

A CLIOMETRIC INVESTIGATION INTO THE CAUSES OF THE US PANIC OF 1873

LUDO DAWNAY

Senior Sophister

Ludo Dawnay sets out a research framework to investigate the link between international contagion and financial crises. He uses the panic of 1873 in the United States as an interesting case study to investigate the theory of financial crises proposed by Charles Kindleberger. He concludes by highlighting some of the potential econometric pitfalls involved in the research proposal.

Introduction

This paper proposes a case study which sets out to contribute to answering the following question: To what extent are financial crises the result of international contagion? The aim of this proposal is to shed light on the degree of interconnectedness of national economies during the end of the 19th century. By this time, almost all regions were part of the world economy. Technological advances and a fall in trade tariffs had made distant corners of the globe increasingly interlinked.

Motivation

Evaluating the factors provoking financial crises are essential for preventing them in the future. Stock market crashes have generated deep and long-lasting recessions since before the 19th century. Over the course of the 1800s, there were six panics in the United States alone. Financial services can be a very useful tool by transferring money from one time period to another; it enables savings and insurance, for example (The Economist, 2014). However, it may also offer the opportunity for a series of misjudged decisions made by a select segment of society to have negative ramifications for all.

Juglar (1967), Mitchell (1926) and Morgenstern (1959) all agree that financial crises in one country both affect and are induced by circumstances beyond its borders. The international movement of money for investment is included as one of the mechanisms by which panics can be transmitted (Kindleberger, 2005). Moreover, wars and monetary policy are further examples of the determinants of the level of fluctuations in capital flows (Kindleberger, 2005).

Various other arguments have been put forward regarding the causes of financial crises. Most academics are divided between speculative investments and systemic economic foundations (Mixon, 2008: 723). Hyman Minsky outlines the classical view that

crises originate from the fragility of markets (Kindleberger, 2005). An exogenous shock expands the supply of credit and thus raises the optimism of borrowers and lowers the level of risk aversion among lenders (Minsky, 1975). The eventual slump in confidence in the initial investments resulting from the realisation of past inflated expectations increases the likelihood of a crash (Kindleberger, 2005). The irrationality was articulated rather cynically in the Chicago Tribune of April 13, 1890:

“In the ruin of all collapsed booms is to be found the work of men who bought property at prices they knew perfectly well were fictitious, but who were willing to pay such prices simply because they knew that some still greater fool could be depended on to take the property off their hands and leave them with a profit.” (Quoted in Hoyt, 1933: 165)

Minsky interpreted Keynes’ theory that a financial crisis is a “systemic rather than an accidental event” generated by the dependence on “debt-financed ownership of capital assets” (Minsky, 1975). Walter Bagehot argued that financial bubbles occur when the ‘blind capital’ of the public wanders towards speculative investments (Bagehot, 1915).

According to Mixon (2008), fundamental domestic economic factors are to blame for economic troubles. Mishkin (1991) argues that worsening balance sheets generates asymmetric information in financial markets. Asymmetric information occurs when there are differences in the information held by borrowers and lenders (Mishkin, 1991). The adverse selection and the ‘market for lemons’ that results have negative repercussions for the economy (Mishkin, 1991; Akerlof, 1970).

Monetarists, led by Milton Friedman and Anna Schwartz (1963), view banking panics as the result of significant contractions in the money supply solved only by the central bank acting as the lender-of-last-resort (Mishkin, 1991). In the view of Schwartz (1986), a ‘real’ financial crisis occurs when the public lose confidence in their ability to withdraw cash from the banks (Bordo, 1990). The monetarist does not view monetarist contraction, but the public perception of the future availability of money, as the cause of a crisis (Bordo, 1990).

Research Question

This research proposal focuses on the Panic of 1873, an event which led to the Long Depression (1873-1879) in Europe and North America. The specific question is: How much was the Panic of 1873 in the United States the result of the Franco-Prussian Indemnity payments of 1871-1873?

The paper intends to explain to what extent the crash in the United States was encouraged by events in Europe, particularly Germany. The New York Stock Exchange closed its doors for ten days at the end of September 1873. The Panic was followed by the

longest period of depression on record, from October 1873 to March 1879 (NBER, 2008). A more interesting reason to select the event known as ‘The Great Depression’ before the more famously known one stole its name, is its international dimension (Kindleberger, 1990). It shares this characteristic with the panics of 1890, 1929 and 1987 (Kindleberger, 1990). Moreover, little empirical research has been carried out to determine the causes of this Panic (Mixon, 2008).

The paper will assess the theory of Charles Kindleberger who is associated with the ‘speculative bubble’ school of thought. The 1873 Panic is a fundamental example used by Kindleberger to outline his theory. Kindleberger (2005) listed thirteen factors which contributed to both crises across the Atlantic, but emphasised the reparations paid to Germany, the victor of the Franco-Prussian War. The Germans increased their domestic investment, thereby decreasing their foreign investment in the U.S. The decrease in capital inflows halted the great expansion of the Northern Pacific Railway which ultimately culminated in the bankruptcy of an important bank, Jay Cooke & Co., in September 1873 and the following stock market crash. Intuitively, an increase in money supply would increase domestic as well as international German investments. But his argument is that there was such a large speculative boom that investors took their money out of the U.S. to put into Germany.

Kindleberger (2005) uses a narrative approach to develop his argument, emphasising the uniqueness of each event through qualitative evidence, rather than identifying patterns by collecting and analysing data. This proposal, on the other hand, will use econometric analysis to assess this theory.

Literature Review

Tackling the question in a different way may overcome some of the faults of the original explanation. The study is ‘vague and untestable’ (Gorton, 1990). Kindleberger offers no definitions for and does not distinguish between concepts that he is trying to explain such as ‘crash’, ‘mania’ or ‘bubble’ (Gorton, 1990) and he did not develop a model to explain the chronology of events (Mixon, 2008). The impact of unanticipated shocks is undoubtedly important to the assessment of business cycles (Bordo, 1990). Kindleberger fails, however, to sufficiently identify the given results of a particular shock, among the many others that occur during any period (Bordo, 1990).

Matthew Simon suggests that European investors lost confidence in railroad debt (Simon, 1978). The increasing number of joint-stock firms in Germany, catalysed by a series of deregulations in 1870, further incentivised investors to turn away from U.S. railways (Simon, 1978; Mixon, 2008). Kindleberger includes the deregulation of the German financial system in his thirteen factors (Kindleberger, 1990). In December 1872, the American consul in Frankfurt wrote that German investors ‘... can no longer be relied upon as a market for the securities of the railroad, cities, or even the states of the Union.

So many railroad corporations have failed to pay their interest coupons ... the buyer now considers everything American uncertain' (Simon, 1978: 161-172; Mixon, 2008: 751). A survey of German bankers concluded, 'Doubtless the failure of a few properties had affected the values of the perfectly sound ones' (Simon, 1978: 143-145). Mixon states that the combination of the poorer than expected business prospects of the U.S. railways and the difficulty of raising capital due to the booming German markets led to the crash (Mixon, 2008). Both Simon and Mixon advocate domestic factors. They do not disagree with the importance Kindleberger places on flows of capital but view it as a symptom, not a cause of the crisis (Mixon, 2008).

Michael Bordo's theory states that the French Indemnity of 1871-72 caused inflation which spilled into Austria (Bordo, 1990). This monetarist viewpoint does not dispute the global background to the financial crisis, citing the connections between countries through the fixed exchange rate gold standard (Bordo, 1990). However, one should note that the United States did not sign up to that mechanism until 1873 (Bordo, 1990). Thus, the U.S. dollar's floating exchange rate immunised its economy from European investments (Bordo, 1990).

Mishkin's (1991) analysis of interest rate spreads and stock prices during the period demonstrates that financial failures such as those of Jay Cooke and Co. contributed to the financial crisis of 1873. However, Mixon's evidence suggests that 'irrational exuberance' was entirely absent within the American financial markets in the period preceding the Crisis of 1873 (Greenspan, 1996; Mixon, 2008). Mishkin's (1991) findings, while consistent with his asymmetric information argument, strongly emphasise the bank panic's impact on declining money supply. Friedman and Schwartz (1963) show a sustained decrease in money supply for the period 1873-1879. This leads Mishkin (1991) to conclude that the monetarist view complements his own by illustrating the transmission mechanism between banking panics and economic activity.

Data

Impact of the Franco-German Indemnity on the German Economy

The dependent variable for the first regression is net new foreign investment into the U.S. in millions of dollars taken from Simon (1960).

The first independent variable is German banknote circulation measured in millions of marks available in International Historical Statistics by Mitchell (2007). It is an indicator of the impact of the Franco-German payments.

The second independent variable is the number of new buildings constructed in Germany available from the National Bureau of Economic Research (NBER, 2008). Also generated by the NBER (2008) is the independent variable of German stock prices indexed to 100 in 1913. Both are indicators of the speculative boom.

The fifth independent variable will be a dummy for the Austrian World Exhibi-

tion, or Weltaustellung, which occurred on May 1, 1873. Its entry will be 0 before and 1 after that date. The Weltaustellung is not one of Kindleberger's thirteen factors, but he does mention it as a cause (Kindleberger, 1990). Large investments were made in services such as hotels and cafés in preparation for an influx of visitors to the event. However, much less than expected made the journey, and on the ninth of May the Austrian stock market crashed.

Kindleberger would expect that all explanatory variables except the fifth are inversely correlated with capital inflows.

Impact of Capital Inflows on U.S. Stock Market Prices

The dependent variable of the second regression is all US common stock prices indexed to 1913 from the NBER (2008).

The first independent variable is capital inflows, the dependent variable in the first regression. The hypothesis of this paper expects a positive coefficient for this variable.

The second independent variable is miles of railroad built in the US which is drawn from data collected by the NBER (2008). The most commonly cited reason for the 1873 Panic is the overextension of the railway and the exhaustion of its funds.

The third independent variable is the price of land and buildings combined in Chicago provided by Hoyt (1933). The Chicago fire of October 8, 1871 is cited as a domestic factor by Kindleberger (1990). It accelerated a real-estate boom in the city which slowed down during the middle of 1873 and crashed after the news of Jay Cooke & Co. (Kindleberger, 1990).

The last independent variable is the ounces of silver per ounces of gold collected by Officer and Williamson (2014). The German Empire introduced the Gold Standard in 1871, halting the use of silver Thaler coins and decreasing the commodity's global market price. The US was a large producer of silver and the decision in Germany caused the US to move away from silver by enacting the Coinage Act of 1873. Therefore, this is an illustration of international financial contagion; a statistically significant result would show that events in one country have affected those in another.

The German-US foreign exchange rate provided by The Federal Reserve Bank of St. Louis is illustrated in Figure 1 of the appendix. Also there are graphs for capital inflows and stock prices.

Drawbacks of the Data

Cliometrically, it is difficult to find detailed historical data regarding international capital flows. The capital inflow figures show total capital inflow into the US, and do not distinguish between those from Germany and those from other countries. Also, not all of German external investment would have been flowing to the US.

The regularity of observations varies: US and German stock prices are given monthly, whereas all other datasets give annual data. The monthly data will be collapsed into means using the `tscollap` function in Stata. Another limitation is the lack of for some of the inputs pre-1871. It would give a more detailed picture to analyse over a greater period of time. Both these shortcomings create smaller sample sizes.

The empirical analysis will be carried out in two stages using econometric methods. The purpose of this analysis is to prove, firstly, that speculative German investments triggered by the Franco-German Indemnity were the cause of a decrease in capital inflows into the United States and, secondly, that this decrease in capital inflows lead to the stock market crash of 1873 in the U.S. The other independent variables of the second regression model are each used to support a different explanation of why the Panic occurred.

Ordinary Least Squares (OLS) time series analysis will be run in order to estimate the impact of each independent variable on the dependent variable, *ceteris paribus*. The time series data collected gives one possible realization of the stochastic process (Wooldridge 2009). The counterfactual case would be any other outcome, which is not exclusive to the Franco-Prussian Indemnity not being paid (Wooldridge 2009).

The data set provides 22 annualized intervals for the years 1871-1892 inclusive, each variable indexed at time period t , as shown below. The interval stretches from the start of the Indemnity to the emergence of the following panic. The limited data, an inevitable consequence of examining such a short period of time, lowers the degrees of freedom of the analysis, and means that the t -statistics will be less normally distributed and more concentrated around the sample mean.

Regression 1

$$USCapFlows = \beta_0 + \beta_1 GerMS_t + \beta_2 GerSP_t + \beta_3 GerCon_t + \beta_4 AusWE_t + u_t$$

Where:

$USCapFlows$ = U. S. capital inflows

$GerMS$ = Germany money supply

$GerSP$ = German stock prices

$GerCon$ = German construction

$AusWE$ = Binary/event variable for the opening of the Austrian World Exhibition

Regression 2

$$USSP = \beta_0 + \beta_1 USCapFlows_t + \beta_2 USRail_t + \beta_3 GoldSilver_t + \beta_4 ChLand_t + u_t$$

Where:

USSP = U.S. stock prices

USCapFlows = U.S. capital inflows

USRail = U.S. railroad mileage

GoldSilver = Gold/Silver price ratio

ChLand = Chicago land prices

The preliminary results of the two regressions and the data tables are shown in the appendix.

From Kindleberger's theory, foreign investments were an integral part of total railway investment. Therefore, capital inflows and railways may not be independent and there may be multicollinearity present. To check robustness, a regression should be run using U.S. railways as the dependent variables with the explanatory variables from the first regression. If both this third and the first regression both show high R², then U.S. railroads and capital inflows may be correlated. This issue could also be inferred to exist between German stock price, money supply and construction.

Multicollinearity violates none of the OLS assumptions (Wooldridge, 2009). However, a strong linear relationship between two independent variables may lead to large variances for the OLS slope estimators (Wooldridge, 2009). The statistical phenomenon increases the standard errors, decreasing the t-values. It therefore is harder to reject the null hypothesis that the coefficient is zero and conclude statistical significance.

Heteroskedasticity, present when the variance of the error term is not constant across explanatory variables, could also exist in this model. It renders the t-statistics and F-statistics invalid and the OLS estimator is no longer the best, linear unbiased estimator. It can be identified using the Breusch-Pagan or White's test. The assumption of residual normality required to enable statistical inference regardless of sample size can be tested by illustrating the values in histograms, normal probability plots or dot plots (National Institute of Standards and Technology, 2014; Wooldridge, 2009).

The potential inconsistency of OLS created by omitted variable bias can be avoided by using a suitable proxy variable for an unobserved variable (Wooldridge 2009). However, this assumes the identification of an omitted variable and the availability of a proxy. Examples of potential omitted variables include required cash reserve ratios implied by Simon (1978), Franks et al. (2006) and Kindleberger (1990) and U.S. money supply suggested by Friedman and Schwartz (1963).

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Appendix

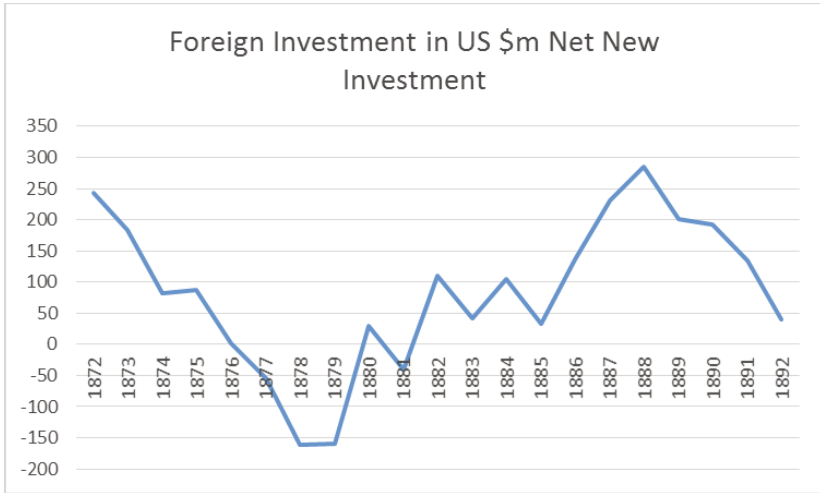


Figure 1: Net New Foreign Investment in US (\$m)

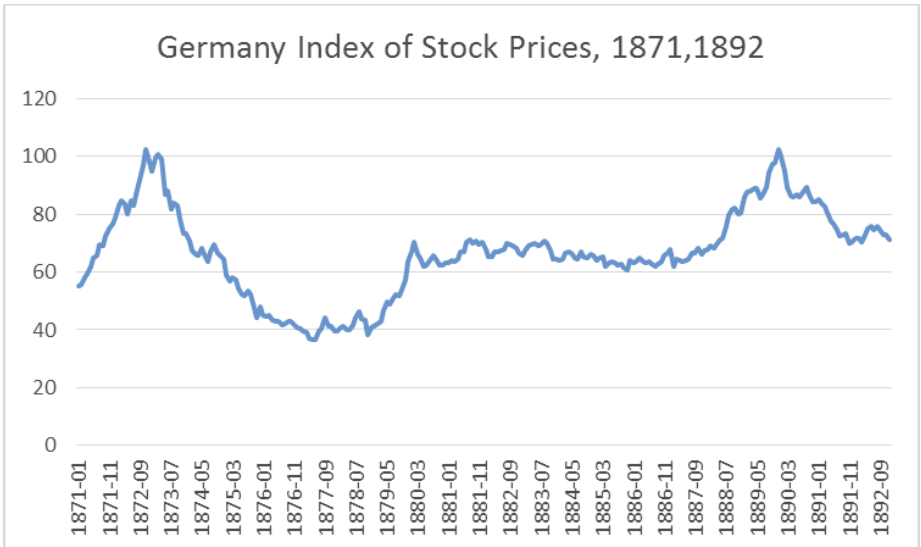


Figure 2: Germany Index of Stock Prices, 1871-1872

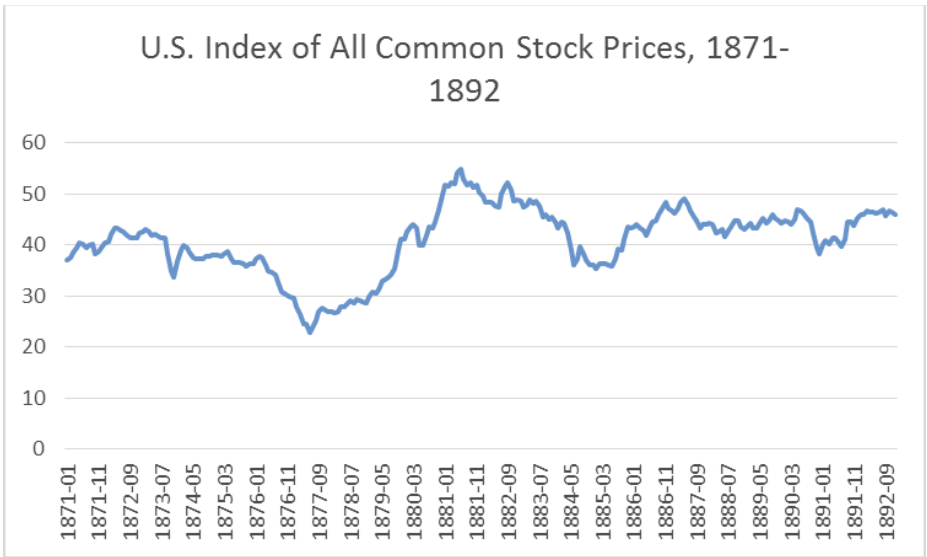


Figure 3: US Index of All Common Stock Prices, 1871-92

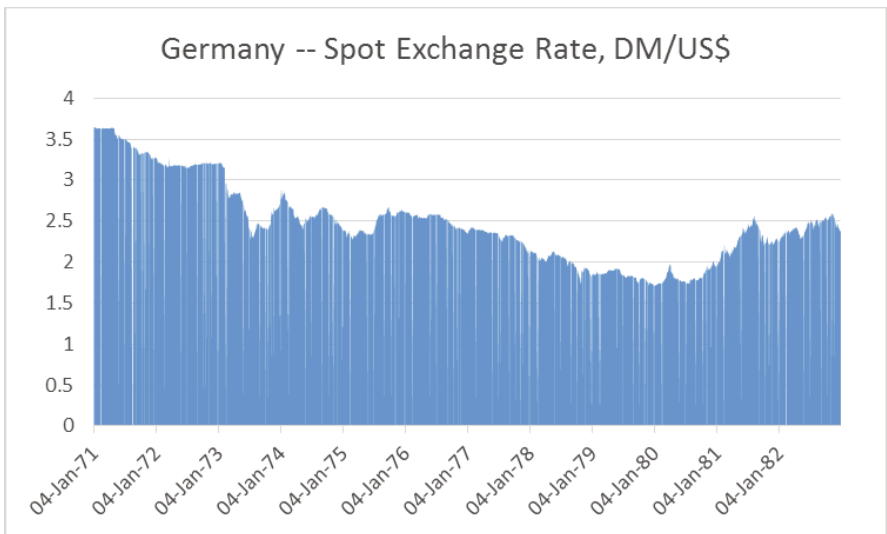


Figure 4: DM/USD Exchange Rate