

Economic Causes of Female Suicide Terrorism: Perceived Versus Actual

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Abstract

Common belief holds that economic misery motivates more people to commit acts of suicide terrorism. The existing literature, however, fails to find an empirical linkage between these two phenomena. This study offers a novel theoretical perspective and statistical evidence on the economy and terrorism connection. I argue that Muslim women decide to engage in acts of suicide terrorism because of their *perception* of the national economy, rather than *actual* economic conditions such as gross domestic product per capita or the Gini index. Based upon a statistical analysis of 4,495 incidents of suicide terrorism during the period from 1981 to 2015, the study shows that, when Muslim women *perceive* their national economy to be unfavorable, they are more likely to commit acts of suicide terrorism.

Keywords: female suicide terrorism, economic causes, perceived economy, actual economy

While cradling a baby in her arms in Iraq, an Islamic State in Iraq and Syria (ISIS) suicide bomber carried out an attack that killed both herself and the child. An Iraqi TV station captured this shocking scene while covering a spree of more than twenty female suicide bombings in the city of Mosul (Roberts 2017). In Northeast Nigeria, three female bombers triggered explosives, resulting in the deaths of twenty-eight people and wounding eighty-two others. Boko Haram claimed responsibility for the three simultaneous attacks (Guardian 2017). Meanwhile, in Cameroon at least fifteen people were killed and another forty-two wounded when two women carried out suicide attacks (Associate Press 2017). These three recent events illustrate an increasing trend for women's participation in suicide bombings, affecting the safety for both security forces and local civilians. This begs the question, what specifically motivates women's participation in such horrendous acts? Explanations that are found in the existing literature are uncertain and inconclusive.

One possible explanation is that poor economic conditions have an impact on women's decisions to engage

in suicide missions. Put differently, the anger, frustration, and hopelessness stemming from economic sufferings encourage women's participation in such missions. Proponents of this position contend that, when living in a struggling economy, women who feel that they have no other options are more likely to take drastic measures such as suicide bombings (e.g., Blomberg, Hess, and Weerapanac 2004; Freytag et al. 2011; Krieger and Meierrieks 2016).¹ President George W. Bush argued along the same lines in his 2002 speech when he suggested that "persistent poverty and oppression can lead to hopelessness and despair." By extension, these life-ending decisions may become more attractive when loved ones receive some sort of compensation. Rohrer and Sobek's (2016) recent study where they examine the motivations of suicide bombers from seven terrorist organizations for the years 2000–2008 supports this reasoning. The authors conclude that

1 See also Krieger and Meierrieks (2011) for an overview of empirical findings on the causes of terrorism.

suicide terrorism² increases because of a combination of poor economic conditions coupled with the prospect of economic compensation on the part of terrorist organizations.

However, several other studies have reported either no evidence for the aforementioned connection or have produced contradictory results. For example, Choi (2015) finds that income inequality has no impact on the presence of suicide terrorism, and economic growth produces mixed effects (see also Choi and Luo 2013). In direct contrast, Krueger (2007) shows that many suicide bombers typically come from a slightly higher socioeconomic status. Conversely, focusing on the Middle East, Gambetta and Hertog (2009) report that highly educated people turn to suicide terrorism when they lack economic opportunities in poverty-stricken areas. Likewise, Benmelech, Berrebi, and Klor (2012) uncover that societal poverty and high education levels fueled Palestinian suicide bombings for the years 2000–2006.

Although the ongoing scholarly debates are constructive, the primary economic motivation of suicide bombers remains a mystery, especially when the bombers are women. It is known that women and men view the economy differently—the former are, generally speaking, far less optimistic about economic conditions than the latter. The reason for the gender gap may be due to the propensity for women to be poorer than men throughout their lives (Segarra 2017). Because women have a more pessimistic economic outlook, they are vulnerable to the exploitations of terrorist groups. Furthermore, terrorist groups have incentives to dispatch women rather than men as they tend to pass through security checkpoints and gain access to previously unavailable targets more easily than men (Jacques and Taylor 2008; O'Rourke 2009; Davis 2013). When women with a pessimistic economic outlook commit acts of suicide terrorism, terrorist groups also draw more publicity and, by extension, gain more notoriety. As Avraham (2016) puts it, female suicide bombers are likely to receive eight times more media publicity than their male counterparts. In addition, terrorist organizations are more likely to employ women bombers because being killed by a woman creates an emasculating image in Muslim countries. This, in turn, induces men to enlist in terrorist organizations on the grounds that, if

even women can blow themselves up, then men must join the movement (Berko 2012; Cashman 2017). This also illustrates how organizations use women as a means to control the media's coverage of their terrorist attacks. In short, terrorist organizations are likely to utilize women for suicide missions over other forms of terrorism due mainly to their tactical advantages, wide publicity, and emasculation of men.

However, nearly all previous studies overlook the fact that the role of a woman in political violence has significantly changed during recent decades. This knowledge gap creates two important obstacles to advancing our scientific understanding of the intersection of women and suicide terrorism. First, turning a blind eye to the changed gender role in previous studies makes it difficult to generalize the relationship between a woman's motivations and suicide terrorism. Second, there is no single empirical study that analyzes how economic distress may drive Muslim women in religion-based female suicide attacks. Focus on Muslim women is important because religion-based female suicide attacks are increasing while secular attacks remain constant. Inconsistent findings across these studies have complicated policy prescriptions. To better understand recent trends, I collect data on suicide bombings committed by Muslim women during the period from 1981 to 2015. As shown in Figure 1, the statistical pattern that emerges from the sample data indicates that acts by female Muslim bombers have risen considerably over the past three decades, with notable jumps in 2003, 2008, and 2015. To explain this increase in attacks, I offer a novel socioeconomic theory of female suicide terrorism: *perceived*—rather than *actual*—economic conditions explain this mysterious trend. I argue that rather than objective indicators of a country's economic performance such as gross domestic product (GDP) per capita or the GINI index, it is Muslim women's subjective perceptions of the economy that influence their decision to engage in such attacks. Based on a statistical analysis of 4,495 suicide bombing incidents, I provide support for my claim that, when Muslim women *believe* their country's economy is in dismay, they are likely to undertake suicide missions. This discovery of the importance of perceived economic standing contributes in important ways to the current debate on the relationship between Islam and suicide attacks.

I organize this study into four further sections. The socioeconomic logic of female suicide terrorism is presented in section two. Section three covers research design, while section four discusses empirical results. The last section sums up the main findings and their significance.

2 In this study, I use the terms *suicide terrorism* and *suicide attacks* interchangeably for simplicity purposes. Both terms refer to any violent attack in which the perpetrator expects their own death as a direct result of the method used to harm, damage, or destroy the combatant or non-combatant target.

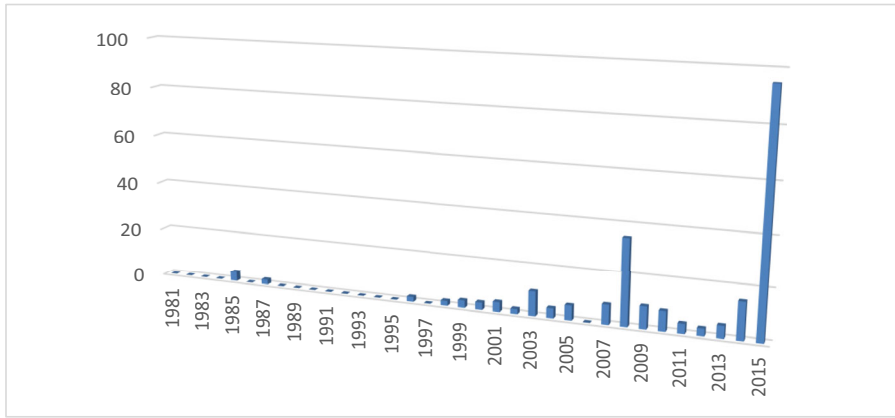


Figure 1. Annual female suicide bombings

The Socioeconomic Logic of Female Suicide Terrorism

Existing empirical studies searching for the root causes of suicide terrorism focus on actual macroeconomic performance—in other words, they seek to determine if objective poor economic conditions motivate women to turn to suicide terrorism. However, rather than the actual, objective strength of the economy, women’s subjective perceptions of the national economy more likely drive female suicide terrorism. Along this line, I contend that the actual state of the national economy and individual perceptions of the same economy are two very different motivators (see [Holbrook 1996](#); [Sanders 2000](#); [Vavreck, 2009, 2014](#)); consequently, each affects the individual decision-making process of potential female suicide bombers differently.

In theory, Muslim women should have the ability to learn objective economic facts, and then act based on this objective information, or at least act as if they were well-informed ([Powell and Whitten 1993](#)). In reality, Muslim women most likely use “bounded rationality” to make decisions—relying on a limited knowledge of objective economic statistics such as GDP, inflation rate, unemployment rate, and exchange rate ([Simon 1991](#); [Lewis-Beck and Paldam 2000](#)). This is partly because Muslim women have received less schooling than females of other major religions and their educational attainment has lagged behind that of Muslim men ([Hackett and Fahmy 2018](#)) and partly because it is not easy to differentiate all of the various different effects and consequences of the macroeconomy ([Anderson 2007](#)). Even though Muslim women hear news reports that the

national economy is currently expanding at a healthy rate, say, growing 4.5 percent, they are unlikely to heed or remember the objective economic figures due to the cognitive limitations of their minds, as noted in [Simon’s \(1991\)](#) work on “bounded rationality” (see also [Lohmann 1999](#); [Krugman 2015](#)). Instead, they are more likely to act based on their feelings about how the national economy is doing.³

Furthermore, because Muslim women experience much less economic prosperity and more unequal opportunities at all stages of their lives, their perception of the national economy is bound to be much more pessimistic than that of non-Muslim women ([Segarra 2017](#); [Economist 2018](#)). The labor statistics in the [World Development Report \(2017\)](#) unarguably show Muslim women’s economic disadvantages. The female labor force participation rate is only 26 percent in the Middle East and North Africa (MENA) region as of 2009, as compared to 52 percent worldwide. In contrast, the male labor force participation rate is 75 percent in MENA and 78 percent worldwide—the difference is negligible. Muslim women’s low economic participation contributes to a widening gender gap in economic outlook, which thus makes them much less optimistic about economic conditions, compared to non-Muslim women.

3 Note that the field of neuroeconomics further looks into why there are situations in which the assumptions of optimal decision-making are violated. It tries to understand the nature of what seem to be suboptimal and illogical decisions by examining which brain areas are active in which types of decision processes (see [Glimcher et al. 2008](#)).

Given that objective economic statistics are not actually factored into Muslim women's decision-making processes, they are unlikely to incentivize them to engage in suicide terrorism. Accordingly, I maintain that Muslim women base their decision to undertake a suicide mission on whether they *believe* that the national economy is performing poorly. Regardless of what real economic indicators are showing, Muslim women's perceptions are likely to lead them to believe that they lack economic opportunities or chances for upward socioeconomic mobility due mainly to the failure of the national economy. These gloomy economic prospects increase their relative perception of deprivation, which makes radicalization more likely (Gambetta and Hertog 2009). My argument about Muslim women and perceived economic peril thus further advances relative deprivation theory (Gurr 1970).⁴ The theory of relative deprivation would predict that, when Muslim women find their own economic conditions (based on objective measures such as GDP per capita) inferior to that of others to whom they compare themselves, they are more inclined to undertake a suicide mission. However, my theoretical analysis differentiates between egocentric (one's personal financial situation) and sociotropic (one's assessment of the state of the broader economy) considerations (see Anderson 2007). I argue that, in order to understand acts of suicide terrorism, a greater emphasis should be placed on how Muslim women perceive national economic performance (sociotropic), rather than how they calculate their own relative financial situations (egocentric). I now turn to explaining how sociotropic and egocentric considerations affect Muslim women's decision on committing suicide terrorism.

In large part, Muslim women's economic perceptions should reflect the information that they absorb on a daily basis. That said, information about the health of the national economy is not personally observed; rather, it comes through third-party sources such as community leaders and the media (Rapkin, Tucker, and Smith 2016). More importantly, perceptions of the national economy are often influenced by propaganda from terrorist organizations that seek to distort objective economic situations. Through targeted negative economic messaging, terrorist organizations manipulate women to turn to suicide bombings.

Juxtaposed against the prosperity of Western economies, terrorist organizations have incentives to

manipulate Muslim women into believing that they are at a great economic disadvantage. By attributing people's economic suffering to undue foreign influence on their holy land or to the misconduct of incumbent governments, terrorist organizations push vulnerable Muslim women to use the act of suicide to kill other domestic and foreign enemies. The types of political messaging that organizations use to motivate Muslim women vary from a hero's narrative to a particular interpretation of the meaning of Jihad. Not surprisingly, Muslim women are indoctrinated to believe that their death liberates the body from their current economic misery, provides material rewards to their family members immediately after the explosion, and secures the highest rank in paradise (Berko 2012; Turner 2015; Acosta 2016; Rohrer and Sobek 2016). Accordingly, Muslim women are drawn to the dire economic message and propaganda put forth by terrorist organizations, who seek to use this distortion to their advantage.

Unlike the perception of *national* economic conditions, the perception of *personal* economic situations is likely to work against Muslim women who contemplate undertaking a suicide mission. While household economic conditions are experienced personally, Muslim women are unlikely to use knowledge of their own poor financial situations as the rationale for carrying out a suicide attack. This is because they are well aware that terrorist organizations will not task women with personal economic grievances with suicide missions.⁵ A suicide mission is perceived to be the most honorable way to die only when it is done for God and the Muslim world. Committing such an act in the name of one's own individual economic misery would be considered disgraceful. The excuse of her own dismal economic prospects is simply not worth the self-sacrifice in a holy war for the Muslim world. If an egocentric Muslim woman were to commit a suicide bombing for her own personal reasons, then the religiously devout may suggest that she would be cast into the fire of hell rather than guaranteed the highest rank in paradise. Anat Berko (2012, 174), an internationally known expert on female suicide bombers, puts it best when she says this:

There are often contradictions between the dictates of the terrorist organizations and those of religion, especially regarding the place of women, including mothers, in the struggle. There is the strict religious injunction [*fatwa*] against suicide for personal reasons (*fatwas* issued by Sheikh Tantawi in 1996 and Sheikh

4 Hafez (2003) goes one step further. He rejects a theory of economic deprivation and argues that Muslims rebel owing to the repressive political environments within which the vast majority of Muslims find themselves.

5 Muslim women know that "candidates who were motivated solely by personal revenge were rejected [for a suicide bombing mission]" (Rosen 2005, 128).

Qardawi in 2003, for example) . . . The general opinion is that a person who commits suicide for personal reasons does not fulfill her duty to society and thus defies Allah.

More importantly, suicide attacks by Muslim women motivated by self-regarding economic concerns are unlikely to be celebrated as acts of jihad, as sympathizers of Islamic terrorism would condemn them rather than revering them as acts of martyrdom (MacEoin 2009). In the same vein, claiming somebody's life because of personal frustration and anger surrounding unemployment would go against commonly held religious beliefs on martyrdom. Additionally, Muslim women who live in poverty are unlikely to have skills and knowledge to successfully execute suicide missions due to a lack of higher-education opportunities. Terrorist organizations often use suicide bombers against hard targets or in higher-impact areas where a sophisticated skill set is necessary to ensure success (Benmelech and Berrebi 2007; Benmelech, Berrebi, and Klor 2012).

The above discussion leads me to formulate the following three hypotheses:

H1: *Even though Muslim women perceive their own economic situation to be bad (egocentric), they are less likely to execute a suicide terrorist mission.*

H2: *Even though Muslim women perceive their own employment prospect to be hopeless (egocentric), they are less likely to execute a suicide terrorist mission.*

H3: *When Muslim women perceive the national economy to be bad (sociotropic), they are more likely to execute a suicide mission.*

Research Design

In this study, I refer to female suicide bombings as attacks against civilian and military targets committed by Muslim women who intended to die in the process. For empirical testing of the above three hypotheses, I collect individual instances of suicide bombings and related data from various open sources. My compilation yields to a total of 4,495 suicide incidents from twenty-five countries from 1981 to 2015. The sample countries come from six different regions: two from Southern-Eastern Europe; four from Central Asia; one from Southeast Asia; three from South Asia; five from Middle East-North Africa; and ten from Sub-Saharan Africa. The data availability of main predictors confines the selection of the sample countries. As my theoretical prediction revolves around the root cause of female suicide bombings, namely Muslim women's individual subjective perception of their coun-

try's economic condition as bad, I organize the dataset at an individual suicide bomber level. This means that the unit of analysis is individual suicide bombing incidents. It is important to note that the ultimate decision to commit acts of suicide terrorism belongs to each individual Muslim woman, though she is probably connected to a larger terrorist organization that assists by helping with logistics. I build a statistical model as follows:

$$\begin{aligned} \text{Female Suicide Bombers} &= \gamma_0 \\ &+ \gamma_1 * \text{Perceived Personal Economic Conditions} \\ &+ \gamma_2 * \text{Perceived Unemployment} \\ &+ \gamma_3 * \text{Perceived National Economic Conditions} \\ &+ \gamma_4 * \text{Income Inequality} \\ &+ \gamma_5 * \text{Economic Development} \\ &+ \gamma_6 * \text{College Education} \\ &+ \gamma_7 * \text{Terrorist Outbidding} \\ &+ \gamma_8 * \text{International Terrorist Organization} \\ &+ \gamma_9 * \text{Foreign Occupation} \\ &+ \varepsilon \end{aligned}$$

The dependent variable—*female suicide bombers*—is dichotomous, coded as 1 when the perpetrator was a Muslim and a woman in the country in which the bombing incident occurred, and 0 otherwise (when suicide attacks were carried out by non-Muslim women and male bombers). The data is collected from the Suicide-Attack Network Database (SAND) at www.sandatabase.org.⁶ I also examined Robert Pape's (2005) Suicide Attack Database (SAD) and the Global Terrorism Database (GTD) to design an alternative indicator for female suicide bombers. The SAD presents two limitations as I test my theoretical expectations. First, the SAD does not have a religious identifier. Second, it does not include data on suicide bombing incidents for some of the countries under study, such as Bosnia and Herzegovina and Ethiopia. The GTD does not record the suicide bomber's gender and is therefore not suitable for my empirical analysis on female suicide attacks. These limitations discourage me from utilizing these databases to test the proposed hypotheses.

In order to study Muslim women's subjective perception of the economic well-being of a country, I introduce three independent variables: *personal economic situation*, *unemployment*, and *national economic situation*.

6 Studies that use the database include Acosta (2016) and Acosta and Childs (2013).

These variables combined help measure Muslim women's perception of economic conditions. These variables are collected from the Pew Research Center's public opinion surveys on the social and political views of Muslims in each of thirty-nine countries that spread over three continents: Africa, Asia, and Europe. To be included in the surveys, a country should have more than ten million Muslims. China, India, Saudi Arabia, and Syria are not included in the surveys because political sensitivities or security concerns prevented opinion research among Muslims (Pew Research Center 2013). My sample includes twenty-five out of the thirty-nine surveyed countries due to the limited data availability of the other predictors.⁷

Perceived personal economic conditions is a measure of the percentage of Muslims who were characterized as very pessimistic—"very bad"—about their personal economic situation. The question specifically asked, "what about your personal economic situation, how would you describe it—is it very good, somewhat good, somewhat bad, or very bad?"

Perceived unemployment is the percentage of Muslims who expressed a strong concern—"a very big problem"—about high levels of unemployment in their country. Individuals were asked the question in the following manner: "Here is a list of things that may be problems in our country. Please tell me if you think it is a very big problem, a moderately big problem, a small problem, or not a problem at all. Unemployment."

The variable, perceived national economic conditions, measures the percentage of Muslims who expressed displeasure—"very bad"—in the overall trend of their national economy. The question asked, "now thinking about our economic situation, how would you describe the current economic situation in our country—is it very good, somewhat good, somewhat bad, or very bad?"

I compare the three subjective indicators of economic perceptions with two objective macroeconomic indicators that have been widely used in previous studies. They are income inequality and economic development, both of which highlight actual economic performance of a country.

Income inequality is a difficult issue, as it draws a somewhat arbitrary line between the rich and the poor, and often illustrates a wide income gap in a country. When that gap is growing, poor people are more likely to view their situation as worse than that of others and thus lash out due to their economic discontent (Gurr 1970; Piazza 2006, 2011; Krieger and Meierrieks 2016).

7 Appendix 1 shows a list of the twenty-five sample countries.

Accordingly, Muslim women are more likely to engage in suicide terrorism when they feel economically frustrated due to their relative shrinking economic welfare, which leads to lack of hope for the future. The data comes from Solt's (2014) new collection on Standardized World Income Inequality.

The growth of the national economy naturally leads to a rise in a country's GDP. Consumption, investment, net exports, government spending, and inventories with individual consumption traditionally make up a measure for GDP. This suggests that an increasing GDP gives individuals more resources, who then should have fewer economic grievances. Accordingly, one would expect that Muslim women in more developed economies are reluctant to engage in suicide terrorism (Blomberg et al. 2004; Freytag et al. 2011; Choi 2015; Piazza 2016). This variable is based on the World Bank's *Economic Development Indicator* (2017), and I measure economic development as logged GDP per capita.

To avoid omitted variable bias, I include four control variables that have appeared in previous empirical studies of suicide terrorism: *college education, terrorist outbidding, international terrorist organization, and foreign occupation*.

As suicide missions can involve complex components that are necessary to ensure success, Muslim women who carry out attacks generally possess high levels of educational skills. Bueno de Mesquita (2005) uses a game theoretical model to illustrate this point. Furthermore, Benmelech, Berrebi, and Klor (2012) also find empirical evidence of higher educational attainment among Palestinian suicide bombers from the years 2000–2006. Data for the college education variable comes from Banks' (2010) Cross-National Time-Series Data Archive; I take a log of the total number of university enrollment per capita.⁸ University enrollment provides a baseline for the education variable as implicit with university admission is the completion of secondary education.

Previous studies have suggested that terrorist organizations increase the amount of terrorist attacks that they carry out as an attempt to outbid one another for attention and notoriety (Bloom 2005; Kydd and Walter 2006; Choi 2018). The theory of outbidding is operationalized by the total number of terrorist groups that appear in my suicide terrorism dataset. As a robustness check, I also employ a similar measure based upon Young and Dugan's (2014) study. As

8 The World Bank's World Development Indicators (2017) contain data on female educational attainment; however, the data points are too sparse to include in my data analysis.

that measure did not substantively change my main findings, the estimates are not reported to economize space.

Another important factor to consider is the scope and size of the terrorist organizations (Thomas and Wood 2017). International terrorist groups foster an environment that is more prone to recruit women. In order to bolster their group's strength, many international organizations have reportedly begun to actively recruit women. This is often in response to a weakening position relative to their opponent(s), as well as a strategic decision given the perceived benefits of employing women in such tactics as suicide bombing (Davis 2013). Research suggests that security forces perceive women as less threatening, allowing them greater access to targets as they do not attract much negative attention (O'Rourke 2009; Davis 2013). International terrorist organizations are coded as 1 when the activities of the terrorist organization to which a suicide bomber belongs go beyond a nation-states' territory. Otherwise, they are coded as 0.

In his seminal work on suicide terrorism, Pape (2005) argues that terrorist movements are most likely to utilize suicide attacks when their territory is under occupation by foreign powers. Foreign military occupation is recorded as a dummy variable: 1 for all observations where the nation is subject to foreign military control, and 0 otherwise. This variable comes from a category of -66 in the composite democracy score of Polity that records cases of foreign "interruption" (Marshall and Jagers 2014).

Previous studies show that democratic political institutions are associated with acts of terrorism (e.g., Choi 2010). Yet, since foreign occupation and democracy both derive from the same Polity indicator, both variables should not be included in the same model. All of the missing observations (i.e., -66) in the composite democracy score in Polity represent the presence of foreign military occupation. As such, democracy is excluded in the model specification.

I also design an alternative measure for the foreign occupation variable, which comes from the International Military Intervention Data (Kisangani and Pickering 2008). The variable *foreign military intervention* measures the same concept as the military occupation variable described above (Choi and Piazza 2017). Both the occupation and intervention variables yield similar effects; however, the latter lacks ten years of data. I therefore report the results only from the foreign occupation variable to save space.

Finally, as the dependent variable—female suicide bombers—is dichotomous, I employ logistic regression for estimation. To assuage a possibility of some kinds of

model misspecification, I report robust standard errors. As a robustness check, I employ rare event logit given the relatively small number of female suicide bombers in the sample data. Mixed-effects logistic regression is also introduced as another robustness check, as it is suitable for analyzing clustered data—female suicide bombers clustered in countries.

Empirical Results⁹

Table 1 shows estimated results of logit, rare event logit, and mixed-effects logistic regression. Given that the p -value for Wald χ^2 is less than 0.000 in Model 1, I am able to confidently assert that the independent variables have a significant effect, taken together, on the dependent variable. In addition, the pseudo R^2 of 0.28 may indicate that the model explains the variation in female suicide terrorism moderately. The overall rate of correct classification is estimated to be 95.17, with 99.72 percent of the normal weight group correctly classified (specificity) and only 8.48 percent of the low weight group correctly classified (sensitivity). Note that classification is sensitive to the relative sizes of each component group and always favors classification into the larger group. This phenomenon is evident here (see Kohler and Kreuter 2012). Model 2 reports the rare event logit that is designed to address the issue of excessive zeros—my data indicates a rare occurrence of female suicide bombings: they occurred in only 224 out of 4,495 cases. Model 3 displays estimated results obtained from mixed-effects logistic regression with two levels: (1) suicide bomber and (2) country.

The coefficients and standard errors in Model 1 provide support for my main hypotheses about Muslim women's subjective perceptions of economic conditions. The perceived *personal* economy variable is statistically significant and points in the expected direction. This means that according to this model, Muslim women are less likely to undertake a suicide mission when their own personal economic situation is viewed as unfavorable. This is consistent with the testimony of Ayisha and other failed female suicide bombers: "Finances are not the reason people blow themselves up. Even people who had no money worries did it" (Berko 2012, 79). As noted earlier, Muslim women are not using their own economic misfortune as rationale for carrying out a suicide attack. This theoretical reasoning receives empirical support, as the perceived unemployment variable turns out to be

9 Using variance inflation factors, R^2 , eigenvalues, and condition index, I checked multicollinearity among the predictors. No serious multicollinearity was found.

Table 1. Causes of female suicide terrorism: perceived versus actual economic conditions

Variable	Logit Model 1	Rare event logit Model 2	Mixed-effects logit Model 3
<i>Subjective economic indicators</i>			
Perceived personal economy (egocentric)	-0.122** (0.044)	-0.121** (0.044)	-0.211*** (0.062)
Perceived unemployment (egocentric)	-0.021 (0.021)	-0.023 (0.021)	-0.040 (0.025)
Perceived national economy (sociotropic)	0.127*** (0.037)	0.128*** (0.036)	0.122*** (0.034)
<i>Objective economic indicators</i>			
Income inequality	0.056 (0.029)	0.054 (0.029)	0.156** (0.060)
Economic development	0.315 (0.290)	0.291 (0.289)	-0.032 (0.285)
<i>Controls</i>			
College education	-0.020 (0.050)	-0.015 (0.050)	-0.035 (0.065)
Terrorist outbidding	-0.139*** (0.025)	-0.139*** (0.025)	-0.095** (0.030)
International terrorist organization	0.556** (0.204)	0.546** (0.204)	0.869** (0.308)
Foreign occupation	0.898*** (0.188)	0.881*** (0.188)	1.096*** (0.239)
Constant	-5.560 (2.950)	-5.164 (2.943)	-4.638 (3.145)
Wald Chi ²	439.43		95.44
Prob > Chi ²	0.000		0.000
Log pseudolikelihood	-636.67		-629.12
Pseudo R ²	0.28		
Observations	4,495	4,495	4,495

Notes: (1) Robust standard errors in parentheses. (2) Statistical significance levels: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, two-tailed tests.

insignificant. Muslim women who are at a high risk of being jobless in the future are unlikely to carry out suicide attacks. Another possible interpretation of this null finding is that Muslim women have relatively limited labor opportunities under the best of circumstances—measures of unemployment would have no effect on the dependent variable. As noted in Hausmann, Tyson, and Zahidi's Global Gender Gap Report from 2012, women's employment in Syria, Iraq, and Afghanistan remains at 15 percent, the lowest rates of female labor force participation among eleven Muslim majority countries.

Nevertheless, the perceived *national* economy variable achieves statistical significance and the sign is positive. This implies that Muslim women are more likely to carry out suicide attacks if they perceive their national economy to hold little promise. The comparison between the subjective perceptions of personal and national economic conditions clearly shows that there are distinctive

effects that sociotropic and egocentric decisions have on the likelihood of Muslim women committing a suicide attack.

The two objective indicators for economic conditions—income inequality and economic development—appear to be insignificant predictors of female suicide bombings. This finding is consistent with my theoretical expectations that Muslim women are largely ignorant of actual macroeconomic figures. These, therefore, have no explanatory power over their decisions to engage in suicide attacks. This finding is also consistent with previous studies that report the same null effect (e.g., Krieger and Meierrieks 2011).

Of the four other control variables, college education is the only one that is not associated with female suicide bombers. The terrorist outbidding variable achieves significance but not in the hypothesized direction. Indeed, the outbidding behavior of terrorist groups actually appears to discourage women's participation in suicide

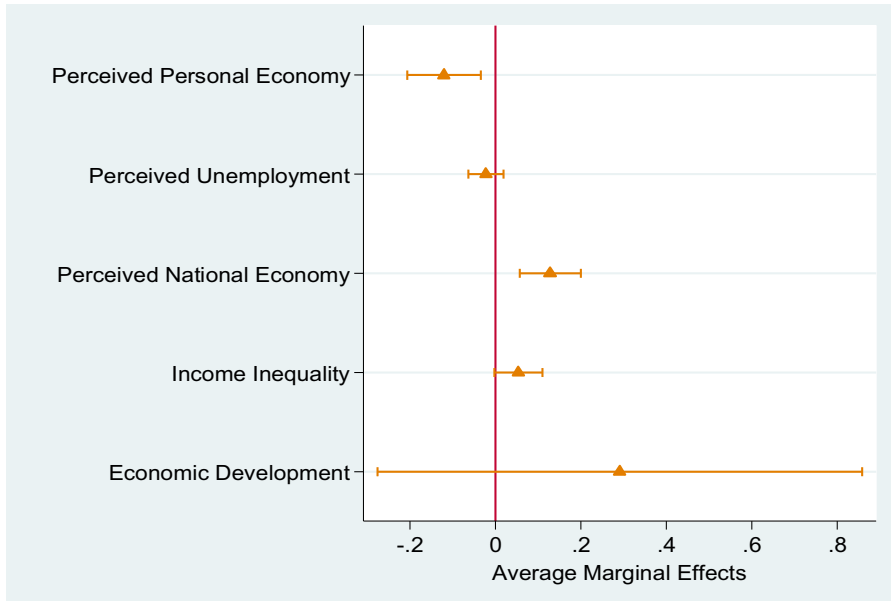


Figure 2. Average marginal effects

attacks. This suggests that female suicide terrorists are not substitutes for male terrorists, but an entirely different phenomenon. The significance of the international terrorist organization variable suggests that female suicide bombers are more attracted to international terrorist organizations. Finally, the expectation that foreign occupation leads to higher levels of suicide attacks receives support because the coefficient is significant and points in the expected direction. Having their homeland under foreign military rule indeed motivates Muslim women to participate in suicide terrorism.

My suicide terrorism data includes 224 female bombers and 4,271 male bombers who carried out their attacks in the past three decades. As the model includes relatively few incidences of Muslim female terrorist attacks, the logit estimates in Model 1 may possess some level of bias. To control for this potential bias, I employ a rare event logit. Model 2 produces quite similar results: the main variables related to perceived economic conditions remain statistically significant in the hypothesized directions, while the objective economic indicators fail to achieve statistical significance.

The suicide terrorism data is organized at more than one level—female suicide bombers are clustered in countries. This may imply the need for another estimation method that can effectively detect the empirical pattern, specifically that the choices of female suicide bombers vary depending on their country of residence in addition

to their perceptions of economic conditions. To take account of the clustering in the sample data, I implement mixed-effects logistic regression whose estimated results appear in Model 3. Consistent with Models 1 and 2, the perceived *personal* economy variable in Model 3 is significant with a negative sign; the perceived unemployment variable is insignificant; and the perceived *national* economy variable is significant with a positive sign. These findings from the multilevel modeling confirm the main hypotheses about Muslim women's subjective perceptions of economic situations. In this latter set of models, income inequality—one of the two objective indicators for economic conditions—emerges as a significant and positive predictor of female suicide bombings. This indicates a possibility that worsening income inequality may also affect the choice of female suicide bombers.

To visualize the differences between perceived and actual economic conditions, I plot average marginal effects of five economy-related variables in Figure 2, based on the log odds from Model 2. Average marginal effects give us the average change in probability when each of the five main independent variables increases by one unit. It is apparent that, while Muslim women's subjective perceptions about national economic conditions matter, the objective economic data has no predictive value. This analysis of substantive effects confirms the results of the conventional significance tests.

Conclusion

This study addresses the controversial connections between poor economic conditions, both perceived and real, and the incidence of female suicide terrorism. I contend that the inconclusive findings of existing studies result from a neglect of the effects that perceived economic conditions have on Muslim women. I differentiate between individual perceptions of national economic situations and objective economic conditions and make a further distinction between egocentric and sociotropic images of the economy. The empirical results support the theoretical argument that Muslim women's participation in suicide bombings are not likely motivated by objective economic statistics, but rather by their subjective and sociotropic perceptions about the national economy. In sum, female suicide bombers appear to pursue revenge for imagined, but not real, national economic hardships.

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Appendix 1: A list of twenty-five sample countries

Southern-Eastern Europe	Bosnia and Herzegovina	Russia
Central Asia	Kazakhstan	Tajikistan
	Turkey	Uzbekistan
Southeast Asia	Indonesia	
South Asia	Afghanistan	Bangladesh
	Pakistan	
Middle East-North Africa	Egypt	Iraq
	Jordan	Lebanon
	Tunisia	
Sub-Saharan Africa	Cameroon	Chad
	Djibouti	Ethiopia
	Kenya	Mali
	Niger	Nigeria
	Tanzania	Uganda