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Hyperinflation and Banks

Summary: In this paper we consider a triangular inter-dependence between hyperinflation, financial repression, and the financial crisis in FRY in the 1990s. When all three vertices of the triangle are present, the crisis propagates and is amplified along its edges. We focus, especially, on the less studied link between the financial crisis and financial repression in FRY. Setting administrative limits on interest rates under conditions of hyperinflation leads to deeply negative real interest rates. The situation in FRY was further aggravated by credit allocation to privileged participants. Under such circumstances, all dinar components of bank balance sheets quickly became worthless, credit activities of banks died down and real quantities of dinars in circulation became negligible. The situation improved only after the removal of the outside repression (i.e. removal of sanctions), reorganization of the entire financial sector and the entrance of foreign banks into the Serbian market at the beginning of 2000s.

Keywords: Hyperinflation, Financial repression, Financial crisis.

JEL: E51, E52, E58.

In this paper we consider triangular inter-dependence between hyperinflation, financial repression and financial crisis with the focus on hyperinflation in the Federal Republic of Yugoslavia (FRY) in the 1990s. Such an approach is, to the best of our knowledge, not explicitly present in the literature even though the triangle's vertices (hyperinflation, financial repression, financial crisis) as well as some of the links between the vertices (e.g., relationship between inflation and financial stability or relationship between financial repression and inflation) are previously extensively studied.

Why do central banks primarily focus on preserving stable and low level of inflation? There is more than one reason. One reason is perhaps most clearly formulated in a series of papers by Anna J. Schwartz (1995a, b). She stresses the fact that instability of aggregate prices is likely to create instability of the financial system. Namely, inflation can cause formation of overly optimistic forecasts about future real returns. In turn, this can lead to an upswing in credit activities of banks above and beyond what is reasonable to do. Namely, in such an environment it is possible to form a wrong perception of the nature of individual price changes. Furthermore, if investors expect that inflation will be prolonged, they may reduce default risk premia on loans denominated in the domestic currency. Together, this can lead to the formation of the credit bubble. On the other hand, reduction in inflation and, especially deflation can cause too pessimistic assessment of the future business environment. That would lead to an increase in default risk premia which, in turn, reduces the opportunities of

entrepreneurs to finance their projects and increases price of external funding. Thus, sudden changes in inflation in either direction, i.e. uncertainty related to future inflation level, makes it difficult for creditors and borrowers to fairly assess real returns on their investments. This, in turn, leads to an increase in the aggregate share of unprofitable investments and, consequently, to an increase in share of non-performing bank loans. This makes the amplitudes of business cycles larger.

Preserving price stability cannot always prevent the emergence of financial instability. This is, in particular, true if price instability is caused by real economic shocks or if significant changes in relative prices of goods and services materialize. On the other hand, according to Anna Schwartz, price stability together with the lack of financial repression makes the system robust enough to usually overcome potential crises without interventions from the central bank (Schwartz 1995b). We shall say much more about financial repression later on. Here let us just stress that by financial repression we have in mind regulatory and/or legal restrictions that prevent financial market participants from optimally diversifying their portfolios or select appropriate levels of interest rates. It follows that a connection exists between shocks in aggregate price level, financial stability and conditions under which financial institutions operate, i.e. whether, and to what extent, are they exposed to financial repression.

Michael D. Bordo, Michael J. Dueker, and David C. Wheelock (2002) perform empirical tests of the connection between inflation shock and financial stability. They utilize data on financial crises in the United States in the period 1790-1997, i.e. in the period of over 200 years. They construct an annual index of financial conditions in the US and estimate the effects of aggregate price shocks on this index using a dynamic probit model. The authors find that aggregate price shocks significantly contribute to financial instability in the 1790-1933 period. On the other hand, shocks in inflation level (instead of price shocks) play an important role in the period 1980-1997. They, also, find that the institutional environment impacts the level of a shock needed to cause significant disturbances in the financial system. Another noteworthy finding is that significant crises of the US financial systems were happening most of the time in periods of significant reduction of inflation and, especially, in deflationary times. In fact, except in periods after the two World Wars, each large and sudden reduction of inflation was accompanied by financial instability. The most famous example is the Great Depression in the United States. This is not typical just for the US. E.g., deflation in Japan in the 1990s coincided with an acute crisis of the Japanese banking system.

One can observe, therefore, that severe inflation shocks are closely related to destabilization of financial stability. But, this is not the only possible connection between inflation and financial stability. Namely, there are theoretical models that demonstrate that inflation growth, even when it is perfectly predictable, can significantly negatively impact financial stability. The mechanism is based on information asymmetry in credit markets – see papers by Elisabeth Huybens and Bruce Smith (1998, 1999). In these papers the level of information friction on credit markets is endogenously determined. An acceleration of inflation reduces real returns on investments. This negatively impacts all market participants. In turn, this leads to an increase in credit market frictions and, consequently, to credit rationing. Credit rationing becomes more pronounced with an increase in inflation. As a result, the banking sector

issues less loans and credit allocation becomes less efficient. Importantly, papers by Huybens and Smith (1999), as well as Sangmok Choi, Smith, and John H. Boyd (1996), demonstrate that inflation starts adversely impacting the credit market only after a certain threshold level of inflation is surpassed. That implies that when inflation is sufficiently small, it does not impact significantly efficient credit allocation and, thus, does not impede economic growth.

However, when the inflation is higher than a certain threshold, credit frictions become binding and credit rationing becomes more intense. This leads to a drop in performance of financial institutions and negatively impacts the economic performance of an economy. Another interesting finding in these papers is that in addition to the lower bound, an upper bound on inflation exists as well. Namely, when the level of inflation surpasses that upper bound, further increase in inflation does not lead to additional substantial worsening of the performance of banks. Basically, this corresponds to the situation when things are so bad that they are "as bad as it gets".

Boyd, Ross Levine, and Smith (2001) perform empirical study to test these predictions. They study the relationship between inflation and financial sector performance. They use the sample in the period of 1960-1995 that includes close to 100 countries. They demonstrate that a negative relationship exists between inflation and performance of financial institutions. Moreover, this relationship is nonlinear. Namely, if inflation is less than 5 percent per annum, it does not significantly impact credit activity and, consequently, the economic performance of countries. In the interval between 5 and 15 percent, an increase in inflation is associated with a drop in credit activity of banks. Finally, when inflation is higher than 15 percent per annum, credit activity drops further and suddenly. After that level (the upper bound) of inflation is reached, further increase in inflation has little additional effect on credit activity and the banking sector.

Boyd, Levine, and Smith (2001) do not explicitly consider cases of hyperinflation. However, extrapolating their findings to very high levels of inflation would lead one naturally to conclude that such levels of inflation would lead to a *de facto* freezing-out of credit activity. This would happen even in the absence of financial repression.

As mentioned before, another factor that significantly impacts stability and performance of a financial system is financial repression. The notion of financial repression was introduced in the economic literature in papers by Ronald I. McKinnon (1973) and Edward S. Shaw (1973). Carmen Reinhart and M. Belen Sbrancia (2015) study financial repression around the world. They find that in the period 1945-1990 and, also, in the period after the Global financial crisis (i.e., after 2008), both developed and developing countries used some forms of financial repression to effectively reduce their public debt. In fact, the authors find that financial repression has been the primary mechanism for debt reduction in most cases. Let us now discuss types of measures that can be used that constitute financial repression. One such mechanism is, certainly, regulatory setting upper limits on interest rates. The measures may include: setting of interest rate caps on public debt as well as on debt issued by government-controlled companies and other entities; setting limits on interest rates on savings and *a-vista* deposits, as well as setting limits on interest rates charged to the private sector. In essence, if nominal rates are capped to a relatively low level but the level of inflation

is high, real interest rates charged become very low or, very often, negative. In this way countries can inflate away their debt burden, but financial institutions suffer as a result. The authors find that in developed countries real interest rates in the period 1945-1990 were negative for at least 50 percent of the years in their sample. In many emerging markets, the situation was even more dramatic. For example, the real interest rate in Argentina was nonnegative only in 2 out of 45 years in this period.

The second important form of financial repression is to create limitations on economic agents to freely transact with the players on the world market. This is achieved, in particular, through restrictions on capital exports and limitation on foreign currency transactions. Keeping a high level of required banking reserves is another mechanism of financial repression. Banks often receive very low or no interest on these reserves. This is a type of tax on banks. Prudential measures prescribing financial institutions to hold in their portfolio public debt of the country which regulates their operations is another form of financial repression.

There are also other measures that are used in addition, especially in emerging markets. One such measure is direct ownership of banks in the hands of the state or indirect but strong control by the state of private financial institutions. Clearly, if most of the financial capital is *de facto* controlled by the state, the situation on the "market" is skewed and normal market mechanisms cannot function. This can be achieved by limiting entry of foreign competitors into the domestic banking markets as well as by issuing below-market loans to certain privileged individuals, entities or industry sectors. As we shall see later, in FRY in the 1990s most of the described mechanisms of financial repressions were clearly at play.

Let us not forget to mention that, especially in the past 30 years in particular, economic sanctions have been another external factor leading to financial repression in targeted countries. In that case, even if a country does not intend to close-off its borders to foreign capital or to exchange rate transactions, this happens as a result of outside pressure. This, in turn, can trigger the above-mentioned mechanisms of repression to a much greater degree than it would have been the case in the absence of sanctions (examples of FRY and Venezuela, etc).

Nuriel Roubini and Xavier Sala-i-Martin (1992), in their well-known paper propose a theoretical model in which they study the connection between financial repression, inflation, and endogenous economic growth. In their model an economy cannot borrow from abroad any further. This qualitatively corresponds to the situation that FRY was facing in the 1990s. Their model shows that, in that case, the state has a motive to implement financial repression. Namely, such a policy would increase the demand for money which, in turn, makes it easier to harvest seigniorage in, essence, utilizing inflation. An increase in the level of financial repressions, however, leads to an increase in inflation and, thus, to a decrease in long-term growth. In other words, while financial repression may look appealing to governments under certain conditions, it is detrimental in the long-run. The second part of their paper focuses on empirically testing the theory. Their empirical findings are in agreement with their theoretical ones, and demonstrate that an increase in the level of financial repression as well as increase in inflation both negatively influence long-term growth of a country.

To summarize, from the literate we know that high (either forecastable or unforecastable) inflation significantly influences stability of the financial system. We see, also, that financial repression fosters inflationary pressures. Note that none of the cited papers, while they are studying some of the edges of the triangle inflation – financial crisis – financial repression, does not study holistically how the crisis is transmitted and amplified along all of the edges of the triangle. We attempt to understand this triangular relationship a little better in the specific example of the crisis in FRY in the 1990s. This is what we do in the rest of the paper.

1. Financial Repression in FRY

1.1 External Repression

An excellent description of the evolution of the crisis in the Socialist Federative Republic of Yugoslavia (SFRY) prior to its dissolution and, later on, in FRY in the 1990s can be found in the work of Dragoslav Avramović (2007). In the later 1980s and beginning of 1990s, the country was exposed to several external shocks that influenced its economic performance and fueled the emergence of hyperinflation. The first in a series of shocks was the interruption of trade between the federal units (republics). This caused the collapse of the common internal market between the republics. This, in turn, had dramatic consequences on the real sector of the economy. Producers suddenly faced severe limitations in obtaining the necessary raw materials, while finished goods became just as hard to place since the most important market for most of the Yugoslav producers collapsed. With the secession of other republics, their stocks of dinars were now all moving into the remainder of the country, i.e. FRY (it consisted of Serbia and Montenegro). The resulting shock in money supply significantly accelerated inflation in FRY.

The strongest external shock is, without a doubt, the beginning of a series of wars in the former Yugoslavia. A few months after the war in Croatia commenced, economic sanctions were imposed on Yugoslavia. The European Economic Community (EEC) imposed economic sanctions in November 1991 issuing a declaration on Yugoslavia. This declaration stipulated the suspension of the Agreement on Trade and Cooperation with Yugoslavia, suspension of preferential treatment in trade, as well as introduction of quantitative limitations for textile exports from Yugoslavia. In addition, Yugoslavia could not use any more resources of the PHARE program.

Six months after the commencement of the economic blockade by the EEC, sanctions against FRY were adopted by the United National (UN) as well. Namely, the UN Security Council passed Resolution 757 which forbade trade, import of foreign currency and transportation of any goods originating in FRY. In addition, the resolution blocked the air traffic between FRY and the rest of the world. A blanket ban was issued, also, on any type of foreign investment into FRY and, even, on any type of cultural, scientific, technological and sport cooperation with FRY.

The sanctions were in the Autumn of 1992 slightly relaxed. However, in April of 1993, the Resolution 820 imposed a total blockade. From 1995, despite partial lifting of the sanctions, the so-called “outer wall” of sanctions remained. It was removed only in October of 2000, after the democratic transition in FRY.

1.2 Internal Financial Repression

SFRY traditionally had, practically throughout its existence, high levels of budget deficits. Debt towards domestic banks, which before the disintegration of the country were socially-owned, was managed by fostering relatively high inflation. On the other hand, access to foreign capital partially alleviated financial repression that the banks faced. The situation dramatically deteriorated when FRY became totally isolated from the international financial system in the 1990s. Under such circumstances, in accordance with the theory of Roubini and Sala-i-Martin (1992), financial repression significantly increased, with very negative consequences for the financial system and the economy as a whole. In particular, inflation significantly increased with respect to the levels in 1980s reaching one of the worst hyperinflation levels seen in economic history of the world. Yugoslav hyperinflation 1991-1994 is a subject of several influential papers by Pavle Petrović and Zorica Mladenović (see, e.g., Pavle Petrović and Zorica Mladenović 2000; Mladenović and Petrović 2010, among others).

1.2.1 Monetization of Fiscal Deficits and Money Creation

A particularly important aspect of the financial repression in FRY was monetization of fiscal deficits. As mentioned before, fiscal deficits were a chronic feature of the former Yugoslavia's economy. The problem of financing necessary public expenditures was present throughout the 1980s and culminated in the 1990s. As a result of the collapse of the former Yugoslavia and the very severe economic sanctions that were imposed on FRY, production and employment were dropping fast. With the collapse of the tax base, state revenues were plummeting. Furthermore, such reduced revenues were in real terms ever smaller due to high and fast-growing inflation. As a result of the hyperinflation dynamics, Olivera-Tanzi effect was activated. This, in turn, further reduced public revenues and increased budget deficits. Avramović (1994) argues that, due to the combination of these factors, public revenues at the end of 1993 made up less than 1 percent of the total public expenditures. As a result, the deficit was, in essence, fully funded by money creation. While fully reliable data on public expenditures in that period do not exist, according to the Program for Monetary Reconstruction and Economic Recovery of Yugoslavia, the deficit in 1992 was 11.2% of GDP, while in 1993 it became 33.1% of GDP (Avramović 1994).

The intensity and volume of monetization of the fiscal deficit is estimated using data on usage of primary and gray money creation. Namely, it is through primary money creation (by the National Bank of Yugoslavia) and the gray money creation by the central banks of Serbia and Montenegro (especially Serbia) that the budget deficits were mostly funded.

An important factor fueling the hyperinflation in that period is, also, provision of loans to socially-owned banks (and companies) using primary and gray money creation. Based on the report on the use of gray money creation based on increase of currency and gold reserves of NBS in the period of August 1991-November 1993, for issuing such loans was spent around 570 million DEM. Based on data on usage of primary money creation, the total quantity of money issued in this way in 1991 was 20.9 billion DEM, of which 14.7 was repaid (i.e., seigniorage was 6.2 billion DEM).

In 1992 and 1993, using primary money creation channels a lot less money was issued when expressed in DEM, and even less repaid (see Table 1).

Table 1 Primary Money Creation and Seigniorage (in Billions of DEM)

Year	Primary money creation	Repaid	Seigniorage
1991	20.9	14.7	6.2
1992	2.3	0.7	1.5
1993	1.43	0.16	1.27

Source: National Bank of Serbia (2001).

During 1993 hyperinflation in FRY spiraled totally out of control. Citizens became active participants in this process. People used checks to pay purchases of goods from stores and utility bills in several monthly installments. Due to very high inflation, the nominal amount of issued checks would become worthless almost immediately. This led to in a day large losses for the recipient of checks unless they quickly increased prices. Of course, this process would not be possible without a tacit and sometimes even direct support of the regulators.

As dinar quickly lost value, both private individuals and companies wanted to, as soon as possible, transfer any amount of money they possessed in dinars into a hard currency in an attempt to reduce losses from local currency depreciation (Petrović and Mladenović 2000). This, in turn, fueled the demand for hard currency and led to further depreciation of Yugoslav dinar. In such a situation, the currency substitution effect accelerated. Real quantity of domestic currency rapidly decreased, and the velocity of its circulation tended to infinity.

1.2.2 Informal Foreign Currency Market

External liquidity of the country was under threat. The state attempted to address the problem by purchasing hard currency from citizens and companies using dinars obtained primarily *via* gray money creation. This strategy in 1992-1992 had two important consequences: a further increase in the informal exchange rate and a further increase in hyperinflation.

Foreign currency reserves of FRY were falling continuously since 1991. The adoption of the UN sanctions in 1992, as we have mentioned before, prevented the country from selling goods and services abroad. This completely blocked the main channel of hard currency access and led to further reduction of currency reserves. All forms of dinar assets were, due to the loss in their value, increasingly converted into the reserve currency – German mark (DEM). At the same time, the central bank tried to fix the official exchange rate. Under such circumstances, an additional form of financial repression appeared: a lower official exchange rate co-existed with a high informal exchange rate. This opened the possibility of massive arbitrage (see Branko Hinić and Milan Šojić 2011, p. 16). This has led to the appearance of a chaotic set of street markets for hard currency (mostly DEM) and the creation of a special market for currency trading between companies. All of this, due to high levels of uncertainty and in the absence of any meaningful regulation, generated exchange rates with very large dispersion. High, ever increasing difference between the official and unofficial rates

made all economic agents try to keep money in hard currency. Companies which possessed some hard currency from export business prior to the sanctions were required by law to sell it to the state at the official exchange rate. Instead, such firms usually decided to keep hard currency outside of FRY risking violating the law rather than holding domestic currency. All this increased the scarcity of the hard currency within the country and, thus, further fueled depreciation of the domestic currency.

As a result of all of these processes, currency reserves were in 1992 only around $ 1.3 billions, a decrease by 52.4% from the 1991 value. In 1993, reserves fell further very fast and amounted to only 16% of their value in 1992. The state was, *de facto*, insolvent. Indirect proofs for that are as follows: freezing of hard currency savings in banks, inability to purchase hard currency on the official market which *de facto* ceased to exist. Even banks were purchasing hard currency on the informal market.

2. The Effects of Hyperinflation on Activities of Banks

2.1 Devastation of the Deposit Base

Yugoslav banks were traditionally commercial banks, their business based on taking deposits and issuing loans. Because of that we describe their activity based on the analysis of their loan issuance and deposit harvesting.

Table 2 Stock of Dinar-Denominated Credit Placements of Commercial Banks in the Period 1975-1994 (in Billions of DEM)

Period	Total	Short-term	Long-term
1975-1979	31.40	11.50	19.90
1980-1984	29.90	12.70	17.30
1985-1989	10.50	6.30	4.20
1994, 2012	1.75	1.62	0.13

Notes: Data for the period 1975-1990 for Serbia and Montenegro are estimated as 40% of the corresponding values for the SFRY total. Furthemore, five-year averages are calculated based on the end-of-year data.

Source: CES-Mecon (1997).

From Table 2 one can see that the stock of dinar-denominated loans, expressed in billions of DEM, dropped from 31.40 on average in the period of 1975-1979, to only 1.75 in December of 1994. In these amounts, interbank loans are not included.

Such a dramatic reduction in the value of the total credit stock expressed in DEM is a result of the drop in GDP and, especially, of high inflation and, consequently, negative real interest rates. Let us first discuss the effect of a drop in GDP. Namely, GDP in 1995 was approximately half of that in the 1980s. Thus, a reduction of loan stock of 50 percent could be explained by that factor. On the other hand, the stock of dinar-denominated loans in FRY, expressed in DEM, in August of 1995 was only 4.9% of the corresponding values in the second half of 1980s. The main reason for the drop in the dinar denominated loan stock can be found in long periods of high inflation and two bouts of hyperinflation when real interest rates became close to negative 100% (in 1993). Because of the extreme negative real interest rates, the real value of the dinar-denominated loans at the beginning of the stabilization program in 1994 was negligible.

Table 3 presents the term structure of dinar-denominated deposits in FRY. Note that while short-term deposits (*a-vista* deposits and savings accounts with up to 1 year maturity) have always dominated the longer-term ones, in the period 1994-1999 long-term dinar-denominated deposits were almost negligible relative to short-term ones.

Table 3 Dinar Deposit Structure (in Percentage Points)

	1980-1984	1985-1989	1994-1999
Short-term	72	76	98
Long-term	28	24	2

Notes: Data for 1980-1984 and 1985-1989 are estimated for Serbia and Montenegro were estimated as 40% of the total for SFRY.

Source: CES-Mecon (1997).

Moreover, as Table 4 documents, short-term deposits were themselves dramatically dropping in value, when expressed in DEM.

Table 4 Short-Term Dinar Deposits (in Billions of DEM)

Period	1980-1984	1985-1989	1994-1995
Average level of deposits	15.70	7.93	0.99

Source: CES-Mecon (1997).

Not only did long-term deposits made in dinars practically disappear in the 1990s, but even the short-term deposits consisted practically entirely of *a-vista* deposits (i.e. term deposits in dinars, even those up to 1 year of maturity, practically disappeared by the middle of 1990s). This is in sharp contrast with the 1980s when there was a significant saving in dinars both up to one year maturity as well as in longer-term maturities.

In the 1990s people lost confidence in the banking system. This can be seen, in particular, in Table 5 which presents the ownership structure of short-term dinar-denominated deposits. After 1994, bank deposits were predominantly held by companies and the state. Citizens in that period held only 12 percent of the total deposit sum. The situation is in that sense dramatically different with respect to the periods 1980-1985 and 1985-1989 when citizens held a very significant fraction of the total short-term deposits.

In the 1994-1995 period, individuals were not saving banks much, and most of the dinar deposits were, in fact, transactional deposits of the state and companies. Such deposit structure, together with the exclusion of FRY from the world financial markets made it clearly impossible to make a significant amount of loans based on deposits.

Table 5 Ownership Structure of Short-Term Dinar Deposits (in Percentage Points)

	1980-1984	1985-1989	1994-1995
Companies	59	48	58
State	11	9	30
Citizens	30	43	12

Source: CES-Mecon (1997).

2.2 Reduction of Credit Supply

Table 6 presents changes in term structure as well as the total amount of dinar-denominated loans in commercial banks in FRY expressed in billions of DEM. In the table, the amounts do not include inter-bank loans. Average stock values for the period of 5 years are determined based on end-of-year values. Data for the period 1980-1984 and 1985-1989 are estimated for Serbia and Montenegro as 40 percent of the total values for SFRY.

Table 6 Stock of Dinar-Denominated Credit Placements of Commercial Banks in FRY (in Billions of DEM)

Period	Stock			(1985-1989=100)
	Total	Short-term	Long-term	
1985-1989	10.50	6.30	4.20	100
1994	1.73	1.60	0.13	16
1995	1.48	1.33	0.15	14
1996	2.67	2.40	0.27	25
1997	3.37	2.90	0.47	32
1998	2.85	2.38	0.47	27
1999	1.48	1.23	0.25	14

Source: National Bank of Yugoslavia (1990, 1994-2000).

From Table 6 we observe that the total dinar-denominated loans expressed in DEM, after price stabilization was achieved (in 1995) reached only 14 percent of the corresponding value in the second half of 1980s. As we have argued before, the main reason for this was the very severe combined effect of hyperinflation and external and internal financial repression.

In the 1980s, as we can see from Table 7, banks issued dinar loans roughly matched by dinar deposits. In contrast, from 1995 banks started to issue loans again. However, they were issuing them at the significantly higher level than the available deposits as well as with the higher times to maturity (see Table 7). Thus, loans and deposits were mismatched both in terms of the term structure and in terms of the quantity. This started to cause illiquidity of the banking sector which was registered already in the first half of 1995. Note that in 1996 loan-to-deposit ratio was 2.3 while in the 1980s it was close to 1.

Table 7 Dinar Loan-to-Deposit Ratio

	Year						
	1999	1998	1997	1996	1995	1994	1980-89
Total loans / total deposits	2.0	2.2	2.0	2.3	2.0	1.5	1.1-1.2
Nominal difference (in USD millions)	381	918	946	970	520	396	n.a.

Source: National Bank of Yugoslavia (1990, 1994-2000).

This would not necessarily lead to illiquidity and insolvency of banks if a functional interbank loan and deposit market existed. However, illiquidity on the money market and deposits was registered already by the end of 1994. In 1995, a massive

amount of nonperforming placements was observed in that market. Banks were forced by the regulators to revolve these loans which led many into illiquidity. Later on, some of them became insolvent. Central bank had to intervene by the end of 1995 and in the first half of 1996 with large emergency liquidity injections.

Note that the banking crisis in FRY coincided with the period of dramatic reduction of inflation. This is consistent with the findings observed in other countries as reported in the paper by Bordo, Dueker, and Wheelock (2002). There, it is demonstrated that large inflation fluctuations and, especially, large drops in inflation often cause financial instability. Systemic insolvency of major banks in FRY destroyed the confidence of people in the banking sector. Old savings denominated in foreign currencies were frozen. New foreign currency savings were gradually accumulating. However, they were outside of the banking system. Saving in dinars *de facto* disappeared. A reduction of private savings (i.e., savings of individuals), made systemic insolvency problems even more pronounced. Dinar-denominated deposits of companies were reduced to just 3% of their value at the beginning of the 1990s. Thus, systemic insolvency made commercial banking fully dependent on the money obtained directly from the central bank.

After the initial reduction of hyperinflation, a high correlation emerged between changes in monetary aggregate and changes in the banking balances. Since people and companies did not save in the banks, the central bank was forced to pretty much fund bank activities directly. At the same time, real money supply and M1/GDP were both falling (see Table 8). Of course, money balances captured here were just a part of the total since much of the transactions were made at that time in the reserve currency, i.e., in DEM. It is in that currency that practically all the savings and part of the transactions was conducted (purchases of expensive items, for example).

Table 8 Supply of Dinars (Real M1 in USD Billions) and Monetization Coefficient

	1999	1998	1997	1996	1995	End of 1989
M1	0.40	0.81	1.10	0.93	0.66	5.00
M1 / GDP	4%	5%	8%	7%	5%	20%

Source: National Bank of Yugoslavia (1990, 1994-2000).

The situation in the commercial banking sector, in turn, significantly negatively impacted monetary stability. Namely, problems with the banking sector led to another period of high inflation. Low level of dinar-denominated monetization and difficulty of the central bank to preserve monetary stability led to further problems in the banking sector. In particular, with fresh supply of central bank money issued for the purposes of preserving bank liquidity inflation was pushed up. This, in turn, created the risk of new monetary destabilization.

3. Financial Repression and the Banking Crisis

The first form of financial repression – limitation on interest rates that push them into the zone of negative real values – had a long tradition in the regulation of the banking system of Yugoslavia. As mentioned before, the most extreme negative values of the

real interest rates were reached in the second half of 1993 when they dropped to the level between –96 and –99 percentage points. While right after the reduction of hyper-inflation real interest rates became positive (briefly), interest rates on the official market turned significantly negative already by the end of 1994 (see Table 9).

Table 9 Real Weighted Average Annual Interest Rates on the Formal Loan Market (in Percentage Points)

	Deposit rate	Credit rate	Primary rate
June 1994	2.2	10.18	7.25
December 1994	-22.12	-13.53	-17.03
June 1995	-46.59	-38,15	-43.32

Source: National Bank of Yugoslavia (1994-1996).

Another often-practiced form of financial repression in FRY was direct allocation of loans by the state. Such a loan allocation system was not very transparent until 1999. At that time, the central bank made a decision to directly allocate approximately 50 percent of the loan potential of banks. A particular form of repression was, also, forced conversion of short-term into long-term loans. This was done since neither the state nor state or socially-owned companies were able to service their loan obligations towards commercial banks. Given that deposits, to the extent they existed, were very short-term (mostly *a-vista*) this further pushed banks forward illiquidity.

Since loans were kept artificially cheap this increased the demand for loans and caused a severe credit rationing. Such policy was a natural consequence of the fact that the vast majority of the banking sector was socially owned. The same was true for their corporate clients. Such banks were, simply, forced to provide minimum needed liquidity to other socially-owned and state companies. Under such circumstances, interest rate became the transfer price of credit and deposit that did not influence, much, its allocation. On the other hand, all of this led to a dramatic reallocation of income and capital from credit and deposit providers to their recipients. The vast majority of loans on the formal market was placed in such a way that it caused the creation of non-commercial relationships between banks and their clients. This, in turn, prevented rational management of banks. They, simply, did not behave as businesses at that time. Each loan deal was, under such circumstances, fraught with risks that normally do not occur in loan business.

Placing ceiling on interest rates accelerated the process of divergence among commercial banks. The market separated into formal and informal ones. On the formal market participated, mostly, just large socially-owned banks and large socially-owned companies. While this group of banks controlled the largest fraction of the total loan potential of the banking sector, their clients were, collectively, concentrated, mostly, in large insolvent firms.

Due to the processes described above noncommercial allocations of loans and negative real interest rates together with a significant growth of moral hazard in the financial sector led to a several banking crisis. The situation was particularly bad for the group of the large socially-owned banks since a very large fraction of their credit placement was

nonperforming. All of this led to the collapse of the large socially-owned banks as well as their largest clients.

4. Conclusions

In this paper we consider a triangular relationship between hyperinflation, financial repression, and financial crisis with the focus on the case of hyperinflation in FRY in the 1990s. We have demonstrated that the crisis was transmitted and amplified, oftentimes in both directions, along the edges of the triangle. We have seen, also, that without the reduction of both external and internal financial repression the crisis was not possible to overcome. Trying to address the crisis in one or two vertices of the triangle was not sufficient.

Only the fall of the outer wall of sanctions and, especially, the entering of foreign capital and foreign banks on the market of FRY opened the possibility for recovery. Financial sector and savings stabilized. Inflation gradually normalized as well, converging much more closely to the levels observed in the Eurozone, our largest trading partner. But, this by itself would not be enough without a consistent effort to reduce chronic budget deficits. Based on all of these considerations one may conclude that partial measures that focus on some but ignore other sides of the triangle cannot, in the longer run, lead to a stable and prosperous economy.

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