"Banking crises and financial instability: Empirical and historical lessons"

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BANKING CRISES AND FINANCIAL INSTABILITY: EMPIRICAL AND HISTORICAL LESSONS

Abstract

The paper examines the importance of financial instability for the development of four Norwegian banking crises. The crises are the Post First World War Crisis during the early 1920s, the mid 1920s Monetary Crisis, the Great Depression in the 1930s, and the Scandinavian Banking Crisis of 1987–1993.

The paper first offers a description of the financial instability hypothesis applied by Minsky and Kindleberger, and in a recent dynamic financial crisis model. Financial instability is defined as a lack of financial markets and institutions that provide capital and liquidity at a sustainable level under stress. Financial instability basically evolves during times of overheating, overspending and extended credit granting. This is most common during significant booms. The process has devastating effects after markets have turned into a state of negative development.

The paper tests the validity of the financial instability hypothesis using a quantitative structural time series model. It reveals upheaval of 10 financial and macroeconomic indicators prior to all the four crises, resulting in a state of economic overheating and asset bubble creation. This is basically explained by huge growth in debts. The over-heating caused the following banking crises.

Finally, the paper discusses the four crises qualitatively. Again, the conclusion is that a significant increase in money supply and debt caused overheating, asset bubbles, and thereafter, financial and banking crises, which in turn spread to other markets and industries and caused huge slumps in the real economy.

Keywords	financial crises, financial instability hypothesis, macroeconomic, economic history, monetary expansion
JEL Classification	E44, E51, E52, F34, G15, N24

INTRODUCTION

This paper examines four incidents of financial crises in the light of the financial instability hypothesis promoted by Minsky and Kindleberger, who both argue that the mismatch between monetary expansion through lending and value creation might cause overheating of the economy with high financial gearing, and thereafter, financial crises.

More precisely, the paper draws on a Minsky-Kindleberger inspired seven stage dynamic model for financial crises as a framework for examining four Norwegian banking crises:

1) Post-First World War Depression 1920–1922;
2) Monetary Crisis 1924–1926;
3) Great Depression 1930–1933;
4) Scandinavian Banking Crisis 1987–1993.

The paper offers a structural time series analysis to isolate positive and negative gaps from long-term sustainable equilibriums. Additionally, it is necessary to discuss each crisis in more detail based on quantitative and qualitative data to examine if one finds traces of overexpansion of credits leading to loss of financial stability, and financial crises.

1. LITERATURE REVIEW

Despite a common understanding of what a financial crisis is, there is no common or general definition of the term. Most scholars agree that financial crises often revolve around four central parameters (Claessens & Kose, 2013):

1) Huge fall in credit volumes and asset prices;

2) Lack of external financing and financial intermediation;

3) Negative asset balances of companies and financial institutions;

4) Need of considerable financial aid from governments.

The present paper recognizes these characteristics. Furthermore, it defines financial crises as incidents where financial institutions fail to supply the right volume of payments in markets. Financial crises occur when financial markets experience "sharp, brief, ultra-cyclical deterioration of almost all financial indicators, short-term interest rates, asset prices, commercial insolvencies and failure of financial institutions" (Goldsmith, 1982).

Banks constitute central units in a financial system. Until the mid 1900s, financial crises were called bank crises or credit crunches. The paper's definition of a bank crisis is a state in the financial market when banks are unable to meet their obligation of providing sufficient credit to the economy. This is basically due to heavy losses. Thus, bank crises occur when negative shocks in financial markets are making them unable to provide sufficient credit to the economy. Financial stability is defined as the absence of market-wide episodes of financial failures and the resilience of stress in the financial system.

Financial institutions should efficiently allocate money to manage financial risks, maintain em-

ployment at a level, which should be mirrored in the labor market close to the natural rate of unemployment. The institutions should also eliminate price developments of real and financial assets affecting monetary stability. The financial system is stable when it dissipates financial imbalances caused by exogenous and endogenous shocks or disturbances. It should absorb shocks through corrective mechanisms, avoiding disruptive effects on financial markets and systems.

Financial instability is commonly seen as the opposite of financial stability. During the state of financial instability, financial institutions may either be too eager or reluctant to provide liquidity. In addition, asset prices may fluctuate significantly compared to their fundamental values. During financial instability markets could either overflow or dry out of liquidity. Instability may lead to high general or asset inflation, or the opposite – market crashes with rapidly falling asset prices. Hence, financial instability is likely to undermine confidence in the financial and the general economic system.

Financial crises most commonly start with instability creation, which is a state where markets and institutions are exposed to disturbances. They commonly result in lack of long-term sustainable equilibriums (Minsky, 1982; 1986). This approach in explaining the upbuilding of financial crises represents the financial instability hypothesis. Kindleberger (1996) argues that such episodes might typically evolve in periods of exogenous macroeconomic shocks, where over extended credits might cause the economy to overheat. Minsky argues that endogenous factors within the system, might make financial instability develop in times of significant mismatch between present and sustainable equilibria.

Minsky and Kindleberger agree that over optimistic expectations and lack of sustainable balance in financial markets may cause credit to over expand. As a consequence, credit and asset

bubbles are likely to develop. Expectations of further growth in asset prices influence bubbles to grow until markets turn due to negative shifts in future price expectations. The turning point is often called the "Minsky Moment". In its aftermath, further expectations of losses cause the markets to fall even deeper. Hence, crashes, followed by credit crunches and recessions occur (Kindleberger & Aliber, 2015).

Tornell and Westermann (2005) argue the financial instability hypothesis applies for most financial crises, since imprudent credit liberalization often leads to boom-bust cycles. Eichengreen (1990) emphasizes the term illusive stability, defined as temporary financial market stability mismatching long-term sustainable stability. He also argues it might seem as though one has gained financial stability, but it lacks sustainability in the long run. This largely coincides with the findings of Reinhart and Rogoff (2009).

Since prominent writers on the subject conclude that market destabilization due to loss of financial stability is a common pattern towards financial crises, this paper investigates if this might have been the case for the four mentioned banking crises in Norway during a 70-year period, about 1920–1990.

2. METHODOLOGY

Minsky (1982) applies a three-step financial taxonomy to explain the stage of lost financial stability in investments. He argues hedge finance, based on running surpluses and normal borrowing, be dominant under stable conditions. In times of extraordinary growth, speculative finance is more common. This is based on expectations of future increase in asset prices. Finally, Ponzi finance becomes more common. At this stage, emissions might be a necessity for continuous growth. Abnormal credit expansion brings markets to overheat, and asset bubbles grow strong. When market expectations change from positive to negative, asset prices fall, markets contract and go into states of post-crises financial instability. This causes markets to contract more than they would have done in times of correction back to its normal state merely.

Kindleberger's neo-classical theory is based on Minsky's model. Kindleberger (1996) argues the road to crisis commonly starts with exogenous shocks, which leads to monetary expansion by an increase in supply and demand for credits. When financial institutions are unable handling this within the frames of financial stability, it results in the creation of bubbles. These are, at one point, followed by a downward correction, which may lead to panic in financial markets with asset crashes and credit crunches.

Furthermore, Kindleberger draws attention to hegemonial powers. They are, because of their size, standing, market power, and role, capable of significantly influencing markets. Hence, a hegemonial power is critical to financial stability and instability. A Minsky-Kindleberger approach to financial crises is summed up in Figure 1.

Combining Minsky's and Kindleberger's theories with empirical research, one may end up with a formal seven-stage dynamic model for the development of financial crises (Grytten & Hunnes, 2016). The model suggests that disturbances to the economy, which the system is not able to handle in a consistent and relevant way, most often mark the start of a crisis foreplay. After the first stage of disturbance, the next step is likely to be overheating. This happens as a result of a positive shift in market expectations, which releases significant economic growth. Thirdly, overheating often gives rise to speculation motivated by credit expansion, and by that, bubble economy.

When asset markets reach very high values based on high lending, markets may step into the fourth stage, nervousness, when markets are very volatile. They will finally turn downwards, which is the fifth stage. Significant losses on huge falls in asset prices lead to stage six, crisis in financial markets. If this crisis is deep and long, it may influence other markets, which is the last phase in the model.

The first four stages are followed by declining importance of hedge financing and increasing importance of speculative and Ponzi financing. Also, deficit financing evolves during the last four stages. At the same time, the first four
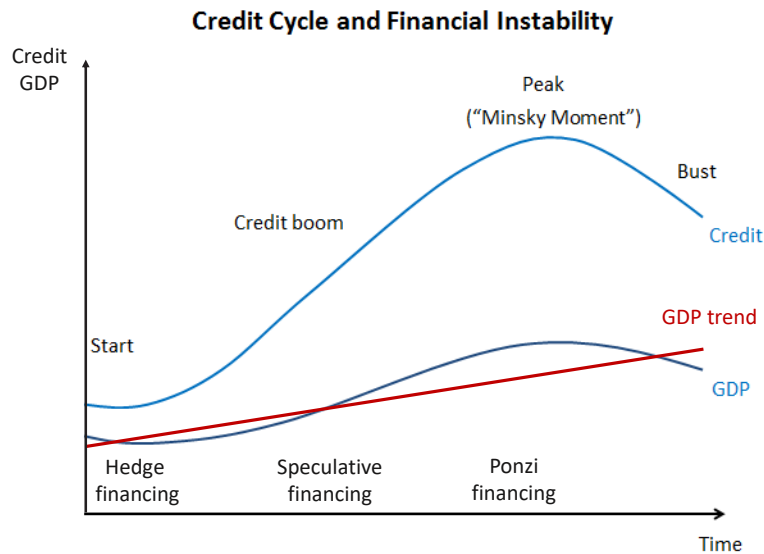
Figure 1. Credit cycle during financial instability

stages represent a period of financial instability creation, and the last four a period of endured financial instability. The model is summed up in Figure 2.

To examine what patterns the four crises under investigation in this paper followed, macroeconomic indicators are used, i.e., time series of money and credit volumes, asset prices, general prices, and gross domestic product. Data are basically taken from a central bank project on creating historical monetary statistics. (Eitrheim, 2004, 2007; Klovland, 2015; Grytten, 2020, 2021).

The paper examines the relationship between financial instability created through money and credit expansion on one hand, and an overheated economy with asset bubbles and thereafter crises on the other hand. This is basically done by iden-

tifying cycles from polynomial trends in financial and macroeconomic time series. Structural time series analysis is used to break a time series (x_t) into four different components, i.e., trend (g_t), cycle (c_t), seasonal (s_t), and irregular (i_t) parameters:

$$x_t = f\left(g_t, c_t, s_t, i_t\right). \qquad (1)$$

Transforming equation (1) into an arithmetic function, one obtains:

$$x_t = g_t + c_t + s_t + i_t. \qquad (2)$$

It seems natural to assume i_t is a residual:

$$i_t = x_t - \left(g_t + c_t + s_t\right). \qquad (3)$$

The present analysis treats i_t and s_t as parts of c_t, which gives two conditions:
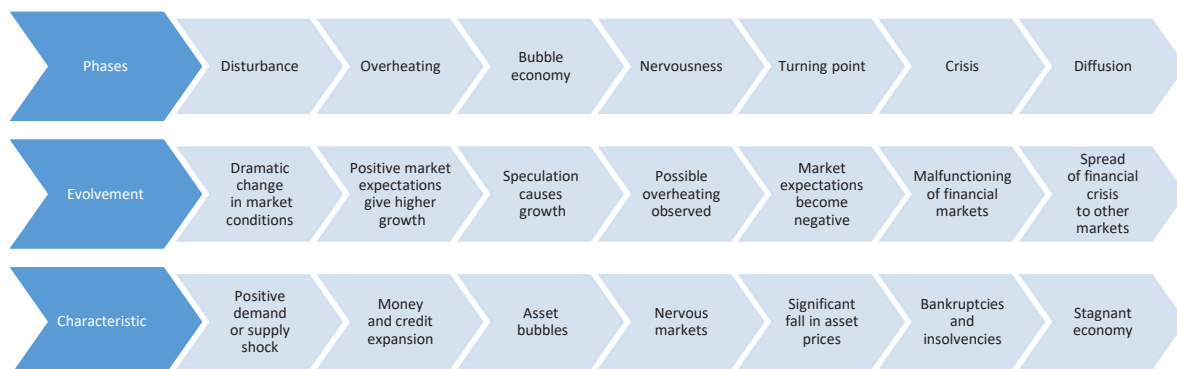
Source: Grytten and Hunnes (2016).

Figure 2. Seven-stage dynamic financial crisis model

$$i_t \subseteq c_t \ \wedge \ s_t \subseteq c_t \ \Rightarrow i_t + s_t \subseteq c_t. \tag{4}$$

Equation (2) is noted in reduced form in equation (5):

$$x_t = g_t + c_t. \tag{5}$$

By adopting the Hoderick-Prescott, i.e., the HP-filter, one can separate trend from the over-all series, where the filter is minimizing variances of c_t subject to the second difference variation penalties for variation of g_t:

$$\min_{g_t} \sum_{t=1}^{T} (x_t - g_t)^2 + \tag{6}$$
$$+\lambda \sum_{t=2}^{T-1} \left[(g_{t+1} - g_t) - (g_t - g_{t-1}) \right]^2,$$

Here, $(x_t - g_t)$ reports a cycle component and $[(g_{t+1} - g_t) - (g_t - g_{t-1})]$ represents the growth trend difference between period t and $t + 1$. The parameter, λ, decides how smooth the trend component should be.

One then finds the cycle component by subtracting the estimated trend from the total time series:

$$c_t = x_t - g_t. \tag{7}$$

To calculate relative cycles, one might use logs, in this case natural logarithms, ln, of the parameters x_t and g_t, implicitly giving correspondingly log values for c_t:

$$\ln(c_t) = \ln(x_t) - \ln(g_t). \tag{8}$$

By using the HP-filter (6) in equation (7), which leads to the following relationships:

$$\min_{g_t} \sum_{t=1}^{T} (x_t - g_t)^2 = \tag{9}$$
$$= x_t - \lambda \sum_{t=2}^{T-1} \left[(g_{t+1} - g_t) - (g_t - g_{t-1}) \right]^2,$$

where the residual

$$\min_{g_t} \sum_{t=1}^{T} (x_t - g_t)^2$$

is the cycle component. Setting into equation (8), one concludes with relative cycles:

$$\ln(c_t) = \ln(x_t) -$$
$$- \ln \left(\lambda \sum_{t=2}^{T-1} \left[(g_{t+1} - g_t) - (g_t - g_{t-1}) \right]^2 \right). \tag{10}$$

Smoothing parameters close to zero imply the series can be explained almost by the polynomial trend developments only. High smoothing parameters give less fluctuations than with low parameters. Hence, high smoothing parameters tend to make cycles large, while low smoothing parameters tend to make cycles more limited in size.

3. RESULTS

3.1. Structural time series analysis

To examine possible relationships between over-expansion and contraction in money and credit (financial) parameters and key macroeconomic indicators, the paper seeks to map booms and busts using the HP-filter. This is done for 10 different key parameters:

1) money supply (M2);
2) total gross debt (C3);
3) bank loans (banks and similar institutions);
4) private bank loans (private banks);
5) gross domestic product (GDP) per capita;
6) manufacturing value added (VA);
7) manufacturing output;
8) house prices;
9) unemployment rate;
10) bankruptcies.

The analysis consists of annual data due to the lack of valid and reliable monthly and quarterly data for several series, basically for the first three crises. Stocks are excluded due to significant noise in the data from the First world war, disturbing the first three crises, which occurred within less than two decades after the war.

It is considered normal using smoothing parameters of $\lambda = 100$; $\lambda = 1,600$; and $\lambda = 14,400$ for annual, quarterly, and monthly figures, respectively. Since the historical data limits one to use annual figures, the study uses $\lambda = 100$ for most parameters, except for the two GDP series and housing. For these series, one often uses a 25-times higher λ-value. Hence, the paper applies $\lambda = 2,500$ for these three parameters.

Table 1. Cycle values of financial and key macroeconomic variables as percentages connected to financial crises

Indicators	Lambda	Post-war crisis		Monetary crisis		Great depression		Nordic bank crisis	
		Early 1920s		Mid-1920s		1st half 1930s		1987–1993	
		Peak*	Through	Peak*	Through	Peak*	Through	Peak	Through
Money supply (M2)	100	22.6	−11.4	22.6	−8.8	22.6	−5.9	7.5	−5.7
Total gross debt (C3)	100	23.2	−8.1	23.2	−6.1	23.2	−10.0	14.6	−8.8
Bank loans	100	25.2	−8.3	25.2	−11.5	25.2	−6.6	20.2	−10.4
Private bank loans	100	28.0	−10.9	28.0	−11.8	28.0	−8.6	20.8	−9.9
GDP per capita	2,500	6.1	−6.7	2.6	−4.8	4.2	−6.3	4.1	−4.9
Manufacturing VA	2,500	6.2	−19.1	3.5	−10.0	8.9	−12.2	5.5	−6.0
Manufacturing output	100	4.5	−28.7	7.5	−4.5	13.8	−15.8	6,9	−3.7
House prices	2,500	23.0	−45.1	23.0	−24.7	21.6	−17.0	33.6	−35.2
Unemployment	100	−61.6	51.6	−32.6	17.2	−21.1	23.9	−41.4	23.5
Bankruptcies	100	−60.9	49.8	−6.2	36.4	−19.3	8.9	−40.4	41.6

Note: * same peak year for the financial parameters (1920) for the three firs episodes.

The econometric analysis confirms the financial instability hypothesis regarding the four crises. Perhaps the most interesting result from the analysis is that all the 80 reported peak and through observations clearly depict this pattern. Note that the unemployment and bankruptcies series are supposed to develop in a reverse manner, which they do.

3.2. Qualitative and quantitative results

3.2.1. Post-First world war crises

During this crisis, both GDP and prices contracted. The First world war (1914–1918) created financial instability in several aspects. Governments abandoned gold redemption of currencies when the war started in August 1914. The measures were taken to avoid an onslaught on national gold reserves. At the same time, central banks reduced their key interest rates and increased credit volumes. Furthermore, governments overspent to meet the financial requirements of the war (Eichengreen, 1993). As a consequence of the inflationary monetary and fiscal policy, there was a huge increase in product demand.

On the supply side, countries lacked raw materials due to the war. Therefore, they experienced a significant fall in product supply, huge increase in product demand, and thus, inflation. The inflation was causing strongly negative interest rates. Before tax they dropped to -30% in Norway in 1917. The
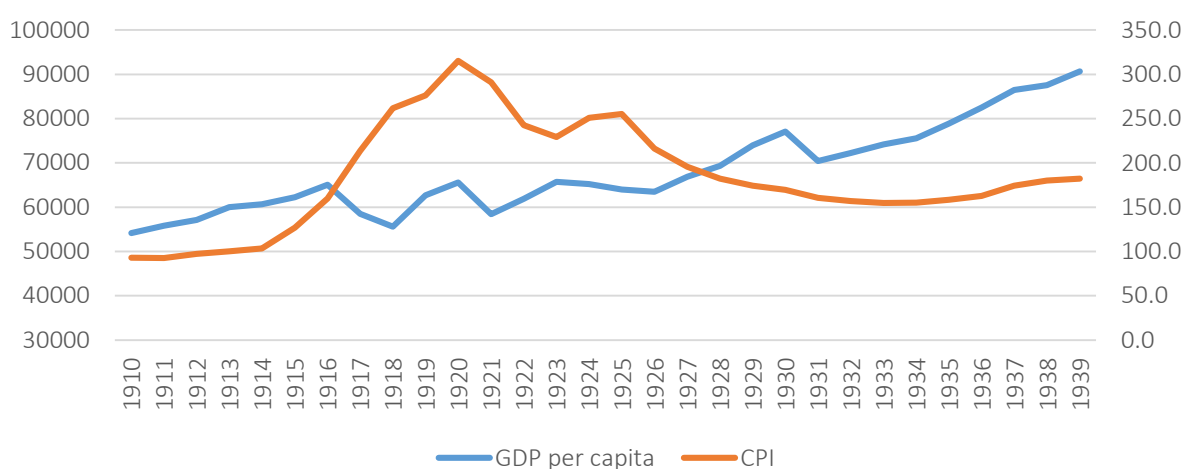
Sources: Grytten (2020, 2021).

Figure 3. GDP per capita in 2015 USD (left scale) and consumer price index (CPI), 1913 = 100 (right scale)

negative real interest rates were fueling demand for credit. Both the money and credit volumes increased by a multiplier of around 5 between 1914 until 1920 (Eitrheim et al., 2016). Consumer prices rose by 215%. Despite high inflation, the government was subsidizing both production and consumption. Additionally, they introduced maximum prices. Consequently, a huge money surplus ensued. The surplus was invested in asset markets, since other investment possibilities were limited.

From early 1915 until the end of 1918, the Oslo Stock Exchange recorded a more than 3 times increase in market prices for stocks. Maritime stocks soared 6 times. GDP fell by 14.5% in 1917 and 1918. During the opening of the economy after the war, surplus money shifted from stock markets to product markets. As a consequence, the stock market crashed by 76.4%, contrary to a GDP per capita increase of 17.9% 1918–1920. The trade deficit reached 25% of GDP in 1919, when inflation continued to surge. Norway rapidly transitioned from being a significant net creditor to a significant net debtor. The par value of the Norwegian Krone depreciated by 50% until Autumn 1920 (Hodne, 1983).

Monetary expansion made the economy overheat. The European growth lost its momentum during the Summer of 1920, as debt problems arose (Aldcroft & Morewood, 2012). Demand fell, and the economies plunged into a post-war recession (Broadberry & Harrison, 2005). Central banks deemed it necessary to introduce deflationary monetary policy to reduce spending and deficits, aiming at reversing inflation and currency depreciation (Hanisch, 1979). Thus, they transferred from inflationary policy during a boom to deflationary policy during a recession. Industrial production fell by 47% and wholesale prices fell by 45%. (Klovland, 2013, 2015).

The central bank increased its key interest rate to reduce credit demand. Real interest almost reached 40% before tax in 1921. Between 1919 and 1921, the gross investment volume fell by 47%. Higher interest rates and deflation caused the Krone to appreciate (Lie et al, 2016). Those who had taken up loans under favorable conditions from 1914 to 1920 became victims to extraordinarily high interest rates, appreciating currencies,

and a huge negative shift in product demand. The deflation also caused investment and consumption postponements. Furthermore, the currency appreciation made Norwegian products more expensive compared to foreign products.

In 1921 alone, GDP per capita fell by 11%. Unemployment soared from 1% to 7.5%, when foreign trade contracted by 25%. The number of bankruptcies increased by more than 400%. Banks lost amounts, equivalent to 7% of GDP in 1923.

3.2.2. Monetary crisis

Denmark, the Netherlands, Norway, Switzerland, and the United Kingdom experienced a new slump in the mid-1920s. The Norwegian Parliament decided to support banks and pause the deflationary policy from March 1923. Deflation temporarily turned into moderate inflation, the number of bankruptcies shrunk, while economic growth regained strength. However, several countries still struggled with large foreign debts and weak national currencies. Until February 1924, the Norwegian Krone again depreciated to less than 50% of its gold parity (Hanisch, 1979). To return to gold parity, the central bank opted for a tight monetary policy aimed at lower demand, deflation, and appreciation of the Krone.

The central bank raised the key interest rate from 5% to 7% from August 1922 to November 1923 (Nordvik, 1993). Combined with deflation, the policy gave real interest rates surpassing 30%, making debt a devastating burden.

Debtors suffered for three reasons. Firstly, a stronger currency made their loans *de facto* increase in value. Secondly, financial costs increased due to high real interest rates. Thirdly, demand shrunk due to lower money stock, and so did income. The factors combined brought about a deep depression and a severe banking crisis. Export industries suffered from the appreciation of the Krone, making relative prices on Norwegian products increase. In consequence, the economy went into a negative spiral.

A favorable international business cycle came to the rescue, causing Norway obtaining balance in its foreign trade. This made the Krone appreciate
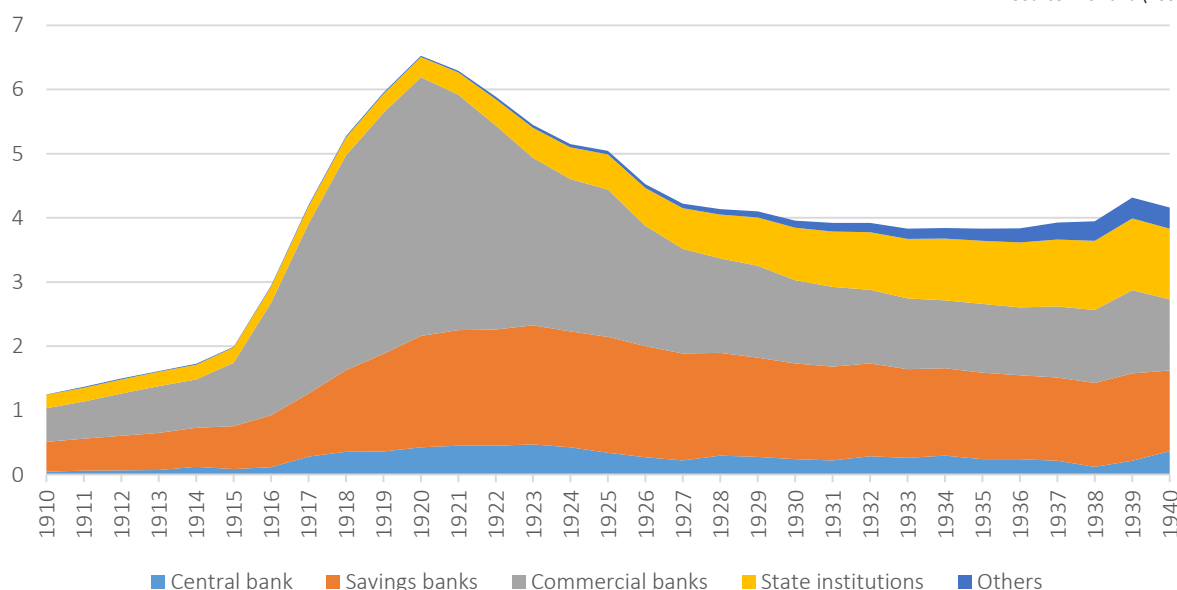
Figure 4. Norwegian domestic credit by source, in billion NOK 1910–1940.

significantly. From May 1924 until the Autumn of 1925, it appreciated from 50% to 78% of its gold parity.

The negative consequences were seen in bank losses, mounting to 7% of GDP in 1925. Unemployment almost hit 9% in 1926–1927. The total number of bankruptcies was almost seven times higher in 1926 than in 1919. Debt collection increased from 5,000 to 30,000 (NOS, 1995).

3.2.3. The great depression

Despite a boom in many countries in the 1920s, there were still major structural problems in the global economy. These were overproduction in agriculture, incipient market saturation of consumer durables, and imbalances in international trade, debt, and exchange rates. Subsequently, a depression hit most Western European economies in the third quarter of 1930. The slump followed a significant expansion in money and credit volumes, creating overheating, and asset bubbles, which crashed in New York from October 24th, 1929.

After the First world war, Germany was to pay war reparations to a real value of $33 billion. Inter-allied debts amounted to $26.5 billion (Roth, 2020). The payments required a German trade surplus. However, tariff barriers were raised. Additionally, both the German Mark and the British Pound

were overvalued, whereas the US Dollar and the French Franc were undervalued. This left the US and France with a relative price advantage in international trade, while the UK and Germany had a corresponding disadvantage (Eichengreen, 1993). Hence, capital accumulated in New York and Paris, while international liquidity was squeezed.

Germany had to draw on short-term credits from American banks to meet the installment requirements. The stock market crash in October 1929 induced a dramatic worsening of the European debt crisis, since heavy losses for American banks made them unable to renew short-term credit granted to European banks (Kindleberger, 2013).

World trade contracted from 5.4 to 1.9 billion from 1929 to 1933 (Graff et al., 2015). Lack of trust resulted in risk hedging by panic sales of German Marks and Austrian Schillings. The gold and foreign exchange reserves in Vienna and Berlin were drained, and they were forced to suspend convertibility to gold in June 1931 (Nadler, 1933).

The liquidity crisis made European banks loose large sums in support positions in German and Austrian banks. Bank of England had to suspend gold redemption of the Pound on September 21, 1931. The Nordic countries followed between September 27th and October 12th the same year. To escape further weakening of the Krone, the cen-
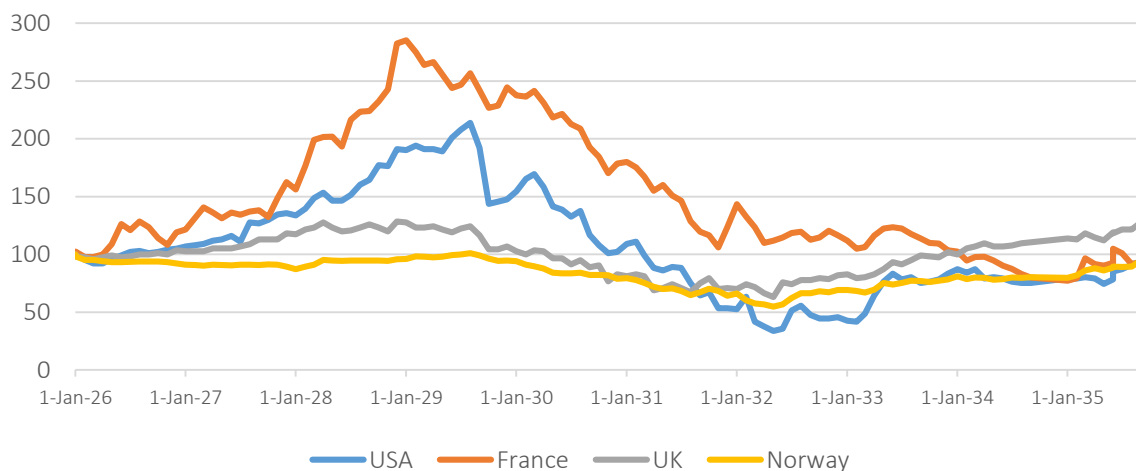
Figure 5. Stock market indices Jan-1926 – Sept-1935 (Jan-1926 = 100)

tral bank aggressively increased the key interest rate from 4% to 8%. The stock exchange was closed for a few days. In March 1933, Norway joined the Sterling Area, pegging the Krone to Pound Sterling, following a formal devaluation of 10% to the Pound. Thereafter, it depreciated along with the Pound in the markets.

Shortly after the economy witnessed a second financial shock. The two largest commercial banks, accounting for a third of the credit to industrial companies, announced large losses. They were granted a three-month debt moratorium to survive. The central bank gave credits and guarantees totaling NOK 150 million for the next two years. The central bank key rate gradually decreased from 8% to 3.5% between September 1931 and May 1933 as the central bank was no longer defending the par value of the Krone. This considerably relieved the situation for banks (Hanisch, 1978).

Industrial production contracted by 22%, when GDP per capita contracted by 8.7%. External trade and investment volumes both decreased by 30%. Consumer and wholesale prices correspondingly dropped by 13% and 20%. In 1931, the real interest rate before tax approached a new peak of 20%. Hence, financial costs again rocketed during difficult times. At the same time, profitability in the private sector was negative, and 1932 saw a record of 18,260 foreclosures. Unemployment reached new heights of 14% during the Winter of 1932–1933. However, the new inflationary policy from late 1931 gradually earned positive impact on the

economy. Thus, the recession reached its bottom in December 1932, earlier than in countries maintaining a tight monetary policy (Klovland, 1998). However, commercial banks still struggled the entire decade.

3.2.4. The Scandinavian banking crisis

From 1987 to 1993, the Western world experienced its most severe banking crisis since the inter-war years. The crisis was particularly hard in the Nordic countries. It evolved after a wave of credit liberalization, which resulted in a significant boom followed by asset market crashes, and contraction of the real economy (Saunders & Cornett, 2007).

In the post Second world war-period, the governments of the Nordic countries pursued a low interest rate policy to motivate investments. The Norwegian Ministry of Finance was to decide the level of interest rates, which should be under the market rates. In addition, politicians admitted generous tax deductions on mortgages. This resulted in negative real interest rates after tax (Lie & Venneslan, 2010). Negative rents caused high demand for credits, and pressure towards overheating, high inflation, and a weakening of the Krone. To ensure stability, the authorities introduced credit regulations.

Stagflation in the 1970s led to falling trust in the post-war planning regime. From 1977 measures were taken to abolish credit regulations and liber-
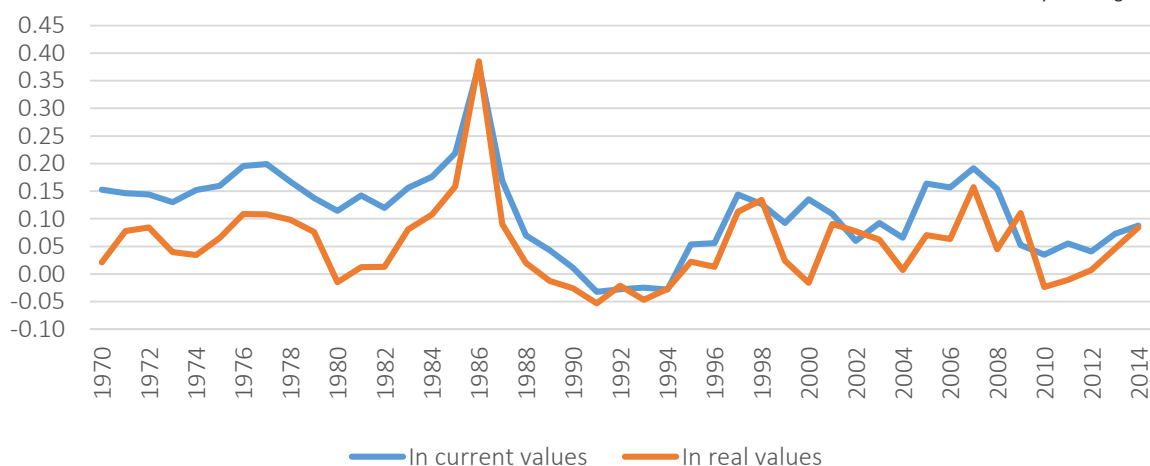
Figure 6. Annual relative changes in total credits for Norway 1970–2014 in current and real prices (2015 = 100)

alize the credit markets. However, the Parliament did not maintain a persistent policy, as they chose to deregulate the credit market, while interest rates were still subsidized. A combination of fixed exchange rate policy and free movement of capital had the same effect. In addition, the banks circumvented regulations that were still in place by establishing additional credit and financial institutions. Another factor was that banks were focusing on expansion rather than solidity. Furthermore, the expansionary economic policy in the 1970s had contributed to large growth in the money supply, and demand for credits increased strongly (Helliwell, 1988). In Norway, a growing petroleum industry and confidence in the future additionally contributed to larger demand for credit. Between the third quarters of 1982 and 1986, the investment volume in the mainland economy stepped up by 40%, while aggregate demand increased by 27%.

The economy entered a powerful upswing. Asset bubbles were created as domestic Norwegian credits more than doubled between 1983 and 1987. The credit volume continued to increase after the peak in the real economy. Real estate markets showed strong growth, and house prices more than tripled between 1980 and 1987. The Tokyo and Oslo Stock Exchanges almost quadrupled from January 1983 until September 1987, when the Dow Jones tripled (Carlson, 2007). The focus on expansion took place over security, reflected in Norwegian banks equity ratios being reduced from 10% to 5% between 1945 and 1987.

During the credit liberalization period, banks did not have capacity to build control routines that provided adequate risk assessment. Combined with a race for market shares, this had a devastating effect (Knutsen & Ecklund, 2000). Moreover, the fixed exchange rate system also caused a pro-cyclical monetary policy. One had to follow the international interest rate level, despite that petroleum dependency gave unsynchronized domestic business cycles compared with those abroad. Thus, Norway had to lower its interest rates in booms and increase them in recessions.

The boom was accompanied by high petroleum prices. In the early 1980s, North Sea oil stood at USD 40 per barrel. During the Winter 1985–1986, oil prices plummeted to around $10, straining domestic liquidity (Hanisch, 1999). Low petroleum prices caused reduced investments, weakened demand, and rising unemployment, from 1.5% in 1986 to 6% in 1993. During 12 days in October 1987, stock markets worldwide fell by 30-45% (Shiller, 1992). From 1987 to 1992, Norwegian real house prices fell by almost 43%, causing significant mortgage losses for banks.

Deficits in public finances forced the government to tighten its fiscal policy. In May 1986, the new Labor government decided to devalue the Krone by 12% to ease the pressure on the currency and improve the trade balance. To defend the new exchange rate, one thereafter had to bring inflation down and ensure long-term balance in foreign trade and public finances.
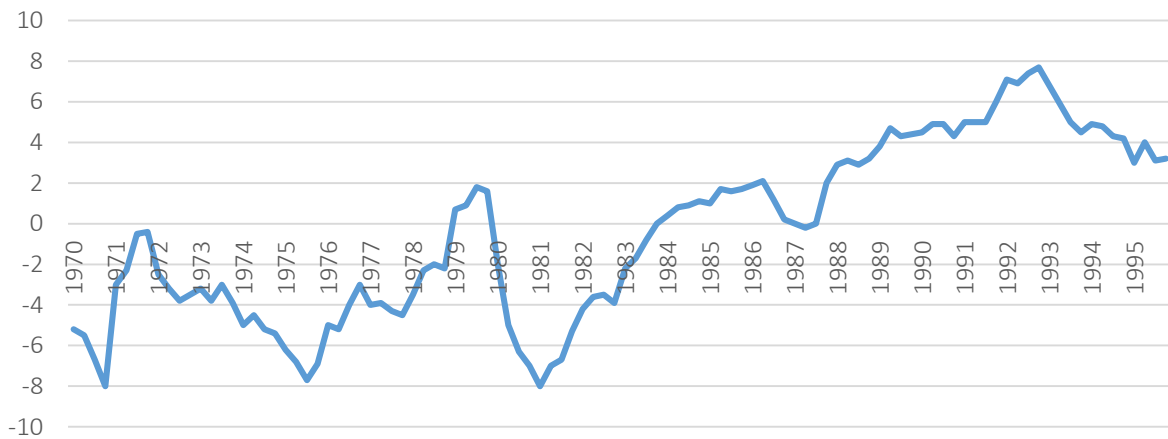
Figure 7. Norwegian real interest rates after tax, 1970–1995

Lower inflation gave higher real interest rates. Additionally, a tax reform in 1992 admitted less tax deductions on interests. Hence, real interest rates after tax increased further. The government had fueled the economy during the boom of 1983 to 1986. They eventually stepped on the brakes during the crisis. Bank failures were unfolding from late 1988. From late 1989, the bank crisis became systemic in nature, causing the entire banking system to falter (Vale, 2004).

In the second quarter of 1991, losses on loans and guarantees by commercial banks were recorded at 6.3%, against 2.8% for the savings banks (Knutsen & Lie, 2002).

The authorities tightened depreciation requirements on losses from 1988 to 1991. This made the banks' accounting records even weaker. Potential losses om engagements had to be writ-

ten off in full even when banks expected the market to pick up later. Banks had to zero out their equities to be rescued by the state, taking over the ownership. Since a significant proportion of the accounted losses were reversed, the take-overs proved to be profitable for the government.

4. DISCUSSION

Both the quantitative and the qualitative analyses reveal that external macroeconomic disturbances to the economy were handled in a way that caused money and credit volumes increase rapidly before all four crises. This was followed by overheating of the economy with asset bubbles. Leverage cycles developed as gearing, i.e., debt financing was increasing. Hence, the booms lacked support in fundamental factors.
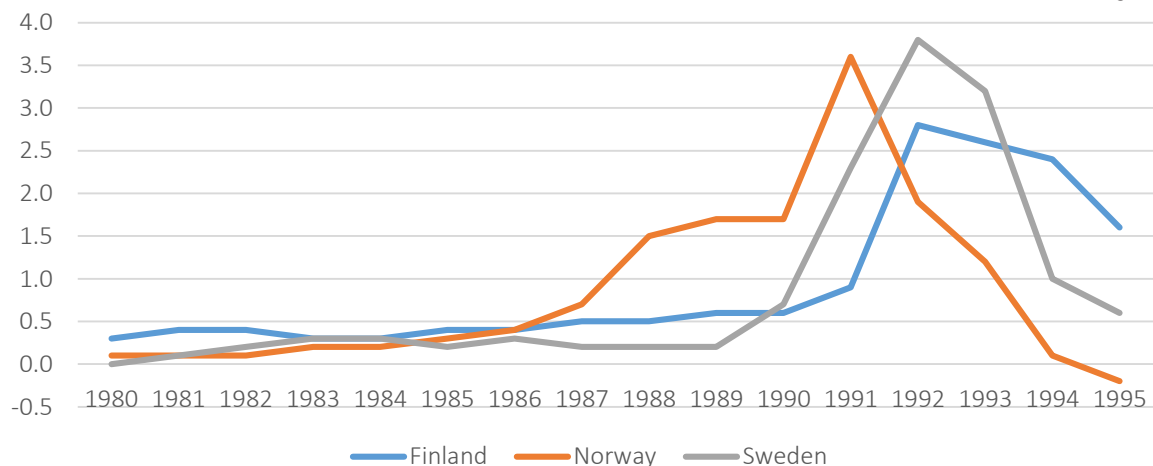
Figure 8. Bank losses as a percentage of total bank assets in Scandinavia

For the three first crises this happened via the exogenous shock during the First world war, 1914–1918, when the gold redemption of par values of currencies was suspended, and inflationary policy was introduced along with high government spending. Since governments were unable to regain financial stability, the overheating ended with three different bank crises within a period of less than 1.5 decades. As for the fourth crises, 1987–1993, credit liberalization served as macroeconomic disturbance which the financial and political system was not able to solve in an adequate manner. Hence, it resulted in a credit boom, overheating, asset bubbles, crash, and bank crises, with loss of financial stability.

In line with the financial instability hypothesis, one saw significant positive cycles before all the four crises and significant negative cycles during and after the crises. This pattern applies to all the relevant parameters investigated in the econometric analysis for all four crises. It is also clear that the periods with highest overheating in monetary and credit parameters experienced the deepest crises thereafter, both regarding financial parameters and real economy parameters. Hence, the econometric time series analysis definitively confirms the importance of the financial instability hypothesis in explaining the four banking crises.

It is also clear that a more qualitative assessment of quantitative data, including more parameters than in the econometric analysis, along with the historical development during all the four crises, confirms this development. Hence, the present analysis confirms that the financial instability hypothesis significantly contributes to explaining the four banking crises described in this paper.

CONCLUSION

The paper examines four banking crises in the light of the financial instability hypothesis, refined in a new seven stage dynamic financial crisis model. The model argues that positive shocks or disturbances to the economy might make credit expand too much and too fast, creating overheating and asset bubbles, ending up in crashes and crises. The crises under investigation are the Post First world war depression 1920–1922, the Monetary crisis 1924–1926, the Great depression 1930–1933, and finally, the Scandinavian banking crisis 1987–1993. The small open economy of Norway is used as a case study in an international perspective.

A quantitative analysis of cycles in financial and real macroeconomic key variables reveals that a significant increase in debt during booms contributed to financial instability creation, overheating and bubble tendencies. This again paved the way for the crises. After the quantitative analysis, a qualitative discussion of each of the four incidents confirms that loss of financial stability was decisive for all the four bank crises.

AUTHOR CONTRIBUTIONS

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