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Liquidity and leverage on the financial performance of savings and credit cooperatives in the emerging Thailand market

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Abstract

Purpose – The purpose of this study is to examine the impact of liquidity, leverage and debt-to-equity (DE) ratio on the profitability of police savings and credit cooperatives (PSCC) within the emerging Thailand market.

Design/methodology/approach – The study was conducted within the Thailand financial sector setting. The secondary data used in the research comprised panel data during 2017–2022. Data was collected from 111 PSCC operating in Thailand's emerging market (EM) and analyzed using a fixed effects modeling technique.

Findings – The study results established that profitability within the emerging Thailand market, and in particular the police and SCC, was determined by various levels of liquidity, leverage and DE ratios. Liquidity and DE ratio were found to have a negative impact on profitability, whereas leverage had a positive effect.

Research limitations/implications – The study was confined to the EM of Thailand's savings and credit cooperative (SCC) sector, and specifically that associated with the Royal Thailand Police service. It also restricted the examination of profitability of these entities to liquidity, leverage and DE ratio. Future studies should also examine addition financial indicators, as well as studies across various SCCs in Thailand and other EM where these forms of financial institutions are prevalent.

Practical implications – The study findings provide administrators and legislators associated with the EM of Thailand some valuable insights into factors that can be used as markers for performance in the SCC sector. Such financial markers can also provide the starting point to help these stakeholders identify the degree to which each of these financial-specific parameters impact profitability, so legislation and/or guidelines can be adopted for each different SCC context across Thailand and other EMs.

Originality/value – To the best of the authors' knowledge, this study is the first attempt at examining the performance of PSCC in the emerging Thailand market and other jurisdictions where they operate. The study examines the combined effects of DE, leverage and liquidity on profitability, which is also unique to our and other research setting that involve SCCs.

Keywords Emerging market, Savings and credit co-operatives, Liquidity, Leverage, Profitability, Credit and banking, Investment and portfolio management

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Introduction

In recent years, the collapse of several savings and credit cooperatives (SCCs) in Thailand's emerging market (EM) has resulted in the Thai government closely monitoring their overall performance (Kitiwong *et al.*, 2021). This is critical to address, given the performance of SCCs have important economic and social consequences within developing economies (Nuansri *et al.*, 2024) such as providing health care, housing and transportation, among others (International Cooperative Alliance, 2018) within EMs. Typically, SCCs are member owned entities that play a crucial role in helping to improve the living standards of their constituents, rather than simply being in existence to optimize profits (Mckillop and Wilson, 2015). Their capacity to function in a robust manner with good governance can help to yield performance outcomes (e.g. Kumkit *et al.*, 2022; Nuansri *et al.*, 2024; Seneerattanaprayul and Gan, 2021) means they also play an important role in the advancement of EMs, such as the Thai economy (Suebpongsakorn, 2021). The expansion of savings and credit co-operatives during 2022 in the Thailand marketing, has also meant the emerging Thai economy in general has also become more reliant on these forms of funding sources.

Typically, the expansion of SCCs in Thailand has primarily involved loan and deposit businesses, comprising 1,364 entities, totaling 3.44 million members, with assets amounting to 3.14 trillion Thai Baht. The highest number of members are government-affiliated cooperatives, that need to become more efficient to provide citizens better access to public services (National Strategy Secretariat Office, 2018). Since Thailand's public sector has been projected to expand as the country transitions into an economy with higher incomes (Charoenporn and Choksawatpaisan, 2024), such entities must therefore continue to perform. One area of particular significance for the emerging Thailand market is the performance of its police savings and credit cooperative (PSCCs) because of the crucial role this part of the public sector plays in bringing law and order to the country. Indeed, the Royal Thai Police (RTP) Service employs around 17% of Thailand's' public sector employees (Wikipedia, 2024), suggesting the effectiveness and efficiency of the PSCC is not only tantamount to the maintenance of the RTP service but this also potentially impacts the broader emerging Thailand economy. To the best of our knowledge, there are no studies that specifically examine the performance of the PSCC within an emerging Asian marketplace, so this research addresses this important gap in the literature.

Using financial theory and empirical evidence, this study's conceptual framework integrates essential variables concerning liquidity, debt and profitability across 111 PSCCs spanning from 2017 to 2022. Liquidity indicators, such as the current ratio (CR) and quick ratio, will serve as proxies for assessing the short-term solvency of PSCC and their ability to meet immediate financial obligations. In addition, debt factors, including leverage ratios and debt-to-equity (DE) ratios, will be used to capture the extent to which PSCC rely on external financing to support their operations. The profitability of PSCCs in Thailand's EM will be measured using net profit (NP), which reflects the efficiency of financial intermediation and resource allocation within cooperative institutions. A hypothesized link between these critical financial indicators will capture the profitability of PSCCs in Thailand and will be measured using the fixed effect (FE) approach to multiple regression analysis. A brief overview of the Thai EM study setting, and the conceptual underpinnings is now discussed.

Literature and conceptual model

In the emerging Thailand market, SCCs are governed by several regulatory requirements (Cooperative Promotion Department, 2019); actions that are designed to provide stability (e.g. Asteriou *et al.*, 2021; Jungo *et al.*, 2022) and good governance (e.g. Ali *et al.*, 2023; Arora and Kashiramka, 2023). These government regulations included the following

elements: First, accepting deposits, creating debt and creating contingent liabilities are permissible but must fall within the following criteria, namely, debt and contingent liabilities (i) cannot exceed 1.5 times the cooperative's share capital *plus* the entities reserves, (b) cannot exceed five times the share capital *plus* the entity's reserves. Second, asset management and maintenance of liquid assets are to be free from encumbrances – such as cash and bank deposits. Cooperative federation deposits, promissory notes issued by cooperative federations and securities or debt instruments issued by the Thai government, the Bank of Thailand, the financial institutions development fund, etc. account for, on average, not less than 3% of the total amount of all types of deposits. Third, a cooperative may deposit or lend money to all types of cooperatives, each of which does not exceed 10% of its share capital and the cooperative's reserves. Finally, the combined debts and obligations cannot exceed 25% of their share capital together with the cooperative's reserves. One exception is when the cooperative incurring debts of which the cooperative is a member cannot exceed 50% of the share capital *plus* the reserve fund of the cooperative.

It is fairly evident then, that savings and credit co-operatives in an EM such as Thailand are essentially a form of financial institution with the main purpose of promoting savings among members and through that provide loan funds to individual members for productive investment (Collins and Clark, 2003). In essence, the operating characteristics of SCCs tend to play the same role as commercial banks but often pay the highest deposit interest rates at the same time as offer loans with relatively lower interest rates than banks (Angelini *et al.*, 1998). In addition, there appears to be contradictions between the concepts of liquidity, risk and profitability when comparing SCCs with the conventional commercial bank (e.g. Daniel and Abdul, 2018 *verses* Demirgüneş, 2016). To help us understand this link, several financial theories and their impact on profitability are now discussed in more detail.

Profitability, liquidity and financial ratios

Whilst maximizing profitability stands as the paramount objective for banking and financial institutions (e.g. Coccorese and Girardone, 2021; Ozili and Ndah, 2024) owing to their inherently profit-driven orientation, it also serves a good marker for savings and credit cooperative (SCC) performance – even though these entities invariably pursue a social agenda for their individual and entity members. Nonetheless, this overarching profitability aim necessitates a concerted effort toward optimizing both revenue generation and cost management, as expounded upon by Ibe (2013), who delineates several strategies such as breakeven analysis, cost control and ratio analysis for bolstering profitability. However, the attainment of this objective is fraught with challenges due to the intricate interplay of numerous variables, thus, making profitability more complex to attain for those SCCs that correspondingly aim for economic, social and member welfare outcomes (e.g. Kumkit *et al.*, 2022; Nuansri *et al.*, 2024; Suebpongsakorn, 2021). Tsomocos (2003) does posit that the preservation of a firm's viability should take precedence over the singular pursuit of profitability, thereby underscoring the symbiotic relationship between liquidity and profitability (e.g. Diyanto, 2020). For instance, in the pursuit of revenue enhancement, prudent liquidity management assumes critical significance, enabling firms to seize lucrative investment opportunities and optimize the utilization of available funds. We posit these aspects of prudent financial management are also intrinsic to SCC, in the Thailand EM that underpins this research.

Similarly, when adopting a cost-control strategy, the critical importance of astute liquidity management policies and procedures (e.g. Almeida, 2021; Shonhadji *et al.*, 2023) emerge as imperative to forestall the emergence of additional costs stemming from inadequate profitability. Thus, we posit herein that the link between liquidity management and

profitability underscores the nuanced approach required by banking and other SCC entities in their quest for sustained financial performance. Typically, the discourse surrounding the proportion of debt versus equity within a firm's overall capital structure has been a prominent subject of investigation, largely originating from the seminal work of Modigliani and Miller (1958). Fundamentally, three foundational theories elucidate the nexus between debt utilization and profitability, namely, signaling, agency cost and tax theory, as delineated by Kebewar (2014). Henceforth, Rajan and Zingales (1995) posit that profitability is a determinant of a firm's capital structure, particularly its debt component. Within their research framework, profitability exhibits a dual influence on debt levels in several ways. First, profitability generates cash, which serves as an internal source of financing, thereby establishing a negative relationship between profitability and leverage. This also means that higher profitability corresponds to lower debt. Second, this line of thinking suggests a positive association between profitability and debt, which in short means that increased profitability correlates with heightened debt utilization.

Concept of liquidity and financial ratios

An underlying premise is that the level of liquidity plays an important role in ensuring the firm is in an optimal position to service its ongoing long- and short-term debts (LD and SD) (e.g. Obadire *et al.*, 2023; O'Toole and Slaymaker, 2021). Typically, Mucheru *et al.* (2017) assert the firm's capability to meet its short-term obligations will depend largely on the availability of its liquidity, which is a function of the firm's "current" and "quick" ratios. Thus, ratio analysis helps to establish the connection between its current assets and liabilities, whereby a secure and healthy CR is generally going to be high. This measure helps to demonstrate the firm not only fulfills its immediate obligations to creditors but does so in a timely manner. However, a firm is not efficiently managing its current assets if the CR is excessively high. The quick ratio establishes a connection between current liabilities and quick assets, also known as liquid assets. For instance, a high number of accounts receivable the firm may have on hand may cause the quick ratio to rise unreasonably. The ability of a business to complete the 'cash-to-cash' cycle as quickly as possible is the real test of its liquidity management. Generally, the large majority of a financial institutions' operations are run through deposits, so this means that if depositors begin to withdraw their funds, it will put those institutions in a liquidity trap.

The inability to meet short-term liabilities not only compromises the firm's operations but this could also have a more long-standing impact on its reputation therefore, since liquidity is a crucial aspect of both current and future operations, shiftability theory (Moulton, 1918) suggests financial firms should invest some of their funds in liquid assets to help these being converted into cash when the need arises, However, this has limitations when there is a general crisis, such as having a lack of market (Ibe, 2013; Mohammad *et al.*, 2020; Summers, 1975). The net impact of this action is to ensure due diligence in your investment decisions as this will inevitably impact upon profitability within the financial entity.

Agency and pecking order theories

According to Agency Theory (Jensen and Meckling, 1976) each stakeholder within an entity has different and distinct interests, but each seek to enhance their income and wealth through dividends and share value appreciation. They all have a keen focus on the entities' long-term financial prospects. Typically, managers, serving as agents for shareholders, prioritize their compensation packages and managerial status, particularly if they lack direct ownership stakes or performance-linked incentives. In the case of the Royal Thailand Police (RTP) SCC, members have a direct ownership stake – meaning these persons are acutely and duly

concerned about the performance of this form of financial cooperative. However, in accordance with the agency costs theory, the impact of debt on company profitability is characterized by two opposing effects. First, debt exerts a positive influence in mitigating agency costs of equity arising from conflicts between shareholders and managers. Conversely, its effect turns negative due to the agency costs of debt stemming from conflicts between shareholders and lenders (Filipovic and Demirovic, 2016). Whilst Jensen and Meckling (1976) posit that agency issues are particularly pronounced in firms characterized by profitability coupled with minimal profit growth, these entities often generate substantial free cash flow, which represents discretionary cash available to management. Unlike funds earmarked for essential obligations such as debt interest payments, taxes and asset replacement, free cash flow offers management considerable latitude in allocation decisions. In line with the literature, we posit these decisions to include high interest payments to members depositing funds as well as the provision of low interest loans (e.g. Chalayonnavin, 2016; Seneerattanaprayul and Gan, 2021). Thus, in the case of the RTP cooperative, the financial performance (and profitability) of the entity is critical to ensure the two outcomes are possible member benefits.

However, when examined through the lens of pecking order theory (e.g. Myers and Majluf, 1984), firms typically opt for financing options with minimal risk, therefore, no singular optimal capital structure exists because firms select funding sources based on a hierarchical preference for risk mitigation. We posit herein that a particular financial structure that generates profitability will need to exist in Thailand's SCC if they are to yield these outcomes for members. Pecking order theory does however rest on several fundamental assumptions that may act to inhibit an ideal financial structure in the SCC when management has no direct link to deposits and financial contributions to such institutes. First, it posits the presence of information asymmetry between managers/owners and external investors, leading to uncertainty about the firm's true value and prospects. Second, it suggests firms prioritize internal financing, such as retained earnings, due to its availability and low transaction costs. Third, it proposes a hierarchical sequence in financing decisions, where firms prefer less risky options before resorting to riskier ones, typically starting with debt financing and then considering equity issuance. Fourth, it assumes that firms are hesitant to issue new equity due to the signaling effect it may have on the firm's perceived value and management's confidence in its prospects. Finally, the theory presupposes rational behavior on the part of firms, as they aim to minimize financing costs and maximize shareholder wealth by making financing decisions based on available information and the perceived costs and benefits of different funding options.

In SCC, we posit these shareholders to be individual members, who in the case of the RTP cooperative are members of the individual police cooperatives across several districts in Thailand. The underlying assertion we make is that individual SCCs within police stations across Thailand invest within the broader Royal Thailand PSCC, and the performance of the aggregate of these cooperatives underpins this analysis – over the given timeframe that data was collected.

Financial performance and profitability

We base this study on the importance of SCC in attaining optimal financial performance (e.g. Onah *et al.*, 2024; Segovia-Vargas *et al.*, 2023), which is a function of how well firms can manage their finances at the same time achieve various financial objectives over a specific period. The literature indicates that firm performance can be assessed through the lens of various metrics to ascertain the firm's level of profitability, efficiency, liquidity, solvency and overall health (e.g. Brigham and Houston, 2022; Ross *et al.*, 2024). Typically, underlying

metrics include return on equity (ROE), ROA, gross profit margin and NP margin, among others. Profitable firms, with ample internal funds, tend to prioritize retained earnings and minimize debt issuance, aligning with the pecking order hierarchy (Frank and Goyal, 2009). However, less profitable firms may face higher financing constraints and resort to debt financing to fund their investments (Flannery and Rangan, 2006). Moreover, empirical research has also examined the impact of debt levels on firm profitability. For instance, while moderate levels of debt can provide tax advantages and leverage benefits, excessive debt may lead to financial distress and reduced profitability (Graham and Harvey, 2001). Thus, the profit-debt relationship reflects a delicate balance between leveraging benefits and financial risk management. Studies indicate an inverse relationship between profitability and debt levels (Rajan and Zingales, 1995; Titman and Wessels, 1988). Profitable firms often maintain lower debt levels as they generate higher internal cash flows, reducing their reliance on external financing (Opler and Titman, 1994), which is interpreted as a positive signal of financial strength and future earnings prospects to investors.

Typically, the literature comprises several studies showing the impact of various financial (e.g. Minanari *et al.*, 2024; Ozili and Ndah, 2024) and nonfinancial (e.g. Aliamutu and Mkhize, 2024; Almashhadani, 2021) elements on firm performance and in particular profitability. For instance, Singh *et al.* (2019) investigate the financial performance of 37 US agricultural cooperatives (from 2009 to 2017), and reveal size and profitability are negative correlated. Daniel and Abdul (2018) investigate Kenyan deposit-taking savings and credit cooperative societies from 2012 to 2016 and reveal that capital structure influences financial outcomes. Specifically, using ROA as proxy for performance they found debt levels negatively impacted the financial well-being of these entities, suggesting debt and equity play a pivotal role in driving financial outcomes. In a Ugandan deposit-taking savings and credit cooperative context, Muheebwa (2018) find a strong association between portfolio liquidity and financial performance, indicating that liquidity is a pivotal metric for evaluating the financial robustness of prospective investments, while also serving as a mechanism for ensuring a consistent availability of cash for deposit-taking savings and credit cooperative organizations. Elsewhere, Benson *et al.* (2016) find that growth in profits in Tanzanian deposit-taking SCC enabled these entities to better services their loans.

More recently, Nduati and Oluoch (2021) found that between 2015 and 2018 Kenyan cooperatives with nonperforming loans had a higher liquidity risk, and found further that liquidity was negatively correlated with capital adequacy and profitability of the entity. In Tanzania, Magali (2013) found that when SCC adopted suitable credit risk management strategies that increased the entities' level of profitability. By way of summary, the literature indicates that liquidity, debt and profitability are inter-related, so based on the above discussion, it is hypothesized that the theoretical link between liquidity, debt and profitability within an EM, can be expressed as follows:

H1. Liquidity has a positive effect on profitability.

H2. Leverage has a positive effect on profitability.

H3. DE ratio has a negative effect on profitability.

Since the aim of the research is to help determine the level of profitability in the Thailand EM, and in particular the RTP SCCs in terms of the impact that liquidity, leverage and DE ratio can play, the hypotheses can be reflected through the following equation:

$$NP_{it} = \alpha + \beta_1 CR_{it} + \beta_2 LD_{it} + \beta_3 SD_{it} + \beta_4 DE_{it} + \varepsilon_{it}$$

where:

NP_{it} = is profitability of SCC i at time t;
CR_{it} = is liquidity of savings of the credit cooperatives i at time t;
LD_{it} = is LD of savings of the credit cooperatives i at time t;
SD_{it} = is SD of savings of the credit cooperatives i at time t;
DE_{it} = is DE ratio of savings of the credit cooperatives i at time t;
α = is intercept of the regression line (the y-intercept is when the x value equals 0);
β_{1-4} = are factor sensitivities (slope coefficient in regression) of the independent variables; and
$\varepsilon_{i,t}$ = is residual of the regression model.

To better understand the variables in the proposed model we depict resources that a cooperative expects to be converted into cash or consumed within a year are classified as current assets. This category generally includes cash and deposits with financial institutions, trade receivables and other short-term investments. A cooperative's current liabilities include all obligations that must be paid within one year. These include overdrafts, short-term loans, deposits, accrued subscriptions to the Cooperative League of Thailand and expenses incurred but not yet paid. LD are financial obligations that extend beyond one year. These typically include long-term loans, other long-term liabilities and hire purchase liabilities; Liabilities that must be repaid within one year are considered current debts. Our method and sample used for the analysis are now discussed in more detail.

Methodology and sample overview

Data for the study was collected from 111 of the 125 licensed PSCC operating across the emerging Thailand (FCST: Federation of Savings and Credit Cooperatives of Thailand Limited, 2022) market, during the 2017–2022 period. Overall, the FCST is comprised of Police member cooperatives from various regions across the Thailand EM. Typically, each province in Thailand comprises several police stations, which are collectively listed as a particular districts' cooperative. For example, the Trat district in South-east Thailand comprises 20 police stations, collectively known as the Trat Police Cooperative, and comprises police officers in that province. Typically, members of the various regional police cooperatives PSCC are either serving police officers of the RTP – known as "regular members", or their spouses and parents who are designated as "associate members" of the PSCC. Since the RTP currently employs between 210,700 and 230,000 serving police officers (excluding military), which represents approximately 17% of Thailand's' public sector employees (Wikipedia, 2024), the performance of the FCST is critical to the wellbeing of contributing constituents, the public sector at large and the upkeep of law and order in the country. Although 14 PSCC were excluded from the analysis, largely due to their financial information not being publicly available, the data provided by FCST was deemed representative and reflected this segment of the Thai financial sector.

Data used in the analysis was supplied by the FCST, and comprised NP, CR, LD, SD and the DE ratio of participant institutions. The six-year longitudinal panel data set underpinning these accounting-based measures constituted the focus of the analysis. Analysis of the data comprised a range of pertinent descriptive statistics, correlations and multiple regression to help determine the overall performance of the PSCC. Table 1 presents statistical summaries of pertinent financial indicators in the proposed model and therefore offers a broad insight

Table 1. Descriptive statistics for panel data

	NP*	CR	SD*	LD*	DE
Mean	89,521,804	0.67	937,000,000	224,000,000	0.92
Median	57,595,249	0.42	362,000,000	96,906,285	0.84
Minimum	2,282,220	0.05	3,485,215	16,402	0.03
Maximum	693,000,000	9.39	19,200,000,000	2,580,000,000	11.64
Observations	666	666	666	666	666

Note(s): NP = Net profit; CR = current ratio; SD = short-term debt; LD = long-term debt; DE = debt-to-equity ratio; *Currency = Thai Baht
Source(s): Created by authors

into both the financial performance and "financial structure" of the 111 PSCCs under examination. The analysis comprised a sample of 666 observations, over a six-year period.

The mean NP, signifying the residual income (expenses less revenue) for the entities is reported at 89,521,804 Thai Baht, with a median of 57,595,249 Baht. The observed range (i.e. Min–Max), spanned 2,282,220–693,000,000 Baht, underscoring a significant variation in profitability observed between the 111 PSCCs in the study. Although we recognize the benefits of normalizing variables, we felt NP was a suitable performance measure as it better reflected the actual income achieved after deducting all expenses. Accordingly, this variable illustrates the SCCs ability to generate real returns. In contrast, ROE is a ratio that shows profitability in relation to equity. On that basis, we posit that using net income provides a clearer overall picture of performance and can be more effective in analyzing trends and long-term profitability.

The mean CR, which evaluates a company's capacity to fulfill short-term liabilities using its current assets, was 0.67, with a median of 0.42. This ratio ranged from a minimum of 0.05 to a maximum of 9.39. Moreover, the data also revealed that the entities hold an average SD of 937,000,000 Baht. The median value of this SD stands at 362,000,000 Baht, indicating that numerically half of the observed PSCC entities have SD amounts below this value, while the others have SDs above 362 million Baht.

The SD held by the PSCCs is substantial and ranges from 3,485,215 to 19,200 M Baht – a difference in the order of 1,000 times larger between the maximum and minimum SD levels being held between cooperatives. This wide range underscores the significant variability in SD among the entities, with some entities having relatively minor debts while others carry much larger obligations. The average LD held by the entities is 224,000,000 Baht across the sample. Once again, the observed range of LD values is significant, extending from a minimum of 16,402 to a maximum of 2,580,000,000 Baht. This broad range emphasizes the substantial variability in LD amounts among the entities, with certain entities bearing relatively modest debt obligations while others carry substantial LD burdens. The mean DE ratio, a measure of a company's leverage, is reported at 0.92, with a median of 0.84. The observed range, spanning from a minimum of 0.03 to a maximum of 11.64, suggests varying degrees of financial risk and capital structure among each of the entities examined. The impact of these financial indicators on the performance (profitability) of the PSCCs, along with pertinent fit statistics to underpin the robustness of the analysis is discussed in the next section.

Findings

In addition to the descriptive findings regards the sample listed in Table 1 (and discussed in the previous section), a Pearson (1920) correlation based on Hauke and Kossowski (2011)

Table 2. Pearson correlation and multicollinearity test[#]

	CR	SD	LD	DE	[#]Coefficient variance	[#]Centred VIF
Current ratio [*CR*]	1				0.000363	1.795460
LOG (short-term debt) [*SD*]	−0.1540*	1			0.000192	2.214521
t-statistic	−4.0160	–				
p-value	0.0001	–				
LOG (long-term debt) [*LD*]	−0.1293*	0.0710	1		3.26E-05	1.036648
t-statistic	−3.3587	1.8346	–			
p-value	0.0008	0.0670	–			
Debt-to-equity ratio [*DE*]	−0.2525*	0.6523*	0.2098*	1	0.000346	1.321950
t-statistic	−6.7253	22.1750	5.5293	–		
p-value	0.0000	0.0000	0.0000	–		
Mean VIF						1.592144

Note(s): *$p = 0.05$ (two tailed); [#]Multicollinearity test
Source(s): Created by authors

parameter estimates was undertaken to assess the basic linear relationship between variables in the study. As we can see from Table 2, data from the 111 RTP savings and credit cooperative under examination revealed several statistically significant [$p < 0.05$] two-tailed correlation associations between the CR and other variables, namely, SD [CR vs SD = −0.1540], LD [CR vs LD = −0.1293] and DE ratio [CR vs DE = −0.2525]. The correlations of the associations between all variables of interest ranged in value from −0.1293 to 0.6523, precipitating a test for multicollinearity (e.g. Marcoulides and Raykov, 2019). The centered VIF ranged from 1.036648 [CR] to 2.214521 [SD] (mean VIF = 1.592144), which is well under the recommended threshold limit of 5 (e.g. Salmeron *et al.*, 2016) suggesting multicollinearity is not present in the data, therefore, further vindicates the choice of FE modeling to further test the impact that short and LD, and DE and CR have on profitability. Instead of LSDV, the Within Estimator was used, which allows a more accurate and precise analysis of the relationships between time-varying variables. Furthermore, when using the Within Estimator in the context of a FE model, parameters are estimated based solely on the observed variation within each unit. This approach allows for a more precise analysis of the relationships between our variables of interest, free from the influence of unobserved variables present in the proposed model.

Model/hypotheses test

In line with Hausman (1978), a model specification test was used to help determine whether the "fixed" or "random" estimator approach should be applied to the regression model to test the underlying hypotheses. The output data (see Table 3) indicated using a fixed-effect model as this (e.g. $\chi^2 = 283.484$; $p < 0.0001$) indicated a significant difference between estimates from the FE in comparison to those from the random effect model. Therefore, the null hypothesis that the random effect model is the best fit for analyzing the effect of factors on the profitability of SCC was rejected, meaning the FE model was more appropriate for this analysis. The hypothesized relationships between the dependent and independent variables were thus determined using FE modeling, applied to panel data for the 2017–2022 period. The first run of the model comprised a fixed-effects panel regression used (see Table 3) to regress the dependent variable, NP, on the independent variables reserve liquidity (CR), SD,

Table 3. Fixed effect panel regression results [and Hausman test]

Variable	Coefficient	Std error	*t*-statistic	Prob
Current ratio [*CR*]	0.064428	0.016789	3.837533	0.0001*
LOG (short-term debt) [*SD*]	0.245088	0.023299	10.51942	0.0000*
LOG (long-term debt) [*LD*]	0.032513	0.004360	7.456532	0.0000*
Debt-to-equity ratio [*DE*]	−0.213486	0.020824	−10.25205	0.0000*
Constant [*C*]	12.63387	0.492685	25.64289	0.0000*
Effects specification				
Cross-section fixed (dummy variables)				
R-squared	0.985397	Durbin–Watson stat		1.257851
Adjusted *R*-squared	0.982376	*F*-statistic		326.1510
SE of regression	0.126574	Prob (*F*-statistic)		0.000000
*$p < 0.005$				
Hausman test				
Test summary	χ statistic	χ d.f.		Prob
Cross-section random	283.484236	4		0.0000*
*$p < 0.0001$				

Source(s): Created by authors

LD and DE. According to the estimation results, the R-squared and Adjusted R-squared values of 0.9853 and 0.9823, respectively, suggest that the model fits the data well.

This indicates that the independent variables, namely, liquidity (CR), SD, LD and DE, incorporated into the model, account for over 98.53% of the variability in the profitability levels of PSCC in the emerging Thailand marketplace. However, approximately 12.65% of the fluctuations in profitability are attributed to factors beyond the scope of the model. In addition, the F-statistic yielded a value of 326.15, with a probability of rejecting the null hypothesis of no statistically significant relationship between the dependent and independent variables at 0.0000, which is less than 0.05. This indicates the model's significance and suitability for regression analysis, affirming that all independent variables jointly contribute significantly to the variation in profitability yielded by the Royal Thailand PSCC.

Moreover, several statistical tests were undertaken to help determine the reliability and validity of the findings, namely, the extent of multicollinearity (Marcoulides and Raykov, 2019), F-test (Hausman, 1978), heteroskedasticity (Breusch and Pagan, 1979), serial correlation (Wooldridge, 2020) to help underpin the findings. Both the Heteroskedasticity and Wald test (see Table 4) indicated that constancy of residuals, along with the null hypothesis (constant variance), are acceptable. The autocorrelation test conducted in this research effectively assessed the relationship between the residuals and their lagged values, revealing no significant serial correlation. The acceptance of the null hypothesis, supported by an F statistic of 0.5409 and a probability greater than 0.05, indicates that the original idiosyncratic errors are uncorrelated. Moreover, the heteroskedasticity test statistic (11,348.30) is well into the upper tail of a $\chi^{2=6,105}$, therefore, strongly rejecting the null of no correlation at conventional significance levels. While the Pesaran CD test statistic value (11.08) is significantly below that of the scaled LM tests, this test still rejects the null at conventional significance levels. Hence, the null hypothesis (constant variance) was, thus, accepted, since the data indicates the presence of heteroscedasticity.

Further to the above statistics, a fixed fixed-effects panel regression was used to assess the moderating influence of factors on profitability by incorporating white cross-section standard

Table 4. Heteroskedasticity and Wald test

Heteroskedasticity test			
Test	Statistic	*d.f.*	Prob
Breusch–Pagan LM	11,348.30	6,105	0.0000
Pesaran scaled LM	47.45117		0.0000
Bias-corrected scaled LM	36.35117		0.0000
Pesaran CD	11.08623		0.0000
Wald test			
Test statistic	Value	*d.f.*	Prob
t-statistic	−0.611863	551	0.5409
F-statistic	0.374376	(1, 551)	0.5409
Chi-square	0.374376	1	0.5406

Source(s): Created by authors

errors and covariance after moderation. Based on the findings (see Table 5), after moderating the independent variables with the profitability of PSCC in Thailand, the R-squared value still stood at 0.9853. This suggests that following moderation, the independent variables account for 98.53% of the variance observed in the dependent variable. Furthermore, the F-statistic yielded a value of 326.15, with a probability of 0.0000, indicating significance at a level lower than 0.05. This implies that subsequent to moderation, the independent variables still collectively exert a substantial influence on the dependent variable, namely, NP.

As can be seen from the data (from Tables 4 and 5) each of the three hypotheses were supported, indicating that in a Thailand PSCC context, profitability levels are found to be a function of liquidity (*H1* = 0.0644; $p < 0.005$), leverage (*H2* = 0.2451; $p < 0.001$ and 0.03251; $p < 0.001$) and DE ratio (*H2* = −0.2135; $p < 0.001$). The implications of these findings, along with limitations and future research directions are now discussed.

Conclusions, discussions and implications

This study explores the relationship between internal factors and the profitability of 111 PSCCs in the emerging Thailand market over a six-year study period, from 2017 to 2022.

Table 5. Fixed effects model after moderating results

Variable	Coefficient	Std error	*t*-statistic	Prob
Current ratio [*CR*]	0.064428	0.023329	2.761758	0.0059*
LOG (short-term debt) [*SD*]	0.245088	0.054808	4.471760	0.0000*
LOG (long-term debt) [*LD*]	0.032513	0.008339	3.898801	0.0001*
Debt-to-equity ratio [*DE*]	−0.213486	0.025154	−8.487072	0.0000*
Constant [*C*]	12.63387	1.200134	10.52705	0.0000*
Effects specification				
Cross-section fixed (dummy variables)				
R-squared	0.985397	Durbin–Watson stat		1.257851
Adjusted *R*-squared	0.982376	*F*-statistic		326.1510
SE of regression	0.126574	Prob (*F*-statistic)		0.000000

*$p < 0.005$

Source(s): Created by authors

Broadly, we conclude the overall health of the RTP savings and credit societies to be relatively well managed through the adoption of good governance practices, as evident in relation to the management of their financial affairs. The findings also indicate that whilst this EM is not fully developed, its financial institutions are equally capable of being robust and highly performance driven when the focus is on attaining and "managing" relevant financial outcomes. In our study, these outcomes related to factors such as the CR, SD, LD and DE ratio, and the impact of these core financial elements on the profitability (NP) of these entities. The data revealed several statistically significant relationships between the variables of interest that have positive and future implications for its PSCC within Thailand as well as other similar EMs. First, the degree of leverage within these institutions, as represented by SD and LD, was found to have a positive influence on the overall the profitability (NP) on these forms of cooperate. Second, the extent of liquidity, as measured by the CR, was shown to have a positive impact on the level of profitability of Thailand's PSCC. Finally, the DE ratio of these cooperatives were found to negatively impact the level of profitability (NP) suggesting that the SCCs under investigation are robust and viable entities. These findings have a range of managerial and scholarly implications for EMs, which are now discussed.

Whilst the study findings in terms of SD and LD on profitability are largely in line with previous works (e.g. Daniel and Abdul, 2018; Karuru and Njeru, 2016), this study also sought to clarify the relationship between liquidity, debt factors and profitability, as current literature presents mixed results (e.g. Daniel and Abdul, 2018 *verses* Demirgüneş, 2016). Despite this, the examination of financial variables in relation to the profitability of PSCC in Thailand's EM reveals insightful observations that have several implications. First, the study serves as valuable guidance for the continual development of further regulatory standards pertaining to the liquidity and debt policies. Second, the findings in this study have served to prompt the effective management of SCC to help prioritize the maintenance of the identified variables. Third, the study provides very useful insights for managers and policy makers to undertake activities that can enhance the level of liquidity and debt in Thailand's SCCs, as well as for other SCCs across Thailand and other similar EMs.

Finally, the link between SD and LD on the level of SCC profitability suggests further that the judicious utilization of debt can potentially bolster the overall financial performance of these types of cooperatives in EMs such as Thailand – possibly by facilitating further investment opportunities and operational expansion. Facilitating prudent public and private financial investments has long been recognized as a core challenge facing governments (Catalán, 2004; Leeds and Sunderland, 2003; Rudolph and Sabat, 2016) in EMs, so this research provides decision and policy makers an insight how successful investments are possible. Moreover, the pivotal role that liquidity, as measured by the CR, plays in shaping the profitability dynamics of these institutions contradicts the proposition that profitability and liquidity typically exhibit an inverse relationship (e.g. Benson *et al.*, 2016; Daniel and Abdul, 2018). On the other hand, earlier works (e.g. Deloof, 2003; Goddard *et al.*, 2005; Demirgüneş, 2016) do suggest elevated liquidity facilitates firms in meeting short-term obligations effortlessly, thus, leading to increased profitability without incurring additional costs. Our findings indicate that elevated liquidity does enable Thai SCCs to capitalize on profitable investment opportunities, so such opportunities must constantly shape managerial thinking in our research context, and other EMs.

However, caution needs to be observed with respect to increasing debt given the negative impact of the DE ratio and profitability. Thus, in line with the literature (e.g. Odondi *et al.*, 2022; Yuan *et al.*, 2022) the nature of capital structure management within Thailand's SCC needs careful consideration given elevated debt levels could lead to significant interest expenses, which, in turn, has the potential to diminish net income and overall profitability.

Catalán (2004, p. 230) does make the point that in developing markets, it is critical to understand the link pension funds, ownership structure and firm performance, so this research in the Thai context provides policy and organizational decision makers some further insight into how these elements are inter-related in the context of EMs.

Limitations and future research

Like all studies, there are several limitations that need further investigation. The first pertains to the specific variables adopted in the study to help determine the profitability of the emerging Thailand market SCCs under examination. The study was limited to exploring the impact of liquidity, leverage and DE on profitability. Investigating the impact of other financial factors, such as dividend policy, credit policy and investment policy on profitability may provide a more comprehensive picture on SCC performance. Second, the study was limited to the RTP savings and credit cooperative, so provided a limited window on this domain of the financial sector across the EM of Thailand. Although there have been previous studies on the performance of Thailand SCC's (e.g. Sowawattanakul and Sukphisal, 2024; Wittayakorn-Puripunpinyoo, 2024), including those in the study in terms of the financial factors identified to impact profitability would have enabled comparisons to be made to help determine which of those entities perform better than others. Third, this study relied solely on historical financial statement data for the 2017–2022 period, which is largely characterized as secondary data. Such data potentially, introduces limitations associated with potential errors in disclosure within the reports, future studies could also collect primary data from individual member contributors (i.e. active serving police officers and family) to help corroborate data and/or include and deficiencies in the panel data used for the analysis.

Fourth, we also acknowledge that the absence of control variables represents a limitation of this study. Although our analysis may lack control variables, we posit the results to be accurate and reliable as the variables included in the model clearly explain the relationship between the variables of interest. Moreover, the data we used was from a credible source, and our selection of variables are shown to have a strong correlation with the results, which helped to increase the accuracy of the analysis, even in the absence of controls for other factors. Having said that, we still urge future studies that focus on the performance of saving and credit societies to include control variables, such as firm size.

Finally, since the study focus was on the role that the various financial indicators played in impacting performance in aggregated terms, future studies could also identify threshold levels of each on profitability of SCC in Thailand and other EMs.

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