Economic coercion and currency crises in target countries

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Abstract

Despite significant research on the efficacy and inadvertent humanitarian and political effects of economic sanctions, surprisingly little is known about the possible economic and financial consequences of sanctions for target economies. Synthesizing insights from the currency crisis literature with sanctions scholarship, we argue that economic sanctions are likely to trigger currency collapses, a major form of financial crisis that impedes economic growth and prosperity. We assert that economic coercion instigates currency crises by weakening the economy and creating political risks conducive to speculative attacks by currency traders. To substantiate the theoretical claims, we use time-series cross-national data for the 1970-2005 period. The results from the data analysis lend support for the hypothesis that sanctions undermine the financial stability of target countries. The findings also indicate that the adverse effect of economic coercion on the financial stability of target economies is likely to be conditioned by the severity of the coercion and the type of actors involved in the implementation of sanctions. The findings of this article add to the sanctions literature demonstrating how economic coercion could be detrimental to the target economy beyond the immediate effect on trade and investment. It also complements and adds to the literature on political economy of currency crises that has so far overlooked the significant role that economic coercion plays in financial crises.

Keywords: economic sanctions, financial crises, coercive diplomacy, currency crises

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Introduction

Existing sanctions literature often considers the negative economic effects of sanctions on the target country as an important determinant of the effectiveness of economic coercion. Studies show that economic coercion is more likely to induce behavioral change from the targeted regimes when they inflict significant harm on the target economy (Tsebelis, 1990; Morgan & Schwebach, 1997; Dashti-Gibson, Davis & Radcliff, 1997; Drury, 1998; Hufbauer et al., 2007). The research on the consequences of sanctions, on the other hand, suggests that economic dislocation caused by sanctions could lead to humanitarian crises (Weiss et al., 1997; Gibbons, 1999; Weiss, 1999; Peksen, 2011; Allen & Lektzian, 2013), destabilize the target regime (Marinov, 2005; Allen, 2008; Escribà-Folch & Wright, 2010), undermine democratic freedoms and human rights (Wood, 2008; Peksen, 2009; Peksen & Drury, 2010; Grauvogel & von Soest, 2014), and deteriorate women's status (Drury & Peksen, 2014).

Despite the significant research and policy implications of the economic consequences of sanctions, scant research has been devoted to the mechanisms through which sanctions undermine the target economy. Previous research has exclusively focused on the dyadic trade and investment flows between the target and sender countries in an attempt to assess the economic impact of sanctions (Hufbauer et al., 2007; Lektzian & Souva, 2001; Biglaiser & Lektzian, 2011). Others have expanded this line of research examining the extent to which sanctions alter the trade and investment relations between the target and non-sanctioning countries (Early, 2009, 2012; Lektzian & Biglaiser, 2013; Barry & Kleinberg, forthcoming).

The sanctions literature has also examined whether financial sanctions and monetary policies of sender countries against the target affect the likelihood of sanction success (e.g., Kishner, 1995a,b; Hufbauer et al., 2007). Kirshner (1995a), for instance, argues that monetary

sanctions are effective when the target is dependent on foreign exchanges. Therefore, other than the well-documented trade and investment effects, we know very little about the possible financial and economic consequences of sanctions. This omission consequently leads to an incomplete understanding of how costly sanctions might be on the target economy.

This study examines the extent to which sanctions increase the likelihood of currency collapses. Our focus on currency depreciation is important because currency crises significantly affect the real economy by undermining economic growth, reducing investment, and increasing poverty, inflation and unemployment (Krugman & Taylor, 1978; Eichengreen & Rose, 2003; Edwards, 2011). We assert that sanctions are likely to trigger currency collapses by exacting significant damage on the target economy and creating economic uncertainties and political risks conducive to speculative attacks by currency traders.

Our study complements and adds to the research on the consequences of sanctions. Whereas earlier studies examined the impact of sanctions on trade and investment ties (Hufbauer et al., 2007; Lektzian & Souva, 2001; Biglaiser & Lektzian, 2011), we focus on the extent to which sanctions undermine national currencies, the key medium of economic exchange. By doing so, we expand the research that attempts to gauge the major economic effects of external sanctions. Our study also speaks to the relevant literature on currency crises. Although much scholarship has been devoted to the domestic and international determinants of currency crises (Kaminsky & Reinhart, 1999; Drazen, 2000; Glick & Rose, 1999; Canova, 2005), no study to date has examined whether economic coercion as an external factor affects the depreciation of a sanctioned country's currency.

The remainder of the study is as follows. We begin with a brief overview of the currency crises literature and then present our theoretical framework explaining how sanctions instigate

currency crises. Next, we discuss the data and model specifications, and report the findings from the data analysis. We conclude with a discussion of foreign policymaking and research implications of the findings.

Political economy of currency crises

A currency crisis is generally understood as the government's reluctant devaluation of its national currency upon strong market pressure to do so. Standard macroeconomic models commonly posit that there are two stages through which a currency crisis unfolds. In the first stage, currency traders change their portfolio of currency holdings by selling a certain currency *en masse*, which is known as speculative attacks. In the second stage, the governments' inability and/or reluctance to intervene to bolster their currencies against these attacks lead to drastic devaluations.

Generations of theories have attempted to unravel the causes of currency crises. Earlier studies emphasized the importance of fiscal policies. First generation theories, for example, suggest that budget deficits and depletion of foreign reserves are the primary determinants of speculative attacks and the subsequent currency failures (Krugman, 1979; Flood & Marion, 1999; Flood & Garber, 1984). With the dramatically increasing incidences of financial crisis in the late 1980s and early 1990s, however, the focus of the literature has shifted to currency traders' evaluation of the possibility of devaluation.

Second generation models suggest that a wider array of economic weaknesses such as unemployment and inflation (Kaminsky, 2003) as well as budget deficits can engender currency traders' expectation of governments' currency devaluation, resulting in speculative attacks and

subsequent 'self-fulfilling' currency crises (Obstfeld, 1986).[1] Improving upon Obstfeld (1986), Morris & Shin's (1998) nuanced analysis suggests that speculative attacks occur even without specific evidence of economic troubles. They show that the situation in which individual traders suspect that their peers view the economic conditions differently than they do is a sufficient condition for speculative attacks. That is, the information asymmetry among investors and their subsequent erratic investment patterns could also engender massive capital flight in currency markets (Chari & Kehoe, 2004).

Other second generation studies indicate that governments that adopt transparent policies are less likely to experience currency crises (Hays, Freeman & Neeseth, 2003; Chari & Kehoe, 2003; Heinemann & Illing, 2002). It is not surprising then that political uncertainty and instability are pointed out as significant sources for traders' anxiety. Frequent and irregular leadership changes (Block, 2003; Frankel & Rose, 1996) as well as elections (Leblang & Satyanath, 2006; Walter, 2009), cabinet collapses (Bernhard & Leblang, 2008), and leftist governments (Leblang, 2003) make it fairly difficult for individual traders to predict what kind of economic policy the government would adopt and how the value of their currency holdings would change accordingly. This unpredictability amounts to Morris & Shin's (1998) information problem that leads to speculative attacks.

Third generation theories, on the other hand, tend to contend that domestic financial institutions' over-borrowing is to be blamed for speculative attacks and the subsequent currency crises. They generally point out that the serious imbalance between foreign borrowing and domestic lending propagated by domestic financial institutions, which often times was made possible by massive financial liberalizations, might be a source of a financial crisis as in the case

[1] Our discussion of second and third generation models does not imply that first generation-type currency crises do not occur any more.

of the Asian Financial Crisis in 1997 (Chang & Velasco, 2001; McKinnon & Pill, 1996). These models help explain why states with seemingly sound economic fundamentals fall victim to currency crises as large volumes of outstanding foreign debts directly trigger a run on currencies (Glick & Hutchison, 2011). Third generation models are also not entirely different from second generation ones in highlighting the self-fulfilling nature of speculative attacks. Burnside, Eichenbaum & Rebelo (2004), for instance, argue that government guarantee on foreign debts raises the possibility of domestic financial institutions' moral hazard on short-term foreign borrowing, thereby prompting speculative attacks even before any over-borrowing actually occurs.

Once a currency is under speculative attacks, the government has to choose whether it will defend the status quo exchange rate or simply capitulate to the speculative pressure by letting devaluation happen. Either policy choice incurs political costs to the government. Devaluating the currency upon speculative attacks is often considered a 'national humiliation' (Buiter, Corsetti & Pesenti, 1998: 7) since it is seen as an indication of 'fundamental policy failure and serious economic disequilibrium' (Remmer, 1991: 784). Therefore, policymakers are more inclined to postpone devaluation as long as possible to avoid the possible political costs of doing so (Walter & Willett, 2012). Exceptional cases include when political leaders can quickly devalue their currency and blame it on other factors such as their predecessors (Klein & Marion, 1997). Currency defense, on the other hand, involves consumption of existing financial resources and other economic policy adjustments that often entail budget deficits, mounting external debts, credit crunch, and a slowing of short-term growth (Andersen & Chiriaeva, 2007; Lahiri & Vegh, 2005).

Economic sanctions and currency crises

In this section we present our theoretical framework connecting foreign economic pressures to currency crashes. Consistent with the two-stage macroeconomic models of currency crises, we begin by discussing how sanctions increase the likelihood of speculative attacks. We then explain why sanctions undermine the target government's ability and willingness to defend its national currency that subsequently leads to a devaluation of the currency.

It is worth noting that speculative attacks and currency defenses are not completely separate events. Studies demonstrate both theoretically (Charie & Kehoe, 2003; Morris & Shin, 1998) and empirically (Leblang, 2003) that currency traders' expectation of a likely devaluation by the government is a strong predictor of speculative attacks. Yet we still choose to discuss the unfolding of currency crises adopting the two-stage approach for two particular reasons. First, as the existence of a sizeable number of failed speculative attacks (i.e., successful currency defenses) indicates, currency traders' expectations are not necessarily correct and some speculative attacks might not result in currency crises (Kraay, 2003). Therefore, factors that explain currency devaluation independently of speculative attacks also deserve close attention when studying currency crises (Walter, 2009). Second, from a practical standpoint, this approach allows us to more systematically show the possible impact of sanctions on initial speculative attacks and the subsequent government response to such attacks.

Consistent with second generation models of currency crises that highlight the significant role of weakening economic fundamentals (Obstfeld, 1996; Jeanne, 2000), the adverse effects of sanctions on the target economy are likely to trigger speculative attacks. The sanctions research provides ample evidence that economic sanctions are likely to engender a variety of troubles in target economies. Once sanctions are in place, target countries on average experience a 3.3%

decline of gross national product (GNP) (Hufbauer et al., 2007) and flourishing black markets (Galtung, 1967; Weiss et al., 1997; Andreas, 2005). The average inflation rate following sanction imposition is 99%. Even when the countries experiencing hyperinflation are excluded, the average inflation is 37%, which is a considerably high level of inflation (Hufbauer et al., 2007).

Adding to these negative macroeconomic effects, sanctions cut access to (1) specific products by restricting exports to the target and/or (2) markets by blocking imports from the target. The target's economy must either find substitutes for the missing products or new markets in which to sell their products. As a result, there is both a reduction in the overall performance of the economy and specific disruptions throughout it.

The economic downturn caused by sanctions is likely to make investors anxious about the future yields of their assets denominated by the local currency. Some investors might consider the worsening economic conditions as a signal of the target government's weakening financial capacity. They might start questioning the government's ability to maintain the current exchange rate (Obstfeld, 1996). Those who do not find devaluation imminent might still fear the consequence of holding onto the currency until the last minute while their peers opt-out forcing the government to devalue in the end (Morris & Shin, 1998). Either way, the economic damage inflicted on the target economy by sanctions implies a higher possibility of currency devaluation and the subsequent loss of the holders of domestic currency-denominated assets. The risk-averse investors are therefore inclined to get their money out of the country and convert it into a reliable foreign currency. Hence, even mere signs of deteriorating economic conditions caused by sanctions are enough to turn away currency traders from the target currency.

Consistent with second generation theories, sanctions also increase the probability of speculative attacks by destabilizing the target regime and thus increasing the uncertainty about

future economic policies. Studies show that sanctions are likely to shorten the tenure of political leaders (Marinov, 2005), incite social unrest (Allen, 2008), and increase the repressiveness of governments (Wood, 2008; Peksen, 2009, 2010; Peksen & Drury, 2010). Thus, similar to the effect of elections (Leblang & Satyanath, 2006) and cabinet changes (Bernhard & Leblang, 2008), we expect that economic sanctions will increase the possibility of speculative attacks through undermining the political stability of target countries.

Consistent with first generation models (Krugman, 1979; Flood & Garber, 1984), economic coercion might also instigate currency crises because the drastically weakening macroeconomic fundamentals following sanctions would constrain the target government's ability to maintain balanced budgets and sufficient foreign reserves. Further, coping with the growing pressure of sanctions might lead to a diversion of government expenditures from economically beneficial activities to some unproductive efforts such as granting more economic rents and secured access to scarce resources to the key groups in return for their loyalty to the government (Weiss et al., 1997; Gibbons, 1999). This heightens currency traders' expectation of devaluation since the only feasible option for the target government to finance its day-to-day expenditures in this dire situation might be lax monetary policies (i.e., printing more money). The growing expectation of devaluation subsequently increases the probability of speculative attacks.

Once a currency is under speculative attacks, the target government has to choose between defending the currency and succumbing to the speculative pressure by letting devaluation happen. Economic sanctions might undermine both the economic capacity and willingness of the government to defend its currency. Currency defense involves consumption of existing financial resources and painful adjustments (Walter, 2009). In sanctioned countries, the

damage inflicted on the economy will undermine the government's capacity to devote the necessary economic resources to currency defense such as increasing interest rates and using foreign exchange reserves.

Further, sanctions might increase the regime's willingness to let currency devaluation occur. Leaders are often reluctant to capitulate to the speculative pressure because of the potential political costs of devaluation. As noted above, the significant drop in the value of a national currency is considered a national embarrassment and a sign of policy incompetence of the government (Remmer, 1991; Buitter, Corsetti & Pesenti, 1998). Therefore, studies show that leaders would opt for currency devaluation only if they quickly devalue their currency and blame it on some domestic or external factors (Edwards, 1994; Leblang, 2002, 2003; Walter, 2009).

The political leadership in target countries often depicts economic sanctions as an external threat to national unity and the economic prosperity of the society (Galtung, 1967). Therefore, the target government is likely to put the blame on these foreign economic pressures as the source of growing economic difficulties. The blame-shifting strategy employed by the target leaders will also help them justify devaluing the currency without facing the political cost of doing so, such as accusations of incompetence or bringing about a national humiliation. Thus, this process of the declining political price of devaluation and increasing cost of defense would increase the possibility that the government will surrender to the high speculative pressures from the market by devaluing the currency.

To better illustrate these mechanisms, we briefly turn to two sanction cases: the US sanctions against Bolivia (1981) and the US-led multilateral sanctions against Iran (2012). The Carter administration announced the suspension of economic and military assistance to Bolivia in November 1980 following a military coup staged by General Meza. The new military regime

was heavily involved in illegal drug trafficking and committed severe human rights violations that eventually led to the Carter administration's decision to levy new sanctions against the military regime.

The sanctions significantly deteriorated the economic conditions of the country, leading to multiple subsequent coup attempts and nearly 600 billion dollars of capital flight in 1981 alone (Siekmeier, 2011). When capital flight amounted to rapid drying up of foreign reserves, the politically unstable military regime resorted to a 'dual exchange rate system.' However, this short-sighted piecemeal prescription only produced investors' heightened expectation of devaluation, or uncertainty thereof, leading to massive speculative attacks on the peso in 1982 (Pastor, 1991). The insurmountable economic troubles in Bolivia following the US sanctions stripped the military regime, which had already agreed to re-democratize the country in a few months, of the capability and willingness to defend this attack, culminating in a 200% devaluation of the peso in the same year (Selden, 1999: 131). The Bolivian case is a good illustration of how sanctions increase the probability of first-generation type currency speculations and discourage the subsequent currency defense.

The devaluation of the Iranian rial following US-led multilateral sanctions in 2011 and 2012 provides a good example of how second-generation type speculative attacks are triggered by sanctions as well as how sanctions incentivize target governments to devalue their currencies. Throughout 2012, Iran experienced a near-unstoppable slide of the rial. On the first day of October 2012 alone the exchange rate of the rial with the US dollar plunged 17%. Analysts point out that the immediate cause of this devaluation was the investors' panic over the expected consequences of the US-UK joint sanctions on the Iranian Central Bank. That is, holders of rial-

denominated assets expected a drastic reduction of the country's oil revenue and subsequent shortage of hard currency (Habibi, 2012).

The crisis can also be attributed to the Iranian regime's relatively lukewarm defense of the rial upon the speculative pressure and rather easy decision to devalue, which was viewed to serve the regime's political interest (Shuster, 2012). President Ahmadinejad faced severe criticism for this decision from his parliamentary critics (Habibi, 2012), yet his decision to devalue the currency might have been even more difficult if he could not blame 'external enemies' on the economic difficulties given that he 'came to power in 2005 with the slogan that he will fix the economy' (Aljazeera, 2012; Habibi, 2013). This blame-shifting seems to have worked effectively as ordinary Iranian citizens mostly blamed the West and external sanctions more than their government for the recent economic difficulties (Younis, 2013).

To summarize the discussion above, we assert that sanctions increase the occurrence of currency crises by undermining the target's economic and political stability and reducing the willingness and/or ability of currency defense by the government. Therefore, we hypothesize that e*conomic sanctions will lead to the onset of currency crises in target countries* (Hypothesis I).

The mere presence of economic sanctions, however, is unlikely to fully account for the extent to which foreign economic pressures would trigger currency collapses. The hypothesized negative effect of economic coercion could be partially determined by the cost and the type of actors involved in the imposition process. We expect that high cost sanctions –such as the cases of comprehensive sanctions against Iraq and the former Yugoslavia during the 1990s– that severely limit a target's economic ties with the outside world are more detrimental to the target economy than partial sanctions (Weiss et al., 1997; Hufbauer et al., 2007). Hence, extensive sanction regimes could be more likely to trigger speculative attacks due to their significant

adverse effect on the target's economic and political stability. Further, such high cost sanctions would be more detrimental to the target government's capacity to defend its currency than low cost sanctions. We therefore postulate that *high cost economic sanctions are more prone to triggering currency crashes than low cost sanctions* (Hypothesis II).

In the same vein, economic coercion initiated by intergovernmental organizations (IGOs) might lead to a higher likelihood of currency crises than non-IGO sanctions. IGO-led sanctions might cause serious economic harm due to the economic pressure applied by multiple countries. Such multilateral sanctions are also more harmful than unilateral sanctions because they might be more effective in undermining the ability of the target regime to mitigate the cost of the coercion through seeking third-party markets to trade and develop economic ties. Thus, the greater economic damage exacted by IGO sanctions on the target economy would significantly increase speculative attacks and the subsequent government failure of the currency defense. Hence, we hypothesize that *sanctions imposed by an IGO are more detrimental to the stability of the target currency than non-IGO sanctions* (Hypothesis III).

Finally, US-led sanctions might be associated with a higher likelihood of currency crashes than non-US sanctions. Countries facing US sanctions might incur major economic damage because of the fact that most target countries have close economic ties with the US, a country that maintains global financial and economic dominance. Thus, the possibly higher economic damage caused by US sanctions on the target economy might create economic uncertainty which is conducive to speculative attacks and might also impair the target government's ability and willingness to defend its currency. We therefore postulate that *US-led sanctions are more detrimental to the stability of the target currency than non-US sanctions* (Hypothesis IV).

Research design

To statistically examine the impact of economic sanctions on the likelihood of currency crises, we gathered time-series, cross-section data for the years 1975–2005. The unit of analysis is country-year. That is, each datum represents a country *i* in a given year *t*. The remainder of this section provides a detailed account for the operationalization of the outcome and explanatory variables and the methodological approach.

Outcome variable: Currency crises

Our measure of the outcome variable, *Onset of currency crisis*, draws upon Frankel and Rose's seminal study. We define a currency crisis as 'a nominal depreciation of the currency of at least 25% that is also at least a 10% increase in the rate of depreciation' (Frankel & Rose, 1996: 3). The variable is coded 1 for the onset of each currency crisis observed in a given year and 0 for all non-crisis years. [2] To avoid over-counting a long currency crisis and account only for the onset of each crisis, we recoded the crisis years following the first year of each crisis episode as missing. Based on these coding decisions, we detected 268 currency crises during the time period (1975–2005) of the analysis for a sample of 153 countries.[3] To quantify currency

[2] This measure of currency crisis is commonly used in the literature (e.g., Leblang & Styanath, 2006, 2008; Berg & Pattillo, 1998; Milesi-Ferretti & Razin, 2000). We had no major change in the main findings when we use an alternative crisis variable. It is coded 1 if there is a currency crisis in a given year and 0 otherwise. In the alternative measure, to avoid over-counting the long currency crises, following Frankel and Rose's '3-year window', we coded the crisis episodes observed within three years from a previous crisis as 0, non-crisis.

[3] To make sure that the inclusion of developed countries in the data analysis does not bias the results, we ran additional models restricting the sample to developing countries. The results from the data analysis with the restricted samples are very similar (see the online appendix). Wealthy countries tend to be less frequent targets of economic coercion (Lektzian & Souva, 2003; Cox &

crises, we use nominal exchange rate data from the World Development Indicators dataset (World Bank, 2011).

Covariates of currency crises

To assess the effect of sanctions in general, the first sanction variable, *Economic sanctions,* takes the value of 1 if a country is under any type of sanctions in a given year, 0 otherwise. We gathered the economic sanctions data from Hufbauer et al. (2007). Economic sanctions refer to the deliberate, government-led restrictions of exports, imports, and the flow of finance (commercial finance, bilateral aid, or the International Monetary Fund or Word Bank funds) that includes such specific measures as tariffs, import duties, investment bans, asset freezes, restrictions on limited dual-use technologies, and suspension of economic or military aid. Overall, the data consist of 692 sanction years (16.58% of the data) and 3,481 non-sanction years (83.42%). There were 64 different countries targeted with economic sanctions at least once during the time period of the analysis.

We run additional models to investigate whether the three major types of sanctions, *Financial sanctions, Export sanctions*, and *Import sanctions*, have a similar effect on the probability of currency crises in the targeted countries. These variables are also dichotomous measures indicating the presence or absence of a particular type of sanction regime in a given year. The bivariate correlation between the financial and export sanction variables is 0.67, between the financial and import sanctions 0.60, and between export and import sanctions 0.72.

Drury, 2006). Even when they face sanctions, because of their relatively more stable economic systems, they might suffer less from the external shocks as much as developing countries that may lack economic capacity to cope with foreign economic pressures. While there is no consensus on what comprises 'developed' countries, for statistical convenience, this study refers to Australia, Canada, Japan, the US, New Zealand, and Western European countries as developed countries.

To account for the cost of the coercion, following Biglaiser & Lektzian (2011) and Lektzian & Biglaiser (2013), *High cost sanctions* is coded 1 when sanctions exceed the average cost of sanctions and 0 when they are below the average cost. The *Low cost sanctions* simply reverses the coding of the high cost sanctions variable. According to our sanctions data, target countries on average experience a 3.3% decline of GNP (Hufbauer et al., 2007). Hence, sanctions whose cost on the target economy is higher than this average are considered high cost sanctions, while those with economic damage less than the average cost are coded as low cost sanctions.[4] Since we control for both cost variables in the same model, the reference category to these variables is 'no sanctions.'

We determined the average cost of sanctions in each sanction episode using the 'cost to target' variable from Hufbauer et al. (2007). It captures the cost of sanctions on the target economy as a percentage of gross national product over the entire sanction episode. The variable attempts to estimate the immediate trade and financial losses caused by the coercion during each sanction episode. It also calculates the possible offsetting impact of third party economic assistance to the target country to thoroughly assess the extent of damage inflicted on the target economy by sanctions (Hufbauer et al., 2007: 101–102).

To assess whether sanctions imposed by IGOs are more detrimental to the financial stability of target economies than non-IGO sanctions, the models include the *IGO sender* and *Non-IGO sender* dichotomous variables. We also control for the dichotomous *US sender* and

[4] The cost variables are static; they attempt to tap into the average cost of the coercion over the entire sanction episode. Therefore, they fail to fully capture the adverse effect of sanctions on the economy associated with the duration of sanctions.

Non-US sender variables to examine whether the US sanction regimes are more detrimental to the general economic and political stability of the target than non-US sanctions.[5]

To avert the omitted variable bias, we also control for several other covariates of currency crises following pervious research. Our control variables draw particularly upon those of Frankel & Rose (1996), which are utilized in both the economic and political science literatures on currency crises (e.g., Leblang & Satyanath, 2006, 2008; Kaminsky, Lizondo & Reinhart, 1998). To account for the possible effect that vulnerability to external shocks might have on the currency depreciation, we include the ratio of total debt to GNP (*Debt/GNP*); the ratio of reserves to monthly import values (*Reserves*); and the current account surplus (+) or deficit (-) expressed as a percentage of domestic output (*Current account balance*).[6]

We control for the possible effect of contemporary public debt stocks (expressed as a percentage of GDP) on currency collapses by including the *Public sector debt* variable. Given that the overall economic health might affect the collapse of national currencies, we control for the annual growth of real GDP per capita (*Growth rate*). Finally, we use the percentage growth rate of real OECD output (in US dollars, at 2000 exchange rates and prices) as a measure of the advanced countries' demand for the products of the rest of the world (*Northern growth*).[7]

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[5] The US-led sanctions include both unilateral and multilateral sanctions, where the US is a leading sanctioning country.

[6] Unless otherwise specified, the data for macroeconomic variables are from World Bank (2011).

[7] To check the robustness of our findings to the inclusion of other possibly significant covariates of currency crises, we ran additional models controlling for several new variables. Our main results remain similar in the models with the additional control variables (see the online appendix). We include the variables accounting for the amount of debt that is concessional (*Concessional*), short-term (*Short term*); lent by multilateral development banks (*Multilateral debt*); and the flow of foreign direct investment (FDI) expressed as a percentage of the debt stock (*FDI/Debt*) to assess the possible effects of contemporary debt stocks (expressed as a percentage of GDP) on currency collapses. We control for the domestic credit growth rate (*Domestic credit*) since the overall strength of an economy might affect the possibility of currency crashes. We

Missing observations are an inherent problem in any time-series cross-section data and our study is not free from this issue. We find that our macroeconomic control variables, particularly the debt variables, contain numerous missing observations, driving down the total number of observations considerably. More importantly, the pattern of missing observations is not random. As shown in Table AI, the correlation between our main independent and dependent variables (i.e., the economic sanctions dummy and the currency crises variable) is consistently higher when macroeconomic control variables are missing than when they are not missing.

This pattern is not entirely surprising. As Hollyer, Rosendorff & Vreeland (2011) argue, the missing values are indicative of the government's incapacity and/or reluctance to release 'sensitive' information when faced with challenging policy environments. The conjunction of economic sanctions and currency crises is likely to be where this inability/reluctance is amplified: sanctions undermine state capacity to carry out administrative functions necessary for reporting economic data and/or currency crises induce governments to conceal their poor economic performance—particularly debt-repaying—such that they can fend off further speculative attacks. The result of this problem is that the relationship between economic sanctions and currency crises might be diluted by the missing observations in the debt-related control variables.

To avoid this underestimation caused by missing observations and to maintain the standard set of control variables, we implemented multiple-imputation for all macroeconomic control variables using Amelia II (Honaker, King & Blackwell, 2011). Amelia II is particularly useful in our case because its simulation-based imputation can effectively reflect an important property of time-series cross-sectional data: the combination of smooth time trend and fitful cross-sectional variation. Amelia II imputes the missing observations of the data based on the

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construct the 'foreign interest rate' as the average of short-term interest rates for the United States, Germany, Japan, France, the United Kingdom and Switzerland (*Foreign interest*).

observed values of the non-missing variables in the same row and creates *m* completed dataset (in our case m=5, the program default). In each of the *m* completed datasets, the observed values are the same, while the missing observations are filled in with different imputations to reflect the range of uncertainty of the imputed data. We then run the model across the *m* datasets and obtain the combined coefficients and standard errors. As the size of the imputed portion of data is relatively large (see Table AI), though not excessive, we also implemented the 'overimpute' diagnosis built in Amelia II (Honaker, King & Blackwell, 2011: 45). The diagnosis reveals that there are hardly any problematically exaggerated observations in our imputed data.

Methodological issues

To correct for the autoregressive process (temporal dependence), we follow the approach of Carter & Signorino (2010) and model the duration of time (i.e., number of years since the last currency crisis), time squared, and time cubed. We find very similar results when we include a count variable, which accounts for the years since the last currency crisis and three cubic splines as suggested by Beck, Katz & Tucker (1998). When we use a one-year lag of the outcome variable for temporal dependence, there was no major change in the results. However, a lagged dependent variable is not appropriate in our case because of the non-linear nature of the binary currency crisis variable that does not contain sufficient information for lagging.

To reduce the possibility of endogeneity (simultaneity bias) and make sure that the explanatory variables precede the response variable, we lag all time-variant explanatory variables one year. All models are estimated using the Huber/White sandwich estimator of variance clustered on country code in order to obtain robust standard errors, which assumes non-independence within clusters. Finally, to test that the causality runs from sanctions to currency crises and not the other way around, we used the Granger causality test (Granger, 1969). Granger

causality is a statistical concept of causality denoting that a variable X causes a variable Y, if the past values of X predict Y even when the past values of Y are controlled for. This is an F-test on the coefficients (beta) and the null hypothesis is a variable X does not Granger-cause a variable Y. The test results suggest that causality indeed runs from sanctions to currency crashes and not the other way around.[8]

[Table I here]

Findings

Table I presents the frequencies of currency crises in sanctioned and non-sanctioned countries. There were 71 different currency crises in sanctioned countries during the time period of the analysis. This accounts for 11% of all sanction years. There were 197 different currency crises in non-target countries, which accounts for only 6% of all non-sanction years. Hence, according to this preliminary analysis, we find that the number of currency crisis on average is likely to be higher in sanctioned countries than non-sanctioned countries. This difference between sanctioned and non-sanctioned cases is statistically significant (p-value=0.001).

Table II reports the findings from the models estimating the effect of sanctions on currency crises. The results in the first two models indicate that sanctions increase the likelihood of a currency crisis in the targeted countries. The results are similar when we run a bivariate analysis (Model 1) or a multivariate analysis (Model 2) by including the sanction variable and the control variables. In Models 3-8, we explore whether the three major types of sanctions have any different effect on the outcome variable. Similar to the findings in the first two models, we find that all three types of sanctions –financial, export, and import sanctions– are statistically significant in predicting the onset of a new currency crisis in target countries. These findings

[8] The p-values and chi-square statistics from the Granger causality tests appear in the online appendix.

show strong support for our hypothesis that foreign economic coercion leads to currency crises by creating significant financial uncertainty and economic damage in the target economies.

[Table II here]

[Table III here]

In Table III, we explore the extent to which the severity of sanctions and the type of actors imposing them affect currency crises. More specifically, we run additional models to compare IGO-led sanctions with non-IGO sanctions, US sanctions with non-US sanctions, and finally high cost sanctions with low cost sanctions. The results in the first two models suggest that sanctions with and without IGO involvement are likely to be detrimental to the financial stability of target countries. The results in the third and fourth models, on the other hand, suggest that both US-led and non-US sanctions are likely to instigate currency collapses. In Models 5 and 6, we find that both high and low cost sanctions are statistically significant in increasing the probability of currency crashes in target countries. These results suggest that sanctions, regardless of the severity and the type of sanctioning countries, significantly co-vary with the onset of currency crashes.

How large is the effect of sanctions on the likelihood of currency crises? The coefficients of probit models identify the direction, positive or negative, of the explanatory variables' respective relationships with the outcome variable. However, their absolute values are of little importance when taken alone. To estimate the substantive impact of economic coercion, we examine the extent of the change in the predicted probability of the onset of currency crises once we increase the average value of the sanctions variables by one standard deviation while holding the other continuous independent variables at their mean values in the models in Tables II and

III. This allows us to have more nuanced assessment of our hypotheses beyond mere significance tests.

[Table IV here]

According to the results reported in Table IV, we find that sanctions in general increase the predicted probability of currency crises by 100%. When we examine the substantive effect of the three sanction types separately, we find that financial sanctions increase the predicted probably of currency crises by 93% while export and import sanctions increase it by 89% and 83%, respectively. Consistent with our conditional hypotheses on IGO-led sanctions, we find that multilateral sanctions under the auspices of IGOs appear to have a larger substantive effect (113%) than non-IGO sanctions (89%) on the change in the predicted probability of currency crashes.

The substantive effect of non-US sanctions (121%) is surprisingly larger than US sanctions (89%). The results for US and non-US sanctions variables appear to contradict our hypothesis that US-led sanctions might cause more harm than non-US sanctions. While future research is required to fully explain this somewhat surprising finding, we speculate that this could be because US sanctions might be more prone to sanction-busting (Early, 2009). The US has significant economic ties and investment in many countries due to their global financial and economic dominance. Hence, non-sanctioning countries might have more incentive to bust US-led sanctions since such sanction regimes could potentially create many more business opportunities and markets to tap for non-US companies and economic agents. Therefore, US sanctions, at least in the long run, might not cause significant damage on the economy. This would subsequently result in US sanctions having a relatively less substantial impact on the likelihood of currency crises.

While high cost sanctions variables increase the predicted probability of currency collapses by 136%, low cost sanctions appear to increase the predicted probability of currency crises by 40%. The substantive effects of the high and low cost sanctions variables support our hypothesis that sanctions that inflict higher economic damage are more detrimental to the financial stability of target countries. Overall, these findings show that economic sanctions are influential factors in instigating financial problems. We also find that high cost sanctions are the most detrimental types of sanctions to the overall stability of markets and finances in target countries.

Among the control variables in the tables, we find that the Public sector/Debt, Currency account balance, and northern growth variables are statistically significant in the expected directions. The remaining control variables are not statistically significant in estimating the probability of currency crashes. Our findings for the control variables are mostly consistent with the baseline model shown in Frankel & Rose (1996). The substantive effects of the statistically significant control variables appear in Table III. We find that one standard deviation increase in the average value of the public sector debt variable increases the predicted probability of currency crashes by 45%, while the same amount of increase in the current account balance measure results in a 26% decline in the predicted probability of currency crises. One standard deviation increase in the mean score of the Northern growth decreases the predicted probability of currency collapses by 12%.

Conclusion

This article offers a systematic analysis of the effect that economic coercion has on the likelihood of currency collapses. We assert that economic sanctions create conditions conducive to drastic

currency depreciations by weakening the economy and undermining the political stability of target countries. The results from the data analysis lend support for the theoretical claim that sanctions undermine the financial stability of target countries. The findings also show that the hypothesized negative effect of economic coercion on the financial stability of target economies is likely to be conditioned by the severity of the coercion and the type of actors involved in the implementation of sanctions.

The findings of this study have significant implications for various strands of the literature. The extant sanctions scholarship has primarily focused on the dyadic trade and investment flows in an attempt to assess the economic impact of sanctions. We contribute to this line of research by providing empirical evidence that foreign economic pressures are likely to instigate currency collapses. We focused primarily on currency crises as a major form of financial crisis because of the well-documented negative impact of currency depreciations on economic growth and prosperity. Thus, we demonstrate that the suggested impact of economic coercion on the target economy goes well beyond the immediate disruption of foreign trade and investment flows.

Our study also speaks to the contemporary currency crisis literature that studies various domestic and external determinants of currency crises. Although the literature has long recognized the possible international determinants of financial crises, our study is the first systematic attempt at examining whether economic coercion as an external shock affects the likelihood of major currency crises in the sanctioned countries. We find strong evidence indicating that international sanctions are significant external triggers for currency depreciations.

The frequent use of sanctions as a foreign policy tool suggests that economic coercion is a popular policy instrument of international politics. Although policymakers often utilize this

non-violent policy tool as an alternative to other policy tools (e.g., diplomacy, foreign economic assistance, and military force), our understanding of the extent of economic damage that sanctions inflict on the target economy remains limited. While scholars and policymakers are well aware of the low-success rate and possible humanitarian consequences of sanctions, scant research has been devoted to the possible mechanisms through which economic coercion might destabilize the economic conditions in target countries. Therefore, the research findings of this study offer some insight to policymakers and scholars about the severity of economic disruption inflicted on target economies.

The findings suggest that economic sanctions will likely undermine the financial stability of the target economy, which might in turn severely hurt the well-being of average citizens, the very groups that sanctions should avoid targeting to help achieve democratic freedoms, government accountability, and economic stability in sanctioned countries. Thus, due to the possible collateral damage to the economic well-being of citizens caused by sanctions, policy-makers should also consider the negative externalities caused by economic coercion in calculating whether the intended goals of costly sanctions would outweigh the possible damage on average citizens.

While this study offers theoretically-guided quantitative evidence on the effect that sanctions have on currency crises, future studies could follow the lead of this manuscript and examine to what extent sanctions also affect domestic and global financial markets. Studies could, for instance, explore whether stock market indices and oil and commodity prices display negative or positive reactions to economic sanctions.

Data replication
The dataset, do-file, and online appendix can be found at http://www.prio.no/jpr/datasets as well as https://sites.google.com/site/kalkas/publications.

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Table I. Economic sanctions and frequency of currency crisis

		Sanction years	**Non-sanction years**
Currency crisis	Yes	71 (11%)	197 (6%)
	No	594 (89%)	3,220 (94%)
Total		665 (100%)	3,417 (100%)
		Chi-squared: 21.89	P=0.000

Table II. Economic sanctions and currency crises

	All sanctions		Financial sanctions		Export sanctions		Import sanctions	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Economic sanctions	0.323**	0.328**	0.353**	0.329**	0.266*	0.305*	0.252*	0.280*
	(0.090)	(0.096)	(0.091)	(0.094)	(0.107)	(0.122)	(0.120)	(0.138)
Growth rate		-0.009		-0.009		-0.009		-0.009
		(0.009)		(0.009)		(0.009)		(0.009)
Debt/GNP		-0.009		-0.009		-0.011		-0.011
		(0.010)		(0.011)		(0.011)		(0.011)
Public sector/Debt		0.014*		0.013*		0.014*		0.014*
		(0.005)		(0.005)		(0.005)		(0.005)
Reserves/Imports		-0.017		-0.016		-0.018		-0.016
		(0.020)		(0.020)		(0.020)		(0.020)
Current account balance		-0.007+		-0.007+		-0.007		-0.007
		(0.004)		(0.004)		(0.004)		(0.004)
Northern growth		-0.051+		-0.050+		-0.052+		-0.052+
		(0.029)		(0.029)		(0.029)		(0.029)
Constant	-1.426**	-1.421**	-1.420**	-1.400**	-1.383**	-1.375**	-1.378**	-1.371**
	(0.076)	(0.131)	(0.078)	(0.134)	(0.077)	(0.129)	(0.076)	(0.129)
Observations	3,396	3,396	3,396	3,396	3,396	3,396	3,396	3,396

Robust standard errors adjusted for clustering over country appear in parentheses. **Significant at 1%, * at 5%, + at 10%. All time-variant independent variables are lagged at *t*–1. The control variables for temporal dependence are included but not shown here.

Table III. Economic sanctions and currency crises

	(1)	(2)	(3)	(4)	(5)	(6)
IGO sender	0.362**	0.330+				
	(0.127)	(0.168)				
Non-IGO sender	0.283**	0.288*				
	(0.106)	(0.112)				
US sender			0.303**	0.304**		
			(0.092)	(0.103)		
Non-US sender			0.384*	0.401*		
			(0.184)	(0.162)		
High cost sanctions					0.460**	0.424**
					(0.128)	(0.156)
Low cost sanctions					0.286**	0.311**
					(0.105)	(0.109)
Growth rate		-0.009		-0.009		-0.010
		(0.009)		(0.009)		(0.009)
Debt/GNP		-0.009		-0.009		-0.003
		(0.010)		(0.010)		(0.010)
Public sector/Debt		0.014*		0.014*		0.011*
		(0.005)		(0.005)		(0.005)
Reserves/Imports		-0.017		-0.016		-0.014
		(0.020)		(0.020)		(0.018)
Current account balance		-0.007+		-0.007+		-0.006
		(0.004)		(0.004)		(0.003)
Northern growth		-0.050+		-0.051+		-0.052+
		(0.029)		(0.029)		(0.028)
Constant	-1.425**	-1.413**	-1.429**	-1.426**	-1.435**	-1.418**
	(0.076)	(0.134)	(0.076)	(0.133)	(0.076)	(0.128)
Observations	3,401	3,401	3,396	3,396	3,485	3,485

Robust standard errors adjusted for clustering over country appear in parentheses. **Significant at 1%, * at 5%, + at 10%. All time-variant independent variables are lagged at *t*–1. The control variables for temporal dependence are included but not shown here.

Table IV. Predicted probabilities of currency crisis

Pr (Currency crisis = 1)

	Initial value	Unit change	New value	% Δ
All sanctions	0.044	0→1	0.088	100
	[0.036, 0.053]		[0.061, 0.114]	
Financial sanctions	0.046	0→1	0.089	93
	[0.037, 0.054]		[0.064, 0.114]	
Export sanctions	0.047	0→1	0.089	89
	[0.038, 0.055]		[0.053, 0.125]	
Import sanctions	0.048	0→1	0.088	83
	[0.040, 0.056]		[0.047, 0.130]	
IGO sanctions	0.048	0→1	0.102	113
	[0.040, 0.057]		[0.053, 0.150]	
Non-IGO sanctions	0.046	0→1	0.084	83
	[0.038, 0.054]		[0.052, 0.115]	
US sanctions	0.046	0→1	0.087	89
	[0.038, 0.054]		[0.058, 0.116]	
Non-US sanctions	0.048	0→1	0.106	121
	[0.040, 0.057]		[0.050, 0.163]	
High cost sanctions	0.048	0→1	0.110	129
	[0.040, 0.056]		[0.060, 0.160]	
Low cost sanctions	0.046	0→1	0.087	89
	[0.038, 0.054]		[0.056, 0.119]	
Public sector/Debt	0.051	mean + 1σ	0.074	45
	[0.042, 0.059]		[0.056, 0.092]	
Current account balance	0.050	mean + 1σ	0.037	-26
	[0.041, 0.058]		[0.028, 0.046]	
Northern growth	0.050	mean + 1σ	0.044	-12
	[0.041, 0.058]		[0.033, 0.054]	

95% confidence interval appears in the bracket. See the descriptive statistics (Table AII) for the values of the means and standard deviations.

Appendix

Table AI. Patterns of missing observations driven by macroeconomic control variables

	Bivariate correlation between Sanctions and Currency crises (# of observations)		
Control variable	Full	Control variable missing	Control variable non-missing
Debt/GNP		0.092 (1,523)	0.058 (2,559)
Public debt		0.137 (1,683)	0.036 (2,399)
Reserves/Imports	0.073 (4,082)	0.136 (630)	0.059 (3,452)
Current account balance		0.131 (690)	0.059 (3,392)

Table AII. Summary statistics*

	Mean	Std. Dev.	Min	Max
Currency crises	0.056	0.230	0	1
Economic sanctions	0.150	0.358	0	1
Financial sanctions	0.125	0.331	0	1
Export sanctions	0.098	0.298	0	1
Import sanctions	0.073	0.260	0	1
IGO sanctions	0.034	0.180	0	1
Non-IGO sanctions	0.118	0.323	0	1
US sanctions	0.117	0.321	0	1
Non-US sanctions	0.034	0.181	0	1
High cost sanctions	0.031	0.173	0	1
Low cost sanction	0.116	0.320	0	1
Growth rate	3.633	6.519	-51.031	106.280
Debt/GNP	4.985	5.120	-32.949	107.374
Public sector/Debt	11.908	12.605	-195.637	152.478
Reserves/Imports	3.386	3.604	-62.280	82.862
Current account balance	-3.598	12.511	-281.462	212.205
Northern growth	2.776	1.104	0.758	4.638

***** The summary statistics are based on the models in Tables II and III.