The historical relationship between inflation and political rebellion, and what it might teach us about neoliberalism

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THE HISTORICAL RELATIONSHIP BETWEEN INFLATION AND POLITICAL REBELLION, AND WHAT IT MIGHT TEACH US ABOUT NEOLIBERALISM

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ABSTRACT

Chronic inflation is argued to be politically destabilizing. We examine data on inflation and political instability that goes as far back as 500 years. Although the behavior of both prices and political rebellion have changed over these five centuries, and enduring relationship between price and political destabilization appears in our analyses. This relationship may provide insight into the context from which neoliberalism emerged, potential reasons for its failure, and some of the key dilemmas upon which the post-2008 global economic order may hinge

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After the 2008 credit market collapse, policy-makers feared a second coming of the Great Depression. Immense amounts of society's wealth were tied up in a web of loans, securities investments and financial institutions whose collapse seemed imminent. A similar collapse in 1929 resulted in a long, vicious cycle of default and deflation (Fisher 1933; Bernanke 1983; 1995), much hardship, political conflict, and ultimately war. To prevent such a scenario from materializing, governments initiated a massive lending and spending program, designed to prevent banks' collapse, rescue major employers, create work and prevent an epidemic of personal bankruptcies. These programs were financed by large deficits and a dramatic expansion of the money supply (Congressional Budget Office 2009; Gavin 2009), two often-cited causes of the chronic stagflation that plagued the world during the 1970s and 1980s (Sachs 1989; Barsky and Kilian 2001).

Several observers believe that these responses to the financial crisis have created a serious risk of inflation in the coming years (Feldstein 2009; Meltzer 2009). One potential byproduct of inflation problems is political disaffect and instability. In his historical study of revolution in the early modern world, Jack Goldstone (1991) finds that chronic inflation, along with population pressures, produce a combination of mass hardship, elite conflict and a lurch towards government insolvency that makes states vulnerable to overthrow. His theory is applied strictly to the pre-industrial modern world, but we argue similar processes may have continued to operate through modernity. We analyze a data set of political revolt and inflation that stretches as far back as past five centuries into history, and find a longstanding relationship between these two variables. This relationship persists in some form despite the fact that governments, economies and money systems have evolved a great deal over these 500 years. Should we fall into a period of chronic global inflation again, political conflict may grow more heated, governments may find themselves embattled, and calls for major political-economic change may grow more strenuous.

The Neoliberal Project may sit at the center of many battles over economic policy. The discussion that ensue should not lose sight of the underlying problems that gave rise to neoliberal, which may persist today. Neoliberalism emerged from a context of serious inflation, which signals a problem in

the mechanism by which economic resources are distributed. Despite our apparent success in quelling inflation rates over the past decades, the world economy's distributional systems still exhibit stressors that might continue to produce problems.

Inflation & Political-Economic Strain

Why Inflation Control Matters. Containing inflation is a key concern for macroeconomic policy-makers. Their desire to avoid high inflation can be attributed to the fact that it evokes a range of economic, political and social problems. High inflation hinders economic growth (e.g., Bruno and Easterly 1998), exacerbates inequality and worsens poverty (e.g., Bulíř 2001; Easterly and Fischer 2001; Albanesi 2007). It can lead to vigorous redistributive battles (e.g., see Olson 1982; Smith 1992) and possibly a malaise in which people see society as being wrecked by exploitation, instability, lost morale and damaged national prestige (Shiller 1997). Inflation seems to promote dissatisfaction with government; incumbent politicians face a greater likelihood of losing office when prices ar rising quickly (Lewis-Beck 1988; Palmer and Whitten 1999). Studies have argued that inflation problems have contributed to political revolution both in the 20th century (Hill, Butler and Lorenzen 1977; Looney 1982; Paldam 1987) and over history (Goldstone 1991). According to David Hackett Fischer (1996), they have long historical relationships with the intensity of drug use, family disintegration and crime.

Containing inflation is important because it represents an erosion of money's value, and in turn the ability of the money system to coordinate economic activity. In broad terms, the destabilizing effects of serious, chronic inflation can be understood as a loss of a working money system, and in turn a disruption to the wide web of transactions, relationships and institutions that are premised on the availability of such a system.[i] Money enables people to engage in indirect exchange[ii], use debt, store value, plan and control economic enterprises, expand their possibilities for economic exchange and make individuated economic decisions (Weber 1978: 80 - 82). It creates a framework upon which we rely to maintain accounts of individuals' claims on societal assets, and in turn their capacity to exchange these

claims for whatever assets they deem fit, without resorting to the much less tenable methods overt centralized monitoring and direct administration (Leijonhufvud 2003). If the ingenuity, adaptability and dynamism of modern economic life is built on the information transmission capacities afforded by price signals (Hayek 1945), then money's absence could be expected to result in a much more stagnant economy, and a decline in material standards-of-living. More profoundly, Simmel (2004) argues the money is a core element of modernity itself, whose existence has helped do things like emancipated us from older forms of economic bondage and granted our freedom to make personal economic choices. Money is a cornerstone of the large enterprises, economics of scale, economic specialization and diversification and personal choice that are fundamental to modern economic life. Its absence would force a dramatic reorganization of the modern economy, and probably a loss of many non-economic facets of social life that we prize.

Inflation Has Not Been Conquered. Over the past decade, most of the world has been able to secure a level of price stability that is extraordinary by historical standards, second only to the level of stability attained during the post-WWII Bretton Woods system. Between 2000 and 2008, only fifteen of the 154 countries for which data is available saw rates exceed 40%[iii] in at least one year: Angola, Azerbaijan, Belarus, the Democratic Republic of Congo, Dominican Republic, Ecuador, Ethiopia, Iraq, Montenegro, Myanmar, Romania, Serbia, Suriname, Turkey and Zimbabwe. This list might can create an impression that inflation problems are the concern of underdeveloped, conflict-ridden or mismanaged countries. Inflation as not been a pressing issue in the West for more than 20 years, a track record that could be construed as a long history of successful price control. Until recently, one might have been able to claim with some credibility that enlightened governments had conquered inflation.

If we consider this record from a long-run historical perspective, 20 years of price stability is quite short, and the proposition that advanced economic science created an immunity to price system crises seems dubious. A long-run perspective suggests that world-systemic crises of money are a recurrent feature of economic history, and have occurred as recently as the 1970s and 1980s. Inflationary

crises tend to cluster in history, and these clusters affect the world's most advanced and powerful countries along with those at the periphery.

The inflationary crisis of the late-20th century and our current crisis suggest that economics is nowhere near the point where it can keep us from putting the money system into jeopardy. Even if they have devised workable theories for stopping it once it start – for example by cutting the money supply and triggering a major recession – these solutions can be impractical, especially when people are experiencing serious economic hardship and we face a simultaneous threat of deflation. These theoretical solutions can also be impractical if the state itself (and, by extension, general societal order) is imperiled. Our analysis below suggests that this jeopardy is raised during periods of chronic inflation.

Past and Present Crises of Money. Money system crises are a recurrent feature of economic history (Goldstone 1991; Fischer 1996; Reinhart and Rogoff 2009), although their character has changed with the passage of time. Figure 1 depicts the inter-quartile range of reported inflation figures over a sample of seven countries for which inflation data is present in at least 65% of the 517 years examined here.[iv]   The next section provides details on the data.

[Insert Figure 1 Here]

This graph does not offer a clear sense of when money systems have fallen into crisis historically. From a late-modern vantage point, it paints a picture of perpetual crisis before the mid-19th century. Its purpose is to impart a sense of how the behavior of prices has changed over history. What is conventionally considered to be "stable" inflation today – a slow, steady inflation of 2% - 5% *per annum* with a low likelihood of deflation – is unique to the 20th century. Inflation was highly variable, both across countries and within countries over time, and deflation was common. Price stability in earlier centuries often meant absolute stability in the form of longer-term mean rates that were close to zero, produced by shorter-term inflationary spikes offset by recurrent deflations. In contrast, inflationary crises typically did not involve enduring spikes of very high inflation, but were instead produced by the

cumulative effects of (by modern standards), small upticks of annual inflation rates of around 0.75% to 1% and a declining incidence of inflation.

To a contemporary observer, a one percentage point difference that separates periods of chronic inflation from stability seems extraordinarily low, making it hard to envision how earlier waves were disruptive. Historical periods of chronic inflation lasted for comparative long periods of time (from 50 to 100-plus years, depending on how one wants to date them), and thus amounted to large cumulative effects. Perhaps more importantly, early modern societies were likely less able to adjust to changing prices than today, and any effort to make sense of previous centuries' inflation by drawing analogies to present-day experiences must account for the underdevelopment or absence of institutions and practices that we now use to minimize the disruption caused by prices changes to both public finances and private relationships.

Many of the means that we now employ to offset the strains of inflation either did not exist or were not widely used before the 19th, or even 20th, centuries. For example, inflation indexation[v] only began to be experimented with near the end of the 18th century, and only went into wide use after World War II.[vi] Mass use of interest-bearing savings accounts (let alone more sophisticated investment options) only began to appear in the early 19th century as philanthropic organizations designed to promote savings among the poor (Verdier 2002: 40).[vii] In earlier centuries, government income relied on land rents (often drawn to long, fixed rates) and only progressively moved to sources that would respond well to general price changes (Goldstone 1991). These innovations – inflation indexation, mass access to interest-bearing accounts and a tax structure that is more responsive to general price changes – are a limited subset of the many institutions upon which we rely to maintain the value of our income and wealth, and solvency of our governments, when facing inflation. Without them, even a slow persistent inflation could push a government, private enterprise or larger society into insolvency over decades. These differences can be difficult to see when prices are examined in shorter time frames, but culminate in large cumulative changes in prices over decades. Despite their apparent modesty in terms of year-to-year inflation, these

waves constituted a slow deterioration of many people or enterprises' economic conditions, a problem that ultimately culminated in a range of serious societal stressors.

Between the 16th and 18th centuries, historians have evidence of two periods of secular inflation lasting several decades. Although they may quibble about how to date their beginnings and ends, there appears to be a clear sense that chronic inflation was well underway from 1550 – 1650 and 1750 – 1820 (Goldstone 1991; Fischer 1999; Allen 2001; Arestis and Howells 2001). Both periods culminated in societal calamity: the General Crisis of the 17th century (see Steensgaard 1997) after the former, and the widespread instability that surrounded the French Revolution and Napoleonic Wars after the latter.

During the 19th century, deflation, rather than inflation, was the most common price system failure with which people dealt. These deflationary crises are believed to have been produced by outbreaks of massive default, bank panics, systematic withdrawals of money from circulation, an emerging scarcity of money, and further bankruptcy (Fisher 1933). There are good reasons to avoid deflation: they destroy economic production, result in major job losses, cause epidemics of bankruptcy and, as the Great Depression demonstrated, can produce severe economic hardship. After the Great Depression, governments developed a strong and lasting aversion to deflation (Bordo and Eichengreen 1998: 429ff), and several means to avoid it, like monetary and fiscal stimulus, deposit insurance and banking regulation. These changes to monetary system governance resulted in persistently inflationary price changes throughout the 20th century, which are depicted in a box plot of inflation rates in an unbalanced panel of 164 countries[viii] below in Figure 2. Note that the graph suppresses outliers.

[Insert Figure 2 Here]

The figure suggests two periods of widespread inflation. The first period, which ran from 1939 to 1952, is a likely result of war debts and a collapsed international financial market following WWII. Countries eventually renegotiated a stable international monetary order under the Bretton Woods Accord, which brought roughly twenty years of unparalleled global price stability. These changes produced a

sense that price system pressures could be managed well, provided that governments could muster the foresight, responsiveness and political will to prevent the economy from "over-heating" as a result of too much growth and employment.

This stability came undone when the Accord collapsed in 1971, and the Western price systems were shocked by the OPEC embargo of 1973. The result was a chronic inflation that afflicted the world system for another twenty years. This period saw spectacularly high levels of inflation in developing countries, with rates that resemble those of the now-rich world during the 16th and 17th centuries. This inflation crisis, which saw the coincidence of slow growth and runaway prices, shattered our sense that inflation was well understood and could be conquered. The event damaged the credibility of the economic theories that underwrote post-Depression economic *dirigisme*, served as a platform from which anti-government intervention policy movements sprang, and created economic and political turbulence that gave rise to neoliberalism. The experience of the 1970s and 80s suggests that the price system can still break down, and that these crises of money can still disrupt society and politics. We may be able to withstand a steady but low inflation, but appear to remain vulnerable to serious price system disruptions.

In the ten years that followed 1995, world prices were again very stable. This track record produced another widespread confidence that the puzzle of inflation had been solved. Rather than seeing governments as our emancipator, great faith was invested in the market system, which was thought to spread risk and respond to price pressures so quickly that systemic crises of money would automatically be averted. This faith in the market underwrote many of the reforms that arguably contributed to the 2008 crisis, including financial deregulation, a nurturance of private financial institutions and "financial innovation", and loose monetary policy.

What Causes Inflationary Crises? Scholars offer a range of explanations for the incidence of inflationary crises. Goldstone's (1991) account of inflation in the early modern world stresses the importance of demographic booms, brought on by the recession of disease, which cause increased

demands on essentials like food, housing and energy. Fischer (1996) also sees demographic expansion as providing an initial impetus for rising prices[ix], but see long-term inflation as a result of the institutionalization of a type of inflationary psychology, in which react to mass perceptions of perpetually-rising prices by doing things like trimming coins, hoarding goods or engaging in speculative activity. These are all viable ways for individuals to cope with inflation, but amount to a self-fulfilling prophesy when these reactions further debase money, cause goods to be withdrawn from markets, and encourage speculative bubbles. Quantity of money theorists stress the importance of increases in the supply of money, for example through governments' debasement of their own currency or the influx of American gold (e.g., Fisher 1989). More recently, some economists have argued that modern money supply growth follows chronic government deficit (Fischer, Sahay et al. 2002), implying that it is over-spending governments that ultimately spur inflation. Others have stressed the role of war in spurring prices (a notion reviewed and criticized by Thompson and Zuk 1982).

Demographic strain, inflationary psychologies, loose monetary policy, government debt and war-making are all probably part of a larger and more complex process that causes price systems to break into chronic inflation. Our interest is not in discerning which of these factors is the "true" cause of inflation. In all probability, these theories touch upon some aspects of the complicated process that pushes prices sustainably upwards, and our focus is on inflation's effects on state rule.

However, it is worth noting that neoliberalism was a pragmatic attempt to tackle many of these problems simultaneously. By pursuing growth aggressively, it sought to enlarge the world's capacity to absorb its ever-growing population without running into situations of scarcity that plagued earlier societies in Goldstone's historical accounts. It failed in part because it was so successful. In enriching millions of people, and doing so through global trade, it pushed us up against our limits to fuel this enrichment using gas and oil, and hurt our environment in the process (Centeno and Cohen 2010). Many of the government cutbacks that were advanced under neoliberalism were designed to restore fiscal balance and ultimately facilitate the repayment of debt. The stable economic prosperity that was probably

required to pay down these debts was short-lived, governments' efforts to reduce debt was often half-hearted. Neoliberalism also ushering in an era in which governments were probably less inclined to expand money supplies sustainably, but some have argued that the US Federal Reserve's aggressive use to monetary policy to quell financial panics[x] created perceptions that America's central bank would aggressively fight financial market downturns, thereby causing investors to assume greater risk with more confidence (this argument, which concerns the so-called "Greenspan put", is discussed briefly in Goodhart 2008).

What the Neoliberal Revolution did not do was contain speculation. Financial investment grew markedly over the past three decades, and the vehicles through which one could profit from financial investment multiplied. This development was convenient for governments in many respects. It allowed them to off-load pension obligations, profit from the sale of publicly-owned enterprises, and draw credit from a deeper pool of private finance. Governments themselves profited from financial investment, and inward investment could help ease the balance of payments strains that occur as a result of trade deficits. While they carried debt, strong financial markets lowered the costs of debt service. It also made them vulnerable to financial markets. A collapsing financial market could subject countries to balance of payment, currency or debt crises. Financial markets' flourishing created powerful lobbies, tied broad cross-sections of society's wealth to these markets' performance, led to increasingly aggressive risk-taking, and created massive financial institutions whose failure would imperil the entire financial system. When these risks culminated in the 2008 crisis, policy-makers faced the prospects of a deflationary spiral, and chose (or were forced) to respond in ways that ultimately threatened inflation. Neoliberalism attempted to quell many problems that have traditionally spurred inflation, which found varying degrees of success. However, the containment of speculation was not one of them.

Producing Political Instability. In the 20th century, chronic inflation has been associated with economic hardship, perceptions of societal injustice and declining well-being, political dissatisfaction and general malaise. These problems may explain how general populations can come to dislike their

governments or vote out incumbents in democratic systems, but a diffuse popular anger generally provides limited power in explaining serious revolts that create existential threats to states. Goldstone's (1991) offers a richer and quite plausible theory of how chronic inflation could contribute to a process that simultaneously helps the formation better-organized and –resourced anti-state movements and weakens states' ability to counteract any challenges that may arise. He argues that the combination of long-term population growth and inflation produced a combination of general popular hardship, elite competition and declining government solvency that ultimately channeled mass disaffect into coherent, powerful political movements that could challenge debilitated states. His study relies heavily on demographic pressures as a cause of both inflation and instability, and is strictly applied to the pre-industrial world. These processes, he argues, ceased to operate after the Industrial Revolution.

We have already noted that causes of chronic inflation need not involve population growth. The late-20th century reappearance of inflationary crises may ultimately be helped by the spread of development (rather than population growth itself), which strains energy supplies (rather than basic commodities like food) to create a Goldstone-like, real economy-based inflationary pressure. Again, our intent is not to show what causes inflation specifically, but rather to show that contexts of inflation are politically destabilizing. The three factors that Goldstone presents as mediating the inflation-instability relationship – mass hardship, elite conflict and government insolvency – could conceivably occur strictly under inflation.

The mass economic hardship and elite competition that materialize under inflation are both rooted in the fact that changing prices can be economically destabilizing and can produce redistributive battles. Its destabilizing aspects are not necessarily the product of rising prices themselves, but rather their propensity to coincide with price volatility (see below). Such a context threatens economic actors' real income, wealth and solvency. If general prices outrun one's wages, revenue or returns on investment, the result is an impoverishment in real terms. In a context of uncertainty, individuals will try to shore up their wealth through efforts to contain their expenses and push up their revenues by securing price rises that

outpace general inflation. The result is a self-reinforcing cycle of increased real price demands, spurred by an inflationary psychology similar to that posited by Fischer (1996).

The non-wealthy are typically ill-equipped to stay ahead of prices in such a context, because they typically lack the bargaining power to wrest price concessions for their counter-parties. During previous inflationary periods, real wages have stagnated (Allen 2001). For those who rely on charity or redistribution for income, the situation can be worse. Both donors and governments face economic strains in these contexts, which makes generous transfers to a potentially burgeoning class of poor less likely. Britain's ill-fated Speenhamland system, made famous by Polanyi (2001), was formed to deal with the problem of the poor at the cusp of the 18th century inflationary wave. The difficulty with that system, as with mid-20th century state welfare programs, is that they are costly and increasingly difficult for states to finance when inflation is chronic and their own budgets are strained. Governments are often reluctant to fully index welfare or pensions to prices (Easterly and Fischer 2001), making the real value of these payments lower.

One interesting difference between previous centuries' inflationary waves and the chronic inflation of the 1970s and '80s was that unionization, and a rich legal infrastructure that bolstered union's bargaining positions, left many workers with a greater capacity to wrest wage concessions from their employers (including governments themselves). Workers' ability to secure better concessions through unions attracted a great deal of attention, and blame, for inflation (Smith 1992). Union power, and their role in producing economic crises, became the subject of many conservative political parties, and their electoral success often resulted in changes to the rules that empowered them in distributional struggles. Even where anti-union platforms were not key elements of ruling parties, the fact that governments' own budgets were strained by public employee wages probably played a role in their loss of many legal protections that were the centerpieces of mid-century policies.

Employers' struggles with unions illustrates several important points about inflation's effects on those who are more economically powerful. First, they too became enmeshed in distributional battles. Second, the power they enjoy in these battles is often shaped by law and convention. Just as labor law empowered unions vis-à-vis employers, the practice of renting land at long fixed rates enriched free tenants at the expense of rentier landlords in the early modern world (Goldstone 1991). In many late-modern developing countries, Import Substitution Industrialization's (see Bruton 1998) trade protectionism likely strengthened domestic industry's ability to wrest price concessions from distributors, retailers and ultimately consumers. Bargaining power's relation to law and conventionalized practice means that it can be altered by states. Under these circumstances, economic rules can be the subject of political conflict. When reasonably well-organized and –resourced parties find themselves on opposing sides of such a battle – like pre-Civil War English gentry and landed aristocracy, or Stagflation-era unions and major employers – the result is elite conflict. Such conflicts can put states in the compromising position of having to take sides, possibly alienating a powerful constituency in the process.

A third and final inflation-related pressure on political instability involves government finances, and ultimately affects the state's capacity mollify or suppress potential challengers. Government solvency erodes during periods of chronic inflation, in part it increases demands for public outlays while hurting their ability to extract new revenues. Inflation pushed up the costs of ongoing government operations, and can be exacerbated if accompanied by increasing demands for new forms of spending. In the face of rising costs, the state can have difficulty raising revenue commensurately. Like wages, taxes are difficult to change and take time to accrue into state coffers, and any effort to alter taxation is bound to stir resentment, particularly when non-state actors are being hurt economically. In the early modern world, these problems were particularly acute because state revenues were principally drawn by rents on land, and were thus plagued by the same pressured faced by private rentiers (Goldstone 1991). With the passage of time, governments were able to develop other forms of taxation that were more responsive to changing prices, like tariffs or income taxes. Still, experiences during the 1970s suggest that these newer

forms of taxation can have difficulty keeping up with rising general prices as well. The result was that governments in the 1970s did what they have typically done under high inflation: accumulate debt and, in many cases, print money. There simply is not enough money to emolliate everyone, and the pressure to either cut spending or draw new taxes is likely to alienate someone.

There are, of course, limits to the amount of taxes and credit that governments can draw, and, once creditors lose their inclination to lend, the state's ability to finance its operations is crippled. In some cases, like Bolivia in the 1980s or the Weimar Republic, governments will simply print money, which ultimately destroys its value. Financial constraints limit the state's ability to contain financial hardship through spending or government employment, and, perhaps most critically, their capacity to fund the coercive apparatus of the state. Armies and police forces need to be equipped and fed, and their deprivation is bound to affect morale and loyalty adversely. This means that, just as the state lurches towards a position in which they may need to suppress (rather than placate) its people, serious questions can emerge about its marshal forces' ability or willingness to do so.

During the 1970s, a variety of factors led governments to assume very large debts, whose overhang persists today. They probably include decreased real tax revenues resulting from economic stagnancy, the rising costs of ongoing and new expenditures brought about by stagflation, and a sovereign lending bubble that temporarily allowed governments to cushion the effects of the crisis by borrowing and guaranteeing others' debts. When this bubble burst in 1982, much of the world found itself embroiled in a debt crisis. In many cases, the result was government bankruptcy, seigniorage, free-falling exchange rates, hyperinflation and a "lost decade" of development. Dictatorships rose and fell over much of the developing world during this period. Although the effects or presents of these or similar problems in the communist bloc is not entirely clear to us, we do know that Soviets suffered major shortages (including food) (Åslund 1994) and experienced inflation in a different form: rationing.

The strains of debt, and developing countries' need for infusions of foreign currency after the collapse of their own money, bore great affinities, if not clear causal links, to the adoption of neoliberalism. The clear causal links involve many countries' implementation of neoliberal reforms as preconditions for the receiving aid in debt refinancing (e.g., the Brady Bond Plan, or Eastern Europe's "shock therapy") or emergency loans (e.g., IMF conditionality). Less directly, but perhaps no less importantly, neoliberalism's pursuit of export earnings, inward investment and privatization proceeds helped infuse foreign currency into their economies, which could help restore the value of their money. Financial deregulation helped make these countries more attractive to international investors, and thus served this hunger for external money.

Weak Money, Weak States and Economic Change. A weak money system is predicted to threaten states, a relationship that has been observed in comparative-historical studies of past centuries' periods of chronic inflation. These problems reemerged in the 1970s and 1980s, a period of great economic stress, political conflict, and ultimately institutional change. The changes that emerged from that crisis can just as easily be understood as a struggle to restore order to the world's money systems as a massive ideological conversion to *laissez-faire* economic philosophies. Neoliberal reforms sought to rectify many of the problems that are believed to produce inflation, like government deficits, loose monetary policy or slow growth, but they did not contain speculation. Whether this permissive attitude towards financial speculation stems from a believe that unfettered financial markets were self-correcting or from a hunger for capital to cover debts and finance growth, it ultimately resulted in the 2008 crisis, a threatened deflationary spiral, and policy redresses that now threaten to bring back inflation.

A key element of this argument is that inflationary crises push governments into positions of desperation, where the state itself could feel threatened. This proposition is tested next.

Methods

We examine the historical relationship between chronic price volatility and political instability through a quantitative analysis of two data sets. The first, "long-run" set is an unbalanced panel of seven states with at least 300 years of inflation and political instability data from 1492 to 1900.[xi] The second, "late modern" set cover the post-World War II era, but allows for much more cross-sectional representation and the inclusion of better controls.

Data

Political Instability. Political instability data in our long-run set was gathered in a project led by the late Terry Boswell and assisted by us (Boswell, Linton and Cohen 2007), which quantified the presence or absence of *revolutionary situations*[xii], a measure that considers successful and failed challenges against the state. Our second, "late-modern" set had better cross-sectional representation, but is restricted to the post-WWII era. Political instability is measured by *Bank's Cross-National Time Series'* (2007) measure of *revolts*, defined as "Any illegal or forced change in the top governmental elite, any attempt at such a change, or any successful or unsuccessful armed rebellion whose aim is independence from the central government." In both cases, political revolt is coded as a binary variable.

Inflationary Pressure. Long-run inflation data was compiled from many sources (Friis and Glamann 1958; Parenti 1967; Barquín Gil 2001; Ozmucur and Pamuk 2002; O'Donoghue, Goulding and Allen 2004; CBS Statistics Netherlands 2009; Global Finance Data 2009; Officer and Williamson 2009; World Bank 2009; Allen n.d.; Economic History Association n.d.; Global Price and Income History Group n.d.).[xiii] Appendix A describes how these data were compiled to produce inflation figures that correspond to sovereign governments in the early modern world. For our modern set, inflation data from 1960 comes from the *World Development Indicators*, and over the earlier parts of the 20th century from *Global Finance Data*.

We consider two specifications of "long-term inflationary pressures" in our analysis. The first specification looks at the mean inflation rate that has prevailed in the seven years preceding a potential

revolt.[xiv] A problem with using inflation rates as a predictor of political revolt over such a large time frame is that the behavior of prices has changed dramatically over history. A ten-percent, two-percent or negative inflation rate means very different things in 1650, 1880, 1955 or 1985. In response to this problem of periodicity, we break the sample down into separate phases of historical inflation and stability (see below) and examine them separately.

Our second specification of price pressures follows the notion that unpredictable inflation is qualitatively different from high but predictable inflation. Some scholars have argued that a stable rate of price growth can be incorporated into actors' economic calculuses (Friedman 1977), and need not produce the uncertainty that strains economic, and in turn political, relationships. Below, we find that, while inflation rates exhibit some degree of long-run cyclicality, price volatility has been declining steadily over time, although it is positively related to inflation rates on a year-by-year basis.

Controls. Finding control variables that stretch far back in time is difficult. Many of the variables that could conceivable affect the process being examined here are sparsely measured, if at all, prior to the 1960s. In the long-run set, we consider Kondratieff Waves and cycles of hegemony (from Chase-Dunn 1998) and the incidence of major war (also from Boswell, Linton et al. 2007). These are system-level measures that are constant within years, which try to tease out, in very rough terms, the effects of economic prosperity, the international political environment and the effect of war. Appendix B lists the dates used for Kondratieff waves and cycles of hegemony.

In the late-modern set, we consider the effect of democracy (from Marshall and Jaggers 2009), inter-state war (Singer and Small 1972; Small and Singer 1982; Sarkees 2000) and, from 1960 onward, per capita GDP levels and growth rates (from World Bank 2009). The inclusion of a democracy measure follows Palmer and Whitten's (1999) arguments that popular political responses to inflation depend on the character of a democracy's ruling party. More broadly, it seems likely that a political system's

characteristics will affect perceptions that laws and policies can be changed electorally, which can channel anti-state sentiments to political, rather than coercive, competition.

Analytical Methods

We use a random-effects probit model. A widely-cited literature on the analysis of this kind of data argues that analysts should incorporate terms that are designed to incorporate the effect of time's passage since the last onset of a revolutionary event (reviewed in Beck 2001). We follow Carter and Signorino's (2007) argument that the use of a time variable, along with its squared and cubed terms, outperforms standard, and more complicated, methods of capturing these dynamics.

Exploring the Inflation-Instability Relationship

The behavior of inflation rates exhibits some degree of long-run cyclicality, but price volatility has been declining over the long-run. Likewise, states in our long-run set have become less vulnerable to revolt, and, in the 20th century, the world as a whole is generally stable compared to European countries in previous centuries. Periods in which inflation pressures rise correspond roughly to periods of heightened instability, and inflation pressures are generally higher in countries that experience revolt. Figure 3 (below) describes both the median cumulative rates and standard deviations over the preceding seven years in our long-run sample prior to 1900 and in our late-modern sample during much of the 20th century.

[Insert Figure 3 Here]

These figures make the differences in long-term inflationary *versus* price-stable periods more visible. During the inflationary waves of 1550 – 1650 and 1750 – 1820, median seven-year inflation rates generally exceeded the pre-19th century mean of 0.8%. Periods of long-term price stability (1650 – 1750 and 1820 – 1900) saw inflation rates that were steadily below this mean, and often deflationary. They also show the steady decline in price volatility over history's long-run. Even during the Stagflation Era, price volatility was elevated but still compares quite favorably to historical periods of price stability. This

comparison is even more favorable when one considers the fact that the late modern sample includes mostly non-core, and often very poor, countries. Although median inflation averages and standard deviations appear to diverge in some periods, especially during the 18th and early 19th centuries, they are generally related positively. Over the entire pre-20th century period, seven-year inflation rates and standard deviations[xv] register a highly significant pairwise correlation of 0.2807, and has a highly significant, but declining correlation that never drops below 0.17 in individual periods of inflation or price-stability.

If we compare the historical behavior of prices to that of revolt, it is possible to discern a rough relationship. Figure 4 (below) presents spike plots denoting the prevalence of revolt in our long-run (left) and late-modern (right) samples.

[Insert Figure 4 Here]

Over time, political systems appear to have grown less prone to rebellion. Although rebellion has become quite rare in the European countries of our long-run set, over the world it seems to afflict between 10% and 15% of countries regularly. These long-run trends notwithstanding, upswings in revolt appear to correspond roughly to periods of intensified inflationary pressures. Revolt was very common during the 16th and 17th century inflationary periods. A period of domestic pacification appears between 1618 – 1648, when the Thirty Years War may have diverted what would have been domestically-directed pressures towards international conflict. This wave of inflation and political instability appears to break after the Thirty Years War. Instability takes time to dissipate after inflation has settled, but this could be attributable to the residual effects of past instability.

Between 1650 and 1750, long-term prices exhibit little long-term movement. The Thirty Years War and chronic plague resulted in tremendous death, and the population's recovery took time to return to a point that prices would begin to again move upwards (Goldstone 1991; Fischer 1996). Over much of the 18th century, domestic politics were relatively placid in our sample.

Revolt activity picks up near the end of the 18th century, after a period of both rising prices and population growth. Political instability and price inflation break around the time of the French Revolution and Napoleonic Wars. From 1820s onward, domestic politics appear relatively calm in Europe, with the exception of a spike in revolts around 1848. This stability generally holds through the overall deflationary 19th century, and more or less price-stable (WWII and its immediate aftermath notwithstanding) 20th century. Although our late-modern European sample seems less prone to revolt, an intensification of rebellion's incidence breaks out during the Stagflation era of the late-20th century.

In our late-modern sample, depicted in this figure's right graph, represents the incidence of revolt in the 20th century. Political instability was more common in the world as a whole than in our European sample, and appears to have intensified significantly after 1971. A two sample test of proportion suggests that the differences in the average annual rates of revolt during 1955 – 1971 (0.12, SD=0.006) are significantly lower from 1971 – 1995 (0.15, SD = 0.005) are significant at the Pr=0.01 level. A similar test comparing 1971 – 1995 with 1995 – 2005 suggests that these differences are not significantly different. After inflation was contained by 1995, political instability (in the form of revolt's prevalence) did not return to mid-century levels.

Do inflation rates or volatility distinguish countries at risk of rebellion from those that are not? Table 1 (below) compares the lagged mean inflation rates and standard deviations that typically preceded country-years that experienced rebellion versus those that did not. As some inflation crises during the 1971 – 1995 crisis were very severe, with cumulative annual inflation rates exceeding 200% and cumulative standard deviations exceeding 1000%, we top code these outliers at 100% (affecting less than 3% of all observations in both cases).

[Insert Table 1 Here]

The table suggests that countries experiencing revolt did not exhibit significantly higher or more variable inflation rates prior to 1650. During the inflationary wave of 1550 – 1650, we postulate that the

lack of a significant relationship is partly a result of the drop in revolts that took place during the context of the high inflation Thirty Years War. In subsequent periods, countries that fall to revolt consistently register significantly higher rates of volatility. In price stable periods, like 1650 – 1750 or 1820 – 1896, this volatility often involved serious deflation, and rendering the difference in cumulative inflation rates either insignificant (as in the 19th century) or significant, but opposite from our expectations (as in 1650 – 1750, where stable countries tended to experience more inflation). In the 20th century, inflation rates and price level variability are significantly higher in countries experiencing revolts.

Of course, changes to inflation are very likely a small part of what creates specific incidences of rebellion. Aside from idiosyncratic factors that lead to particular revolts in particular contexts, a range of macro-level variables probably influence countries' general risk of rebellion. In the next section, we consider a few of these possible controls: economic prosperity, economic development, international order and democracy. To tease out the partial effects of inflation on revolt, net of these factors, we turn to regression analysis.

Analysis

Inflation rates and volatility appear to offer some power in the prediction of a country's vulnerability to political revolt. Our models find a significant relationship between inflationary pressures and rebellion in pre-20th century Europe, but a lack of high-quality controls probably contributes to a sense of inflation's significance. In our late-modern sample, the inclusion of better controls suggests that economic growth and development, as well as democracy, are stronger predictors of rebellion. These variables could offer the strongest explanations of a long-term stabilization of political institutions in the West. However, even when these controls are included, inflation appears to retain predictive power. In all likelihood, rebellion is produced by a complex interaction of economic development, prosperity, political institutions and price system stability that might be best uncovered with alternative, more qualitatively-based, comparative-historical methods.

Long-Run Sample. Table 2 (below) presents a random-effects model that predicts the onset of revolutionary situations in our long-term sample. The models consider the potential influence of both inflation rates, as the mean rate of inflation that took hold over the seven years preceding an observation[xvi], and variability, represented by the standard deviation of inflation rates over the preceding seven years.

[Insert Table 2 Here]

Interpreting these results directly from the table is difficult, because both the dependent variable and key predictors are transformed or include higher-order terms. To impart a sense of these estimates in more concrete terms, Table 3 (below) interprets these results as "75th/25th Percentile Differences". These figures which represent the ratio of a country's predicted odds of experiencing a revolt if they were to register a given variable score at the sample's 75th versus 25th percentile score, assuming all other predictors scored at the sample median.

[Insert Table 3 Here]

Models One through Three examine the period of 1492 – 1900 as a whole. They provide a broad sense of inflation's relationship with revolt. They suggest a country with typically high inflation variability (at the 75th percentile) has 8% higher odds of experiencing a revolt. For countries register inflation variability scores at the 95th percentile generally register around 15% higher odds of experiencing revolt. Although this effect may seem modest, it is important to note that periods of elevated price instability could continue for many decades, and, once a country fell into revolt, it was far more vulnerable to subsequent revolt. Inflation variance is not significant from 1550 – 1650, but is important in predicting instability after 1750. We believe that this difference is attributable to the way that inflationary crises manifested themselves in 1550 – 1650 versus other periods. In this earlier inflationary wave, rising prices took hold with persistent volatility. In the 1750 – 1820 wave, political revolt remained pent up for some time, and was unleashed when financial systems fell into a period of volatility.

Also, the instability surrounding the turn of the 19th century involves wild swings into high inflation and severe deflation, suggesting that general monetary system instability acted as a trigger for revolt.

Models Two and Three suggest that, over the entire pre-20th century sample, Kondratieff waves are important. These effects are attributable to the very large effects of Kondratieff waves during the late-16th/early-17th century inflationary wave, and the mid- to late-19th century. We believe that its effect in Model Four is not capturing the effect of long-run economic prosperity, but rather a transition point in history that foreran Europe's immersion into the Thirty Years War and a concurrent long-term economic decline. In other words, it is capturing a period in which that era's political pressures were high, but had not yet been redirected outward. The negligible effect of war during this period is a likely product of having some its effects over the Thirty Years War having been washed out by the Kondratieff decline variable, and some of its coincidence with revolution prior to the Thirty Years War pushing its effect into a positive range. The apparently positive effects of Kondratieff Wave variables in the 19th century are probably produced by the political calm that took place during the long-term economic growth of the Industrial Revolution. These variables compare the incidence of political rebellion relative to a baseline comparison group of years in which the world economy was expanding.

The table imparts a very strong sense that previous rebellion shapes a country's vulnerability to subsequent rebellion. The 75th and 25th percentiles of these variables register scores of 30 – 35 years and 2 – 5 years, respectively, and do not vary widely across sub-samples. A country with that has enjoyed around three decades without rebellion is predicted in these models to have anywhere between one-tenth and one-half the odds of falling into subsequent revolt, relative to a country that experienced revolt only a few years ago. This dynamic helps explain why revolutionary activity tends to cluster historically. Countries tend to fall into cycles of revolt once they first experience it. As a result, even a slightly elevated risk of revolt of 10% - 20% can represent a serious risk.

Late Modern Sample. Table 4 (below) examines the relationship between inflation and political revolt in our late modern sample. Limitations on GDP data prior to 1960 and war data after 1997 require us to look at these relationships under different model specifications, but they collectively result in a common message: economic development and prosperity are the most significant predictors of rebellion, and these factors, along with democracy, condition the effects of inflation. Still, our models suggest a 90% likelihood that inflation's relationship with the onset of rebellion is significant.

[Insert Table 4 Here]

These results are interpreted below in Table 5, using the same $75^{th}/25^{th}$ percentile comparisons used above in Table 3.

[Insert Table 5 Here]

Although the panel is heavily unbalanced, models in a more balanced and less representative set render substantively similar results. The models suggest a 90% likelihood that inflation's relationship with revolt is significant, net of the effects of residual instability, democracy, economic growth and wealth. Inflation rates and variability covary more strong in the 20th century – with a highly-significant pairwise correlation of 0.89 – and may wash each others' effects out. The comparisons between Models Eleven and Twelve suggest that their effects are commensurate.

Table 5 predicts differences of a +8% - +11% higher risk of rebellion in a country whose inflation variability sits at the sample's 75th versus 25th percentile levels (22% versus 5% for 1945 – 2006). Although these differences are modest, both inflation rates and variability have a very strong, positive skew. Inflation variability scores at this same sample's 90th, 95th and 99th percentiles are 52%, 112% and 1900% are predicted to have +15% to +40% higher odds of experiencing revolt relative to a country with variance levels of 5%.

The predicted effects of residual instability in Table 5 shaped by a change in historical context, but also the sample's increased representativeness and possibly differences in the ways that revolts are coded in our long-run versus late-modern set. The predicted effects of residual effects are different than in the long-run set. Although they predict that the likelihood of revolt diminishes in the first fifteen years after a revolt (-65% lower odds compared to the first year following a revolt), it begins to rise thereafter until 39 years after a revolt (-21% lower odds) and fall thereafter. Over the world as a whole, anti-government rebellion is much more common than it is when we restrict our focus to Europe, and these effects predict that countries will typically be more vulnerable to major challenges as time passes until a very long history of political stability is established.

The effects of democracy and per capita GDP are considerable. One interpretation of these results is that both wealth and democracy raise the threshold beyond which disaffect materialized into rebellion. Democratic systems give discontents a peaceful means of changing governments, and wealth may mitigate the absolute hardship experienced in economic downturns. Furthermore, a wealthier society has more to lose if its governments collapse. In a rich democracy, it may be in fewer people's interests to mount serious, open challenges to the state. This does not imply that wealthy democracies are immune from political problems during economic crises, but, in stable and wealthy democracies, these problems may product government turnover.

Finally, economic growth affects countries' vulnerability to rebellion. Although growth's effect is stronger than inflation when comparing 75th and 25th percentile effects, growth lacks the high variability of prices. Many of the economic problems that high inflation produces, like desperation, insecurity, conflict and tight government budgets, are also produced during economic recessions. In addition, serious inflation problems are argued to produce economic recessions (Bruno and Easterly 1998), which could compound inflation's effects.

Discussion

This paper examined the historical incidence of chronic global inflation, and its relationship with political rebellion over the past five centuries. Although the institutions of money and government have evolved a great deal over this time, we remain vulnerable to a destabilization of the money system, and in turn the erosion of government finances. Price problems are probably caused by a complicated mixture of problems that we have not yet conquered, and may reappear as a serious issue in the coming years. We show that even normal differences in price system disruptions cause marginally higher risks of revolt, and their threat to stability can become extreme if inflation and price volatility become serious, as they did only a few decades ago. These risks are compounded by the fact that, once a country's political order is disrupted, it risks further instability.

Should the world's money systems fall into inflationary spirals again, our analysis suggests that more countries will experience political instability. Those who are most likely to be affected are poorer and more authoritarian countries, and our results suggest that spurring growth and securing democratic institutions in these countries are probably priorities if they wish to avoid rebellion. Although we in the West may be insulated from the threat of open rebellion, perhaps in part due to our wealth and democracies, inflation produces a range of problems that will raise the stakes of economic policy and possibly produce more vigorous political conflict. It may also create a greater likelihood of change. Governments face a great deal of inertia when attempting reform, and may need to be threatened themselves before advancing major, and potentially disruptive, policy projects. An inflationary crisis would certainly be an occasion for such change.

Despite the immense economic prosperity and stability of the late-1990s and early 2000s, public finances remained stretched and vulnerable to shock. When this shock came in 2008, governments seemed to prioritize the defense of their money systems. In the United States and elsewhere, governments have been repeatedly criticized for defending financial institutions, who are widely seem as key, if not principle, culprits of the crisis. Prioritizing the well-being of banks is a highly pragmatic decision, rather

than one rooted in notions of justice. In defending the financial system, governments are attempting to secure a key social infrastructure upon which our entire political economic edifice rests. That system's collapse not only imperils the complex web upon which trade, business, jobs and retirement savings rests, but also possibly the solvency of, and order established by, governments themselves.

Should our problems worsen, it seems likely that neoliberal policy – or at least its concrete manifestations like globalization, deregulation, privatization and so on – will be the subject of more intense debate. Although the past twenty years of economic policy attract much antipathy, neoliberalism did not fail entirely. The world's money systems were breaking down, governments were progressively falling into bankruptcy, and societies were in acute political economic crisis. Neoliberalism helped resolve a serious global economic crisis and restored political and economic stability, even if imperfectly. There is much to criticize about neoliberalism, but an inordinate focus on attacking the ideology risks losing sight of the deeper problems it was attempting to resolve. They still need to be addressed.

Although it tackled countries' money system and government solvency problems on many fronts, neoliberalism not only maintained a vulnerability to speculation but depended on it. Speculators helped fund government borrowing, secure inward investment and the acquisition of hard money, enabled governments to off-load old obligations (like pensions or public investment) and fuel moments of economic prosperity. We are now very aware of the downside associated with having an economy in which speculation is rampant. Any post-neoliberal economic order needs to find practical solutions for reestablishing the stability of money and solvency of governments. If speculators are to be replaced, something else has do help secure our money's and governments' solvency. Political economic systems seem less likely to be long-lived if they don't find these kinds of solutions.

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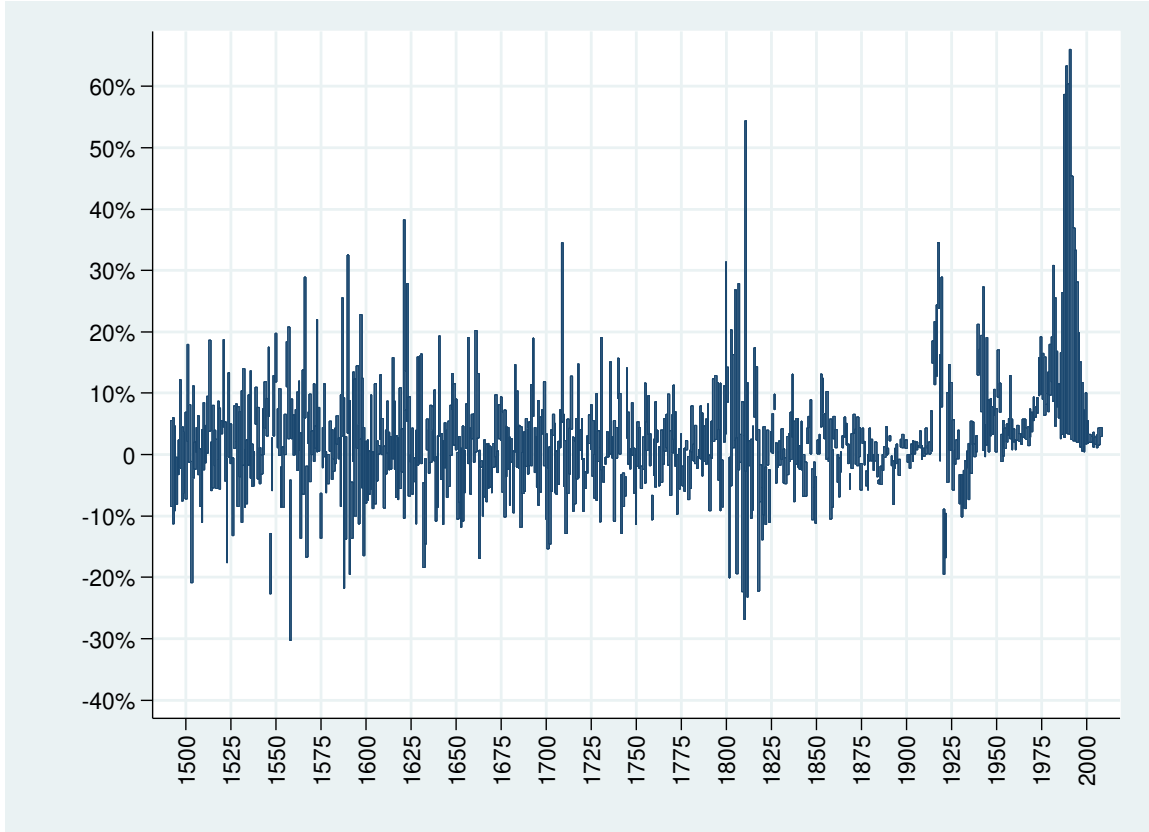World Bank (2009). World Development Indicators, World Bank.

Figure 1: Inter-Quartile Range of Annual Inflation Rates, Seven Countries, 1492 – 2005. Vertical blue lines demarcate range between 25th and 75th percentile single-year inflation scores in any given year.
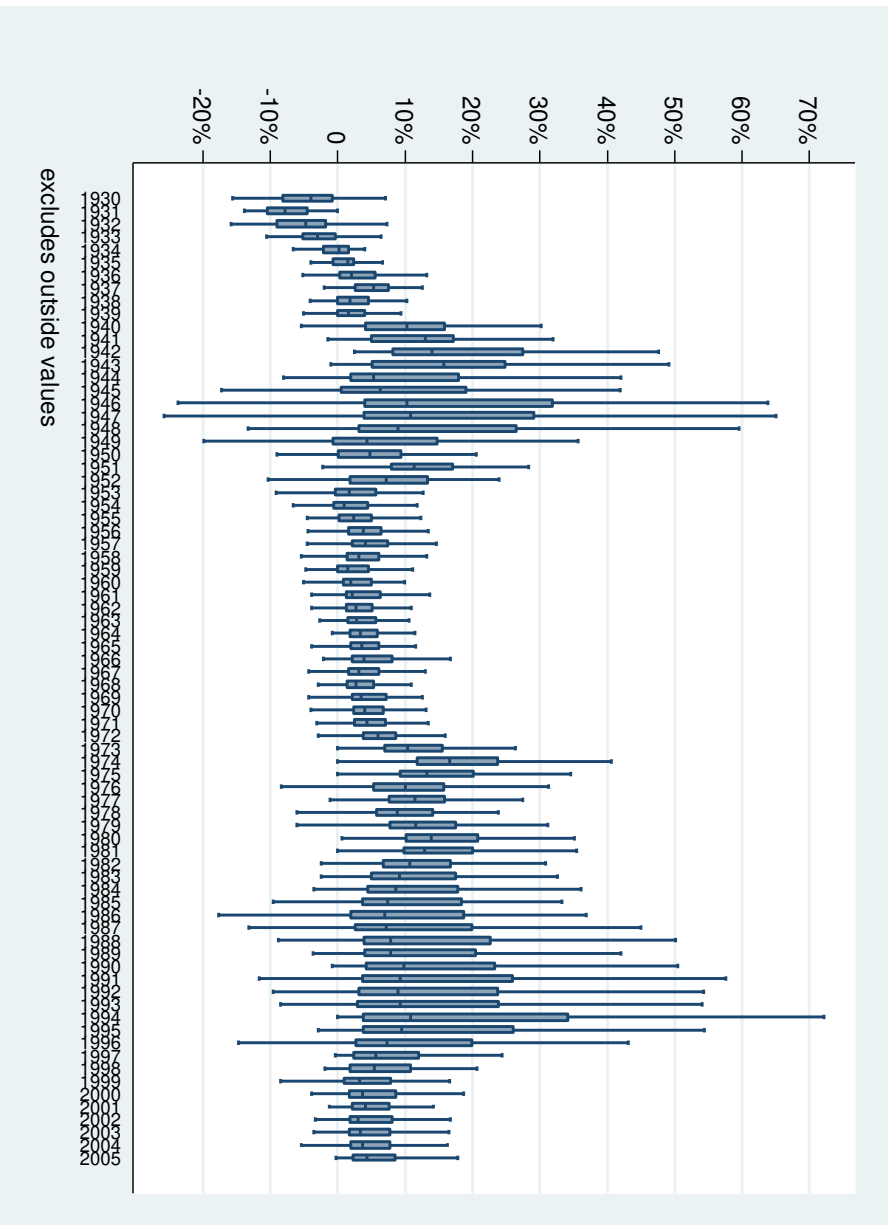
Figure 2: Box Plot of Inflation Rates, 1930 - 2005. Represents data for an unbalanced panel of 164 countries. Outliers have been suppressed.
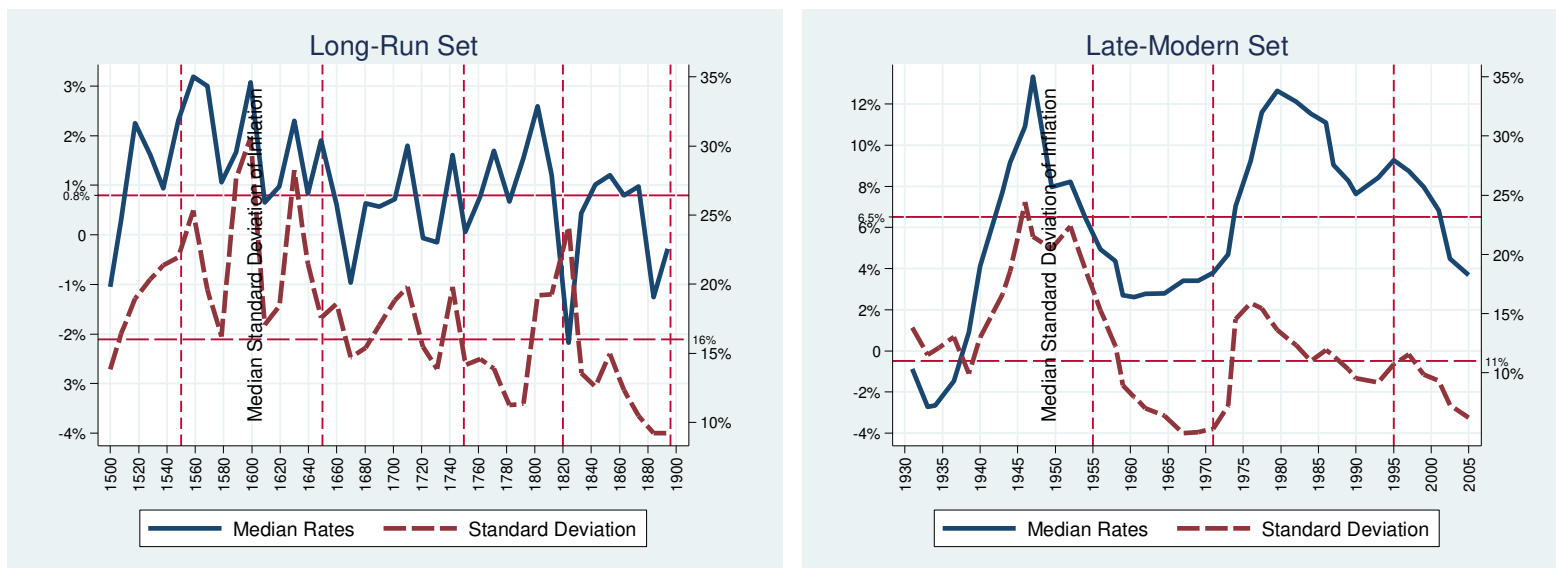
Figure 3: Median Lagged Seven Year Inflation Rates and Standard Deviation, 1492 – 1900 (left) and 1930 – 2005 (right). Note that these graphs depict different samples – see Methods section. Solid blue lines denote the median score for countries' mean inflation rates over the preceding years, and is scaled to the left axis. The solid horizontal red line at the left axis' 0.8% (left) and 6.5% (right) marks is the median score for this variable over the entire pre-20th century period. The dashed red line represents median standard deviation of inflation by year, and is scaled to the right axis. The dashed horizontal red line at the right axis' 16% (left) and 11% (right) marks represents the median score for this variable over the time period studied here. Vertical dashed lines mark the years that are commonly argued to be periods in which the world system transitioned from periods of secular inflation to stability or vice-versa.
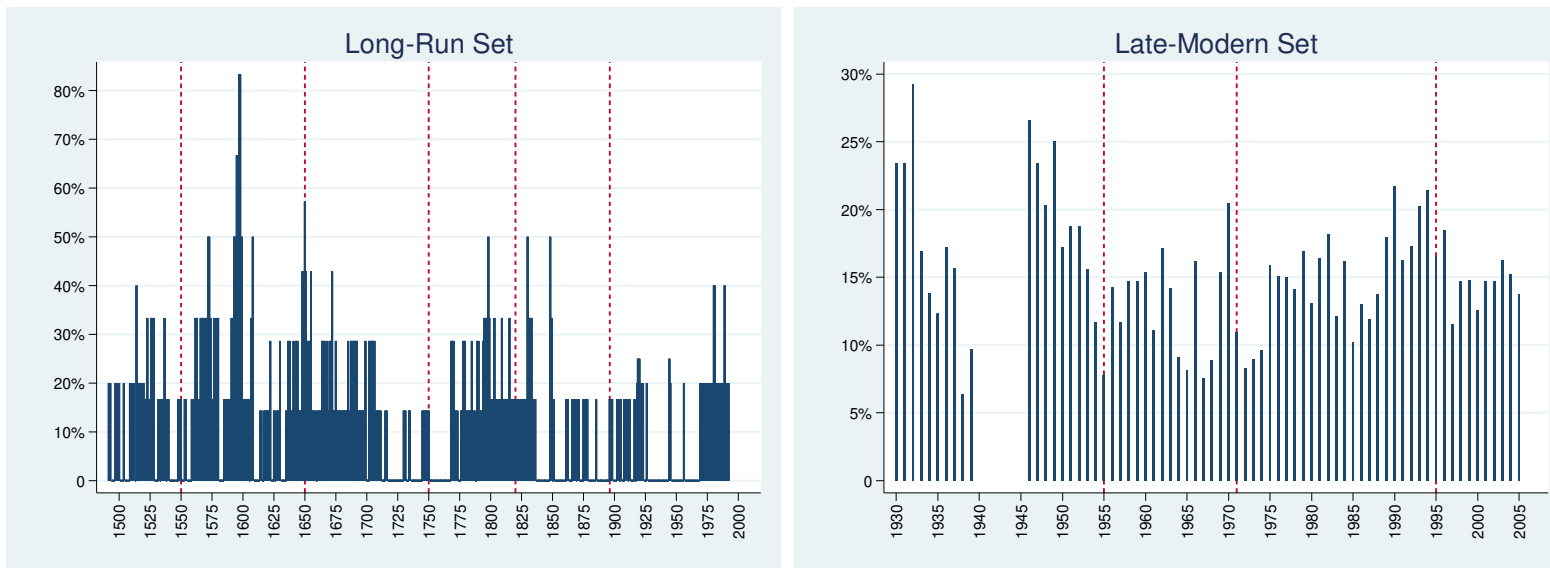
Figure 4: Incidence of Revolutionary Situations, Long-Run Sample from 1492 – 1992 (left) and Late-Modern Sample from 1930 – 2005 (right). Vertical dashed lines denote periods commonly cited as transition periods between eras of secular inflation and long-term price stability. Note that the two graphs use different samples and different specifications of rebellion. See Methods Section.

Table 1: Mean Cumulative Inflation Rates and Variation, by Period of Secular Inflationary Wave or Price Stability

Period		No Revolt	Revolt	Pr(diff)
1492 – 1550	*Rates*	1.5	1.3	0.6113
	SD	20.3	15.2	0.0144
1550 - 1650	*Rates*	2.1	2.5	0.3751
	SD	25.9	27.8	0.3377
1650 - 1750	*Rates*	0.8	0.04	0.0116
	SD	19.1	22.1	0.0092
1750 - 1820	*Rates*	1.0	2.3	0.0000
	SD	16.0	27.2	0.0000
1820 - 1896	*Rates*	0.4	0.9	0.3238
	SD	14.1	46.0	0.0000
1955 - 1971	*Rates*	6.53	12.5	0.0000
	SD	12.3	22.8	0.0000
1971 - 1995	*Rates*	15.6	23.3	0.0000
	SD	19.7	29.1	0.0000
1995 – 2005	*Rates*	13.5	22.3	0.0000
	SD	18.8	29.4	0.0000

Rates = Cumulative Lagged Mean Seven-Year Inflation Rates; SD = Standard Deviation of Inflation Rates over Preceding Seven Years. Pr(diff) = Probability that differences between <u>mean</u> scores of countries experiencing revolts versus not are insignificant

Table 2: Random-Effects Probit of Incidence of Revolutionary Situations on Inflation Rates, 1492 - 1900

Model	One	Two	Three	Four	Five	Six	Seven
Years	1492-1900	1492 - 1900	1492-1900	1550 - 1650	1650 - 1750	1750 - 1820†	1820 - 1900†
tlast	-0.202***	-0.201***	-0.203***	-0.258***	-0.171***	-0.297***	-0.180^
	(0.013)	(0.013)	(0.013)	(0.039)	(0.022)	(0.054)	(0.094)
tlast2	0.005***	0.005***	0.005***	0.009***	0.004***	0.010***	0.005
	(0.000)	(0.000)	(0.000)	(0.002)	(0.001)	(0.003)	(0.003)
tlast3	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Cum. Inflation Rates (square root)	0.060	0.060		0.356***			
	(0.079)	(0.079)		(0.159)			
Inflation Variance (logged)	0.255***	0.255***	0.264***			0.689**	0.479***
	(0.078)	(0.078)	(0.076)			(0.226)	(0.071)
Hegemony: Maturity		-0.088			-0.280		
		(0.130)			(0.286)		
Hegemony: Decline		-0.136					
		(0.240)					
Hegemony: None		-0.059			-0.699*		
		(0.119)			(0.289)		
Kondratieff: Peak		0.314*	0.316*	0.786***	-0.197	-0.299	1.438***
		(0.143)	(0.142)	(0.231)	(0.304)	(0.403)	(0.161)
Kondratieff: Decline		0.070	0.052	0.159	-0.432*	0.410^	0.766^
		(0.105)	(0.104)	(0.202)	(0.207)	(0.247)	(0.454)
Kondratieff: Trough		0.237^	0.234^	0.399	0.362	0.510	1.213**
		(0.133)	(0.132)	(0.263)	(0.243)	(0.594)	(0.458)
Major War		0.128	0.146^	0.345^			
		(0.092)	(0.087)	(0.178)			
Core of WS		-0.103					
		(0.131)					
Constant	-0.805**	-0.787*	-0.825**	-1.555*	0.751*	-1.734*	-2.172***
	(0.297)	(0.354)	(0.277)	(0.648)	(0.343)	(0.792)	(0.342)
N	2100	2100	2100	539	707	332	393
N(groups)	7	7	7	7	7	7	6
log-likelihood	-598.4	-593.0	-593.9	-175.7	-195.1	-92.52	-58.1
AIC	1210.8	1216.0	1207.8	371.5	410.2	197.0	126.1

***p<0.001, **p<0.01, *p<0.05, ^p<0.10; Standard errors in parentheses under coefficients
†Results are from cross-sectional probit. Tests suggests random-effects not significant in this period.

Table 3: 75th/25th Percentile Differences, Results from Table 2: Random-Effects Probit of Incidence of Revolutionary Situations on Inflation Rates, 1492 - 1900Table 2

Model	One	Two	Three	Four	Five	Six	Seven
Time Since Last Revolt	18%	18%	17%	55%	25%	31%	9%
Cumulative Inflation Rates	n.s.	n.s.	-	107%	-	-	-
Cumulative Inflation Variability	108%	108%	108%	-	-	119%	113%
Hegemony: None	-	n.s.	-	-	49%	-	-
Kondratieff: Peak	-	137%	137%	219%	n.s.	n.s.	420%
Kondratieff: Decline	-	n.s.	n.s.	n.s.	65%	151%	215%
Kondratieff: Trough	-	127%	126%	n.s.	n.s.	n.s.	307%
War		n.s.	116%	142%	-	-	-

Represents ratio of predicted value of country that scores at the model's sample's 75th percentile versus 25th percentile, other predictors at median. n.s. = not significant; - = not in model

Table 4: Random-Effects Probit of Revolts, Post-War Era

Model	Eight	Nine	Ten	Eleven	Twelve	Thirteen
Years	1945 - 1997	1945 - 1997	1960 - 1997	1960-1997	1960-1997	1960-2006
tlast	-0.189***	-0.190***	-0.193***	-0.194***	-0.194***	-0.235***
	(0.021)	(0.021)	(0.023)	(0.023)	(0.023)	(0.020)
tlast2	0.008***	0.009***	0.009***	0.009***	0.009***	0.011***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
tlast3	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Inflation Rates	0.074^	0.104***	0.026		0.057^	0.053*
(logged)	(0.040)	(0.026)	(0.052)		(0.031)	(0.027)
Inflation Variance	0.040		0.036	0.057^		
(logged)	(0.040)		(0.049)	(0.030)		
Democracy	-0.024***	-0.024***	-0.013*	-0.012^	-0.013*	
	(0.005)	(0.005)	(0.006)	(0.006)	(0.006)	
International War	-0.149		-0.148			
	(0.178)		(0.0226)			
Per Capita GDP			-0.033***	-0.033***	-0.033***	-0.032***
Growth			(0.007)	(0.007)	(0.007)	(0.006)
Per Capita GDP			-0.153***	-0.149***	-0.158***	-0.178***
(logged)			(0.047)	(0.046)	(0.046)	(0.037)
Constant	-0.792***	-0.746***	-0.543***	-0.537***	-0.510***	-0.313**
	(0.119)	(0.109)	(0.134)	(0.133)	(0.126)	(0.104)
N	3958	3958	3087	3087	3087	4462
N(groups)	125	123	117	117	117	154
log-likelihood	-1276.1	-1276.9	-960.6	-960.7	-960.9	-1306.2
AIC	2570.1	2576.8	1942.7	1939.4	1939.7	2628.4

***$p<0.001$, **$p<0.01$, *$p<0.05$, ^$p<0.10$; Standard errors in parentheses under coefficients*

Table 5: 75th/25th Percentile Differences, Results from Table 4

Model	Eight	Nine	Ten	Eleven	Twelve	Thirteen
Time Since Last Revolt	52%	66%	49%	48%	48%	49%
Cumulative Inflation Rates	111%	115%	n.s.	-	108%	108%
Cumulative Inflation Variability	n.s.	-	n.s.	108%	-	-
Democracy	70%	70%	82%	82%	82%	-
International War	n.s.	-	n.s.	-	-	-
Per Capita GDP Growth	-	-	83%	83%	83%	84%
Per Capita GDP	-	-	68%	69%	67%	64%

Represents ratio of predicted value of country that scores at the model's sample's 75th percentile versus 25th percentile, other predictors at median. n.s. = not significant; - = not in model

Endnotes

[i] There are many ways of consummating economic transactions or sustaining economic relationships without money, like barter, individual trust, organizations, collectives or vassal-lord-like relationships. These means of organizing economic activity have been common historically, and many of them continue to sustain a wide range of transacting today. However, it is hard to envision how these alternative, non-money-based methods of coordinating economic relationships could sustain a larger, modern economy to deliver our current material standard-of-living or lifestyle. Money is not necessary for the organization of economic activity, but is one upon which we are reliant if modern economic institutions are to be reproduced on a scale to which we have become accustomed.

[ii] Enables transactants to separate the act of economic production and consumption by enabling them to take place with different people, in different places, at different times and in different quantities.

[iii] A benchmark that several researchers identify as a threshold beyond which price pressures can clearly be considered high (Bruno and Easterly 1998; Fischer, Sahay and Végh 2002).

[iv] These countries include Austria-Hungary/Austria, England/Great Britain/United Kingdom, France, Dutch Republic/Netherlands, Ottoman Empire/Turkey, Poland and Sweden. For these countries, we have at least 340 inflation data points, with a mean representation of 415. England and France are fully represented. In no year are less than five countries' inflation figures reported.

[v] The practice of drawing contracts that automatically adjust prices to inflation.

[vi] Schiller (2003) finds the earliest example of interest indexation to occur in late-18th century Massachusetts, but argues that they only came into wide usage after WWII. Wage indexation in a major US labor contract first appeared in 1948 (Ehrenberg, Danziger and San 1983).

[vii] Its adoption was slow enough that, two hundred years later, roughly 10% of US households still lacked any ownership of a bank account (Hogarth, Anguelov and Lee 2004).

[viii] Although sample representativeness varies over time, the general shape of the graph is similar to one in which a limited sample of highly-represented cases are used. The basic message imparted by the graph does not depend on the sample being balanced.

[ix] In contrast with Goldstone, Fischer sees population growth as being driven by fertility choice, which is taken to occur where life's amenities are abundant relative to population and real wages are rising as a result of labor shortages.

[x] like the 1987 Crash, 1990s' developing world currency crises, the Long-Term Capital Management crisis or the dot-com crash

[xi] Austria (Austria-Hungary / Hapsburg Monarchy), France, Netherlands (Dutch Republic), Poland, Sweden, Turkey (Ottoman Empire), United Kingdom (England / Great Britain)

[xii] A concept drawn from Tilly (1993) that represents the presence or absence of a situation in which competing political contenders, each with popular support, claim exclusive controls of the state or some segment of it.

[xiii] For pre-1960 years, particularly country-years' inflation scores were determined as follows. Data were compiled via a procedure in which the inflation data set that correlated best with the World Development Indicators (which we take to be our most authoritative set) replaced any missing values. Then, the set whose inflation values correlated best with the resulting data set replaced remaining missing values. This process continued until we were left with data sets that correlated poorly ($\rho < 0.500$) with this compilation's figures.

[xiv] The choice of seven years is, to some degree, arbitrary, but this specification performed best in our exploratory research.

[xv] In which the latter is log-transformed and the former is square-root transformed

[xvi] In these models, seven-year inflation rates are top- and bottom-coded at 15% and -5%, respectively, which affect less than 1% of the sample in both cases. The variable is shifted and transformed by square root.