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Can Sweden Afford Another High Equity Premium?

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Abstract

This paper calculates the empirical equity premium in Sweden between 1919-2006 and disaster probabilities of 25% and 50% contractions in real Gross Domestic Product. The calculation puts the equity premium at approximately 8%, 2% higher than what appears in the historical United States data, due to rare disaster events outside and idiosyncratic to Sweden. This study makes two important contributions. First, it projects that Sweden can afford the economic cost of another high equity premium but should remain cautious. Second, this paper affirms that WWII increased investors' perceptions of future equity risk despite Sweden's neutrality. To arrive at the empirical results this paper follows a distilled version of Barro (2006) written by Taub (2007). The results stemming from this analysis help inform macroeconomic policy in Sweden.

Keywords

Sweden, equity premium puzzle, rare disasters, war neutrality

Cover Page Footnote

I am thankful to Professor Bart Taub for useful comments and to fellow student Edwin Montufar for LaTeX typesetting assistance.

1 Introduction

The novel contribution of this paper is that I calculate the empirical equity premium in Sweden at approximately 8%, and from this estimate my analysis of Swedish historical data from 1919 to 2006 suggest rare disaster probabilities of 1.05% for a 50% contraction in real GDP and similarly 13.73% for a 25% contraction. The research that I conduct is based on Robert Barro's (2006) theory that posits high observed equity premia are the offspring of rare macroeconomic shocks such as extreme events like wars, financial crises, or disease pandemics. However, to arrive at the aforementioned empirical results I follow a distilled version of Barro (2006) written by Bart Taub (2007). The results yield interesting insights into the welfare and policy implications for Sweden in light of the United States financial crisis: a series of economic hardships commencing with the burst of the United States housing bubble in 2006, whose pernicious effects have extended globally.

Although I wanted to study a country that Barro (2006) does not consider in his paper, the asset data for exotic nations outside the Organization for Economic Co-operation and Development (OECD) is hard to acquire, in particular total stock returns for extended time horizons. Instead, I chose Sweden for two compelling reasons. The first being because of its non-alliance policy during World War II and I wondered if Sweden's philosophy of *neutrality* might exclude World War II as a rare disaster. The second reason is because of its unique economic model in the post-World War II era known as the Swedish Model. To illustrate, Sweden's mixed economy, which has highly influenced political and economic thinking in Western Europe since World War II, supports private enterprise directed by strong government intervention to establish fair competition, low inflation, low levels of unemployment, and social welfare benefits. This is in contrast to the free-market economy of the United States, which until recently in 2008 has seen markets nearly unfettered since the late 1970s.

However, there are signs that the Swedish people are growing wary of this idyllic economic model. First, in the most recent elections held in September 2006, the Social Democratic Party, which has led the government for 65 of the 76 years since 1932, lost a majority of its seats which ended 12 consecutive years in office. The Social Democratic Party, whose political ideology commits to social welfare programs and government direction of the economy, was replaced by the Alliance for Sweden. This coalition of four center-right parties supports increased free enterprise and less government intervention, while still supporting the social welfare programs introduced by the Social Democrats.

The reason the political composition in Sweden is important to rare disasters is there is much debate about which party's economic policies contributed most to Sweden's severe financial crisis of the early 1990s. Those on the Right argue it was the internal failure of the Keynesian-inspired macroeconomic Swedish Model, while those on the Left argue it was external global pressure on the Swedish government to adapt capitalist interests in the mid-1980s that lead to the early 1990s crisis. The debate remains controversial, however the political landscape is important because the recent shift towards a less interventionist economy could potentially be welfare worsening in Sweden.

1.1 Sweden's Mixed Economy

Since the 1990s financial crisis, the Swedish economy has rebounded nicely, although recent news indicate Sweden is headed towards a recession exacerbated by the current US financial

crisis. Sweden is a highly industrialized nation and is export-oriented. Sweden's extensive forests, rich iron ore deposits and hydroelectric power are the natural resources, through the application of modern information technology, that have enabled Sweden to become highly focused on foreign trade. Along with it natural resources, Sweden has an excellent and skilled labor force. Aided by its philosophies of peace, neutrality and extensive welfare benefits, Sweden has achieved a high standard of living suggested through GDP per capita (2008 est., purchasing power parity) of $39,600.

Economic growth has been strong in recent years, with an annual average real consumption growth rate of 1.96% in 2004, 2.77% in 2005, and 1.79% in 2006. The Riksbank (Swedish Central Bank) aims for 2% annual inflation, however this rate has not been achieved in recent years. Inflation has not been as stable as GDP growth with an annual inflation rate of 0.403% in 2004, 0.422% in 2005, and 1.35% in 2006. In 2006 the unemployment rate reached 7.1%, but in 2007 it fell to 6.2%, and then rose to 9.3% in 2009. But questions remain unanswered. An analysis of the observed equity premia asks us to question the future stability of Sweden's prosperity. And from this discussion, we can look at what policy actions Sweden should take to insure itself against the adverse global effects of the US financial crisis. To put it candidly, can the highly praised Swedish Model afford the welfare cost of another high equity premium?

1.2 Literature Review

The theory for this paper stems from Barro (2006). His model, an extension of Rietz (1988), hypothesizes that the equity premium puzzle, first documented by Mehra and Prescott (1985), can be explained by the potential for rare economic disasters to depress real GDP. But, first, what is the equity premium puzzle? Historical data series show that the real rate of return to holding and buying shares of stock is considerably larger than the real rate of return to holding government bonds. To illustrate, Mehra and Prescott (1985) show that the average annual yield on the Standard and Poors 500 index over the period 1889-1978 was 7%, while the average return on government bonds was less than 1%. Thus, the difference of 6% is known as the observed equity premium: It is the amount that investors must be compensated in the market for holding risky assets like shares of stock.

However, standard economic theory predicts that the equity premium ought to be miniscule, in most cases less than half a percentage point based on models of capital markets and investor risk preferences. The dichotomy between the high observed equity premium and its theoretical component is known as the "equity premium puzzle". While Barro's (2006) theory has much credibility, there remains no accepted solution to the puzzle in the economics profession.

Second, it is important to understand why the equity premium is important to macroeconomic policy. First and foremost, the equity premium is about aggregate fluctuations in the economy (Taub, 2007). However, Grant and Quiggin (2005) explain that scarce attention has been given to the implications of the equity premium puzzle for resource allocation, welfare or macroeconomic policy, irrespective of whichever model best solves the puzzle. They believe this absence in the literature is disconcerting because they show that the size of the equity premium has nontrivial macroeconomic policy implications. Their observation is that the larger the equity premium, the larger the marginal value of recession-state income (i.e. the average investor values an extra dollar earned in a recession more than he does during an expansion), and thus the welfare cost of a recession is high.

It follows then that the greater the disparity between the observed and theoretical equity premium, then the more interventionist are the policy conclusions. While Lucas (1987) remains steadfast in his position that the welfare costs of aggregate fluctuations are trivial, separate studies show that society is willing to relinquish large amounts of income to eliminate systematic risk (i.e. systematic risk is risk in the market that cannot be diversified away like recessions, wars, and rare disasters). For example, Barro (2009) estimates that society would eagerly reduce real GDP by around 20% each year to eliminate rare disasters and Grant and Quiggin (2005) calculate that society would willingly pay a premium of 15% of real GDP to eliminate systematic risk. To sum up the importance of equity premia in macroeconomic policy, Grant and Quiggin (2005) aver that a high equity premium induces an expensive cost of recession and thus government intervention is potentially welfare improving.

2 Methodology

2.1 Theoretical vs. Empirical Equity Premia

To arrive at the theoretical and empirical equity premia and the rare disaster probabilities I examine consumption and asset returns in a stochastic setting. The time series horizon that I use is from 1919-2006. I believe that this time span is large enough to include one of the rare disasters that the equity premium reflects. This time span captures the Great Depression, World War II including the Midsummer Crisis of 1941, the oil embargo of the 1970s, and the Swedish financial crisis of the early 1990s. All regressions and calculations are done on Microsoft Excel 2004, and all charts are created using the data I collected.

My first objective is to calculate the variance of Sweden's growth rate. I collected private final consumption data for 1919-2000 from Historical National Accounts for Sweden 1800-2000 compiled by Rodney Edvinsson in his 2005 dissertation *Growth, Accumulation, Crisis: With New Macroeconomic Data for Sweden*. The data are nominal values in purchasers' prices. Edvinsson explains purchasers' prices as "A type of price on a unit of good or services produced as output, which includes the excess of indirect taxes over subsidies and transport charges invoiced separately by the producer". Consumption data for 2001-2006 are retrieved from the Swedish National Institute of Economic Research. Again, the data are nominal values but are in constant prices. The compromise I make is that a majority of the nominal final consumption is in terms of the producer's consumption, while the last six years are in terms of the consumer's consumption. The price index I use is the CPI with a base year of 1980. The CPI was retrieved from Global Financial Data. To calculate real private final consumption I divided the nominal consumption at time t by the CPI at time t. I then took the natural logarithm of each value to obtain $\ln(c_t)$.

To observe the growth rate and the volatility of consumption over time I ran the regression $\ln(c_t) = a + bt + e_t$. Sweden's growth rate over the period 1919-2006 is roughly 2.6%, while the variance of the growth rate σ_e^2 is 0.02062281. This variance is low and from this low value the regression suggests that real consumption between 1919-2006 is not very volatile. Sweden's steady upward growth is seen in Figure 1.

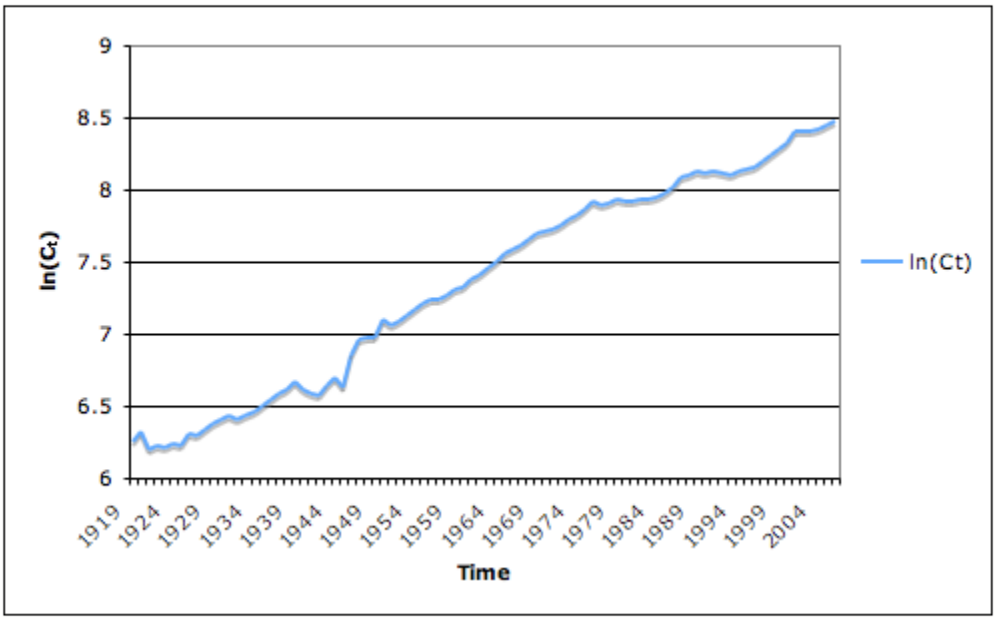

Figure 1: Growth of Real Consumption, 1919-2006

The smooth growth trend indicates that stochastic shocks do not perturb private final consumption greatly. In fact, the subtle concave shape of the trend suggests that Sweden is tending towards a steady state of real consumption.

Next, I ran an autoregression of the log of real consumption $\ln(c_{t+1}) = a + b\ln(c_t) + u_t$ to calculate the variance of the residuals in order to calculate the theoretical equity premium, which is derived as the equation $\lambda = (\gamma\sigma_u^2)$. The variance σ_u^2 is 0.00182123. γ is the risk aversion factor, and I use a conservative estimate of 4 as an assumption. I multiply the risk aversion factor and the variance of the residuals to arrive at the theoretical equity premium of $\lambda = 0.00728494$. The theoretical equity premium reflects a 0.728% return over riskless assets that investors require if they anticipate no rare disasters. Clearly, this is not the case as Barro (2006) claims because it is too low (it is not even 1%).

To find the empirical equity premium I used historical data on total stock returns and short-run yields. I retrieved data on total stock returns from the Riksbank website. Currently the Riksbank is undergoing a project to construct historical monetary statistics of Sweden from 1668 onward, which provided me with a wealth of information on asset returns. The compiler of all stock returns and short-run and long-run yields for this project is Daniel Waldenstrom. I did not have to calculate a dividend adjustment because the composite stock return index has dividends reinvested from 1919 onwards based on end-of-the months quotes on the Stockholm Stock Exchange. Also, I did not have to adjust for inflation because Waldenstrom has the total stock return in real values. I could not have been more fortunate then to find real stock returns that include reinvested dividends on top of capital gains in order to save myself the cumbersome trouble of having to adjust stock prices for dividends and inflation.

To calculate total stock returns I calculate $\ln(p_{t+1}/p_t)$ where p_t denotes the dividend and inflation adjusted total stock return at time t. To find the empirical rate of return on stocks, denoted r^e, I take the arithmetic average from 1920 to 2006 and get 0.102289, which is 10.2289%. Waldenstrom observes that real stock prices were largely constant up to 1980, but the increase after 1980 is unprecedented. This exponential growth can bee seen in Figure

2 below. This observation is important later when I discuss the equity premium.

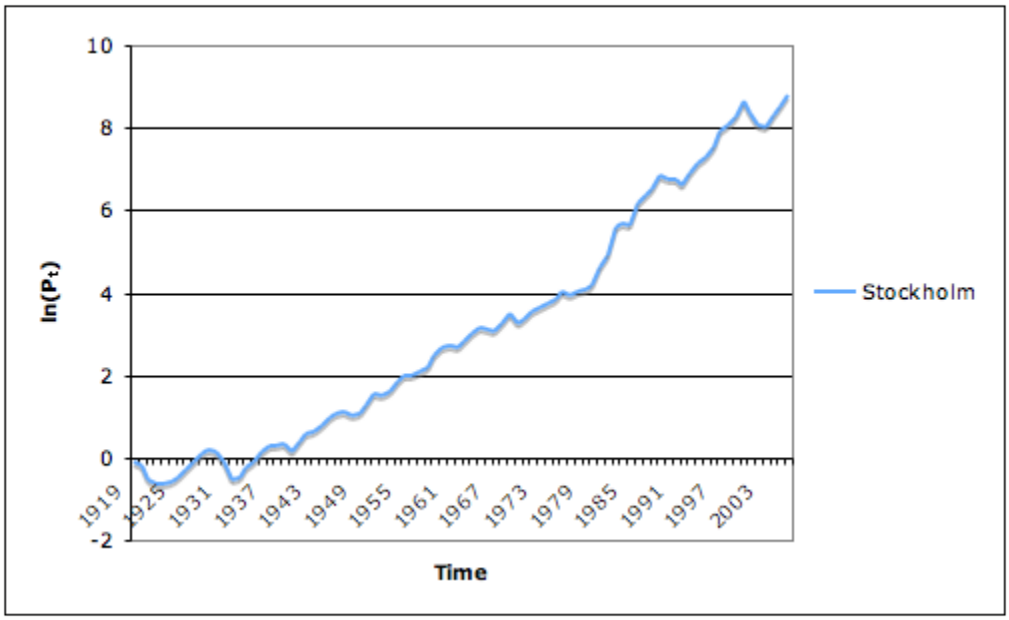

Figure 2: Stockholm Composite Stock Return Index, 1919-2006

To find returns on relatively riskless assets I look at short-term government bonds. In particular, the Swedish short-term risk free rate is measured as the discount rate of the Riksbank from 1856-1982 and as the Swedish 30-day Treasury bill thereafter. Since Barro (2006) measures the risk free rate using 30-day treasury yields, I attempt to do the same. However, unfortunately there was no such Treasury bill market in Sweden before the 1980s. Consequently, Waldenstrom uses the discount rate as a proxy. The discount rate in Sweden was an important market rate in the sense that banking law stipulated that commercial banks had to follow it when setting their own borrowing and lending rates. The rates are in nominal values, so to adjust the data for inflation I use the formula $r_t^f real = [(1 + r_t^f nominal) \cdot (x_{t-1}/x_t)] - 1$ with x_t being the consumer price index (1980=100) of current year t .To find the empirical risk-free rate, denoted r^f, I calculate the arithmetic average of inflation-adjusted short-run yields from 1920 through 2006 and find that $r^f = 0.022494$, which is 2.2494%.

I now have the returns $r^e = 10.2289\%$ and $r^f = 2.2494\%$ to calculate $r^e - r^f$: the empirical equity premium. Therefore the empirical equity premium for Sweden is $r^e - r^f = 7.9795\%$. The empirical equity premium, unlike the theoretical equity premium, represents the return over riskless assets (bonds) investors require to compensate for risky assets (stocks) if they anticipate rare disasters. Also, the empirical equity premium is roughly 10.96 times higher than the theoretical equity premium. Figure 3 shows the annual equity premia trend from 1920-2006 along with total stock returns and real short-run riskless yields. The data suggests that the equity premia per unit of time move procyclicaly with total stock returns and there exists a small suggestion in the trend that the equity premia per unit of time move countercyclicaly with riskless assets.

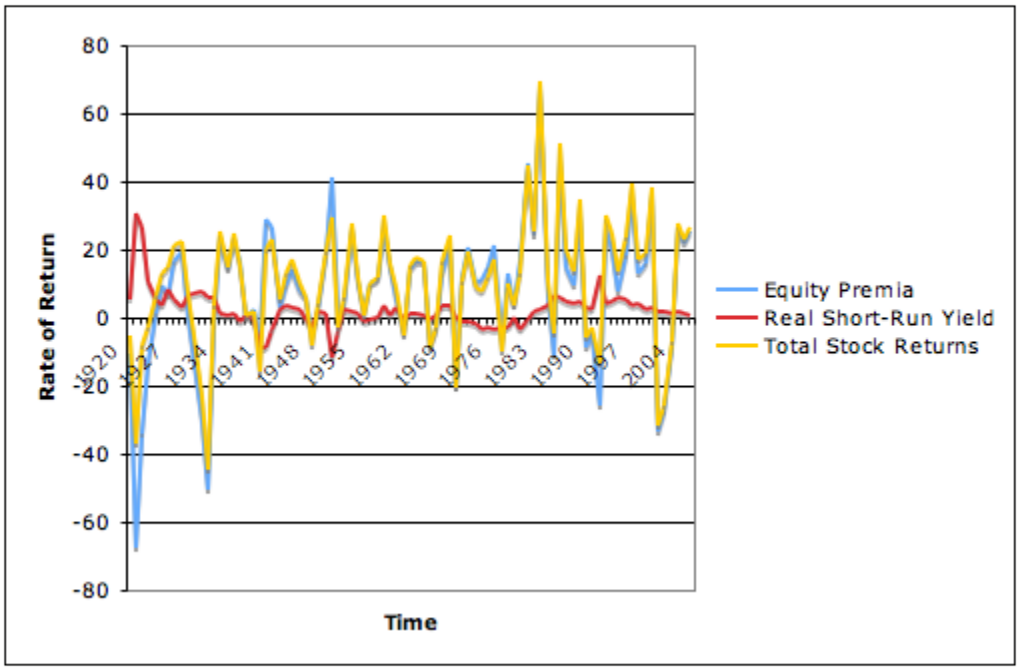

Figure 3: Annual Equity Premia, 1920-2006

2.2 Empirical Compromises in Analysis

I need to note the empirical compromises I had to make in calculating the equity premium. First, the equity premium should be the difference between the expected future total stock returns and the return on riskless assets, i.e. $E[r^e]-r^r$ where $E[\cdot]$ is the expectation operator. However, the historical equity premium, which I calculate above, suffices since it is difficult to obtain each investor's expectation and I have historical statistics to calculate the equity premium.

Additionally, periods of high inflation cause real returns of government bonds to become negative. The 1970s is a prime example of the countercyclical pattern between real short-run yields and inflation. To illustrate, the Stockholm Stock Exchange remained strong until 1977 even though government bonds were negative from 1970 until 1981, due to high inflation rates during the 1970s. This high spread can lead to an overestimate of the equity premium.

My third concern with the empirical equity premium estimate is that it may be upward biased. Starting in December 1918 a weekly Swedish financial chronicle *Affarsvarlden* published a composite stock price index that is now called AFGX. AFGX is a capital weighted stock price index and up to 1998 only firms on the Stockholm Stock Exchange so called A-list were weighted. Which firms were on the A-list is not mentioned in the documentation Waldenstrom provides. However, since 1998 AFGX includes firms on the so-called O-list containing previously unlisted firms. Therefore, the equity premium estimate may be biased because it does not reflect losses or gains on investments incurred by unlisted firms. Nevertheless, withstanding the concerns with the empirical equity premium, I can now calculate the set of rare disaster probabilities in Sweden.

2.3 Rare Disaster Probabilities

I need to briefly mention how Taub's (2007) distilled model departs from Barro's (2006) richer model. Most notably, Taub (2007) departs from Barro's richer model by modifying the stochastic process governing the growth of consumption. First, Taub does not mix the ongoing shocks with the rare disasters. He starts over and in his distilled model the rare disasters are the only exogenous shocks in the economy. Second, Taub does not allow the extent of the rare disaster to be random. He assumes that when the rare disaster shocks the economy, real output always contracts proportionally by the same magnitude, but he still allows the shock to hit at a random time. Also, Taub ignores the probability of default on government bonds. The Swedish government is stable so the default on bonds is neither a concern of mine as well.

With Taub's modifications in mind, the equity premium with rare disasters is seen as $r^e - r^f = p[(1-b)^{-\gamma} - (1-b)^{1-\gamma} - b]$. p is the hazard rate and captures the probability per unit of time of a rare disaster event happening between 1919-2006. b is the proportion that real output contracts if a rare disaster hits the economy. Barro argues that b is between .25 and .5, which I use as given. Since I have the values of b, the value of $r^e - r^f$, and the conservative value $\gamma = 4$, I can calculate the unknown probability of a rare disaster. Substituting $b = .25$ into the equation I get a probability p of 0.147735, which means there is a 14.7735% annual probability that a rare disaster will shrink real output by 25%. However, the implied probability of seeing a 25% GDP contraction in perpetuity is $1 - e^{-p}$, and this equals 13.7340%. Next, substituting in $b = .5$ yields a probability p of 0.010639, which means there is a 1.0639% annual probability that a rare disaster will shrink real output by 50%. On the other hand, the implied probability of seeing a 50% GDP contraction in perpetuity is $1 - e^{-p}$, and this equals 1.0583%.

3 Discussion

3.1 Swedish Rare Disasters

The rare disaster events that I consider outside the events that Barro (2006) documents are the Midsummer Crisis of 1941, the 1973 oil embargo, the Swedish financial crisis of the early 1990s, and I consider the US financial crisis of 2007, although this occurs outside the run of my data.

To begin with, I had wondered if Sweden's policy to remain neutral during World War II would not produce any adverse economic effects, which might declassify WWII as a rare disaster in Sweden's defense. After studying the data, I conclude that my hypothesis is wrong. The long-standing policy of neutrality did not save Sweden from experiencing inauspicious economic shocks during the war. In fact, seen in Figure 4, Sweden experienced a period of lengthy stagflation between 1940 and 1942. For example, inflation in 1940 was 12.69%, then in 1941 it had stayed at 12.41%, and finally lowered to 6.64% in 1942, which is still high given the Rikbanks target of 2% per year. During the same time, real consumption contracted -5.98% in 1940, -2.50% in 1941, and -1.35% in 1942.

What is most unexpected in the data is the trough in the growth trend seen in Figure 1 during World War II is much deeper than during the Great Depression. In fact, from 1929-1933 real consumption only declined in 1932 by 3.76%. The sharpest drop in real consumption was in 1921 characterized by a 12.84% decline in real consumption from 1920.

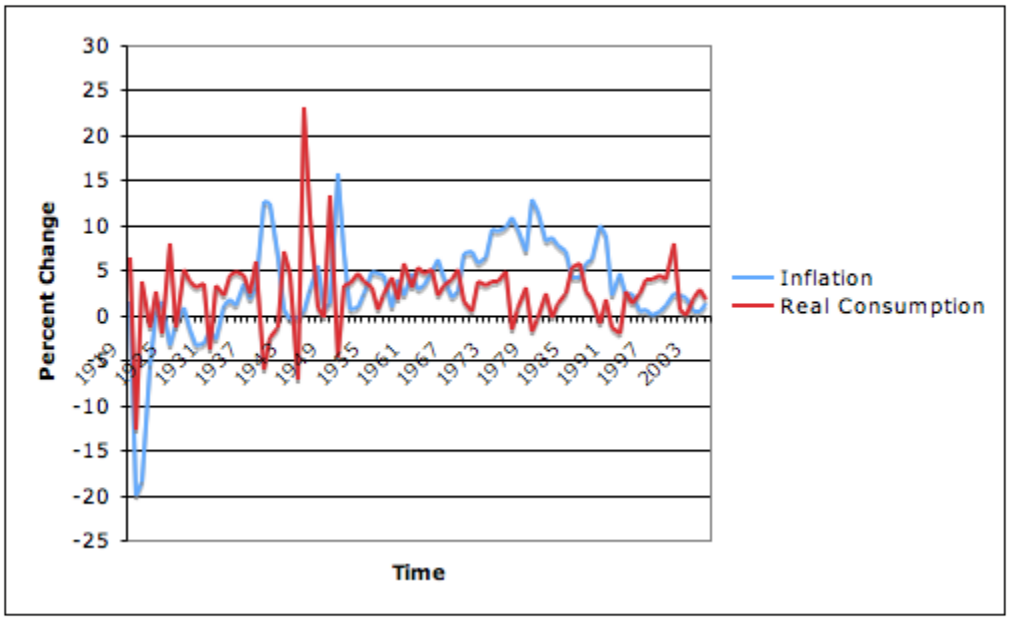

Figure 4: Annual Percent Change of Inflation and Real Consumption, 1919-2006

Additionally, the data on real imports suggests the war acted as an adverse supply shock by reducing real imports all throughout the war period. For example, as seen in Figure 5 below, imports dropped 34.76% in 1940, dropped 30.40% in 1941, declined 0.50% in 1942 followed by a small increase in 1943, but continued to fall until 1945 when imports to Sweden increased 113.47%. Also, the war contracted demand for Swedish iron ore and timber products, for which Sweden is known even today. By the late 19th century, these materials were being turned into increasingly advanced products, laying the groundwork for a broad manufacturing sector that even today largely forms the base of the economy. Most notably, high demand from Britain and the European continent internationalized Sweden's manufacturing sector, which expanded Sweden's export sector.

However, the export activity that continues to drive the Swedish economy decreased along with imports between 1940 and 1945 with a 5-year average decline in real exports during World War II of -6.025%. On top of this, during the war period the Social Democratic Party was in power, and their commitment to excessive regulation of the goods market can partially explain the stagflation. Therefore, the contraction of inputs and the government regulations helped feed the high inflation and low real consumption seen in Figure 4.

Additionally, during the World War II period, Sweden's long-standing policy of neutrality was tested in 1941 by the Germans. In June of 1941, at the outbreak of the Nazi-Soviet war, the Germans presented Sweden with a petition for a series of military concession in what has come to be known as the Midsummer Crisis of 1941. The Swedish government decided to grant Germany the request, and Sweden subsequently provided Hitler's Third Reich with several forms of logistical support by allowing armed Nazi troops transit across Sweden (Scott, 2002).

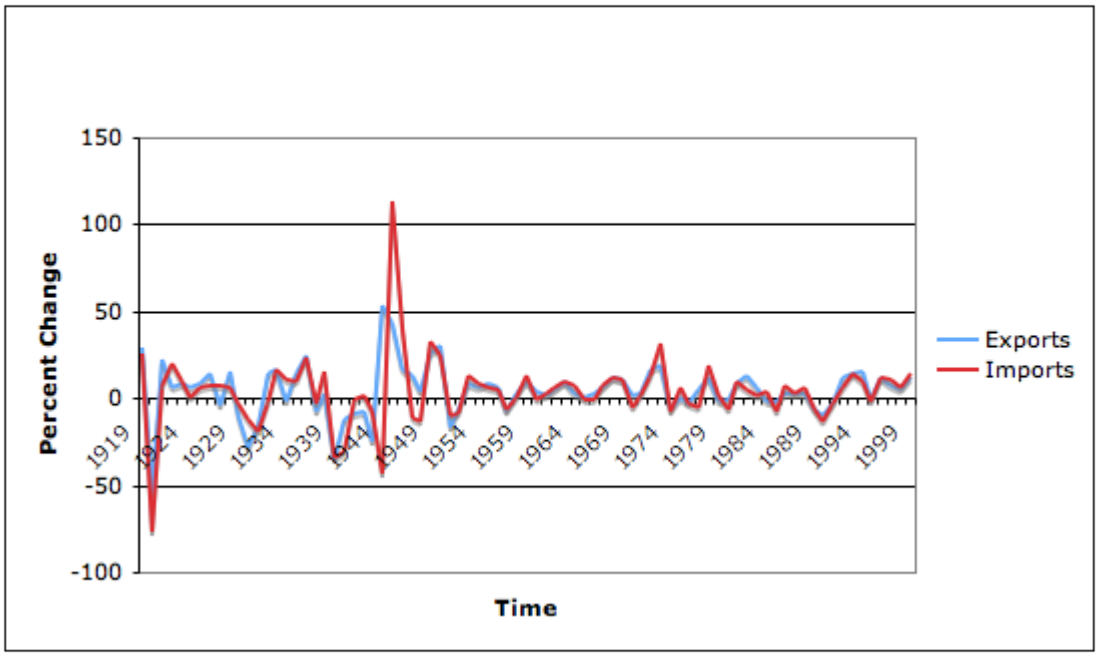

Figure 5: Annual Percent Change of Exports and Imports, 1919-2000

Whether or not Sweden's concession to Germany was a conspicuous violation of their tradition of neutrality remains controversial. However, the equity premia in my data say otherwise about the Swedes' expectation of World War II as a rare disaster. To illustrate, in 1940, before the Midsummer Crisis, the equity premium was -6.65%, yet in 1941 it sharply increased to 28.95%, and remained at 26.50% in 1942. This increase in the equity premium suggests that the Swedish investors were not fooled by their government's political maneuver because of rational expectations. As a result of the Midsummer Crisis of 1941, the data suggests Swedes anticipated the remainder of World War II to develop into a rare disaster.

Another period of stagflation in Sweden's economy occurred during the economic crisis of the 1970s. First, the stagflation was essentially determined by over-accumulation of capital and declining productivity growth, which was then exacerbated by the Organization of the Petroleum Exporting Countries (OPEC) oil embargo of 1973. However, the adverse economic effects of the oil shock reached Sweden in 1977 after some delay because Sweden initially benefited from the raw materials boom of 1974-1976, which consisted of imports of agricultural produce and minerals. However, from 1972 until 1981 real short-term yields were consecutively negative, suggesting that inflation was extraordinarily high although the Stockholm Stock Exchange remained strong until 1977, at which time total stock returns dropped to -9.97% but which jumped back to 10.16% in 1978. These observations can bee seen in Figure 3 and Figure 4. On top of this high inflation, the oil shock caused a structural crisis with reference to the composition of the Swedish export sector (an important component of Sweden' GDP). The oil shock caused intense price competition among Swedish steel export companies, which contributed to the deterioration of Sweden's export performance characterized by a 6.72% drop in 1975, a small 0.74% increase in 1976, followed by a 3.44% decline in 1977. Because of the structural crisis, an uncompetitive export market, lack of investment, and increasing foreign debt emerged. Consequently, the private sector was affected and real consumption fell 1.68% in 1977 and meekly recovered with 0.83% growth in 1978 (refer to Figure 4). Also, the average equity premium from 1976 to 1980 was 9.38%,

again which suggests Swedes anticipated the 1970's crisis to emerge as a rare disaster.

To improve the functionality of the economy, Sweden's government initiated the deregulation of many sectors, including the financial service market, transportation markets, and the electricity market. During the mid-1980s economic growth again rose, driven by high export activity. The average growth in real consumption from 1984 to 1989 was 3.14%. The deregulation of the credit market contributed to a very rapid increased in bank lending, largely focused on the real estate sector. However, Sweden developed a banking and financial market bubble early in 1990s. A restructuring of the tax system, in order to emphasize low inflation combined with an international economic slowdown in the early 1990s, caused the bubble to burst. Consequently, Sweden entered into the most severe recession it had seen since the 1930s. Between 1990 and 1993 real consumption fell by an average 0.67%, with a maximum decline in real consumption in 1993 of -2.11%. Also between 1990 and 1993 the average total stock return on the Stockholm Stock Exchange was -7.40%.

Similar to events leading up to the US financial crisis, a rising stock market in the 1980s with total stock returns of 51% in 1986 and 34.6% in 1989 induced a euphoric sense of wealth among Swedish investors. Consequently, borrowers began to take out real estate loans at the same time while newly deregulated banks provided these mortgages with highly favorable terms with little or no credit evaluation. When home prices fell in 1990s, asset values on banks' balance sheets dropped reducing liquidity in the economy. Sweden was able to emerge from the crisis with the rapid growth of the Information Technology sector.

The data on the equity premia during the financial crisis of the early 1990s suggest that the Swedes anticipated this severe crisis as a rare disaster. For instance, in 1992, the equity premium was -25.76%, a result of low yields on government bills and poor performance on the Stockholm Stock Exchange. However, when the economy began to rebound in 1993, the financial crisis was still fresh in the Swedish people's memory and consequently the equity premium shot up to 25.94% in only one year in the expectation of a future rare disaster. The Swedish government was able to abate this fear through its successful bailout of insolvent banks. Instead of just bailing out the banks with hordes of capital, the Swedish government extracted equity from bank shareholders, thus holding the banks more accountable. When the government sold the toxic assets, the profits flowed back to the Swedish taxpayers. In contrast, the United States did not take action to extract equity from American banks as a price for their costly bailout in 2008 (Dougherty, 2008).

3.2 Welfare and Policy Implications

Currently, I conjecture that future data on equity premia will show that the Swedes anticipate the US financial crisis of 2007 to emerge as a rare disaster. Having been through a severe liquidity crisis in the early 1990s, the Swedish people can expect the US financial meltdown to be a rare disaster whether or not the current crisis fully matures into one, following our assumption that a rare disaster contracts real output by 25%-50%. Nevertheless, because the equity premium should be the expected rate of return on risky assets minus the rate of return on riskless assets, it is reasonable to predict that the empirical equity premium that I calculate is the best estimate of the future risk premium that the Swedes will require as the Swedish economy heads towards a recession.

Furthermore, Johnasson (2008) quotes Lars Nyberg of the Riksbank saying that Sweden is poorly prepared for the international effects the US financial crisis will produce. He says that any economic measures the Swedish government, which is now headed by a right-center

alliance, and the Riksbank have taken to improve market conditions in Sweden will not stop the financial crisis from hitting Sweden. On top of that, he says that despite the quite recent experience of the crisis of the early 1990s, Swedish lawmakers have still not been able to get a proper framework for the management and closure of ailing banks in place. Such a framework is necessary to facilitate the quick and efficient closure of banks at a low cost to the deposit guarantee system (analogous to the US Federal Deposit Insurance Corporation), while making shareholders and uninsured creditors bear the responsibility of their investment decisions. In light of this, Sweden's unpreparedness might raise the expected equity premium above 7.97%.

The implications of the global harms of the United States financial crisis on the expected equity premium will change future estimates of the probabilities p and magnitudes b of rare disasters in Sweden. Currently, despite Sweden's steady consumption growth sometimes buffeted by stochastic perturbations like the 1973 oil embargo and the crisis in the early 1990s, a probability of 13.7340% of a rare disaster cutting real output by 25% in the future is a warning sign that Sweden should carefully examine and execute its economic policies. And while the historical data is there to substantiate a 50% drop in real output, the Swedish government should be more concerned about preventing a 25% drop given its higher implied probability.

Recall that Grant and Quiggin (2005) state that government intervention can be welfare improving and that privitisation may reduce public welfare in the presence of high equity premia. In 2006, the Swedish annual equity premium shot up to 25.55% reflecting investors' antcipation that the US financial crisis might hit Sweden hard. This high value implicates that while Sweden's new conservative government continues its ongoing privitisation, they should remain committed to preserving the country's social welfare programs and to keeping privitisation to a minimum in order to maintain stable public welfare. Keeping this policy recommendation in mind however, the confluence of Sweden's strong political credibility mixed with its social economic policies like high tax burdens, close cooperation between corporations and the government, and extant robust public sector can help Sweden afford the expensive cost of another high equity premium.

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