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The Impact of Kidnapping Characteristics on the Probability of Outcomes in Colombia 1970-2010

Wyatt D. Suling
Maxwell School of Citizenship and Public Affairs, wdsuling@syr.edu

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ABSTRACT

This paper examines the effect of victim and perpetrator characteristics on the probability of kidnapping outcomes in Colombia from 1970-2010. The data is analyzed using linear regressions and competing risks survival analysis. I find that ransom amounts had very little effect on the probability of ransom payments, indicating a highly inelastic market for the return of loved ones. Sex had a small impact on the probability of being killed in captivity and of being rescued. Childhood improved a victim's chance of rescue by 21.3%. Outcomes also varied by perpetrator group. Captives of criminal networks were 21.5% more likely to be rescued than FARC captives. Paramilitary groups were 10.6% more likely to kill captives than FARC and M-19 captives were 18.1% more likely to be rescued than FARC captives. These results can be used to better understand the decision-making process of kidnappers with an aim towards informing the tactics and policies of security forces and policymakers.

1   INTRODUCTION

Kidnappings, like all illicit activity, are difficult to study empirically, but have tremendous impacts on people's lives and potentially the politics and policy of countries. To better understand why kidnappings reach the outcomes they do, I examine the impact of kidnapping characteristics on the probabilities of the four most common outcomes of kidnappings in Colombia from 1970-2010. These outcomes are the captive being killed in captivity, released without the captors receiving a ransom, released after a ransom payment, and rescued by security forces. I use linear regressions to look at the overall impacts and survival analysis to look at the impacts over the course of a captivity. The data covers 9,905 Colombian kidnappings and was collected by the National Center for Historical Memory.

Increases of $100,000 in ransom demands were shown to have very slight impacts on the probability of release with or without a ransom. The small impacts indicate that the market for the return of loved ones is highly inelastic. Victim characteristics such as sex and adulthood had significant impacts on the probability of rescue by security forces. The faction that conducted the kidnapping had significant impacts on the probability of the four outcomes. These impacts are likely rooted in differences in motivation, strength, and structure between each of the factions.

The results of this analysis could be used by policy makers and security professionals to form better expectations for the outcomes of future kidnappings. They could also be used to take more effective preventative measures that account for perpetrators' preferences and which people are most at risk for being kidnapped. Economists can use the results to improve the theory of kidnapping by beginning to understand how potential kidnappers decide to kidnap and how they select their victims.

2   BACKGROUND

Historical Context

The story of Colombia's kidnapping epidemic has its roots in the political violence of 1948-1964 referred to as *La Violencia*. While Colombia has a long history of political violence, prior to *La Violencia* Colombia had seen relative peace though politics remained highly partisan. A carefully planned effort to delegitimize political violence in the early 1900's kept the opposing Liberal and Conservative parties from starting civil wars over various disputes. There was, however, a large gap between the political and economic elites of the country and the rest of Colombian society. This allowed an upstart outsider political figure named Jorge Eliécer Gaitán to build a mass following among the poor working class. While technically a Liberal party member, Gaitán was not a member of the elite and represented a threat to both parties. He threatened the status quo because he regarded the standards of civility and decorum in politics as nothing more than a way for the elite to maintain power. As with many populist leaders, he generated a powerful personality cult that encouraged powerful loyalty. This would prove disastrous when he was assassinated by an unknown gunman on April 9, 1948 in the heart of Bogotá. Gaitán's assassination led to riots in Bogotá that shattered the veneer of political civility (T.E. Skidmore, P.H. Smith and J.N. Green, 2013).

The ensuing political violence lasted years, killing between 250,000 and 300,000 people and became known as *La Violencia*. A political settlement finally ended *La Violencia*, however, the agreement excluded anyone who did not support the traditional parties, forcing these people out of the political sphere. Worse, rather than leading to a smooth functioning, compromising government, the agreement led to political stalemate that, while peaceful, frustrated many

working class and poor. Eventually, in 1962, university students founded the first armed revolutionary movement, Ejército de Liberación Nacional (ELN), which renounced the political system and even the Communist Party. Shortly after, the Fuerzas Armadas Revolucionarias de Colombia (FARC, or in English, Revolutionary Armed Forces of Colombia) was founded in 1966. Anchored in the countryside, FARC would become the most powerful guerrilla group in Colombia, exercising control in the rural areas of Colombia that the government struggled to effectively challenge until the early 2000's (Skidmore, Smith and Green, 2013).

In 1970, when the duopoly of power between the Liberals and the Conservatives was delegitimized by the respectable performance of a third political party in the election of that year, another guerrilla group rose. The April 19th Movement (M-19) was named after the date of the 1970 election and focused its efforts in Colombia's cities. They conducted several daring operations, the last being the takeover and ensuing battle for the Palace of Justice in 1985 that killed a dozen members of the Colombian Supreme Court. This event caused M-19 to lose popular backing, soon forcing them to disarm and join civilian politics (Skidmore, Smith and Green, 2013).

During this time, Colombia's infamous drug cartels were rising and gaining power. They offered opportunities for incredible wealth and power to Colombian poor. This lifestyle was even more attractive due to debt crisis facing Colombia at the time that forced the government to freeze public-sector wages and make cuts in education and housing for the poor. The cartels growing power was put on display when an immensely popular presidential candidate, Luis Carlos Galán, was assassinated at the order of drug traffickers in 1989. The next several years brought much violence and political turbulence, but the strength of the cartels would begin to break when the leader of the Medellín Cartel, Pablo Escobar, was killed by Colombian security

forces. A few years later the Cali Cartel would be broken up as well, leading to a decentralization of drug trafficking in Colombia that would be taken advantage of by the guerrilla groups, namely FARC (Skidmore, Smith and Green, 2013).

It was during the 1970's that the tactic of kidnapping began to arise. Before their fall, the cartels clashed with the guerrilla groups on and off just as they did the government. Due to their immense wealth, many cartel leaders became de facto members of the oligarchy the leftist guerrilla movements were aligned against, and therefore the groups would kidnap cartel members' families to extort ransoms. This tactic was not reserved for drug traffickers and ELN and especially FARC would use the tactic to raise funds and pressure the government. One consequence of this was the rise of vaguely right-wing paramilitary groups that veiled themselves in vigilantism while conducting attacks and kidnappings of their own for various reasons. These paramilitary groups would sometimes be hired by drug traffickers to protect them from guerrillas and had an informal alliance with Colombian security forces unable to control the guerrilla groups themselves (Skidmore, Smith and Green, 2013).

The collapse of the large centralized drug cartels in the mid 1990-s paved the way for the guerrilla movements, especially FARC, to begin to act as facilitators, guards, and even participants in the drug trade. This brought the groups immense wealth just as it had done for the cartels before them, and this wealth was used to bolster their ranks and power. FARC would exercise near total control of the rural areas of Colombia during these years, kidnapping thousands with impunity. Attempts at a peaceful settlement stalled through the late 1990's and then collapsed in late 2001. Monitoring events in Colombia, the United States pledged $1.3 billion to Colombia to help fight drug trafficking. After 9/11, however, the mandate for the use of this money was expanded to include terrorism and therefore FARC and the other guerrilla

groups. When Álvaro Uribe was elected president in 2002, he declared total-war on FARC, who had assassinated his father, and the other guerrilla groups. For the next decade, Colombian security forces would decimate guerrilla forces, leading to the peace agreement signed in November 2016 under which FARC would disarm and reintegrate into civilian politics and life (Skidmore, Smith and Green, 2013).

Faction Profiles

National Liberation Army (ELN)

ELN founding members began training on July 4, 1964. They consisted of radical Catholic students, left wing intellectuals and students inspired by the Cuban revolution and Che Guevara. ELN's goal from its founding was the overthrow of the government in favor of a more representative one and it was driven by strong ideology and an emphasis on community relations. ELN was nearly wiped out in 1973 after a government offensive killed 135 of its 200 members, and to finance its rebuilding, began to kidnap for ransom. Under its former leadership, ELN had considered kidnapping and the drug trade anti-revolutionary but after 1973, kidnapping became ELN's main revenue source and its members became experts in it by the 1980s. It avoided the drug trade until 1998, but now is involved with a wide range of criminal activity and is less ideologically driven. At its peak in 1999, ELN boasted 4,000-5,000 members and 15,000 supporters. Since then, however, government and right wing paramilitary efforts have severely weakened ELN and it has entered peace talks with the Colombian government (Stanford University, 2015b).

Revolutionary Armed Forces of Colombia (FARC)

FARC was formed in 1964 from members of the Colombian Communist Party. At first it only defended communities of rural left wing Colombians from government attack, but in 1966, it expanded its mandate to offensive operations against the government. From the beginning, FARC used the kidnapping of politicians and elites to fund its operations, but in the late 1970s it expanded into cocaine trafficking. The revenue from these tactics allowed FARC grow more powerful an attract many more members. Throughout the 1990s, FARC became the most powerful guerrilla group in Colombia with its peak membership at 18,000 in 1999. But the kidnapping epidemic driven largely by FARC operations turned public opinion against it and 1999 also saw a quarter of the population turn out to protest FARC and continued violence. In 2000, the United States began Plan Colombia, which would give Colombia $9 billion to fight drug trafficking and after 9/11, terrorism. This enabled the Colombian security forces to effectively combat FARC and from 2002 onwards their power decreased dramatically. In November of 2016, FARC and the government signed a peace treaty and FARC has begun the process of disarmament and transition to the normal political process (Stanford University, 2015a).

The April 19th Movement (M-19)

M-19 was formed in 1974 by Colombians dissatisfied with the political system and state of democracy in Colombia. The elections of April 19th, 1970, which many Colombians considered stolen from a popular candidate, provided the inspiration for M-19's creation. It would conduct several high-profile attacks, including attacking and forcing a siege of both the Dominican Republic's embassy and the Palace of Justice. To fund its operations, it targeted drug traffickers and their children for kidnapping. In response, drug traffickers helped to create and

fund right-wing paramilitary groups that would target M-19 among other leftist guerrilla groups. M-19 would become Colombia's second most infamous guerrilla group behind FARC and would continue fighting until 1989 when peace talks with the government led to it disarming and forming a political party (Stanford University, 2015c).

Paramilitary Factions of Colombia

The targeting of elites and drug traffickers by leftist guerrilla groups in Colombia during the 1980s led to the formation of right-wing paramilitary self-defense forces. These groups aligned themselves with Colombia's security forces but did not coordinate with them in their fight against various guerrilla groups and their supporters. Paramilitary groups used brutal tactics against those who supported guerrilla groups, killing thousands as well as conducting kidnappings of their own. In the mid-1990s, these groups would begin to centralize and form the United Self Defense Forces of Colombia (AUC). The extreme violence used against guerrillas and their supporters continued, and the AUC got involved in drug trafficking to help fund its operations in the early 2000's. As the AUC's body count increased, the Colombian government took an adversarial stance towards the AUC and in 2005, many of the AUC's members disarmed and accepted reduced jail terms for their crimes, though splinter groups are still active (Stanford University, 2015d).

Criminal Networks

Criminal Networks is an umbrella term used for loose bands of criminals as well as drug trafficking cartels. This is the most loosely defined faction described in these data, but cartel activity is likely to make out most of the kidnappings attributed to this group since kidnapping is a complex and resource intensive crime. The cartels' power reached their peak in the late 1980s

and early 1990s. Partly with American assistance from the War on Drugs, Colombian security forces would crack down on the cartels in the mid-1990s, with the Medellin Cartel crumbling in 1993 and the Cali cartel following it in 1995. The drug trafficking cartels did not disappear after this however, only decentralizing and forming low level agreements with other factions in Colombia such as FARC (Skidmore, Smith and Green, 2013).

Theoretical Framework

While the groups that terrorized and destabilized Colombia for decades through kidnapping had many motivations, they still had to go through a similar decision-making process to that of regular criminals. When their members were contemplating a kidnapping, they still attempted to maximize their utility while minimizing costs. Gary Becker's (1974) work on the economic theory of crime therefore provides an infrastructure to think about kidnapping and the decision making the various culprits go through. In his work, Becker notes that there have been many theories for what drives individuals to commit a crime and each faction conducting kidnappings in Colombia had very different motives and goals. But when comparing the expected utility of a crime against that of conducting legal activities, all potential criminals must factor in the probability of getting caught and convicted as well as the severity of the punishment awaiting them after conviction. To illustrate this, Becker created the following equation of the expected utility of a crime:

$$EU_j = p_j U_j\left(Y_j - f_j\right) + (1 - p_j)U_j(Y_j)$$

where p_j is the probability of getting caught and convicted, U_j is the utility function encapsulating the individual's risk aversion, Y_j is the individual's income in both monetary and psychic terms, and f_j represents the severity of the punishment awaiting the individual given a

conviction. When the state increases the value of p_j and f_j, it reduces the expected utility of a kidnapping, therefore making criminals less likely to judge committing a crime in their best interests when compared to the alternative of legal activities (Becker, 1974).

Becker's equation provides an excellent starting point for thinking about the decision-making process of a potential kidnapper, but there are several differences between a kidnapping and a typical crime like a robbery that must be accounted for. In a robbery, once the initial criminal action is complete, the criminal receives his/her payoff. This is not the case for a kidnapping in which the actual kidnapping is but the beginning of the crime. Once the victim has been secured, there are several ways in which the kidnapping can be administered by the criminal, each of which impacts the potential outcomes of the kidnapping.

To keep the model relatively simple, we will consider only two courses of action a kidnapper would have to choose from. The first is that the potential criminal never commits the kidnapping, choosing legal activities instead. The second is that the criminal kidnaps a victim, but involved in this decision are several other concerns. At the beginning of a kidnapping, the kidnapper sets a ransom demand ranging from zero to, theoretically speaking, positive infinity. A kidnapper might set the ransom at zero because many of the factions active in Colombia during the kidnapping epidemic had political motivations and aspirations that a ransom might take away from. Alongside the choice to kidnap and the ransom demand is the choice of victim. The characteristics of the kidnapping can dramatically impact the probability of success for the kidnapper as well as the range of ransom demands that would be reasonable. For example, the state's response to a villager from a rural community being kidnapped would be very different to its response to a prominent politician being kidnapped. The state's response would also differ by the faction conducting the kidnapping as one performed by a weak faction would be easier to

stop than one performed by the FARC at the height of its power. A kidnapper would need to account for these variables when selecting a deciding whether to kidnap.

When running through the decision-making process on whether to pursue legal activities or kidnap, a potential kidnapper would need to attempt to judge the way the ransom demand and kidnapping characteristics would impact both the probability and benefits of each of the possible outcomes of a kidnapping. To model this process, the following equation is helpful:

$$E(U; R, X) = p_1(R, X)U_j(Y_1(R, X)) + p_2(R, X)U_j(Y_2(R, X)) + \cdots + p_k(R, X)U_j(Y_k(R, X))$$

where p_k is the probability of an outcome coming to pass and $p_1 + p_2 + \cdots + p_k = 1$, (R, X) models how the given values for the ransom and kidnapping characteristics, respectively, affect p_k and Y_k, U_j is the potential kidnapper's utility function which encapsulates his/her risk aversion, and Y_k is the utility an outcome will bring the kidnapper. Because there are nearly countless ways in which a kidnapping can end, there would be k factors to account for each outcome a potential kidnapper could imagine. Potential outcomes examined in this paper include the captive being;

- Killed by the kidnappers
- Released after the kidnappers receive the ransom
- Released without the kidnappers receiving the ransom
- Rescued by security forces

but there are many other outcomes that occur far less often that would still need to be accounted for by the kidnappers such as the captive dying of natural causes, escaping, getting exchanged for another person, and dying during a rescue attempt.

When a potential kidnapper compares the expected utility of legal activities against that of a kidnapping, the equation above allows the kidnapper to account for as many influences as possible. However, this comparison is still difficult and imprecise since it is impossible for a potential kidnapper to accurately predict so many outcomes and the payoffs they will bring. However, many of the possible outcomes of a kidnapping would have had very small probabilities of occurrence, such as the captive escaping once transported to the kidnapper's base. The kidnapper would have also been able to directly control the probability of some outcomes, such as the killing of the captive. Finally, the kidnapper would have to judge his/her own risk aversion and whether there are outcomes in which the payoff is not worth the risk. Once these calculations have been made, the potential kidnapper would do a final comparison of expected utilities and choose a course of action. The existence of Colombia's kidnapping epidemic in the 1980s and 1990s reveals the most common choice among Colombia's armed factions, but examining the outcomes of these kidnapping may provide insight into how these kidnappers populated the expected utility function above and went through the decision-making process.

Hypotheses

This paper focuses on four variables of interest in relation to kidnappings, the ransom demand, sex of the captive, whether the captive was an adult or a child, and the faction responsible for the kidnapping. While these are basic kidnapping characteristics, they may have strong impacts on the probability of certain outcomes for a kidnapping. An example is that many kidnappings revolve around a ransom demand. Higher ransom demands should reduce the probability of a captive being released after the captors receive a ransom because it is more difficult to avoid the ransom. This effect may be small since the demand for a loved one is highly

inelastic. Accordingly, a higher ransom should lead to a higher probability of a captive being released without the captors receiving a ransom since it becomes more likely the captors will cut their losses when they realize they will not receive a ransom. A higher ransom may cause a captive to be less likely to be killed in captivity since he/she is more valuable to the kidnappers. A higher ransom may slightly increase the probability of rescue as a higher ransom could be correlated with a politically or economically powerful captive, but is likely small since security forces will be working to rescue the captive regardless of the ransom demand.

Sex is likely to have strong influences on the probability of outcomes. Women are traditionally seen as more sacred than men during conflict, so a captive being female may have spark behaviors a male captive would not. A captive being female is likely to increase her chance of rescue, and may decrease her probability of being killed in captivity if the kidnappers wish to avoid killing women. For factions with political aspirations, killing women often would carry severe repercussions, discouraging the killing of women further. The inclination to quickly return a kidnapped woman home should also lead to an increase in the probability of a female captive being released after the captors receive a ransom. The probability of a female captive being released without a ransom should decrease since the probability of the other outcomes have increased. Like women, children are also considered sacred during conflict. The impact of a captive being under the age of 18 should have very similar effects to those seen for female captives since there would be a general desire to return them home through any means.

Because FARC is the best-known guerrilla group in Colombia, it was chosen as the baseline against which other factions' dummy variables are compared. Its mixture of political and economic motivations made it unlikely to release captives without a ransom and its power left the rescue of a captive unlikely. The revenue diversification provided to FARC through

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cocaine trafficking would have allowed it to kill captives more often than many of its peers, but its need for popular support would have limited this.

ELN and FARC have many similarities, but ELN's more ideological nature and focus on community relations will likely make it more willing to release captives for political rather than economic benefits. At the same time, ELN's avoidance of the drug trade and dependence on kidnapping for revenue will make them less likely to kill their captives as this provides little benefit, economic or political. Despite being Colombia's second most infamous guerrilla group, it is still less powerful than FARC, so ELN captives should have a higher probability of rescue than FARC captives. ELN captives may be less likely to be released after the captors receive a ransom since a higher proportion of them will be rescued and released without receipt of a ransom.

M-19's reliance on kidnapping as a source of revenue would make it less likely to kill its captives or release them without a ransom. While it did have political motivations like other guerrilla groups, it pursued these through attacks on the government rather than kidnappings. Because M-19's kidnappings were purely economically motivated, they had even less incentive to release captives without a ransom. M-19 gravitated to urban centers more than FARC, putting it within easy reach of security forces. It was also not as powerful despite its high-profile attacks. These factors would make a rescue by security forces more likely for a M-19 captive compared to a FARC captive. The increased probability of rescue should decrease an M-19 captive's chance of being released after the captors receive a ransom since they are leaving captivity in a different way.

Colombia's paramilitaries were not motivated by politics and had most their financial concerns paid for by elites, drug traffickers, and the paramilitaries' own drug operations. This

would leave paramilitaries much more likely to kill those they kidnapped compared to FARC because they used kidnapping as a terror tactic against guerrilla supporters. Paramilitaries' choice of powerful enemies combined with their relatively small size and decentralization means captives were more likely to be rescued than those taken by FARC. It should be noted that guerrilla groups could be the ones rescuing captives rather than government security forces. Paramilitary captives will be less likely than FARC captives to be released with or without a ransom due to the increased probability of being rescued or killed.

Colombia's cartels and criminal networks would not have been motivated by ransoms since drug trafficking provided more than enough revenue. Instead, kidnappings would have been used to exert pressure on the government as well as rival criminals and resistant civilians. This motivation would make criminal networks more likely than FARC to kill captives or release them with or without a ransom. Government security forces would also be more capable of combatting criminal groups, even that of the cartels, than they would be guerrilla groups like FARC that were entirely paramilitary organizations isolated in the Colombian jungle. This would have made rescue by security forces much more likely for captives of criminal networks than those of FARC.

TABLE I	Outcomes			
Characteristics	Killed in Captivity	Released w/o Ransom	Released w/ Ransom	Rescued
Ransom ($100,000)	Decrease	Increase	Decrease	Increase
Male	Increase	Decrease	Decrease	Decrease
Adult	Increase	Decrease	Decrease	Decrease
Crm. Net. (vs. FARC)	Increase	Decrease	Decrease	Increase
ELN (vs. FARC)	Decrease	Increase	Decrease	Increase
Paramil. (vs. FARC)	Increase	Decrease	Decrease	Increase
M-19 (vs. FARC)	Decrease	Decrease	Decrease	Increase

TABLE I: This table is a summary of my hypotheses on the impact each of the characteristics would have on each outcome's probability. "Increase" means that a kidnapping having that characteristic would make the probability of that outcome more likely. "Decrease" means that a kidnapping having that characteristic would make the probability of that outcome less likely.

3   DATA

The data used in this paper was drawn from a report published by the National Center for

Historical Memory (NCHM) in Colombia in 2014 called "Una Sociedad Secuestrada" or "A

Kidnapped Society." The NCHM was created by the Colombian government to assist in the

remembrance and recording of the events of Colombia's armed conflict. It published "A

Kidnapped Society" in 2014 and it includes 39,058 separate kidnapping incidents from 1970-

2010. The data are organized by kidnapping incident and include variables relating to details of

the kidnapping such as date, length, and method as well as details of the victim and suspected

culprits.

There are obvious limitations to these data. Kidnappings are illicit activities and thus

accurate record keeping of the events is extremely difficult, especially since the state was often

not in control of the territory in which kidnapping occurred. The NCHM drew these data from

many sources including government records and victim and witness testimony. While there are

98 separate variables, many kidnappings are missing data. For example, the data contains a

variable for the rank of the culprits committing the kidnapping in their organization, but it is

largely blank because this data is too difficult to recover from poor records and memory.

However, simple variables, such as the age and sex of the victim are present for most of the

incidents. Some variables were complete enough to use, such as ransom and suspected faction

responsible, but required several thousand observations with missing values to be dropped before

conducting any analysis.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Table II			Descriptive Statistics of All Data				
n = 39,058	Killed in Captivity	Released w/o Ransom	Released w/ Ransom	Rescued	Other	Total (Not Missing Outcome)	Missing Outcome
Male Victim	8.77%	7.41%	60.43%	17.31%	6.08%	100%	24.62%
	2,022	1,710	13,939	3,993	1,403	23,067	7,532
Female Victim	4.29%	5.97%	56.01%	30.26%	3.46%	100%	34.48%
	238	331	3,104	1,677	192	5,542	2,917
Adult Victim	8.23%	7.27%	62.01%	16.58%	5.90%	100%	25.83%
	2,044	1,805	15,396	4,116	1,466	24,827	8,646
Child Victim	5.71%	6.24%	43.55%	41.09%	3.41%	100%	32.28%
	216	236	1,647	1,554	129	3,782	1,803
Criminal Network	6.10%	4.72%	51.96%	32.86%	4.36%	100%	5.27%
	470	364	4,007	2,534	336	7,711	429
ELN	4.34%	8.93%	67.30%	14.24%	5.19%	100%	13.67%
	284	585	4,408	933	340	6,550	1,037
Paramilitaries	19.90%	3.10%	54.11%	14.36%	8.52%	100%	22.43%
	327	51	889	236	140	1,643	475
M-19	2.10%	19.69%	24.15%	50.39%	3.67%	100%	8.19%
	8	75	92	192	14	381	34
FARC	7.50%	7.34%	66.04%	12.84%	6.27%	100%	15.96%
	605	592	5,327	1,036	506	8,066	1,532
Other	7.71%	10.47%	54.18%	18.69%	8.95%	100%	23.06%
	106	144	745	257	123	1,375	412
Missing Faction	15.96%	7.98%	54.63%	16.72%	4.72%	100%	69.37%
	460	230	1,575	482	13	9,413	6,530
Overall Outcome Distribution	7.90%	7.13%	59.57%	19.82%	5.58%	100%	26.75%
	2,260	2,041	17,043	5,670	1,595	28,609	10,449

TABLE II: Each pair of rows presents the percentage of kidnappings with the specified characteristic that reached each outcome. The lower row presents the raw number of kidnappings. The percentages do not account for missing data, they are reported separately in column (7). For rows indicating an armed group in Colombia, the kidnapping characteristic is that the specified group was either the presumed or confirmed culprit. The "Missing Faction" row presents the distribution of kidnappings that had an outcome recorded but not a group responsible. The "Overall Outcome Distribution" row presents the distribution of outcomes in the data regardless of kidnapping characteristics.

Sample of Analysis

Four variables were chosen for analysis based upon availability of data and potential for interesting results. The sex of the captive, whether the captive was an adult (over 18 years old), the faction responsible for the kidnapping, and the ransom demand amount were chosen. In which of Colombia's 32 departments and five major time periods the kidnapping took place were used as controls for the maximum likelihood regressions. The time period ranges were set by the NCHM and were 1970-1989, 1990-1995, 1996-2000, 2000-2005, and 2006-2010. The outcome and length of the captivity in days were used to facilitate the maximum likelihood regressions and survival analysis. Kidnappings missing these data were dropped from the analysis.

Figure I presents a histogram of ransom values for the sample examined in this paper. Ransom demand amounts were recorded in 2012 Colombian pesos, but converted to 2012 US dollars for this study. The median ransom demand for the sample was $231,007.90 and the mean was $607,139.40. Figure one presents the distribution of ransom demands for the final sample. There were several outlying ransoms that were greater than most by several million dollars. These kidnapping drove the mean higher, but most kidnapping involved ransoms below $1,000,000.

Figure II presents a histogram of captivity lengths used in the survival analysis. Captivity lengths were measured in days, with fractions of days possible. The median captivity length was 14 days and the mean was 143.85. Most cases were relatively short, but some outliers lasted exceedingly long times. The longest captivity was 5,167 days, but 99% of of captivities ended at or before 2,062 days.

The process of dropping kidnappings that were missing required data was somewhat complex for the responsible faction variable. There are two variables that tracked the faction responsible for a kidnapping. One was the initial expectation of guilt and the other was for when guilt had been confirmed. It was possible for the initial expectation to be blank, as well as not match the confirmed guilt variable. If the confirmed guilt variable had a value it overrode the initial expectation when coded. If there was an entry for the initial expectation, but not the confirmed guilt variable, the initial expectation was left unchanged. Once these changes had been made, the initial expectation was used to attribute a faction to each kidnapping. Kidnappings missing any attribution at all were dropped, as well as those attributed to "Other" since these culprits were an unknown factor. Once all kidnappings missing required data were dropped, 9,905 kidnappings remained. Table III presents descriptive statistics for the sample data that involve the primary variables selected.

Histogram of Ransom Demands of the Sample

FIGURE I: Ransom demands are reported in 2012 US dollars. The median ransom was $231,007.90 and the mean was $607,139.40. Eight outlying kidnappings were removed from this histogram to improve clarity, but included in the analysis. Their values are as follows: $7,867,662; $9,022,701; $10,700,000; $10,800,000; $10,800,000; $12,500,000; $15,500,000; and $27,100,000.

Histogram of Days in Captivity for the Sample

FIGURE II: This figure shows the distribution of captivity lengths between 0 and 1,500 days. Captivities above this were excluded to allow a more detailed look at the left-hand side of the histogram. The median captivity length was 14 days, the mean 143.85. The longest captivity in the sample was 5,167 days, but 99% of cases ended at or before 2,062 days.

Table III	Descriptive Statistics of the Sample					
n = 9,905	(1)	(2)	(3)	(4)	(5)	(6)
	Killed in Captivity	Released w/o Ransom	Released w/ Ransom	Rescued	Other	Total
Male Victim	5.17%	3.59%	67.00%	18.54%	5.69%	100%
	443	308	5,742	1,589	488	8,570
Female Victim	2.92%	2.70%	59.93%	31.54%	2.92%	100%
	39	36	800	421	39	1,335
Adult Victim	4.85%	3.48%	67.48%	18.68%	5.51%	100%
	456	327	6,340	1,755	518	9,396
Child Victim	5.11%	3.34%	39.69%	50.10%	1.77%	100%
	26	17	202	255	9	509
Criminal Network	5.22%	2.46%	48.92%	39.01%	4.39%	100%
	138	65	1,293	1,031	116	2,643
ELN	3.00%	5.01%	74.74%	12.73%	4.51%	100%
	85	142	2,119	361	128	2,835
Paramilitaries	14.78%	1.23%	57.14%	21.92%	4.93%	100%
	60	5	232	89	20	406
M-19	3.51%	7.02%	50.88%	28.07%	10.53%	100%
	4	8	58	32	12	114
FARC	4.99%	3.17%	72.69%	12.72%	6.42%	100%
	195	124	2,840	497	251	3,907
General Distribution of Outcomes	4.87%	3.47%	66.05%	20.29%	5.32%	100%
	482	344	6,542	2,010	527	9,905

TABLE III: This table presents descriptive statistics for the data after unusable kidnapping incidents were dropped. Each pairing of rows presents the percentage of kidnappings with the specified characteristic that reached each outcome in the upper row. The lower row presents the raw number of kidnappings meeting the same criteria. For rows indicating an armed group in Colombia, the kidnapping characteristic is that the specified group was either the presumed or confirmed culprit. The "Overall Outcome Distribution" row presents the distribution of outcomes in the data regardless of kidnapping characteristics.

4   METHODS

This paper uses two different statistical models to examine the data. Linear regressions are used to model the overall impact of the selected kidnapping characteristics on the probability of an outcome. Four dummy variables were made, one for each of the outcomes of interest: killed in captivity, released without a ransom payment, released after a ransom payment, and rescued. The responsible faction, geographic department, and time period variables were similarly coded into dummy variables. The outcome dummies were set on the left side of four separate regressions to be used as the dependent variable, with the ransom demand, sex, adulthood, faction responsible, department, and time period variables on the right to be used as independent variables. The dummy variable for FARC was not included in the regression so it could be used as the baseline against which the other factions were compared. FARC was chosen because it is the most well-known faction in Colombia, and as such there is plentiful information on it. There were 32 geographic department dummy variables and five time period variables that were used only as controls. The time period ranges were chosen by the NCHM and were 1970-1989, 1990-1995, 1996-2000, 2001-2005, and 2006-2010. An example of a regression is below:

$$P_{Outcome} = \beta_1 + \beta_2 Ransom + \beta_3 Male + \beta_4 Adult + \beta_5 CrmNet + \beta_5 ELN + \beta_6 ParaMil$$
$$+ \beta_7 M19 + \beta_8 TP9095 + \cdots + \beta_{12} Dept.\#1 + \cdots + \varepsilon$$

Competing risks survival analysis was used to model the same variables while accounting for dynamics related to the length of each captive's captivity. Survival analysis looks at the time a subject spends "at risk" in a study. It is often used in the medical field to compare the health of a treatment and control group over time. At its most basic level, survival analysis models the probability of a subject experiencing an event of interest over a specified time interval. As the

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interval is reduced to zero, the instantaneous probability of an event, or the hazard rate, can be found. The equation for this is below.

$$\lambda(t) = \lim_{dt \to 0} \frac{\Pr\{t \leq T < t + dt | T \geq t\}}{dt}$$

where $\lambda(t)$ is the hazard rate, dt is the size of the interval of time, t is the time the survival analysis is currently examining, and T is the time when the subject experiences the event. The numerator of the equation can be read as the probability of the subject experiencing the event during the interval given the subject has not already experienced the event. Dividing by dt provides the hazard rate for the interval and as $dt \to 0$, the instantaneous rate is found (Rodriguez, 2010).

To analyze the impact of explanatory variables on a subject's hazard rate, the effect of the variables are assumed to be the same for all times t. The baseline hazard rate of a subject lacking all the variables being analyzed is multiplied by the exponential of the coefficient of the impact caused by the presence of the variables. This can be seen below.

$$\lambda_i(t|x_i) = \lambda_0(t) \exp\{x_i \beta\}$$

where x_i represents the explanatory variables being analyzed, $\lambda_0(t)$ is the baseline hazard rate of a subject lacking all the explanatory variables, and $\exp\{x_i \beta\}$ models the proportional impact of the variables on the baseline hazard rate. Each subject's proportional hazard rate is:

$$\lambda_i(t|x_i) = \begin{cases} \lambda_0(t), & if \ x = 0 \\ \lambda_0(t)e^\beta, & if \ x = 1 \end{cases}$$

so when the proportional hazard rate is 1, the explanatory variables have no impact on the hazard rate. When $e^\beta > 1$, they increase the hazard rate for all t and when $e^\beta < 1$, they reduce the hazard rate for all t (Rodriguez, 2010).

The problem with normal survival analysis is that it only models a single event for each analysis and does not account for "competing" events. This means that if a subject "fails" out of a study from an event besides the event of interest, the set of subjects still at risk is reduced, causing a false rise in the hazard rate for the event of interest. To analyze multiple "competing" events, I use Fine and Gray's (1999) subdistribution hazard rate. In their model, when a subject "fails" out of the study from a competing event, it is never removed from the risk set. This creates an unnatural risk set, but it prevents the hazard rate for the event of interest from becoming skewed. The subdistribution hazard rate can be seen below:

$$\overline{\lambda_j}(t|x_i) = \overline{\lambda_{j0}}(t) \exp\{x_i \beta_j\}$$

where $\overline{\lambda_{j0}}(t)$ is built from

$$\overline{\lambda_j}(t) = \lim_{dt \to 0} \frac{\Pr\{t \le T < t+dt \text{ and } J=j \mid T>t \text{ or } T \le t \text{ and } J \ne j\}}{dt}$$

where J is the event of interest and j is the event experienced by the subject. The numerator can be read as the probability of a subject experiencing the event of interest given that it has not previously experienced an event, or if it has, it was not the event of interest (Rodriguez, 2012).

To graphically model the hazard rate, I use survival curves, drawn from the cumulative hazard rate, that represent the probability of a subject being in the risk set at time t. They can be modeled (Rodriguez, 2010) as:

$$S(t) = \Pr\{T \ge t\} = 1 - \Pr\{T < t\}$$

For my analysis, the same preparation done for the linear regression was used except geographic and time period controls were not used. Four competing risks survival analyses were done, one for each outcome with the other three events of interest and those grouped as "Other" designated as competing risks. From the sample of 9,905, a further 392 kidnappings were excluded because they ended almost immediately.

5   RESULTS

Linear Regressions

The linear regressions show several notable relationships. Increases in ransom did not impact the probability of being killed in captivity or rescued contrary to the hypothesis. However, increases of $100,000 had a statistically significantly different from zero impact on the probability the captive being released, both with and without the captors receiving a ransom. A $100,000 increase in ransom made being released without the captors receiving a ransom 0.1 percent more likely. The same change made being released after a ransom payment 0.2 percent less likely. It is interesting that large increases in the ransom demand created so little change in the probability of the two outcomes. As theorized earlier, this could be due to a highly inelastic demand curve for the return of loved ones that large changes in the ransom barely bother. This suggests that the characteristics of the kidnappers and captive are more important in determining the outcome of a kidnapping than the ransom amount.

Male captives were 2.6 percent more likely than their female counterparts to be killed while in captivity. This result was statistically significant to the 99 percent confidence interval. Being male did not have a statistically significant impact on the probability of release with or without a ransom payment. Male captives were 5.4 percent less likely than their female counterparts to be rescued. The results support the hypotheses that female would be more likely to be rescued and less likely to be killed than their male counterparts. This is likely due to the notion of women being more sacred than men during conflict.

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Table IV	Estimate of the Impact of Kidnapping Characteristics on the Likelihood of a Given Outcome			
n = 9,905	(1)	(2)	(3)	(4)
	Killed in Captivity	Released w/o Ransom	Released w/ Ransom	Rescued
Constant	0.136**	0.169**	0.302**	0.304**
	(0.046)	(0.039)	(0.098)	(0.082)
Ransom ($100,000)	0.000	0.001**	-0.002**	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Male	0.026**	0.002	0.008	-0.054**
	(0.006)	(0.005)	(0.014)	(0.011)
Adult	-0.005	-0.001	0.190**	-0.213**
	(0.010)	(0.008)	(0.021)	(0.018)
Criminal Network (vs. FARC)	0.006	-0.009	-0.207**	0.215**
	(0.006)	(0.005)	(0.012)	(0.010)
ELN (vs. FARC)	-0.020**	0.006	0.005	0.014
	(0.006)	(0.005)	(0.012)	(0.010)
Paramilitaries (vs. FARC)	0.106**	-0.016	-0.177**	0.088**
	(0.011)	(0.009)	(0.024)	(0.020)
M-19 (vs. FARC)	-0.028	-0.187**	0.029	0.181**
	(0.025)	(0.021)	(0.053)	(0.045)
Adj. R2	0.0882	0.1224	0.0563	0.0187

TABLE IV: Standard errors are in parentheses. Results significant to the 95% confidence interval are denoted by *. Results significant to the 99% confidence interval are denoted by **. Each column shows the results for a separate outcome. Coefficients show the change in probability of an outcome caused by a characteristic of a kidnapping. Ransom estimates the impact of an increase of $100,000 on outcome probability. Male estimates the impact of being male on the probability of an outcome. Adult estimates the impact of being over 18 on the probability of an outcome. The four rows for armed factions estimate the impact of being kidnapped by the named group rather than the FARC on the probability of an outcome. Dummy variables for the departments of Colombia were included as well as five dummies for distinct time periods included in the data.

Adult captives were not statistically significantly more or less likely to be killed in captivity or released without a ransom. This result contradicts part of the adult hypothesis that children would be treated with a similar sense of sacredness to women. However, they were 19

percent more likely to be released after a ransom payment than captives under 18. Mirroring this, however, adult captives were 21.3 percent less likely to be rescued than those under 18. Both results were significant to the 99 percent confidence interval. The greatly increased probability of rescue for children is likely caused by the human instinct to defend children more arduously than adults. It could also be caused by the excess efforts by the government to rescue children to prevent popular anger at its inability to prevent children from being harmed.

Captives of criminal networks were 20.7 percent less likely to be released after a ransom payment compared to FARC captives, mirrored by being 21.5 percent more likely to be rescued. This supports the hypothesis that criminal networks' decentralization and less militant nature would facilitate more rescues by security forces. Those who are rescued cannot be ransomed back to their loved ones. Criminal networks did not show a statistically significant difference in their likelihood to kill captives or release captives without a ransom. This contradicts the earlier hypothesis that criminal networks would be more likely to kill their captives as a means of terrorizing opponents.

ELN closely matched FARC in the probability of outcomes for its victims. The only statistically significant difference was that ELN captives were 2 percent less likely to be killed in captivity. While this contradicts three hypotheses on ELN's behavior, it is not surprising since ELN is the faction most alike to FARC. However, this result does support the hypothesis that ELN's more ideological nature and emphasis of community relations would make it less likely to kill captives.

Paramilitary groups were 10.6 percent more likely to kill their captives than FARC. Captives of paramilitary groups were 17.7 percent less likely to be released after receiving a ransom. They were 8.8 percent more likely to be rescued than their FARC counterparts. These

results strongly support the hypothesis that the lack of standard political or economic motives for paramilitaries would cause them to behave quite differently from FARC. Paramilitaries' backing by the elite and drug traffickers meant the only goal they had was combatting leftist guerrilla groups, so it is likely they used kidnapping as a tactic to terrorize guerrilla supporters. Their decentralized nature and conflict with the most powerful guerrilla groups in Colombia are likely to blame for the increased probability for rescue.

M-19's captives were 18.7 percent more likely to be released without a ransom payment than FARC captives. They were 18.1 percent more likely to be rescued. These results support the hypothesis that security forces' easier access to M-19's power base in urban areas as compared to FARC's rural bases would make them more likely to suffer successful rescue attempts. M-19's smaller manpower relative to FARC also likely contributed to this result.

Competing Risks Survival Analysis

The competing risks survival analysis showed relationships in line with those shown in the linear regressions, but some were stronger due to time dynamics modeled by the survival analysis. The subdistribution hazard ratios (SHRs) reported in Table V can be interpreted as the overall proportional risk a captive with that characteristic faces at any time during a captivity. Thus, a 2.0 result means that a captive with that trait is twice as likely as a captive without it to meet the specified outcome at any time during his/her captivity. A result of 0.5 would mean that a captive with a trait is half as likely as a captive without it to meet the specified outcome at any time during his/her captivity. Note that the SHR also accounts for a characteristic causing an outcome to occur sooner for kidnappings with it than those without. The selected survival curves shown in the results and appendix display the time dynamics encapsulated in the SHRs.

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An increase of $100,000 in the ransom demand for a captive resulted in a 1.007 SHR for being killed in captivity, a 1.020 SHR for being released without the captors receiving a ransom, and a 0.988 SHR for being released after the captors received a ransom. This is interesting because the SHR of being killed in captivity rejects the hypothesis that a higher ransom would decrease the probability of being killed in captivity. A possible reason for this is that as a ransom increased, the chance of the captors ever receiving it decreased, leading them to eventually cut their losses and kill the captive. The other two results are in line with the linear regression results, an increased ransom mildly increased the probability of a captive being released without a ransom and decreased the probability of a captive being released after the captors received a ransom payment.

A captive being male resulted in a 1.875 SHR for being killed in captivity and a 0.733 SHR for being rescued. Sex did not have a statistically significant impact on the SHR of being released with or without the captors receiving a ransom. These results mean males were 1.875 times as likely to be killed in captivity at any time and 0.733 times less likely to be rescued. The trends these results indicate matches that of the linear regressions, but are more pronounced. The survival curve describing the difference in hazard rates between male and female captives for being rescued can be seen below. Because the male line is significantly above the female line, women are rescued more often as well as earlier than men. When the curves plateau, it means that captives are not being rescued, but they can still be leaving captivity from one of the other outcomes. When all captives leave captivity, the curve ends. Therefore, the curves do not end at zero on the Y axis, a quirk of the Fine and Gray model.
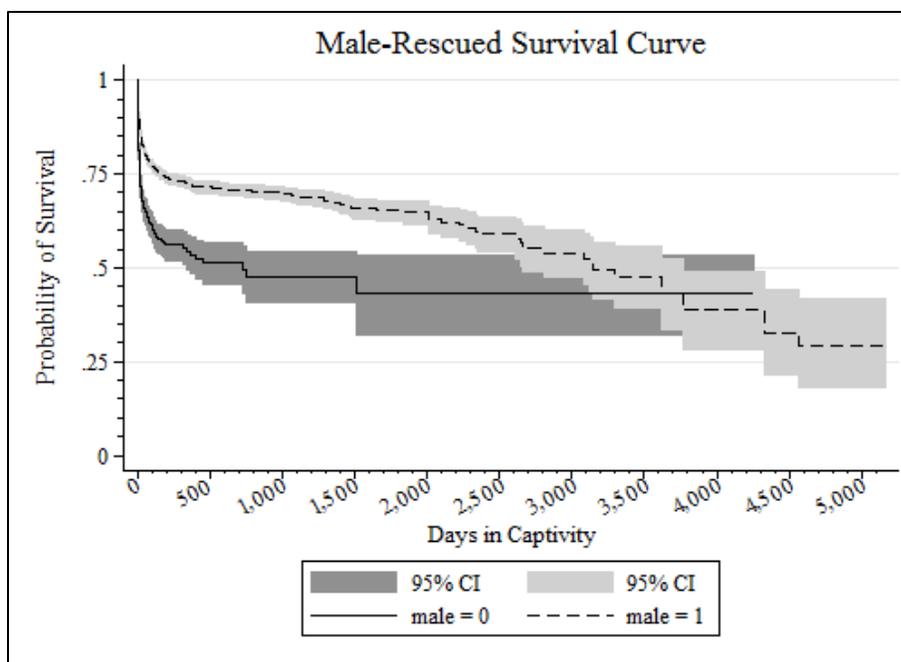
FIGURE III: This figure compares the rescued survival curves of male and female captives. The curves show that female captives are considerably more likely to be rescued in the early stages of captivity, but that this difference roughly plateaus after the first 1,000 days.

An adult captive had a 1.925 SHR compared to a child for being released after the captors received a ransom payment. Adult captives had a 0.452 SHR for being rescued. This can be interpreted as children being rescued far more often than they are ransomed back. Being over 18 did not statistically significantly impact the SHR of a captive for being killed in captivity or released without a ransom. The survival curve describing the difference in hazard rates between adult and child captives for being rescued can be seen below. The nature of the child curve shows that children are a lot more likely to be rescued than adults and that the rescues take place early in captivity.
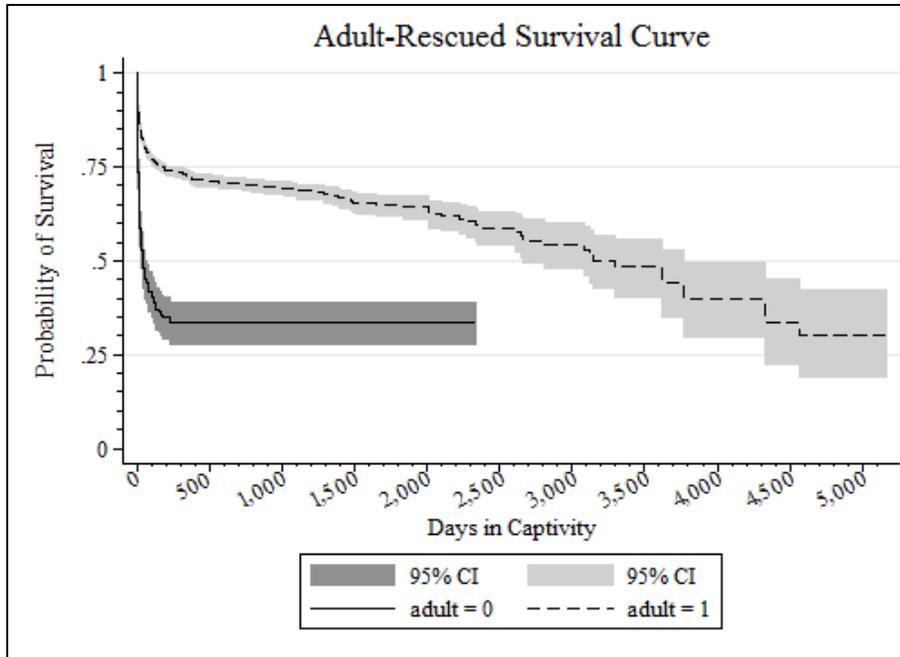
FIGURE IV: This figure compares the rescued survival curves of adult and child captives. The curves show children a far more likely to be rescued than adults and that these rescues take place early in captivity.

Captives of criminal networks had a 0.664 SHR for being released after the captors received a ransom, but a 3.396 SHR for being rescued when compared against FARC captives. This means that at any time during captivity, a captive of a criminal network is 3.396 times as likely to be rescued as a FARC captive. Being a captive of a criminal network did not statistically significantly affect the SHR of being killed in captivity or released without a ransom. Being a captive of a criminal network impacted the probability of the same outcomes as shown in the linear regression, but the effect was far more pronounced because the SHR accounts for how early the rescue happens in the captivity. The survival curve describing the difference in hazard rates between criminal network and FARC captives for being rescued is below. It shows that captives of criminal networks are far more likely to be rescued than FARC captives especially early in captivity.
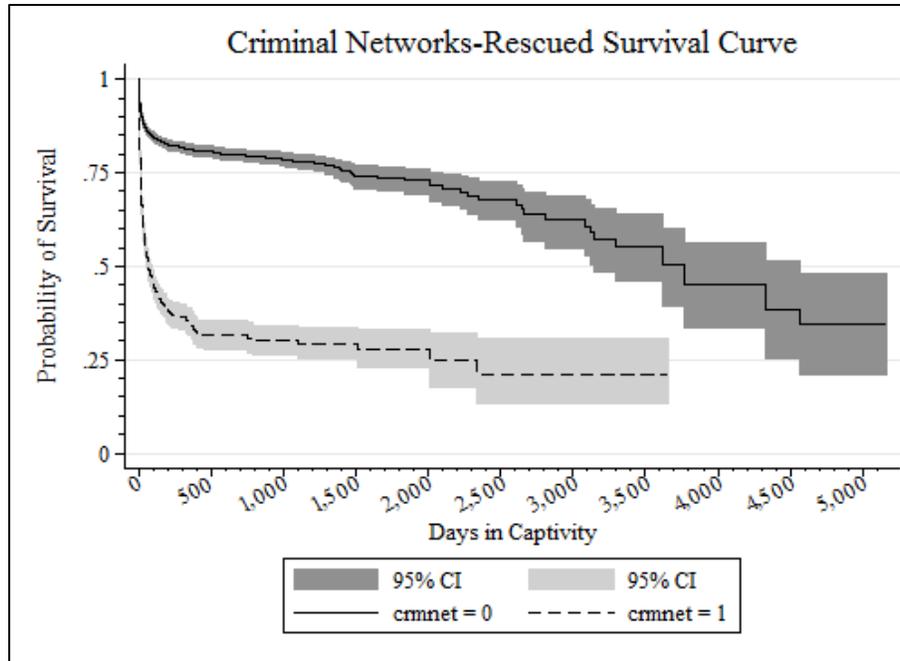
FIGURE V: This figure compares the rescued survival curves of criminal network and FARC captives. The curves show that captives of criminal networks are far more likely to be rescued than FARC captives. The effect is most pronounced early in captivity.

ELN captives faced a 0.609 SHR for being killed, a 1.693 SHR for being released without the captors receiving a ransom, and a 1.153 SHR for being released after the captors received a ransom when compared to FARC captives. There was not a statistically significant difference in the SHR for being rescued. ELN increased probability of releasing captives without a ransom could be due to their more ideological nature compared to FARC, making their kidnappings motivated more by politics than revenue.

Table V	Subdistribution Hazard Ratio of Kidnapping Characteristics			
n = 9,513	(1)	(2)	(3)	(4)
	Killed in Captivity	Released w/o Ransom	Released w/ Ransom	Rescued
Ransom ($100,000)	1.007*	1.020**	0.988**	1.002
	(0.003)	(0.002)	(0.001)	(0.002)
Male	1.875**	1.243	0.963	0.733**
	(0.320)	(0.231)	(0.038)	(0.042)
Adult	0.904	0.764	1.925**	0.452**
	(0.188)	(0.202)	(0.138)	(0.031)
Criminal Network (vs. FARC)	1.113	0.793	0.664**	3.396**
	(0.126)	(0.128)	(0.024)	(0.193)
ELN (vs. FARC)	0.609**	1.693**	1.153**	1.005
	(0.079)	(0.215)	(0.032)	(0.073)
Paramilitaries (vs. FARC)	3.144**	0.447	0.831**	1.806**
	(0.487)	(0.205)	(0.064)	(0.224)
M-19 (vs. FARC)	0.564	0.656	1.031	2.422**
	(0.315)	(0.310)	(0.153)	(0.521)
No. Failed	468	330	6400	1820
No. Competing	9,045	9,183	3,113	7,693

TABLE V: Standard errors are in parentheses. Results significant to the 95% confidence interval are denoted by *. Results significant to the 99% confidence interval are denoted by **. Estimates have a baseline of one, with those above one indicating an increased hazard rate for that outcome and those below a reduced hazard rate for that outcome versus that variable's comparison group. Ransom represents the hazard ratio between no ransom and a $100,000 ransom. Male indicates the hazard ratio between men and women. Adult indicates the hazard ratio between those over 18 years old and those less than 18 years old. The four rows for armed factions estimate the hazard ratio for an outcome given being kidnapped by that group rather than FARC.

Captives of paramilitary groups had a 3.144 SHR for being killed while in captivity compared to FARC captives. They also had a 0.831 SHR for being released after the captors received a ransom and a 1.806 SHR for being rescued. Being kidnapped by a paramilitary group did not show a statistically significant impact on the SHR for being released without a ransom. These results are in line with the results of the linear regression, but are far more pronounced.

The survival curve describing the difference in hazard rates between paramilitary and FARC captives for being killed in captivity is below. It shows that paramilitaries kill their captives much faster than FARC and that all paramilitary captives leave captivity one way or another much earlier than FARC captives.
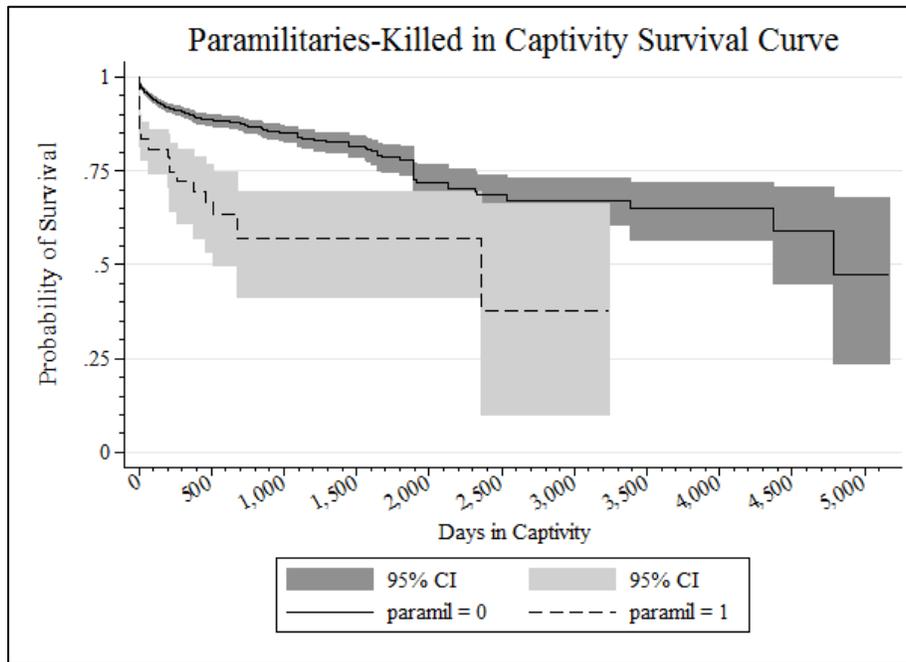

FIGURE VI: This figure compares the killed in captivity survival curves of captives of paramilitary groups and FARC. The curves show that paramilitaries are far more likely to kill their captives than FARC, especially in the early stages of captivity.

Captives of M-19 had SHRs close to FARC captives on most outcomes examined in this paper. The exception was being rescued, where M-19 captives had a 2.422 SHR, making them 2.422 times as likely to be rescued than FARC captives. As discussed previously, this could be caused by M-19's weaker power and urban nature that would have made rescue attempts by government security forces easier. FARC's relatively greater power and rural nature made rescue attempts considerably more difficult for government security forces.

TABLE VI	Outcomes			
Characteristics	Killed in Captivity	Released w/o Ransom	Released w/ Ransom	Rescued
Ransom ($100,000)	Decrease	Increase	Decrease	~~Increase~~
Male	Increase	~~Decrease~~	~~Decrease~~	Decrease
Adult	~~Increase~~	~~Decrease~~	Decrease	Decrease
Crm. Net. (vs. FARC)	~~Increase~~	~~Decrease~~	Decrease	Increase
ELN (vs. FARC)	Decrease	Increase	Decrease	~~Increase~~
Paramil. (vs. FARC)	Increase	~~Decrease~~	Decrease	Increase
M-19 (vs. FARC)	~~Decrease~~	~~Decrease~~	~~Decrease~~	Increase

TABLE VI: This table is a summary of my hypotheses on the impact each of the characteristics would have on each outcome's probability. "Increase" means that a kidnapping having that characteristic would make the probability of that outcome more likely. "Decrease" means that a kidnapping having that characteristic would make the probability of that outcome less likely. Entries that have been crossed out indicate a lack of statistically significant results supporting or refuting my hypotheses. Entries that have been shaded grey had results that refuted my hypotheses. All other entries represent hypotheses that support my hypotheses.

5   CONCLUSION

Kidnapping characteristics determined by perpetrators before any action is taken can have dramatic impacts on the probability of an eventual outcome. Experienced kidnappers use this knowledge when selecting their victims and policy makers can use this same knowledge to better deter and counter kidnapping as a criminal and guerrilla tactic.

Ransom, victim sex and adulthood, and perpetrating faction all had informative effects on outcome probabilities. Large increases in ransom demand amounts had very slight impacts on the probability of release with or without a ransom. The small impacts suggest that the market for the return of loved ones is highly inelastic. Victim characteristics such as sex and adulthood had significant impacts on the probability of rescue by security forces with rescue more likely for women and children. The faction that conducted the kidnapping had significant impacts on the probability of the four outcomes. These impacts are likely rooted in differences in motivation, strength, and structure between each of the factions and could be used to adjust security forces response according to the faction conducting the kidnapping.

The illicit nature of kidnapping and the inability of the government and media to keep accurate records in guerrilla controlled territory limited my analysis. Many data were missing, potentially biasing the data. Future research should aim to build a more complete data set, perhaps with the cooperation of former guerrillas and criminals. There are many interesting avenues for future research. One topic could be how the outcomes of kidnappings impact the ransom and victim characteristics chosen by the same perpetrators for future kidnappings. A game theory analysis of how kidnappings play out between perpetrators, victims, victim families, and security forces would also be interesting. The results of this research could change government policy on paying ransoms and managing kidnappings all over the world.

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6   REFERENCES

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7   APPENDIX

Criminal Networks-Killed in Captivity Survival Curve
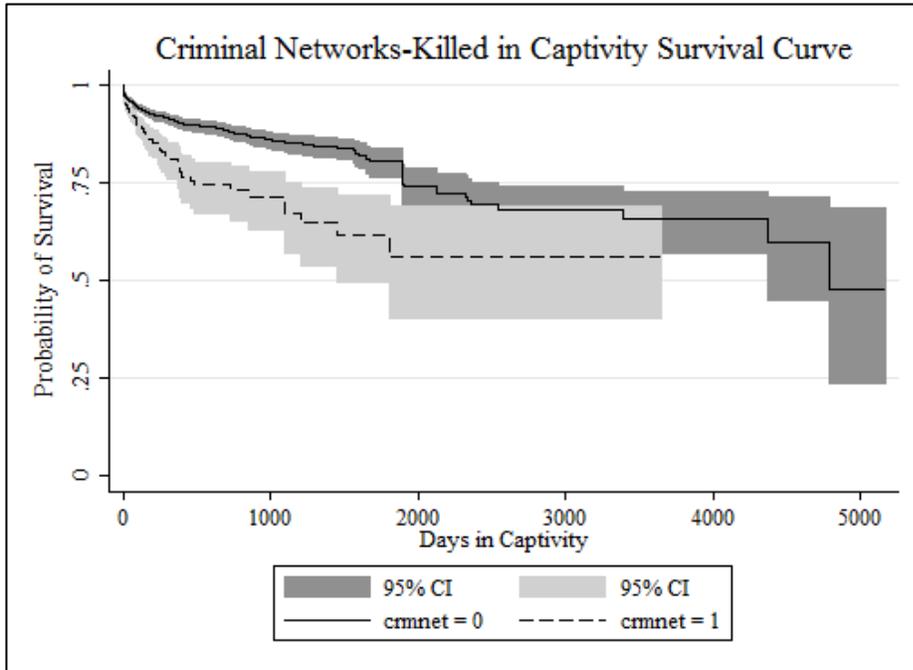
A1: This figure compares the killed in captivity survival curves for captives of criminal networks and of FARC. The curves show that criminal networks are more likely to kill their captives than FARC, particularly in the early stages of captivity.


ELN-Killed in Captivity Survival Curve
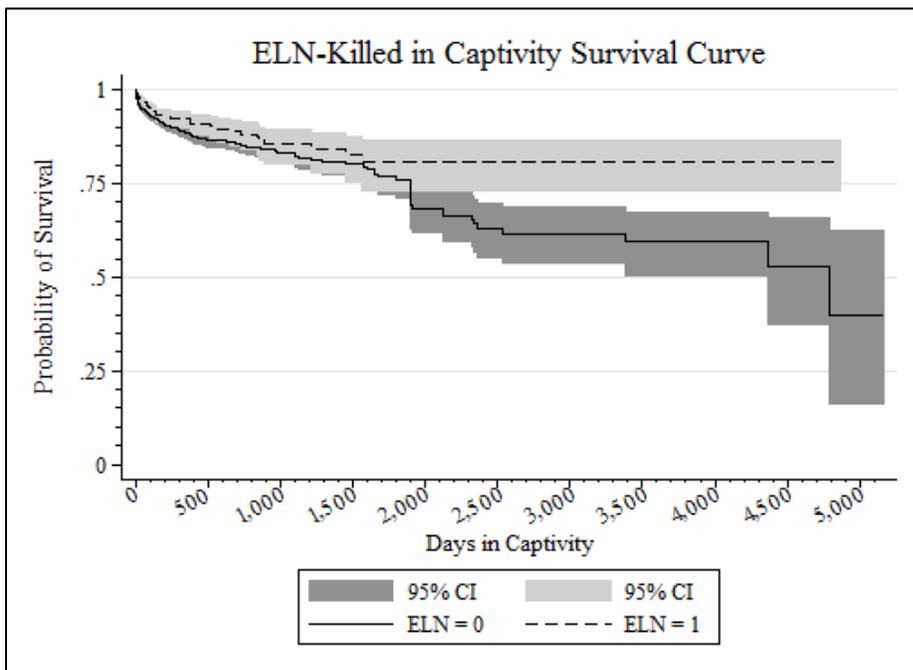
A2: This figure compares the killed in captivity survival curves for captives of ELN and FARC. The curves show that ELN is less likely to kill its captives, particularly in cases of long-term captivity.

Adult-Released w/ Ransom Survival Curve
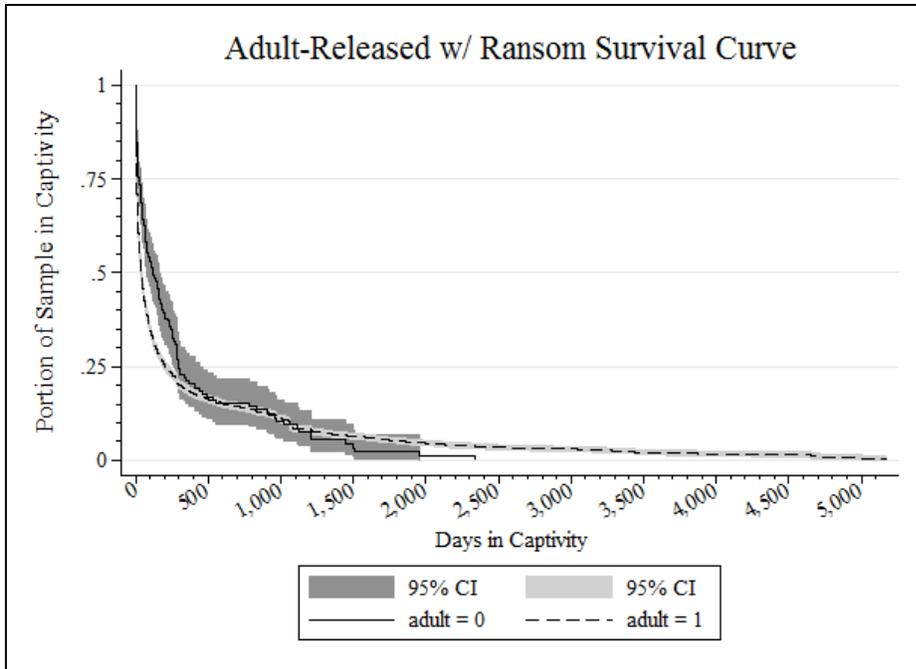
A3: This figure compares the released without captors receiving a ransom survival curves of captives of ELN and FARC. While the confidence intervals overlap a lot in the late stages of captivity, there is evidence that ELN releases more captives in the early stages than FARC does.
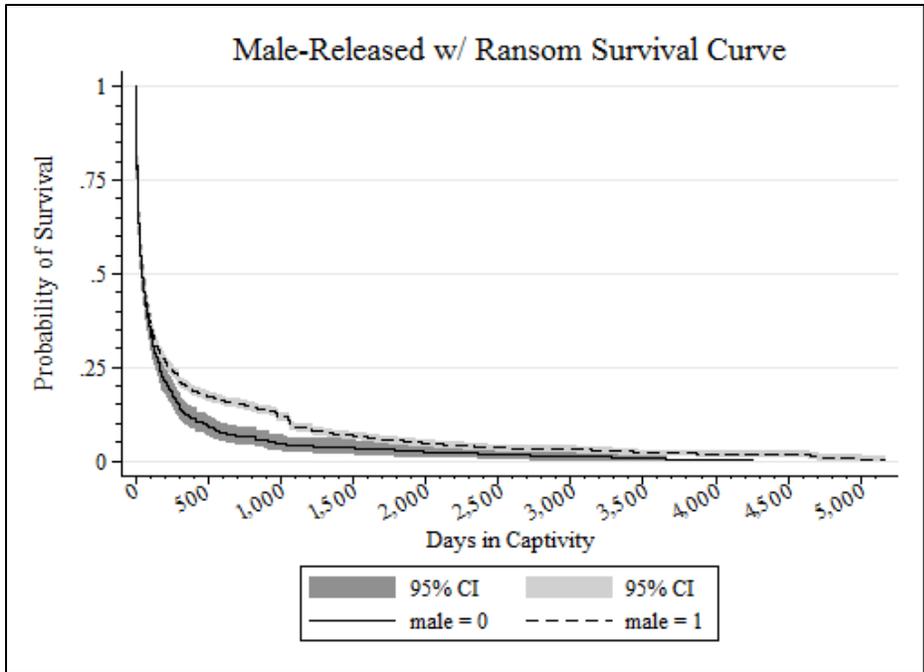

ELN-Released w/o Ransom Survival Curve
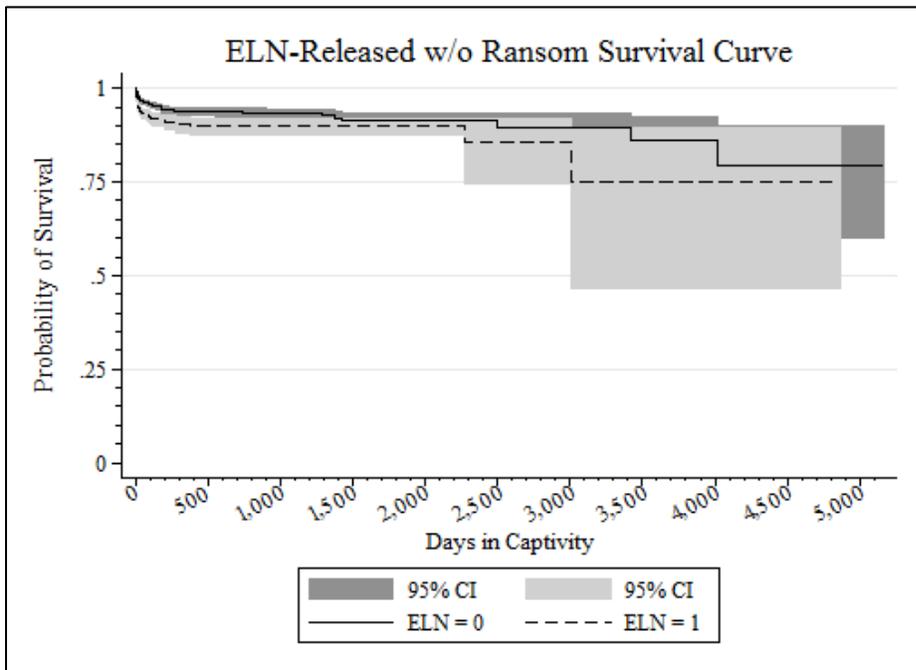
A4: This figure compares the released after captors receive a ransom survival curves of ELN and FARC. The curves show ELN captives are more likely to be ransomed back than FARC captives, particularly in the early stages of captivity.

Appendix - 2

Criminal Networks-Released w/ Ransom Survival Curve
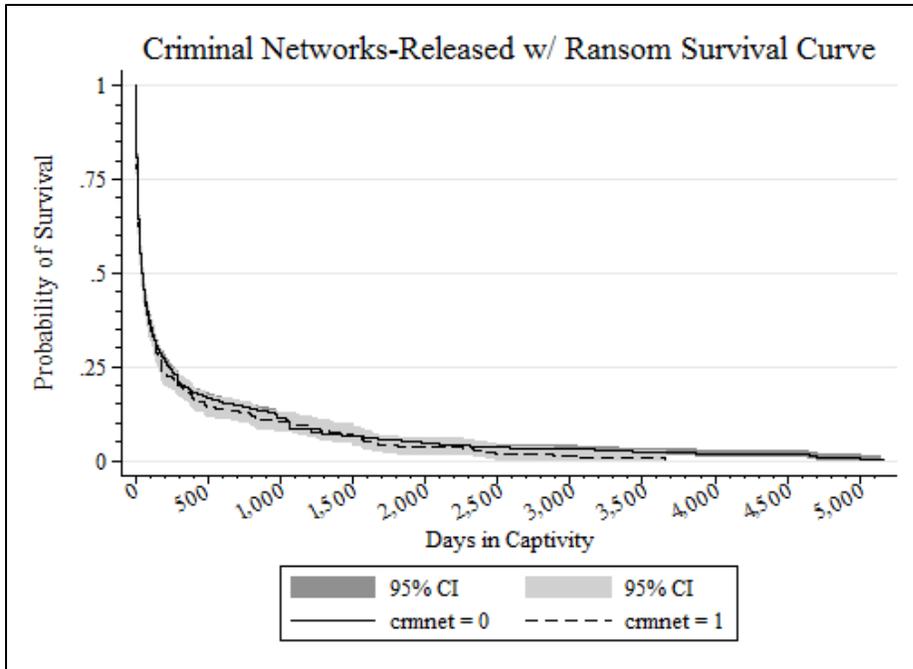
A5: This figure compares the released after captors receive a ransom survival curves of adult captive against that of captive under 18 years old. In the early stages of captivity, the curve shows adults are more likely to get ransomed back than children. However, all children have exited captivity long before the last adult.



ELN-Released w/ Ransom Survival Curve
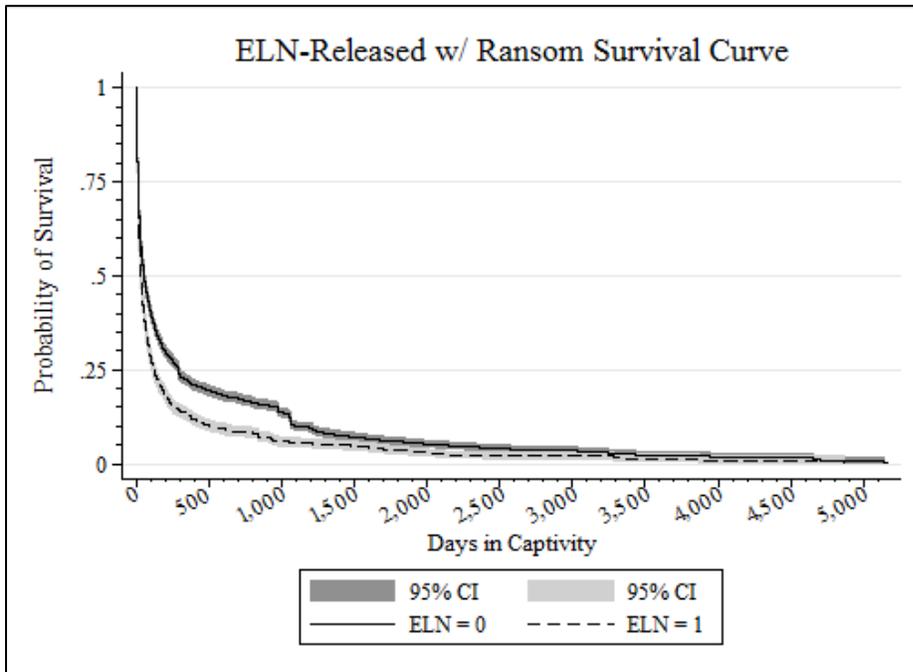
A6: This figure compares the released after captors receive a ransom survival curves of captive of criminal networks and FARC. The curves show that while the rate being ransomed back is nearly identical between the two groups, criminal groups are rid of all captives earlier than FARC is.

Male-Released w/ Ransom Survival Curve

A7: This figure compares the released after captors receive a ransom survival curves of male and female captives. The curves show females are considerably more likely to be ransomed back in the early stages of captivity.

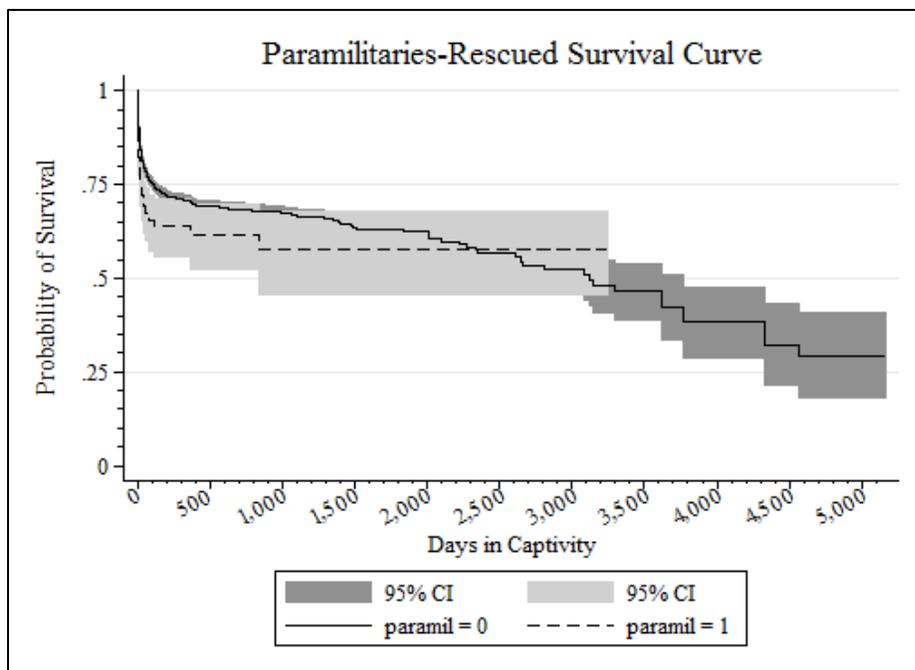**Paramilitaries-Released w/ Ransom Survival Curve**
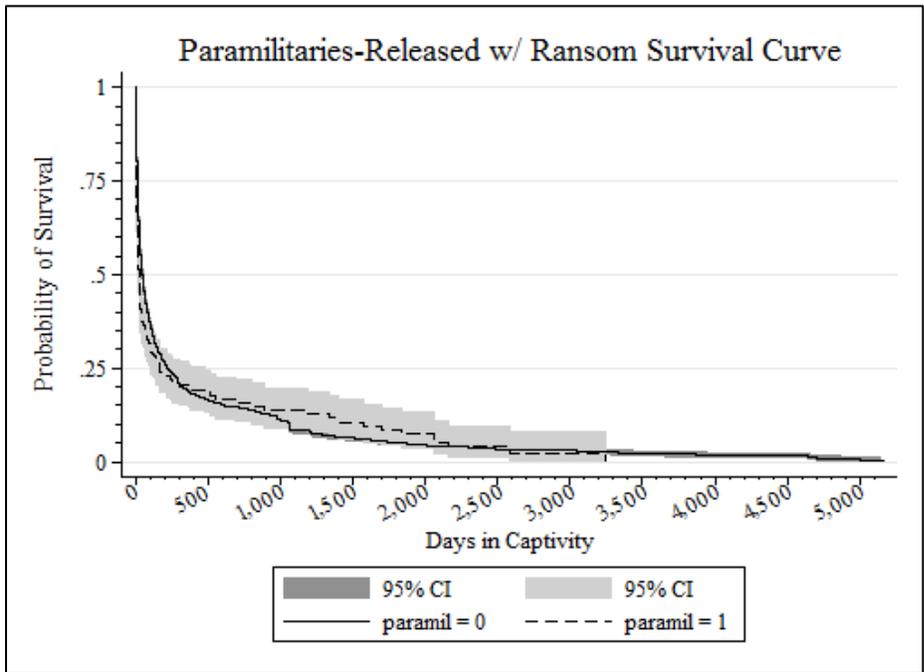
A8: This figure compares the released after captors receive a ransom survival curves of paramilitary and FARC captives. The curves show that paramilitary groups ransom back captives faster than FARC when they do so.

ELN-Rescued Survival Curve
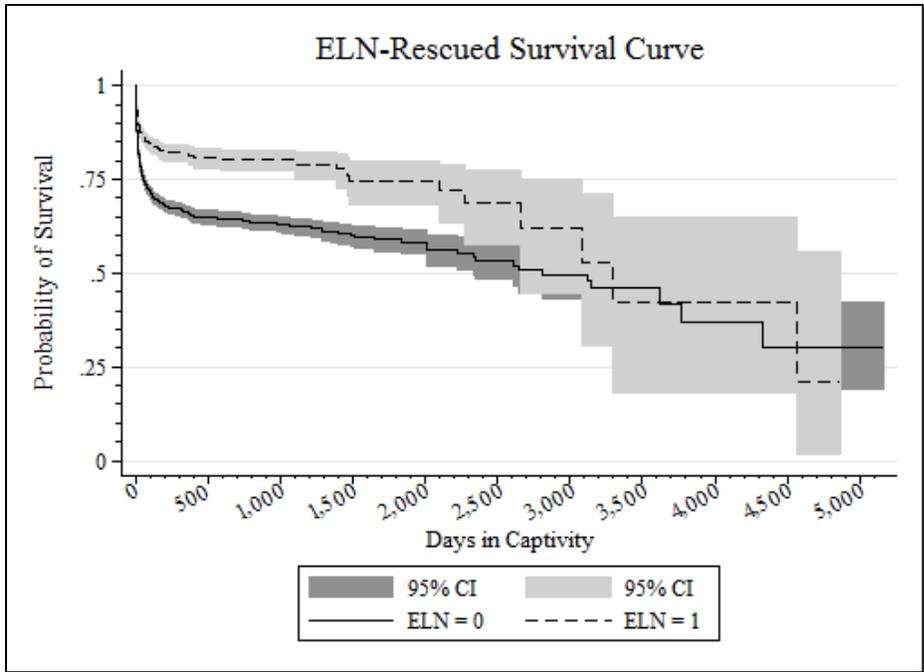
A9: This figure compares the rescued survival curves of ELN and FARC captives. The curves show that ELN captives are less likely to be rescued than FARC captives, especially in the early stages of captivity.

M-19-Rescued Survival Curve
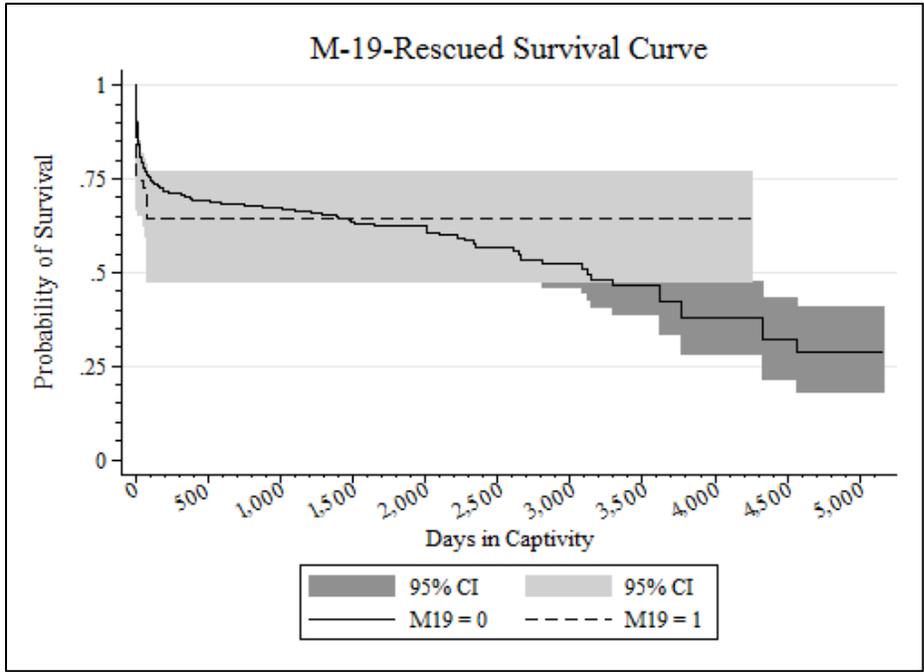
A10: This figure compares the rescued survival curves of M-19 and FARC captives. The curves show that M-19 captives are more likely than FARC captives to be rescued in the earliest days of captivity, but the plateau indicates that once the initial phase finishes, there are no successful rescue attempts against M-19.

Paramilitaries-Rescued Survival Curve

A11: This figure compares the rescued survival curves of paramilitary and FARC captives. The curves show that paramilitary captives are more likely to be rescued than FARC captives in the early stages of captivity, but the confidence intervals leave the size of the difference in doubt. The curve also shows that there are not any successful rescue attempts after approximately 1,000 days in captivity.