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WAR AND PEACE TIMES, INTEREST MARGIN AND COMMERCIAL BANK OPERATIONS: A CASE OF THE SRI LANKAN BANKING SECTOR

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The civil war in Sri Lanka, which lasted over 30 years, concluded in 2009. As well as causing enormous pain and disruption to everyday life, the war had a lasting impact on socio-economic and political activities in Sri Lanka. It deprived Sri Lankans of many opportunities, and thus hindered the true potential of economic development in the island nation. The conclusion of the war has added a new dimension to Sri Lankan society; Sri Lanka has embarked on an ambitious journey of economic expansion to regain wartime losses.

Against this background, this paper analyses the impact of the civil war on the operations of the financial services sector, with specific reference to the commercial banking industry in Sri Lanka. It uses a longitudinal graphical analysis coupled with panel data regression. The former is used to understand banking operations during peacetime and wartime, while the latter is used to analyse the impact of the civil war on the net interest margin (NIM) and interest rate spread between lending and deposit rates of commercial banks. The results reveal that the civil war has significantly undermined the development of the commercial banking industry and its economic performance and widened the interest rate spread. Moreover, the results confirm that the conclusion of civil war has brought some relief to the economy, with commercial banks able to reduce the NIM.

Introduction

Sri Lanka is at a crucial point in its history in terms of development. Soon after the conclusion of the 30-year civil war, the previous United People's Freedom Alliance government embarked upon an ambitious plan of turning Sri Lanka into 'The Emerging Wonder of Asia'. In the pursuit of this plan, Sri Lanka has recognised several key economic targets, as outlined in the development policy framework (Department of Planning 2010). These include a doubling of per capita gross domestic product (GDP) by 2016, continuous economic growth of over 8 per cent per annum, an increase in investment to 33–35 per cent of GDP, export growth of twice the real GDP growth rate and a four-fold growth in tourism earnings. The United National Front government, which came to power in 2015, has formulated a five-fold development program, in which economic targets are very much in line with those of the previous government. While these targets are not unreachable, there

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are a number of fundamental economic, social and political prerequisites. Among these, careful policy planning and implementation, a conducive macro-economic environment, strong commitment from political leadership and acceptable law-and-order contexts are key. It appears that leadership on both sides of the political divide are fully committed and have wholeheartedly supported this important journey. However, it is unclear whether other conditions are in place to help realise these goals.

As rightly identified in the policy framework, increased investment from both the public and private sectors is key to realising targeted economic growth. Traditionally, public sector investment has played the dominant role in economic development in Sri Lanka. Following the war, the government significantly increased its involvement in infrastructure development, particularly regarding the restoration of economic and social systems in war-affected areas. The government has relied heavily on foreign grants or aid in this pursuit. Though successive governments have implemented policies to attract greater investment from both local and foreign entrepreneurs, the contribution from these groups has been low.

Against this background, it is important to review the role of the market interest rate, which is driven by monetary policy. We focus on whether the banks offer a competitive interest rate, attractive to both investors and depositors. The role of the net interest margin (NIM) cannot be ignored, as it determines the level of savings and investment, and thus, economic growth. However, it is believed that commercial banks in Sri Lanka charge a relatively higher lending rate, mainly because of the high NIM. This would drive potential savers and investors away from the conventional banking system towards non-banking financial institutions (NBFIs). Recently, there has been significant expansion in the Sri Lankan NBFIs sector and a shift of deposits away from the conventional banking sector to NBFIs. Due to poor regulation by the central bank, several of these NBFIs collapsed, and investors lost millions of rupees. Therefore, there is a clear case for an inquiry into the role of the NIM in the Sri Lankan banking sector.

The current literature shows that neither the Sri Lankan conflict nor the role of the NIM in the Sri Lankan banking sector has attracted much attention in terms of the empirical work. Most research has focused on the nexus between military spending and economic growth in Sri Lanka (see for example Suzuki 2018; de Silva 1999; Wijeweera and Webb 2009, 2011, 2012; Azam and Feng 2015). The present study was motivated by this lack of empirical evidence. The authors believe that the findings of this study will add to the existing literature in this important and under-researched area.

The aim of this paper is to analyse the determinants of the NIM in the Sri Lankan banking sector. More specifically, this paper attempts to assess whether the NIM has been affected by the prevailing political climate of the country, particularly during the civil war and immediately after its conclusion. The findings suggest that the war and truce have affected the banking sector performance, thereby altering the NIM and interest rate spread. NIM was measured using two different variables—net interest margin to earning assets (NIMEA) and net interest margin to total assets (NIMTA)—and both these reveal similar results. Overall, the findings are in line with previous empirical work in this area.

The remainder of this paper is organised as follows. The next section provides a brief overview of the Sri Lankan banking sector. Section 3 summarises the literature, while Section 4 describes the study's model, sample and methodology. Section 5 presents the results and the final section concludes the paper.

Challenging times in the Sri Lanka banking sector

Sri Lanka's challenging times: A brief review

As noted earlier, during the past four decades, Sri Lanka has experienced the most challenging times in its post-independence history. The challenges were social, economic, cultural and global in nature. Of these, the most challenging was the civil war, which lasted almost three decades (1983–2009), against a separatist guerrilla movement. The aim in this section is not to analyse the history or reasons for this war, but to highlight the most economically significant events that occurred during that period as a result of the war. While the civil war was a considerable impediment to economic growth throughout the period, this section highlights war-related events that caused significant shocks to economic activity.

Table 1 provides an account of events related to the civil war and peace in Sri Lanka from 1983–2009. The year 1983 has been selected as the starting point, as this was when 13 army soldiers were killed by the Liberation Tigers of Tamil Eelam (LTTE), which led to a series of communal violent events in Colombo and its surrounding suburbs. This soon spread to other parts of the country, before eventually being controlled by government law enforcement agencies. Following these events, though it was still mainly confined to the northern and eastern provinces, the war escalated, with LTTE making sporadic attacks on civilian, economic and government targets. Of these, the attacks during the mid-1990s–early 2000s were the most disastrous in terms of economic growth and expansion. The attacks on the oil storage facilities in Colombo (1995), the Central Bank of Sri Lanka (1996), the World Trade Centre (1997) and Colombo International Airport (2001) are but a few that threw the already crippled economy into total disarray.

Table 1: Timeline of Sri Lankan civil war events affecting economic activity. Extracted from Crossette (1994), Kamalendra (1999), Sharma (2000), IHS Jane (2001), Al Jazeera (2009) and University of Stanford (2015).

Year	Incident
1983	Tiger attack in the north kills 13 soldiers, triggering anti-Tamil riots in Colombo. Beginning of what is known as the 'First Eelam War'.
1987	Signing of the first peace accord and establishment of the provincial council system, arrival of Indian Peace Keeping Force (IPKF). LTTE breaks the truce and begins three years of fighting that kills 1,000 Indian soldiers.
1990	Withdrawal of IPKF from Sri Lanka, LTTE takes control of Jaffna, capital city of Northern Province.
1993	Assassination of Sri Lankan President Ranasinghe Premadasa by a suspected LTTE suicide attack.

Year	Incident
1994	Assassination of ruling party presidential candidate Gamini Dissanayake.
1995	Attack on the oil storage complexes at Kolonnawa and Orugodawatta (the only refinery in Sri Lanka), a series of bomb explosions in Colombo by suspected LTTE carders. Offer of truce to rebels by President Chandrika Kumaratunga.
1996	Suicide bomb attack at the Central Bank of Sri Lanka.
1997	Bomb attack at Colombo World Trade Centre.
2001	Suicide bomb attack on Bandaranaike International Airport that destroys half the Sri Lankan Airlines fleet.
2002	Norwegian-mediated ceasefire agreement signed.
2003	LTTE withdraws from peace talks but ceasefire holds.
2004–2005	LTTE splits into two factions after its eastern commander breaks away (taking 6,000 fighters with him), assassination of Foreign Minister Luxman Kadiragamar; Mahinda Rajapaksha wins the presidential election.
2006	Fighting escalates in April–July, raising fears of renewed war. Geneva peace talks fail in October. Government captures Tiger's eastern strongholds.
2007	LTTE carries out its first air strike, bombing a government-controlled military airbase in Anuradhapura.
2008	Government officially annuls ceasefire in early January and launches massive offensive.
2009	A major operation launched by government forces against LTTE concludes in May of this year.

There were several attempts to resolve the differences through dialogue, some of which were mediated by foreign countries, but ultimately, these failed. The first was the India-mediated peace accord signed in 1987. After 19 years of conflict, Norway mediated a ceasefire, with a peace agreement signed in 2002, but this was officially annulled by the government in 2008. The 2006–2009 period is regarded as the bloodiest in the 30-year civil war. The war was declared over in May 2009, but with a huge loss of lives for all parties involved and significant economic costs in terms of lost growth and damage to economic infrastructure. The northern and eastern provinces incurred the worst damage, but other provinces still bore considerable impacts. It is the authors' view that the Sri Lankan banking sector was significantly affected by the war, as were other sectors of the economy. This hypothesis is reviewed and analysed in the sections below, beginning with a brief description of the Sri Lankan banking sector.

Banking sector in Sri Lanka

Banking in Sri Lanka was introduced by British planters in the country's Central Province, with the establishment of the first bank in 1888 (then known as Hatton Bank, later to become Hatton National Bank). After independence, the government of Sri Lanka established the Central Bank of Ceylon in 1950, in recognition of the importance of an active monetary policy regime and a dynamic financial sector in supporting and promoting economic growth. The first state-owned bank, the Bank of Ceylon, was established in 1939. The private sector was not allowed to establish new banks or expand existing operations (Karunasena 1999).

Thus, as with many other countries, the banking sector in Sri Lanka was dominated by the two state banks. However, after the 1977 introduction of policies aimed at opening the economy and implementing financial reforms, several local commercial banks were established (e.g., four main private banks were established).¹

Table 2 shows the number of commercial banks, including foreign banks, and the number of branches for 1977–2016. The numbers confirm that the banking sector in Sri Lanka experienced significant expansion in tandem with economic growth. However, the expansion of the sector reflects the economic climate at the time. For example, following the financial reforms (introduced in 1977), the branch network (local commercial banks) doubled in size until 1983, after which time expansion was modest. 1983 is when the 30-year civil war commenced. From 1983, there were constant disruptions to economic and social activities in Sri Lanka; however, as shown in Table 1, the banking sector was highly resilient to such negative events, with a gradual expansion of the sector until 2009, when the war ended. The postwar period is regarded as the golden era of the sector, with unprecedented expansion in the branch network. In 2013, there were 2,582 local bank branches, representing a 30 per cent expansion in the branch network within the four years of peace and stability. This is in clear contrast to the increase in the number of branches during the war period (1983–2009).

Table 2: Structure of the banking sector in Sri Lanka. Data sourced from various issues of CBCL *Annual Reports*, 1988–2014 (www.cbsl.gov.lk).

Year	Local Commercial Banks	Foreign Commercial Banks	Regional Development Bank - Branches	Savings Banks	Rural Bank Branches	Licensed Specialised Banks	Unit Trust	Finance Companies
1977	4 [298]	7	—	1 [25]	544	Na	-	29
1980	4 [486]	17	—	1 [42]	641	Na	-	27
1985	4 [600]	21	—	1 [57]	914	Na	-	56
1986	4 [604]	21	—	1 [60]	932	Na	-	56
1987	4 [608]	21	—	1 [62]	955	Na	-	53
1988	6 [678]	19	80	1 [64]	Na	Na	-	54
1989	6 [690]	18 [21]	89	1 [69]	Na	Na	-	60
1990	6 [719]	18 [23]	100	1 [76]	Na	Na	2	40
1991	6 [737]	18 [25]	124	1 [81]	Na	Na	2	24
1992	6 [781]	17 [29]	156	1 [84]	Na	Na	2	27
1993	6 [845]	23 [33]	163	1 [85]	Na	Na	2	26
1994	6 [876]	23 [36]	169	1 [90]	1216	Na	2	26
1995	6 [876]	26 [37]	171	1 [96]	1251	Na	4	24

¹ Sampath Bank PLC was incorporated in Sri Lanka in 1986 and Seylan Bank PLC was incorporated in 1987.

Year	Local Commercial Banks	Foreign Commercial Banks	Regional Development Bank - Branches	Savings Banks	Rural Bank Branches	Licensed Specialised Banks	Unit Trust	Finance Companies
1996	7 [906]	26 [37]	175	1 [99]	1293	Na	5	24
1997	8 [949]	18 [38]	176	1 [101]	1329	6	10	25
1998	8 [988]	18 [40]	176	1 [102]	1351	8	10	25
1999	9 [1009]	17 [38]	177	1 [101]	1418	12	12	25
2000	10 [1042]	16 [38]	181	2 [101]	1476	12	12	25
2001	11 [1080]	14 [37]	188	2 [101]	1507	12	12	25
2002	11 [1185]	12 [31]	190	2 [103]	1554	14	13	26
2003	11 [1285]	12 [40]	194	2 [112]	1594	14	13	26
2004	11 [1342]	11 [38]	196	2 [112]	1594	14	14	27
2005	11 [1380]	11 [30]	197	1 [114]	1650	14	13	28
2006	11 [1675]	12 [39]	204	1 [114]	1608	14	13	29
2007	11 [1758]	11 [43]	218	2 [118]	1628	15	14	32
2008	11 [1857]	11 [44]	219	2 [143]	1763	14	17	34
2009	11 [2000]	11 [44]	226	2 [147]	1717	14	18	35
2010	11 [2159]	11 [46]	230	2 [173]	1761	9	21	37
2011	12 [2434]	12 [49]	235	2 [179]	1857	9	24	39
2012	12 [2510]	12 [220]	254	2 [220]	1953	9	37	47
2013	12 [2582]	12 [221]	255	2 [223]	2080	9	53	48
2014	13	12	255	2[223]				
2015	13[2705]	12[220]	255	2[223]				
2016	13[2763]	12 [221]	255	2[228]				

Notes: The tables show the expansion of the banking industry in Sri Lanka during the last 36 years. The expansion speed of the industry's institutional structure has been greatly affected by the civil war (1983–2009). The number of commercial bank and the savings bank branch offices is in parentheses; 'Na' denotes that data are not available.

Further evidence of the impact of the war and subsequent peace on commercial banks' operations is presented in Figure 1, which graphically summarises the assets, liabilities, income and expenditure of commercial banks in Sri Lanka for 1998–2016. Close examination of Figure 1 demonstrates that the levels of total assets and liabilities of banks were affected by civil war. For example, from 1998–2002, growth of assets and liabilities is modest. From 2002 (when there was a truce between the government and LTTE) to 2007, there are signs of significant growth in banking operations, before a sudden dip in 2008–2009. As noted earlier, once the war ended, banking operations experienced massive growth, with assets and liabilities of commercial banks increasing to more than five times their level at the beginning of the period (1998). A similar pattern is evident in terms of bank interest income and interest expenses. Importantly, the gap between interest income

and interest expenses widened gradually over the period, with the widest gap experienced after 2009. This is a clear indication that the security situation of a country has a significant bearing on bank performance.

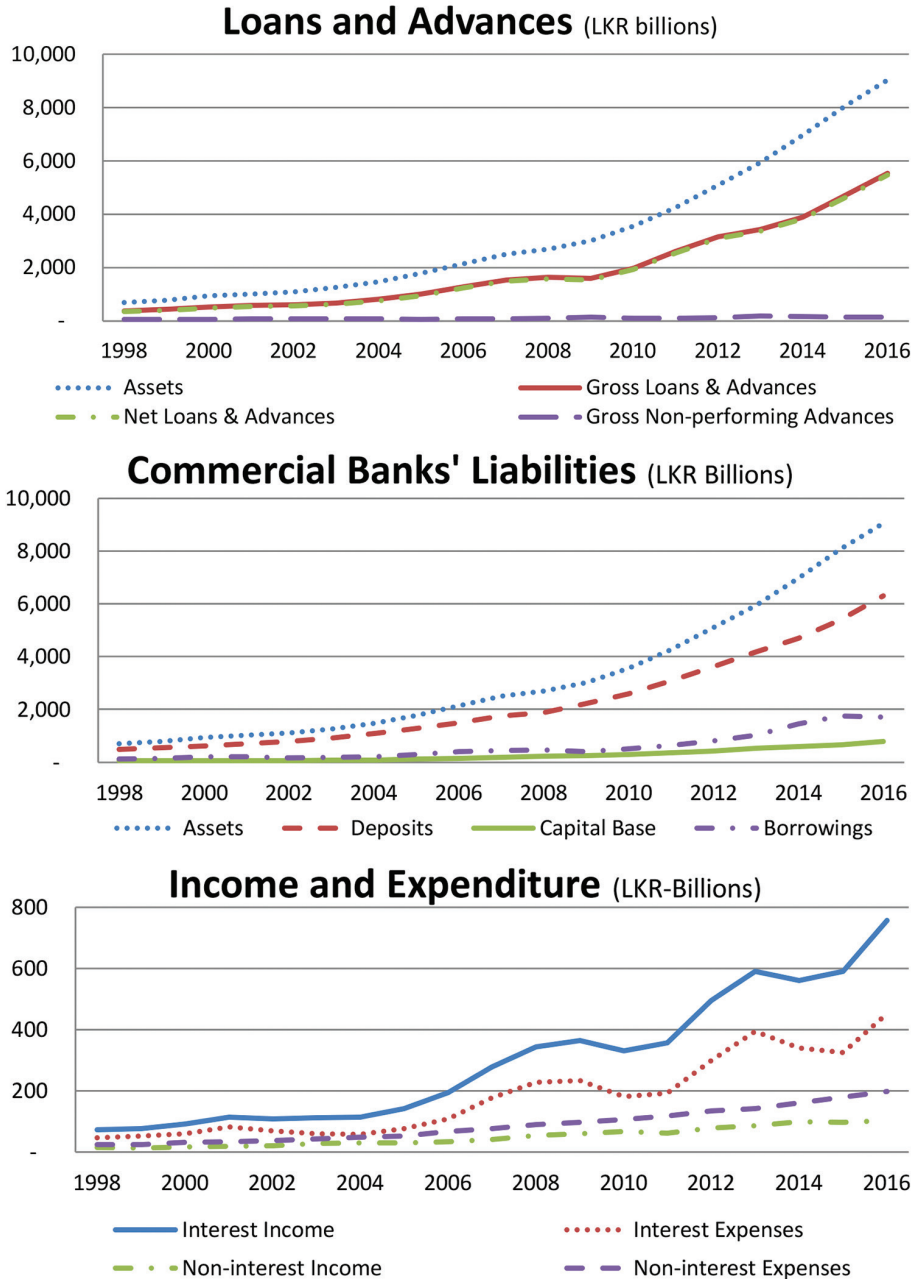


Figure 1: Commercial bank assets, liabilities, income and expenditure. Data sourced from Central Bank of Sri Lanka Annual Reports, various years (www.cbsl.gov.lk).

Note: The above charts exhibit the total loan and advances, liabilities, income and expenditure structure of commercial banks in Sri Lanka.

Literature review

Though a robust body of literature relating to civil wars is available, there is very little in terms of the economic consequences of such wars (Blattman and Miguel 2010). Blattman and Miguel (2010) emphasised the necessity of micro-level analysis and case studies to decipher the causes, conduct and consequences of war. The current world environment has renewed a research focus on the links between economic performance and the political environment. As noted by Fielding (2004), economists have tended to investigate the possibility that political instability and unrest has a considerable and lasting impact on the real economy. Baddeley (2011) noted that armed conflicts may have a direct impact on financial stability. Moreover, he stated that since military expenditure associated with armed conflicts can drain economic resources, conflicts could cause financial instability. War and conflict generate financial strain by undermining general economic confidence, destroying key financial institutions and disrupting the social relationships essential to financial transactions in developing economies (Baddeley 2011). It is clear that civil war has a direct effect on the development of the financial system. However, the way financial systems operate in affected countries can prolong such civil disturbance. Therefore, it is important to investigate the way civil disturbances affect banking operations.

The Sri Lankan conflict did not attract a great deal of attention in the literature. However, a few studies deserve to be mentioned. Suzuki (2018) estimated a stochastic growth model for Sri Lanka to analyse the negative effects of war on economic growth caused by an exodus of skilled workers. De Silva (1999) analysed Sri Lanka's security situation in the context of its neighbours, with specific reference to India's role as a superpower in the region. Wijeweera and Webb (2009) analysed the nexus between military spending and economic growth in Sri Lanka using VAR analysis and discovered that the role of military spending in economic growth is less significant than non-military spending. Wijeweera and Webb (2012) conducted the same study using the Feder–Ram and military Keynesian models. Moreover, Wijeweera and Webb (2011) conducted a panel data analysis on military spending and economic growth in South Asia—Sri Lanka was one of the five countries considered. Azam and Feng (2015) analysed the relationship between military spending and external debt of 10 Asian countries, of which Sri Lanka was one. This study determined that for developing countries caught in a security dilemma, military expenditure often requires an increase in external debt, which may negatively affect economic development. However, to the best of the authors' knowledge, none of these studies addressed the impact of the civil war on the financial services sector in Sri Lanka.

The main function of commercial banks is to mobilise deposits and grant loans. Their operating results depend on the NIM they charge over the loan granted. Commercial banks may consider both financial and socio-economic factors when deciding on the NIM. The socio-economic environment affects the level of risk in banking operations and hence, the risk premium banks charge on loans. Thus, both the financial instability created by the civil war and the disrupted social relationships can affect the NIM.

Ho and Saunders's (1981) landmark study provided an empirical framework for studying factors that affect the NIM. This study analysed the determinants of the NIM by

integrating the hedging² and expected utility approaches (Pyle 1972).³ Ho and Saunders (1981) argued that banks expect to have an NIM as the fee or price of providing intermediary (depository and/or lending) services. A positive NIM represents the amount by which the interest earned on a bank's portfolio exceeds the interest paid on deposits or/and borrowed funds (Brissimis, Delis and Papanikolaou 2008).

Banks' increasing reliance on interest-sensitive short-term liabilities placing a greater emphasis on loans in the asset portfolio (many of which have contractually fixed or insensitive interest rates) has increased the sensitivity of the NIM to interest rate volatility (Ho and Saunders 1981). However, banks with monopoly powers have the power to demand a greater spread than banks do in a competitive market. Saunders and Schumacher (2000) viewed a low NIM as an indicator of relative competitiveness in the banking sector. As they explained, a narrow NIM reflects lower transaction costs and regulatory taxes. They also pointed out the importance of a higher margin for continuity and financial institution strength. As explained by Fungáčová and Poghosyan (2011), there is trade-off between high margins and low deposit rates—while lower deposit rates discourage savings flowing to bank deposits, higher lending rates reduce investment opportunities for banks.

However, Maudos and Solís (2009) showed that a high NIM reflects high intermediation costs, which in turn has negative effects on economic growth in general. They further explained that banks receive deposits and grant loans at different points in time. Since the timing and size of cash inflows (deposits) may not be synchronised with the timing and size of cash outflows, banks may need to make short-term borrowing and investment decisions, which may result in reinvestment (refinance) risk.

Ho and Saunders (1981) identified two set of variables capable of affecting the NIM. The first includes market specific factors, such as the:

1. variability of interest rates
2. structure of the market
3. average size of banks' transactions
4. degree of risk aversion.

The second set of factors includes bank-specific variables, such as implicit interest rates, opportunity cost of reserves and the default risk premium. Allen (1988) extended this basic model to identify the impact of services diversification by incorporating various types of loans. She argued that the existence of cross-elasticities can trigger a reduction in the NIM. Maudos and Solís (2009) extended the model to include operating cost, diversification and specialisation. As explained by Ho and Saunders (1981), adjusting the recorded interest margin for firm-specific factors can identify the optimal mark-up or pure spread charged by commercial banks for deposit and loan services.

Maudos and Fernández de Guevara (2004) found that competitiveness, interest rate risk, credit risk and operating cost affect the NIM in their study, which focused on interest

² The hedging approach assumes that banks seek to match the maturities of their assets and liabilities to avoid reinvestment or refinancing risks.

³ The expected utility approach assumes that the bank seeks to maximise either expected profits (wealth) or the expected utility of profit (wealth).

rate margins in the banking sectors of the European Union. Maudos and Solís (2009) studied the Mexican banking industry and discovered that the NIM has a positive relationship with factors such as operating costs, banks' market power, volatility of market interest rates and implicit interest payments. The NIM has negative relationships with the quality of management and non-interest income. Moreover, they argued that banks' non-lending activities influence the pricing of loans because of cross-subsidisation of banking products.

López-Espinosa, Moreno and Pérez de Gracia (2011) explored the impact of accounting reporting standards on the NIM using Saunders and Schumacher's framework. Their study, which used data collected from 15 developed and emerging economies, found that loan-to-assets and loan-loss provisions have a positive relationship with the NIM, while a more stable financial environment has a negative influence on the NIM.

Saunders and Schumacher (2000) discovered that the credit risk also affects the NIM. Banks tend to keep a higher level of equity capital to face expected and unexpected credit risks. Since equity capital is more expensive than other sources of capital, banks tend to cover the additional cost on equity capital by increasing the NIM.

Brock and Suarez (2000) explored the determinants of bank spreads in six Latin American countries during the mid-1990s. They found that operating costs, levels of non-performing loans and reserve requirements are positively related with the NIM; however, the impact of these effects differs across countries. Other than bank-specific variables, uncertainty in the macro-economic environment appears to increase interest spreads.

Valverde and Fernández (2007) showed that, because of competitive pressures, traditional accounting measures of bank margins may not reflect the full market power of a bank. As diversified banks earn complementary profits from non-banking operations, they may be in a strong position to compete with more specialised rivals (e.g., through price-cutting). Valverde and Fernández (2007) found that the relationship between bank margins and market power varies significantly across bank specialisation.

As evidenced from the discussion so far, the NIM has been the subject of numerous studies. However, to the authors' knowledge, no study has attempted to analyse the impact of civil war as a determinant of the NIM. The banking environment in Sri Lanka, together with the recently concluded civil war, provides an opportunity to explore the impact of civil war on the determination of the NIM. Moreover, such a novel attempt helps to uncover the economic consequences of civil war on the financial services sector. This paper investigates the determinants of the NIM using the seminal work of Ho and Saunders (1981) and subsequent improvements to the model described above.

Methodology

The impact of the civil war on the NIM and the interest rate spread of commercial banks was investigated using two different models that will be explained in the following subsections. The models have been estimated using the cross-section fixed-effect panel regression of which results will be presented in the next section.

Model 1: The net interest margin

NIM can be considered one of the major performance indicators of commercial banks.

Thus, the study assumed that a bank is a risk-averse agent that produces deposit and loan products (Saunders and Schumacher 2000) and charges interest on loans granted and pays interest on deposits collected. The NIM is the compensation for bank inventory risk, arising from uncertainty about the (random) arrival of loan and deposit transaction requests (Allen 1988). Based on this framework, this study adopts the following model, initially developed by Ho and Saunders (1981) and subsequently updated by Allen (1988) and others (Angbanzo 1997; Maudos and Fernández de Guevara 2004; Nguyen 2012; Valverde and Fernández 2007) to identify the drivers of the Sri Lankan commercial banks' NIM. In adopting this model, the authors have incorporated two dummy variables to identify the impact of the war and truce on the NIM.

$$NIM_{it} = \alpha_i + \sum_{i=1}^n \beta_i X_{it} + \tilde{\alpha}_i + \varepsilon_{it} \quad (1)$$

Where ' α ' is the intercept of the equation, ' β_i ' is a vector of estimated coefficients, ' γ_i ' is a vector of unknown intercept for each cross section, and ' X_{it} ' is a vector of explanatory variables.⁴ As noted earlier, coefficients for the model variables are estimated using the cross-section fixed-effect model used in previous studies (Angbanzo 1997; Drakos 2003; Fungáčová and Poghosyan 2011; McShane and Sharpe 1985).

Model 2: The net interest rate spread

In addition to the NIM, the interest rate spread is considered a performance indicator of banks. Thus, in the second model, the impact of war on the interest rate spread was analysed as shown in Equation 2. The interest rate spread is defined as the difference between commercial bank lending rate and the deposit rate.

$$\text{Spread}_{it} = \alpha_i + \sum_{i=1}^n \theta_i X_{it} + \delta_i + \varepsilon_{it} \quad (2)$$

Where ' α ' is the intercept of the equation, ' Θ_i ' is a vector of estimated coefficients, ' δ_i ' is a vector of unknown intercept for each cross section, and ' X_{it} ' is a vector of explanatory variables. Equation 2 uses the same vector of explanatory variables as Equation 1.

The sample

This study used an unbalanced panel dataset that includes accounting and macro-economic data from 1989–2016 for 11 local commercial banks operating in Sri Lanka. The sample was restricted to 1989–2016 and to local banks for two reasons. First, financial information from foreign banks or branches was not available in the public domain, and the nature and scope of their business operations in Sri Lanka were limited. Second, the comprehensive financial information required by the study was not available prior to 1989. However,

⁴ The main purpose of the study is to investigate the impact of civil war on NIM in commercial banks in Sri Lanka. Thus, this study is not interested in the signs of these parameters or the empirical performance of the dealership model adopted. Isolating the probable impact of those variables is essential to increase the accuracy of the inferences of the impact of the war and truce.

1989–2016 is the focus of this study, as it represents the significant part of the 30-year civil war. Therefore, the selected cross-section can be regarded as reflective of the various stages of the civil war and post-civil war period in Sri Lanka.

For the purpose of analysis, the sample period is divided into three segments: ‘during the war’, ‘the truce’ and ‘postwar’. During the war period represents the periods 1989–2001 and 2006–2009. During these periods, many direct confrontations between Sri Lankan armed forces and separatist guerrillas were recorded, despite occasional ceasefire arrangements between the two parties. However, in 2002, a formal ceasefire agreement was signed between parties with the intervention of Norwegian peace facilitators. Despite its fragility, the agreement significantly reduced direct confrontation until 2005. Therefore, this period has been identified as a separate time segment. The third segment represents the post-war period. Identified outliers, if any, were excluded from the sample.

Data and variables

The required data for the study were collected directly from the published annual reports of both commercial banks and the Central Bank of Sri Lanka. For the purpose of the study, banks were defined as financial institutions that primarily use deposit mobilisation for banking activities. Savings banks and other non-commercial banks were excluded from the sample, since their line of products are different from that of commercial banks. As noted above, due to the limited operations, the study also excluded foreign bank branches from the analysis.

The data were analysed in two stages. First, the study compared the mean value of collected data for the key operational indicators of commercial banks using the independent sample ‘t’ test, to check for any significant difference in mean value across the three time segments. Second, the cross-section fixed-effect panel regression was performed to investigate the impact of the war on commercial banks’ performance.

As shown in Equations 1 and 2, two dependent variables—the NIM and SPREAD—were used. To represent the former (NIM), two measures were adopted. The first is the ratio of the net interest income to the total earnings assets (NIMEA). Though many previous studies used NIMEA, it disregards the contribution of a part of the total assets to the NIM. Thus, it may not perfectly represent the earning capacity of all assets. Therefore, this study used NIMTA, which is the ratio of the net interest income to the total assets as an alternative measure of NIM (Nguyen 2012). The SPREAD, the second dependent variable, is estimated by taking the difference of the weighted deposit rates and the weighted lending rates of each bank.

The vector of explanatory variables (X_{it}) includes eight firm-specific variables: credit risk (CRR), liquidity (LIQUD), market structure (MSTA), non-interest operating expenses (NEXTA), non-interest income on other earning assets (NINOE), interest rate risk (INRRI), risk aversion (RAVER), return on assets (ROA) and the size (LNTA). CRR is proxied by the ratio of problem loans to total loans granted (Angbanzo 1997; Hawtrey and Liang 2008; López-Espinosa, Moreno and Pérez de Gracia 2011). CRR is considered an

indicator of the probability of default in loans granted. A bank's LIQUID position reflects its capacity to entertain random demands on deposits and loans (Fungáčová and Poghosyan 2011). Therefore, this study used the ratio of liquid assets to total assets to represent LIQUID. Following most previous studies, the current study uses the market share of total assets (MSTA) of each bank to represent the market structure of the commercial banking industry. The NEXTA is used to represent the impact of other operating expenses (Maudos and Fernández de Guevara 2004; Zhou and Wong 2008). The ratio between non-interest income and the total assets is used as NINOE. The ratio of total assets to total equity is used as the proxy for the banks' RAVR behaviour (Zhou and Wong 2008). However, this may not be able to fully capture banks' attitude to risk. Therefore, the result for this variable needs to be carefully interpreted. ROA is used to represent the banks' profitability. The SIZE of a bank could also affect the individual banks' NIM and the SPREAD; the log value of total assets is used to measure the size.

Two macro-economic variables are also included as explanatory variables. The first, INRRI, is measured by the annual standard deviation of monthly three-month Treasury bill rates, published by the Central Bank of Sri Lanka (Hawtrey and Liang 2008; López-Espinosa, Moreno and Pérez de Gracia 2011). The second is government debt (PDEBT) as a percentage of the GDP. Since government debt can directly affect the demand for loanable funds available in the market, it could have an impact on NIM. Specially, in a civil war period, government may tend to borrow directly from the local market. The study also used two dummy variables to proxy the time variant unobservable impact of war (DWAR) and truce (DTRUCE). The next section summarises the findings of the statistical analysis of the study.

Results and discussion

Table 3 presents descriptive statistics estimated for the whole sample and for the three subsample periods (during the war, the truce and postwar). The mean value of test variables during the war and truce periods were compared with the mean values of the postwar period using the t-test for independent samples. The recorded 't' statistics indicate significant variations in mean values of test variables for the war and truce periods relative to postwar period. For example, variables such as NIMEA, SPREAD, CRR, LIQUID, NEXTA, NINOE, SIZE, INRRI and PDEBT stand out in terms of statistical mean difference. This confirms earlier evidence regarding the differences in banking performances/operations during these periods of civil war relative to the postwar and ceasefire periods (see Figure 1).

The recorded descriptive statistics for NIM indicates that banks have maintained a higher NIM during the war than they did in postwar times. For example, during war, NIMEA was 5.21 per cent whereas it was 4.72 per cent in the postwar period. The higher NIMEA may have been caused by the impact of war on the fragile economic and political environment. By charging a higher NIMEA, commercial banks may have aimed to mitigate such risks. Moreover, the interest spread, the second major indicator of bank performance, follows the same pattern as in NIMEA. Both variables show statistically significant mean differences (e.g., see 't' statistics for NIMEA and SPREAD) for the two periods.

Additionally, during the truce period, banks have relaxed their profit margins as shown in lower NIMEA relative to the rest of the periods.

Table 3 Descriptive statistics of test variables.

Variable	Definition	Mean (Standard deviation)				T-test for equality of means	
		Pool	War	Truce	Post-war	War and post-war	Truce and post-war
NIMEA	Net interest margin on earning assets	0.0492 (0.0144)	0.05210 (0.0160)	0.0432 (0.0116)	0.04721 (0.0110)	3.4984***	-2.9285***
NIMTA	Net interest margin on total assets	0.0388 (0.0106)	0.03845 (0.0118)	0.0352 (0.0101)	0.04139 (0.0077)	-0.5062	-2.3343**
SPREAD	The difference of average lending rates and average deposit rates	0.0647 (0.0238)	0.07188 (0.0236)	0.0615 (0.0180)	0.05292 (0.0222)	5.4642***	-0.9351
CRR	Credit risk (problem loans to gross loan ratio)	0.0508 (0.0361)	0.05576 (0.0425)	0.0587 (0.0312)	0.03662 (0.0166)	2.4133**	1.5252
LIQUID	Liquidity (liquid assets on loanable funds)	0.1305 (0.0816)	0.16425 (0.0906)	0.1184 (0.0514)	0.07270 (0.0214)	8.0068***	-1.0218
MSTA	Market structure (identified by using each bank's market share of total assets)	0.1147 (0.1117)	0.12686 (0.1269)	0.1000 (0.0929)	0.10000 (0.0860)	1.8784**	-0.9130
NEXTA	Non-interest expenditure to total assets	0.0293 (0.0075)	0.03100 (0.0078)	0.0295 (0.0068)	0.02610 (0.0061)	3.9399***	0.1118
NINOE A	Non-interest income on other earning assets	0.1120 (0.0757)	0.13794 (0.0894)	0.0888 (0.0418)	0.07577 (0.0290)	6.3572***	-2.1402
RAVER	Risk aversion (equity to total assets)	0.0795 (0.0591)	0.07803 (0.0683)	0.0568 (0.0320)	0.09516 (0.0466)	-0.4192	-2.6868
ROA	Return on assets	0.0149 (0.0128)	0.01440 (0.0148)	0.0090 (0.0101)	0.01927 (0.0078)	-0.6893	-3.2422
SIZE	Size (natural logarithms of total assets)	10.6185 (1.6912)	9.93748 (1.5356)	10.2887 (1.3608)	12.11075 (1.1216)	-7.7383***	-1.3514
INRRI	Interest rate risk (annual standard deviation of 03-months Treasury Bill rates)	0.0114 (0.0080)	0.01540 (0.0086)	0.0093 (0.0029)	0.00476 (0.0019)	10.4217***	-1.7505
PDebt	Government debt as a % GDP	0.8559 0.1769	0.87932 (0.2000)	1.0020 (0.0577)	0.72764 (0.0337)	2.3005**	6.1254***
Defence	Government defence expenditure as a % GDP	3.3601 (0.9808)	3.97716 (0.9234)	2.9907 (0.3020)	2.44289 (0.20963)	14.2515***	-2.6445**

Note: Standard deviations are in parentheses. *** denotes statistically significant at 1% significance level, ** denotes statistically significant at 5% significance level. Sample and sub-sample time period: Pool, 1989–2016; War 1989–2002 and 2005–09; Truce, 2003–05; Post-war 2010–16.

Additionally, the results have also indicated that the average CRR and INRRI is significantly higher during war than it is in the post-war period. This suggests that during the war, Sri Lankan banks were exposed to increased credit and interstate risks. Complementing this evidence, the LIQUID variable has revealed a similar pattern. For example, in wartime, banks kept 16.42 per cent of their assets as liquid assets (cash or cash-equivalent assets), whereas this rate was 7.27 per cent in the post-war period. This scenario shows that the banking sector has maintained a higher percentage of liquid assets as a strategy for countering the increases in CRR and INRR due to the war. Further, this finding can be linked with higher NIMEA reordered during the war. By maintaining a higher percentage of liquid assets, banks may have limited the supply of funds for granting loans. Consequently, banks may have had to charge a higher margin on loans to maximise profits.

Among the other variables, NEXTA and SIZE have also shown significant differences during the periods. This was expected, as the non-interest expenditure component (as measured in NEXTA) relative to total assets may decline after war. Conversely, the post-war economic expansion has helped increase the size of the total assets in commercial banks as measured in SIZE. The next section of the paper will discuss the results of panel regression.

Determinants of NIM and interest rate spread

The NIM and SPREAD equations are estimated using the cross-section panel data fixed-effect model. To determine the fitness of the fixed-effect model for the study, the authors performed the Hausman test. Accordingly, the test statistics confirmed that the cross-section fixed-effect model is more appropriate for the sample. Table 4 presents the estimated coefficients for two equations. The estimated 'F' statistics and 'R²' values have shown that models applied are appropriate and the variables included in the models are able to explain the NIM and SPREAD in commercial banks in Sri Lanka.

The main objective of the regression analysis is to test the war's effect on the NIM and SPREAD of the commercial banks. Following are the major findings of the analysis. First, there is no statistically significant evidence to support the effect of the war on NIMEA and NIMTA. However, the SPREAD has been affected positively by the war. Further, the results show that the truce has had a significant positive impact on NIMEA, NIMTA and SPREAD. The above evidence implies that due to the risky environment and the fragile nature present during the truce, banks may have been forced to charge relatively higher margins. Additionally, the increased government borrowing for rebuilding war-affected areas and defence infrastructure also could have exerted extra demand for funds, resulting in higher margins in commercial banks.

Second, the results show that the estimated coefficients for the rest of the variables shown in Equation 1 (NIMEA) are statistically significant except for the firm size (LNTA). Furthermore, as theoretically expected, the relationship between net interest margin (as measured in NIMEA and NIMTA) and non-interest income (NINOE), credit risk (CRR), risk aversion (RAVER), liquidity risk (LIQD), return on assets (ROA), and non-interest

Table 4: Drivers of the NIM.

Variables	NIMEA	NIMTA	SPREAD
NINOEAE	0.0487*** (3.81)	0.0090 (0.98)	-0.0142 (-0.59)
CRR	0.0998 *** (3.72)	0.0395** (2.05)	0.0549 (1.09)
RAVER	0.0983*** (6.67)	0.0717*** (6.78)	-0.1184*** (-4.30)
LIQD	0.0506*** (3.59)	0.0062 (0.62)	-0.0261 (-0.99)
MSTA	0.0563*** (2.70)	0.0135 (0.90)	0.0139 (0.35)
NEXTA	0.3257*** (2.65)	0.3564*** (4.04)	0.1125 (0.49)
LNTA	0.0013 (1.12)	0.0017** (2.03)	-0.0026 (-1.18)
ROA	0.3750*** (5.43)	0.2758*** (5.57)	0.7490*** (5.80)
INRRI	0.2309** (2.24)	0.1435* (1.95)	0.5190*** (2.70)
DEBT	-0.0380*** (-2.39)	-0.0241** (-2.11)	-0.1089*** (-3.66)
DTRUCE	0.0092** (2.23)	0.0060** (2.04)	0.0343*** (4.47)
DWAR	0.0043 (1.42)	0.0025 (1.17)	0.0321*** (5.68)
C	0.0160 (0.69)	0.0124 (0.74)	0.1545*** (3.56)
R-squared	0.6202	0.6397	0.5160
Adjusted R-squared	0.5833	0.6047	0.4690
Log likelihood	786.05	865.28	637.07
F-statistic	16.79	18.26	10.9676
Durbin-Watson stat	1.5369	1.4853	1.3796
Correlated Random Effects-Hausman Test Chi-Sq. Statistic	59.96***	64.57***	70.94***

Notes: The equation is estimated using cross-section fixed-effect panel least square regression. Two alternative measures of NIM have been used (NIMEA and NIMTA). There are 11 explanatory variables, which include NINOEAE, INRR, CRR (credit risk represented by problem loans to gross loan), REVER, LIQD, MSTAE, NEXTA, LNTASS (size of the bank proxy by ln [total assets]), ROA (profitability proxy by return on assets), DWAR and DTRUCE. *** denotes statistically significant at 1% significance level, ** denotes statistically significant at 5% significance level.

expenditure (NEXTA) are positive. These results confirm that in an environment where banks are exposed to a high level of credit risk, and liquidity risk due to the war, banks may maintain a high net interest margin. Similarly, the alternative regression (NIMTA) confirms the same statistical significance except for the liquidity risk (LIQD). These findings are

empirically consistent with those of previous studies (Saunders and Schumacher 2000; Maudos and Fernández 2004; Valverde and Fernández 2007; Maudos and Solís 2009).

Third, two macro-economic variables (INRRI and DEBT) are also statistically significant. As far as INRRI is concerned, this result is a confirmation of the theoretical expectation that interest rate risk has a positive effect on both NIM and SPREAD. However, in all regressions, the government debt to GDP ratio is negatively related to NIM and the SPREAD. This may be explained by analysing the economic environment during the period. As the government borrowed heavily from the local market, the banks had limited funds available for lending in the domestic market. Given that the returns on government bonds are relatively low, during the period, banks may not have realised higher margins, which is a reflection on low NIM.

We have also conducted three additional regressions with defence expenditure, government debt and interest rate risk as dependent variables against the impact of war and truce (DWAR and DTRUCE). We conducted these tests on the assumption that changes in defence expenditure, government debt and interest rate risk during a war may have had a significant impact on bank performances. As previously noted, bank performance was measured in terms of NIM and the SPREAD. Table 5 reports the results of these tests. The estimated coefficients for all three regressions have shown that both war and truce have a positive effect on all three variables. As expected, relative to the post-war period, results show that during war there has been a considerable increase in the defence expenditure, government debt and interest rate risk. This confirms the general perception of the war's impact on the economy and financial system.

In summary, the results confirm that the war and truce have affected the banking sector performance, thereby altering the NIM and the interest rate spread. We measured NIM using two different variables—NIMEA and NIMTA—and both revealed similar results.

Table 5: Government action.

	Defence expenditure and civil war	Government debt and civil war	Interest rate risk and civil war
DTRUCE	0.5478 (3.95)***	0.2743 (25.91)***	0.0046 (3.53)***
DWAR	1.5343 (14.76)***	0.1929 (24.28)***	0.0103 (10.62)***
C	2.4428 (29.23)***	0.7276 (113.93)***	0.0048 (6.12)***
R-squared	0.4961	0.7836	0.3311
Adjusted R-squared	0.4917	0.7817	0.3253
Log likelihood	-251.03	360.97	862.04
F-statistic	115.65	425.40	58.15

Notes: The equation is estimated using cross-section fixed-effect regression and panel least square regression. Explanatory variables used for estimation are DWAR and DTRUCE. *** denotes statistically significant at 1% significance level, ** denotes statistically significant at 5% significance level.

Conclusions

This paper investigated the impacts of the 30-year civil war in Sri Lanka on the operations of the financial services sector, with specific reference to the commercial banking industry. It found that the war adversely affected the evolution of the banking industry in Sri Lanka. The recorded significant differences in the mean values of key performance indicators of commercial banks during peacetime relative to wartime reveal the magnitude of the destructive impacts of the war on industry. Confirming the findings of earlier research by Baddeley (2011), this study found that the civil war in Sri Lanka undermined the development of the financial services sector and increased instability in the financial system. This is evident in the favourable changes observed since the conclusion of the war in the key performance indicators of the sector, such as NIM, interest rate risk, liquid assets, size of banks and non-banking operations.

To understand the overall impact of war on the banking industry, this study analysed the determinants of the NIM and SPREAD as main indicators of bank performance. The regression results reveal that the NIMEA, NIMTA and SPREAD are higher during times of war and truce than they are in the post-war period. This offers clear evidence that the real benefits of peace cannot be achieved using a fragile, non-permanent truce. Further, this study shows that a peaceful, disturbance-free business environment is necessary for the efficient operation of a financial system. Increased operational risk due to war is ultimately reflected in banks' day-to-day operations.

The civil war also limited the Sri Lankan banking sector's capacity to diversify its investment portfolios. The increased risk associated with war forced banks to retain more liquid assets and discouraged new investments. The overall results suggest that policymakers should focus on monetary policies that help the expansion of investment and funding opportunities for financial institutions.

The findings of this study could be applied to other developing countries in Asia, Africa, Latin America and the Middle East, where there are ongoing armed conflicts, to further learn about the impact of conflicts on commercial banking operations. While the authors are modest about the findings of this study, it is their strong view that all parties involved in armed conflicts or civil wars around the world should make every possible effort to solve problems amicably. This would ensure smooth, efficient and effective operations in the banking sector, a fundamental requirement for economic development.

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