is parallel to the knowledge on this financial instrument. Based on this finding, which is compatible with the literature that one of the important psychological factors affecting cryptocurrency investments is the level of knowledge, the rate of participants who invest in cryptocurrencies is 33 percent for women and 53 percent for men.

Although cryptocurrencies are among the top 6 investment instruments most preferred by the survey participants, their ranking within the investment portfolio varies depending on gender. When we look at the investment preferences shown in detail in Figure 4 in line with the preferences of female investors, cryptocurrency investments are at the sixth place where cryptocurrencies are among the top 5 of male investors. Based on the survey findings, we can say that men prefer cryptocurrencies more than women in their investments. Looking at the breakdown of the research participants according to their cryptocurrency investments, shown in Table 3, it is seen that men invest in cryptocurrencies, which is a relatively risky tool compared to other investment tools, more than women. Therefore, it is confirmed that the tendency to take risks is higher than that of women. Many studies examining the investment decisions of investors in the context of gender show that women's risk-taking tendencies are different from men's and they are more cautious than men. (Baltaş, 2021) Considering other views on gender in the literature; Anbar and Eker (2009) stated that women are more cautious than men because they are more sensitive to violence, have maternal instincts and act more responsibly. Uluyol (2019) stated that

women are less inclined towards risky investment instruments. Some studies have focused on the effect of gender on financial risk taking. For example, in the study of Fehr-Duda et al. (2006), it is stated that women exhibit less risky behaviors and control more than men. Although the effect of the risk factor related to gender in cryptocurrency investments, which is compatible with the literature, is observed in these research findings, the proportional difference based on gender is observed to be low. The risk of loss is observed in the research findings as one of the primary factors affecting the investment decision of women. Again, in connection with the risk factor, factors such as trust and reliability are among the first three factors that affect investment decisions. The data of this research on rationality, which is one of the psychological factors in investment decisions, shows that both men and women state that men are more rational, with a low proportional difference. The dynamics of the cryptocurrency market and the volatility of crypto prices bring the need for regular follow-up and short-term investment changes in this investment tool. Based on the survey findings, 70 percent of female investors and 80 percent of men declared that they constantly follow their investments. It can be said that risk factor as a psychological factor and the necessity of follow-up are among the reasons why it is an investment tool that is preferred by female investors at a low rate. Considering the factors that affect the investment decisions of individual investors, it is observed that the factors of reliability and return are most effective. Risk of loss, easy conversion to cash and economic indicators in the country are also among the top 5 considerations, while the protection of the principal and investor comments are also noted, with a lower rate among the considerations. When the first 5 of the factors affecting the decisions of individual investors are analysed by gender, it is observed that the most differentiated ones are in the factors of easy cash conversion and economic indicators in the country. As can be seen in detail in Figure 6, the economic indicators factor in the country, which is among the factors that show a proportional difference depending on gender taken into account in investment preferences, is accounted for by 41 percent of women and 49 percent of men, and the easy conversion factor into cash by 40 percent of women and 49 percent of men.

Figure 6: Factors Affecting Investment Decisions
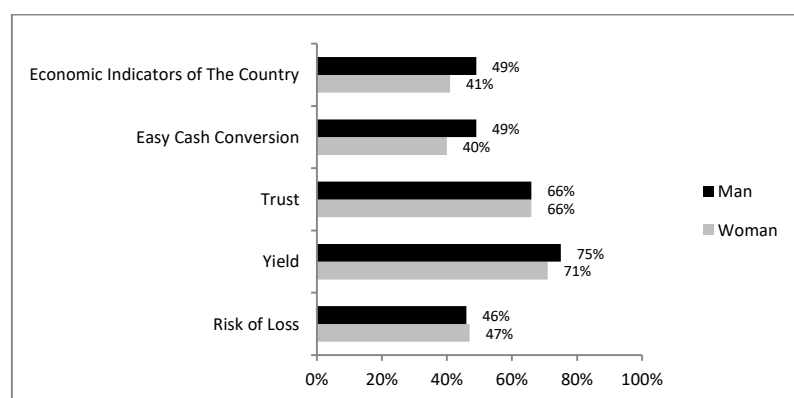
Similarly, when the factors affecting investment decisions are examined within the framework of cryptocurrency investments, the first 5 factors among the survey findings are trust (trust in the trading platform), volatility (extreme price mobility), regulations, blockchain technology, and commission. Although the first two factors do not differ according to gender, their rankings are different depending on their percentages. While the two most important factors are confidence with 49 percent in women and volatility in the second place with 34 percent, while volatility is in the first place with a high rate of 57 percent in men, while the element of confidence is in the second place with a rate of 49 percent.

6. CONCLUSION

Investors always think that they are rational and make the right decision while investing. However, many studies in the literature have shown that investors do not act rationally. The understanding of behavioral finance is a large research area in which studies on this subject are made. Investment decisions are affected by many demographic and psychological factors. One of the important factors affecting investment decisions is gender. In this research, the examination of the factors affecting investment decisions regarding cryptocurrencies, one of the investment instruments, in the context of gender reveals the relationship between gender and both psychological and demographic factors. When the results of the survey conducted within the scope of the study are compared with similar studies on traditional investment instruments in the literature, it is seen that women prefer different investment tools primarily due to their lower knowledge level and lower income level, especially in cryptocurrency investments. While gold and silver as an investment tool ranks first among the investment products most preferred by both women and men, cryptocurrency investments, which are among the top five for men, are not among the top five in women's preferences. The rate of female participants choosing cryptocurrencies in their investment preferences is 20 percent lower than that of male investors. Cryptocurrencies are seen as a risky investment tool for both men and women due to their extremely volatile price structure. In cryptocurrencies, where prices are so volatile, continuous monitoring is important in terms of the risk of loss. In this context, another result obtained from

the study is that men follow their investments more frequently than women. Another finding obtained from the study is that the age group that prefers cryptocurrencies for both male and female participants is the middle age group. The fact that cryptocurrencies require digital literacy in addition to financial literacy compared to other investment tools and that the information flow is predominantly through digital media channels shows that it is an investment instrument mostly preferred by young people. Cryptocurrency, which is an investment tool preferred by female investors aged 20-40, which we can consider as young and middle age, shows similarity in age-related preference by male investors. Women's labor force participation and low incomes cause them to direct their investment preferences to less risky products. The gender gap in employment in the context of a sustainable economy is clearly reflected in the gender-related differentiation of cryptocurrency investment preferences. Due to the fact that the survey participants are not homogeneously distributed in terms of education level, research findings on the effect of education on cryptocurrency investments are not included. It has been seen that the findings obtained as a result of the study are in parallel with the literature on traditional financial investment instruments. The research makes an important contribution to the relevant literature as one of the first studies in the context of gender within the framework of cryptocurrency investments.

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