

The “Hierarchy of Institutions” Reconsidered: Monetary Policy and its Effect on the Rule of Law in Interwar Poland

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ABSTRACT

Traditional wisdom in economics holds that institutional change runs from political institutions to economic ones, with distribution of political power affecting the creation of property rights and rule of law. This hierarchy of institutions has been observed in macroeconomic policy, where it has long been understood that there are political incentives for economic mismanagement, namely creation of inflation or currency debasement. But are there longer-term effects of currency manipulation on the rule of law in a country? That is, does the hierarchy not always hold? This paper answers this question by focusing on a specific case of monetary instability, the newly-independent Second Polish Republic of 1918 to 1939. Using cointegration techniques on a new database of old data, I find that monetary profligacy correlates strongly with significantly lower rule of law. This result is robust to several tests and all specifications, including the use of a new variable for measuring access to the political system. The results show that monetary instability is a threat to political institutions in its own right, eroding the rule of law in addition to creating macroeconomic difficulties.

Keywords: Poland, inflation, institutions, rule of law, monetary policy
JEL Codes: E42; E52; N14; E02

“The best way to destroy the capitalist system is to debauch the currency.”

– attributed to V.I. Lenin by J.M Keynes, 1919

1. Introduction

In a somewhat ironic twist, the received wisdom in economics over the past three decades has downplayed the role of economic institutions in economic outcomes, holding that political institutions almost exclusively determine the composition of economic institutions, and thus broader economic outcomes. This approach, dubbed a “hierarchy of institutions” by Acemoglu *et al.* (2005) and further advanced in Acemoglu and Johnson (2005), argues that the distribution of political power affects the creation of property rights and rule of law, which in turn have been proven to mediate economic results (a finding echoed by Flachaire *et al.* 2014). While this distribution of power may be changed by shifts in “the relative bargaining power of rulers versus constituents (or rulers versus rulers)... [or] major, persistent changes in relative prices” (North 1984:260), such a process is generally much longer-term and political institutions remain “slow-moving” (Acemoglu *et al.* 2005). Indeed, as Acemoglu and Robinson (2005:24) note, this trait is inherent to “political institutions as a means of allocating political power [as] they regulate the *future* allocation of political power.” Acemoglu *et al.* (2005) further formalize this hierarchy into a more coherent model of institutional influence, arguing that distribution of resources and distribution of power (likely, but not necessarily, linked) have the predominant effect on a country’s growth path precisely through their effect on economic institutions such as property rights.

Additional examples abound from the literature on how political institutions would influence economic outcomes, especially concentrated in macroeconomic policy. In particular, money, as a unit of value or a method of exchange, has been subjected to political manipulation for centuries, from the debasement of currency in Roman times (De Cecco 1985, Goodhart 1998) to *renovatio monetae* (the “renovation of money” undertaken by royalty in the Middle Ages, see Svensson 2013) and the travails of monetary policy in developed economies such as Great Britain (Craig 1953). This reality of monetary manipulation, especially when matched up against political cycles,

has spawned an entire economics literature related to issues of “dynamic inconsistency” (Kydland and Prescott 1977); most prominently, the literature on central bank independence (CBI, as shown in Cukierman *et al.* [1992] and continued by literally hundreds of papers since) has attempted to show how proper institutional arrangements could, in certain circumstances, mitigate incentives for inflation and monetary manipulation. Other, similar, work has shown how a country’s broader political system could have the same effect of lowering inflation (Desai *et al.* 2003). Underpinning all of this work has been the assumption of the validity of the hierarchy of institutions.

However, the wrinkle in this vast literature is that, while it has taken for granted the fact that political institutions may influence economic institutions, it does not necessarily consider that the relationship can run in both directions in a much shorter time-frame than North (1984) envisioned. As noted above, Acemoglu *et al.* (2005, amongst others) explicitly call our attention to the fact that political institutions are slow-moving and difficult to change. While this reality is plausible in times of normal politicking and in the absence of external threats, this assertion is patently untrue during severe economic disruptions. Extreme behavior by economic institutions, either during or in precipitating a crisis, may in turn disrupt or determine political institutions and their subsequent path, quickly altering the status quo in a destabilizing manner. Crisis periods, episodes of hyperinflation, and invasion all have the ability to force changes in power distributions across society and thus alter political institutions as well.

To come back to the issue of monetary institutions, it may be an established fact that politicians have incentives to reduce the value of money, but what effect would such debasement have on the development of existing and future political institutions? Monetary policy famously can have a profound effect on distribution of power (Woolley 1985; Argitis and Pitelis 2001), but poor monetary policy may also send important signals about the prevailing institutional structure and its inability to function, leading to (sometimes radical) institutional change. In such an atmosphere of monetary profligacy, would the rule of law, based as it is on predictability and impartiality, be affected? It is highly likely that not only does monetary policy at time t affect macroeconomic aggregates at times t through $t+n$, but monetary institutions also affect political institutional development during this same timeframe and beyond. This question is especially relevant in the post-CBI world, where the economic institution of the central bank is (supposedly) explicitly

insulated from the political institutions of the government; under this scenario, the effects from an independent monetary authority's actions, unmoored by political considerations, could be even larger on the political institutions it resides amongst.

The purpose of this paper is thus to revisit the “hierarchy of institutions” debate, tracing the effect of monetary policy in the reborn Second Polish Republic from 1918 to 1939 and how economic institutions profoundly changed the political path of the country. Following from earlier work on the relationship between political and monetary institutions, and extending the sparsely-populated literature on institutional endogeneity, I examine how the hyper-inflation of the early 1920s in Poland and subsequent monetary policies led directly to political instability. Moving from an open (if unstable) parliamentary democracy to a more authoritarian executive and, finally, a proto-fascist state, Poland uniformly saw episodes of political change preceded by massive bouts of monetary instability. In fact, the degradation of rule of law due to monetary excess was only arrested with the move of Poland to a full gold standard in November 1927; however, by this point, the hardening of the currency was a way for the ruling (and unconstrained) executive to try and wrest back monetary stability so that it would no longer threaten the regime.¹ And when such monetary stability began to threaten other goals of the proto-fascist regime, it too was jettisoned in favor of total control over the currency. Unlike modern theories of monetary policy, which focus on the need for independence from political pressure, the experience of Poland showed that monetary institutions had a direct and deleterious impact on nascent political ones.

The contributions of this paper to the literature on both economic history and the relationship of monetary policy to institutional development are manifold. In the first instance, this paper expands the literature on the relationship between macroeconomic developments and political institutions by focusing on a heretofore unexplored episode in European economic history. In order to do this, I have assembled a new dataset of old data but on a monthly basis, tracing the development of macroeconomic and institutional aggregates in Poland and the rest of Central Europe at a much higher frequency than has been attempted before. Combined with this archival data, I also make

¹ To be fair, some stability was attempted with Polish monetary reforms in 1924, which tied the zloty to the Swiss franc, which itself was backed by gold, as well as other foreign currencies. Thus, there was a proxy gold standard in place, but discretion still prevailed, as we shall see below.

use of a new database on political regimes and access to power as a control for standard indicators of rule of law, introducing a new measure of political institutional change. All of these attributes help us to advance the literature on the endogeneity of political institutions, revising the hierarchy of institutions thesis, and helping us to understand how economic institutions may have an impact on the political development of a country. But the final, and perhaps most important, contribution of this paper is its relevance for the post-global financial crisis world of today. More than a specialized study in economic history of a faraway place of which we know nothing, the tale of monetary profligacy impacting political outcomes in Poland is especially relevant in a world of quantitative easing, asset buybacks, and negative interest rates. Understanding the relationship between monetary policy and the rule of law may hopefully provide insights to policymakers to avoid the same mistakes.

2. Monetary Policy and the Rule of Law: The Link

As the quote at the beginning of this paper, attributed to Lenin (White and Schuler 2009), makes clear, the relationship of money to the functioning of political and other economic institutions is not a new issue, making an appearance throughout the past two centuries in various tomes of political economy. However, the bulk of theoretical and empirical examination in the modern economics literature has inverted this research question, focusing on the effect that rule of law or overall institutional quality has on monetary policy or the design of monetary policy institutions (Mishkin 1999, Fatás and Mihov 2013). Driven by attempts to isolate the determinants of short-term macroeconomic outcomes (growth or inflation), this literature has tended to assume that a country's level of rule of law is exogenously given rather than endogenously determined over short-time frames (for a recent example, see Calderón *et al.* 2016, who examine institutions and macroeconomic policies from 1984-2008). Not surprisingly, the empirical treatment from these studies show that monetary institutions and their outcomes depend upon the rule of law to function properly (Eijffinger and Stadhouders 2003 is a perfect example of this). Indeed, the whole central bank independence literature is formed around the assumption that monetary policy institutions are a derivation of political institutions (even if it is never explicitly stated), and thus central banks need to be insulated from political pressure via independence, whether legal or operational.

Left unspoken in the prevailing literature is how these monetary policy institutions, and the policies they then pursue, would then translate into political institutional changes. Even over a short period of time, the exogeneity of political institutions cannot be plausibly assumed: macroeconomic conditions can change, creating different electoral strategies, different political coalitions, and different political approaches to economic policy. In times of severe economic distress, as during the Great Depression or more recently during the Global Financial Crisis, governments may aggregate powers to themselves that were previously unheard of during times of economic growth. This aggregation of economic powers may also lead to an expansion of political powers as well, altering the path of both political institutions (rule of law) and monetary policy for the future. As Andrews and Montinola (2004) note, the reduction of veto players in an economic system makes for specific policy paths, especially in the monetary realm, so that previous monetary policies, by influencing the political system, could sow the seeds of future monetary policy.

Despite this reality, the relationship of monetary policy on political development has thus far been relegated theoretically and empirically to political science, sociology, and the heterodox fringes of economics. Both Neo-Mengerian (Austrian) and post-Keynesian approaches, reasoning from almost exactly the same analytical basis, note that money is an endogenous construct within a system, and as such is also a political institution unto itself. While the two heterodox schools diverge is in their prescriptions on how monetary authorities *should* act, both schools of thought identify the institutional structure of central banking and its modern practice as threats to rule of law (see Canova 2009 for the post-Keynesian argument and White 2010 for the Austrian one).² From a post-Keynesian perspective, the conduct of monetary policy unmoored from political oversight creates imbalance in the political system and allows one political authority, the one controlling the money supply, to impose its own desires upon the political system and bypass democratic legitimacy (Arestis and Bain 1995). In this manner, the rule of law is replaced by a financial elite. On the other side, Austrians argue that the use of money for policy means concentrates discretion in the hands of a few and allows for arbitrary transfers amongst the

² The divergence in prescriptions is pronounced, as Neo-Mengerians prefer to eliminate the central bank and move towards free banking, while post-Keynesians wish to eliminate the independence of the central bank and bring its mandate in line with broader economic policy goals and interventions.

populace. As Hanke (2003:133) notes, this capricious use of policy to advantage or disadvantage segments of the population means that property rights are never truly protect, and thus “governments that fail to protect the value of their money are guilty of not abiding by the rule of law.”

Despite the long history of theorizing the relationship between monetary policy and rule of law, only recently has there been a more mainstream attempt to fashion a theory (with corresponding empirics) regarding the influence of monetary policy on a country’s institutional make-up. One of the early mainstream papers to even touch upon this idea was Hoff and Stiglitz (2004), who noted that *tight* monetary policy could affect the rule of law; using the example of Russia in the 1990s, they asserted that any policy that decreases credit availability hampers long-term time horizons and thus the rule of law. However, no justification is given for this assertion, nor is any evidence offered.

Much more comprehensive than these early papers is a recent work from Koyama and Johnson (2015), who argue that *loose* monetary policy is far more destructive to country-level institutions. Drawing on a panel dataset of 143 countries but over a short and recent timespan (from 1996 to 2011), Koyama and Johnson find a strong negative relationship between rule of law and inflation, concluding that monetary instability does indeed erode the rule of law. They conjecture that there are two separate avenues through which monetary profligacy could affect rule of law:

1. *Monetary instability favors specific segments of society (debtors) over others (savers), creating incentives for non-market activities.* This political decision on who wins and who loses in society would naturally create groups with a vested interest in seeing such policies continued. Under such an eventuality, politicians would be willing to curry to these groups and keep such policies in place (advantaging short-term gains over long-term sustainability). The longer-term effect of such policies would also be, as Koyama and Johnson (2015) note, to reduce the political power of the middle class, further stratifying society and impacting institutional development.
2. *Monetary crises beget their own terrible solutions.* Monetary crises, begun as a politically-motivated decision to manipulate economic aggregates, tend to encourage interventionism,

aggregation of powers to the executive, and additional measures which transfer power from the market to the government; Koyama and Johnson (2015) mention price and wage controls, as well as noting that the panic which sustained monetary profligacy can engender could birth a number of measures that would never be accepted in normal economic times. As President Obama's former Chief of Staff Rahm Emanuel said, "you never let a good crisis go to waste."³ The issue for rule of law is that this is precisely what would come to pass.

In addition to these plausible channels of influence, a third one must be noted, especially salient for countries undergoing a state of flux. In newly-independent or transition economies, the institutional environment is evolving across a broad front simultaneously, as the lack of institutional memory means that the entire economic system is adjusting to new information, new actors, and, oftentimes, new patterns of production and trade. In this environment, it is crucial for institutions to receive the appropriate signals for their evolution, as the path-dependency of institutional change means that a new path can be moved towards quite easily; as Koppl (2006:235) notes, "institutions generally work best when they are governed by relatively simple rules rather than discretion," and such discretion can cause chaos at the early stages of institutional genesis. With monetary institutions overwhelming the price mechanism and encouraging non-market activities, the institutions that will be created in this environment will not be those that facilitate a market economy, but rather those that are birthed in an atmosphere of distortions. This of course applies to economic institutions but also to political ones, especially in a situation where the new political authorities have no experience in dealing with the exigencies of a free market.

This cocktail of mixed signals and institutional evolution can be exacerbated by political institutions themselves, especially when democracy, allowing for free and open elections, is evolving alongside nascent economic institutions. Under a democratic regime, voters have the ability to correct for poor economic policy, whether perceived or real, and presumably can act through the ballot box to correct past monetary profligacy. However, the manner in which the

³ Spoken at the Wall Street Journal CEO Council in Washington, DC, on November 9, 2008. Video of his talk, including this quote, can be found at: <https://www.youtube.com/watch?v=mzcbXi1Tkk>.

polity acts may not necessarily be in the best interest of institutional development for the longer-term, especially in regards to economic institutions.⁴

This reality may be illustrated with a simple median voter model.⁵ In the first instance, it is helpful to assume that the income distribution of the economy tempers the response of the polity to inflationary outcomes; this is not a new observation, as noted above, as savers and laborers (generally poorer) should be inflation-averse (inflation acting as a tax on their wages and savings, especially if they were not indexed), but politicians, borrowers, and holders of assets like land (i.e. those likely to be wealthier, see Robinson [1979]) might favor looser monetary policies. Inflation outcomes would then be determined by the relative size of each group: in an economy that is more agrarian, or where the inflation-averse outnumber the inflation-seeking, the median voter is likely to also be more inflation-averse. Or, as Przeworski and Limongi (1993:53) note in the context of incomes, “if the median voter is decisive and if the market-generated distribution of income is skewed downward, as it always is, the majority equilibrium (if one exists) will call for a greater equality.”

In such a situation, where inflation-averse voters are relatively abundant, there is no guarantee that inflation will not occur, as politicians still follow their own incentives (the famous dynamic inconsistency problem of Kydland and Prescott [1977]). However, when inflation, especially at very high levels, does occur, the median voter would likely vote for the party which promised stability, as it would stop the taxation of the poorer segments of society. In an atmosphere where the party system was not developed or chaotic itself, the median voter might then gravitate towards strong personalities that could deliver this stability. Unfortunately, in an environment in flux, leaders brought in under such circumstances would likely not limit themselves to monetary stability, but to broader worries about economic and political instability in the country. The ramifications of this assumption regarding stability would be a greater concentration of power in the executive as a way to both project confidence to the voters and to control potential sources of

⁴ Hartwell (2013) makes this point in transition, as data shows that stronger legislatures early in the transition process actually retarded the growth of economic institutions, mainly due to the ability to redistribute income and stifle early incentives.

⁵ Thanks to Harald Uhlig for suggesting this framework.

instability in the country. Both of these trends would, in the longer-term, lead to an erosion of rule of law.

3. Monetary Shenanigans and Political Change in Interwar Poland⁶

Such a situation was precisely the case with the new Second Republic of Poland in 1918. Poland, having been wiped from the map of Europe via three Partitions culminating in 1795, was reborn as a sovereign state at the end of the First World War in 1918. With the fall of the Axis powers and the road to Versailles, the Poles took back a sovereignty that had been steadily whittled away and then finally extinguished in the 18th century. In one sense, the rebirth of Poland led to a continuation of the interplay of political and monetary institutions that had existed during Poland's long history as an independent power, from 1386 to 1795 (Hartwell 2016). In fact, the Polish experience with money during the years of the Polish-Lithuanian Commonwealth had shown notable advances in theory but not necessarily progress in implementation: as Volckart (1997) notes, monetary policy theory was well-advanced in Poland and the quantity theory of money was mooted as early as 1542, while King Sigismund I fashioned a currency reform that put Poland on a bimetallic system in 1528 (Frost 2015). However, successive kings and centuries of almost never-ending war between Poland and Sweden and Russia led to severe currency crises in the 17th century, competitive debasements, and weakening of money to finance Poland's foreign adventures (Bogucka 1975). This reckless approach to money continued throughout the 18th century, with fully 43.8 percent of the 96 years in between 1704 and the end of the century having inflation rates over 20 percent per annum (Hartwell 2016), driven by debasement of the country's currencies (typified in the precipitous decline in the amount of silver contained in the Lwów Grosz (Jacks 2004) and the Gdańsk florin (Edvisson 2010)).

As Hartwell (2016) notes, the loss of Polish sovereignty during the time of the Partitions coincided with the development of modern economic systems and the ascendance of capitalist institutional relations. The 123 years without indigenous governance in Polish lands, coupled with the differing approaches to economic policy pursued by its three occupying empires (Prussia/Germany, Russia, and Austria-Hungary), meant that Poland was without hands-on knowledge of basic modern

⁶ The historical retelling of this section is based on Hartwell (2016).

economic institutions in 1918. Great advances in economic governance, in addition to an Industrial Revolution, occurred while Poland was under the rule of other countries, meaning that advances in political and economic institutions had been outsourced to others, leaving no indigenous institutions in Warsaw. Paramount amongst these institutions was a central bank, an institution that was immaterial in Warsaw when monetary policy was controlled in Berlin, St. Petersburg, and Vienna.

Understanding that a central bank was a necessary economic institution in post-war Europe, almost immediately after independence was won, the interim government simply replaced the German staff of the central monetary authority, the “Polish National Credit Bank” (*Polska Krajowa Kasa Pożyczkowa*, or PKKP) with Polish staff. The key directive of the PKKP, the sole bank of issuance for the now-reunified country, was to continue to issue notes of legal tender, a role which it held until 1924 and the creation of a true central bank, the “Bank Polski.” The challenge of building a modern monetary authority, already difficult in a post-conflict setting and with no institutional memory, was compounded by the fact that money itself was an overwhelming problem from the outset of Polish independence, with no less than five separate currencies operating on Polish soil: the German Mark, the Austrian Crown, the Russian Ruble, the Polish Mark in the Kingdom of Poland (an equivalent to the German Mark, introduced after the Germans captured the Russian partition) and the “Ost-Rubel” on the territory of “Ober Ost,” which included Lithuania and Białystok-Grodno (Wolf 2005). To overcome the monetary confusion that threatened to undermine the new government’s attempts to forge a new Poland from its constituent parts, the Polish Mark was slowly introduced as a parallel currency wherever it was not already in circulation, due mainly to its status as the one currency that the government in Warsaw could control) (Hartwell 2016). Concurrently, the four other currencies noted above were gradually withdrawn by the central authorities on all Polish territory, a process that was completed by early 1920 (Landau 1990). This success was a major monetary milestone for the reborn Republic, one that boded well for the new Republic.

Unfortunately, this success was short-lived, as the Second Republic faced continuous conflict in the early 1920s, beginning with a brief war with Ukraine in 1919 which then blossomed into a much more protracted (and threatening) conflict with the Bolsheviks of the Soviet Union. The

Russo-Polish War brought the Red Army to the banks of the Vistula river before they were ultimately turned back; for our purposes, the war also created massive fiscal issues, and, in order to finance the conflict, the new Polish government followed the experience of other countries in the region and ran the printing press non-stop. This led to predictable consequences: as Wolf (2004:417), quoting Zdziechowski (1925), notes, “the money supply increased between 1918 and 1919 by 519%, in the following year by another 929%, to reach in 1923 more than 12,000,000% (!) of the level in 1918.”

Moreover, the inertia of such monetary manipulation persisted, with Inflation settling at stratospheric levels well after the Russians were repulsed from the gates of Warsaw due to the government’s addiction to seignorage financing the explosion of spending that the new government took on (Sargent 1982). From 1921 and 1922, after the Treaty of Riga ended the Russo-Polish War in March 1921, the number of notes in circulation increased by 316 percent (in 1921) and a further 231 percent in 1922, leading to an increase of over a hundred percent in the wholesale price index in just four months in 1922 (July to October). Creating a constituency in the burgeoning industrial sector, which saw an implicit state subsidy in the form of continually falling export prices (Landau and Tomaszewski 1984), the wholesale price index ballooned to an improbable 248,426.60 (with 1914 as the base) from a manageable 32.88 in March 1920 (based on Sargent 1982).

The hyperinflation was only broken with the creation of a new currency, the złoty, as legal tender in 1924, as Bank Polski created a reserve comprising of gold and major foreign currencies to back the fledgling złoty (Sargent 1982). The new Bank Polski was modeled on the Bank of England and, presaging the debates on central bank independence fifty years hence, was set up as a joint stock company in order to retain some autonomy from the Polish government in setting monetary policy (Landau and Tomaszewski 1984). Prices began to stabilize immediately as the amount of money in circulation dropped dramatically, with money supplies having leveled off by January 1925. But even with the halt to hyperinflation, inflation still remained very high throughout the following five years (approximately 16% annually) and employment levels struggled to recover, mainly due to the fact that firms which had benefited from the inflationary subsidy went bankrupt following the monetary stabilization (Hartwell 2016). Similarly, the nascent Polish banking sector

underwent a massive crisis in 1925 once the monetary stimulus of the previous years ended (Morawski 2008), a situation exacerbated by the traits that the banks had taken on during the years of easy money, namely low levels of capital reserves, bloated staff rosters, and high costs of administration (Taylor 1926).

The ramifications of the monetary policies of the government also fed through to the political situation in Poland, as, exhausted by years of subpar governance and economic results, Polish Marshal Josef Piłsudski, a hero of the Russo-Polish war and Chief of State for the Second Republic from 1918 to 1922, led a coup that overthrew the elected government in 1926.⁷ The new regime, named “*Sanacja*” (literally “sanitation,” signifying a cleansing of the body politic), was meant to curb the weakness of the previous revolving-door governments and centralize power in the office of the executive, severely curtailing the *Sejm* (Polish parliament); in fact, the *Sejm* sanctioned this transfer of powers, offering Piłsudski the office of President after the coup, an offer he declined in favor of his protégé, Ignacy Mościcki (Lerski 1996), but he remained in the Cabinet as Minister of Defense. The new regime also attempted to formalize its newfound authority through existing formal institutional frameworks, passing a new Constitution in August 1926, which gave the President the right to dissolve the *Sejm* and to pass resolutions that were equivalent to legislation originating from parliament (Kowalski 2014).

With the new “Sanitation” regime in place, one of the moves undertaken by the government to ensure a stability that was lacking in the previous regime was a switch to a full gold standard in late 1927. Wolf (2007) makes the argument explicitly that the move to the gold standard was conditioned by the experiences of hyperinflation soon after independence, and that the *Sanacja* regime was most concerned about retaining Poland’s territorial integrity and fending off foreign aggression (namely Germany); in this context, the move to the gold standard was meant to stabilize the economy and keep foreign investment flowing to Warsaw. While Wolf (2007:359) frames the decision to remain on the gold standard in the context of broader European politics and military alliances (noting that “Polish monetary policy apparently hinged to a large degree on the strategic considerations of the regime”), the dependence of the regime on foreign investment also meant

⁷ The designation “chief of state” (*Naczelnik Państwa*) was used only for Piłsudski, as the powers that were delegated to this post were transitioned to the President upon the end of Piłsudski’s term in December 1922.

that monetary stability equaled investment, which equaled political stability. Given that the *Sanacja* regime was becoming more authoritarian with each passing year, the gold standard thus helped to suppress rule of law. Put another way, the monetary instability of the early 1920s paved the way for an expansion of executive power and a diminution of rule of law, a situation that the new authoritarian regime sought to rectify by reining in monetary policy.

Wolf (2007) details the years of Poland under the gold standard in meticulous detail, and there is no need to revisit it here. An important point to note, however, is that the effects of monetary instability in the early 1920s continued to linger and influence rule of law in Poland, even as the gold standard's days were numbered. As Hartwell (2016) notes, the price level in Poland in 1935 was only slightly below that of 1929, meaning that the excess liquidity and artificial price inflation that had been injected into the system by the hyperinflation was continuing to hang on, taking a long time to be wrung out by the new monetary regime. Alas, the long-term benefits of disinflation for Poland, including perhaps for the rule of law, had no chance to accrue, as Poland left the gold standard in April 1936, shortly after the death of Piłsudski and the passage of a new, proto-fascist Constitution in 1935.⁸ This monetary decision was exogenously conditioned by the coming end of the “gold bloc” (Great Britain left the gold standard in 1931 and the US in 1933, Italy in 1934, Belgium in 1935, with France the largest holdout until the bloc collapsed in September 1936),⁹ but was also spurred on by the desire to undertake massive fiscal stimulus (mainly military spending) in a tight fiscal environment (Wolf 2008). Blaming, as authoritarian governments are wont to do, “speculators and hoarders,” the Polish government instituted exchange and capital controls in 1936, with additional and more stringent ones introduced throughout 1937 and 1938, and began (slowly at first but in a much more accelerated manner in 1938) to re-inflate the *złoty*. Concurrently, the Polish government expanded its powers even further, but the prospect of such control meant that political instability returned, as, without the force of Piłsudski's personality, his successors wasted energy on maneuvers to assume the presidency (Haczyński 1975). Regardless

⁸ While the 1935 Constitution did not explicitly create a fascist state, it eliminated all checks and balances on the executive, brought the judiciary under the control of the executive, extended the term of the President to seven years (with no term limits), and, most notably, in Article 7 noted that “the state was to be an organizer of public life” (Hartwell 2016).

⁹ The Netherlands and Switzerland also held on until the end, exiting the gold bloc in early October 1936.

of who was in power, the damage to the rule of law had already been done, and it was obliterated entirely by September 1939, with the joint Nazi and Soviet invasions of the country.

4. Empirical Examination

In order to test econometrically the relationship between rule of law and monetary policy in interwar Poland, I have compiled a new monthly dataset of economic conditions in the Polish Republic from December 1918 to August 1939s. The scarcity of high-frequency data from the inter-war period is problematic, but enough was available across disparate sources, many never compiled in spreadsheet form, to allow for an econometric examination of our thesis. In particular, macroeconomic and monetary data were assembled from the League of Nations *Monthly Statistical Bulletin*, the Global Financial Database, the German *Statistisches Jahrbuch* from various years, and Polish sources, while political data and estimations of the rule of law are derived from existing datasets, brand-new datasets, or created whole cloth based on the political history of Poland.

In particular, as the proxy for rule of law, I utilize the Polity IV “executive constraints” indicator, indicating the number of veto points and checks and balances that an executive faces in regards to the exercise of power (high values indicating more constraints). As this measure is coded annually, I use recourse to the historical evidence noted above to code the indicator at a monthly level; in particular, the two major changes in executive constraints in Poland in the interwar period took place in May 1926, with the coup of Józef Piłsudski, and in May 1935, with the adoption of a new constitution which placed increased powers in the hands of the President. For these two events, the change in the Polity score (noted for the whole year) was coded in the month in which they occurred, with no change otherwise. As a check on this indicator, I also utilize a brand-new indicator for the access to the political system, the Max Range regime variable (see below and the Data Appendix).

For the key independent variable of interest, monetary stability, I have chosen to use currency in circulation as the proxy for the monetary rectitude of Polish political institutions. This variable has

several aspects to commend it, not least that it has an unbroken series spanning the entire interwar period and accurately captures the monetary policies of the Second Republic. However, the use of this series also is fraught with some statistical difficulties related to the situation that Poland faced in the early 1920s. In the first instance, the series refers only to the Polish Mark (from 1918 to 1924) and the Polish zloty from thereon, both of which were new, domestically-controlled currencies; as noted above, the Mark competed in the early years against several other currencies, meaning this series utilized here may understate currency in circulation in the Republic's first years of existence. This reality can be mitigated by the fact that we are exploring the effects of monetary institutions and their policies on the rule of law, rather than the presence of competing currencies; as the Mark and then the zloty was the only currency under the control of the new government, and, more importantly, it was soon the only legal tender in the country, it is plausible to utilize the amount of zloty in circulation as a proxy for the monetary policies of the interwar Polish government.

Figure 1

Log of Currency in Circulation in Poland, 1918-1939

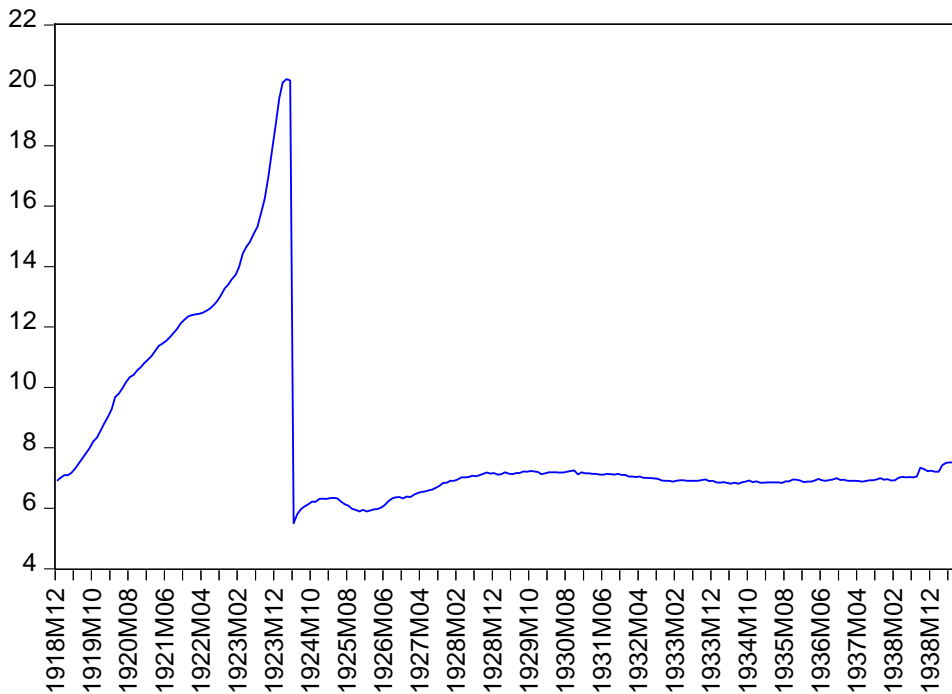


Table 1 - Unit Root Test with Structural Break for Currency in Circulation

Null Hypothesis: Unit root is present		
<i>LN (currency in circulation) - level</i>		
	t-Statistic	Probability
Detrended Augmented Dickey-Fuller test statistic	-0.4138	>= 0.50
Break Date: 1924M05		
Lag Length: 0 (Automatic - based on Schwarz information criterion)		
<i>LN (currency in circulation) - first difference</i>		
	t-Statistic	Probability
Detrended Augmented Dickey-Fuller test statistic	-1.8787	>= 0.50
Break Date: 1924M05		
Lag Length: 2 (Automatic - based on Schwarz information criterion)		
<i>LN (currency in circulation) - second difference</i>		
	t-Statistic	Probability
Detrended Augmented Dickey-Fuller test statistic	-6.8997	0.000
Break Date: 1924M05		
Lag Length: 2 (Automatic - based on Schwarz information criterion)		
Test critical values:	1% level	-3.55
	5% level	-3.03
	10% level	-2.76

The second issue regarding currency in circulation is more troubling, and that is the issue of non-stationarity (as with executive constraints) in the presence of the glaring structural break in the series corresponding with the monetary reform of 1924 noted above (see Figure 1). Any econometric strategy to test the relationship between rule of law and monetary stability must take this structural break into account for both diagnostics and estimation. In regards to diagnostics, tests for stationarity of the data, and in particular the ability to test for a unit root, are complicated by this regime shift: as Perron (1989) showed, the presence of a structural break vitiates the predictive power of the traditional ADF test, leading to likelihood of a “false positive” with regards to a unit root. Given the undeniable break in the currency series as shown in Figure 1, I correct for the break using the structural break unit root test of Lanne *et al.* (2002), which de-trends the series using a GLS approach and then performs an augmented ADF test on the adjusted series and a

shift dummy. This test was chosen over the more standard Perron (1989) or Vogelsang and Perron (1992) break tests as the Lanne *et al.* (2002) method allows for a simple structural shift that is completed in one period (Byrne and Perman 2007), as the Polish monetary reform undoubtedly was.¹⁰ The results of the test, shown below in Table 1, confirm that the currency variable is not only non-stationarity, but it is I(2), that is, requires second-differencing in order to be stable. This result is in line with a long literature on the statistical properties of money and money growth (Haldrup [1998]; evidence includes for example Metin [1998] in the context of Turkey or Kaufmann and Kugler [2008] for the Eurozone), and especially in the case of hyperinflationary episodes, where the growth rate of money accelerates by definition (Juselius [2004] finds this to be the case in Brazil's hyperinflation of the early 1980s, as do Mladenović and Petrović [2010], using daily data to examine Serbia's hyperinflationary episode in 1992-93).¹¹

Table 2 - Unit Root Test with Structural Break on Executive Constraints

Null Hypothesis: Executive Constraints has a unit root			
		t-Statistic	Probability
Augmented Dickey-Fuller test statistic		-3.9175	0.4246
Test critical values:	1% level	-5.3476	
	5% level	-4.8598	
	10% level	-4.6073	
Lag Length: 0 (Automatic - based on Schwarz information criterion)			
Trend specification: trend and intercept/break specification: intercept only			

With the modified unit root tests confirming the non-stationarity of the two key variables, the presence of cointegration between these variables of interest would allow for statistical inference to understand their long-run equilibrium relationship. For our purposes, we are not necessarily interested in the level of currency in circulation, but its growth, i.e. how the expansion of money relates to rule of law. With the natural log of currency non-stationary at I(2), we may difference

¹⁰ The tests were carried out in the statistical package *JMulti* from Humboldt University, Berlin.

¹¹ The finding of order I(2) non-stationarity for currency in circulation in Poland conflicts with the Taylor's (1991) examination of several studies on Polish money growth, but this is because these studies limit themselves to the hyperinflationary period and do not include the entire interwar era.

the levels of currency to obtain the growth rate but still have a non-stationary variable, making cointegration possible. Again, given the obvious presence of the structural break in 1924, the test detailed in Johansen *et al.* (2000) and the cointegration test of Saikkonen and Lütkepohl (2002) and Lanne *et al.* (2003) may be used to test for cointegration: both tests allow for a piecewise linear trend and are appropriate for use with known break points. Table 3 shows the results of these tests; using a maximum lag of 2 as suggested by all available information criteria (Schwarz, Akaike, Hannan-Quinn) and including appropriate dummies and interactions as exogenous variables in order to capture the structural change (Giles and Godwin 2012), both tests confirm no more than one cointegrating vector at the 1 percent level. Thus, we may safely conclude that the executive constraints variable and the growth of currency in circulation are indeed cointegrated at order I(1).

Table 3 - Cointegration Tests with Structural Break

Johansen Cointegration Rank Test (Trace)			
Hypothesized No. of CE(s)	Trace Statistic	0.05 Critical Value	Probability**
None *	46.80	35.36	0.000
At most 1	8.15	17.87	0.618
Trace test indicates 1 cointegrating equation(s) at the 0.01 level			

Saikkonen and Lütkepohl Cointegration Test			
Hypothesized No. of CE(s)	Trace Statistic	0.05 Critical Value	Probability**
None *	104.78	15.76	0.000
At most 1	4.60	6.79	0.157
Trace test indicates 1 cointegrating equation(s) at the 0.01 level			

With the presence of a cointegrating vector established, there must also be causality amongst these variables in at least one, if not both, directions (Granger 1988). Undertaking Granger causality testing on the rule of law and monetary policy in Poland also is problematic due to the structural

break, as structural instabilities in any tested series will have a substantial impact on the test (Lütkepohl 1989). This structural break can be corrected for with both an unrestricted VAR and a Vector Error Correction Model (VECM) using a dummy at the breakpoint for the series and a dummy for the shift to the gold standard, and executing a Wald block test afterwards for Granger causality.¹² Diagnostics with the inclusion of the structural break and a trend variable suggest that the optimal lag length is 24 months, as agreed to by the AIC, the likelihood-ratio (LR) test, and, perhaps most importantly, the final prediction error (FPE) as used by Hsiao (1981). Results, detailed in Table 4, show definitively that the direction of Granger causality runs from currency growth to executive constraints rather than the other way around; under the VAR and the VECM, the probability that currency growth does not Granger-cause rule of law is definitively rejected beyond the 1% level, while the Granger non-causality from rule of law to monetary institutions cannot be rejected.

Table 4 - Granger Causality between Executive Constraints and Growth of Currency in Circulation

VAR			
Dependent variable: Executive Constraints			
<i>Excluded</i>	<i>Chi-sq</i>	<i>df</i>	<i>Prob.</i>
Growth of Currency	167.9079	24	0.000
Dependent variable: Growth of Currency			
<i>Excluded</i>	<i>Chi-sq</i>	<i>df</i>	<i>Prob.</i>
Executive Constraints	23.2021	24	0.508
VECM			
Dependent variable: D(Executive Constraints)			
<i>Excluded</i>	<i>Chi-sq</i>	<i>df</i>	<i>Prob.</i>
D(Growth of Currency)	175.513	24	0.000

¹² This approach was suggested in Bianchi (1995) and is utilized in, *inter alia*, Husein (2009), Esso (2010), and Stern and Enflo (2013), and is common in the energy economics literature.

Dependent variable: D(Growth of Currency)			
<i>Excluded</i>	<i>Chi-sq</i>	<i>df</i>	<i>Prob.</i>
D(Executive Constraints)	10.90505	24	0.9897

Building on the Granger-causality results, to include additional covariates and ascertain the extent of the relationship between monetary profligacy and the rule of law, I utilize two separate cointegration approaches. The first is the canonical cointegration regression estimator (CCR) of Park (1992), an estimator “based on a transformation of the variables in the cointegrating regression that removes the second-order bias of the OLS estimator in the general case” (Montalvo 1995:230). Montalvo (1995) showed that CCR had the smallest bias in finite samples (and was found to perform better in the presence of persistent autocorrelation, as noted by Kurozumi and Hayakawa 2009). The second method to be used as a check on these results is an ordinary least squares model corrected for the cointegrating vectors, the dynamic ordinary least square (DOLS) model of Stock and Watson (1993). According to Mark and Sul (2003:655), DOLS should “allow for individual heterogeneity through disparate short-run dynamics, individual-specific fixed effects and individual-specific time trends.” In terms of its performance, DOLS was found by Montalvo (1995) to have bias when there is almost no decay in the effect of the lagged independent variable, but with declining impact the bias and root squared mean error are the lowest of all cointegration techniques. Both DOLS and CCR correct for serial correlation and the endogeneity of regressors which could be found in such a long-term, cointegrated relationship; DOLS by the use of lagged and lead values of first differences to absorb residual correlation and CCR through the transformation of the variables for the same end. In each of these techniques, long-run covariance is estimated using a quadratic spectral kernel with bandwidth chosen by Newey-West automatic selection, an approach which ensures consistency in the presence of heteroskedasticity and the autocorrelation present in the data.¹³

The full model for these estimators is thus:

$$Y_i = \Delta Cur_i + MonetaryRegime_i + X_i' + \varepsilon$$

¹³ Andrews (1991) shows that the quadratic spectral kernel is optimal across the series of HAC estimators.

Where Y is the rule of law variables noted above, ΔCur_i is the change in (the natural log of) currency in circulation, *Monetary Regime* captures the structural break in the currency series, and X' represents a vector of controls. In regards to possible control variables, other data issues common to economic history are present. In particular, we are doubly constrained by both the lack of monthly economic data from the interwar period and from a very small economics literature examining the determinants of a constrained executive. A rich literature exists across disciplines on the possible determinants of *democracy*, including Muller (1995), Barro (1999), Berkowitz *et al.* (2003), Acemoglu and Robinson (2005), Csordas and Ludwig (2011), and Møller and Skaaning (2014), focusing on the role of economic development, legitimacy, and general regional and global trends in political institutions. While not explicitly linked with executive constraints *per se*, some of the variables found to associate with democracy could also plausibly have some overlap with executive constraints. Unfortunately, many of the most popular correlates with democracy, as summarized in Møller and Skaaning (2014), are not appropriate for examining the source of rule of law in interwar Poland. Variables such as country size or dominant religion were time-invariant over this period, while colonial origin is difficult to code due to the separation of Poland into three Partitions amongst three competing Empires in the centuries preceding independence. Perhaps the most promising of the commonly-used correlates, ethnolinguistic fractionalization, suffers doubly in the Polish case from relative time-invariance and data issues: not only is the data available only for two points during the interwar period (due to the General Censuses of 1921 and 1931), there were well-known and politically motivated attempts to manipulate the language and ethnicity data from the 1931 Census, leading to underrepresentation of ethnic minorities, especially Jews and Ukrainians (Corrsin 1998).

With many of the usual suspects ruled out as possible determinants of rule of law, we must look elsewhere for the reasons that executive constraints could take root. While, other suitable candidates for controls emerge from the macroeconomic conditions faced by interwar Poland, many of which could play a role in the development of rule of law in a young country, these too have problems regarding data. In the first instance, democracy and executive constraints tend to be associated with economic growth, and including a suitable proxy for economic activity could isolate these effects. Unfortunately, indices of industrial production on a monthly basis are limited

for Poland for the interwar period: data from *Instytut Badania Konjunktur Gospodarczych i Cen* (the Research Institute for Business Cycles and Prices) could only be traced back to January 1922, while other sources such as the League of Nations (1945) had annual data and the *Statistisches Jahrbuch für das Deutsche Reich* (Statistical Yearbook for Germany) had a different series of indices starting in 1925. Additional problems have been raised in Landau (1981), mainly the switch in the weighting used to calculate the indices and the re-basing of the index suddenly in 1933 (see the Data Appendix).

To cope with this issue, I have been forced to use several different proxies for economic activity in interwar Poland (see Data Appendix for a description of sources and methods). The first is a measure of unemployment, the number of registered unemployed monthly, obtained from Drecki (1929) for 1919 through 1928 and thereafter by *Główny Urząd Statystyczny* (GUS, the Polish Central Statistical Office). Given that unemployment is a lagging indicator of economic distress, and given that the appearance of unemployment may take time to translate into political changes, I have used the 6-month lag of unemployment in Equation 1. Secondly, a vibrant economy should be expected to see its exports increasing, and thus I also use the natural log of exports (by volume) as a further indicator of economic activity, but unfortunately one which begins only in 1920. Finally, while not perfect by any means, I have also constructed an industrial production index based on available data (see Data Appendix) as a final check, with the caveat that such data only goes back to January 1922.

Other country-specific traits are also used as controls here, derived from the literature, to proxy for the state of a country's rule of law. For example, Barro (1999) found that urbanization tended to correlate with lower levels of democracy, a relationship which one would expect to be similar for executive constraints; as Barro (1999:S160) notes, urbanization "makes it easier for an autocrat to monitor and control activities." Poland's experience of urbanization during the interwar period was slow-moving, to say the least, with 73% of the country remaining rural in 1931, according to the Census from that year. In estimating the urban population of Poland in the interwar period, I rely on several sources for data points (see Data Appendix), and then apply the Chow-Lin (1971)

linear interpolation method to link the points (on the assumption that migration during this period was consistent and linear).¹⁴

Beyond geographic concentration, additional institutional or endowment factors may also influence the development of rule of law; as noted by Norman (2009) and Møller and Skaaning (2014) among others, natural resource abundance is often negatively correlated with rule of law, with rents creating a source of corruption and stifling political competition (Bulte and Damania 2008). In regards to Poland, coal was an important resource which Poland had a comparative advantage in during the interwar period, and thus production of coal is used here as a proxy for resource dependence. Similarly, the political science literature notes that a key determinant of executive constraints relates to the frequency of turnover, with Besley *et al.* (2014) and Karakas (2016) in particular showing that leaders who have a lower probability of being replaced are less likely to introduce reforms that constrain the executive, while leaders who are faced with the possibility of being out of power are more likely to attempt to constrain their successors. To measure the effect of turnover in the Polish case, I examine Prime Ministerial and governmental changes on a monthly basis, creating a new time-series coded as 1 in the month that the PM was changed (even if the government change resulted in the same person being appointed Prime Minister, as happened in 1922 with Antoni Ponikowski and three times in 1926 with Kazimierz Bartel) and 0 otherwise.¹⁵ Given the high probability of a PM being replaced in the early years of the Second Republic, it is likely that turnover did have an effect on the rule of law. Additionally, given the slow-moving nature of the dependent variable, the turnover in the executive may also capture underlying measures of the political state of Poland. In particular, given that degradation of rule of law is not instantaneous, turnover should provide a proxy of societal trends which would need to reach a certain threshold before feeding through to the executive constraint measure;

¹⁴ An interesting issue, not explored here but mentioned in Gawryszewski (2005), was the spatial differences in Polish internal migration in the interwar period, where the western provinces gained people but the eastern ones generally saw a loss. The spatial component of urbanization, and how this may have affected rule of law and the impact of monetary policy, is a fascinating topic for future research.

¹⁵ This coding was based on the information contained in the Max Range dataset and was cross-checked with the Cross-National Time Series dataset, which contains annual data on the number of major cabinet changes in Poland occurring over 1918-1939.

however, turnover would continuously affect money growth, due specifically to the incentives of politicians.¹⁶

As a last control, and to return to the issue of monetary policy, as noted above, Poland underwent its own policy regime shift during the interwar period, moving from fiat money with some gold/foreign currency backing in 1919 to 1928 to a full gold standard in late 1927, and then jettisoning the gold standard in 1936 and returning to fiat money. As the shift to gold might have directly affected the operations of monetary policy, specifically in the creation of currency (and thus impacted the rule of law), I have included a dummy variable equal to 1 for each month that Poland was on the gold standard and 0 otherwise.

Finally, the diagnostics utilized above for our key variables of interest were repeated for all control variables, and all variables showed stationarity at their levels, making the cointegration technique noted above appropriate for analysis.¹⁷

4.1 Results

The results of this econometric exercise are shown in Tables 5, with the addition of control variables done in a stepwise manner, but without our variables proxying for economic activity. Two observations stand out immediately from the analysis: first, our hypothesis of the importance of monetary policy on the rule of law is confirmed across all specifications, with high rates of growth of money corresponding uniformly with lower executive constraints and thus less rule of law. Indeed, the differences in the estimated scale of this effect are also consistent depending upon the estimator is used, with the DOLS estimator showing slightly less effect of monetary policy on rule of law, but with an undeniable connection. Secondly, the addition of more controls does not vitiate this relationship, but does underscore the sensitivity of some of the controls: in particular, the dummy for the gold standard is of no real significance until a control is added for urbanization (Columns 13 and 14), at which point it appears to have had a statistically significant positive effect

¹⁶ Thanks to John Leahy for suggesting the need to address underlying, faster-moving trends.

¹⁷ Results available from author on request. Interestingly, the ADF test with a structural break did show a break in the series for coal production, likely due to the absorption of Upper Silesia into Poland in 1922, but the null of a unit root was rejected at the 1% level.

on rule of law. The urbanization indicators themselves have a large impact on rule of law, with each percentage point increase in urbanization contributing to a decline in nearly a quarter of a point in a country's executive constraints, no matter which variation of urbanization is utilized. It is possible that this large association is due to the underlying data issues of the urbanization indicator, but even looking at broader trends in the Polish population, there seems to be a direct correlation between urbanization and deterioration of rule of law, as predicted in Barro (1999).¹⁸

Table 6 expands the analysis further, including the broader economic controls and the various different proxies for economic activity mentioned above, across both CCR and DOLS estimators. Using two different variables for unemployment (change in the unemployment rate and the level of unemployment six months prior), we see very little consistent effect on rule of law, with growth of unemployment significant only in the DOLS regression and the level of unemployment significant only in the CCR one. Exports and our constructed industrial production measure fare better, with exports showing a positive correlation across both models with rule of law, while industrial production has a slight economic but statistically significant effect on executive constraints. Most importantly, the effect of monetary policy on the rule of law has not changed, with only three models (Columns 4, 7, and 8) showing significance at the 2%, rather than the 1%, level.¹⁹ In perhaps the most "accurate" model, utilizing exports as a proxy of economic activity, a 100% increase in the rate of growth of currency (i.e. from 8% a month to 16% a month) would result in a decrease in the rule of law between 1.48 and 1.71 points. This is not an insignificant drop on the executive constraints scale, as a change in the growth of money from 8% per month to 24% per month would translate in a country going from "substantial limitations on executive authority" to nearly unlimited executive authority.

4.2 *Robustness tests*

¹⁸ Overall, much like Caballero (1994), the dynamic nature of the DOLS system placed a much greater emphasis on lags rather than leads, with all information criteria available often choosing between 0 and 5 leads but up to 14 lags.

¹⁹ Further tests, not reported here, including the removal of the (insignificant) coal production variable, on the belief that it may have captured some of the economic activity also embodied in unemployment or exports; the removal of this variable did not, however, affect the behavior of either the other economic activity variables, nor of monetary policy.

These results show a strong and significant relationship between the growth of money and the diminution of the rule of law in interwar Poland. However, there may be other issues present, independent of money growth, which could have contributed to the erosion of rule of law in the Second Republic, including the wave of fascism which took hold in the 1930s across Europe. In an inversion of Csordas and Ludwig (2011), who showed that democratic transitions in a country are strongly influenced by transitions in their neighbors, perhaps Poland's move to fascism and away from rule of law was influenced by the general environment of Central and Eastern Europe at the time. That is, perhaps fascist transitions in the neighborhood of Poland, in particular in Germany and Austria (former colonial masters still tied to the Polish economy), had a disproportionate effect on Poland's own political transition. To capture this effect econometrically, I use two separate dummy variables in the full regression shown in Table 7: the first variable is a categorical variable equal to the cumulative number of neighbors of Poland which were fascist in any given month, while the second dummy focuses on fascist transitions, coded 1 for a month in which a neighboring country experienced a fascist transition and 0 otherwise. As an additional check, much like Csordas and Ludwig (2011), I also use the average Polity IV democracy score of Poland's closest neighbors to examine authoritarian tendencies in the region;²⁰ this is done precisely because interwar Europe as a whole became increasingly more authoritarian during the 1930s, especially in Poland's neighborhood, but only a few countries became explicitly fascist along the German or Italian model.²¹

The results of these robustness checks are shown in Table 7, and the inclusion of neither the cumulative fascist neighbors, fascist transitions, or authoritarian neighbors (apart from the DOLS specification, which appears to have some unseen issues) has little effect on the overall relationship between the increase in currency and the rule of law in Poland. In fact, the only consistent takeaway from the robustness tests is that growth of currency, export volume, and urbanization are the main determinants of executive constraints, with coal production also entering in as statistically significant but economically less so. As earlier, Poland's choice of the gold standard and

²⁰ The countries used for this comparison include Austria, Czechoslovakia (through March 1939), Estonia, Germany, Hungary, Latvia, Lithuania, Romania, and the Soviet Union, chosen due to their geographic proximity.

²¹ Hungary is a prime example of this effect, as the Kingdom remained conservative and became increasingly more militant and aligned with Nazi Germany as the 1930s progressed. However, as Blinkhorn (2014) notes, Hungary's authoritarianism, while substantial, never quite reached the fascist pitch of Germany until 1938, where it acquired a racial (anti-Jewish) and nationalist/militaristic fusion.

continuous political turnover during its first seven years of life had no effect on rule of law writ large.

While the political developments of Poland's neighbors had little bearing on the development of its rule of law, perhaps the development of the global economy did; that is, in a total inversion of the hierarchy of institutions, perhaps it was the trend in the world economy during the interwar period which led to the erosion of the rule of law rather than monetary conditions in Poland. To test this possibility, I include two separate additional sets of regressions, one using data from the United States to proxy for global economic trends, and one using data from Poland's large neighbor Germany. In the case of the US, industrial production data going back to the 1920s was readily available, as was a complete set of monthly inflation indices, and both of these variables (lagged one period) are included in the cointegrating regressions in columns 7 and 8 of Table 7.²² The results for monetary institutions do not change, and, indeed, in the DOLS specification has a much larger coefficient than in any other specification (consistent across various cointegrating trends), while the inclusion of the US variables shows that inflation abroad strengthened the rule of law at home (while global economic trends weakened it).²³

A similar outcome is apparent when we include Germany's variables instead of the US (columns 9 and 10), on the assumption that Polish economic trends would more likely be influenced by closer countries which were more integrated with Poland. Germany did not have available the same data series as the US, and so we have to be creative: here, I have used the log of German iron output to proxy for overall economic health, and the log of German currency in circulation as a proxy for German inflation or monetary policy (this change in variables also explains the change in scaling of the coefficients, see data appendix). Regardless of the substitution, the same trends as seen with the US are revealed, with German industrial might corresponding to slightly lower rule of law in Poland, and German inflation corresponding with higher executive constraints. Put another way, every one percent growth of money in circulation in Germany corresponded with an

²² Additional tests, not shown, experimented with deeper lags of these global variables. As expected, the effect of global economic conditions decayed fairly rapidly, with statistically significant results back one year but with diminishing economic importance. The inclusion of these variables at deeper lags only strengthened the impact of monetary policy on rule of law, both statistically and economically.

²³ See the data appendix for a description of the US and German variables and data sources.

increase of between 0.02 and 0.04 percent in executive constraints in Poland. In either case, the effect of Polish monetary policy on rule of law has not wavered, and, as with the US, the DOLS specification shows a much greater influence of monetary policy than in any other specification.

While the political and economic system in neighboring countries may not have been as important as domestic monetary policy, perhaps their encroachment or adventurism did have an effect on rule of law in Poland? It has long been argued that a negative correlation exists between war and the rule of law, with governments suspending legal niceties in pursuit of victory (Collier 1999). Moreover, as the history of the Polish-Lithuanian Commonwealth showed, there also was a strong relationship between military conflict and monetary profligacy, with war leading to both currency debasement and erosion of rule of law. Could the effects of war, rather than currency instability, be the overriding cause of patterns in the rule of law in the Second Polish Republic? This is another plausible explanator for Poland's decline in executive constraints during the interwar period, as the Second Republic was involved in a number of armed clashes or outright wars occurring in its early years: conflict with Ukrainians in Galicia from November 1918 through July 1919 resulted in the absorption of eastern Galicia into Poland, while a Bolshevik invasion extended this conflict through until early 1921 and nearly resulted in a quick dismemberment of the Republic (before the "Miracle on the Vistula" turned back the Russian invaders). On Poland's western front, there also were armed insurrections in Upper Silesia that were silenced only with the plebiscite that put the region into Polish hands, while to the north there was a brief war with Lithuania that was part of the broader struggle in Ukraine and Russia.

To test if war, rather than monetary policy, was the driving factor in Poland's deteriorating rule of law, I include a dummy variable to capture if Poland was engaged in conflict in that particular month, based on data in Brecke (1999). Results of these augmented regressions using various lags of the war dummy, also shown in Table 7, show that Poland's wars, localized in the early years of its independence, did not have a negative influence on executive constraints independent of the monetary channel.

As a final robustness test, perhaps the Polity IV "executive constraints" indicator does not do justice to capturing rule of law, given its stepwise trend during the period in question, and another

dependent variable is needed. To test this, I utilize a brand-new dataset, compiled by researchers at Halmstad University in Sweden and covering political institutions and regime types on a monthly basis from 1789 to the present day (Range *et al.* 2015). The “Max Range” dataset offers an impressive new way to conceptualize the extent of democratic access to the political system, with its “regime value” measure in particular allowing for fine gradations in the type of political institutions that exist. Coded from 0 to 100, with higher numbers representing more democratic access, the Max Range data is more related to classifying a country as democratic or not, but it also encapsulates the checks and balances within a system, the particular institutional arrangements, and political competition. In this sense, it is a multi-faceted variable that can capture rule of law in Poland.

The results from the alternate specification of “rule of law” are shown in the last two columns of Table 7, and the results remain broadly consistent across estimators with an even stronger effect of monetary profligacy on the regime’s democratic nature. Given these results, we can conclude that not only is monetary instability deleterious for constraining the executive, it also has a substantial effect on the overall political makeup of a country, restricting access to the political system writ large.

5. Conclusions

This paper has examined the role of monetary policy in undermining the rule of law in interwar Poland. Using a newly-compiled dataset of historical statistics and drawing on brand-new data on political institutions, I have shown that the unchecked growth of money in the Second Republic had a direct and demonstrable effect in eroding the rule of law. This result was robust to several alternate specifications and variables, correcting for the properties of the data and the different regimes that Polish monetary policy passed through between the two World Wars. In short, the massive growth in the supply of money during the Second Republic’s early years, coupled with later bursts of inflation, directly resulted in the degradation of the rule of law, whether expressed as executive constraints or access to the political system.

This research opens the door for a whole new avenue of exploration in economics, namely tying the development of macroeconomic indicators to institutional development instead of assuming institutions as either a given (a result of historical accidents) or as unilaterally affecting economic outcomes. Most importantly, this work has shown the importance of applying a much longer lens to macroeconomics, noting that every institution is in some way shaped by macroeconomic priors, even as they are shaping macroeconomic futures.

Finally, the lessons from this examination should be clear in a world of quantitative easing and unconventional monetary policy, of zero interest rates and asset buy-backs: monetary profligacy is another challenge to the rule of law, and without monetary rectitude (even in an atmosphere of fiscal austerity), the chance of erosion of the rule of law is much higher. The monetary explosion of the early 1920s led to the fascism of the 1930s, and care should be taken that such an eventuality does not occur again in the 2020s.

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Table 5 – CCR and DOLS Regression Results, Stepwise Controls

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	CCR	DOLS	CCR	DOLS	CCR	DOLS	CCR	DOLS	CCR	DOLS	CCR	DOLS	CCR	DOLS
Currency in Circulation	-0.05 2.08**	-0.07 3.13***	-2.13 2.71***	-2.14 3.59***	-2.23 2.95***	-2.11 3.75***	-2.19 3.09***	-2.28 3.41***	-2.30 3.29***	-2.19 3.23***	-2.15 3.18***	-2.21 3.28***	-2.61 3.33***	-2.28 3.05***
Monetary Regime Dummy			-0.033 0.86	-1.82 2.25**	-0.47 1.11	-1.79 2.32**	-0.56 1.35	-0.93 1.37	-0.60 1.47	-0.93 1.36	-0.54 1.36	-0.94 1.38	-0.40 0.84	-0.53 0.66
Coal Production					0.0001 0.60	-0.0001 1.21	0.0001 0.62	-0.0004 0.39	0.0001 0.59	-0.0001 0.34	0.0001 0.37	-0.0001 0.46	0.0002 1.45	0.0002 0.17
Gold Standard Dummy							0.20 0.95	0.46 1.84*	0.19 0.93	0.45 1.81*	0.17 0.82	0.43 1.73*	0.60 2.61***	0.79 3.51***
Political Turnover									-0.03 0.06	-0.07 0.69	-0.07 0.18	-0.07 0.70	-0.03 0.06	-0.04 0.34
Urbanization											-19.51 10.10***	-17.32 6.14***		
Alternate Urbanization													-29.23 8.48***	-27.95 5.59***
C	7.65 23.61***	7.68 43.03***	7.92 33.77***	7.10 19.46***	7.85 30.72***	7.16 21.05***	7.84 31.24***	8.1 44.39***	7.92 31.50***	8.11 42.28***	-20.00 7.32***	-16.73 4.19***	-33.92 6.95***	-31.72 4.49***
n	247	247	247	232	242	230	245	226	245	227	245	227	245	225
sample	1919M2-1939M8	1919M2-1939M8	1919M2-1939M8	1920M5-1939M8	1919M2-1939M6	1920M5-1939M6	1919M2-1939M6	1920M5-1939M3	1919M2-1939M6	1920M5-1939M3	1919M2-1939M6	1920M5-1939M3	1919M2-1939M6	1920M5-1939M1
cointegrating trend	linear	linear	linear	linear & quadratic	linear	linear & quadratic	linear	linear	linear	linear & quadratic	level	level	level	level

Absolute value of *t*-statistics under coefficients. CCR = Canonical Cointegrating Regressions, DOLS = Dynamic Ordinary Least Squares. Quadratic-spectral kernel with Newey-West automatic bandwidth selection. Lags and leads for DOLS chosen automatically by AIC. *, **, and *** denote significance at the 10%, 5%, and 1% levels respectively.

Table 6 - CCR and DOLS Regressions, Economic Activity Controls Included

	1	2	3	4	5	6	7	8
	CCR	DOLS	CCR	DOLS	CCR	DOLS	CCR	DOLS
Currency in Circulation	-1.99 2.56***	-1.43 2.79***	-1.87 2.63***	-1.51 2.48**	-1.75 2.79***	-1.48 2.56***	-1.30 2.25**	-1.34 2.48**
Monetary Regime Dummy	-0.45 1.00	-0.82 1.92*	-0.36 0.89	-0.74 1.11	-0.58 1.52	-0.96 1.58	-0.63 1.77*	-0.93 1.71*
Coal Production	-0.0002 0.11	-0.0001 0.32	-0.0001 0.70	-0.0001 0.59	-0.001 1.86*	-0.0003 2.12**	-0.0002 0.14	-0.0002 0.06
Gold Standard Dummy	0.24 0.93	0.31 1.61	0.07 0.34	0.34 1.31	0.16 0.80	0.36 1.50	-0.07 0.39	0.20 0.79
Political Turnover	0.09 0.18	-0.13 1.19	0.01 0.02	-0.07 0.71	-0.11 0.28	-0.10 0.90	-0.33 0.86	-0.13 0.99
Urbanization	-18.65 7.95***	-17.80 9.93***	-16.33 6.83***	-16.32 6.53**	-19.78 10.93***	-17.71 6.53***	-18.83 10.86***	-17.52 6.65**
Growth of Unemployment	0.00004 0.15	0.00004 2.59***						
Unemployment (-6)			-0.00002 2.17**	-0.00001 1.30				
Log Exports					0.32 2.43**	0.41 3.19***		
Industrial Production							-0.01 2.19**	-0.01 2.62***
C	-18.83 5.68***	-17.47 6.84***	-15.07 4.36***	-15.26 4.32***	-21.58 8.23***	-19.29 4.84***	-17.53 7.05***	-15.98 4.36***
n	241	225	236	231	235	231	209	210
sample	1919M3- 1939M6	1920M5- 1939M1	1919M8- 1939M6	1920M4- 1939M6	1919M12- 1939M6	1920M4- 1939M6	1922M2- 1939M6	1922M1 - 1939M6
cointegrating trend(s)	level	level	level	level	level	level	level	level

Absolute value of t-statistics under coefficients. CCR = Canonical Cointegrating Regressions, DOLS = Dynamic Ordinary Least Squares. Quadratic-spectral kernel with Newey-West automatic bandwidth selection. Lags and leads for DOLS chosen automatically by AIC. *, **, and *** denote significance at the 10%, 5%, and 1% levels respectively.

Table 7 – Robustness Tests

	Dependent variable: executive constraints												Regime value	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	CCR	DOLS	CCR	DOLS	CCR	DOLS	CCR	DOLS	CCR	DOLS	CCR	DOLS	CCR	DOLS
Currency in Circulation	-1.71 2.78***	-1.48 2.55**	-1.78 2.90***	-1.38 2.32**	-1.84 3.08***	-2.01 3.78***	-1.43 2.51**	-7.68 2.45**	-1.87 3.24***	-8.21 2.65***	-1.74 2.79***	-1.48 2.52**	-59.48 4.07***	-71.33 2.96***
Monetary Regime Dummy	-0.68 1.82*	-0.96 1.57	-0.50 1.30	-0.79 1.24	-0.66 1.76*	-1.65 2.93***	-0.32 0.96	0.01 0.01	0.11 0.31	0.27 0.47	-0.75 1.93*	-0.96 1.54	-25.30 2.71***	-40.12 1.74*
Coal Production	-0.0005 2.60***	-0.0003 2.13**	-0.0005 2.48**	-0.0003 2.20**	-0.0005 2.48**	-0.0003 2.01**	-0.0003 0.02	-0.0001 0.13	-0.00001 0.05	-0.0001 0.95	-0.0005 2.63***	-0.0003 2.16**	-0.01 2.12**	-0.01 2.18**
Gold Standard Dummy	0.15 0.80	0.36 1.51	0.31 1.52	0.43 1.72*	0.08 0.39	0.25 0.83	-0.09 0.52	0.22 1.32	-0.06 0.32	0.07 0.35	0.14 0.74	0.36 1.49	-15.79 3.27***	-5.46 0.70
Political Turnover	-0.21 0.55	-0.10 0.87	-0.24 0.66	-0.11 0.94	-0.17 0.46	-0.01 0.15	-0.10 0.31	-0.05 0.59	-0.08 0.28	-0.05 0.48	-0.26 0.68	-0.10 0.91	-1.53 0.16	-0.02 0.01
Urbanization	-20.12 11.21***	-17.79 6.50***	-25.99 6.76***	-20.96 4.99***	-19.47 4.01***	-4.05 10.86***	-19.58 12.87***	-20.39 12.93***	18.16 10.51***	-17.85 8.41***	-19.63 10.98***	-17.70 6.39***	-380.78 8.37***	-279.92 3.16***
Log Exports	0.58 3.04***	0.41 3.21***	0.62 3.32***	0.43 3.24***	0.53 2.72***	0.25 2.18**	0.23 2.34**	-0.37 2.39**	0.11 1.00	-0.42 2.01**	0.71 2.40**	0.41 3.00***	21.05 4.27***	21.07 4.43***
Fascist Transition	0.89 0.97	0.23 1.42												
Fascist Momentum			0.30 1.67*	0.16 1.05										
Average Neighbor Polity Score					0.01 0.15	0.19 4.09**								
US Industrial Production(-1)							-0.35 3.99***	-0.21 3.11***						
US Inflation(-1)							182.24 3.01***	72.58 2.35**						
German Iron Production(-1)									-0.0001 3.81***	-0.0001 3.25***				

	Dependent variable: executive constraints												Regime value	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	CCR	DOLS	CCR	DOLS	CCR	DOLS	CCR	DOLS	CCR	DOLS	CCR	DOLS	CCR	DOLS
German Currency in Circulation(-1)									0.10	0.25				
War									2.29**	2.33**			0.40	0.02
C											0.56	0.09		
	-23.29	-19.41	-31.73	-23.99	-22.14		-19.69	-17.63	-19.22	-17.09	-23.31	-19.31	-541.55	-406.48
	8.67***	4.84***	5.70***	3.85***	3.22***		8.60***	9.63**	7.11***	5.56***	8.29***	4.95***	7.95***	2.94***
n	233	231	233	231	233	231	235	225	229	225	233	231	233	227
sample	1920M2- 1939M6	1920M4- 1939M6	1920M2- 1939M6	1920M4- 1939M6	1920M2- 1939M6	1920M4- 1939M6	1919M12- 1939M6	1920M4- 1938M10	1919M12- 1938M12	1920M4- 1938M10	1920M2- 1939M6	1920M4- 1939M6	1920M2- 1939M6	1920M4- 1939M2
cointegrating trend(s)	level	level	level	level	level	none	level	level	level	level	level	level	level	level

*Absolute value of t-statistics under coefficients. CCR = Canonical Cointegrating Regressions, DOLS = Dynamic Ordinary Least Squares. Quadratic-spectral kernel with Newey-West automatic bandwidth selection. Lags and leads for DOLS chosen automatically by AIC. *, **, and *** denote significance at the 10%, 5%, and 1% levels respectively.*

DATA APPENDIX

Variable	Description
<i>Rule of Law Variables</i>	
Executive constraints	The amount of constraints that the executive of a country faces, coded from 1 to 7, with higher number corresponding to more constraints
Regime type	Variable capturing the type of political regime a country has, coded from 0-100 and with higher numbers signifying more democratic access to the political system
Fascism transition	Dummy coded as 1 in the month a fascist transition occurred in one of Poland's neighboring countries, 0 otherwise
Fascism momentum	Categorical variable showing the cumulative number of fascist neighbors Poland had by month
Average Polity	The monthly average of the Polity IV score of Poland's nine closest neighbors: Austria, Czechoslovakia, Estonia, Germany, Hungary, Latvia, Lithuania, Romania, and the Soviet Union.
War	A dummy variable taking the value of 1 in the month that Poland was involved in an armed conflict and 0 otherwise
<i>Currency and controls</i>	
Currency in circulation	The natural log of actual banknotes in circulation in the Republic
Regime dummy	A dummy taking the value of 0 from December 1918 to April 1924 and 1 afterwards; this captures the break in the series after the currency reforms that tamed hyperinflation
Gold standard	A dummy taking the value of 1 for the years that Poland was on the gold standard (October 1927 through April 1936), 0 otherwise.
Political turnover	A dummy variable taking the value of 1 in the month that there was a change of government/Prime Minister, and 0 otherwise. As noted in the text, any fall in government, even those that retained the same PM, is coded as 1 here.
Industrial production	Index of industrial production, base year 1928=100, augmented as noted below.
Exports and Imports	The natural log of the volume of exports or imports for that year
Coal production	Amount of coal extracted from all Polish territories, in thousands of metric tons. Production after and including 1922 includes Upper Silesia, which acceded to Poland after a 1921 plebiscite in favor.
Urbanization	Natural log percentage of the population living in urban areas in Poland, interpolated on a monthly basis.
Urbanization (alternate)	Same as the previous variable, but with a slower rate of growth due to a different data source for 1938

FOR ONLINE - Notes on Data Sources and Methodologies by Variable

Coal Production

A complete series of coal production, missing only November and December 1919, was created using the *Statistisches Jahrbuch für das Deutsche Reich*, various issues, through 1936, cross-checked with the League of Nations *Monthly Statistical Bulletin*. Data for November and December 1919 was obtained from *Przegląd Gospodarczy* (Economic Review), the newsletter of the *Centralnego Związku Polskiego Przemysłu, Górnictwa, Handlu i Finansów* (the Central Union of Polish Industry, Mining, Trade and Finance), Vol. 1 from 1920. This monthly data comports with the data trends from both other sources and surrounding months. Data from 1937 was found in *Wiadomości statystyczne Głównego Urzędu Statystycznego 1938* (Statistical Notes of the Central Statistical Office) and for 1938 was found in *Wiadomości statystyczne Głównego Urzędu Statystycznego 1939*, both issued by GUS. Data up until June 1939 was found in the *Mały Rocznik Statystyczny* (Little Statistical Yearbook), also from GUS.

Currency in Circulation

Both Polish and German data was obtained from the Global Financial Database. Polish data was cross-checked with League of Nations and GUS data and found to be consistent across months and years.

Inflation

US inflation data for the robustness tests was derived from the Federal Reserve Bank of St. Louis, using the series “Consumer Price Index for All Urban Consumers: All Items,” non-seasonally adjusted, with a base of 1982-1984=100 (this was the only series available on a monthly basis that covered all years in the sample, with the FRED Database having this series back to January 1913). Inflation was calculated as the percentage change of the CPI between months.

Industrial Production

As noted in the text, reliable industrial production data in Poland is not available before 1922, and after 1922 the series suffers from statistical reworking. The original series produced by *Instytut Badania Konjunktur Gospodarczych i Cen* (the Research Institute for Business Cycles and Prices)

used a base of 1925-27, a number which was picked up in several GUS publications. However, without warning, in 1932 the base year shifted to 1928, which was then in use until 1938. Moreover, the two indices were weighted differently (see Landau 1969 for a good discussion of the problems with the indices), making direct comparisons difficult. Other data which went back to 1913 for Poland (i.e. before it became independent), have been unearthed in League of Nations publications (1945), using 1925-29 as a base year, was only available annually.

In order to provide at least a rough approximation of industrial production, I have constructed a series using the 1928 base year series, reweighting the 1922-32 index (base year 1925-27) at 77% of the 1928 base year series. This admittedly arbitrary method is done for two reasons: in the first instance, specific manufacturing data needed to compute the 1922-32 index along the weighting of the 1932-39 index is not available, meaning that we cannot make an accurate index using the newer methodology. Second, 77% was chosen as the scaling measure as it was the average difference between the two indices during the years where both indices co-existed; for example, in September 1925, the index using 1925-27 as a base year was 90.4, while using 1928 as a base it was 69.6, exactly 77%. This method was then used to extend the 1928 series back to 1922.

US industrial production data was much easier to find on a consistent basis, provided by the Federal Reserve Bank of St. Louis. The industrial production index for the US stretches back to January 1919 on a monthly basis and was converted into log form for this exercise. Unfortunately, as noted in the text, German industrial production data was not available consistently for the years desired, and thus a decision was made to use iron production data as a proxy for industrial production. This data was secured from the Global Financial Database.

Trade Data

Monthly data on imports and exports were also difficult to come by on a consistent basis. A complete set of imports and exports (both value and volume) beginning in January 1923 can be found in the *Statistisches Jahrbuch für das Deutsche Reich*, compiled from various issues beginning in 1924 and running through 1934. Data from 1920 to 1923, comports with the data reported by the Germans, was found in Young (1925) through the US Government Printing Office.

Post-1934 data was obtained from staff at GUS in Warsaw via different issues of the *Rocznik Statystyki Rzeczypospolitej Polskiej* (Yearbook of Statistics of the Polish Republic).

Despite much searching and many hours with the staff of GUS, trade data on a monthly basis for 1919 was not available: the publication *Przegląd Gospodarczy* from 1920 (Volume 6, pp. 4-5) offers some estimates for import and export volume from November and December 1919, but these estimates are admitted in the document as being incomplete. According to *Przegląd Gospodarczy* (1920:4, translated from Polish), "For numerous reasons, the full and exhaustive statistics of imports and exports in Poland will be available only from 1st April 1920. For the time before November 1st, the data remains completely unknown. Data between November 1st 1919 and April 1st 1920 covers only a part of real import/export, i.e. private commercial movements (without any provisions for transportation, government and military institutions)." However, these numbers for November and December 1919 are repeated in a GUS document from early 1920 (*Sprawozdanie Miesięczne z Handlu Zagranicznego 1919*, Monthly Report of Foreign Trade in 1919), and thus have been used here.

Unemployment

Unemployment statistics in interwar Poland are notoriously tricky and, according to staff members at GUS, were tied into social benefits (i.e. when there was a decrease in benefits, the number of registered unemployed also dropped, even though the actual number of unemployed may have remained the same). The series used here is a combination of two separate series: Drecki (1929) offers somewhat accurate data on monthly unemployment from 1919 through 1928, although there is a misprint in his work that I have corrected (he notes August 1923 as having registered unemployment of 645,063, a number higher than any other month in the interwar period – this has been changed to 64,506, in line with the observations in nearby months). From 1929 to 1939, I have used the series provided by GUS. Cross-checking was done with the League of Nations *Monthly Bulletin of Statistics*, which mostly comports with the GUS data, but in some earlier months has a much lower level of precision than GUS data.

Urbanization

Urbanization and population statistics in general are difficult to come by on a high-frequency basis, due to only two censuses being run during the interwar years (1921 and 1931), with their own issues as noted in the text. A series of several annual data points have been cobbled together from various sources to create two separate series for urban population, due to conflicting data regarding the last years before the dual Nazi and Soviet invasions: according to the Polish Academy of Sciences (1975), the share of urban population in Poland in 1938 was 30%, while Gawryszewski (2005), in a much more comprehensive study, puts the urban population of Poland in April 1939 at 28.4%. Interpolations using both of these data points for the last two years of Poland's independence were included in the analysis above, with the data series (natural) log transformed to understand percentage changes.