THE ENDS OF FOUR MODERN HYPERINFLATIONS

by

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by

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DEDICATION

Dedicated to my father Billy, my mother Lisa, and my sister Rebecca.

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LIST OF ABBREVIATIONS

Active fiscal passive monetary strategy.....AFPM
Active monetary passive fiscal strategy.....AMPF
Ancillary Foreign Currency Administration System.....SICAD
Central Bank of Armenia..... CBA
Central Bank of Russia.....CBR
Central Bank of Venezuela..... BCV
Central Bank of Zimbabwe.....RBZ
Commonwealth of Independent States..... CIS
Executive Order..... EO
Gross Domestic Product.....GDP
Federal Reserve Economic Database..... FRED
Former Soviet Republic..... FSR
International Monetary Fund..... IMF
Marginal Currency System..... SIMADI
National Center for Foreign Commerce.....CADIVI
Observatory of Economic Complexity.....OEC
Quasi-fiscal activities.....QFA
United Nations Commission of Experts.....UNCE
United Nations Security Council.....UNSC
United Socialist Party of Venezuela..... PSUV
United States Dollar.....USD
West Texas Intermediate.....WTI
Yugoslav National Bank..... YNB
Zimbabwe African National Union Patriotic Front.....ZANU-PF

ABSTRACT

THE ENDS OF FOUR MODERN HYPERINFLATIONS

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In Thomas Sargent's 1982 journal *the Ends of Four Big Inflations*, he conducted several case studies on historic hyperinflations occurring in the early to mid-1900s. This thesis draws large amounts of inspiration from this and Sargent's other work by utilizing a case study approach to analyze four more hyperinflationary crises occurring in the modern era (1990s-present). For each of these cases, this thesis observes the instrumental role fiscal-monetary elements such as fiscal responsibility, central bank independence, and credibility play in both the formation and conclusion of these modern crises. While each of these crises were preceded by differing domestic conditions, actions conducted by each nation's fiscal-monetary regime would result in the abandonment of these key elements ultimately triggering each case of hyperinflation.

This thesis contains two chapters. Chapter one briefly introduces the three main fiscal-monetary elements by describing the various implications resulting from either the retainment or abandonment of them. Chapter two presents the formation and conclusion

of the hyperinflation crises of Zimbabwe, Yugoslavia, Armenia, and Venezuela with an exploration of the actions conducted by the fiscal-monetary regime of each country. Venezuela's case does not include details on the conclusion of the hyperinflation due the crisis being ongoing. This case instead demonstrates how the non-reestablishment of key fiscal-monetary elements contributes to the continuation of the crisis.

CHAPTER ONE: A BRIEF INTRODUCTION OF VARIOUS FISCAL-MONETARY ELEMENTS

Hyperinflations are a relatively rare phenomenon resulting from a poorly coordinated fiscal-monetary regime. Each instance of hyperinflation is triggered by a country's unique domestic conditions resulting in the adoption of such a coordination scheme. While circumstances may differ, each crisis contains identical fiscal-monetary elements in the form of central bank independence, fiscal responsibility, and credibility. Just as the lack of these elements trigger hyperinflation crises, the reestablishment precedes the immediate conclusion of the crises.

Most hyperinflations begin from some form of economic downturn. The blow to domestic industry leads to the fiscal-monetary regime of a country to conduct expenditure in an attempt to alleviate pressures on struggling industry. In most of these instances, expenditure levels continue to rise without an accompanying increase in revenues forcing the fiscal authority to lean on the monetary authority to finance the budget. This relationship continues resulting in an inflationary spiral with inflation levels rapidly rising. In most cases, fiscal-monetary authorities will implement various superficial actions such as price controls in an attempt to halt the problems that arise from rising inflation levels. These actions prove largely ineffective due to the lack of necessary fiscal-monetary regime adjustments. Eventually inflation reaches critical levels and countries formally enter a hyperinflation.

Fiscal and monetary policy are deeply related. In Sargent's Nobel lecture (2012), he would state the inseparability of the policies:

> What a responsible fiscal policy—one that sustains present value government budget balance with zero revenues from the inflation tax—it is easy for a monetary authority to sustain low inflation; but that with a profligate fiscal policy, it is impossible for a monetary authority to sustain low inflation because the intertemporal government budget then implies that the monetary authority must sooner or later impose a sufficiently large inflation tax to finance the budget. In this sense, monetary and fiscal policies cannot be independent. They must be coordinated. (pp. 330-331)

In the presented cases, hyperinflation would develop from a poorly coordinated fiscal-monetary strategy. Just as the poor coordination of fiscal and monetary policy would result in the creation of hyperinflation, the solution to these crises must occur from a proper coordination strategy between the policies. Any attempt by a country's authorities to independently resolve a hyperinflation crisis will cause an uncoordinated strategy resulting in a continuation of the crisis.

Hyperinflations serve as useful case studies due to their extreme nature. Thomas Sargent equates these crises to laboratory experiments that cause the elements that both trigger and end these periods to be easily observable (Sargent 1982). In the modern hyperinflation cases of Zimbabwe, Yugoslavia, Armenia, and Venezuela, causal fiscal-monetary elements were easily observable. First, each country would run budget deficits abandoning responsible expenditure with the aim to improve domestic conditions. Second, each case would see the fiscal authority exert pressure on the monetary authority to finance expenditures. With the agreement to bankroll these excessive expenditures, the monetary authority has conducted actions against monetary stability therefore forfeiting their independence. Finally, the resulting loss of credibility from a poorly coordinated

fiscal-monetary scheme would damage the country's ability to receive assistance as well as any recovery efforts.

Independent Central Bank

Independence is an encompassing term to describe a set of attributes involving how the monetary authority conducts policy to achieve its stability objectives. In hyperinflationary crises, the monetary authority must have complete and total independence from any factor of outside influence. By mandating central bank independence, the monetary authority has the ability to deny requests from the fiscal authority to finance aggressive structural deficits which trigger hyperinflations. Implementing this element proves problematic in fiscal-monetary regimes with an authoritarian political structure. In these cases, the central bank may or may not appear to have the autonomy necessary to deny the financing of reckless expenditures. Any claims of "independence" under authoritarian regimes are largely superficial and should not be considered to be true central bank independence. The possibility exists that any authorized action that goes against the overall objectives of the regime such as denying reckless expenditure could lead to the removal and/or replacement of those associated with such actions.

Historically, aggressive expenditures bankrolled by subservient central banks who refuse to uphold independence led to a continuation of the crises. This theme is present in the hyperinflation cases presented by Sargent in *The Ends of Four Big Inflations.* In each of these cases, the crises were created and exacerbated by central banks fulfilling a subservient role by continuing to finance reckless expenditure. This coordination scheme

can be classified as an active fiscal passive monetary (AFPM) strategy (see Leeper 1991). Once the monetary authority acts upon a strategy of independence, it attempts to become "active" by conducting policy to achieve its objectives. By the monetary authority attempting to become active, the fiscal-monetary relationship takes on the form of a chicken game (Leeper 1991). If the monetary authority is fully committed to their strategy and the fiscal authority "swerves first" the coordination scheme takes on an active monetary passive fiscal (AMPF) form. This form dictates that the monetary authority can conduct whatever actions are required to achieve its stabilization objectives while the fiscal authority is forced to undertake a "passive" role. A passive role entails conducting policy to assist in the achievement of the active authority's objectives. Reneging on a declaration of independence, or the lack of development of true independence, will lead to the fiscal authority becoming (or remaining) "active" resulting in a continuation of the crisis.

Typically, actions conducted by the monetary authority upholding central bank independence can require the fiscal authority to reactively conduct adjustments towards a balanced budget. The adherence to independence through the refusal to conduct monetization prevents a fiscal authority from continuing to run deficits. Given enough independence, the central bank will always "starve out" the fiscal authority by refusing to make purchases therefore requiring the fiscal authority to balance budgets either from raising taxes or cut expenditures. Similarly, the possibility exists for the government in crisis to remove the ability for the central bank to print currency. This would enable the government to continue to finance expenditure through inflationary means. Fortunately,

this measure is seldom utilized, and has not occurred in any of the observed cases of hyperinflation.

Another independence action demonstrating the ability for the central bank to require responsible expenditure is through the central bank refusing to issue bonds that would go against stability objectives. Without the additional funds from the sale of bonds, budgets would be forced to balance from either an increase in tax revenues or lower amounts of expenditure. However, this independence does not prevent the issuing and defaulting of some other hastily created instrument by another government organization. The ability to refuse the implementation of bonds that go against stability objectives prevents a bond themed inflationary spiral from occurring (see Sargent & Wallace 1981).

The refusal to continue to finance excessive expenditure permits the monetary authority to implement restrictive policy in order to maintain monetary stability. With central bank financing on loan instruments barred from use, financing would be accomplished by using future surpluses. These surpluses would result from either lower expenditure, higher taxes, the sale of future debt obligations, or a combination of these factors. If the fiscal authority continues to refuse to adopt a responsible budget, there will be no other option but to default when interest payments exceed surpluses. The result of such a scheme is a blow to a country's credibility as a debtor, albeit with stable levels of inflation. This outcome, while not ideal, is a superior alternative to having the combination of high inflation and a blow to borrower credibility.

Just as the willingness for the monetary authority to finance excessive expenditures by the fiscal authority is the foundation of hyperinflation, the refusal to do so is the first step of the solution. In every case of hyperinflation, a credible regime change emphasizing central bank independence would force fiscal authorities to adopt responsible expenditure. The central bank independence condition will often dictate necessary fiscal adjustments, but without credibility, expenditure will continue to be excessive. Without central bank independence, little can be done to bring about the end of a hyperinflation when faced with excessive structural deficits birthed from rash fiscal expenditure.

Responsible Expenditure

In each of the presented cases of hyperinflation, budget deficits from large government expenditures were run on current accounts. These expenditures would lead to continuous deficits not accompanied by an increase in future surpluses. Instead of conducting fiscal adjustments such as raising taxes or cutting future expenditure, the fiscal authority would instead rely on a coordination scheme where the monetary authority willingly bankrolls these excessive expenditures. This poorly coordinated fiscal-monetary strategy results in an inflationary spiral with budget deficits being balanced in a non-traditional manner forcing the monetary authority to finance the deficit. When the monetary authority finances expenditures, they do so by printing money. This action raises the money supply triggering a rise in the price level leading to higher inflation levels. A continual reliance on a country's monetary authority as a method to balance budgets been the primary cause of each of the presented cases of hyperinflation.

Excessive expenditure can be comprised of necessary inflexible purchases. Often, developing or transitional economies require excessive expenditures to be conducted to provide a fundamental level of services. These purchases are warranted with the necessity for these fundamental services in the present coming at the expense of fiscal stability in the future. In other non-developmental cases, large amounts of fiscal expenditure can be undertaken to provide extreme levels of social services or subsidies. In these cases, future fiscal stability is sacrificed in order to make these extreme expenditures. While these subsets of expenditure may fundamentally differ, the resulting fiscal instability will occur regardless of the type of excessive expenditure.

Common forms of the two types of excessive fiscal expenditure can include subsidies to industry, supporting ineffective government organizations, or massive social welfare projects. In some cases, these expenditures were conducted with the acknowledgement that doing so would lead to an increase in inflation levels. The rise in inflation would be accepted due to the personal or political gain that occurred as a result of these expenditures. In other cases, wartime would lead to unavoidable expenditure on current accounts. However, in an attempt to aid struggling domestic industry (either triggered from or occurring at the same time as war) inefficient subsidies would lead to rising expenditure often without the necessary fiscal reallocation to help finance these expenditures.

At a certain point, leaning on the monetary authority for financing becomes an unviable option. By forcing the holding of domestic currency, demand is artificially created prolonging the effectiveness of central bank financing. One measure to raise

artificial demand is to implement various legal measures on currency holdings. A variation of this technique involves passing restrictions on the exchange of foreign currency. Restrictions such as limits on the amount of foreign exchange or an outright banning of exchange are all possible measures. These restrictions are attempts to stabilize exchange rates and prevent a currency flight from occurring. Techniques to prolong financing by the central authority do not have to explicitly pertain to currency. Requirements on the amount of bonds and other financial instruments within industry portfolios may also be implemented to prolong financing by a monetary authority.

According to Cagan's model of hyperinflation, when a momentum coefficient takes on a value higher than unity, monetary policy alone is incapable of preventing hyperinflation (Cagan 1956). Sargent notes that the momentum in each of these cases is not some supernatural aspect of hyperinflation but is the result of fiscal policy refusing to adopt responsible expenditure (Sargent 1982). Inflation levels rise from sustained deficits with agents reacting by preemptively raising the price level contributing to the inflation spiral. This spiral will continue until the fiscal authority credibly signals that it will adopt responsible levels of expenditure and no longer rely on the central bank to finance expenditures. Budget financing will instead be accomplished through future budgetary surpluses. Thus, inflation will no longer rise due to central bank financing during each period of expenditure. It should be apparent from this relationship that fiscal expenditure contributes to both the start and end of hyperinflation crises.

Credibility

Like central bank independence, credibility is an all-encompassing term. Little consensus exists with many economists draw differing conclusions on the role credibility plays in monetary regimes. However, each of these conclusions all involve aspects of monetary stabilization. When monetary regimes regain credibility, it signals that recovery efforts are earnest with the intention to keep inflation levels low (Blinder 1999). This may influence the public to react in a manner conducive to policy aimed at recovery. Credibility also refers to a country's fiscal-monetary authorities adhering to claims of recovery. By conducting policy actions in line with stated recovery objectives, credibility can be reestablished. While it is unclear the explicit role credibility plays within hyperinflation recovery, in each of these modern cases a decline of the credibility of a nation's fiscal-monetary regime occurred either during, or at the start of the crisis. The recovery in the credibility of the fiscal-monetary regime in each of the modern cases would precede the conclusion of the crises.

Authorities may make any claims they wish about recovery conditions involving central bank independency or expenditure responsibility. One belief on the role of credibility claims that without credibility, rational agents will continue to assume that these claims are baseless, and the status quo against recovery efforts will dominate. A credible declaration of a complete regime change presupposed the end of the hyperinflationary crises presented by Sargent (see Sargent 1982). As demonstrated by Sargent's analysis, the negative effects of hyperinflation are quickly (almost immediately) remedied once a responsible regime is established. In some of these cases,

county's debt obligations were renegotiated with strict guidelines requiring adherence to recovery policies. Through mandatory adherence to these policies, credibility would forcibly reestablished. Various actions to reestablish credibility from other cases include: the act of removing inefficient government organizations/individuals, adherence to claims of recovery, formation of new organizations, or the appointment of new leadership. These actions provide tangible evidence of making good on claims of a new strategy of responsible expenditure.

Policy actions enabling the fiscal authority to continue reckless expenditure such as passing legal restrictions, sends signals that the fiscal-monetary regime is in state of distress. Rational agents realize that this currency is not a reliable asset to hold, and a flight from the currency will occur as is commonplace during hyperinflation crises. The currency flight is a result of agent's established beliefs of a nation's inability to maintain a currencies value. If domestic currency becomes unreliable through an inflation spiral, rational agents will actively avoid holding this currency by instead opting to hold more stable foreign assets. In an attempt to increase stores of foreign assets, and or stabilize exchange rates more restrictive exchange measures may be implemented resulting in the formation of black markets for foreign assets.

Regarding another aspect of credibility, the reputation of failing to pay off debts directly effects the ability for countries experiencing hyperinflation crises to find the necessary lenders to contribute to recovery efforts. If the country has the reputation of defaulting, or a reputation of arrears, a higher interest rate to attract creditors must be presented. Often as crises continue the number of available creditors will dwindle from

rising amounts of defaulted loans. This will lead to the country resorting to financing payments on whatever loans they are able to receive by conducting seigniorage contributing to rising inflation figures. Moreover, a reputation of defaulting on loans prevents the ability to renegotiate repayment terms further complicating recovery efforts.

One strategy to address a lack of credibility is a complete regime change emphasizing fiscal responsibility and monetary stability. A regime change signals to creditors that the necessary actions are being undertaken to resolve the crisis. While a simplistic concept, Sargent's main finding would be that each of the hyperinflation cases he observed would immediately conclude as a result of a credible regime change. Given the similarities from Sargent's cases, a credible regime change emphasizing central bank independence and fiscal expenditure should be a solution to these modern cases. Steps towards a credible regime change should result in rational agents observing fiscal-monetary authorities acting upon recovery claims. This observation contributes to a restoration in the credibility to conduct the necessary fiscal-monetary adjustments. In addition, with the regime's reputation being reestablished, the ability to receive foreign assistance or renegotiate debt obligations is once again possible.

Another widely utilized strategy to instill credibility would be to fix the exchange rate. Under a fixed exchange rate scheme, money growth is limited due to the announced exchange rate. This resolves the concerns of fiscal expenditure financed by the monetary authority causing rising levels of inflation. Because the domestic currency is backed by non-fiat instrument, the public's belief in the currency's future stability can begin to be reaffirmed. While fixed exchange rates may be undone in the future, they are removed

only after the public's future expectations of government credibility remain steadfast. A variation of a fixed exchange rate strategy would be used by Yugoslavia resulting in the conclusion of their crisis.

Regime Change

In *The Ends of Four Big Inflations*, cases presented by Sargent would often be accomplished through external oversight. In Austria's case, regime change was to be overseen by commissioner assigned by the League of Nations.

> The Austrian government promised to establish a new independent central bank, to cease running large deficits, and to bind itself not to finance deficits with advances of notes from the central bank. Further, the government of Austria agreed to accept in Austria a commissioner general, appointed by the Council of the League, who was to be responsible for monitoring the fulfillment of Austria's commitments. The government of Austria also agreed to furnish security to back the reconstruction loan. At the same time, it was understood that the Reparation Commission would give up or modify its claim on the resources of the government of Austria. (p. 53).

The assignment of a commissioner would help to reestablish the credibility of Austria by forced adherence to their claims of a new regime emphasizing the necessary fiscal-monetary adjustments. Once this regime change became credible, the conclusion of the crisis would immediately follow. The assignment of a commissioner would also boost the regime's credibility as a debtor permitting the renegotiation of debt obligations further aiding recovery efforts.

In other cases, credible regime change would occur without the need of external

oversight. Just as the forced adherence by an external entity fosters the credibility necessary to conduct a successful regime change to conclude a crisis, a country conducting an internal credible regime change would also result in a conclusion of the crisis. In these cases, credibility can be reestablished by adherence to firm guidelines such as reserve requirements or credit limits. These guidelines help to establish agent's opinions on future stability. Sargent 1982 would describe how internal arrangements within Poland's fiscal-monetary regime would result in a self-stabilization of Poland's crisis.

> "But in terms of the substantial fiscal and monetary regime changes that accompanied the end of the inflation, there is much similarity to the Austrian and Hungarian experiences. The two interrelated changes were a dramatic move toward a balanced government budget and the establishment of an independent central bank that was prohibited from making additional unsecured loans to the government. In January 1924, the minister of finance was granted broad powers to effect monetary and fiscal reform. The minister immediately initiated the establishment of the Bank of Poland, which was to assume the functions of the Polish State Loan Bank. The eventual goal was to restore convertibility with gold. The bank was required to hold a 30% reserve behind its notes, to consist of gold and foreign paper assets denominated in stable currencies. Beyond this reserve, the bank's notes had to be secured by private bills of exchange and silver. A maximum credit to the government of 50 million zlotys was permitted. The government also moved swiftly to balance the budget" (pp.70-72)

By implementing these arrangements, Poland would establish a credible regime resulting in the conclusion of their hyperinflation. Given the large similarities in both Sargent's cases and the modern cases of hyperinflation, a credible regime change emphasizing central bank independence and fiscal responsibility would also prove to be solution to these modern crises of hyperinflation.

CHAPTER TWO: MODERN HYPERINFLATIONS

Although occurring several decades after the hyperinflations observed by Sargent, these cases of modern hyperinflation would similarly develop from poorly coordinated fiscal-monetary regimes. While the domestic conditions that preceded these crises may have differed, actions undertaken by each country's fiscal-monetary regime would result in the abandonment of the same key elements as previous regimes. Moreover, the cessation of the crisis would not occur until the reestablishment of these elements. The following cases will not only prove the instrumental role fiscal-monetary factors play in hyperinflation development but will demonstrate the effectiveness of a case study approach to evaluate multiple hyperinflation crises from differing regimes.

Zimbabwe

The foundations of Zimbabwe's hyperinflation crisis began in 1985 with the passing of the Land Acquisition act. The act itself was an attempt to empower the impoverished black majority through the purchasing and redistribution of farmland. Initially the white owned farmland was to be purchased by the state on a "willing buyer willing seller" basis and would see little success in the early years of the program (Mafa et al., 2015). The land was to be paid using foreign currency, and deficits were run on current accounts in order to finance the program. Seven years later, the act was modified to replace the initial "willing buyer willing seller" agreement with a compulsory land

acquisition program. Realizing that the state could not afford to pay the full value of the farmland, the decision was made to only partially compensate the farmers for the purchase of their land (Mafa et al., 2015).

In the late 1990s, various fiscal expenditures would increase the budget deficit with war veterans being promised various benefits in the form of direct compensation, a pension, and farmland (Coomer & Gstraunthaler, 2011). These benefits were a method to obtain much needed political support for the ruling Zimbabwe African National Union Patriotic Front (ZANU-PF). One year after the war veteran funds were established, civil war broke out in the neighboring Democratic Republic of Congo to which Zimbabwe would provide military assistance to the leadership of the DRC. Rising tensions involving the precarious relationship between war veterans and the political leadership would strongly influence the leaderships' policy decisions with each future change to the Land Acquisition act.

Several crises would unfold with the Zimbabwe dollar losing 75 percent of the value against the United States Dollar (Coomer & Gstraunthaler, 2011). Investor confidence would fall due to rising budget deficits from the Land Acquisition Act and Veteran funds. Low confidence would lead to investors removing funds causing exchange rates to further plummet. The government, attempting to deflect blame and save face, would pass a number of price controls blaming the economic downturn on greedy industry leaders (Kairiza 2009). These price controls would cause shortages of basic goods and be the first of many bad policy decisions made in an attempt to alleviate economic troubles.

The rising budget deficits would draw unwanted attention by Zimbabwe's creditors. Due to falling government revenue paired with rising deficits from high amounts of expenditures, Zimbabwe had previously sought foreign assistance from international groups in an attempt to finance its developing budgetary issues. Noncompliance with agreed upon terms involving projected budget deficit figures would cause the World Bank to suspend assistance until compliance with previously agreed upon budgetary figures was met. With revenue from foreign assistance no longer a possibility, Zimbabwe's authorities would be forced to self-correct their growing problems. In an attempt to balance the budget, taxes were briefly raised until massive public backlash would cause fiscal authorities to instead lean on the central bank to finance growing deficits.

In 2002 the final revision of the Land Acquisition act would be implemented. The changes to the act would permit the state to seize farmland with no requirement for prompt payment. Instead farmers would be compensated through domestic cash, government bonds or other government securities with payment given at whatever time convenient to the government (Mafa et al., 2015). In addition to the "legal" land acquisition, several farms were invaded by veterans claiming the land as their own. The domestic output would further suffer from several droughts greatly affecting Zimbabwe's output. The Zimbabwean economy is largely agrarian based with agricultural goods such as raw tobacco accounting for 52 percent of Zimbabwe's exports (OEC 2019). With farm seizures leading to low crop yields and farmland being underutilized by poor policy decisions, Zimbabwe's domestic output would face a decline.

Table 1 Zimbabwe Exports

Export	Percent
Raw Tobacco	51
Ferroalloys	8.9
Diamonds	7.4
Chromium Ore	6.3
Raw Sugar	2.8
Other Hides and Skins	1.8
Raw Cotton	1.1

From 2000 to 2002 agricultural output would fall from 18 to 14 percent of GDP (Kairiza 2009). Foreign assistance would no longer be available with both the World Bank and IMF to cease all debt assistance due to negligent payments (IMF 2002). With domestic production falling, no actions to attempt to adopt a balance budget, and no chance of foreign assistance funding expenditures to assist industry, the budget deficit would rise to an alarming 23 percent of GDP (Coomer & Gstraunthaler, 2011). Annual inflation figures from the Central Bank of Zimbabwe (RBZ) bankrolling expenditures would rise from 55 percent in 2000 to 199 percent in 2002 (Kairiza 2009).

2001 to 2004 would see various policy measures implemented to address the growing number of domestic difficulties. One measure was to lower interest rates with the goal of stimulating domestic investment. This would prove largely unsuccessful with domestic industry falling and both money supply and prices increasing. Another failed measure was to instill another round of price controls to redirect public blame away from ineffective policy and onto heads of industry. The result of these controls led to a rise in

unemployment and the closing of several businesses due to required prices being below production costs (Coltart 2008). In late 2003, a failed attempt to stabilize inflation involving the raising of interest rates, accompanied by other restrictive monetary policy actions was implemented. The minor success of these adjustments would be quickly undone with the implementation of higher levels expenditures in the form of quasi-fiscal activities.

Table 2 Macroeconomic Indicators in Zimbabwe 1998-2007

Year	Growth rate (Real GDP)	Annual inflation	M1 change
1990	-0.8	47	26
1999	-2.1	57	39
2000	-7	55	53
2001	-3	112	114
2002	-4	199	171
2003	-10	599	491
2004	-2	133	234
2005	-4	586	547
2006	-3	1281	1315
2007	-6	7982	66659
Note measured in percent			

Source: Kairiza 2009

Consistent domestic struggles such as political instability, low output, low good availability, and poor fiscal responsibility, would eventually set the stage for the adoption of various quasi-fiscal activities by the RBZ. These activities are defined in Mackenzie and Stella (1996) as:

> an operation or measure carried out by a central bank or other PFI with an effect that can, in principle, be duplicated by budgetary measures in the form of an explicit tax, subsidy, or direct expenditure and that has or may have an impact on the financial operations of the central bank, other PFIs, or government. (p.18)

Zimbabwe's quasi-fiscal activities (QFAs) would include subsidies, exchange rate schemes, and interest payments forcing the monetization of the funding and losses from the failure of these activities further contributing to the hyperinflation crisis (Muños et al., 2007). While the total amount of officially reported seigniorage would fall, the implementing of QFAs would trigger an increase in the "hidden" levels of seigniorage. "Hidden" seigniorage would only be observed on RBZ balance sheets with a rise resulting from the implementation of QFAs as well as monetized QFA losses. By conducting these QFAs, the RBZ would undertake a role as both the monetary and the fiscal authority by implementing actions simulating excessive expenditure then conducting monetization to finance it.

QFAs in the form of subsidies to struggling industries would be the main factor contributing to the overall growth of money in the Zimbabwe economy. Several of the main sectors of the economy such as agriculture and mining would receive assistance in the form of a direct subsidy per unit produced. These parastatal industries were also gifted sums of foreign exchange to purchase imports (Muños et al., 2007). Banks facing fallout from a liquidity crisis triggered by rising interest rates from a failed stabilization attempt in 2003 would be offered cheap loans to boost their reserves. This program would prove to be largely unsuccessful with many of these loans being defaulted on.

In addition to the large number of subsidies, the failure of various central bank schemes would result in more currency being printed to cover the incurred losses. In an attempt to earn profit from foreign exchange, the RBZ would control the foreign currency exchange market by becoming the sole source of obtaining foreign currency (Muños et al., 2007). By utilizing surrender requirements, Zimbabwe officials would attempt to earn monopoly profits through arbitrage. This exchange scheme would also serve an additional purpose as a system to manage the regime's scarce holdings of foreign currencies. The RBZ would utilize surrender requirements to obtain foreign currency from importers and auction it to the public hopefully at a profit. This system would eventually collapse when losses from government purchasing rates from importers would exceed the public auction price leading to losses having to be covered by further money being printed.

Several of Zimbabwe's political leaders would endorse these activities to obtain personal wealth (Kairiza 2009). Various funds issued to the central bank for crisis aid would be instead used for political campaigns for members of the ZANU PF party. Moreover, evidence shows that large amounts of consumption by state institutions was occurring largely at the expense of the populace. The government would turn a blind eye to this institutional corruption in exchange for much needed political support (Kairiza 2009). The political leadership's vast personal gains from QFAs, as well as the necessity to retain political power, would undoubtably be the primary driving factor in the continuation of these inefficient activities.

In an attempt to manage skyrocketing inflation from the implementation of QFAs, the RBZ would begin to issue a new form of treasury bills. These strictly RBZ controlled bills would offer high interest rates (above 900% annum) with the overall goal to reduce the amount of money circulating within the Zimbabwean economy (Muños et al., 2007). This inflation management scheme would not be accompanied by the necessary fiscal-monetary adjustments resulting in inflation levels continuing to rise. Moreover, the RBZ bonds themselves would prove to be largely ineffective from real yields becoming negative due to the rapidly rising inflation. Monetization would be required to make interest payments on these bonds further contributing to higher levels of inflation.

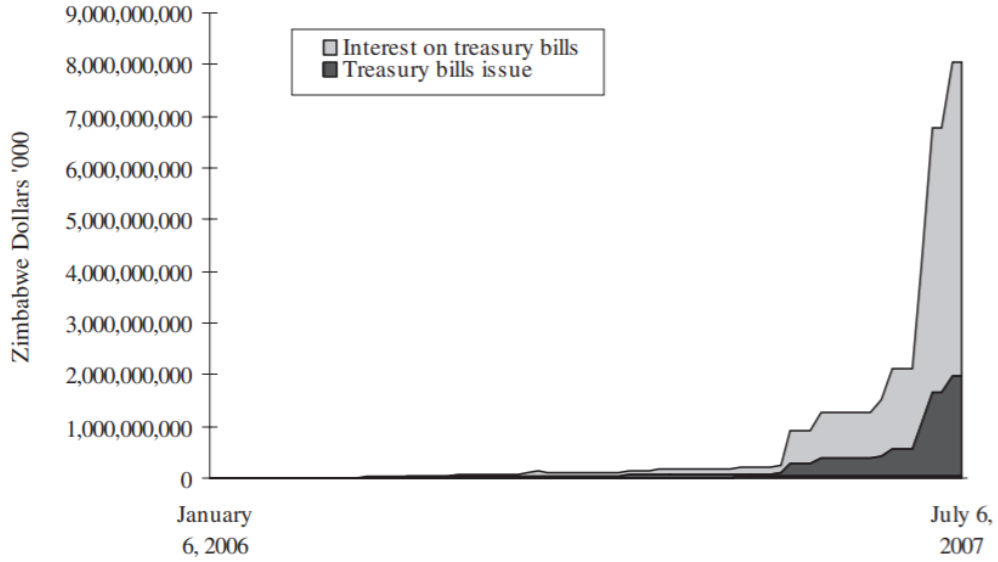

Figure 1 Zimbabwe's Interest on Treasury Bills (Coltart, 2008). [graph from image file]

The continuation of inefficient QFAs would propel the Zimbabwean economy into hyperinflation. March 2007 would officially signal the start of the Zimbabwe hyperinflation with monthly inflation figures reaching 50.54 percent surpassing Cagan's 50 percent increase in monthly inflation threshold (Cagan 1956). During the crisis, yet another round of price controls were issued resulting in further shortages of goods. The manufacturing industry would be hit especially hard with output falling more than 50 percent with several firms being forced to shut down due to required prices (Coltart 2008). In another attempt to gain political support, firms would be further affected by legal restrictions mirroring the injustice of Land Acquisition Act with businesses forced to be majority owned by indigenous South Africans (Coltart 2008). Firm owners would be required to relinquish control or face the possibility of losing profits from their business entirely.

Monthly inflation figures would dramatically dip in the middle months of 2007 (Hanke & Kwok, 2008). This drop in inflation figures was not the result of responsible policy, but instead were most likely the result of the price controls on goods within baskets used to calculate inflation. Given the state of the Zimbabwean government at this time it would not be excessive to assume price controls were carefully selected with the goal of manipulating inflation figures. The decline in inflation figures would not last long with monthly inflation rebounding and continuing to grow over the course of the next year. With monthly inflation figures reaching an astonishing 2600% in July 2008, official figures would no longer be reported by the RBZ. However, calculations by Hanke and

Kwok estimate the inflation figures rising to a catastrophic 79,600,000,000 percent monthly in November of 2008 (Hanke & Kwok, 2008).

Table 3 Zimbabwe Monthly Inflation Levels 2007-2008

Date	Month-over-month inflation rate
March 2007	50.54
April 2007	100.70
May 2007	55.40
June 2007	86.20
July 2007	31.60
August 2007	11.80
September 2007	38.70
October 2007	135.62
November 2007	131.42
December 2007	240.06
January 2008	120.83
February 2008	125.86
March 2008	281.29
April 2008	212.54
May 2008	433.40
June 2008	839.30
July 2008	2600.24
August 2008	3190.00
September 2008	12,400.00
October 2008	690,000,000.00
November 2008	79,600,000,000.00

Notes: Hank and Kwok estimates for August 2008-November 2008
November 2008 only includes calculations up to the 14th of November

Source: Hank & Kwok 2008

With inflation figures reaching astronomical levels, the Zimbabwe government began measures to dollarize with both the South African Rand and USD. With

dollarization an immediate stabilization occurred. Recovery would occur quickly with monthly inflation levels slowly declining, prices beginning to stabilize, and foreign funds slowly beginning to reenter the economy.

It should be evident that the root cause of the Zimbabwe hyperinflation was reckless expenditure (QFAs) financed (authorized) by the RBZ. A precarious political situation would only worsen the crisis with the need of the ZANU PF to remain in power influencing much of the reckless expenditure decisions. The utter lack of fiscal discipline would be both the foundation and main propellant of the hyperinflation crisis. The need to retain political power would largely contribute to the growing extravagant promises that ultimately resulted in more expenditure having to be made. These promises would also contribute to the decline in domestic industry through the passing of inefficient measures to gain political support. The decision to continuously implement ineffective price controls in an attempt to blame the hyperinflation on industry would demonstrate the utter lack of responsibility within Zimbabwe's fiscal authority, the RBZ, and Zimbabwe's political system as a whole.

QFAs conducted by the RBZ would result in outcomes normally triggered by a fiscal-monetary regime conducting monetization of excessive expenditure. Although QFAs are a non-traditional form of excessive expenditure, the implementation of these actives would include the same aspects as standard excessive expenditure (subsidies). Because of the role QFAs played within Zimbabwe's fiscal-monetary regime, Zimbabwe's hyperinflation would be propelled by excessive expenditure similar to the other cases of hyperinflation. Moreover, just as the refusal to further finance expenditures

would preclude the conclusion of other crises, the cessation of QFAs by the RBZ would preclude the end of Zimbabwe's crisis.

The implementation of quasi-fiscal activities demonstrates the willing destruction of a central bank's independence by the central bank itself. The main role of the central bank of a nation should be the stabilization of a nation's economy with Independence being the key factor in the central bank's ability to commit to this task. In Zimbabwe's case, the RBZ should have had the ability to refuse to bank roll excessive fiscal expenditures such as veteran pensions and farm seizures. However, by willingly casting aside independence to become a political tool and actively contribute to the hyperinflationary crisis (the type of crisis the central bank is responsible for preventing) highlights a complete abandonment of both independence and its duty. If the RBZ credibly refused to further participate in QFAs, inflation would not have reached the astronomical levels seen in 2008.

A case could be argued that due to the precarious political environment, RBZ central bank independence never truly existed in the first place. Several of Zimbabwe's institutional heads were given positions based on loyalty to ZANU-PF leadership. Given this situation, any action not in line with overall party goals could elicit a less than ideal response for those who chose to go against the leadership. Given actions by the RBZ in backing ZANU-PF plans of utilizing expenditures in an attempt to keep their elected positions gives evidence towards the nonexistence of true central bank independence.

Several blows to the reputation of Zimbabwe's authorities would greatly impact the perceived credibility of the fiscal-monetary regime. Zimbabwe, not adhering to, or

outright defaulting on loan terms, would result in foreign assistance from the IMF and World Bank no longer being issued at a time where foreign assistance was greatly needed. Reckless expenditure involving seizure of farmland, the seizure of private business, as well as the complete disregard towards contractual agreements would contribute to both a decline of Zimbabwe's reputation and a rise in inflation. In order to address this rise in inflation, Zimbabwe's decision to implement superficial actions such as the RBZ bond scheme in lieu of the necessary fiscal-monetary adjustments would further erode what little regime credibility remained. This poor reputation of crisis management and credibility as a debtor would affect Zimbabwe 11 years post hyperinflation with only restrictive funds available to the country from the World Bank and IMF.

The decision to dollarize would instill a system of credibility into Zimbabwe's fiscal and monetary authorities. The dollarization as well as the election of new political leadership would signal a credible regime change with stabilization promises made by authorities to resolve the hyperinflation finally being (forcefully) realized. With the removal of the ability to implement QFAs, authorities would no longer be able to continue inefficient self-serving activities hidden behind a strategy of blaming industry for its own greed. Dollarization unlike price controls would signal a regime shift with recovery claims being credible.

The foundations and abrupt end of the crisis was presupposed by the lack (or development) of these elements. The Zimbabwean case as well as the others presented

should demonstrate the instrumental role central bank independence, fiscal responsibility, and credibility play within hyperinflation crises.

Yugoslavia

In the short run as a country, Yugoslavia has had a complex history. The former Balkan state was created as a result of World War One, using land previously under the control of various countries such as Austria, Hungary and Turkey. The Yugoslav state was comprised of the republics of Bosnia and Herzegovina, Croatia, Macedonia, Montenegro, Serbia, and Slovenia. In addition to these six republics, there were also two associated provinces of Vojvodina and Kosovo. The local governments of each of the six republics differed ethnically and were strongly influenced by each republic's unique culture and traditions. These differences would undoubtedly lead to cultural tensions between the member republics. Eventually, these difference lead to the independence of several republics, war, and the eventual dissolution of the Balkan state. These factors would also put Yugoslav on the path to a hyperinflation crisis.

The republics of Croatia and Slovenia were initially among the least developed members of Yugoslavia. However, over time this would change with the republics eventually becoming the primary commercial centers of Yugoslavia. Tensions would develop from authoritative trade restrictions by the central government located in Serbia (Kunitz 2004). Further authoritative actions by the Serbian republic would be passed by their leader Slobodan Milosevic. Many of these actions were thinly veiled attempts to exert Serbian government influence over the political leadership of member republics. Legislative agreements regarding the structure of the Yugoslav state would not reach a

consensus, and as a result the republics of Slovenia and Croatia would officially declare sovereignty from the Yugoslav state (UNCE 1992).

The succession of the republics in 1991 would trigger several related conflicts collectively known as the Yugoslav Wars. Despite Yugoslavia becoming much smaller in size, the country's military and bureaucratic offices faced zero fiscal adjustment. These organizations would be staffed and receive funding at a rate consistent with a fully unified Yugoslavia. In some cases, these funds would be illegally distributed by circumventing various bureaucratic restrictions (Petrović et al., 1998). The refusal to at the minimum conduct fundamental budget adjustments by scaling back now bloated bureaucratic offices would contribute to the overall rising levels of expenditure. Inflexible wartime costs would also contribute to Yugoslavia's growing budget deficit. These expenditures would not be financed through an increase in the tax revenue, but by exerting pressure onto the National Bank of Yugoslavia (NBY) to bankroll the expenditure (Petrović et al., 1998).

The falling levels of tax revenue and continual reliance on the NBY to finance rising budget deficits would ultimately trigger an inflationary spiral causing monthly inflation figures to reach hyperinflationary levels. Using Cagan's hyperinflation definition of 50 percent increase in monthly inflation (Cagan 1956), the Yugoslav hyperinflation officially began in April 1992 with inflation figures reaching hyperinflationary levels (Hanke Krus 2012).

Table 4 Yugoslavia Monthly Inflation Levels 1992-1994

Date	1992	1993	1994
January	28	100.6	313,563,558
February	47	211.8	2,143.3
March	41	225.8	
April	75.5	114.1	
May	80.8	205.2	
June	102.3	366.7	
July	62	413.6	
August	42.4	1,880.6	
September	64.4	643.2	
October	49.8	1,895.6	
November	33.3	20,190.1	
December	46.6	178,882	
Note: values are discrete rates presented by authors			

Source: Bogetić, Dragutinović & Petrović 1994

Table 5 Yugoslavia Fiscal-Monetary Indicators 1991-1993

Date	Inflation	Fiscal deficit (%GDP)	Expenditures (%GDP)	Inflation tax on M1 (%GDP)
1991	117.8	13	47	16
1992	8954.3	21	41	15
1993	1.16×10^{14}	34/28*	47/39*	22
Note: *denotes estimates by Petrović Bogetić and Vujošević				

Source: Petrović, Bogetić & Vujošević 1998

Due to several war atrocities committed by warring republics, the United Nations Security Council (UNSC) would create a number of resolutions both condemning the conflicts of the Yugoslav Wars themselves and enacting a multi-stage embargo through various resolutions. UNSC Resolution 757 built off the arms embargo enacted by sections 4 and 5 of UNSC Resolution 713 by increasing the embargo's scope to include all goods and foreign financial exchange. In regard to the restrictions, resolution 757 explicitly states:

> 4. Decides also that all States shall prevent: (a) the import into their territories of all commodities and products originating in the Federal Republic of Yugoslavia (Serbia and Montenegro) exported therefrom after the date of the present resolution; 5. Decides further that no State shall make available to the authorities in the Federal Republic of Yugoslavia (Serbia and Montenegro) or to any commercial, industrial or public utility undertaking in the Federal Republic of Yugoslavia(Serbia and Montenegro), any funds or any other financial or economic resource and shall prevent their nationals and any person within their territories from removing from their territories or otherwise making available to those authorities or to any such undertaking any such funds or resources and from remitting any other funds to persons or bodies within the Federal Republic of Yugoslavia (Serbia and Montenegro), except payments exclusively for strictly medical or humanitarian purposes and foodstuffs;

An important distinction regarding the role of the UNSC embargo in the crisis needs to be made. While the Yugoslav hyperinflation was not a direct result of the embargo, the infeasibility of raising tax revenues paired with the necessity to conduct high levels of expenditure from wartime would force the fiscal authority to lean on the YNB for financing. The initial resolution implementing an arms and military goods only embargo was passed in September 1991, while the complete goods embargo was passed one month after the official start of the hyperinflation in May 1992. The complete embargo would affect domestic production limiting the amount of available tax revenue (both foreign and domestic) as well as the increase of government expenditures in the form of inefficient subsidies to state sponsored industries. Because of an increase in government expenditures from inflexible wartime costs, pressure from the UNSC embargo affecting domestic industry, and the barring of foreign assistance by the UNSC, the fiscal authority had no option besides continuing to exert pressure upon the central bank to finance expenditures.

With the decision to further monetize government expenditures, actions were undertaken in the form of cheap bank and tax credits to alleviate domestic market pressure brought upon from the UNSC embargo (Petrović et al., 1998). The reality was much of the resources aimed at improving domestic conditions went to the recipients gaining personal wealth by conducting capital flight, with sparse amounts of resources used for its intended purpose. This assistance was initially thought of as a stop-gap solution with the political leadership believing the embargo to be a transitory measure. The embargo also served as a convenient scapegoat for internal issues originating from poorly coordinated fiscal-monetary policy actions. This false attribution would lead to actions that would have lowered hyperinflation (namely the adoption of a responsible fiscal regime) being cast aside in favor of policy that would contribute to the continuation of the crisis.

The Yugoslav government would take multiple attempts to establish price controls on various essential goods with the hope of lowering inflation (Bogeteć et al., 1994). However, these controls were quickly abandoned due to both massive public disapproval and widespread good shortages. While the controls did succeed in briefly lowering inflation levels, these actions would prove to be largely superficial. The decision to implement price controls in lieu of the necessary fiscal-monetary adjustments would result in inflation quickly rebounding beyond pre-control levels. This arrangement would be representative of the decisions made by government officials casting aside necessary adjustments in favor of ineffective policy.

During this crisis, Yugoslavia's banking system was hit by several issues destroying both its ability to control money circulation and its credibility. Provincial banks, state institutions, and even local shops would illegally and uncontrollably increase the money supply (Bogeteć et al., 1994). These entities would falsify deposit and checking account balances to conduct purchases in the present with the hope future inflation and YNB credits would offset the difference. The widespread acceptance in discrepancies between actual balances and claimed balances would result in informal money creation contributing to the increase in money supply. The result of this arrangement meant that the YNB no longer had full control the creation of Dinars. This lack of control over the supply of Dinars would demonstrate the complete inability of the YNB to perform the most basic functions of a central bank. Given this inability there would be little hope that the YNB could credibility implement tough policy to force the necessary fiscal expenditure adjustments.

In addition to the loss of control over Dinar circulation, the banking system of Yugoslavia was plagued with corruption that destroyed the credibility of the banking system as a whole (Petrović et al. 1998). Several banks would follow the same actions undertaken by state industries by taking subsidies and conducting capital flight further eroding the public's perception of the credibility of the banking system. Others would run Ponzi schemes by offering high interest rates on banked foreign currency. Once the scheme could no longer stay afloat, the owners would flee with large profits. These issues would contribute to negative public perception causing currency flight further depreciating the value of the Dinar. With exchange ratios facing decline, minuscule tax

revenues, and the inability for revenue to be made from instruments such as treasury bills from being sold, the authorities would be forced to continue increasing the money supply to finance expenditures further propelling the hyperinflationary crisis.

Surface level issues such as the Dinar's real value decreasing, low tax revenue, inefficient subsidies to state industries, the refusal to scale back overstaffed bureaucratic offices, the destruction of credibility, and ongoing inflexible wartime expenses would play an causal role in the hyperinflation crisis. However, special interest groups would operate behind the scenes undertaking voting to postpone stabilization in favor of receiving funds to stimulate current production (Bogeteć et al. 1994). This voting would continue until economic conditions worsened and the realization by the interest groups that they would not be forced to contribute excessive funds towards stabilization efforts. Eventually, legislative interest groups would finally permit much needed policy reform aimed to curb hyperinflation. The most important of these reforms would be the development of a new currency aptly dubbed the "Super Dinar".

Requiring assistance with these reforms, Yugoslavian officials would seek the guidance of former World Bank official Dragoslav Avramovic. Under Avramovic's management, YNB officials would choose to remonetize in 1994 by creating the "Super Dinar". The board-controlled currency was completely backed by both gold and foreign exchange reserves in USD. Yugoslavia's fiscal-monetary regime credibility would increase as the Super Dinar slowly phased out previous Dinars. Actions from the new regime would lead to the beginning of recovery as evident by prices stabilizing and goods gradually returning. In addition to the new currency, the Yugoslav currency board

declared a fixed exchange rate of one to one with the German Deutschmark. Most importantly the currency board would not allow free converting from the old Dinar to the Super Dinar. Old Dinars had to be exchanged for "hard currency" which would then be exchanged for the new Super Dinars (Petrović et al. 1998). In addition to the hard currency requirement, Super Dinars would be under strict exchange limits. By gradually introducing the new currency through these limits, the YNB could adjust the program as needed to avoid the standard issues of remonetization.

Due to the number of issues involving banks, the currency board would conduct actions that would result in a recovery of credibility into the banking system. As previously mentioned, the currency board would limit banks on the exchange of old Dinars for hard currency. Various tax penalties with payment in hard currency were enforced on banks attempting to move assets outside Yugoslavia. These actions would cut down on banking Ponzi scheme profitability as well as currency flight overall. These restrictive actions were tangible and would signal a sincere attempt at recovery. The outcome of these actions would result in a slow reestablishment of bank and currency credibility. Most importantly, given the prior actions of banks and other institutions illegally contributing currency growth, the Super Dinar would permit the YNB to regain a firm control over the money supply.

With a fixed exchange rate, Yugoslavia's fiscal authority would no longer be able to rely on the central bank to finance its' profligate expenditure. This would in turn force the fiscal authority to adopt a responsible budget by cutting expenditures and finally collect taxes from industries long benefiting from inefficient subsidies. A newly drafted

tax reform would include adjustments such as a lump-sum firm tax and various adjustments to a previously overcomplicated tax system. Yugoslavia's claims of fiscal-monetary regime would be realized with rising tax revenues and falling central bank credits. Central bank credits would increase during the first half 1994 most likely from actions to ease the transition of Yugoslavia's fiscal authority. Moreover, an increase these credit levels would be nowhere near crisis levels. In some of the cases presented by Sargent, real money supply would increase from a rise in the demand for money after the conclusion of a crisis. This factor could have also contributed to the rise in central bank credit. Expenditures, while not initially reduced, would eventually be lowered after the realization of necessity to control the budget deficit.

With responsible budgetary actions finally instilled, a declaration of central bank independence, and growing credibility, the hyperinflation would conclude in the beginning of 1994. In the months that followed, recovery would be threatened by various banking issues. However, responsible government expenditure and central bank independency would largely continue to hold. Expenditures levels remained responsible and were paired with a steady flow of tax income. With recovery underway, the currency board controlling the implementation of the Super Dinar would be adjourned in July 1994. With the adjournment came an explicit statement that central bank credits to the government would no longer be issued. This declaration was practiced with the newly established stability holding.

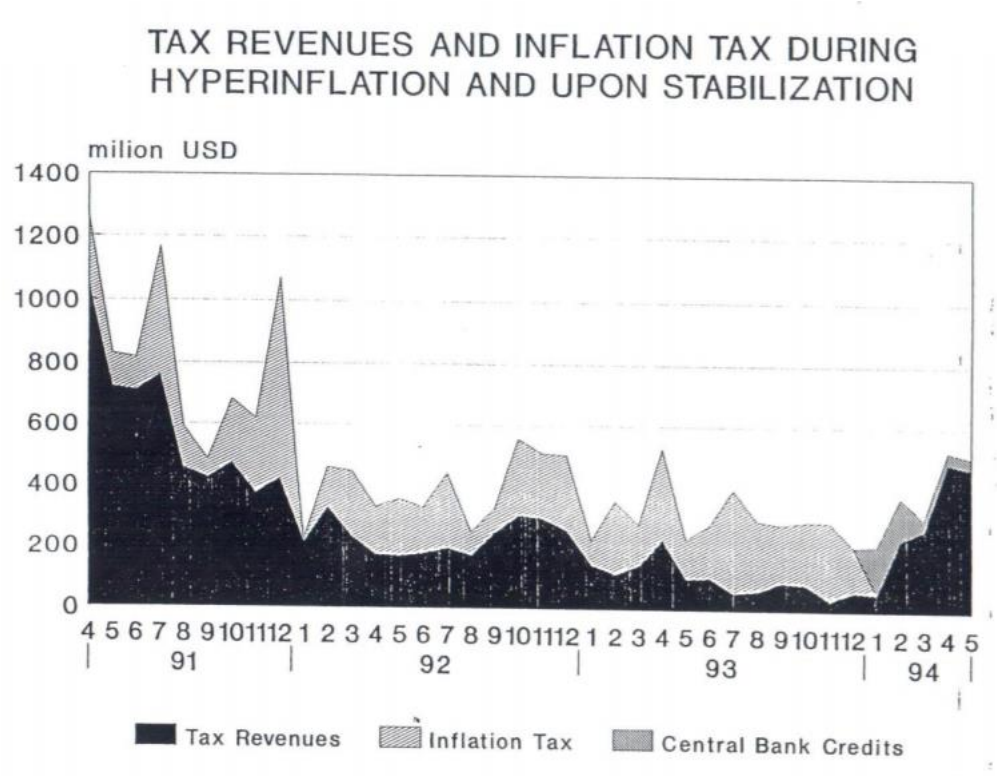

Figure 2 Yugoslavia Fiscal-Monetary Tax Revenue (Bogeteć et al., 1994). [graph from image file]

It should be evident that the Yugoslav hyperinflationary crisis was a result of a poorly coordinated fiscal-monetary regime emphasizing excessive debt monetization by the YNB. While not the trigger of the hyperinflation, the UNSC embargo would put a great amount of pressure onto domestic industry largely contributing to the decision to implement expansive fiscal policy. Problems arising from these actions would be further exacerbated through actions of special interest voting groups refusing to permit the necessary policy measures to end the hyperinflation in favor of inefficient subsidies. This reluctance due to large personal profits from the crisis by both industry heads and voting groups would result in the crisis further progressing.

Yugoslavia's crisis began from poor fiscal discipline including expenditure on inefficient subsidies, minuscule tax collection, and the refusal to reduce government organization budgets. Excessive expenditure as well as subsidies to industry would contribute to the inflationary spiral and ultimately result in inflation reaching hyperinflationary levels. The adoption of a responsible budget would only occur after a declaration by the YNB to no longer finance government expenditures. Without the ability to rely on the YNB bankrolling purchases, the fiscal authority would be forced to adopt responsible levels of expenditure.

The refusal to adhere to necessary restrictive policy during a time of persistent deficits would demonstrate the YNB's complete inefficacy to perform its stabilization objectives. This inefficacy would be further demonstrated with the loss of strict control over the creation of Dinars. Regional banks and state institutions would illegally create funds further contributing to the rising inflation levels. Had the YNB adhered to a policy of central bank independence, the hyperinflation crisis would have concluded much earlier. This would be evident with stabilization occurring immediately after a credible declaration by the YNB to uphold independence and no longer bankroll government expenditures.

The creation of the Super Dinar and board would be the first part of the solution to Yugoslavia's credibility issues. A key attribute of the Super Dinar was that it had a fixed exchange rate, and it was completely backed by reserves of gold and hard currency. This factor would provide the public with the perception that this remonetization would be different than the previous thirty-three others. This time the Dinar would retain its

value. The fact that the Super Dinar had a fixed exchange rate would further cement government credibility. Moreover, the collection of tax revenues from industry long benefiting from the crisis would contribute to the public perception of recovery efforts being earnest. These factors would signal a credible shift in the fiscal-monetary regime resulting in an increase in much needed credibility.

The cessation of Yugoslavia's hyperinflation crisis would come about from the same elements as other historic cases. By making a credible declaration of central bank independence, the monetization of budget deficits would no longer be permitted. Responsible fiscal expenditure would be forcefully imposed with a reduction in budgets expenditures. Finally, with various policies slowly restoring credibility (although not directly targeting credibility), all criteria for the end of hyperinflation were met resulting in the crisis abruptly stopping with inflation figures dramatically decreasing.

Armenia

Armenia is a former Soviet state with a history of reliance on Russia to provide much of its infrastructure. With the dissolution of the Soviet Union in 1991, Armenia would choose to remain in the Commonwealth of Independent States (CIS) as well as participate in the Ruble Zone adopting the Ruble as its main currency (Filatochev & Bradshaw, 1992). The central government would run high levels of budget expenditures including elements such as increased pensions and higher public servant salaries. Several issues that predated the dissolution such as shortages, high budget deficits, and rising inflation would not disappear with the formal break-up of the Soviet Union

(Efremov 2012). These issues originating from inefficient policy would be inherited by the former states, setting the stage for a ruble hyperinflation.

The rubble zone would be comprised of several former soviet republics (FSRs) under the supervision of the Central Bank of Russia (CBR). The FSRs would take over previous USSR central bank (Gosbank) branches creating their own national banks (Granville 2016). While these national banks were not be able to print physical Rubles, they were given the ability to conduct credit creation as they saw fit. In many cases, credit creation would be conducted to balance budget deficits of the FSRs. In response to these credit creations, the CBR would be forced to monetize the difference resulting in an increase in inflation levels. Because of the shared currency, inflation costs from ruble credit creation and subsequent monetization were shared amongst the FSRs.

The shared costs in inflation from this arrangement would create both rising levels of inflation, and a free rider problem involving inflation costs with strong incentives to run large deficits. Granville would succinctly explain this arrangement in a 2016 article:

> For as long as the CBR was unable to control the monetary policy of the FSRs, the latter were free riders motivated by the desire to acquire a share of seigniorage, as the inflationary impact of FSR budget deficits was shared with the other RZ members through the issue of ruble credits which, given the absence of non-monetary financial assets, were necessarily financed out of money created by the CBR (pp. 20-21)

The ability to gain profits at the expense of other FSRs combined with the willingness of the CBR to conduct monetization, would result in an increase in the supply of Rubles. The arrangement between FSRs can be modeled by a game where the players would have either the option to refuse to create credits to lower the total amount of monetization (and by extent inflation), or defect and gain profit at the expense of the other players. With the

inability to confirm other players (FSRs) would not select a strategy of inflation tampering, they would select the latter.

The dissolution of the Soviet Union would cause a lack of coordination between Russia and its previous states. Arrangements between Russia and the republics included contributions to the central budget to which the republics would not honor. Freeriding involving budget contributions by the FSRs would result in about only half of the republic's required contributions transferred to the central budget (Efremov 2012). In his 2012 Nobel lecture, Sargent would describe the budget contribution freeriding issue through subordinate governments as:

> Because there is a classic free-rider problem in paying for public goods, subordinate governments, like states in the United States or nations in the European Union, cannot be relied on voluntarily to provide revenue to the central government to pay for public goods. Each state has an incentive to refuse, hoping that other states will accept the burden. (p. 299)

The resulting lack of promised contributions combined with high expenditure by the republics would force the remaining deficit to be monetized contributing to rising inflation figures. Health standards and other domestic conditions would worsen from previous price controls causing large shortages of basic goods. The republics would respond to these issues by further raising expenditure financed by credit creation resulting in inflation figures climbing to an estimated high of 2318% in 1992 (Efremov 2012).

Each republic creating credits to conduct large amounts of budget deficits would result in a "budget war". The FSRs would run varying, yet large CBR monetized deficits, with expenditures raising the income of their citizens (Filatochev & Bradshaw, 1992). The lack of contribution from freeriding republics combined with the unwillingness of

the CBR to refuse the monetization of republic's deficits would contribute to the rising instability of the Ruble Zone. This instability would contribute to five republics exiting the ruble zone between late 1992 and mid-1993. A few months after the exodus of the five republics, the ruble zone would completely collapse leading to each republic (excluding Tajikistan) forming their own currency (Dabrowski 2016). The Armenian Dram would be included in these newly created currencies. In addition to the new currencies, the formal breakup of the Ruble Zone would cause the inheritance of debt obligations by each of the former republics creating initial difficulty for the newly created Dram.

Unlike the creation of the Super Dinar during the Yugoslav Hyperinflation, the creation of the Dram would not be the solution to Armenia's rising levels of inflation. Inheritance of debts from the poorly coordinated fiscal-monetary regime of the Soviet Union to the CIS, and now to from the CIS to Armenia, would greatly contribute the Armenian hyperinflation. Each regime would pass on a propensity to conduct excessive fiscal expenditure. Armenia's authorities would be forced to continue high levels of expenditure due to the Nagorno-Karabakh conflict with Azerbaijan. While this conflict had been ongoing, the collapse of the CIS would trigger a rise in conflict. This ethnic conflict would contribute to the rising expenditures during the early years of the Dram. Armenia's 1993 budget would see expenditure figures reach a disastrous 85 percent of GDP (IMF Staff Report No. 95/111 1995). The conflict would also lead to the decline in both Armenia's living standards as well as domestic production.

Further struggles would present themselves from the lack of infrastructure within Armenia. Historically, Armenia's infrastructure has heavily relied on imports to access goods with one of Armenia's major imports being energy (OEC 2019). This reliance on goods would become further complicated due to the escalations in the Nagorno-Karabakh conflict with Azerbaijan. Neighboring countries supporting Azerbaijan would impose trade restrictions by refusing to allow imports destined to Armenia pass through their borders. This lack of domestic infrastructure would force Armenia to conduct further budget expenditures in order to import energy and other goods at a high cost resulting in more debt monetization and higher levels of inflation. High amounts of monetized expenditures would develop an inflationary spiral causing inflation figures to reach Cagan's hyperinflation threshold in October 1993 (Hanke & Krus, 2012).

Shortly after the start of the hyperinflation, Inflation figures would peak in November 1993 with inflation levels reaching 438 percent monthly (Hanke & Krus, 2012). In response to the sharp rise in inflation levels, Armenia's monetary authority would reorganize as the Central Bank of Armenia (CBA) replacing the former National Bank. Realizing the gravity of the crisis, the CBA would act quickly to pass several critical resolutions to address the various shortcomings in monetary policy. In the early days of 1994, the first of several necessary resolutions regarding fiscal-monetary adjustments would be passed. Many of these resolutions would include measures to regain control of the banking system, increase reserve requirements, and restrict the allocation of credit. With these resolutions came the declaration by the first chairman of

the CBA to implement the restrictive monetary policy necessary to lower the growing levels of inflation.

Table 6 Armenian Inflation 1993-1995

Date	Inflation
Q1 1993	48
Q2 1993	30
Q3 1993	17
Q4 1993	158
Q1 1994	46
Q2 1994	42
Q3 1994	3
Q4 1994	27
Q1 1995	2
Q2 1995	5
Note: Inflation measured within period	

Source IMF Staff Report 95/111 1995

Most importantly, monetary reform by the CBA would restrict the overall flow of credit by preventing government authorities from implementing ad hoc credit injections into local banks. These restrictions regarding credit issue would also apply to the 52 banks operating within Armenia through barring the issue of excess loans to individuals (Pazarbaşioğlu & Willem van der Vossen 1997). By conducting these restrictions, the CBA could control the excess liquidity circulating within the economy. Liquidity would be further managed with an increase in reserve requirements. These corrections would result in both a boost to the fiscal-monetary regime's credibility as well as the CBA establishing firm control over Armenia's banking system.

Throughout the hyperinflation crisis, a public distrust of the banking and financial systems of Armenia would develop. A lack of banking supervision would create opportunities for private banks to utilize the crisis to gain personal profits at the expense of the public. The fiscal-monetary regime adjustments would include a number of supervisory corrections aimed to resolve the issues surrounding Armenia's banking system. Many of these restrictive measures would continue to be implemented post hyperinflation in order to maintain the fragile stability. Audits and the closing of local banks foreign exchange accounts were among the actions to address the schemes that fueled the public's growing distrust of the banking system. These actions would prove to be effective resulting in several banks being forced to shut down operations. Just two years after the start of these reforms the number of banks operating in Armenia would decrease from 52 in 1994 to 35 in 1996 (Pazarbaşioğlu & Willem van der Vossen, 1997).

Table 7 Armenia Monetary Indicators 1994-1995

Date	Central Bank Financing (% of GDP)	Required Reserves
Q1 1994	34.5	282
Q2 1994	5.1	402
Q3 1994	1.2	337
Q4 1994	2.3	1510
Q1 1995	1.1*	2458
Q2 1995	-5.9*	3174
Notes: Required reserves measured in millions of Dram *Denotes preliminary figures		

Source IMF Staff Report 95/111 1995

The CBA would also regulate foreign assets by issuing various exchange restrictions in order to increase reserves in foreign currency. Sales of foreign exchange had previously been implemented in an attempt to stabilize the exchange rate. However, these actions were not accompanied by the necessary fiscal-monetary policy adjustments causing stabilization efforts to fail. While the CBA would not implement a fixed exchange regime, the Dram's value would retain its value against other hard currencies (Horvath et al. 1998). The Dram retaining its value would signal recovery efforts were both credible and successful. In 1993 Dram deposits would increase from 667 million to 3.8 trillion in 1994 (IMF Staff Report 95/115 1995). This increase in currency holdings would demonstrate the public's belief in the credibility of the Dram with the assumption the currency would remain a stable store of value.

The Nagorno-Karabakh conflict would reach a ceasefire agreement in mid-1994 with the signing of the Bishkek Protocol. The combination of war de-escalation and the passing of recovery efforts would result in domestic production improving with a rise in GDP figures. This ceasefire would result in lower levels of expenditure contributing to the overall recovery. In addition to the lower expenditure, the de-escalation of the conflict permitted the ability to implement more stringent monetary reforms long delayed from wartime pressure.

Fiscal-monetary regime corrections would also include several necessary changes to the budget. The plan to implement tight fiscal policy through lower expenditure would succeed with expenditures decreasing from 56 percent of GDP in 1993 to 16 percent in 1994 (IMF Staff Report 95/115 1995). This reduced expenditure would include cuts to

wage and market subsidies, pensions, social programs, as well as public services. Expenditures were further reduced to include the number of government ministries and employees. Additional fiscal adjustments would be introduced through a tax reform which would include an increase to the tax base from the creation of new industry. These actions (while painful to the pubic) proved necessary and with assistance from the restrictive monetary policy conducted by the CBA, inflation figures would rapidly decrease throughout 1994.

Table 8 Armenia Domestic Figures 1994-1995

Date	Total Expenditure	GDP
Q1 1994	82.2	6594
Q2 1994	71.0	22,772
Q3 1994	54.4	42,991
Q4 1994	32.7	115,095
Q1 1995	19.7*	128,803*
Q2 1995	34.2*	129,432*
Notes: Expenditure measured as a percent of GDP *denotes preliminary figures		

Source IMF Staff Report No. 95/111 1995

Overall, these reforms would prove largely successful and the hyperinflation would officially conclude in December 1994. While hyperinflation would conclude, Armenia's government, industry, and citizens would be faced with further difficulties in the following years to maintain stability as well as develop necessary economic growth.

The Armenian hyperinflation was unique due to it occurring under two distinct regimes with two distinct currencies. Although both regimes would differ in organizational structure, the foundation of each phase of the hyperinflation would

originate from excessive fiscal expenditure paired with the absence of restrictive monetary policy. The first phase would experience a free-rider problem often occurring between a central government and its subordinates (See Sargent 2011). Under the second phase of Armenia's hyperinflation, several issues inherited from the crisis in the first phase would force massive budget deficits to be run. The fact that Armenia was in a transitional phase while experiencing war would leave little option but to accept these deficits. A lack of domestic industry and embargos by neighboring countries would result in the government being forced to lean on Armenia's monetary authority for funds.

While still a hyperinflation caused by high deficits financed through the CBA, Armenia's excessive fiscal expenditure would differ somewhat from other cases. Monetized expenditure conducted by Zimbabwe and Yugoslavia would contain astronomical amounts of monetized expenditure towards political campaigns, subsidies to parastatal industry, and ineffective programs (Kairiza 2009) (Bogeteć et al., 1994). In the Armenian case, budget deficits were largely comprised of inflexible expenses such as fundamental welfare, adjustment costs, and wartime expenditures stemming from the transition to a fully independent country (IMF Staff Report 95/115 1995). Similar to the other hyperinflation cases, budgets would eventually be restricted contributing to the end of these crises.

The instability regarding the credibility of Armenia's banking system would provide an opportunity for authorities to demonstrate that policy reform was an earnest attempt in recovery. The closure of banks from corrective actions preventing exploitation would be tangible evidence towards the fiscal-monetary regimes claims of resolving the

crisis. Similar to rates of inflation improving as a result of these reforms, credibility would follow suit with the increase in credibility contributing to the stability in the value of the Dram. This would evident with an increase in Dram holdings by the public believing it to once again be a store of value.

In the first phase, the ability for FSRs to create credit paired with the willingness of the CBR to monetize the resulting deficits would set the stage for the ruble hyperinflation. The shared cost of inflation would encourage FSRs to run high budget deficits at the expense of the other members (inflation cost freeriding). Moreover, the budget contribution freeriding of FSRs to refuse obligations to central budget would force monetization of the remaining debt; further contributing to rising inflation levels. The lack of contribution from freeriding republics combined with the unwillingness of the CBR to refuse the monetization of republic's deficits would contribute to the collapse of the Ruble Zone. The poorly coordinated monetary regime of the first phase would be in stark contrast to the monetary regime of the second phase. Not only would this phase contain a singular entity to create credit, but the CBA would conduct the necessary restrictive fiscal policy that would not be implemented in the first phase.

Shortly after the initial issue of the Dram, the second phase of Armenia's hyperinflation crisis would begin. This phase would have the CBA learning from the ineffective policy measures of the previous regime by immediately conducting the necessary policy reforms to address the crisis. The rapid adoption of a regime containing both central bank independence and responsible expenditure would lead to the conclusion of the crisis within the same year. Unlike the fiscal-monetary regime of the ruble zone,

the existence of a singular monetary authority within Armenia's regime would permit the restriction in the amount of credit that could be injected into the economy. While domestic issues from Armenia's transition into an independent country would linger, the continuation of restrictive policy would prevent a relapse in inflation figures.

Venezuela

The Venezuelan hyperinflation is an ongoing (at the time of writing this) crisis. Similar to Zimbabwe's hyperinflation crisis, the foundations of Venezuela's crisis would involve government seizing private property involving the countries primary source of output. As Zimbabwe would seize farmland, Venezuela would seize oil refineries with the intent of nationalizing the industry. The oil industry itself is Venezuela's largest source of domestic production, with the industry accounting for 90 percent of Venezuela's total exports (OEC 2019). The official start of industry nationalization would begin January 1st, 1976. Venezuelan workers would operate the oil companies utilizing the same structure and equipment as the previous multinational corporation owners. These national refineries would be owned by a holding company under the control of the Venezuelan government.

Table 9 Venezuela Exports

Export	Percent
Crude Petroleum	80
Refined Petroleum	10
Acyclic Alcohols	1.6
Iron Reductions	1.1

Source OEC 2019

The early and mid-nineties would see a multitude of domestic struggles. Oil prices would face minor downturns at the same time as the outbreak of a financial crisis. These issues would set the stage for the late nineties with various welfare policy measures being passed by Hugo Chavez and the United Socialist Party of Venezuela (PSUV). These measures would include expenditure on welfare programs with an attempt to raise the standards of living across Venezuela. The policy measures would be included within the budget expenditures for the year with the belief that profit from the oil industry would partially finance the higher levels of expenditure. This plan would require the fiscal authority of Venezuela to rely heavily on the price of oil to remain strong in order to continue these high levels of expenditure. Budgetary reliance on a singular commodity would prove disastrous when prices would decline with fiscal expenditures not following suit. In order to balance the budget discrepancy, the fiscal authority would lean on the Central Bank of Venezuela (BCV) to finance their excessive expenditure.

The early years of this objective would see the BCV financing the remainder of the deficit, yet interestingly no inflationary spiral would occur. The BCV and fiscal authority would coordinate with yearly inflation fluctuating at a concerning, yet non-hyperinflationary level (IMF 2019). Venezuela in the early 2000s would also see large amounts of political turmoil with sporadic protests greatly affecting domestic production (Kuleza 2017). These factors would result in shortages of basic goods, a dwindling in confidence levels, and capital flight would be undertaken. Several adjustments to control

the unrest such as price controls, exchange controls, and a commission for foreign exchange would be established (Vera 2015).

Venezuela's fiscal-monetary regime would remain somewhat stable with an increase in expenditure over the course of the next five years. These expenditures would be a part of the Bolivarian Missions. These missions were a group of generous social programs to raise the overall welfare of Venezuelans (Pittaluga et al., 2020). Another budget crisis would occur in 2008 when the price of oil plummeted from 133.88 dollars a barrel in mid-2008 to 41.12 at the end of the year (FRED 2020). In an attempt to mitigate economic conditions from the shock in oil prices, the BCV would implement expansive policy, as well as conduct exchange rate measures in an attempt to maintain Bolivar exchange values (Vera 2015). Expansive policy would prove fruitless with domestic industry continuing to face difficulty. Venezuela's import reliant domestic industry would suffer from a lack of available goods resulting from exchange rate measures greatly harming production. Conditions would slowly improve from a combination of the price of oil climbing back to profitable levels and the implementation of further exchange rate measures.

2011 would see another round of massive levels of expenditures being made. Similar to the standard of life enhancing expenditure of the Bolivarian Missions, various social welfare actions were undertaken to further enhance Venezuelan quality of life. Among these actions were an increase in qualified pensioners, the building of government assisted housing, job training programs, and income subsidization (Pittaluga et al., 2020). An overall increase in wages from large amounts of protests would also

contribute to the amount of expenditures being made (Kuleza 2017). These increases in expenditures would continue to be made eventually leading into the beginning of the hyperinflation crisis.

While Venezuela's inflation figures have certainly always been concerning, they have remained relatively consistent not hitting hyperinflationary levels (IMF 2019). Venezuela's fiscal-monetary regime (while inefficient) has been able to successfully stave off various problems stemming from their decision use nationalized industry to finance high levels of expenditures. This fragile stability would collapse with the start of the crisis. Beginning in 2013, inflation figures would rise to levels not seen since the turbulent late 90s (IMF 2019). In mid- 2014, various international factors would cause the price of oil to begin to decline creating trouble for the Venezuela's authorities.

While Venezuela had previously been able to ride out domestic pressure triggered from oil price downturn in the past, recovery has only occurred due to prices rebounding in a relatively short timeframe. Each of these recoveries would not include adjustments to Venezuela's fiscal-monetary regime. The 2014 decline in oil prices would differ due to the fact that it is the longest lasting downturn in price experienced by Venezuela's fiscal-monetary regime. This downturn in prices is still ongoing (at the time of writing this) with prices substantially lower than peak prices of the early 2010s. This price downturn would presuppose another capital flight, the result of which would be a blow to the Bolivar exchange rate. Several attempts would be made to mitigate exchange rate issues either with various currency adjustments or new schemes such as SICAD, CADIVI, and

SIMADI (Vera 2015). However, none of these schemes would prove completely successful resulting in the exchange rate value continuing to fall.

Table 10 Oil Prices 1990-2019

Date	Price
1990	24.53
1991	21.54
1992	20.58
1993	18.43
1994	17.2
1995	18.43
1996	22.12
1997	20.61
1998	14.42
1999	19.34
2000	30.38
2001	25.98
2002	26.18
2003	31.08
2004	41.51
2005	56.64
2006	66.05
2007	72.34
2008	99.67
2009	61.95
2010	79.48
2011	94.88
2012	94.05
2013	97.98
2014	93.17
2015	48.66
2016	43.29
2017	50.8
2018	65.23
2019	56.98
Notes: WTI values Price per barrel	

Source FRED

Fiscal expenditures would remain constant with the same levels being conducted as pre depressed prices. Falling domestic revenue from price deprecation would contribute to Venezuela borrowing large sums in order to continue their high level of

expenditure. Many of these debts would be repaid late or defaulted on causing Venezuela's debt ranking to lower from a Caa3 ranking to a C ranking (Mathis 2018). The lowering of the debt ranking would lead to difficulty finding much needed international assistance with foreign investors becoming more hesitant to lend assets. The BCV would conduct inflationary financing to meet their obligations, triggering an inflationary spiral. In October 2017, the continual reliance on inflation financing would result in inflation figures reaching a hyperinflationary level of 50 percent a month (Cagan 1956). Inflation would continue to dramatically rise reaching the current estimated level of 200,000 percent (IMF World Economic Outlook 2019).

Chart 11 Venezuela Fiscal-Monetary Indicators 2000-2019

Date	Inflation rate	Expenditure (% of GDP)
2000	16.2	28.29
2001	12.5	31.90
2002	22.4	30.99
2003	31.1	32.18
2004	21.7	31.91
2005	16	33.53
2006	13.7	39.27
2007	18.7	35.95
2008	31.4	34.88
2009	26	33.27
2010	28.2	31.1
2011	26.1	39.36
2012	21.1	40.28
2013	40.6	39.67
2014	62.2	50.12
2015	121.7	30.31
2016	254.9	25.15
2017	438.1	36.57
2018	65,374.1	34.72
2019	200,000	32.87

Source IMF World Economic Outlook 2019

In the past, oil prices would tend to rebound quickly. Given historic trends, the belief during the 2014 oil price depression would have been that downturn in price would be transitory. Standard measures such as undertaking debt would be conducted as stop gap measures to balance the budget. When oil prices would not return to previous levels, it would be too late with debt obligations rising resulting in no other option but to lean on the BCV to monetize the debt. After many years of overreliance on both the price of oil to remain high and the BCV to support high levels of expenditures, the fiscal-monetary coordination scheme would collapse.

With the crisis came another round of shortages of basic goods (Congressional Research Service 2020). In an attempt to push blame away from failures within Venezuela's regimes, Maduro would instead blame the economic troubles on foreign powers and the greed of the business elite (Corrales 2015). Legislature would shortly follow with the Fair Prices Act of 2014. In addition to the implementation of tighter price controls, this act would issue an outright ban on profit margins over 30 percent (Nino 2016). The result of these controls would lead to massive suffering with many Venezuelans unable to obtain basic food and medicine. The Venezuelan government would continue to vehemently deny that a crisis is ongoing. Furthermore, the Maduro regime would place bans the acceptance of foreign humanitarian assistance further exasperating the situation. Eventually declining conditions would permit humanitarian aid shipments to be accepted into the country (Al Jazeera 2019).

This crisis has led to falling health levels with the population of Venezuela losing weight due to starvation. The domestic situation has become so severe that there has been

reports of Venezuelans resorting to consuming garbage due to a lack of food (Ellis 2017). Various human rights violations resulting from protests against the Maduro regime would include the torture and execution of citizens and several members of the political opposition (Congressional Research Service 2020). As a response to these violations, several countries would pass various sanctions preventing access to parts of international markets. The political and economic crisis has also triggered a mass migration with many Venezuelans fleeing into neighboring countries (Congressional Research Service 2020).

A poorly coordinated fiscal-monetary regime would be the root cause of the Venezuela hyperinflation. An irresponsible fiscal strategy with an emphasis on the role of the oil industry would force the BCV to implement monetization to balance budgets. In times of oil prices decline, expenditure would remain at a constant level, and taxes would not be increased in order to offset the lower revenues from oil. Venezuela would develop an overreliance on the BCV resulting in high amounts of budget expenditure. Moreover, during times of high oil prices, fiscal expenditure would reach higher levels of expenditure. This excessive expenditure is still ongoing despite the desperate need for responsible budget modifications.

Fiscal irresponsibility to not conduct some form of fiscal smoothing would also contribute to the hyperinflation crisis. The formation of a system of adequate budgetary stores from times when oil prices were high could have enabled the Venezuelan authorities to not resort to taking out excessive loans (or at the very least softened the amount necessary debt obligations). These expenditures included massive amounts of welfare policy passed by the PSUV in an attempt to gain political support. The immediate

need for political support would influence both the magnitude of the polices as well as the inability to establish budget stores. In addition, the possibility exists for expenditure to follow a more stable path if welfare policy would have been more gradual in nature allowing for the necessary fiscal adjustments to be made.

Given the chosen fiscal-monetary coordination strategy of high expenditure and debt monetization with a complete disregard for the effect on inflation, it would appear that the BCV never had any form of independence in the first place. It would become evident during the early stages of the social welfare expenditure that the BCV would be forced to undertake a much more involved (passive) role within Venezuela's fiscal-monetary coordination scheme. This risky AFPM relationship (see Leeper 1991) would become the standard operating procedure with independence of the central bank or even monetary stability as a whole being complete afterthoughts. The complete oversight by assuming that oil prices would remain high or recover in price would help to rectify this poorly designed coordination scheme.

The political arrangement in Venezuela is reminiscent of the one in Zimbabwe during their hyperinflation crisis. Supporters of Maduro would be staffed in the upper tiers of government institutions with anyone who dare go against the plans of the regime facing immediate replacement. This political arrangement would prevent key decisions such as the refusal to finance excessive expenditure during a necessary time of restrictive spending. The ability no longer conduct central bank financing would have forced the fiscal authority to establish a responsible budget. The presence of a truly independent BCV would threaten the absolute control of the maduro regime. Because of this, the

development of a truly independent BCV would require a massive political regime change so that members of the BCV could make necessary policy decisions without fear of replacement or their lives. The formation of an independent BCV is a necessary requirement to conclude this crisis.

Due to various sanctions preventing the access to parts of the international market (EO 13808), Venezuela would respond by creating a crypto currency. The Petro would be launched in early 2018 and is backed by oil reserves. This currency served a secondary purpose to be used in an attempt to signal some credibility due to Petro being backed by real assets (Chohan 2018). This plan would be abruptly ended with countries passing further sanctions against using Venezuelan based crypto currencies (EO 13827). This would effectively trigger the abandonment of the currency.

The credibility of Venezuela has experienced several blows in recent years due to a large amount of loan defaults. The lowering of their debt ranking from a poor ranking of caa3 to bottom tier C, would greatly impact their ability to gain debt assistance. In a scheme to receive better loan terms, the regime has been forced to use an industry subsidiary to borrow on the bond market (Kulesza 2017). These bonds would also largely be defaulted on leading to the further lowering of credibility. The continuation of late or defaulted on loan payments caused by a lack of funds from excessive fiscal expenditure will lead to the inability for the fiscal-monetary regime to receive or restructure better loan terms. Without these loan terms there would be little hope that Venezuela will self-stabilize. The only possibility for Venezuela to regain international assistance would be through a credible regime change (see Sargent 1982).

Given the current situation, the end of Venezuela's hyperinflation will require dramatic shifts to the fiscal-monetary coordination scheme. The most effective way to instill responsible expenditure, central bank independence, and credibility would be a complete and credible regime change. In Thomas Sargent's *The Ends of Four Big Inflations* Sargent showed how regime change presupposed the immediate end to several cases of hyperinflation. With a new regime, the BCV would be given independence, and with it the ability to refuse the financing of reckless fiscal expenditure. This independence would instill responsibility into the fiscal authority by preventing inflation levels from reigniting. The most obvious measure would be to conduct fiscal responsibility by cutting excessive expenditures. In addition to reducing expenditure, the most glaring oversight needs to be addressed. Budgetary expenditure must no longer be reliant on a monetary authority for financing. The belief that conducting a risky fiscal-monetary coordination strategy involving leaning on the monetary authority to "ride out the storm" wouldn't result in an episode of hyperinflation was clearly the wrong takeaway from previous oil price depressions. The true takeaway from previous oil depressions should have been fiscal adjustments need to be implemented due to an overreliance on the monetary authority to prevent future crises.

The existence of a new regime would signal higher credibility. With higher credibility, debt obligations payments could be renegotiated leading to a better path to recovery. This new regime would be able to finally acknowledge the crisis and accept foreign assistance leading to the recovery of the populace. Until Venezuela's crisis

reaches an apex resulting in the changing of the current regime, the solutions to the hyperinflation will be unable to be implemented leading to the continuation of the crisis.

Conclusion

The cases of Zimbabwe, Yugoslavia, Armenia, and Venezuela should demonstrate that the fiscal-monetary elements presented in this thesis are not one-off solutions to a particular case of hyperinflation. Fiscal responsibility, central bank independence, and credibility, while simplistic, have far reaching macroeconomic implications. The speed to which each crisis would end would depend on how rapidly the regime of each country reestablishes these fiscal-monetary elements. Armenia's Dram hyperinflation would quickly conclude due to their fiscal-monetary regime immediately adopting the necessary elements. In contrast, Venezuela's case has continued to worsen for the last two years with little evidence of adjustments being undertaken to reestablish the necessary elements. Until these elements are developed, economic conditions will continue to decline.

Sargent's Nobel Lecture would demonstrate that valuable lessons can be concluded from using economic theory to observe historic events. A simplistic, yet valuable lesson from observing previous historic events would be "The government budget constraint and a pricing equation for government debt always prevail" (Sargent, 2012, p. 330). As evident by the modern cases of hyperinflation, this lesson remains relevant today. While this thesis observed but a fraction of the total cases of hyperinflation, perhaps other relevant lessons from further observations into the remaining hyperinflationary crises may prove fruitful.

REFERENCES

Al Jazeera. (2019). Maduro says Venezuela ready to receive international aid. *Al Jazeera.* Retrieved from https://www.aljazeera.com/news/2019/04/maduro-venezuela-ready-receive-international-aid-190410083550252.html

Blinder, A. (1999). CENTRAL BANK CREDIBILITY: WHY DO WE CARE? HOW DO WE BUILD IT?. NBER. Retrieved from https://www.nber.org/papers/w7161

Bogetić, Ž., Dragutinović, D., & Petrović, P. (1994). ANATOMY OF HYPERINFLAITON AND THE BEGINNING OF STABILIZATION IN YUGOSLAVIA 1992-1994. ResearchGate. DOI 10.13140/RG.2.1.3167.6888, Retrieved from https://www.researchgate.net/publication/284030027

Bogetić, Ž., Dragutinović, D., & Petrović, P. (1994). Figure 2: TAX REVENUES AND INFLATION TAX DURING HYPERINFLATION AND UPON STABILIZATION. *In ANATOMY OF HYPERINFLAITON AND THE BEGINNING OF STABILIZATION IN YUGOSLAVIA 1992-1994*, 1994 (p. 75). Retrieved from https://www.researchgate.net/publication/284030027

Bogetić, Ž., Dragutinović, D., & Petrović, P. (1994). Table 2: Monthly Inflation Rates (retail prices) During the Yugoslav Hyperinflation and Stabilization: January 1992-August 1994. *In ANATOMY OF HYPERINFLAITON AND THE BEGINNING OF STABILIZATION IN YUGOSLAVIA 1992-1994*, 1994 (p. 10). Retrieved from https://www.researchgate.net/publication/284030027

Bye, V. (1979). Nationalization of Oil in Venezuela: Re-Defined Dependence and Legitimization of Imperialism. *Journal of Peace Research*, *16*(1), 57-78. Retrieved February 14, 2020, from www.jstor.org/stable/422789

Cagan, P. (1956). The Monetary Dynamics of hyperinflation. In M. Friedman, *Studies in the quantity of money.* Chicago: University of Chicago Press.

Chohan, U.W.(2018) Cryptocurrencies as Asset-Backed Instruments: the Venezuelan Petro. SSRN. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3119606

Coltart, D. (2008, March 24). A Decade of Suffering in Zimbabwe: Economic Collapse and Political Repression under Robert Mugabe Executive Summary (Development Policy Analysis No.5). Retrieved from https://www.cato.org/publications/development-policy-analysis/decade-suffering-zimbabwe-economic-collapse-political-repression-under-robert-mugabe

Coomer, J., & Gstraunthaler, T. (2011). The Hyperinflation in Zimbabwe. *The Quarterly Journal of Austrian Economics 14, No.3* (pp. 311-346). Retrieved February 10, 2020, from https://mises.org/library/hyperinflation-zimbabwe

Corrales, J. (2015). Don't Blame It On the Oil. *Foreign Policy.* Retrieved from https://foreignpolicy.com/2015/05/07/dont-blame-it-on-the-oil-venezuela-caracas-maduro/

Dabrowski, M. (2016). Currency crises in post-Soviet economies—a never ending story? Russian Journal of Economics, 2(3), 302-326. Retrieved January 8, 2020, from www.jstor.org/stable/152269

Efremov, S. M. (2012). *The Role of Inflation in Soviet History: Prices, Living Standards, and Political Change* (Masters thesis). Retrieved from Economic History Commons.

Ellis, R. E. (2017). The Collapse of Venezuela and Its Impact on the Region. *Army University Press.* Retrieved from https://www.armyupress.army.mil/Journals/Military-Review/English-Edition-Archives/July-August-2017/Ellis-Collapse-of-Venezuela/

Federal Register. (2017). *Imposing Additional Sanctions With Respect to the Situation in Venezuela (Executive Order 13808 of August 24, 2017).* Retrieved from https://www.treasury.gov/resource-center/sanctions/Programs/Documents/13808.pdf

Federal Register. (2018). *Taking Additional Steps to Address the Situation in Venezuela (Executive Order 13827 of March 19, 2018).* Retrieved from https://www.treasury.gov/resource-center/sanctions/Programs/Documents/13827.pdf

Filatochev, I., & Bradshaw, R. (1992). The Soviet Hyperinflation: Its Origins and Impact throughout the Former Republics. *Soviet Studies, 44*(5), 739-759. Retrieved January 8, 2020, from www.jstor.org/stable/152269

Granville, B. (2016). LESSONS FROM THE COLLAPSE OF THE RUBLE ZONE AND THE TRANSFERABLE RUBLE SYSTEM. Retrieved from https://www.ifo.de/DocDL/forum-2016-4-granville-ruble-zone-collapse-december.pdf

Hanke, S. (2008). Zimbabwe From Hyperinflation to Growth (Development Policy Analysis no.6). Retrieved from https://www.cato.org/publications/development-policy-analysis/zimbabwe-hyperinflation-growth

Hanke, S. H., & Krus, N. (2012). World Hyperinflations (Cato working paper). Washington, DC: Cato Institute. Retrieved from SSRN: https://ssrn.com/abstract=2130109

Hanke, S. H., & Kwok, A. (2009). On the Measurement of Zimbabwe's Hyperinflation. *Cato Journal*, *Vol. 29, No. 2,* 353-364. Retrieved from https://ssrn.com/abstract=2264895

Hanke, S. H., & Kwok, A. (2009). Table 1: Zimbabwe Hyperinflation. in *On the Measurement of Zimbabwe's Hyperinflation*, 2009 (p.355). Retrieved from https://www.cato.org/sites/cato.org/files/serials/files/cato-journal/2009/5/cj29n2-8.pdf

Horváth, B., Thacker, N., & Ha, J. (1998). Achieving Stabilization in Armenia. International Monetary Fund. Retrieved February 23, 2020, available from https://www.bookstore.imf.org/books/title/achieving-stabilization-in-armenia

Kairiza, T. (2009). Unbundling Zimbabwe's journey to hyperinflation and official dollarization. Ideas. Retrieved January 10, 2020, available from https://ideas.repec.org/p/ngi/dpaper/09-12.html

Kairiza, T. (2009). Table 1: Macroeconomic trends 1998-2007. In *Unbundling Zimbabwe's journey to hyperinflation and official dollarization*, 2009 (p. 2). Available from https://ideas.repec.org/p/ngi/dpaper/09-12.html

Kulesza, M. (2017). *Inflation and hyperinflation in Venezuela (1970s-2016)- a post-Keynesian interpretation*. Institute for International Political Economy Berlin Working Paper No. 93/2017. Available at https://www.boeckler.de/pdf/v_2017_11_10_kulesza.pdf (Accessed: February 14, 2020).

International Monetary Fund. (1995). Republic of Armenia-Recent Economic Developments (IMF Staff Country Report No. 95/111). Retrieved from https://www.imf.org/en/Publications/CR/Issues/2016/12/30/Armenia-Recent-Economic-Developments-632

International Monetary Fund. (1995). Table 3: Armenia Basic Economic Indicators 1993-95. In Republic of Armenia-Recent Economic Developments (p.5) Retrieved from https://www.imf.org/en/Publications/CR/Issues/2016/12/30/Armenia-Recent-Economic-Developments-632

International Monetary Fund. (1995). Table 6: Armenia: Consolidated State Government Operations. 1993-1995. In Republic of Armenia-Recent Economic Developments (p.19) Retrieved from https://www.imf.org/en/Publications/CR/Issues/2016/12/30/Armenia-Recent-Economic-Developments-632

International Monetary Fund. (1995). Table 9: Armenia: Accounts of the Central Bank. In Republic of Armenia-Recent Economic Developments (p.31) Retrieved from https://www.imf.org/en/Publications/CR/Issues/2016/12/30/Armenia-Recent-Economic-Developments-632

International Monetary Fund. (2002). *Press Release: IMF Adopts Declaration of Noncooperation for Zimabawe and Suspends Technical Assistance.* Retrieved from https://www.imf.org/en/News/Articles/2015/09/14/01/49/pr0228

International Monetary Fund, World Economic Outlook (2019). *Expenditure % of GDP: Venezuela 1990-2020.* Available from https://www.imf.org/external/datamapper/G_X_G01_GDP_PT@FM/VEN?zoom=VEN&highlight=VEN

International Monetary Fund, World Economic Outlook (2019). *Inflation rate, average consumer prices: Venezuela 1990-2020.* Available from https://www.imf.org/external/datamapper/PCPIPCH@WEO/VEN?zoom=VEN&highlight=VEN

Leeper, E. (1991). Equilibria Under 'Active' and 'Passive' Monetary Policies. *Journal of Monetary Economics*. 27. 129-147. 10.1016/0304-3932(91)90007-B.

Lorie, H. (1997). Macroeconomic Developments in 1995 and Early 1996. *Central Bank Reform in the Transition Economies* (pp. 10-26). Retrieved February 14, 2020, from https://www.elibrary.imf.org/view/IMF071/01154-9781557756084/01154-9781557756084/C02.xml?redirect=true

Mafa, O., Gudhlanga, E., Manyeruke, N., Matavire, E., & Mpofu, J. (2015). Land Reform Programme. In *Gender, Politics and Land Use in Zimbabwe 1980-2012* (pp. 65-108). DAKAR: CODESRIA. Retrieved January 17, 2020, from www.jstor.org/stable/j.ctvh8r289.12

Mandich, O. (1958). YUGOSLAVIA. In ROSE A. (Ed.), *The Institutions of Advanced Societies* (pp. 274-329). University of Minnesota Press. Retrieved January 2, 2020, from www.jstor.org/stable/10.5749/j.cttttcfp.8

Mathis, W. (2018). Venezuela Credit Rating Bottoms Out With $1.7 Billion Overdue. *Bloomberg.* Retrieved from https://www.bloomberg.com/news/articles/2018-03-09/venezuela-credit-rating-bottoms-out-with-1-7-billion-overdue

Niño, J. (2016). Price Controls Are Disastrous for Venezuela and Everywhere Else. *Mises Wire.* Retrieved from https://mises.org/wire/price-controls-are-disastrous-venezuela-and-everywhere-else

Observatory of Economic Complexity (2019). *Armenia Imports*. Retrieved from https://oec.world/en/profile/country/arm/

Observatory of Economic Complexity (2019). *Venezuela Exports*. Retrieved from https://oec.world/en/profile/country/ven/

Observatory of Economic Complexity (2019). *Zimbabwe Exports*. Retrieved from https://oec.world/en/profile/country/zwe/

Odling-Smee, J. (2001, July). Yerevan. Retrieved from https://www.imf.org/en/News/Articles/2015/09/28/04/53/sp073101

Pazarbaşioğlu, C., & Willem van der Vossen, J. (1997). Main Issues and Challenges in Designing Bank-Restructuring Strategies. *Central Bank Reform in the Transition Economies* (pp. 27-61). Retrieved February 14, 2020, from https://www.elibrary.imf.org/view/IMF071/01154-9781557756084/01154-9781557756084/C02.xml?redirect=true

Petrovic, P., Bogetić, Ž., & Vujošević, Z L., (1998). Table 1: Federal Republic of Yugoslavia: Annual Economic Indicators 1991-1993. *In The Yugoslav Hyperinflation of 1992-1994: Causes, Dynamics, and Money Supply Process*, 2009 (p. 339). Available from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1805821

Petrovic, P., Bogetić, Ž., & Vujošević, Z L., (1998). The Yugoslav Hyperinflation of 1992-1994: Causes, Dynamics, and Money Supply Process. *Journal of Comparative Economics*, *27*, 335-353 Retrieved January 22, 2020, Available from https://ssrn.com/abstract=1805821

Pittaluga, G.B., Seghezza, E. & Morelli, P. The political economy of hyperinflation in Venezuela. *Public Choice* (2020). https://doi.org/10.1007/s11127-019-00766-5

Raftopoulos, B. (2009). The Crisis in Zimbabwe, 1998–2008. In Raftopoulos B. & Mlambo A. (Eds.), *Becoming Zimbabwe. A History from the Pre-colonial Period to 2008: A History from the Pre-colonial Period to 2008* (pp. 201-232). Avondale, Harare: Weaver Press. Retrieved March 7, 2020, from www.jstor.org/stable/j.ctvk3gmpr.15

Sargent, T. (2013). The Ends of Four Big Inflations. In *Rational Expectations and Inflation (Third Edition)* (pp. 38-110). Princeton; Oxford: Princeton University Press. doi:10.2307/j.ctt2jc97n.11

Sargent, T. (2013). United States Then, Europe Now. In *Rational Expectations and Inflation (Third Edition)* (pp. 297-338). Princeton; Oxford: Princeton University Press. doi:10.2307/j.ctt2jc97n.18

United Nations Commission of Experts. (1992). *Final report of the United Nations Commission of Experts established pursuant to security council resolution 780 Annex IV The policy of ethnic cleansing*. Retrieved from https://web.archive.org/web/20120504142243/http://www.ess.uwe.ac.uk/comexpert/ANX/ IV.htm#0-IV

United Nations Security Council. (1992). Resolution 757. Retrieved from http://unscr.com/en/resolutions/doc/757

United States Congress, Congressional Research Service. (2019). *Venezuela: Background and U.S. Relations*. Retrieved from https://crsreports.congress.gov/product/pdf/R/R44841

U.S. Energy Information Administration, Crude Oil Prices: West Texas Intermediate (WTI) - Cushing, Oklahoma [DCOILWTICO], Retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/DCOILWTICO

Vera, L. (2015). Venezuela 1999–2014: Macro-policy, oil governance and economic performance. *Comparative Economic Studies,57*, 539–568. Retrieved from https://www.researchgate.net/publication/279218897_Venezuela_1999-2014_Macro-Policy_Oil_Governance_and_Economic_Performance

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