Economic growth strategy: an empirical analysis of the determinants of the private saving rate in Lebanon

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Abstract: Stemming from the factuality that a nation's saving rate is a key indicator of the investment rate, a decisive influencer on economic growth, this empirical study aims at analysing the determinants of the Lebanese private saving rate. Private saving is a vital element to the Lebanese national saving rate, as the other constituent, the public saving rate, has remained persistently negative throughout the post-war period, hence accentuating the importance of researching its determinants. Secondary data covering the period from 1980 to 2014 is employed in the aim of testing seven hypotheses linking private saving to both demographic and macroeconomic variables. The findings provide evidence of significant negative causality between the dollarisation rate and growth in urbanisation rate with private saving as expected, while the income variable unpredictably showed a negative causal relationship. These implications help determine the proper strategy to follow for more effective planning and policy making.

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1   Introduction

Countless reasons motivate people to save money, of which are unforeseen future expenses, unexpected income volatility, and the drive to secure the futures of following generations. In the same line, many psychological factors also play an influential role in shaping households' saving behaviours, as consumption is adjusted according to the access to credit in some situations, whereas modified in the aim of maximising self-satisfaction in others. Nevertheless, there still is an ongoing debate about what exactly motivates the saving behaviour of individuals over time, and how it varies between developed and developing countries, different cultures, as well as across different social classes. According to Hamadi et al. (2011a, p.36), "the order of

importance in the determinants of saving varies across cultures, populations, experiences, backgrounds, and shocks, hence influencing in a different way the saving of a nation with respect to that of another."

Investigating the determinants of the private saving rate has been a growing area of interest for economists of classical, neo-classical and modern schools, as wealth accumulation is a supporter as well as a predictor of economic growth. According to Mankiw (2015), the national saving rate constitutes the sum of the private and public savings, with the latter being the difference between the government's revenues and its expenditures. If the difference was to be negative, then the government would be undergoing a budget deficit, and consequently public saving would be negative as well. However, when government's revenues are increased, mainly from taxes, public saving would henceforth be increased, nevertheless, private saving would be reduced (Mankiw, 2015). Hence, the saving of households or the private saving rate is therefore considered to constitute what remains of households' incomes after deducting consumption and taxes (Mankiw, 2015).

Within the Lebanese context, several features demonstrate the fragile situation, those mainly being the dire economic conditions characterised by high inflation and unemployment figures, in addition to a persistent political instability. To add, the country's financial system is obstructed by many constraints hampering its economic growth, specifically the progressive risky debt financing of the government mainly from local banks, which forces interest rates to rise and subsequently hinders local productive investments. Henceforth, private saving is considered to be a vital element to the Lebanese national saving rate, as the other constituent the public saving rate, has remained persistently negative throughout the post-war period, therefore justifying the importance of researching and scrutinising its determinants. In this line, many inquiries revolving around private saving are left unanswered, of which some concerning the saving behaviour of the Lebanese people, the sensitivity of this behaviour to changes in interest rates and inflation, as well as the relevant effect of psychological and demographic factors.

This research will attempt to identify the main determinants of the private saving rate in Lebanon, covering a larger period from 1980 to 2014 compared to previous studies in the country. In general, a relatively young population in a developing country as Lebanon is expected to have increased private saving, particularly in the absence of a well-designed pension system where the government has yet to reform its benefits. Most importantly, the past few years witnessed violent socioeconomic disorders resulting from corrupted public sector activities, declining GDP growth rate approaching 0% (and expected to become negative), high unemployment rate of almost 35% in the 25 to 40 age bracket, public debt to GDP (alarmingly) exceeding 130%, the large number of Syrian refugees of around one quarter of the Lebanese population, large and wild disorder by a crowd of almost half of the population in the streets protesting (sometimes violently) against government policies accused of corruption, and an exodus of the young generation emigrating in masses to safer and more stable environments. These imbalances require a revision and an extension to the present time of the main determinants of the private saving rate in Lebanon in order to better shed light on policies that could be adopted to stimulate private saving, hence productive investment, and consequently lead to economic growth.

This herein paper is structured as follows: Section 2 provides a discussion of the existing literature on the topic, as well as the theoretical frameworks used to explain the determinants of the private saving rate. Section 3 introduces and elaborates on the hypotheses to be tested, whereas Section 4 discusses the adopted methodology for the research, as well as the qualities of the sample. Then, the findings and their interpretation are introduced throughout Section 5, and finally, Section 6 presents a comprehensive summary of the framework, findings and concluding remarks.

2   Theoretical foundations

Studies aimed at uncovering the determinants of private saving have been significantly proliferating, with the corresponding researchers belonging to different economic schools of thought. Amongst a multitude of stances, classical and neo-classical theoreticians stress mainly on the saving rate of return, which is the interest received for avoiding present consumption, as being the main determinant of saving, and where a higher interest rate level would increase the saving rate. On the other hand, modern economists such as Keynes, Ando, Modigliani and Friedman, stipulate that income is the most significant and central determinant of saving. According to Keynes (1936), both consumption and saving are positively and significantly correlated with income. Moreover, the life cycle hypothesis that was developed by Ando and Modigliani (1963) states that young and aging individuals have a higher propensity to consume than middle-aged people, as the formers have a lower income on average. Furthermore, Friedman (1957) developed the permanent income hypothesis, which differentiates transitory or unexpected income from the permanent one, and states that household consumption is a function of the permanent one. Therefore, any growth in income that is considered as permanent would therefore incite and stimulate households to increase their consumption, while a rise in what is perceived as transitory would conversely increase saving. Still, as confirmed by Friedman's permanent income hypothesis, people in rural areas tend to save more and consume less because of the instability in their sources of income in their areas. Lastly and according to the Ricardian equivalence, the spending behaviour of consumers is forward-looking, hence consequently provoking them to base spending decisions on their expected future income, rather than solely on their current income. Henceforth, "the implication of Ricardian equivalence is that a debt-financed tax cut leaves consumption unaffected. Households save the extra disposable income to pay the future tax liability that the tax cut implies" [Mankiw, (2015), p.567].

Empirically, researches aimed at identifying and analysing the determinants of the saving rate have grown in both numbers and coverage across the globe, as well as have produced different findings. Loayza et al. (2000) found that real interest rate, financial liberalisation, urbanisation, and dependency ratios had negative impacts on private saving, while conversely that of inflation was positive. Samwick (1999) concluded that the level of income per capita and its growth rate affected saving positively and significantly, whereas the urbanisation ratio, youth dependency ratio, and the ratio of private credit to income were found to negatively affect it. Hondroyiannis (2006) discovered that the saving function was sensitive to real disposable income growth, real interest rate, inflation, dependency ratio, and public finances in European countries. Schrooten and Stephan (2005) stated that household saving in both EU and accession countries was driven by the per capita income growth, which had a positive impact on the

private savings rate, as well as the relaxation of international borrowing constraints, better performance of domestic financial markets, and dependency ratios which had a negative one. Garcia et al. (2011) stipulated that the significant factors that affected the saving attitude in Portugal were the respondents' ages, perception of longevity, and the perception of the replacement rate. Rószkiewicz (2014) affirmed a relation between income and saving in Poland, while Kolasa and Liberda (2015) found that private saving was positively affected by the change in real private income, growth of consumer prices, and interest rates, yet negatively affected by government saving and financial deepening. Castro Campos et al. (2013) discovered that government budget, disposable income, and dependency ratios were negatively correlated with private saving, whereas net foreign assets had a positive coefficient in OECD countries. Guariglia and Kim (2001) uncovered that earnings uncertainty had a significant positive effect on saving in Russia, while Gatina (2014) concluded that the saving of emigrants to Australia was positively correlated with the country's old-age dependency ratio and GDP per capita, however negatively correlated with the country's national household saving rate and national saving rate. Furthermore, Hess (2010) found that income is positively correlated with private saving, opposed to young and old dependency ratios, which had a negative effect. Athukorala and Sen (2004) validated that the real rate of return on bank deposits, the income-growth rate, the GNDI per capita, and inflation, were significantly and positively related to saving behaviour in India, whereas population per bank branch and terms of trade were negatively correlated with private saving. Kwack and Lee (2005) discovered that the moving average of the growth rate of income and the variance of income growth positively affected the saving rate in Korea, whereas dependency ratios, old and young, had a negative correlation with the saving rates. Jongwanich (2010) concluded that current income and income growth tended to positively affect private saving in Thailand, while the increase in elderly and childhood dependency ratios were found to have a negative impact. Butelmann and Gallego (2001) revealed that income, education, age, and dependency ratios were positively correlated determinants of household saving rates in Chile. As within Lebanon specifically, Hamadi et al. (2011a) examined the factors that stimulated private saving and concluded that income had a positive and significant effect, while inflation, real interest rate, and dollarisation rate were found to have a negative and significant impact, with the exception of urbanisation rate which had a negative yet insignificant impact.

In this line, it is evident that the determinants of private saving vary in magnitude across nations, as well as in typology and nature of correlation. Therefore, various and sometimes contrasting findings exist in the related body of literature, hence expanding further on economic theoretical foundations concerning private saving, and incenting additional research on the topic within new spatial and temporal contexts.

3   Hypotheses and operationalisation

Deductive in nature, this herein paper intends to empirically investigate the determinants of the private saving rate in Lebanon, by examining the potential causal relationship between private saving and various local macroeconomic and demographic variables. Income, real interest rate on deposits, inflation, and the dollarisation rate constitute the macroeconomic variables, while growth in age dependency ratios and urbanisation rate

are employed as demographic ones. The dependent variable being the private saving rate is calculated by dividing real increase in private deposits by RGDP, and whereby the accuracy of the relevant figures is guaranteed via the extraction of data from audited balance sheets of local commercial banks.

3.1   Income variable

According to modern economists, the private saving rate is mainly affected by the income of households, hence selecting income growth rate as a probable factor in determining the saving rate in Lebanon is justifiable given its significant effect as revealed by several authors. According to Loayza et al. (2000), Hondroyiannis (2004, 2006) and Samwick (1999), income growth rate was found to produce a significant positive effect on the private saving rate, thus suggesting that as households become richer, their saving rates increase. In addition, this reality remained accurate for both European-accession and member countries (Schrooten and Stephan, 2005), China (Horioka and Wan, 2006), Thailand (Jongwanich, 2010), Lebanon (Hamadi et al., 2011a), and India (Athukorala and Sen, 2004). Yet, in the Polish context as per Rószkiewicz (2014), only a weak positive association was observed between the income level and the possibility of systematic saving, therefore the income effect might differ across nations. However, the assumption to be validated in this paper is that income affects saving rate significantly and positively. This reasoning allows the formulation of the first hypothesis:

H_1 The private saving rate is positively affected by income.

3.2   Real interest rate

As per classical and neoclassical theoreticians, the savings' rate of return, which is the interest received for refraining from present consumption, is the main determinant of private saving, consequently, a higher interest rate level will increase the saving rate. As elaborated by Athukorala and Sen (2004, p.494): "a higher interest rate increases the present price of consumption relative to the future price (the substitution effect), and thus provides an incentive to increase saving." However, if the household is a net lender, the interest rate rise also raises lifetime income, and thus tends to increase consumption and decrease saving (the income effect). Therefore, a change in interest rate levels might generate different effects on households, depending on their preferences or positions, and consequently any increase in interest shall affect the saving rate positively only if the substitution effect surpasses the income effect. In European countries (Hondroyiannis, 2006), Greece (Hondroyiannis, 2004), and India (Athukorala and Sen, 2004), the real interest rate had a positive and statistically significant effect on the private saving rate. On the other hand, the real interest rate generated a negative effect on the private saving rate in several countries worldwide (Loayza et al., 2000), as well as in Lebanon (Hamadi et al., 2011a), suggesting that the income effect dominated the substitution effect. Furthermore, the interest rate in Thailand, generated a positive but statistically insignificant effect on the saving rate (Jongwanich, 2010). Henceforth, it is worth testing the effect of interest on the saving rate in Lebanon, especially that the banking system provides high interest levels on local currency deposits compared to other currencies. Thus, the assumption to be validated is that real interest rate affects saving rate significantly and positively, and consequently hypothesising the following:

H₂   The private saving rate is positively affected by the real interest rate.

3.3   Inflation

Inflation, commonly defined as a general increase in prices, reduces consumers' purchasing power, which in turn according to Athukorala and Sen (2004) might trigger them to reduce consumption in order to maintain a target real wealth relative to income. As elaborated by Hondroyiannis (2006, p.564) when referring to European countries, "inflation, which is a proxy for macroeconomic uncertainty, has a statistically significant positive effect on private saving behavior. This result suggested that in periods of high inflation, individuals prefer to save a larger fraction of their income for precautionary motives." The same case applies in worldwide countries (Loayza et al., 2000), Greece (Hondroyiannis, 2004), and Thailand (Jongwanich, 2010). On the other hand, the impact of inflation was ambiguous in China as explored by Horioka and Wan (2006) where the coefficient was not always significant, yet negative and significant in selected samples. In Lebanon and as concluded by Hamadi et al. (2011a), inflation had a negative impact on saving, justified by the attitude of individuals switching their investments to more profitable areas in order to safeguard their wealth from the negative real return on saving. Based on the above, it is worth testing inflation as a major determinant of private saving, and the assumption to be validated is that inflation affects saving rate significantly and positively. This reasoning allows the formulation of the third hypothesis:

H₃   The private saving rate is positively affected by inflation.

3.4   Dollarisation rate

The dollarisation rate of deposits was established as a significant indicator of uncertainty in Lebanon, as it exponentially increased between the years 1985 and 1986 from 38% to 73%, amid people's fears of losing the real value of deposits following the steep depreciation of the national currency in September 1983. Even with the adoption of a pegged exchange rate system since 1993 by the Lebanese Central Bank, the dollarisation rate has been persistently high in Lebanon up until present times. As stated earlier, the dollarisation rate has been found to have a negative and significant coefficient towards affecting the saving rate in Lebanon (Hamadi et al., 2011a), as economic instability and political uncertainty emerge, thus increasing the dollarisation rate as people rush to convert their savings from the local currency to the USD and transfer them outside the country. Accordingly, it is worth considering the dollarisation rate as a probable key determinant of saving rate in Lebanon, and therefore the assumption to be validated is that dollarisation rate affects saving rate significantly and negatively. This reasoning allows the formulation of the fourth hypothesis:

H₄   The private saving rate is negatively affected by the dollarisation rate.

3.5   Age dependency ratios

The life cycle hypothesis, developed by Ando and Modigliani (1963), stated that young and aging individuals have a higher propensity to consume than middle-aged people, knowing that the formers have a lower income on average. Thus, it is expected to have a

negative relation between the age dependency ratios and the private saving rate. The life cycle hypothesis has been authenticated worldwide across countries throughout many studies of which are Loayza et al. (2000) and Samwick (1999), yet in the latter study, the elderly dependency ratios were insignificant. Moreover, the hypothesis stood valid in Thailand (Jongwanich, 2010), Greece, (Hondroyiannis, 2004) and throughout the most of Europe (Hondroyiannis, 2006). As clarified by Hondroyiannis (2006, p.562), "in most of the countries in the European Union, the established social security systems are under financial pressure. The level of reimbursement from the existing social security systems does not satisfy the individuals, and they realize the need for more own provision by private saving." More specifically, because of residing strong family ties in Greece, old people continue to save money in order to support financially their children and grand-children. Conversely, age dependency ratios tended to have an insignificant effect on the saving rate in European member states (Schrooten and Stephan, 2005) and China (Horioka and Wan, 2006). In this line, testing the effect of age dependency ratios on saving rate is worth considering, and therefore the assumption to be validated is that the growth in young and old age dependency ratios affect saving rate significantly and negatively. This reasoning allows the formulation of the following hypotheses:

H_5 The private saving rate is negatively affected by the growth in the young dependency ratios.

H_6 The private saving rate is negatively affected by the growth in the old dependency ratios.

3.6   Urbanisation rate

Friedman's (1957) permanent income hypothesis confirmed that people in rural areas tend to save more and consume less, because of the instability in their sources of income in their areas. This phenomenon can be hence considered as a precautionary-saving motive. Consequently, it is expected that a negative relation exists between urbanisation ratios and private saving rates, such as in the case of many countries worldwide as investigated by Loayza et al. (2000) and Samwick (1999). As within the Lebanese context in particular, the urbanisation rate has been found to generate a negative impact on the total saving rate in Lebanon, with the coefficient being statistically insignificant (Hamadi et al., 2011a). Accordingly, considering the urbanisation rate as a potential determinant of the private saving rate is crucial, and the assumption to be validated would therefore be that the growth in the urbanisation rate affects saving rate significantly and negatively. This reasoning allows the formulation of the seventh hypothesis:

H_7 The private saving rate is negatively affected by the growth in the urbanisation rate.

4   Research design and strategies

The succeeding paragraphs will first briefly outline the main characteristics of the Lebanese economy, and then discuss the sampling procedures, data collection tools, as well as the measures used to test the hypotheses that have been outlined previously.

4.1 The Lebanese economy

Lebanon underwent critical turning points in its history during the past 50 years. These events were and still are mainly characterised by political instability and severe deterioration of the economy due to civil and regional wars between the years 1975 till 1990. Throughout the post-war period, fiscal deficits grew continuously due to the large spending programs that were directed towards rebuilding the country. To add, the excessive borrowing of the government increased the domestic interest rates, which in turn crowded out private local investments and resulted in an economic stagnation. Lebanon is still weathering until today the political, social, and economic consequences of the war running in Syria, which are contributing to the further hindering of consumers and investors' confidence in the country. Precisely, the war has and still is restraining economic activity and growth because of the large number of existing refugees, estimated around 1.5 million, or 25% of the current country's inhabitants, and thus requiring substantial public spending and infrastructure services.

Table 1   Consolidated balance sheet of commercial banks – billion USD – end of period

Items	2012	2013	2014	Nov-15	Share %
Cash and deposits at BDL	52.8	54.7	63.9	70.1	38.3%
Claims on resident private sector	37.8	41.5	45.4	47.5	25.9%
Claims on public sector	31.2	37.7	37.4	37.9	20.7%
Foreign assets	26.2	26.6	24.1	22.4	12.2%
Fixed assets and other assets	3.9	4.3	4.9	5.3	2.9%
Total assets	151.9	164.8	175.7	183.2	100.0%
Resident private deposits	100.9	107.7	114.1	118.8	64.8%
Non-resident private sector deposits	24.1	28.5	30.3	31.0	16.9%
Public sector deposits	2.7	3.0	3.2	3.3	1.8%
Non-resident financial sector deposits	5.9	5.0	5.8	6.4	3.5%
Capital accounts	12.6	14.2	15.8	16.3	8.9%
Bonds and unclassified liabilities	5.7	6.4	6.5	7.4	4.0%
Total liabilities and equity	151.9	164.8	175.7	183.2	100.0%

Source: Association of Banks in Lebanon (2016)

The country's weak economic situation allowed for a further widening in the government deficit to around 6.5% of GDP in 2015 versus 6.2% in 2014, while the primary surplus decreased to almost 1.8% of output, compared to 2.6% in 2014. Consequently, the gross public debt grew to reach a debt-to-GDP ratio of 139% in 2015 compared to 135% in the years 2013 and 2014. Furthermore, Lebanese banks have kept on financing part of the government deficit and providing loans to the private sector, despite the poor economic activity and dire situation. To add, customer's deposits in commercial banks grew by around 3.7% until November 2015, compared to 4.8% in 2014. As for the growth in loans to the private sector given the economic situation, it has peaked at 4.6% during the first 11 months of 2015, compared to 6.6% in 2014. As it can be examined in Table 1, commercial banks persist in financing the government deficit directly, denoted officially as claims on public sector, and indirectly through the deposits at the central bank 'BDL'

on an increasing trend, leaving only around 26% of their total assets as loans to the private sector.

4.2   Population and sampling procedures

The tested population is the private saving rate in Lebanon over the years 1980–2014. This herein research deals with the population as being the same as the sample, therefore dealing with the existing census. The investigated period in the study is critical, as it encompasses a precarious period in Lebanon's history characterised by political instability and deterioration of its economy. The civil wars and the invasions that took place in Lebanon between the years 1975 and 1990 resulted in severe damages to the country, especially on the human resource and economic levels. Damages on the economic level included mainly the degeneration of GDP, with high unemployment levels and severe devaluation of the local currency, which ultimately led to the weakening of the vital financial and touristic role of the country within the Middle East. Additionally, the country's infrastructure was severely deteriorated, and the shutdown of local and foreign businesses contributed further to the worsening of the Lebanese economy. On the human resource plane, the effects included the massive immigration of citizens to European, Arab, and American countries on one hand, and local migration of citizens from their home town or village as a result of the violent clashes on the other. Furthermore, and being worsened further by the improper collection of revenues during the war, fiscal deficits grew continuously after the years of war due to the large spending programs directed towards rebuilding the country, as well as the immense incurred interest expenses on government debt. In addition, and while the Lebanese Central Bank was pursuing its role in monetary expansion, inflation hit high levels reaching an unprecedented record of 487% in 1987 (Hamadi et al., 2011a, 2011b). Due to the severe depreciation of the local currency, depositors lost their trust in the Lebanese lira and exchanged their deposits' currency to USD, which was later revealed throughout the dollarisation rate.

4.3   Measuring private saving and data collection

Throughout the existing body of research concerning the private saving rate, a common approach was adopted and whereby Loayza et al. (2000), Hondroyiannis (2004, 2006), Schrooten and Stephan (2005), Kolasa and Liberda (2015), Athukorala and Sen (2004), Horioka and Wan (2006), Kwack and Lee (2005) and Hamadi et al. (2011a) have all made use of annual data of macroeconomic and demographic indicators for the countries under which the determinants of saving were investigated and then analysed. Henceforth, the approach that this paper adopts to identify and later analyse the determinants of the private saving rate in Lebanon is similar, through the employment of secondary quantitative data within the context of an archival study. In this line, secondary panel data for Lebanon covering the period 1980–2014 was collected and employed, as it was deemed to be the sole and most reliable source for quantifying the selected variables. the gross domestic product, population, and urbanisation ratios were extracted from The World Bank (2016) database, the private saving, dollarisation, and interest rates were sourced from the Lebanese Central Bank figures, and inflation was obtained from the International Monetary Fund records.

4.4   The model

To test all hypotheses, going from the first to the seventh, concerning the potentially existing causality between private saving in Lebanon and a selected number of variables, the following multivariate regression model was set out as below:

$$Private\ saving\ rate = \alpha + \beta_1 Income + \beta_2 Real\ interest\ rate\ on\ deposits$$
$$+ \beta_3 Inflation + \beta_4 Dollarisation\ rate\ of\ deposits$$
$$+ \beta_5 Growth\ in\ young\ dependency\ ratio$$
$$+ \beta_6 Growth\ in\ old\ dependency\ ratio$$
$$+ \beta_7 Growth\ in\ urbanisation\ ratio + \varepsilon$$

where

α the intercept

β the regression coefficients

ε the error term

Income	real GDP per capita
Real interest rate on deposits	log of the squared values of the real interest rate (average deposit rate on LBP-net of inflation)
Inflation	log of the squared values of the inflation rate based on CPI
Dollarisation rate of deposits	dollarisation rate of deposits
Growth in young dependency	ratio of younger dependents (people younger than 15) to the working-age population (people aged between 15 and 64)
Growth in old dependency ratio	the ratio of older dependents (people older than 64) to the working-age population (people aged between 15 and 64)
Growth in urbanisation ratio	smoothed figures by United Nations Population Division divided by the total population.

5   Analysis

The following section covers the data analysis, where the archival data of 34 years will be initially statistically described across the dependent and independent variables, and then the descriptive analysis will be followed by the testing of the previously-mentioned hypotheses via inferential statistics, to be featured and analysed within the upcoming paragraphs.

5.1   Descriptive analysis

Table 2 relates detailed descriptive statistics of the sample. Throughout the years spanning from 1980 till 2014, the inflation rate reached an exceptional record in 1987 scoring its maximum value of 487%, and therefore causing the real interest rate to reach its minimum value of –467%, while also anchoring it at negative figures for the following six years. Conversely, the minimum value of inflation revealed a rate of –0.72% in the year 2005, indicating that Lebanon witnessed a deflation period as well, which also occurred in the years 2000 and 2001. As a result, the standard deviations of inflation and simultaneously the real interest rate witnessed high variations. Moreover, and as it can be observed in Table 2, the saving rate was hit firmly by inflation in year 1987 to reach its minimum value of –47.14%, while having a maximum value of 49.87% in 1982 with a mean of 3.47% during that period, revealing that the saving rate was variable and not stagnant over the years. The mean and median of RGDP per capita in millions are almost the same being LBP 7.94 million and 7.97 million respectively, meaning that the values of the income variable are equally divided around the mean with no outliers. The dollarisation rate, being a second proxy for uncertainty after inflation, also had hit its maximum value of 92.30% in 1987, indicating a striking macroeconomic instability during that year, having most of the deposits in foreign currencies. However, it is worth noting that in the last seven years (2008–2014), the dollarisation rate began to stabilise around the mean, indicating less volatility in perceiving uncertainties in the country. The growth in the young dependency ratio showed a negative mean of –1.9%, while the growth in the old dependency ratio showed a positive mean of 0.6%. Lastly, the growth in the urbanisation rate was always positive, indicating a continuous migration from rural areas to urban areas. Furthermore, according to Table 2, it can be noticed from the coefficients of kurtosis that the saving rate, RGDP per capita, dollarisation rate, the growth in young and old dependency ratios, and the growth in the urbanisation rate, are normally distributed. On the other hand, a shift from normality can be noticed from the kurtosis values of real interest rate and inflation, hence calling for the need to remedy the deviation. The corresponding data was first raised to power two due to the existence of negative numbers, and then a log transformation to the power of ten was then applied. Consequently, the transformed variables with their new coefficients of kurtosis improved from 23.5621 to 0.3827 for the real interest rate, and from 22.9657 to –0.3594 for the inflation rate.

5.2   Testing the hypotheses

Following the utilisation of a stepwise regression method, the final model includes three significant independent variables as shown in Table 3. The tolerance level and variance inflation factors (VIF) results for the three remaining variables indicate low levels of multi-collinearity (tolerance > 0.2 and VIF < 10), therefore the variances of the estimated regression coefficients were not significantly increased because of collinearity.

Table 2   Characteristics of the sample (untransformed)

Variable	Mean	Median	SD	Skew.	Kurt.	Min.	Max.
Saving rate	3.4679	2.8692	17.7028	–0.3734	2.9677	–47.1415	49.8654
RGDP per capita	7.9434	7.9664	1.6657	–0.4743	0.2278	3.9943	11.2502
Real interest rate	–26.4822	1.6974	83.8999	–4.58	23.5621	–467.117	11.0583
Inflation	37.0299	7.7469	86.1102	4.5085	22.9657	–0.7185	486.6667
Dollarisation rate	63.192	66.1	14.2406	–1.0604	1.0719	29.05	92.3
Growth in young dep. ratio	–1.935	–2.1671	1.4417	0.2749	0.271	–4.9815	1.0531
Growth in old dep. ratio	0.6201	0.8933	1.3197	–0.7768	0.0154	–2.359	2.9051
Growth in urbanisation rate	0.5496	0.3723	0.5563	1.1263	–0.3912	0.1337	1.7527

Notes: RGDP per capita is presented in millions. All other variables are in percentages.
    SD is the standard deviation. Skew. and kurt. denote the coefficients of skewness
    and kurtosis, respectively.

Table 3   Results of the stepwise multivariate regression and collinearity diagnostics

Independent variable	Coefficient	P value	Tolerance	VIF
Dependent variable: private saving rate (N = 35), R = 0.744, R square = 0.5533, adjusted R square = 0.5101				
RGDP per capita (in millions)	–3.006	0.028	0.955	1.048
Dollarisation rate	–0.995	0.000	0.616	1.625
Growth in urbanisation ratio	–15.43	0.003	0.637	1.571

Note: Excluded variables and (p values): real inflation (0.409), real interest (0.182),
    growth in young dep. (0.143) and growth in old dep. (0.740).

Table 3 shows a statistically significant linear negative relation between the Lebanese private saving rate and the independent variables of RGDP per capita, an income variable, the dollarisation rate, an uncertainty variable, and the growth in urbanisation ratio being a demographic variable.

The most significant variable in the model is the dollarisation rate with a *p* value of 0.000, which confirms its significant negative effect on the saving rate performance, and affirms consistency with Hamadi et al. (2011a). Therefore, the previously stated Hypothesis 'H$_4$: the private saving rate is negatively affected by the dollarisation rate' is validated. Moreover, a more refined interpretation of the results shows that an increase of 1% in the dollarisation rate will lead to a 0.995% decrease in the saving rate, indicating that macroeconomic instability and uncertainty hinders the saving rate performance. The coefficient estimates of the growth in urbanisation ratio showed a value of –15.43 along with a *p* value of 0.003. Results are consistent with Friedman's (1957) permanent income hypothesis, confirming that people in rural areas tend to save more and consume less because of the instability in their sources of income in their areas, consequently considered as a precautionary-saving motive. In addition, the results are consistent with worldwide countries as investigated by Loayza et al. (2000) and Samwick (1999). Hence, the previously mentioned Hypothesis 'H$_7$: the private saving rate is negatively affected by the urbanisation rate' is validated in the Lebanese context. Therefore, it can be said that

an increase of 1% in the urbanisation rate growth will lead to a decrease of 15.43% in the saving rate. Although the coefficient of the income variable (RGDP per capita) is significant, its value turned out unexpectedly to be negative, being inconsistent with Keynes (1936), Samwick (1999), Loayza et al. (2000), Hondroyiannis (2004, 2006), Schrooten and Stephan (2005), Horioka and Wan (2006), Jongwanich (2010), Hamadi et al. (2011a) and Athukorala and Sen (2004). Hence, the previously stated Hypothesis 'H_1: the private saving rate is positively affected by income' is rejected. The unpredicted results might be explained by the permanent income hypothesis developed by Friedman (1957), which differentiates the transitory or unexpected income from the permanent one. Consequently, according to the former, household consumption is a function of the permanent one, hence; any rise in income, considered as permanent, will incite and stimulate households to increase their consumption. Furthermore, the precautionary motive might serve as an explanation for the negative coefficient; being afraid of further catastrophic events, people would then save more. Also, and due to the stressful environment that Lebanese people live in permanently, many tend to live as if tomorrow will not come and thus have a high predisposition to consume, trying to neglect problems. Additionally, saving might not be in the form of cash but in the form of real estate properties or insurance plans, especially knowing that nowadays many individuals save through retirement plans that require monthly contributions.

Four independent variables were excluded from the final model: the real interest rate (after transformation), inflation rate (after transformation), the growth in young dependency ratio, and the growth in old dependency ratio, because of their low significance levels. Hence the corresponding four hypotheses (H_2, H_3, H_5 and H_6) are rejected. Consequently, the abovementioned variables are not considered explanatory of the saving rate, the dependent variable of the study.

The real interest variable, hypothesised by the classical and neoclassical theoreticians as a firm determinant of saving, turned out to be insignificant in this study, while having a negative coefficient. The reason why the coefficient turned out to be insignificant might be justified by the inelastic demand for deposit accounts in Lebanon given the limited investment opportunities in the Lebanese capital market. Therefore, regardless of the interest rate level, people will keep accumulating their reserves in their bank accounts. Besides, people consider commercial banks as being the most secure place for their savings, since the latter are highly regulated and supervised to protect the depositors' money. On the other hand, the inflation rate appeared to also be an insignificant variable, hence not affecting the saving rate. One credible reason is that people might consider savings in nominal terms instead of real terms, not aware of their real purchasing power, hence tending to save a fixed portion of their monthly income. Moreover, the growth in dependency ratios seemed to be insignificant in the model, although signs are consistent with Ando and Modigliani's (1963) life cycle hypothesis, which states that young and aging individuals have a higher propensity to consume than middle-aged people have. A probable justification of the insignificance of the dependency figures is analysed through the divergent mentality and behaviour of the Lebanese society members. Many Lebanese individuals keep working after the age of 64, hence receiving income and consequently conserving their capacity to continue saving, therefore rendering the overall effect on the saving rate as ambiguous, and thus resulting in an insignificant coefficient.

6   Conclusions

This research aims at identifying and analysing the determinants of the private saving rate in Lebanon through formulating and testing seven hypotheses that uncover any plausible causal relationship between macroeconomic, demographic, and uncertainty variables on one hand, and private saving on the other. The importance of the private saving rate was highlighted during the introductory sections, as it is a key determinant of the investment rate and consequently imperative for the welfare of the economy, especially in the midst of the weak performing Lebanese economy.

Stemming from a thorough literature review, it was then concluded that the main determinants of private saving vary in magnitude and type and across nations, where the main ones were the income variable, real interest rate, inflation rate, age dependency ratios and the urbanisation rate. However, being relevant to the Lebanese economic context where the local currency is pegged to the US dollar, the dollarisation rate was also identified as a valid variable for use. Henceforth, a multivariate stepwise regression model was created and initiated to test the aforementioned variables in the aim of identifying possible causal relations with saving, and consequently analyse this relation where it existed.

The use of the most recent available data updates the existing body of literature on the topic and provides both theoretical and practical implications that provide valuable insight to both scholars and practitioners

6.1   Theoretical implications

First, the research revealed a significant negative linear relationship between the variables of income, dollarisation rate, and urbanisation rate from one side and private saving on the other. The dollarisation rate appeared to be the most significant, followed by the urbanisation rate, and the effect of growth in net income. Second, the findings concerning two of the variables are deemed as consistent with previous studies concerning the Lebanese private rate, where the effect of the dollarisation rate is negative and consistent with Hamadi et al. (2011a), in addition to the negative causality concerning the urbanisation ratio that is aligned with Friedman's (1957) permanent income hypothesis, as well as worldwide precedent studies conducted by Loayza et al. (2000) and Samwick (1999). Third, the unpredictable negative effect of income turned out to be inconsistent with previous literature and studies, such as Keynes (1936), Samwick (1999), Loayza et al. (2000), Hondroyiannis (2004, 2006), Schrooten and Stephan (2005), Horioka and Wan (2006), Jongwanich (2010), Hamadi et al. (2011a) and Athukorala and Sen (2004).

6.2   Practical implications

The utilisation of the model by local banks offers predictive insight into the variations of deposits with time via analysing the movements of the independent variables, thus enabling the division of effective operational policies that allow the management of liquidity risks. Furthermore, such findings may also be used by governmental bodies when considering new policies on a national scale, whereby the central bank may stimulate private saving by restoring confidence in the local currency and decreasing the dollarisation rate. To add and relating to income, the findings are consistent with what

Khoueiri (2005, p.116) proposed, and whereby "policies favoring a redistribution of income from the upper income group to the middle and lower income groups will not result in a decrease but in an increase in the saving rate. Therefore, equity in the distribution and growth of income would increase saving and hence will result in growth." Finally, the negative effect of the growth in urbanisation on saving implies that decreasing the urbanisation rate by ensuring sustainable development throughout the Lebanese territory and creating more job opportunities in the rural areas would eventually lead to growth in the saving rate.

6.3   Limitations

Having atypical results generated by this paper triggers further researches to employ other potential proxies for the income variable and the saving rate to further validate the findings, as well as to explore the potential causal effect of other independent variables on private saving. Additional future longitudinal studies are also warranted, as the determinants of the private saving rate and their nature are not inherently static, however are subject to change depending on temporal and contingent conditions.

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