Bulletin of Business and Economics, 13(3), 403-412
https://bbejournal.com
https://doi.org/10.61506/01.00513

The Role of Various Factors in Accumulation of Household Debt on OECD Countries

Abdul Rehman Aziz[1], Shumaila Israr[2], Sadiya Amin[3], Bisma Ashraf[4], Hanzalah-bin-Tahir[5]

Abstract
The rapid increase in household debt since the 1980s has significantly transformed economic environments and raised substantial concerns regarding financial stability, particularly in the aftermath of the 2008 global financial crisis. This research seeks to explore the underlying factors contributing to household debt accumulation across 30 OECD nations, examining the impacts of both demand and supply-side elements. The analysis utilizes a baseline regression model to assess the determinants of household debt, employing fixed effect (FE), random effect (RE), and panel corrected standard error (PCSE) estimators to ensure robustness over the period from 1995 to 2022. The findings of this study provide novel insights into the drivers of household debt. Additionally, the results indicate that income, interest rates, financial development, unemployment, housing prices, welfare expenditures, and the working population all exert positive and significant influences on household debt, while inflation is found to have a negative impact. Consequently, the study advises policymakers to exercise caution and take proactive measures to prevent household indebtedness from escalating to unsustainable levels, thereby fostering sound countercyclical policies and ensuring adequate regulation of the housing market.

Keywords: household debt, the Organization for Economic Cooperation and Development (OECD), panel data analysis, fixed effects, random effects, and panel-corrected standard errors

1. Introduction

In most of the Organization for Economic Cooperation and Development (OECD) nations, household debt has been rapidly accruing since the 1980s, and this has been a major contributing factor to the global financial crisis of 2007–2009. (Mian, 2014). According to the Organization for Economic Cooperation and Development (OECD), household debt comprises all obligations incurred by households (including non-profit organizations that provide services to households) that necessitate repayment of principal or interest to creditors at a given future date. Liabilities include loans (mainly mortgage loans and consumer credit) and other accounts payable. The total of these categories is used to calculate debt. Net household disposable income is used to calculate the indicator's percentage. (OECD, 2024).

From 1990 to 2018, gross household debt increased significantly in most OECD nations. It roughly doubled as a percentage of net disposable income. Gross household debt as a percentage of net disposable income varies from less than 25% in certain countries to approximately 208% in Denmark and over 211% in the Netherlands. (OECD, 2024). Many factors contribute to the accumulation of aggregated debt including income level, housing prices, welfare spending, macroeconomic factors such as inflation, interest rate, consumption, and working population.

The determination of the root causes of rising household debt gained prominence after the 2008 financial crisis. While economists analyzed the demand-side macroeconomic factors such as income per capita, unemployment, inflation, consumption, and others, recent research has highlighted a contributed significantly of supply-side factors in the accumulation of household debt, for instance (Jha, 2019; Ali, 2022) argued financial liberalization, especially low-interest rate led to rapid increase in household debt. Extending the argument of financial liberalization (Svirydzenka, 2016; Ali, 2022) demonstrated a high correlation between debt level and financial development in European countries. Moreover, nearly all previous studies showed the significance of rising housing prices in the accumulation of household debt as mortgage makes up most of the household debt. Additionally, (Justiniano, 2015) discussed how the relaxation of lending constraints led to a significant expansion in the supply of mortgages, the largest component of household debt. Nonetheless, few studies discussed the role of welfare spending, (Lapavitsas, 2013; Ali, 2015) argued that rising household debt is due to the reduction in welfare spending by the state.

1.1. Problem Statement

Empirical testing of these arguments, often conducted in isolation, has been limited. Assessing the causes of household indebtedness empirically is crucial for designing policies aimed at maintaining financial and macroeconomic stability, for example (Merxe Tudela, 2005) tested household equation excluding house price. Whereas (Rubaszek, 2014) examined the claim that household debt accumulation is influenced by home prices. The panel study by Rubaszek and Serwa, however, does not examine the other theories regarding the causes of household debt that were previously mentioned.(Stockhammer G. L., 2018) consider just demand-side variables. Designing policies that sustain financial and macroeconomic stability through the household sector by regulating households' balance sheets requires an empirical assessment of the factors contributing to household indebtedness.

1.2. Research Questions

How do income, interest rate, financial development, government welfare spending, house price, consumption, and inflation drive the accumulation of household debt in OECD countries?

1.3. Objective

- Integrating both supply and demand-side factors in an empirical study of household debt accumulation.
- Including a wider database of 30 OECD countries.

[1] BS Graduate Student of Management Studies Department, Bahria Business School, Bahria University Islamabad, Pakistan, azizabdulrehman25@gmail.com
[2] Senior Assistant Professor, Management studies Department, Bahria Business School, Islamabad, Pakistan, shmailaisrar.buic@bahria.edu.pk
[3] BS Graduate Student of Management Studies Department, Bahria Business School, Bahria University Islamabad, Pakistan, sadiaamin354@gmail.com
[4] BS Graduate Student of Management Studies Department, Bahria Business School, Bahria University Islamabad, Pakistan, bismaashraf968@gmail.com
[5] BS Graduate Student of Management Studies Department, Bahria Business School, Bahria University Islamabad, Pakistan, hanzalatahir07@gmail.com

- Examines the macroeconomic factors influencing household debt in countries most impacted by the 2008 housing bubble burst.
- Explores hypotheses such as the welfare retrenchment hypothesis, along with testing the life cycle hypothesis, permanent income hypothesis, expenditure cascade hypothesis, and house price hypothesis,
- Provide a comprehensive analysis of household debt accumulation.

2. Literature Review

The 2008 financial crisis served as a wake-up call about the detrimental effects of increasing household debt. The impact of household debt led the decision-maker to look for the main reason behind the rise in household debt. there are recent literary studies that address the potential reasons behind rising debt. Numerous studies examined macroeconomic variables that affect household debt, including inflation, unemployment, and per capita income. The research was carried out in the US, UK, OECD, EU, and other developed nations. (Dumitrescu, Enciu, Handoreanu, Oberja, & Blaga, 2022), (Rubaszek, 2014), (Stockhammer G. L., 2018), (Xianming Meng, 2013), (Mian, 2014), (Merxe Tudela, 2005), (Khairunnisa Abd Samad, 2020) (Wildauer, 2017), (Massimo Coletta, 2019), (YEOM, 2014), (Ali, 2018), (Ali & Bibi, 2017), (Audi & Ali, 2023), (Audi et al., 2023), and (Audi et al., 2024).

(Dumitrescu, Enciu, Handoreanu, Oberja, & Blaga, 2022) analyzed the 28 OECD country's households via the unconditional quantile regression model and found that the level of household borrowing was significantly influenced in the upward direction by house prices, investment, and interest rate and positively influenced by public spending, unemployment, and inflation. In the emerging countries context, data from (Khairunnisa Abd Samad, 2020) revealed that other than house prices, and low interest rates the accumulation of household debt is rooted in financial development and the desire to own assets.

Meanwhile, (Stockhammer G. L., 2018) evaluated macroeconomic arguments for household indebtedness. using error correction models, they tested 7 hypotheses and found evidence for the house price, financial assets, falling wages, and welfare retrenchment hypothesis. (Massimo Coletta, 2019) investigated the household debt determinant in OECD countries and found the strength of bankruptcy systems and strong legal frameworks tend to have higher household debt levels. (Wildauer, 2017) analyzed 11 OECD countries and found a rise in housing prices explains nearly 20% of household debt, interest rates play a role but less the house prices whereas financial development has limited impact, and income inequality is insignificant in their study.

Table 1: Summary of studies on determinates of household debt

Summary of Studies on various factors in accumulation of household debt

Author name	Sample	Model	Other variable	GGDPC	INT	UP	FD	GS	HP	CO	INF	WP
(Khairunnisa Abd Samad, 2020)	19 Emerging countries	LSDVC		"+/-"	"+"	"-"	"+"		"+"	"+"	"-"	
Glenn Lauren Moore & Engelbert Stockhammer (2018)	13 OECD countries	Fixed effect & PCSE	Stock price Income inequality	"-"				"+"	"+"			"+"
Engelbert Stockhammer and Rafael Wildauer	11 OECD countries	Error correction model ARDL	Income inequality Population		"-"		"+"		"+"			
(Bogdan Andrei Dumitrescu, 2022)	26 OECD countries	GMM	Economic growth economic crises	"+"	"+/-"	"-"	"+"	"+"	"+"		"-"	
(Massimo Coletta, 2019)	OECD countries	Fixed effect instrumental variable	Gross saving rate Government effectiveness	"+"					"+"		"-"	
Merxe Tudela and Garry Young (2005)	United Kingdom	Overlapping generation (OLG)	Aggregated Financial Assets Housing Wealth		"+"				"+"	"+"		"+"
Xianming Meng, Nam T. Hoang, Mahinda Siriwardana (2013)	Australia	Cointegrated vector autoregressive (CVAR)	Population	"+"	"-"	"+"			"+"		"-"	
(Hyun Jeong Kim, 2017)	Korea	Canonical cointegrating regression (CCR)		"+"					"+"			
Mamoru Nagano And DongHo Yeom (2014)	Japan	Empirical Model	Financial assets	"-"	"-"		"+"		"-"			

(Xianming Meng, 2013) used the Cointegrated Vector Autoregression (CVAR) model to analyze Australian households and discovered that the rate of interest had a significant impact on the amount of borrowing that households did. GDP, housing prices, and population all had a positive impact on domestic debt. As a result, the sharp rise in household debt is closely linked to high home prices brought on by low interest rates. examined the factor that determines household debt.
(YEOM, 2014) discovered that the level of competition in the regional bank markets and the soundness of the bank's management have an impact on how aggressively the residential mortgage loan business operates in Japan.
Housing prices are a consistent driver of household debt change, according to previous literature surveys that have included both individual and cross-country analyses. According to this review, there aren't many studies explaining household debt by looking at welfare spending and financial development. Furthermore, few studies have focused on financial development and welfare spending; instead, they have highlighted the rise in household debt caused by low interest rates and high housing costs.
According to the life cycle model, a household would take out a loan when earnings were below expectations to choose the best course of consumption for the duration of the loan. Similar to this, the permanent income model contends that a household's consumption is determined by both its expected and current income levels, as a result,
H1: Income has a statistically significant mixed relationship with household debt.
An increase in domestic lending is expected to occur when short-term interest rates are low, as this allows households to access funds at a reduced cost. Nevertheless, research indicates that during periods of economic expansion, there is a significant demand for debt financing. Households exhibit a lower sensitivity to rising interest rates in financial markets during these prosperous times, as the heightened demand for loans enables lenders to maintain profit margins.
H2: Interest rate has a statistically significant mixed impact on household debt.
According to the expenditure cascades hypothesis, rising consumption pushes households that are already relatively poor owing to real income losses to accumulate debt to maintain relative consumption. As a result,
H3: Unemployment has a statistically significant positive impact on changes in household debt.
Prior research has demonstrated a link between rising credit and rising housing values, which is exacerbated by widespread money printing and market deregulation, leading to financial excess. (Hofmann, 2008; Audi, 2024). Therefore, it is anticipated that,
H4: Household debt and financial development will positively and statistically significantly correlate. Government welfare spending is predicted to positively correlate with household debt because it increases household consumption and pushes households to take on debt to fulfill their desire to own an asset. Whereas The welfare retrenchment hypothesis, which contends that rising household debt has been linked to social provision of basic services like housing, health, education, and so forth,
H5: Government welfare spending has a statistically significant mixed relationship with household debt.
Although a household's decision to accumulate assets makes the household more indebted, **H6:** House prices have a statistically significant positive correlation with household debt.
While rising household debt can be attributed to falling inflation, according to the studies, low inflation may contribute to household debt by easing the financial constraints on households.
H7: Inflation has a negative statistically significant relationship with Household debt,
Whereas, falling inflation is linked to rising household expenditures that fund consumption and are thus expected to positively impact household debt.
H8: Consumption has a positive statistically significant relationship with Household debt.
In addition, the life cycle model maintains that households borrow more when they are younger and save less when they are older. Therefore,
H9: working population and household debt have a positive statistically significant relationship.
Furthermore, we included income inequality as a control variable because prior research has demonstrated that rising incomes at the top end of the distribution drive household debt. After all, lower-income households take on debt in an attempt to keep up with the consumption of wealthier households. (Frank, 2014; Alvi, 2024). Furthermore, this study includes control variables like population growth and life expectancy to count for the demographic impact of each country in the panel.

3. Methodology and Data

Based on the review of theory and previous studies, the following model of household debt is suggested:
Equation 1: Function of Household debt

$$HD = f(GGPC, INT, UP, DCR, GS, HP, CO, INF, LWP, GINI, POP, LIFE) \quad \dots (1)$$

Where Household debt (HD) is a function of GDP per capita income growth (GGDPC), Short term interest rate (INT), Unemployment (UP), Domestic credit to private sector (DCR), Government welfare spending (GS), House price (HP), Consumption (CO), Inflation (INF), Working population percentage of total population (WP), Gini index (GINI), Population growth rate (POP), Life expectancy (LIFE).
To capture the effect of income, interest rate, unemployment, financial development, government welfare spending, House price, consumption, inflation, working population, income inequality, population, and life expectancy, the study proposes the household debt model as follows:
Equation 2: baseline model of Household debt

$$HDi,t = \beta 0 + \beta 1 GGDPCit + \beta 2 INTit + \beta 3 UPit + \beta 4 DCRit + \beta 5 GSit + \beta 6 HPit + \beta 7 COit + \beta 8 INFit + \beta 9 LWPit + \beta 10 GINIit + \beta 11 POPit + \beta 12 LIFEit \quad \dots (2)$$

Where $HD_{i,t}$ is household debt as dependent variables at the country I at time t, β_0 is the constant term. β_j (j= 1…9) as the coefficient of explanatory variable income GGDPC, Interest rate INT, Unemployment UP, Financial Development (DCR), Government welfare spending (GS), House price (HP), Consumption (CO), Inflation (INF) and working population (WPOP).
The dataset for this study involves the observations of panel data for 30 OECD countries: **Table 2: List of Countries in the panel**

Table 2: List of Countries

1	Australia	16	Korea, Dem. People's Rep.
2	Austria	17	Latvia
3	Belgium	18	Lithuania
4	Colombia	19	Luxembourg
5	Czechia	20	Netherlands
6	Denmark	21	Norway
7	Estonia	22	Poland
8	Finland	23	Portugal
9	France	24	Slovak Republic
10	Germany	25	Slovenia
11	Greece	26	Spain
12	Hungary	27	Sweden
13	Ireland	28	Switzerland
14	Italy	29	United Kingdom
15	Japan	30	United States

Data concerning household debt, short-term interest rates, unemployment, welfare expenditures, inflation, and life expectancy were obtained from the OECD Data Explorer. Information regarding income, financial development, consumption, the working population, and overall population figures was sourced from the World Bank database. Additionally, house price data and the income inequality index were collected from the Bank for International Settlements.

The panel data utilized in this study, covering the period from 1995 to 2022, is characterized as unbalanced. The analysis employed panel-correlated standard errors (PCSE) to ensure robustness. Given that the panel data consists of unbalanced cross-sections with a sample size of 30, it is classified as large, allowing for the application of the Fixed Effect Model (FE) to examine within-country variations while controlling for time-invariant country-specific effects (Massimo Coletta, 2019), Conversely, the Random Effect Model (RE) is deemed more efficient when unobserved effects are not perfectly correlated with independent variables, thereby offering insights into between-country variations and heterogeneity. The use of panel-corrected standard errors (PCSE) serves to test the robustness of both the Fixed and Random Effect Models, providing cluster-robust standard errors that account for heteroscedasticity and serial correlation present in the panel data (Stockhammer G. L., 2018).

Table 3: Data and Source

Variable	Proxy	Measuring Unit	Source
Dependent variable			
Household debt	Household debt to net disposable income	Percentage	OECD.org
Independent Variables			
Income	GDP per capita growth rate	Annual growth	WDI
Interest rate	Short-term interest rate	Annual rate	OECD.org
Unemployment	Annual unemployment rate	Percentage of the labor force in the same subgroup	OECD.org
Financial Development	Domestic Credit to private sectors	net inflows (% of GDP)	WDI
Welfare spending	Total of government spending on Education, social protection, Health, protection, housing, and public service	percentage of GDP	OECD.org
House prices	Real House price	Index	OECD
Consumption	Households and NPISHs final consumption expenditure (% of GDP)	(% of GDP)	WDI
Working Population	Population ages 15-64	Total	WDI
Inflation	Harmonized Indices of Consumer Prices	index	OECD.org
Control Variable			
Income Inequality	Gini Index	Index	BIS
Population	Population growth rate	%	WDI
Life Expectancy	Life expectancy	Year	OECD.org

4. ANALYSIS

4.1. Summary Statistics

Table 4 provides a summary of statistical analysis for all variables in the model for 30 countries. Included in the descriptive analysis is. household debt to disposable income (HD), GDP per capita growth (GGDPC), Short term interest rate (INT), Unemployment rate (UP), Domestic credit to the private sector (DCR), Government welfare spending (GS),

Table: 4 Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
HD	799	111.573	65.949	2.873	339.778
GGDPC	836	2.172	3.469	-14.464	23.305
INT	827	3.174	4.328	-0.819	32.583
DCR	696	95.962	46.865	0.186	217.761
UP	792	7.827	4.156	1.900	27.825
GS	809	44.160	7.620	20.996	64.894
HP	732	100.083	25.749	31.906	176.795
CO	840	54.676	8.158	24.447	72.573
INF	835	2.966	3.809	-4.448	39.648
LWP	696	9.076	1.488	1.928	12.242
GINI	812	30.203	5.292	21.900	53.200
POP	840	0.378	0.715	-2.482	2.891
LIFE	826	78.672	3.344	67.700	84.600

House price index (HP), Household consumption expenditure percentage of GDP (CO), Working population percentage (WPOP), consumer price index (INF), Gini index (GINI), Population growth rate (POP), Life expectancy (LIFE).

Table 4 shows that the average ratio of household debt to disposal income is 111.57%, with the lowest value of 2.87%(Lithuania) and the highest value of 339.78% (Denmark) respectively. The overall mean GDP per capita growth rate indicates economic growth at a rate of 2.17% per person and its minimum value is -14.464%(Estonia) and its maximum value is 23.305%(Ireland). On average the interest rate is 3.17% and the lowest is -0.819%(Switzerland) have negative interest rates while the highest go up to 32.58%(Colombia). The overall mean value for unemployment is 7.827% with the lowest value of 1.90%(Luxembourg) and maximum value of 27.825%(Greece).

For financial development (DCR), the mean value is 95.962%, with a range minimum and minimum value of 0.186%(Slovenia) and 217.7%(Japan) respectively. The mean value of Welfare spending (GS) is 44.160%, with the lowest minimum value at 20.99% in Korea and the highest maximum at 64.89% in Ireland. House prices have a mean value of 102.87%, with the lowest value of 39,17% in Sweden and the highest value of 176.7%(Hungary). The average value of consumption is 54.67% with Ireland having a minimum value of 24.44% and a maximum value is 72.57% in Colombia. The natural log of the working population has a mean of 9.07 its minimum value is 1.928 and Korea has the highest maximum at 12.24. The mean value of the inflation rate is 2.966% with a minimum value of -4.44%(Ireland) and a maximum value of 39.65%(Lithuania). To identify income inequality in population this study uses the Gini index, its mean value is 30.203, and the range of minimum and maximum is 21.9 (Slovakia) and 53.2 (Colombia) which indicates Slovakia distributes income evenly within the boundaries, so people take less household debt as compared to Colombia. The mean value of the population is 0.378% and its lowest minimum is -2.48% in Poland and 2.89% is the highest maximum in Ireland. The life expectancy has an average value of 78.67 and its range minimum and maximum value is 67.7 (Austria) and 84.6 (Netherlands).

Table 5 demonstrates the correlation matrix for all variables. The indicator for financial development, welfare spending, House prices, population, and life expectancy shows a statistically significant and positive relationship between household debt to disposal income. The variables that have a Negative correlation and are statistically significant with household debt are GDP per capita growth rate, interest, unemployment, consumption, inflation, and income inequality.

Table 5 exhibits the correlation matrix for all variables. The variables which are statistically and significantly have a positive impact on household debt (HD) are Financial Development (FD), Government Spending (GS), House Prices (HP), Population (POP), And Life Expectancy (LIFE). The variables GDP Per Capita Growth Rate (GGDPC), Interest (INT), Unemployment (UN), Consumption (CON), Inflation (INF), And Income Inequality (GINI) have a Negative correlation and are statistically significant with Household Debt (HD). The coefficient (-0.281) shows us that the income is significantly and negatively related to household debt (HD), households with high incomes (GGDPC) are less likely to borrow. The interest rates (INT)on the other hand, also show a negative coefficient (-0.3637) that indicates that the higher interest (INT) rates often decrease household debt (HD) because people do not borrow money when interest rates (INT) are high. A positive coefficient (0.65) for financial development (FD) shows a strong positive correlation between financial development (FD) and household debt (HD) which indicates that the developed countries' financial systems would encourage increased borrowing. Moreover, the negative coefficient (-0.2932) for unemployment (UN) indicates a negative relation between unemployment (UN) and household debt (HD). When unemployment increases, the households tend to borrow less which shows households reduced level of confidence in economic development.

Table: 5 Correlation Matrix

	HD	GGDPC	INT	DCR	UP	GS	HP	CO	INF	LWP	GINI	POP	LIFE
HD	1.00												
GGDPC	-0.28	1.00											
INT	-0.36	0.12	1.00										
DCR	0.66	-0.30	-0.32	1.00									
UP	-0.29	-0.04	0.10	-0.17	1.00								
GS	0.04	-0.33	-0.07	-0.07	0.20	1.00							
HP	-0.04	-0.04	-0.32	0.06	-0.10	-0.03	1.00						
CO	-0.42	-0.01	0.21	0.03	0.42	-0.06	0.02	1.00					
INF	-0.32	0.17	0.68	-0.34	-0.05	-0.06	0.18	0.15	1.00				
LWP	0.14	-0.01	-0.01	0.07	0.16	0.04	0.04	0.01	-0.02	1.00			
GINI	-0.15	0.02	0.22	0.01	0.23	-0.48	0.01	0.61	0.16	-0.24	1.00		
POP	0.48	-0.22	0.01	0.21	-0.34	-0.14	-0.11	-0.34	-0.08	-0.04	0.11	1.00	
LIFE	0.60	-0.35	-0.63	0.55	-0.18	0.20	0.14	-0.33	-0.51	0.05	-0.25	0.36	1.00

Additionally, the existence of a positive correlation coefficient (0.0396) between government spending (GS) and household debt (HD) shows a moderate positive relationship which suggests the higher government spending (GS) the higher household debt (HD). Conversely, the house price (HP) coefficient is negative which indicates there is a moderate negative relationship between house price (HP) and household debt (HD) when house price (HP) increases households tend to borrow less. The correlation between consumption (CON) and household debt (HD) shows a moderate negative relationship (-0.4206) which indicates higher consumption (CON) tends to lower household debt (HD). The negative correlation coefficient (-0.3213) for inflation (INF) shows a moderate negative relationship between inflation (INF) and household debt (HD) which shows that the higher inflation rate discourages households from borrowing more.

Furthermore, the correlation between the working-age population (WOP) and household debt
(HD) is significantly and moderately positive which indicates the higher the working-age population (WOP) the higher the household debt (HD). On the other hand, income inequality (GINI) has a negative coefficient (-0.152) which shows a weak negative relationship between income inequality (GINI) and household debt (HD). When income inequality (GINI) increases household debt decreases (HD), and lower-income households tend to borrow less due to highincome inequality.

Table: 6 Variance Inflation test

Variable	VIF	1/VIF
GINI	3.43	0.29
CO	2.76	0.36
GS	2.14	0.47
LIFE	2.13	0.47
POP	1.98	0.50
INT	1.81	0.55
UP	1.62	0.62
DCR	1.59	0.63
INF	1.57	0.64
GGDPC	1.35	0.74
HP	1.28	0.78
LWP	1.21	0.83
Mean VIF	1.91	

Lastly, this study observes a positive correlation between the population size (POP) and the share of household debt (0.4795), showing that when the population increases the household debt also increases, which suggests the high level of economic activity and loan opportunities. Similarly, the positive correlation between life expectancy (LIFE) and household debt (0.6049) shows that increasing life expectancy is associated with more borrowing, representing financial arrangements for long-term needs.

Table 6 shows that no variable exceeds the limit. The highest VIF value of GINI is 3.43 and the mean VIF values of the variables are below the limit of 2, exactly at 1.91. This enhances results and makes them more reliable as proves that there are no multicollinearity problems exist in the model.

The table refers to the period 1995-2022. The dependent variable is the household debt to net disposable income ratio. FE denotes the fixed effects estimator, RE donates the random effect estimator and PCSEs denotes panelcorrected standard errors estimator.

Table: 7 Econometric Results

	FE	RE	PCSE
GGDPC	0.566***	0.576***	0.904***
	(0.004)	(0.003)	(0.004)
INT	1.703***	1.682***	2.727***
	(0.000)	(0.001)	(0.001)
DCR	0.636***	0.664***	1.052***
	(0.000)	(0.000)	(0.000)
UP	0.636***	0.992***	0.5499**
	(0.000)	(0.001)	(0.046)
GS	0.711***	0.771***	1.152***
	(0.001)	(0.000)	(0.000)
HP	0.195***	0.156***	-0.713
	(0.000)	(0.001)	(0.176)
CO	0.692**	0.296	-3.926***
	(0.026)	(0.319)	(0.000)
INF	-0.703*	-0.672*	-1.419*
	(0.069)	(0.085)	(0.057)
LWP	3.366**	3.252**	6.36***
	(0.014)	(0.014)	(0.000)
GINI	-2.704***	-2.67***	0.060
	(0.000)	(0.000)	(0.886)
POP	1.150**	1.798	4.226***
	(0.050)	(0.291)	(0.002)
LIFE	6.090***	5.900***	-0.511
	(0.000)	(0.000)	(0.000)
Constant	-471.96***	-438.29***	161.96***
	(0.000)	(0.000)	(0.000)
σ_u	45.06	35.66	
σ_e	11.52	11.52	
ρ	0.93	0.905	
R^2 within	0.727	0.726	
Wald chi2			8456.06***
Prob > chi2			(0.000)
Observations	533	533	533

p-value is parentheses

*p<0.10; **p<0.05; ***p<0.001

5. Results and Discussion

This section presents the baseline regression analysis concerning the variables that affect household debt, employing both fixed effect (FE) and random effect (RE) estimators. The panel corrected standard error estimator (PCSE) is applied to mitigate the inconsistencies in estimates that may arise from measurement errors, omitted variables, and the potential endogeneity of the regressors. This approach is instrumental in evaluating the robustness of the baseline regression findings. The results of the baseline regression, utilizing fixed effect, random effect, and panel-corrected standard error models, are detailed in each column of Table 7. The analysis reveals several factors that are associated with the growth of household debt (as indicated by FE and RE), including positive correlations with income, interest rates, financial development, unemployment, government welfare expenditures, housing prices, consumption, the working population, total population, and life expectancy. Conversely, inflation and income inequality exhibit negative correlations with household debt.

Given the household's increased purchasing power, income is expected to increase expenditure and credit demand. Income has a positive coefficient and is statistically significant at the 1 percent significance level. Because household income generation is stable, they can repay debts more easily, which is why they are granted larger loans. (Khairunnisa Abd Samad, 2020), (Merxe Tudela, 2005) and (Hyun Jeong Kim, 2017) who made the case that real income and real house prices are positively correlated with households. A rise in real income (adjusted for inflation) leads to a desire for more expensive housing purchases.

The interest rate is found to have a positive correlation with household debt at a significance level of one percent for the subsequent explanatory variable. According to the findings, an increase in interest rates causes a 1.7 percent increase in household debt. (Khairunnisa Abd Samad, 2020), (Ho, 2016) found similar results in their research. Studies that revealed the phenomena of the

economic boom phase discovered a strong demand for debt financing. Due to the high demand for loans, households are less vulnerable to interest rate increases made by financial markets, which profit from prosperous times (Debelle, 2004). Therefore, as interest rates rise, so does household debt.

Table 7 illustrates that for both mediations, the coefficient of financial development is positive and statistically significant at the 1 percent significance level. Depending on the availability of domestic credit, household debt will rise by either 0.66 percent or 0.63 percent for every unit increase in financial development. The most significant factor in explaining household debt turned out to be the focal variable, economic development. Numerous studies have concluded that the financial system is to blame for the high level of household debt. The quick rise in household debt was largely caused by banks' lenient lending policies toward consumers as well as the expansion of deposits in financial institutions (Kim, 2014). Conversely, nations possessing advanced integrated financial institutions and efficient, comprehensive, and accessible financial market support systems can oversee and control risk and morality, which boosts confidence and makes it easier to obtain more domestic funding. Furthermore, people can obtain better financing if they can access financial institutions more easily. The ability of people and businesses to access financial services is referred to as financial accessibility (Svirydzenka, 2016). In this sense, a higher level of household debt may present more favorable prospects for obtaining bank-offered consumer loans(Debelle, 2004). Consequently, the findings indicate that household debt and economic development are positively correlated.

The analysis of FE and RE indicates a positive coefficient that is statistically significant at the 1 percent level. Specifically, a 1% rise in the unemployment rate correlates with an increase in the household debt to disposable income ratio by either 0.63% or 0.99%. This finding is supported by previous research, including studies by (Massimo Coletta, 2019) and (Xianming Meng, 2013) which suggest that elevated unemployment rates lead to diminished household income and a heightened demand for loans to support consumption. From this viewpoint, while a high unemployment rate tends to elevate household debt, the associated decrease in income raises concerns regarding future earnings, leading to two significant implications. First, households lacking stable employment are more likely to experience financial constraints due to apprehensions about their ability to repay loans. Second, unemployment itself heightens the risk of encountering financial limitations. These two factors collectively dampen the demand for financing and impede the growth of household debt. Furthermore, the estimated results indicate that interest rates exert a more substantial impact than the unemployment rate. This observation aligns with earlier findings, as (Debelle, 2004) argues that unemployment typically affects a smaller segment of the population and that there has historically been minimal overlap between households with high debt levels and those facing greater unemployment risk, rendering the unemployment rate less impactful than interest rates.

Also, the estimated coefficient of government welfare spending is statistically significant at a 1% level but has a positive sign which contradicts to welfare retrenchment hypothesis but (Stockhammer G. L., 2018) obtained similar results in the short run. However, (Dumitrescu, Enciu, Handoreanu, Oberja, & Blaga, 2022) Government expenditure was tested and found to have a low level of significance with a positive sign, supporting the argument that the government should use public expenditure to boost consumer confidence. However, the sign rapidly changes when household debt levels rise, exhibiting a negative response to rising public expenditure. This could be attributed to the crowd effect or Ricardian behavior of households, but it also occurs when household expectations regarding the state of the economy are negative. Furthermore, instances where governments share the burden of household consumption basket, may result in households taking on more debt to finance their desire for housing with the now spared portion of income.

House prices have an additional impact on the rise in household debt. Positive and statistically significant coefficients of house prices are found at the 1 percent confidence level. With every 1% increase in house prices, household debt will increase by at least 0.19% or 0.15% (as indicated in FE and RE), respectively. The findings are backed up by (Bogdan Andrei Dumitrescu, 2022), (Dumitrescu, Enciu, Handoreanu, Oberja, & Blaga, 2022), (Khairunnisa Abd Samad, 2020), (Frank, 2014), They concluded that household debt is positively impacted by home prices. In addition to borrowing more to pay for non-durable expenses, households with high debt also borrow more to finance investments backed by assets; in fact, Minsky contended that debt financing for investments rises during economic booms.

Furthermore, Consumption has a positive and statistical significant at a 5% level with the FE estimator and a positive and statistically insignificant impact with the RE estimator, (Adél Bosch, 2022) argued when an asset bubble bursts, households experience a variety of shocks at once, meaning that having a high debt load does not always negatively affect consumption. For instance, households that were excessively indebted to the mortgage market faced significant wealth loss following the financial crisis when home prices dropped precipitously. Households decreased their consumption in response to this wealth loss, and potential job and income losses, but to maintain their standard of living, they tended to borrow more, which strengthened their case by demonstrating a positive correlation between consumption and consumer debt to income and mortgages.

The estimated coefficient for inflation is found to be negative and statistically significant at the 5% and 10% levels when employing fixed effect and random effect models, respectively. This indicates that a 1% increase in inflation is associated with a reduction in household debt ranging from 0.6% to 0.7%. These findings align with the research conducted by (Debelle, 2004), (Ho, 2016) which posits that the increase in household debt can be attributed to a decrease in inflation. The studies imply that low inflation may contribute to higher household debt levels by alleviating financial constraints faced by households.

In both of the estimated results, the explanatory variable, the natural logarithm of the working population, has a positive and statistically significant effect on household debt at a 1 percent confidence level.(Adél Bosch, 2022) (Stockhammer G. L., 2018) (Wildauer, 2017) and (Hyun Jeong Kim, 2017) all these studies showed, that people in their retirement years are less likely to accumulate debt because they borrow money in their early working years when their income is typically lower, and pay it back later in life, which balances out their lifetime consumption and supports the life-cycle hypothesis.

Table 7 illustrates the regression analysis with the PCSE estimator for robustness testing: Income Interest rate financial development Unemployment Government welfare spending Working population on the other hand, inflation shows a negative and statistically significant coefficient.

The results are robust and consistent with other test-estimated results in Table 7. Consumption The house price hypothesis is refuted by the statistical insignificance of the coefficient of the house price. The impact of consumption and demography is absorbed by financial development interest rate consumption. The empirical evidence is shown in Table 7: household debt has a negative relationship with inflation, but it has a positive relationship with income interest rate, unemployment, financial development, government welfare spending, and working population.

Table: 8 Comparison of econometric findings with findings of existing panel econometric studies

	Variable	Findings	Consistency with the general findings of existing panel econometrics studies on factors of household debt
1	Income	Robust evidence of a positive relationship	Consistent with (Khairunnisa Abd Samad, 2020), (Merxe Tudela, 2005)
2	Interest Rate	Robust evidence of a positive relationship	Consistent with (Ho, 2016), (Khairunnisa Abd Samad, 2020)
3	Financial Development	Robust evidence of a positive relationship	Consistent with (Svirydzenka, 2016), (Debelle, 2004)
4	Unemployment	Robust evidence of a positive relationship	Consistent with (Massimo Coletta, 2019), (Debelle, 2004)
5	House Prices	Some evidence of a positive relationship	Consistent with (Adél Bosch, 2022), (Dumitrescu, Enciu, Handoreanu, Oberja, & Blaga, 2022), (Frank, 2014), (Khairunnisa Abd Samad, 2020)
6	Government Welfare spending	Robust evidence of a positive relationship	Consistent with (Stockhammer G. L., 2018), (Dumitrescu, Enciu, Handoreanu, Oberja, & Blaga, 2022)
7	Consumption	Some evidence of a positive relationship	Consistent with (Adél Bosch, 2022)
8	Inflation	Robust evidence of a negative relationship	Consistent with (Debelle, 2004), (Ho, 2016)
9	Working Population	Robust evidence of a positive relationship	Consistent with (Adél Bosch, 2022), (Stockhammer G. L., 2018), (Wildauer, 2017)

6. Conclusion

In most OECD nations, household debt levels rose sharply in the years preceding the Great Recession, but they have stabilized or even declined since the recession's beginning. A lot of experts think that the Great Recession started because of household debt. This study examines the relationship between household debt and disposable income, considering demand and supply factors along with other variables, and analyzes 30 countries between 1995 and 2022. The following outcomes are obtained by this paper. In 30 OECD countries, the working population, government spending on welfare, interest rates, financial development, unemployment, and income growth all contribute to rising household debt. Debt is negatively impacted by inflation.

6.1. Policy Implications & Recommendations

These findings have implications for OECD policymakers who balance household debt against financial stability. The key takeaways from this research are to encourage healthy countercyclical policies, exercise caution intervene early before household debt reaches unmanageable levels and provide adequate oversight of the housing market. The ability of households to smooth consumption over time, the sustainability of household debt, and overall economic performance are all impacted by macroeconomic management. Future studies should investigate whether the results of this study hold over extended periods and whether they are consistent between
nations.

References

Adél Bosch, M. C. (2022). Household debt and consumption dynamics A non-developed world view following the financial crisis. *Applied Economics*, 54, 897-917.

Ali, A. (2015). *The impact of macroeconomic instability on social progress: an empirical analysis of Pakistan*. (Doctoral dissertation, National College of Business Administration & Economics Lahore).

Ali, A. (2018). Issue of Income Inequality Under the Perceptive of Macroeconomic Instability: An Empirical Analysis of Pakistan. *Pakistan Economic and Social Review*, 56(1), 121-155.

Ali, A. (2022). Determining Pakistan's Financial Dependency: The Role of Financial Globalization and Corruption. *Journal of Business and Economic Options*.

Ali, A. (2022). Financial Liberalization, Institutional Quality and Economic Growth Nexus: Panel Analysis of African Countries. *Bulletin of Business and Economics (BBE), 11*(3), 37-49.

Ali, A. and Bibi, C. (2017). Determinants of Social Progress and its Scenarios under the role of Macroeconomic Instability: Empirics from Pakistan. *Pakistan Economic and Social Review* 55 (2), 505-540.

Alvi, A. A., Audi, M., & Ashiq, R. (2024). *Is indirect Taxes Bad for the Poor? Examining the Determinants of Poverty in Pakistan*. University Library of Munich, Germany.

Audi, M. (2024). The Impact of Exchange Rate Volatility on Long-term Economic Growth: Insights from Lebanon. *Journal of Policy Options*, *7*(2), 1-10.
Audi, M., & Ali, A. (2023). Public Policy and Economic Misery Nexus: A Comparative Analysis of Developed and Developing World. *International Journal of Economics and Financial Issues*, *13*(3), 56.
Audi, M., Ali, A., & Hamadeh, H. F. (2022). Nexus Among Innovations, Financial Development and Economic Growth in Developing Countries. *Journal of Applied Economic Sciences*, *17*(4).
Audi, M., Ehsan, R., & Ali, A. (2023). Does Globalization Promote Financial Integration in South Asian Economies? Unveiling the Role of Monetary and Fiscal Performance in Internationalization. *Empirical Economics Letters*, 22(10), 237-248.
Audi, M., Poulin, M., & Ali, A. (2024). Determinants of Business Freedom in Developing Countries: The Role of Institutional Development and Policy Mix. *International Journal of Economics and Financial Issues*, *14*(4), 188-199.
Bogdan Andrei Dumitrescu, A. E. (2022). Macroeconomic Determinants of Household Debt in OECD Countries. *Sustainability*, 14, 3977.
Cooper, D. A. (2016). Wealth Effects and Macroeconomic Dynamics. *Journal of Economic Surveys*, 34-55.
Debelle, G. (2004). Macroeconomic implications of rising household debt. *Monetary and Economic Department BIS Working Papers*.
Dumitrescu, B., Enciu, A., Handoreanu, C., Oberja, C., & Blaga, F. (2022). Macroeconomic Determinants of Household Debt in OECD Countries. *Sustainability*.
Frank van Hoenselaar, B. C. (2021). Mortgage finance across. *OECD Economics Department Working Papers*.
Frank, R. H. (2014). Expenditure Cascades. *Review of Behavioral Economics*, 55-73.
Friedman, M. (1957). A Theory of the Consumption Function. *Princeton University Press*.
Ho, S. F. (2016). Household debt, macroeconomic fundamentals, and household characteristics in Asian developed and developing countries. *The Social Science*, 11(18), 4358–4362.
Hofmann, C. G. (2008). House prices, money, credit, and the macroeconomy. *Oxford Review of Economic Policy*.
Hyun Jeong Kim, J. C.-S. (2017). House Price Dynamics with Household Debt: The Korean Case. *Asian Economic Journal*, Vol. 31 No. 1, 39–59.
Jha, C. K. (2019). Financial reforms and corruption: Evidence using GMM estimation. *International Review of Economics & Finance*.
Jones, R. S. (2014). Addressing High Household Debt in Korea. *OECD Economics Department Working Papers*, 1164.
Justiniano, A. G. (2015). Credit supply and the housing boom. *Federal Reserve Bank of New York Staff Reports*, 709.
Khairunnisa Abd Samad, S. N. (2020). Determinants of household debt in emerging economies: A macro panel analysis. *Cogent Business & Management*.
Kim, H. J. (2014). Household indebtedness in Korea: Its causes and sustainability. *Japan and the World Economy*, 29, 59– 76.
Lapavitsas, C. (2013). *Profiting without Producing. How Finance Exploits Us All.* London: Verso.
Massimo Coletta, R. S. (2019). Household Debt in OECD Countries: The Role of Supply-Side. *Springer Nature*.
Merxe Tudela, G. Y. (2005). The determinants of household debt and balance sheets in the United Kingdom. *Bank of England*.
Mian, A. A. (2014). House of Debt: How They (and You) Caused the Great Recession, and How We Can Prevent It from Happening Again. *University of Chicago Press*.
Modigliani, F., & Brumberg, R. (1954). Utility Analysis and the Consumption Function: An Interpretation of Cross-section Data. PostKeynesian Economics. *Post Keynesian Economics*, 388-436.
OECD. (2024). *Household debt (indicator).* OECD.org.
Rubaszek, M. a. (2014). Determinants of Credit to Households: An Approach Using the Life-Cycle Model. *Economic Systems 38*, 572-87.
Stockhammer, E. (2012). Financialization, Income Distribution, and the Crisis. *Investigacion Economica*, 39-70.
Stockhammer, E. (2015). Rising Inequality as a Cause of the Present Crisis. *Cambridge Journal of Economics*.
Stockhammer, G. L. (2018). The drivers of household indebtedness reconsidered: An empirical evaluation of competing arguments on the Index of Financial Development. *Internaational Monetary Fund*.
Taylor, J. B. (2009). The Financial Crisis and the Policy Responses: An Empirical Analysis of What Went Wrong. *NBER Working Paper No. 14631*.
Wildauer, E. S. (2017). Expenditure Cascades, Low Interest Rates, or Property Booms? Determinants of Household Debt in OECD Countries. *Post Keynesian Economics Study Group*.
Xianming Meng, N. T. (2013). The determinates of Australian Household debt: A macro level. *Journal of Asian Economics*.
Yeom, M. N.-H. (2014). Another Determinant of Household Leverage: Evidence from Japan's Mortgage Loan Data. *Internation Review of Finance*.