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The Impact of Macroeconomic and Environmental Factors on Household Debts in G7 Countries

Nasiha Osmanović[1], Shaista Alvi[2]

[1]Campus World University, Sharjah Research Technology and Innovation Park - Al Quoz - Wasit Suburb – Sharjah, UAE
[2]Amity University, Dubai, UAE

A B S T R A C T

This article aims to study the influence of macroeconomic and ecological factors on household debts. The quantitative method of OLS multiple Regression is applied to the data used for this research from the period 2003 to 2021. To establish the macroeconomic factor, the metrics are the real house price index with the base year 2015, unemployment as % of the labour force, and short-term interest rate per annum. Research shows that house price and unemployment have a noteworthy relationship with the dependent variable, while trade in goods significantly adversely affects household debt. In respect to the climate change factors, results reveal that annual surface temperature and annual emissions of CO_2 have a favourable and notable impact on household debt. The only insignificant effect on household debts had been shown by the short interest rate. The beneficiaries of this research can include policymakers, economists, and financial institutions who are interested in understanding the factors that affect household debts. The significant relationship between household debt and factors such as house prices, unemployment, export trade, climate change factors, etc. reflect underlying economic disparities in these countries. The results of this research could benefit policymakers and economist in farther understanding the environmental factors that influence household debts.

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1. Introduction

Macroeconomic and environmental factors in G7 countries affect investment and saving of the economy. The premise of this research is that household debts effect financial soundness of the nation and automatically that has negative impact on the economic growth. If we want to study more about progress and the growth of the economy, it is very important to understand the nature of these variables. Lower investment and consumption are the results of rising interest rates (Blanchard, 2023). Household debt in many countries harms fiscal stability. Some economists believe that financial debt was one of the main triggers of the fiscal meltdown in Cyprus, the United States, and Greece Mian and Sufi (2014). Private household debt become a debate in the last two decades. According to Koo (2011), Japan experienced a balance sheet recession in the 1990s, whilst the world economy experienced a recession as a result of a drop in interest charges, and the non-government sector was attempting to shrink debt. A rise in the number of households causes the economy to enter a recession. Household debts are controlled by the central bank and international organizations for monitoring household debts. Fernandes and Mota (2011) examined financial markets in European countries. They concluded that these countries have been affected by the increase in sovereign debt.

Few post-Keynesian economists studied the macroeconomic effect of household debt while using the formal model. In his research, Palley (1994) worked on buyer debt as a linear multiplier-accelerator model where he investigated the cyclic facets of consumer credit during the economic cycle. The objective of the research is to understand relationship between household debt, Export Trade of Goods and Climate change dynamics. This study shows that an increase in consumer obligation causes an increase in consumption level and stimulates development. The negative side of this is it would result in a dramatic increase in the level of debt. Automatically, we can conclude that there would be an allocation of income from debtors to rentiers. Household debt will decrease the consumption level of the economy, creating a credit-driven output process. Similar research has been done by Dutt (2006) who incorporated household debt with neo-Kaleckian growth. Results show that an increase in household debts will affect the increase in

growth rate but as a temporary effect only. The long-term effect of a rise in household debt will impact the shift of income distribution to the rentiers and push them to save more for the future. The main objective of this paper is finding the way of influence of macroeconomic and ecological factors on household debts. We use the quantitative method of OLS multiple Regression from the period 2003 to 2021. After all findings shows that house price and unemployment have a noteworthy relationship with the dependent variable, while trade in goods significantly adversely affects household debt. In respect to the climate change factors, results reveal that annual surface temperature and annual emissions of CO_2 have a favourable and notable impact on household debt. At the end, insignificant effect on household debts had been shown by the short interest rate.

The incorporating environmental factors such as mean surface temperature and CO_2 levels, this research expands the traditional macroeconomic models of household debt which contributes to theoretical knowledge. The findings of this research can inform policymakers about the macroeconomic and environmental factors that impact household debt, which can guide them in formulating policies aimed at addressing the issue of household debt

The paper is systematized as follows: the next section provides the literature review. Section 3 describes the research methodology. Section 4 provides an interpretation of the data. Finally, Section 5 concludes the research.

2. Literature Review

G7 countries are the most advanced economies in the world, and they can be used as a benchmark for other economies. Household debt has an essential element in evaluating financial security and controlling market risk. A significant decrease in accommodation/ markets can lead to the deterioration of household balance sheets, and the lending of money from the banks. There is a lot of research that is done on the housing market. The study of Alter et al. (2018) examined that home loan debt divides lower socioeconomic households – as a measure of unequal approach to financial markets which impacts household debt and growth.

Interest rate plays an important role in private borrowing. The decrease in the interest rate will support

households in taking care of their mortgage and funding current consumption. Regional house price shocks play a significant role in determining home equity and the effectiveness of the refinancing channel of monetary policy, due to the localized nature of housing markets Baro (1972).

Mian and Sufi (2016) have studied household debt and housing prices and found that a fall in consumption occurs after a decline in housing prices that is concurrent with a decrease in household incomes. The capacity of households to withstand shocks like rising interest rates and income declines, which have the effect of reducing private consumption, is impacted by high household debt. In order to influence household wealth, it is crucial to pinpoint the primary factors influencing housing prices.

Agnello and Schuknecht (2011) demonstrate how several macroeconomic and structural elements are related to housing price valuation. Real interest rates and supply factors have the strongest correlations with housing prices. Many variables, including housing demand, financing availability, and balance sheet effects, have a significant impact on home prices. A study by Atalay et al. (2020) found that house price shocks asymmetric impact household indebtedness, with households responding to increases in housing wealth by significantly increasing their debt. Dumitrescu et al. (2022) investigates the macroeconomic determinants of household debt in developed economies using a sample of 26 OECD countries from 2002 to 2020. The results show that economic growth, inflation, house prices, investments, mortgage credit interest rates, unemployment rate, and public expenditures all have significant impacts on household debt. However, the strength and direction of these relationships vary depending on the level of household debt. Mian et al. (2017) research states that an increase in household debt to GDP ratio predicts lower GDP growth and higher unemployment.

The Low mortgage spreads are associated with an increase in household debt to GDP ratio and a decline in subsequent GDP growth. Economic forecasters overpredict GDP growth at the end of household debt booms, and the negative relation between household debt to GDP and subsequent output growth is stronger for countries with less flexible exchange rate regimes. It examines household debt levels amplifying effects of economic downturns and contributes to the asymmetry in the impact of business cycles on different segments of the population.

Furthermore, Jordà et al. (2014) indicate that household debt to asset ratios have risen significantly in many countries. Real estate lending booms have been increasingly associated with financial stability risks and are often followed by deeper recessions and slower recoveries. Thus, housing finance has become a crucial factor in the modern macroeconomy. The paper suggests that the rise in mortgage lending and household debt may have contributed to disparities in access to credit and homeownership among different groups or regions.

Peek and Wilcox (1991) study demonstrates that one of the major factors influencing home values is the unemployment rate. Their findings demonstrate that the decline in interest rates and low unemployment rates in 1980 were responsible for the recovery in home values. In his research Pinter (2018) demonstrates that between 1985 and 2013, there was an 80% association between actual house price components and separation rates in the UK. According to his research, unexpected changes in housing prices can predict changes in output by 10–20 percent, unemployment rates by 20–30 percent, and employment severance rates by 10–30 percent.

A similar study has been done by Geerolf and Grjebine (2014). They investigated the 40-year causal link between shifts in home prices and employment trends in 34 different countries. Employing real estate taxes as a gauge of home prices, their findings show a strong correlation between changes in unemployment and home prices. Based on these results, the unemployment rate decreases by 3.4% for every 10% increase in home costs. Research shows how non-residential investment and consumption are impacted by overall employment. Housing growth has a considerable effect on the employment situation in the tradable industry. These all support an increase in the real exchange rate, which is advantageous to the industrial sector.

The research in the area of the Fiscal Theory of Price Level (FTPL) supports the premise that monetary policy determines the price level and that fiscal policy mainly serves to maintain debt sustainability. Those

who carry out this kind of study include Leeper, (1991). The FTPL model's impact on high inflation can be discussed primarily in terms of central bank policy and budget policies. In the event that government spending policy does make it possible to sustain debt levels with adequate primary surpluses, central bank policy will focus on boosting inflation in order to reduce the public debt, which will lower inflation.

Reinhart and Sbrancia (2011) have done research on the debt of developed economies in the period from 1945 to 2014. Their research shows that inflation contributes to a significant decrease in debt, especially in the period till the 1970s. The fiscal positions of the country affect long-term interest rates in many situations. Gruber and Kamin (2012) One of these ways is through default risk premium, in which the appearance of private debt seeks an increase in interest rates from the other side investors could opt for a hold of government debt only if they receive a significant interest on this debt. Finally, inflationary expectations are a significant factor as debt monetization leads to a growth in an interest rate proportionally to an escalation in the expected inflation. A high increase in the debt will crowd out private investment which will affect interests' rate and the higher marginal product of capital.

Kandikuppa-Gray (2022) examines the impact of abnormal weather on household debt across rural India. The study looks at the broader impact of weather anomalies, years 5, abnormal weather effects on several dimensions of household debt Abnormal temperatures are associated with higher household debt. The study also shows that climate change interacts with existing socioeconomic disparities such as race and land ownership, exacerbating the size and depth of debt in rural households In terms of income inequality, the paper argues that climate change could exacerbate existing inequality by disproportionately affecting vulnerable households and businesses. For example, households in arid and semi-arid regions may be more vulnerable to climate change impacts and may have fewer loans to cope with these impacts.

Sengupta (2021) discusses the challenges confronted via international locations struggling to manage both dazzling debt and mounting climate screw ups. The article highlights the growing reputation that debt obli-

gations can stand inside the manner of assembly the immediate desires of human beings and the investments required to shield them from climate failures. In phrases of financial asymmetries, the object suggests that nations facing each high levels of debt and sizable weather dangers may conflict to satisfy the desires in their populations and spend money on measures to defend them from weather failures. This can exacerbate current disparities in get right of entry to resources, income, and opportunities amongst exceptional groups or areas. The vulnerable populations can be disproportionately affected by climate disasters and might have confined get admission to resources and guide to address those impacts.

With intensive literature review to our knowledge, we find that the literature is devoid of research on the relationship between household debt, Export Trade of Goods and Climate change dynamics.

3. Methodology

This study analysed how household debts are affected by macroeconomic and environmental factors. The parameters are taken from G7 countries as they contribute to approx. USD 42 trillion to the world Gross Domestic Product (GDP) of USD 92 trillion in 2022 (World bank, 2022) indicating that these countries have a combined GDP that represents a significant portion of the world's total GDP. These developed economies are considered stable and combined have a large impact on the world economy.

Initially, we provide descriptive analysis for the G7 Countries to understand the overall data structure. To understand the association of Household debts with macroeconomic factors and environmental factors we employ the quantitative method of OLS multiple Regression.

The information was gathered from numerous secondary sources between the years of 2003 and 2021. For establishing the macroeconomic factor, we have used the real house price index with the base year 2015, unemployment as % of the labour force, and short-term interest rate% per annum. For measuring environmental factors annual surface Temperature change and annual carbon emission were considered for the model under study.

Table 1

The summary of research variables is as follows

	Parameters	Measures	Source
Dependent Variable			
	Household debt	Household debt, all instruments	IMF
Independent Variables			
Macroeconomic	Real house prices	Real house prices, Base year 2015=100	OECD
	Unemployment rate Total	Total Unemployment rate % of the labor force,	OECD
	Short-term interest rates,	rates of interest for short-term debt percent p.a.	OECD
	Trade in goods	Trade in goods- Exports, Percentage change, previous period	OECD
Climate Change	Annual Surface Temperature Change	Temperature change concerning a baseline climatology, corresponding to the period 1951-1980	IMF
	Annual Carbon dioxide (CO_2) emissions	CO_2 emissions from fossil fuels and industry excluding Land use change.	Our world of data

Notes. Author's calculation.

In Table 1, Household debt ( ) - The total stock of household debt liabilities, including all debt instruments, is considered to compute the household debt, all instruments' percentage of GDP. Real house prices (V2_House Price) - reached with Base Year 2015=100, and the index is determined by the OECD National Accounts Database's comparison of the nominal housing price index to the consumers' spending deflator in an individual country. These indices are adjusted for seasonality. Unemployment rate (V3_UNE)- Rate of unemployment % of the workforce overall. Those of working age who lack a job but are eager to work and have made a conscious attempt to find one are regarded as unemployed. This indicator calculates the percentage of the workforce that is unemployed and is seasonally adjusted. The labour force is made up of both people who are employed and those who are unemployed.

Short-term interest (V4_STR) - the market charges at which short-term sovereign debt is issued, or the charges at which short-term loans are taken between financial organizations.

Trade in goods (V5_Trade) - exchange of goods Exports, percentage change from the prior timeframe. The trade in goods (export), which is indicated in USD million, includes all goods that add to or deplete a nation's stock of material resources by crossing its borders (imports) or leaving it (exports). The term "commodity" refers to produced, tangible items over which legal claims to ownership may be made and whose title may be transferred through transactions from one institutional entity to another. The exclusions are a) goods for internal or external processing, b) goods being transported across a country, temporarily admitted, or temporarily withdrawn.

Annual Surface Temperature Change (V6_Temp) - Yearly estimations of average surface temperature change assessed in relation to a baseline climatology, pertaining to the years 1951–1980. Over the years 1961 through 2021, estimates of changes in the global mean surface temperature are given, expressed in degrees Celsius. The time series temperature change at a site is determined using the weighted average of the GISTEMP data over all stations within a specified radius, with the closest stations weighted most significantly.

Annual carbon dioxide (CO_2) emissions (V7_CO2) Emissions from fossil fuels and industry except from land use is measured in tonnes

3.1. Research model

To determine the most appropriate panel regression approach to be used in analysing the relationship be-

tween household debt and various factors in G7 countries, a test was conducted. The three-panel regression models were considered for the Ordinary Least Square (OLS). The Diagnostic test results (detailed below) indicated that the most appropriate model for the analysis was the Fixed Effect Model from the Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM). As a result, the Fixed Effect Model was employed in the OLS regression analysis to examine the factors affecting household debt in G7 countries.

This model permits individuality or heterogeneity among several cross-sections, allowing each cross-section to have its unique intercept. The intercept may differ for the cross sections, but it is still constant over time, meaning that it does not change over time (Andesite, 2017). In a fixed effect model, the error term is presumptively different for each entity and every year. There are qualities about people that remain constant over time and have a correlation with unrelated variables the following particular FEM equation (Brooks, 2008):

$$y\_it = \alpha + \beta^* x\_(it) + \mu\_(i) + \varepsilon\_(it) \qquad (1)$$

Where,

y= represents the dependent variable; α = constant /Intercept for each regressor; β = coefficient representing the common effect in cross-section x= regressor; μ = within-cross section error term and are correlated with the regressors for fixed effect model ε it = remainder disturbance

i= 1,2 … …N; N= cross-section count; t = 1, 2, … …T;T= time period count

The following equation describes our panel model with fixed cross-section effect.

V1_Household Debt = C(1)*V2_House Price + C(2)*V3_UNE + C(3)*V4_STI + C(4)*V5_Trade + C(5)*V6_Temp + C(6)*V7_CO2 + C(7) + [CX=F] $\qquad$ (2)

Where,

CX=F, fixed cross-section effect

The mathematical model applied for the panel is:
V1_Household Debt= 0.379711163571*V2_House-Price + 3.08664229455*V3_UNE - 0.474028951393*V4_STI-0.109027908238*V5_Trade + 1.71250255122*V6_Temp + 2.10626342123e-08*V7_CO2 - 14.8135770784 + [CX=F] $\qquad$ (3)

4. Results

4.1. Descriptive statistics

In Table 2, the variables' Means, Medians, Maximums, and Minimums are used to describe the features of the variables.

Table 2
Summary of Descriptive Statistics

	V1_Household Debt.	V2_House Price	V3_UNE	V4_STR.	V5_TRADE	V6_Temp	V7_CO2.
Mean	74.39914	102.9726	6.769361	1.251374	4.568792	1.205271	1.34E+09
Median	70.09025	100.6761	6.775000	0.693822	7.091085	1.193000	5.73E+08
Maximum	115.5834	145.8611	12.82500	6.002207	32.18758	2.928000	6.14E+09
Minimum	39.72724	57.43922	2.350000	-0.548767	-30.66164	-0.054000	2.80E+08

Notes. Author's calculation.

To sum up, the mean score is highest for V7 CO2 (1.34E+09) and lowest for V6 Temp (0.918). The high mean score for V7_CO2 (1.34E+09) indicates significant CO2 emissions, highlighting environmental concerns. The low mean score for V6_Temp (1.205271)

suggests relatively stable temperature changes. This disparity emphasizes the urgent need for addressing high CO2 levels despite stable temperature trends.

Table 3 presents the relationship between the research variables, and an examination of the matrix in-

dicates that none of the independent variables has a value less than 0.7 (Osmanovic& Alvi, 2022), which suggests that there is no evidence of multi-collinearity among the explanatory variables used in the model. Each box in the matrix represents the Coefficient (Coeff.) between two variables, with a value of 1 = perfect + ve correlation, -1 = perfect - ve correlation, and 0 = no association between the variables.

V1_Household Debt (explained variable) has a negative correlation with V2_House Price, V3_UNE, V5_Trade, and V6_Temp, however, has a positive correlation with V4_STR and V7_CO2.V2_House

Price has a small negative correlation with V3_UNE, and V4_STI, and has a moderate positive correlation V5_Trade, V6_Temp, and V7_CO2. For, V3_UNE has a negative association with V4_STI, V5_Trade, and V7_CO2 and a positive association with V6_TEMP.It is also observed that V5_Trade has a small adverse relationship with V6_TEMP and an affirmative relationship with V7_CO2. On the other hand, V6_Temp is negatively affiliated with V7_CO2. The matrix indicates that the highest correlation with other variables is -0.181898 (V6_Temp, V7_CO2) and the lowest correlation is -0.008513 (V1_Household Debt, V5_Trade)

Table 3

Pearson Correlation Matrix

	V1_House hold Debt.	V2_House Price	V3_UNE	V4_STR.	V5_Trade	V6_Temp	V7_CO2.
V1_Househ old Debt.	1.000000	-0.061592	-0.119133	0.179003	-0.008513	-0.106812	0.278090
V2_House Price		1.000000	-0.158018	-0.115752	0.033793	0.124044	0.071808
V3_UNE			1.000000	-0.030578	-0.026105	0.087338	-0.201149
V4_STR.				1.000000	0.305053	-0.094119	0.066432
V5_TRADE					1.000000	-0.052068	0.044536
V6_Temp						1.000000	-0.181898
V7_CO2.							1.000000

Notes. Author's calculation.

4.2. Empirical results and discussion

The cross-section fixed effects test equation is used to study the nexus between the measured variable in Table 4, household debt % GDP (V1_Household Debt), and 7 independent variables, including house cost (V2_House Price), unemployment rate (V3_UNE), short-term interest (V4_STR), trade in goods (V5_Trade), annual Surface temperature (V6_Temp), and annual CO2 emissions (V7_CO2). The model uses cross-section fixed effects, meaning that each cross-section (country) has a dummy variable and the model adjusts for differences between the countries. The outcomes of the test in Table 3 demonstrate that V2_House Price and V3_UNE have a positive and significant correlation with the measured variable, with coefficients of 0.379711 and 3.086642, respectively, and p-values of 0.0000. This implies that a 1% upsurge in Real house prices will

direct to a 0.3797% growth in household debt % of GDP. Correspondingly, it is seen that a one percent rise in the unemployment rate will result in a 3.086% surge in household debt % of GDP. On the other hand, trade in goods (p-value = 0.0042) has a significant adverse effect on household debt, the coefficient of -0.109028, infers that a 1% growth in trade in goods will cause a 0.1090% decrease in household debt % of GDP. Furthermore, the only macro factor variable which is insignificant is V4_STR (p-value = 0.1476)

Analysing the effect of climate change factors, it is witnessed that Annual surface temperature (p-value = 0.0496) and annual CO2 emissions (p-value = 0.0000) also have a progressive and significant effect on household debt with the 1-degree increase in annual temperature and annual CO2 emissions is associated with a growth of 1.71%, 0.02% in household debt % of GDP respectively.

Table 4

Independent Variables	Coeff.	SE	t-Stats.	Prob.
V2_House Price	0.379711	0.033078	11.47912	0.0000
V3_UNE	3.086642	0.294194	10.49185	0.0000
V4_STR	-0.474029	0.325243	-1.457459	0.1476
V5_Trade	-0.109028	0.037385	-2.916391	0.0042
V6_Temp	1.712503	0.863567	1.983058	0.0496
V7_CO2	2.11E-08	2.97E-09	7.091188	0.0000
C	-14.81358	6.538237	-2.265684	0.0253

Cross-section fixed (dummy variables)

R-squared i	0.937626	Mean independent var	74.39914
Adjusted R-squared i	0.931389	S.D. dependent var i	18.17065
S.E. of regression i	4.75958	Akaike info criterion i	6.050827
Sum squared resid i	2718.432	Schwarz criterion i	6.333342
Log likelihood i	-389.38	Hannan-Quinn criter.	6.165631
F-statistic i	150.3233	iDurbin-Watson stat	0.385745
Prob(F-statistic) i	0.000000		

Notes. Authors' calculation.
Measured Variable: V1_Household Debt Total
panel (balanced) observations

With an R-squared of 0.937626, the explanatory variables can account for 93.76% explanation of in household debt. After accounting for the number of factors included in the study, the adjusted R-squared value of 0.931389 demonstrates that the explanatory variables can account for 93.14% of the variation in household debt. An excellent match between the model and the data is indicated by the high R-squared value. The model is statistically significant, as evidenced by the F-statistic of 150.3233 and p-value = 0.000000. There is no discernible autocorrelation in the residuals, according to the F-statistic, which is significant at $p < 0.05$ and the Durbin-Watson statistic, which is very near to 2.

4.3. Diagnostic tests
We conducted Walt test for for heteroskedasticity which indicat Chi-square(7) = 14.5638, with p-value = 0.042016. Therefore, based on this test, we reject the null hypothesis of homoskedasticity (where errors have constant variance across observations) at the 5% significance level. This suggests that there is evidence to indicate that the errors in the model exhibit heteroskedasticity. Further Pesaran CD test for cross-sectional dependence Test statistic: z = 0.529929,with p-value = P(|z| > 0.529929) = 0.596 Emphasize the high p-value (0.596) from the Pesaran CD test, indicating no significant cross-sectional dependence.

The 'Redundant Fixed Effect test' is the first test to identify the best model between common or fixed effects. A cross-section fixed effects test was conducted to test for the presence of fixed effects in a panel data analysis. The results shown in Table 4 evidence that both the cross-section F-statistic and the cross-section chi-square statistic are statistically significant at the 0.0000 level, strong evidence of the presence of fixed effects.

The cross-section F-statistic tests the null hypothesis that all cross-sectional unit effects are equal to zero, while the alternative hypothesis is that at least one of the effects is non-zero. The large F-statistic value of 262.76 and the associated p-value of 0.0000 suggest that the null hypothesis can be rejected, providing evidence that the cross-sectional unit effects are not all equal to zero. The cross-section chi-square statistic tests the null hypothesis that there are no fixed effects across cross-sectional units, while the alternative hypothesis is that there are fixed effects. The large chi-square value of 352.30 and the associated p-value of 0.0000 also suggest that the null hypothesis can be rejected, providing further evidence that there are fixed effects in the panel data (Table 5).

Overall, these results indicate that it is appropriate to include cross-section fixed effects in the panel data analysis to control for unobserved heterogeneity across the cross-sectional units. Therefore, it is accepted that there is a country effect.

Table 5
Redundant Fixed Effects Tests- Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	262.755558	-6,120	0.0000
Cross-section Chi-square	352.297116	6	0.0000

Notes. Authors' calculation.

The Hausman Test is performed for assessment the Endogeneity (Greene, 2003, p. 301). The null hypothesis: *the preferred model is random effects as the model assumes the error term is uncorrelated with the predictor variables.*

Table 6 indicates that the p-value is less than 0.05, resulting in the alternative hypothesis being accepted. Therefore, the fixed model is applicable.

Table 6
Hausman Test - Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	1576.533345	6	0.0000

Notes. Authors' calculation.

Household debt and macroeconomic elements can play a function in shaping monetary asymmetries, the relationship among those factors is complicated and multifaceted. The research results indicate that household debts which are asymmetric even in developed nations of G7 individually are affected by the degree of macroeconomic factors and sustainable factors.

The findings from the hypothesis testing underscore the intricate relationship between various factors and household debt. While house prices and unemployment show a positive impact on household debt, as indicated by studies such as Atalay et al. (2020) and Dumitrescu et al. (2022), respectively, trade exhibits an inverse effect, as noted by Xu et al. (2023). Moreover, the inclusion of environmental factors, particularly changes in temperature and CO_2 levels, as highlighted by Kandikuppa-Gray (2022), introduces a novel dimension to the discourse, suggesting that climate conditions may exert a significant influence on household financial behaviour. Surprisingly, the insignificance of short-term interest rates challenges conventional economic wisdom, prompting a revaluation of the factors driving borrowing decisions. In light of these findings, there is a compelling need for the development of a comprehensive multi-factor model that integrates economic and environmental variables to better elucidate their combined effects on household debt dynamics. This model could offer valuable insights into the underlying mechanisms and interactions shaping borrowing behaviour, thereby informing more nuanced and effective economic policies. Additionally, longitudinal studies focusing on the long-term impact of environmental factors on household debt, alongside behavioural analyses of how households navigate debt during periods of unemployment, could provide deeper insights into the complex dynamics at play. Ultimately, such research endeavours hold the potential to contribute significantly to the theoretical understanding of household debt and offer practical implications for policymakers and stakeholders alike.

5. Conclusions and implications

The economy of G7 countries is the most advanced economies in the world, and they can be used as a benchmark for future research on these topics. Household debt has a very important role in evaluating

financial stability and controlling systemic risk (Gray et al., 2007). Interest rate plays important role in private borrowing here. The study shows the relationship between Household debts, macroeconomic factors, and environmental factors by employing the quantitative method of OLS multiple Regression. The hypothesis testing shows that Household Debt was impacted positively by House Prices, Unemployment, and environmental factors. However, Trade had an inverse effect on household debt. We investigated the relationship and found that the strongest effect on household debt is unemployment and then the environmental factors represented by variable changes in the mean surface temperature. However, what seems very interesting is the short-term interest rate remained insignificant to household debts. Furthermore, its thought-provoking to see a progressive and significant effect on household debt by environmental factors temperature and CO_2 on household debts.

The beneficiaries of this research can include policymakers, economists, and financial institutions who are interested in understanding the factors that affect household debts. The findings of this research can inform policymakers about the macroeconomic and environmental factors that impact household debt, which can guide them in formulating policies aimed at addressing the issue of household debt. Financial institutions can also benefit from this research by using the insights gained from this study to develop products and services that are tailored to the needs of consumers who are struggling with debt. This research could be directive for other studies to examine the impact and influence of macroeconomic factors on the different environmental factors in the economy. The study provides insights into the relationship between these factors and household debt, the further research to examine the underlying causes and factors that contribute to these economic disparities.

5.1. Theoretical contributions

This study brings fresh theoretical insights into the understanding of household debt by incorporating environmental factors such as mean surface temperature and CO_2 levels into macroeconomic models of household debt. It finds a significant link between these environmental factors and household debt, suggesting that environmental changes can indeed influence eco-

nomic behavior. This opens up a new avenue in economic theory, integrating environmental variables with conventional economic indicators.

Moreover, the study challenges the conventional belief about the role of interest rates in household borrowing. Contrary to common assumptions, it finds that short-term interest rates do not significantly impact household debt levels. This result requires a rethinking of how monetary policy affects household debt and suggests the need for new theoretical frameworks to capture the complexities of household financial behavior

Furthermore, the research highlights the impact of unemployment on household debt, reaffirming its critical role in financial stability. By quantitatively assessing the influence of house prices and trade, the study provides a comprehensive understanding of the of the diverse factors influencing household debt. This contribution enhances the theoretical discourse on the interplay between macroeconomic conditions and household financial decisions, offering a more holistic view of the factors driving household indebtedness.

5.2. Policy and managerial implicatons

The insights gained from this study have significant implications for policymakers and financial managers. Policymakers can leverage these findings to design more effective interventions aimed at mitigating household debt. The positive relationship between environmental factors and household debt suggests that addressing climate change and promoting environmental sustainability could also have economic benefits. For example, investing in green technologies and infrastructure might not only help the environment but also stabilize household finances. Furthermore , strong influence of unemployment on household debt, policymakers should prioritize labor market policies that promote job creation and economic stability. Additionally, understanding that interest rates are less influential on household debt can help financial institutions design more flexible lending criteria that better reflect the broader economic context.

5.3. Limitations and suggestions for future research

The study is based on data from G7 countries, which are advanced economies with specific charac-

teristics. The findings may not be generalizable to developing countries or economies with different structural conditions. Future research should investigate the relationships between household debt, macroeconomic factors, and environmental factors in a diverse set of countries.

Finally researh or further explontation about relationship between haousehold debts and other environmental factors could be very usefull in this domain. For example, some possible studies could be done about deep investigation of macroeconomic and ecological factors on household saving and consumtions. In that regard authors could focus on these two varibles saving and consumtion from different perspectives. Beside this suggestions, further research could focus on detailed investigations how household debt is effected in different climate zone in some specific countries. Having in the mind that this suggestions would be very usefull for the future reasearch in this filed.

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Biography

Nasiha Osmanović, PhD, is, an educationist by profession, has been associated with the education industry for the past 13 years. She holds a PhD in Economics and Finance and has held various managerial administrative positions, including Deanship and Director of the MBA Program of universities in UAE. Dr. Osmanović demonstrates a high level of intellectual curiosity, research independence, and self-motivation. She is well-organized, highly structured in her research, and fully oriented towards adopting new research and empirical methods. She is a creative individual with the ability to visualize new concepts, and her intellectual curiosity makes her multilingual.

Shaista Alvi, is an Assistant Professor at Amity University, with an impressive career spanning over two decades of distinguished international experience within the banking sector. Her career has encompassed senior leadership roles in both local and global banks, with expertise in corporate lending, Credit Management, and Trade Finance, with a distinct focus on Emerging Markets. She actively contributes to the academic community through memberships in GARP and GICP, while her substantial research contributions are evident in numerous publications within esteemed, peer-reviewed Scopus (Q1)/ABDC-indexed journals and book chapters. Additionally, Dr. Shaista's commitment to academic excellence extends to her role as a dedicated reviewer for various Scopus (Q1)/ABDC-indexed journals and IEEE Conferences.

Утицај макроекономских и еколошких фактора на дугове домаћинстава у земљама Г7

Nasiha Osmanović[1], Shaista Alvi[2]

[1]Campus World University, Sharjah Research Technology and Innovation Park - Al Quoz - Wasit Suburb – Sharjah, Уједињени Арапски Емирати
[2]Amity University, Dubai, Уједињени Арапски Емирати

Кључне ријечи:

Земље Г7, Дугови домаћинстава, Макроекономско окружење, Метода обичних најмањих квадрата.

САЖЕТАК

Овај чланак има за циљ проучавање утицаја макроекономских и еколошких фактора на дугове домаћинстава. Квантитативна метода вишеструке регресије OLS је примјењена на податке коришћене за ово истраживање у периоду од 2003. до 2021. године. За утврђивање макроекономског фактора, метрике укључују индекс реалних цијена некретнина са базном годином 2015, незапосленост као % радне снаге и краткорочне каматне стопе на годишњем нивоу. Истраживање показује да цијене некретнина и незапосленост имају значајан однос са зависном промјењивом, док трговина робом значајно негативно утиче на дугове домаћинстава. У погледу фактора климатских промјена, резултати откривају да годишња површинска температура и годишње емисије CO_2 имају повољан и значајан утицај на дугове домаћинстава. Једини незнатан утицај на дугове домаћинстава показала је краткорочна каматна стопа. Корисници овог истраживања могу укључивати доносиоце политика, економисте и финансијске институције које су заинтересоване за разумијевање фактора који утичу на дугове домаћинстава. Значајан однос између дугова домаћинстава и фактора као што су цијене некретнина, незапосленост, извозна трговина, фактори климатских промјена, итд., одражава основне економске разлике у овим земљама. Резултати овог истраживања могу користити доносиоцима политика и економистима у даљем разумијевању еколошких фактора који утичу на дугове домаћинстава.