Methodological Appendix: "The Global Diffusion of Law: Transnational Crime and the Case of Human Trafficking"

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Abstract

This appendix contains additional details and code from the main draft. Included are additional details on modeling choices, descriptions of the data and additional results and visualizations of each model presented in the main text. The PDF version of this document has a clickable table of contents for easier navigation in page 2.

1 Navigating The Appendix

This appendix contains a great deal of material. This section provides an overview of the contents. The document is accompanied by a code file that replicates the main results.

1. Story
   This section overviews how the evidence in the paper fits together to help contextualize the results.

2. Models
   This section describes the specific technical modeling choices along with diagnostic tests.

3. Data
   This section provides data sources along with descriptions of the variables and multiple imputation information.

4. Main Results
   This section and those that follow correspond to the Tables in the main draft of the paper. They provide 95% confidence intervals on hazard ratios, hypothesis tests and visualizations of results.

This page is followed by a clickable table of contents.

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2 The Story

Below, we briefly overview the argument of the paper and the story told by our results.

The Puzzle Our motivating empirical puzzle is the rapid criminalization of human trafficking during the mid-1990's and early 2000's. The map below shows geographically the rapid and global criminalization of human trafficking.

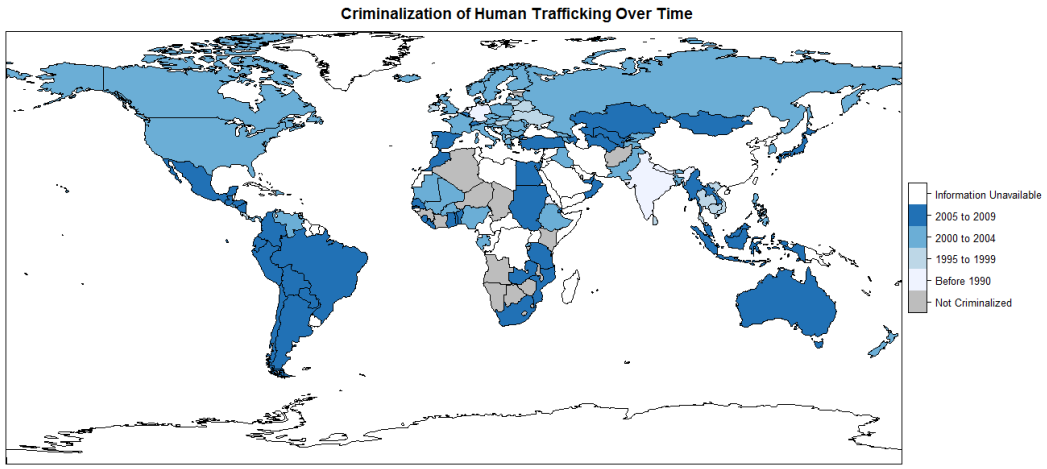


Figure 1 shows that the number of countries choosing to criminalize human trafficking has risen rapidly over the last two decades. We updated this figure (and the one in the paper also Figure 1) to include information through 2015 but lacked the corresponding variables to update the analyses. Consequently, the data in the analyses are not exactly equal to the data in the cumulative criminalization graph. The latter reflects corrections made by countries and reporting agencies over time, and is the best data available now to show readers trends. Conversely, the analyses use what we understand states had on hand at the time. Our theory is that states emulate their neighbors, depending on how connected they are. The publication of the criminalization information affirms our assumption that states know what their neighbor has done when they make a policy choice. Therefore, to revise the corrected data would be contrary to the knowledge and beliefs about neighboring countries criminalization policies at the time.

The Explanation We argue that countries criminalize when their neighbors criminalize out of concern for negative externalities. Thus our evidence establishes two pieces of the puzzle. First, we demonstrate that criminalization is more associated with a prevailing frame of crime rather than human rights, and second that criminalization is associated with the criminalization of neighbors who might generate externalities.

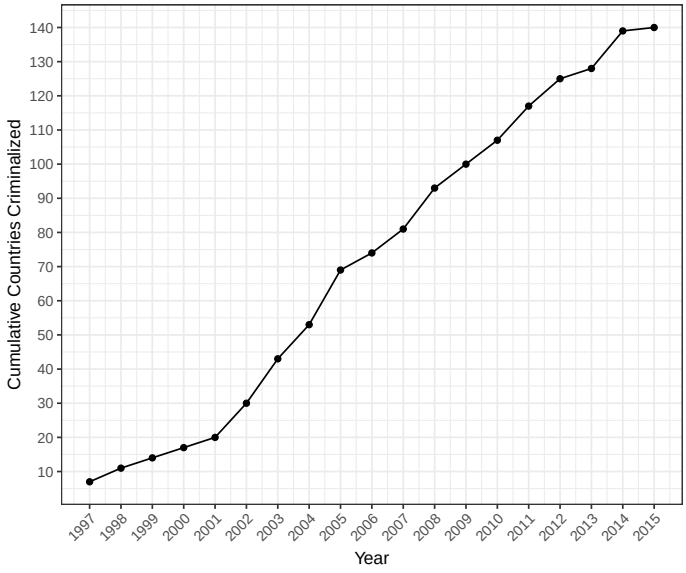


Figure 1: The total number of countries that have criminalized within or before a given year.

Roads as Connectedness To measure connectedness we turn to the network of major roads depicted in Figure 2. Countries which have several major roads on their borders are at a higher

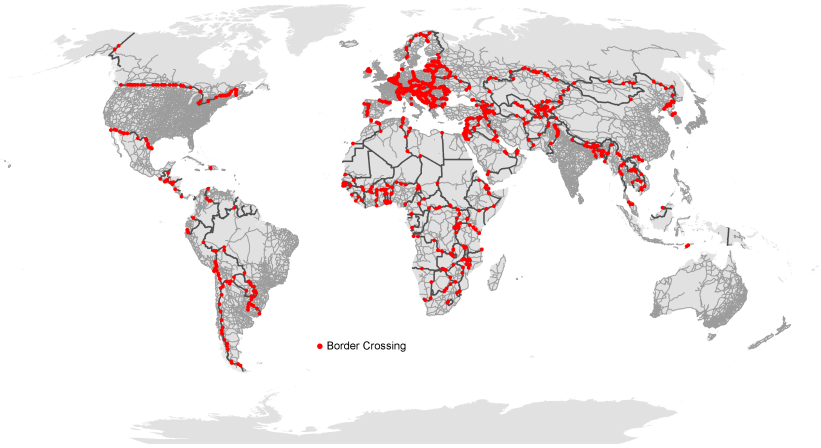


Figure 2: USGS Global GIS database network of major highways. We operationalize connectedness based on the number of major highways which cross the border between two countries.

risk of externalities from criminalization in the neighboring state.

Criminalization of Neighbors Matters We show across a series of models with various controls that the criminalization of neighbors as measured by roads has a significant and sizeable effect on the probability of criminalization.

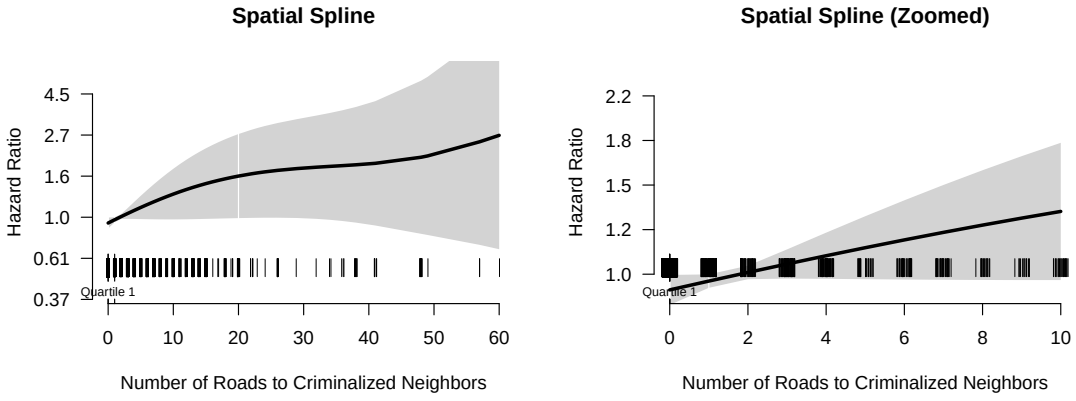


Figure 3: A representative depiction of the probability of criminalization.

Figure 3 shows the results of the core model, depicting the strong association between roads to criminalized neighbors and the probability of criminalization.

Ruling Out Other Possibilities There is no clear path to causal identification in this setting and so we focus our efforts on demonstrating robustness of the association to many potential confounding variables. We do this by showing:

1. Robustness to alternate stories
   We consider a sequence of alternative control sets that capture stories about: material coercion, development, women's influence and human rights.

2. Robustness to alternative networks
   The diffusion attributed to the road diffusion network is consistent when controlling for trade networks, media information networks, developmental networks, civilizational networks and legal family networks.

3. Criminalized neighbors improve prosecution more than protection
   Consistent with an externalities motivation we see greater associations with criminal prosecution than with efforts towards victim protection.

4. Money laundering does not diffuse in the same way
   Money laundering is an electronic crime which does not generate the same kind of externalities thus serving as an effective placebo test.

5. Destination and transit countries see more diffusion than origin and internal-trafficking countries
   Consistent with the externalities explanation the effects are stronger in destination and transit countries than origin and internal-trafficking countries.

3 Models

Overview The majority of the models presented in the paper are Cox Proportional Hazards Models estimated using p-splines. Analyses are carried out using the `R` Statistical Computing Language (R Core Team, 2016) and the `survival` package (Therneau and original Splus to R port by Thomas Lumley, 2016). This section contains a quick overview of methods used.

Cox Proportional Hazards Models Cox Proportional Hazards (CPH) models have grown increasingly popular in political science studies of duration variables (particularly in international relations) due to their relatively un-restrictive assumptions (Box-Steffensmeier and Jones, 1997; Box-Steffensmeier and Zorn, 2001; Box-Steffensmeier and Jones, 2004). Unlike parametric event history models, the CPH model does not require assumptions about the baseline hazard. Covariates enter the model linearly and are easily interpretable by exponentiating the resulting coefficient to get the hazard ratio which is assumed to be independent of time. The model is estimated by the method of partial likelihood (Cox, 1975) as implemented in (Therneau and original Splus to R port by Thomas Lumley, 2016). In estimating the model this way we trade off some efficiency (compared to the fully parametric model) to avoid making potentially unfounded assumptions about the baseline hazard.

Time Varying Covariates Since many of the covariates change over time we use interval censoring to capture time varying covariates (Fox, 2002; Therneau and Grambsch, 2000). Each case is observed every year from the start date (usually 1991) through the final year (2009) at which point cases which have not yet criminalized are right censored.

Ties One assumption of the cox-proportional hazard model is that no two countries criminalize at the same time. In actuality, of course, many countries criminalize in the same year so we have to find a way to "break the tie." It is possible to calculate the exact marginal likelihood, but as the number of ties grows, it becomes essentially impossible.[1] Thus, we turn to one of two approximations. `STATA` (probably the most commonly used statistical package amongst political scientists) by default uses the Breslow approximation. However, the Efron approximation is a tighter approximation to the exact marginal (although it is more computationally expensive). This becomes particularly important as the number of ties grows. Since we know the number of ties to be somewhat large we use the Efron approximation. Early in the process we observed that there were some significant differences in the results when employing the Breslow approximation.

Standard Errors We use robust standard errors with clustering on the countries which implements a grouped jacknife over the country ID. This allows us to deal with the correlation between the observations within a country. More details about the calculation of robust and clustered standard errors can be found in the technical documentation for the packages: Therneau and original Splus to R port by Thomas Lumley (2016).

Non-Linearity A key assumption of the cox-proportional hazards model is that the hazard ratios do not vary over time. So if US Pressure increases the probability of criminalization by 20%

[1] The calculation requires $t!$ terms where t is the number of ties (Cleves et al., 2008).

it shouldn't matter whether its 1996 or 2000. Unfortunately this assumption is often not met. Imagine for instance you take a drug which protects you from having a stroke in the first 12 hours, but over time you build up an immunity. Thus its impact on you actually changes over time. This is the notion of a non-proportional hazard.

Box-Steffensmeier et al. (2003) draws attention to the problem of non-proportional hazards in international relations applications. While the assumption is testable using residuals (more on that later), Keele (2010) has pointed out that these tests assume the mean function has been correctly specified and thus will produce false positives in the presence of non-linearity. It has been speculated that many of the hypothesized relationships in political science are non-linear despite the general tendency of the field to estimate only linear models (Beck et al., 2000; Beck and Jackman, 1998).

Usually non-linearity is incorporated into models through the use of polynomials $(x, x^2, x^3 \dots)$ however these fits are global rather than local (Keele, 2008). As such we turn to the use of splines which are piecewise polynomial functions that allow for smooth non-linear fits (Wasserman, 2006). This allows for an estimation method with intuitive properties (an extreme outlier in X does not affect the relationship between the median value of X with Y) and relatively few assumptions.

Splines We estimate the models using p-splines on all continuous covariates in the model. p-splines are computationally convenient and due to results from Therneau and Grambsch (2000) we are able to present familiar hypothesis tests for the linear and non-linear components of the covariate relationship. The splines are estimated with the `pspline` function in the `survival` package. Keele (2008, 2010) demonstrates that these splines are very effective at capturing the non-linearities that are often mistaken as non-proportional hazards.

Non-Spline Transformations In some circumstances it is difficult to use the splines and so we turn to alternative transformations for the criminalized neighbors variable. Having observed that when using splines the estimated functional form was always one of diminishing marginal returns, we looked for log-like functions. Because the log function itself is not defined at zero, we need an alternative. Shadden and Zorn (2011) make the case that common corrections can bias results and that an attractive alternative is the inverse hyperbolic sine function is a good alternative. It looks like the log function but is defined at zero. We use this function at times. Figure 4 provides a comparison of the two functions for the baseline model in Table 1: Model 1.

Diagnostics for Non-Proportional Hazards As mentioned above we need to verify that the models do not exhibit non-proportional hazard problems. First we correct for potential non-linearities using splines, then we are able to test residuals for correlation with time. Residuals are somewhat more complicated to define in the context of the Cox model, but Grambsch and Therneau (1994) derive a test based on the scaled Schoenfeld residuals (a non-technical explanation for political science audiences can be found in Box-Steffensmeier et al. (2003) with a gentle explanation of technical details available in Box-Steffensmeier and Zorn (2001)).

Due to the complexity of the splines we opt for the tabular (non-graphical) diagnostic test of non-proportional hazards as implemented in the `survival` package. Thus we are able to present p-values for a global test as well as for each variable (in the context of the splines, this means one p-value is returned for each basis function. If the p-value is below the conventional .05 level we may be concerned that there is evidence of non-proportionality. There is no consensus on the primacy of the global versus the covariate specific tests, however, in our circumstance we choose to

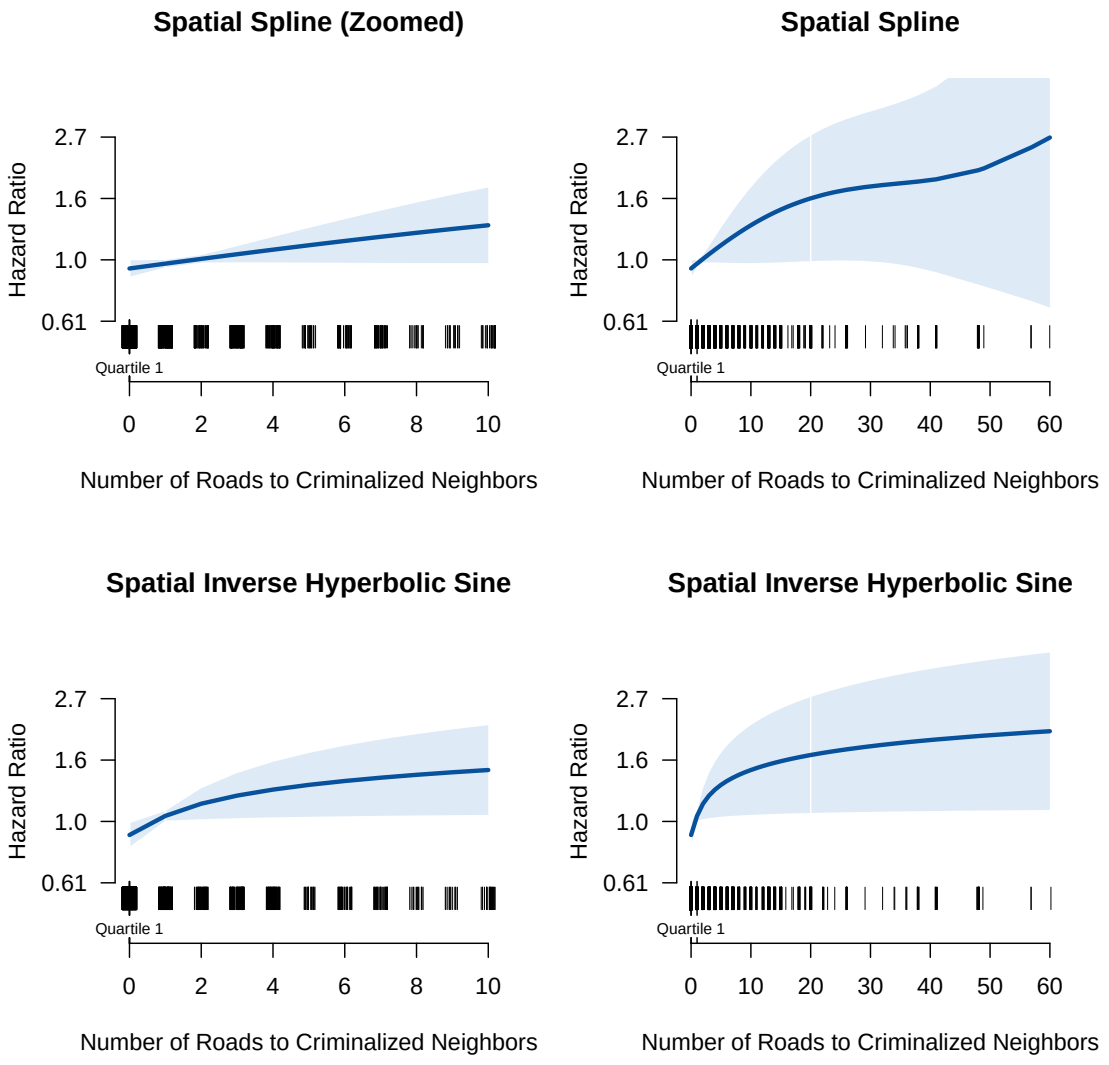


Figure 4: In Table 1: Model 1 the inverse hyperbolic sine function returns a very similar shape to the more flexible p-spline for criminalized neighbors.

focus exclusively on the covariate specific tests since none of the global tests are close to significant. Keele (2010) notes that it is important to examine the p-value for each component of the spline, but often diagnoses non-linearity through the presentation of an average p-value across the entire spline.

Missing Data In early drafts of the paper we experimented with multiple imputation to address the concern of missing data. These solutions were extremely complicated in order to address the structure in the dataset and the interpretation became even more complicated after the fact. The results for models that we ran were generally stronger than those we report here. Thus in order to simplify and streamline the results we opt for the more conservative (in this case) listwise deletion results.

4 Data

We draw data from a wide variety of sources. Most of the control variables are from standard data sources as detailed below. The dependent variable is measured using the *UN Global Report on Trafficking in Persons*.

4.1 The Main D.V. Data

Human Trafficking (HT) Criminalization Whether (1) or not (0) a country has criminalized human trafficking in domestic law. We define criminalization with three levels of stringency based on information contained in The UN Global Report on Trafficking in Persons available at `http://www.unodc.org`(accessed August 2009).

1. HT Criminalization: Most stringent definition: 1 here indicates the country has criminalized all forms of trafficking, as reflected in specific legislation. This coding does not include cases for which there is no information; these are left blank. All tests in the tables of the article are based on this definition: the country criminalizes all forms of trafficking.

2. HT Criminalization2: Moderately stringent definition: 1 here means the country has criminalized, with specific legislation, although the legislation may note some exceptions. It does not include cases in which trafficking is partially criminalized. It does not include cases for which there is no information; these are left blank. Countries that are included here that are not included in the most stringent definition above include Bulgaria, Mexico, Turkmenistan, Turkey, Eritrea, and Israel.

3. HT Criminalization3: Lax definition: 1 here means the country has criminalized with specific legislation, but that the legislation has important exceptions and/or the legislation is not very comprehensive. It does NOT include cases for which there is no information; these are left blank. Countries that are included here that are NOT included in the moderately stringent definition include Bangladesh, Benin, Burkina Faso, Cambodia, Chile, Costa Rica, Ecuador, Egypt, Gabon, Guatemala, Iraq, Mali, Mauritius, Morocco, Nepal, Pakistan, Panama, Serbia, Singapore, South Africa, Togo, UK, Venezuela, and Zambia.

We primarily use the most stringent definition although we at various points tested others for robustness checks (not described here).

4.2 Alternate D.V.s

Money Laundering Whether (1) or not (0) a country has criminalized money laundering in domestic law. We define criminalization with two levels of stringency based on information from multiple sources as there is no global organization that deals authoritatively with money laundering. The Financial Action Task Force (FATF) is part of the OECD, and is the main source of information. They publish periodical mutual evaluations of their membership (primarily OECD countries). See for example the list of reports posted at: `http://www.fatf-gafi.org` (accessed May 2011).
Regional groups conduct and publish their own Mutual Reports. These include the following, all accessed January through May 2011:

- Asia Pacific Group (APG)
- Eurasian Group on Combating Money Laundering and Financing of Terrorism (EAG)
- Moneyval (Council of Europe)
- Caribbean Financial Action Task Force: (CFATF)
- Eastern and Southern Africa Anti-Money Laundering Group (ESAAMLG)
- Financial Action Task Force of South America (GAFISUD)
- Intergovernmental Action Group Against Money laundering in West Africa (GIABA)
- Middle East and North Africa Financial Action Task Force (MENAFATF)
- Observer Group of Bank Supervisors (OGBS)

Most stringent definition: 1 here indicates the country is largely in compliance with FATF/regional organization expectations regarding criminalization

Moderately stringent definition: 1 here means the country is in partial compliance, e.g., the country has criminalized some money-laundering activities, but there are loopholes and the law is criticized in the report as not very strong.

We use the most stringent definition.

Protection and Prosecution In order to validate our results we employ data from Cho et. al (2011) on prosecution and protection policies of human trafficking. They have varying measures on trafficking programs: prosecution of traffickers, protection of victims, and trafficking prevention. These are a 5-point scale and vary across time (although we opt not to use their data as our main model since they vary over a much shorter period of time).

> Source: Cho, Seo-Young, Axel Dreher and Eric Neumayer. 2011. 'The Spread of Anti-trafficking Policies Evidence from a New Index' Cege Discussion Paper Series No. 119, Georg-August-University of Goettingen, Germany and IZA Discussion paper No. 5559 (Bonn) and CESifo Working Paper No. 3376 (Munich).

Prosecution:
In measuring government prosecution policy, our primary interests are: 1) whether the country has legislative and other measures to establish criminal offences for trafficking in persons, in line with the definition provided by the Anti-trafficking Protocol; and 2) whether such legislative and other measures are appropriately and effectively enforced.

- Score 5: The country has a legislative measure specifically prohibiting trafficking in persons and; the law is fully enforced in the form of investigations, prosecutions, convictions and punishment of such offenders. Generally, the country should maintain a stringent level of penalty (either more than five years imprisonment or punishment equivalent to other related crimes such as rape or labor exploitation).

- Score 4: The country has a legislative measure specifically prohibiting trafficking in persons; BUT the law is not fully enforced in the form of investigations, prosecutions, convictions and punishment of such offenders.

- Score 3: The country does NOT have a legislative measure specifically prohibiting trafficking in persons; but applies some other relevant laws (such as laws against rape, slavery, exploitation, abuse or human rights violation) to punish offenders of such crimes; and the law is fully or adequately enforced in the form of investigations, prosecutions, convictions and punishment of such offenders.

- Score 2: The country does NOT have a legislative measure specifically prohibiting trafficking in persons; BUT applies some other related law to punish offenders of such crimes; the law is not adequately enforced in the form of investigations, prosecutions, convictions and punishment of such offenders. If the country has a legislative measure specifically prohibiting trafficking in persons but does not enforce the law at all (or there is no evidence that the country has conducted prosecution or conviction of such offenders), it also receives score 2.

- Score 1: The country does NOT have a legislative measure prohibiting trafficking in persons and no other law is applied; and there is no evidence of punishment for such a crime at all.

Protection:
Coding Scheme: In measuring government protection policy, our primary interests are: whether the country protects the human rights of victims of trafficking; identifies them; and provides for the physical, psychological and social recovery of victims of trafficking by legislative and other measures.

- Score 5: The country does not punish victims of trafficking for acts related to the situations being trafficked; does not impose the self-identification of victims; and exerts STRONG efforts to give victims information on, and assistance for, relevant court and administrative proceedings, as well as support for the physical, psychological and social recovery of victims such as housing (shelter), medical assistance, job training, (temporal) residence permit, and other assistance for rehabilitation and repatriation.

- Score 4: The country does not punish victims of trafficking for acts related to the situations being trafficked; does not impose the self-identification of victims; and exerts MODERATE efforts to give victims information on, and assistance for, relevant court and administrative proceedings, as well as support for the physical, psychological and social recovery of victims such as housing (shelter), medical assistance, job training, (temporal) residence permit, and other assistance for rehabilitation and repatriation.

- Score 3: The country does not punish victims of trafficking for acts related to the situations being trafficked; does not impose the self-identification of victims; and exerts LIMITED efforts to give victims information on, and assistance for, relevant court and administrative

proceedings, as well as support for the physical, psychological and social recovery of victims such as housing (shelter), medical assistance, job training, (temporal) residence permit, and other assistance for rehabilitation and repatriation. Or, if the country fails to ensure that victims of trafficking are never punished for acts related to the trafficking itself or the consequences of being trafficking BUT exerts STRONG/Moderate efforts in protecting victims, the country qualifies for score 3.

- Score 2: The country fails to ensure that victims of trafficking are punished for acts related to the trafficking itself or to the consequences of being trafficked; and there is limited assistance and support for court proceedings and the recovery of victims. Or, the country does not punish victims of trafficking in persons for acts related to the situations being trafficked; however, does not provide any assistance or support for recovery, rehabilitation and repatriation.

- Score 1: The country punishes victims of trafficking in persons for acts related to the situations being trafficked; and does not provide any assistance and support

4.3 The Measure of Diffusion

To measure vulnerability to policy externalities of neighbors, we create a weighted measure of neighboring countries who have criminalized human trafficking. In the paper, we used the strictest definition of criminalization as defined above, e.g., whether a country has enacted specific anti-trafficking legislation, with broad coverage admitting of no important exceptions. We develop our weights by creating a dataset of the number of major highways connecting a pair of contiguous countries. We used the USGS Global GIS database which provides a worldwide network of major highways. The data is based on aerial photography and geological surveys taken in January of 1997 by the United States National Imagery and Mapping Agency. Documentation and definitions can be found at `http://www.agiweb.org/pubs/globalgis/metadata_qr/roads_qk_ref.html` We then created a count of the number of roads which crossed each border between two countries to create a contiguity matrix. Since qualitative sources indicate that human trafficking often occurs across small bodies of water, we also include information from the Correlates of War Contiguity Dataset (Stinnett et al., 2002). Specifically we add one "road" whenever two countries are connected by 150 miles of water or less.

Using this contiguity matrix we create two measures of diffusion. For each country, we summed the number of borders to each country which had criminalized human trafficking by the previous year (the temporal lag both allows the policy diffusion effects to spread and avoids a host of complex methodological issues with purely spatial lags). Major roads are built to accommodate increased traffic suggesting both that borders with many crossings have a high travel demands and most likely large cities on either side. For example, Russia's borders with Eastern Europe are given more weight than its border with Mongolia. This also provides an easy interpretation to the hazard ratio, e.g., a 1.10 hazard ratio corresponds to a 10% increase for each criminalized border crossing.

Any country with no neighbors receives a zero since conceivably they have no externalities in the sense that we use them here.

Alternate Diffusion Measures We employ a few alternate measures of diffusion in Table 2. These are calculated in the obvious way, usually sums of criminalized neighbors with a one year temporal lag within a sub-group (such as civilizational grouping).

4.4 The I.V. Data

US pressure We employ the one year lag of US Pressure.
A dichotomous measure indicating whether (1) or not (0) a country rates on the watch list or below (e.g., do not comply with minimal standards) according to the U.S. State Department tier system for rating human trafficking effort in the previous year (t-1). We collapse the scale below coding countries in Tier 1 and 2 as 0 and countries on the Tier 2 Watch List or Tier 3 as 1. The original State Department tiers correspond to the following criteria:

- TIER 1: Countries whose governments fully comply with the Trafficking Victims Protection Act's (TVPA) minimum standards
- TIER 2: Countries whose governments do not fully comply with the TVPA's minimum standards, but are making significant efforts to bring themselves into compliance with those standards
- TIER 2 WATCH LIST: Countries whose governments do not fully comply with the TVPA's minimum standards, but are making significant efforts to bring themselves into compliance with those standards AND:
    1. The absolute number of victims of severe forms of trafficking is very significant or is significantly increasing; or
    2. There is a failure to provide evidence of increasing efforts to combat severe forms of trafficking in persons from the previous year; or
    3. The determination that a country is making significant efforts to bring themselves into compliance with minimum standards was based on commitments by the country to take additional future steps over the next year
- TIER 3: Countries whose governments do not fully comply with the minimum standards and are not making significant efforts to do so.

These criteria are discussed at: `http://www.state.gov/documents/organization/123360.pdf` (p. 49). Original Source: US-DOS Trafficking in Persons (TIP) Reports: `http://www.state.gov/g/tip/rls/tiprpt/index.htm`

Regional News Coverage Number of articles in the LexisNexis international news sources database each year that contained both the country name and the phrase "human trafficking" in the headline or newswire lead. We lag the measure by two years to ensure that the news reports to do not simply reflect the criminalization or ratification process itself (as opposed to a growing awareness of the problem).

Rule of Law The average rule of law score assigned by the World Bank between 1996 and 2008. This proxy measures "perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence." This is a constant. Source (accessed Oct 13, 2009): World Bank: `http://info.worldbank.org/governance/wgi/index.asp`

US aid/GDP Official aid from the US to the specific country, year; in millions of US dollars, as a proportion of GDP. Source (accessed): OECD. 2008. "OECD International Development Statistics CD-ROM 2008 Edition." CD-Rom. For a full description of the data see CD rom or `http://www.oecdbookshop.org`

Use of IMF credits A dichotomous variable indicating whether (1) or not (0) a country had used credits from the International Monetary Fund in the previous year. Converted data based on amount in dollars of credits received from the IMF in a particular year. Original source: World Bank, World Development Indicators, `http://devdata.worldbank.org/dataonline/`

US trade/total trade Percentage of a country's total trade (imports plus exports) that is with the United States. Source: International Monetary Fund, Direction of Trade Statistics.

EU trade/total trade Percentage of a country's total trade (imports plus exports) that is with the European Union. Source: International Monetary Fund, Direction of Trade Statistics

Prevalence of Child labor Labor force, children 10-14 (% of age group). Source: World Bank, World Development Indicators. Note: as of 2009, WDI redefined this category and removed the earlier data. Therefore, actual data from the WDI extend only to 2001. Data through 2009 are extensions of 2001 values, basically this does not pick up variance over time since 2001. (No valid time series is available from the WDI.)

Low and Middle Income category Whether (1) or not (0) a country is in either the low or lower middle income category as defined by the World Bank. Income definitions are as follows:

- Low income category: defined in 2009 as per capita income of $975 or less per year.
- Middle income: lower middle income category: defined in 2009 as per capita income of between $976 and $3,855 per year. upper middle income category: defined in 2009 as per capita income of between $3,856 and $11,905 per year.
- High income category: defined in 2009 as per capita income of $11,906 or more per year.

Source: World Bank: (accessed August 2009). `http://web.worldbank.org`

Remittances/GDP Workers' remittances and compensation of employees, received (% of GDP). Source: World Development Indicators.

Percent Women in Parliament Share of voting seats in the lower house of national parliaments held by women (% of total seats), as of the last day of the listed year. Source (accessed May 1, 2010): Women in National Parliaments, statistical archive. `http://www.ipu.org/wmn-e/classif-arc.htm`

Origin, destination, transit, and internal trafficking Information on country position in the human trafficking network was obtained from The Protection Project, a research institute based at The Johns Hopkins University School of Advanced International Studies (SAIS) in Washington, D.C. One of its projects is to prepare country reports on human trafficking (see `http://www.protectionproject.org/?q=content/country-reports` ; accessed October 29, 2009; updated March 2010 at `http://www.protectionproject.org/human_rights_reports/`). The Project's website does not provide specific information on methodology, but based on the information in the country reports, they obtain and compile information from a variety of sources. These include reports from UN agencies such as UNICEF and from IGOs and NGOs both local and international as well as a number of news sources. The sources for each country report vary; for example, the International Organization for Migration provided most of the information for Afghanistan. The Protection Project also draws from the US DOS TIPs reports. The DOS provides information on its methodology, however. See `http://www.state.gov/g/tip/rls/tiprpt/index.htm`. The Protection Project reports focus on what countries are origin, destination, and transit countries and which have problems with internal trafficking. They also detail the reason for the trafficking, e.g., forced prostitution, forced labor; abductions for forced marriage; exchange of women for dispute settlement, and for removal of organs.

- Country of origin: Dichotomous variable–whether (1) or not (0) the country is mentioned as a major "country of origin" for trafficked persons in reports compiled by Protection Project. Note that a country can be a country of origin as well as a transit or destination country; the categories are not mutually exclusive. There are missing reports for obvious countries like Sweden, Ukraine, the U.S., and Turkey.

- Transit country: Dichotomous variable–whether (1) or not (0) the country is mentioned as a major "transit country" for trafficked persons in reports compiled by Protection Project. A transit country is a place where individuals are sold, traded, or transferred; not necessarily where they work. Note that a country can be a transit country as well as an origin or destination country; the categories are not mutually exclusive. There are missing reports for obvious countries like Sweden, Ukraine, the U.S., and Turkey.

- Destination country: Dichotomous variable–whether (1) or not (0) the country is mentioned as a major "destination country" for trafficked persons in reports compiled by Protection Project. This is a country in which trafficked persons are primarily employed. Note that a country can be a destination country as well as an origin or transit country; the categories are not mutually exclusive. There are missing reports for obvious countries like Sweden, Ukraine, the U.S., and Turkey.

- Internal trafficking: Dichotomous variable–whether (1) or not (0) the country is mentioned as having a problem with internal trafficking in reports compiled by Protection Project. Note that a country with internal trafficking can be a destination country as well as an origin or transit country; the categories are not mutually exclusive. There are missing reports for obvious countries like Sweden, Ukraine, the U.S., and Turkey.

Common Law Whether (1) or not (0) the country's legal system is classified as of British legal origin, denoting its status as a common law system. Original source: Global Development Network Growth Database, William Easterly and Hairong Yu, World Bank. `http://econ.worldbank.org`

Middle income Whether (1) or not (0) a country is categorized as either lower middle or upper middle income by the World Bank. See definition and source above under Middle and Lower Income.

Civilizational Indicator (Huntington, 1997) divided the world into 8 major civilizations.

- Western (includes North America, Western and Central Europe, Australia and Oceania)
- Orthodox (former Soviet Union countries (excluding the Baltic states and most of Central Asia), Armenia, George, former Yugoslavia (except Slovenia and Croatia), Bulgaria, Cyprus, Greece, Ukraine, and Romania),
- Sinic (China, the Koreas, Singapore, Taiwan, Vietnam- we add Japan, which he lists as a hybrid of Chinese civilization and older patterns)
- Latin America (includes Central and South America, Cuba, the Dominican Republic and Mexico, although he notes that they can be considered part of Western civilization); includes non-Spanish speaking Caribbean: (Antigua Barbuda, Bahamas, Barbados, Dominica, Grenada, Guyana, Haiti, Jamaica, St. Kitts & Nevis, St. Lucia, St. Vincent Grenadines, Suriname, and Trinidad and Tobago)
- Muslim (a mix of Middle East, Africa, Asian countries who are predominately Muslim and have membership in the Organization of Islamic Conference);
- Hindu (India, Nepal)
- Buddhist (Bhutan, Cambodia, Laos, Mongolia, Myanmar, Sri Lanka, and Thailand)
- Sub-Saharan Africa (includes Southern, Middle and East Africa)

Respect for Human Rights Scores We use the respect for human rights scores developed in Fariss (2014).

Shared Human Rights Organizations For data about criminalization among members of shared human rights organizations we use data from Greenhill (2016).

5 Main Results

In this section we provide results and diagnostic tests along with visualizations of all key figures.

How to Read the Results Every model contains a table like the following.

	Hazard Ratio	Lower 95% CI	Upper 95% CI	p-value
Sum of Roads	1.027	1.010	1.043	0.002
Sum of Roads Nonlinear				0.030
US Pressure	2.291	1.295	4.051	0.004
Rule of Law	1.591	1.304	1.940	0.000
Rule of Law Nonlinear				0.001
Ratification	1.560	1.144	2.126	0.005

Table 1: Table 1, Model 1.
2196 complete cases (79 events). There were 0 p-values less than .05 in the NPH tests with a global p-valiue of 1.000

The first label: here "Table 1" numbers the tables in this appendix. Immediately after the colon is the table and model number that corresponds to the original paper. Terms with splines are shown with their best linear approximation, confidence interval for that linear approximation and a p-value for both the linear and non-linear portions of the model. This serves as an approximate sense of the linear effect. The caption includes the location of the model in the original paper and some basic information about the number of observations and events as well as diagnostic tests for non-proportional hazards. We report the number of individual p-values below .05 and the p-value of the global test.

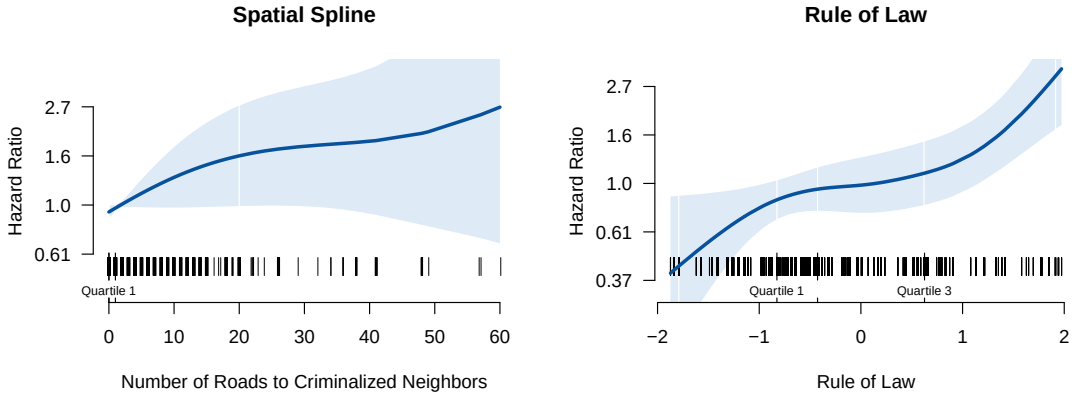
A Note on Visualizations Generally speaking we use the `plotHR` in the `Greg` package (Gordon and Seifert, 2016) to visualize the non-linear spline terms. For some of the models the function fails. When this happens we produce the plots using the `survival` package's (Therneau, 2015) built in `termplot` function which while more robust, is not as aesthetically appealing. The biggest difference for interpretation is that the y-axis is labeled in the space of the coefficient rather than the hazard ratio (centered at 0 rather than 1 etc.). Fundamentally though `plotHR` is a specialized form of `termplot`.

5.1 Table 1: Externalities and Other Influences

5.1.1 Model 1: Base

	Hazard Ratio	Lower 95% CI	Upper 95% CI	p-value
Sum of Roads	1.027	1.010	1.043	0.002
Sum of Roads Nonlinear				0.030
US Pressure	2.291	1.295	4.051	0.004
Rule of Law	1.591	1.304	1.940	0.000
Rule of Law Nonlinear				0.001
Ratification	1.560	1.144	2.126	0.005

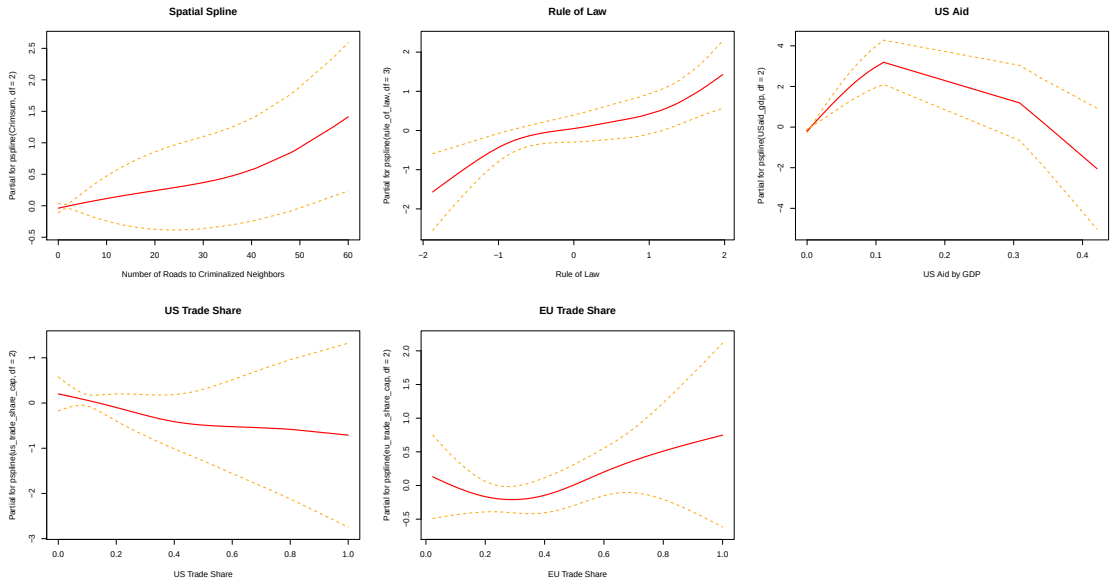
Table 2: Table 1, Model 1.
2196 complete cases (79 events). There were 0 p-values less than .05 in the NPH tests with a global p-valiue of 1.000



5.1.2 Model 2: Material Coercion

	Hazard Ratio	Lower 95% CI	Upper 95% CI	p-value
Sum of Roads	1.021	1.006	1.036	0.006
Sum of Roads Nonlinear				0.055
US Pressure	2.506	1.259	4.987	0.009
Rule of Law	1.880	1.362	2.596	0.000
Rule of Law Nonlinear				0.001
Ratification	1.485	1.024	2.153	0.037
US aid GDP	0.071	0.001	4.547	0.212
US Aid Nonlinear				0.000
IMF Credit	8.292	0.950	72.386	0.056
US Trade Share	0.180	0.041	0.787	0.023
US Trade Share Nonlinear				0.072
EU Trade Share	1.598	0.507	5.039	0.424
EU Trade Share Nonlinear				0.021

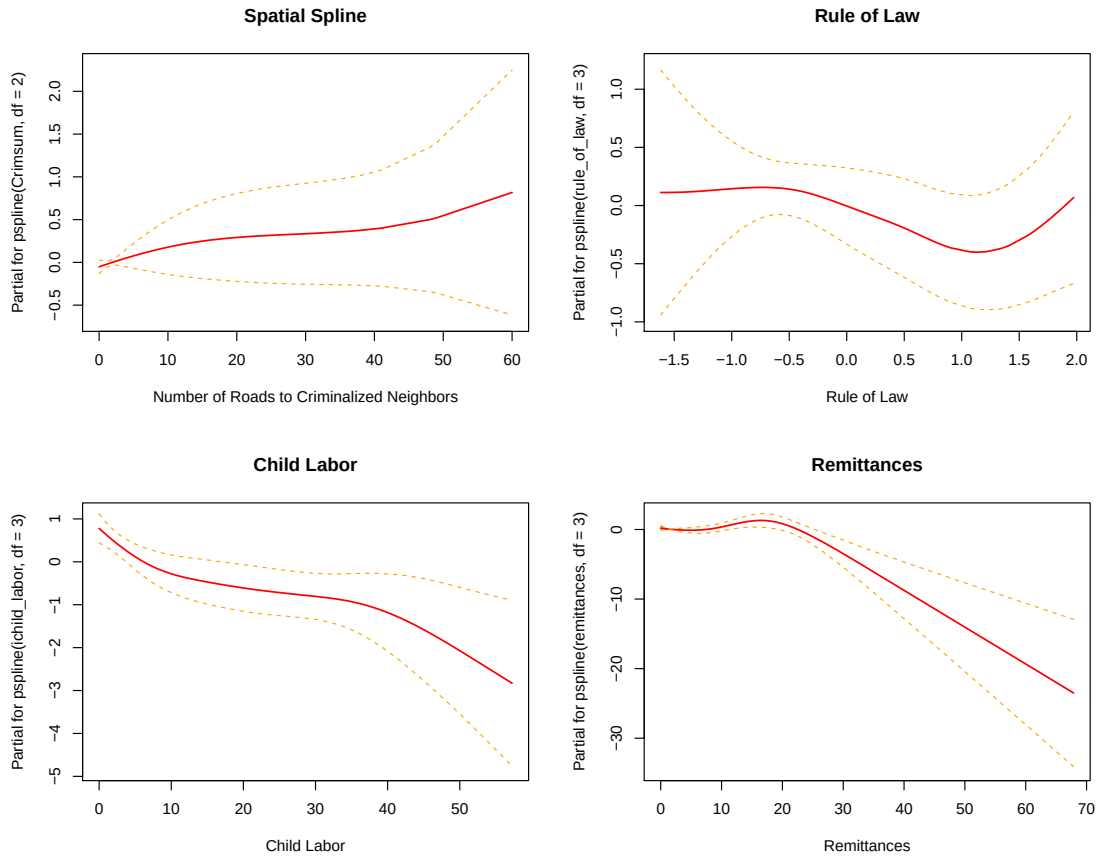
Table 3: Table 1, Model 2.
1764 complete cases (64 events). There were 0 p-values less than .05 in the NPH tests with a global p-valiue of 1.000



5.1.3 Model 3: Developmental Controls

	Hazard Ratio	Lower 95% CI	Upper 95% CI	p-value
Sum of Roads	1.014	0.999	1.030	0.063
Sum of Roads Nonlinear				0.058
US Pressure	1.674	0.782	3.581	0.184
Rule of Law	0.905	0.671	1.219	0.511
Rule of Law Nonlinear				0.000
Ratification	1.437	1.035	1.995	0.030
Child Labor	0.940	0.921	0.959	0.000
Child Labor Nonlinear				0.009
Middle Income Country	0.441	0.231	0.843	0.013
Remittances	0.966	0.928	1.006	0.097
Remittances Nonlinear				0.000

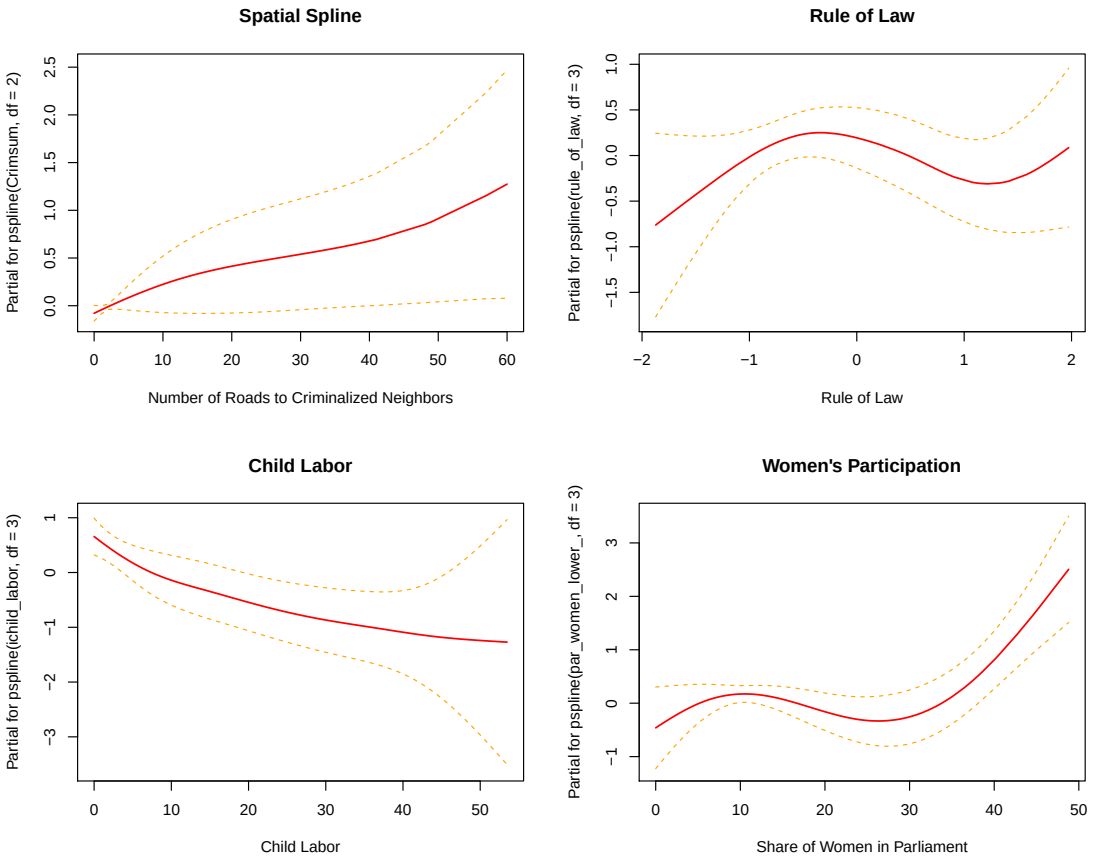
Table 4: Table 1, Model 3.
1589 complete cases (68 events). There were 0 p-values less than .05 in the NPH tests with a global p-valiue of 1.000



5.1.4 Model 4: Women's Influence

	Hazard Ratio	Lower 95% CI	Upper 95% CI	p-value
Sum of Roads	1.025	1.009	1.042	0.002
Sum of Roads Nonlinear				0.019
US Pressure	1.980	1.075	3.644	0.028
Rule of Law	1.100	0.824	1.469	0.516
Rule of Law Nonlinear				0.000
Ratification	1.500	1.086	2.073	0.014
Child Labor	0.953	0.931	0.975	0.000
Child Labor Nonlinear				0.036
Middle Income Country	0.424	0.224	0.802	0.008
Share Women in Parliament	1.043	1.024	1.062	0.000
Share Women Nonlinear				0.000

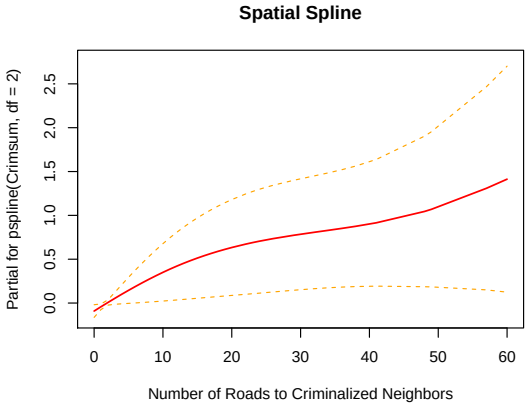
Table 5: Table 1, Model 4.
1482 complete cases (75 events). There were 0 p-values less than .05 in the NPH tests with a global p-valiue of 1.000

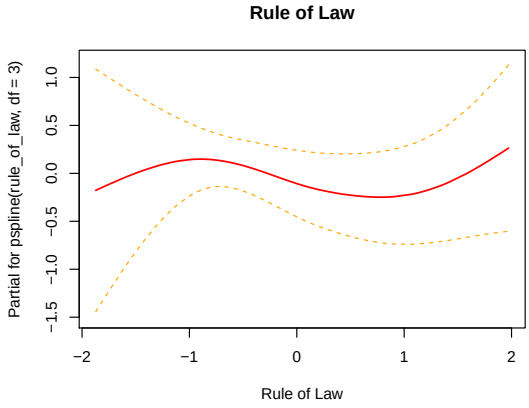


5.1.5 Model 5: Human Rights Practices

	Hazard Ratio	Lower 95% CI	Upper 95% CI	p-value
Sum of Roads	1.032	1.015	1.049	0.000
Sum of Roads Nonlinear				0.033
US Pressure	2.533	1.401	4.581	0.002
Rule of Law	1.006	0.711	1.425	0.972
Rule of Law Nonlinear				0.011
Ratification	1.545	1.120	2.131	0.008
Respect For Human Rights	1.563	1.256	1.946	0.000
Respect for HR Nonlinear				0.000

Table 6: Table 1, Model 5.
2167 complete cases (78 events). There were 0 p-values less than .05 in the NPH tests with a global p-valiue of 1.000

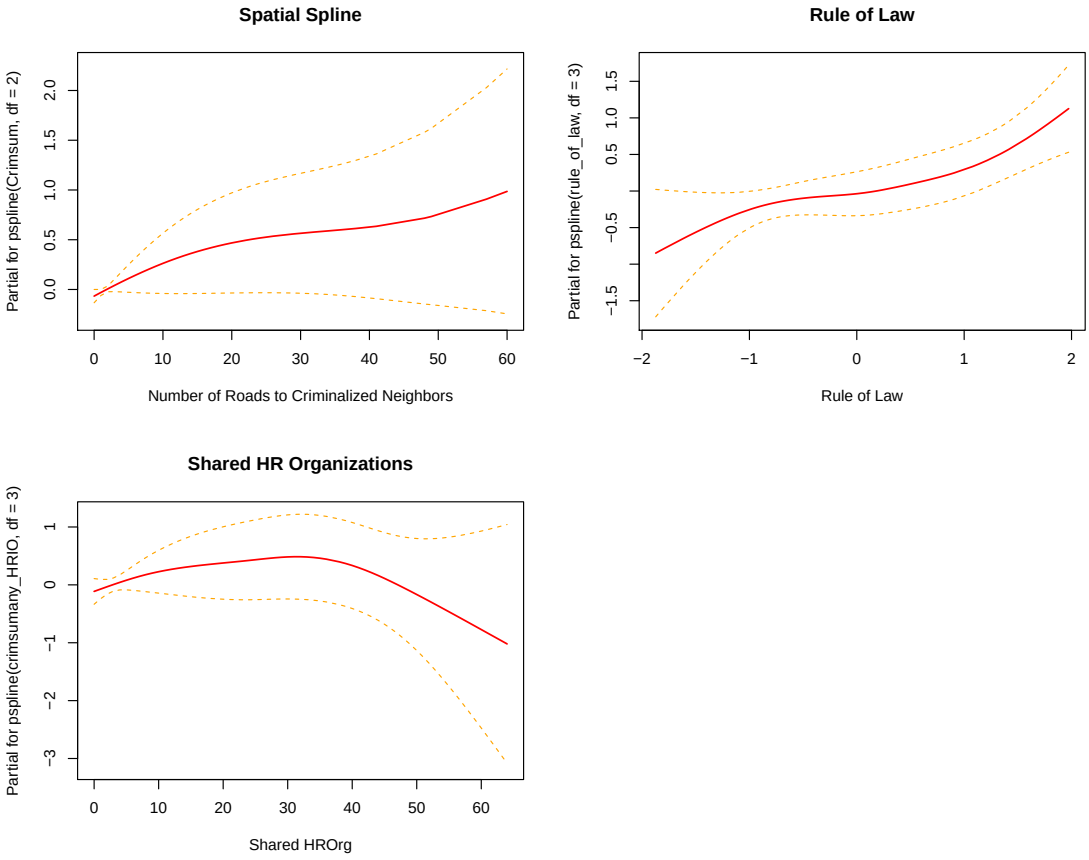




5.1.6 Model 6: Human Rights Diffusion

	Hazard Ratio	Lower 95% CI	Upper 95% CI	p-value
Sum of Roads	1.026	1.011	1.042	0.001
Sum of Roads Nonlinear				0.041
US Pressure	2.291	1.276	4.113	0.006
Rule of Law	1.564	1.278	1.914	0.000
Rule of Law Nonlinear				0.001
Ratification	1.565	1.131	2.165	0.007
Shared HROrg Crim	1.001	0.981	1.021	0.932
Shared HROrg Crim Nonlinear				0.020

Table 7: Table 1, Model 6.
2182 complete cases (78 events). There were 7 p-values less than .05 in the NPH tests with a global p-valiue of 1.000



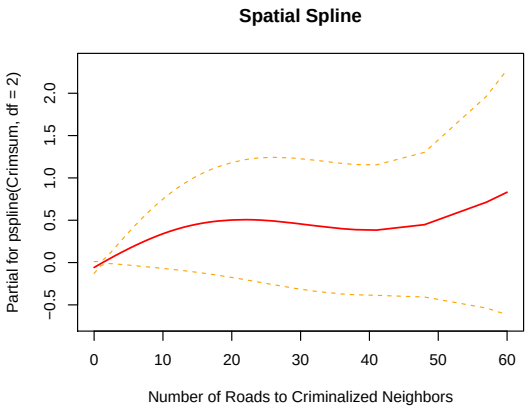
Note: There are several p-values in the non-proportional hazards test that are below the .05 threshold. They are all for the spline terms in the shared organizations variable. The average p-value is still quite high and the global p-value is close to one. We also note that the degrees of freedom on the shared organizations variable can be raised quite high (e.g. 10) and the tests will all fail to reject while the roads variable remains significant.

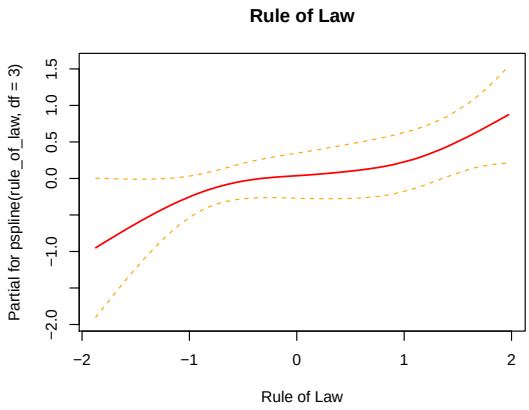
5.2 Table 2: Robustness of Diffusion via Roads

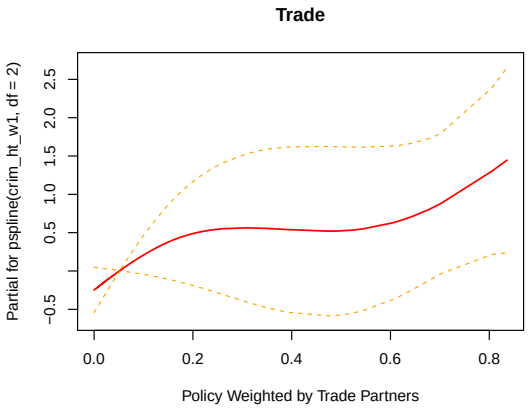
5.2.1 Model 1: Trade Diffusion

	Hazard Ratio	Lower 95% CI	Upper 95% CI	p-value
Sum of Roads	1.005	0.989	1.022	0.521
Sum of Roads Nonlinear				0.003
US Pressure	1.353	0.592	3.092	0.473
Rule of Law	1.451	1.147	1.836	0.002
Rule of Law Nonlinear				0.005
Policy Weighted by Trade Partners	4.651	2.265	9.547	0.000
Policy Weighted by Trade Nonlinear				0.012

Table 8: Table 2, Model 1.
1917 complete cases (60 events). There were 0 p-values less than .05 in the NPH tests with a global p-valiue of 1.000



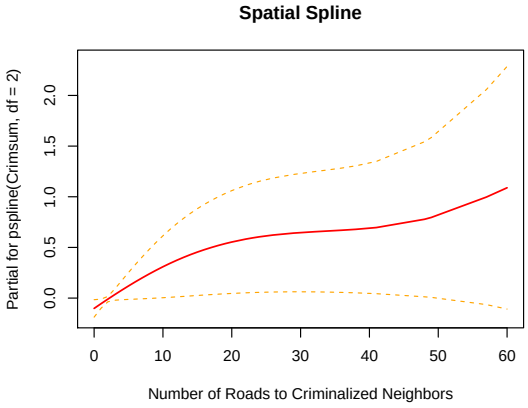


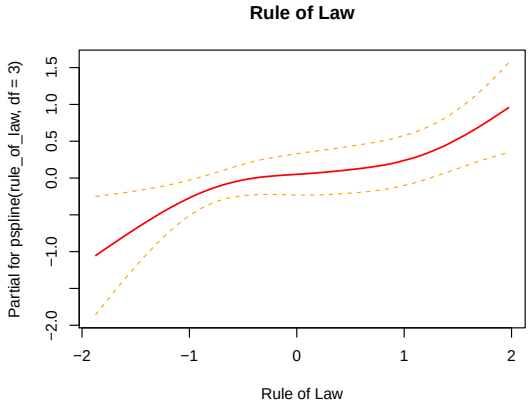


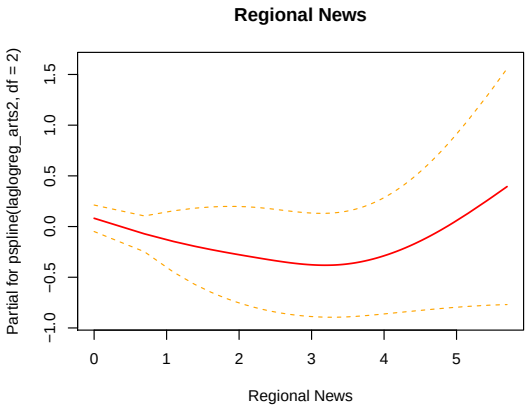
5.2.2 Model 2: Regional News Coverage

	Hazard Ratio	Lower 95% CI	Upper 95% CI	p-value
Sum of Roads	1.023	1.008	1.038	0.003
Sum of Roads Nonlinear				0.008
US Pressure	2.475	1.379	4.442	0.002
Rule of Law	1.480	1.204	1.820	0.000
Rule of Law Nonlinear				0.003
Regional News	0.919	0.782	1.079	0.302
Regional News Nonlinear				0.001

Table 9: Table 2, Model 2.
1614 complete cases (79 events). There were 0 p-values less than .05 in the NPH tests with a global p-valiue of 1.000



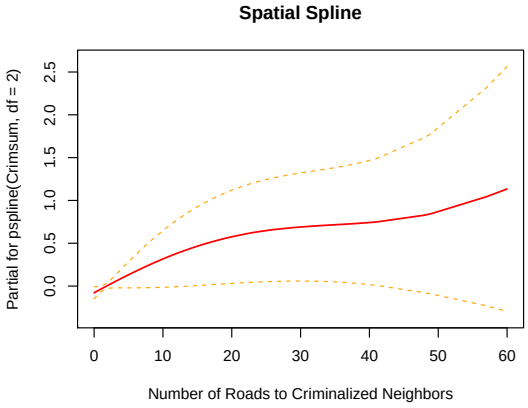


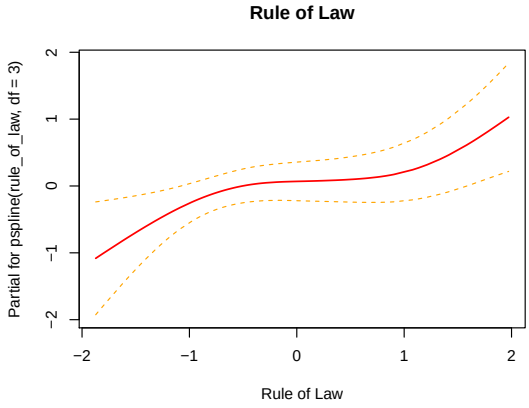


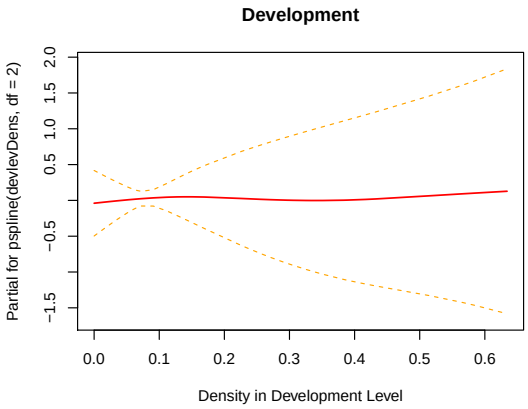
5.2.3 Model 3: Developmental Emulation

	Hazard Ratio	Lower 95% CI	Upper 95% CI	p-value
Sum of Roads	1.025	1.008	1.041	0.003
Sum of Roads Nonlinear				0.013
US Pressure	2.390	1.335	4.280	0.003
Rule of Law	1.555	1.166	2.074	0.003
Rule of Law Nonlinear				0.003
Density in DevLevel	0.816	0.038	17.497	0.896
Density in DevLevel Nonlinear				0.067

Table 10: Table 2, Model 3.
2186 complete cases (78 events). There were 0 p-values less than .05 in the NPH tests with a global p-valiue of 1.000



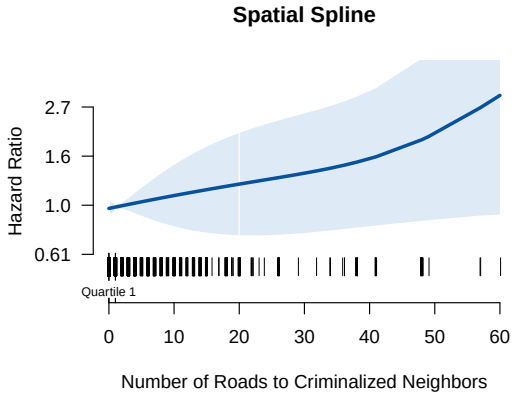


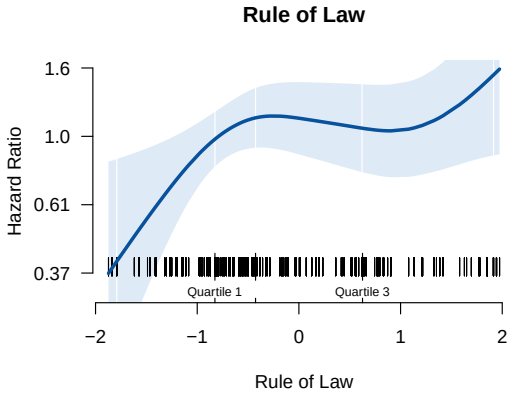


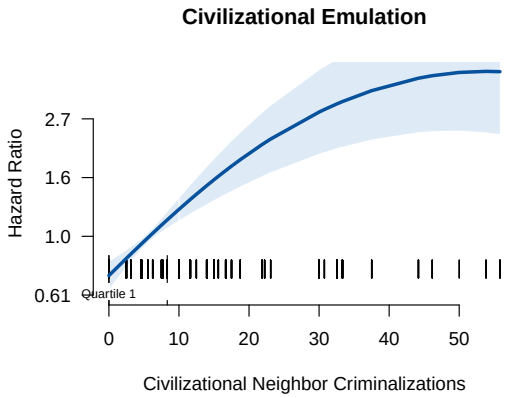
5.2.4 Model 4: Civilizational Emulation

	Hazard Ratio	Lower 95% CI	Upper 95% CI	p-value
Sum of Roads	1.016	1.001	1.031	0.038
Sum of Roads Nonlinear				0.039
US Pressure	2.193	1.254	3.834	0.006
Rule of Law	1.237	0.998	1.532	0.052
Rule of Law Nonlinear				0.000
Civilizational Crim	1.012	1.003	1.022	0.010
CivCrim Nonlinear				0.000

Table 11: Table 2, Model 4.
2196 complete cases (79 events). There were 0 p-values less than .05 in the NPH tests with a global p-valiue of 1.000



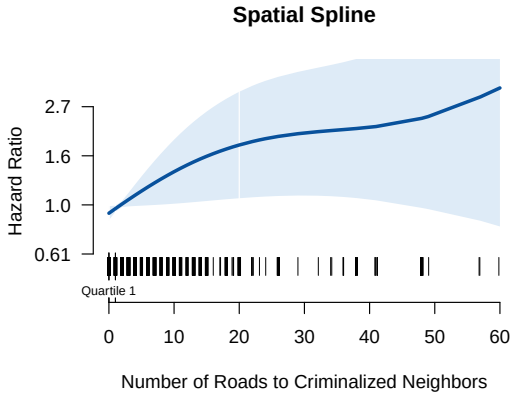


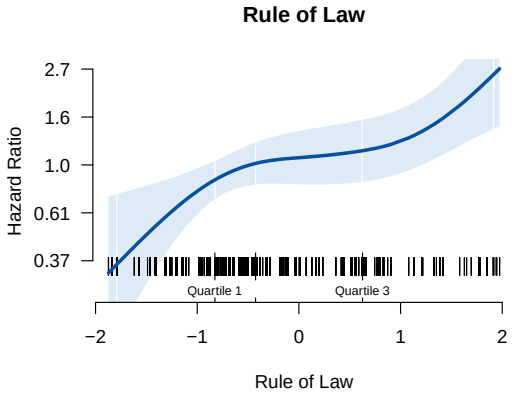


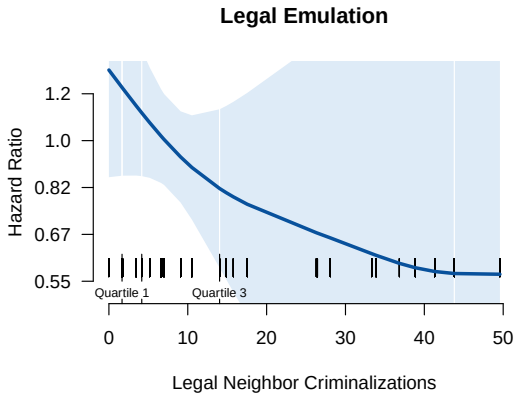
5.2.5 Model 5: Emulation Among Legal Families

	Hazard Ratio	Lower 95% CI	Upper 95% CI	p-value
Sum of Roads	1.026	1.010	1.044	0.002
Sum of Roads Nonlinear				0.010
US Pressure	2.323	1.307	4.129	0.004
Rule of Law	1.510	1.226	1.859	0.000
Rule of Law Nonlinear				0.003
Legal Crim	0.973	0.935	1.012	0.177
LegCrim Nonlinear				0.001

Table 12: Table 2, Model 5.
2196 complete cases (79 events). There were 0 p-values less than .05 in the NPH tests with a global p-valiue of 1.000







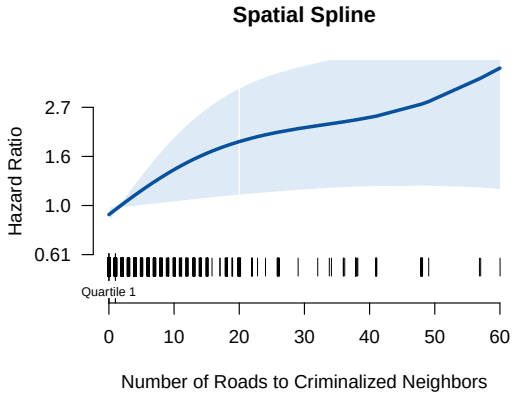
5.3 Table 3: Robustness of Diffusion with Other Outcomes

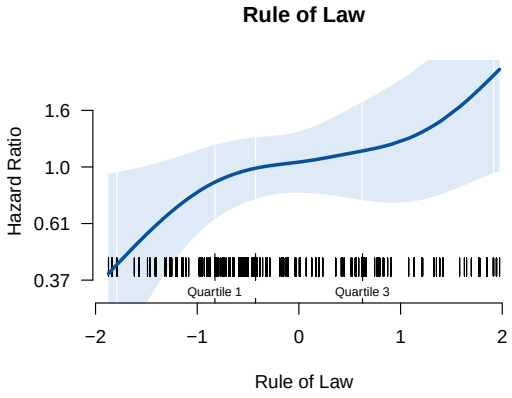
Full details for Model 1 are in the original paper- replication code for the main text can be used to further investigate.

5.3.1 Model 2a: Human Trafficking

	Hazard Ratio	Lower 95% CI	Upper 95% CI	p-value
Sum of Roads	1.027	1.011	1.043	0.001
Sum of Roads Nonlinear				0.012
Rule of Law	1.517	1.052	2.187	0.026
Rule of Law Nonlinear				0.005
DevLev	0.967	0.676	1.382	0.853

Table 13: Table 3, Model 2a.
2196 complete cases (79 events). There were 0 p-values less than .05 in the NPH tests with a global p-valiue of 1.000

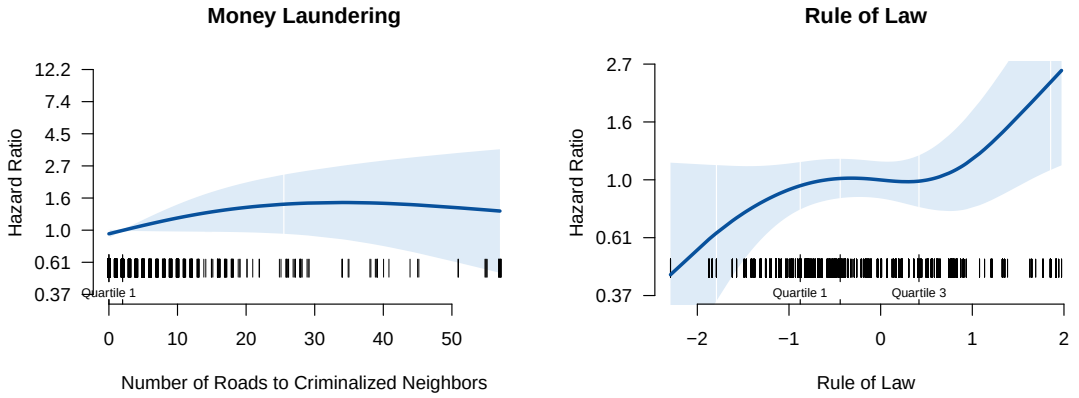




5.3.2 Model 2b: Money Laundering

	Hazard Ratio	Lower 95% CI	Upper 95% CI	p-value
Sum of Roads	1.005	0.995	1.015	0.320
Sum of Roads Nonlinear				0.014
Rule of Law	1.267	0.968	1.658	0.085
Rule of Law Nonlinear				0.004
DevLev	1.248	0.977	1.592	0.076

Table 14: Table 3, Model 2b.
2261 complete cases (160 events). There were 5 p-values less than .05 in the NPH tests with a global p-valiue of 0.600



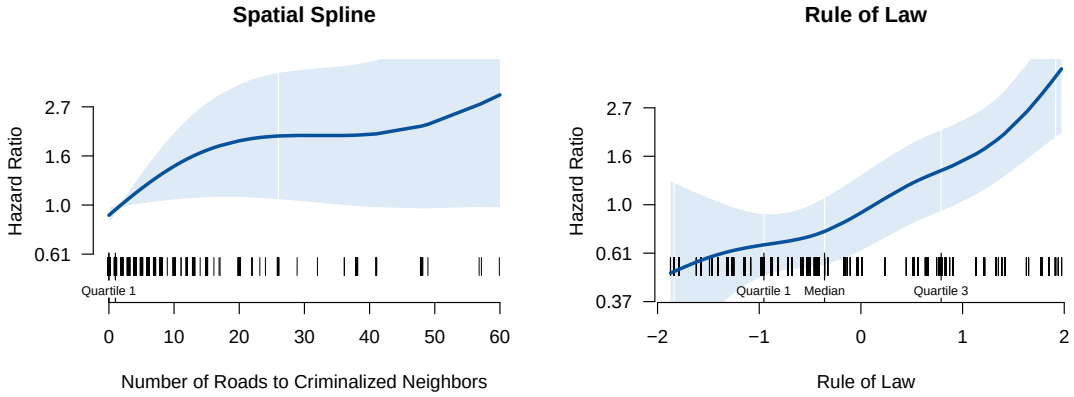
Note: There are several p-values in the non-proportional hazards test that are below the .05 threshold. One is for development level and several are for the spline terms in the money laundering. The average p-value and global p-value are quite high. A spline term placed on the development level only flattens out the effect of money laundering more. Increasing the flexibility for the spline term on money laundering does not address the problem with the development level and still does not yield a substantively interesting effect for money laundering. For symmetry with Model 2a we leave the model specification the same.

5.4 Table 4: Externalities by Ego Exposure Category

5.4.1 Model 1: Destination

	Hazard Ratio	Lower 95% CI	Upper 95% CI	p-value
Sum of Roads	1.022	1.010	1.035	0.000
Sum of Roads Nonlinear				0.010
US Pressure	2.116	0.984	4.551	0.055
Rule of Law	1.889	1.476	2.417	0.000
Rule of Law Nonlinear				0.004
Ratification	1.332	0.870	2.040	0.187

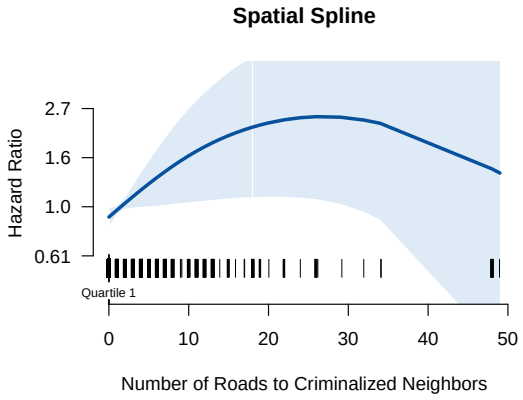
Table 15: Table 4, Model 1.
1371 complete cases (46 events). There were 0 p-values less than .05 in the NPH tests with a global p-valiue of 1.000

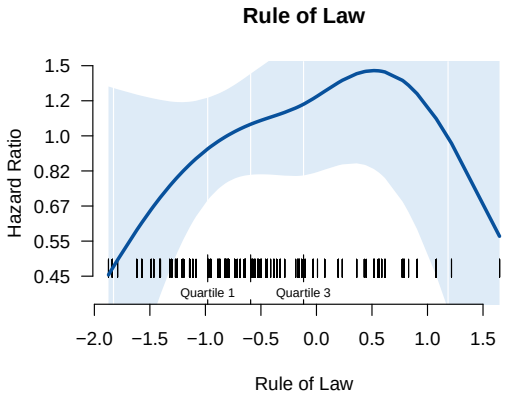


5.4.2 Model 2: Origin

	Hazard Ratio	Lower 95% CI	Upper 95% CI	p-value
Sum of Roads	1.014	0.986	1.043	0.321
Sum of Roads Nonlinear				0.003
US Pressure	2.067	0.849	5.032	0.110
Rule of Law	1.050	0.691	1.594	0.820
Rule of Law Nonlinear				0.000
Ratification	1.260	0.819	1.939	0.292

Table 16: Table 4, Model 1.
1490 complete cases (41 events). There were 0 p-values less than .05 in the NPH tests with a global p-valiue of 1.000

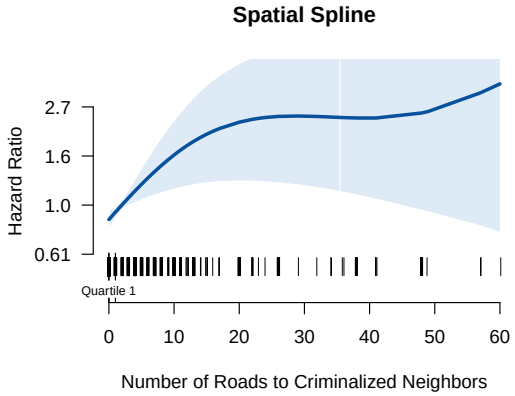


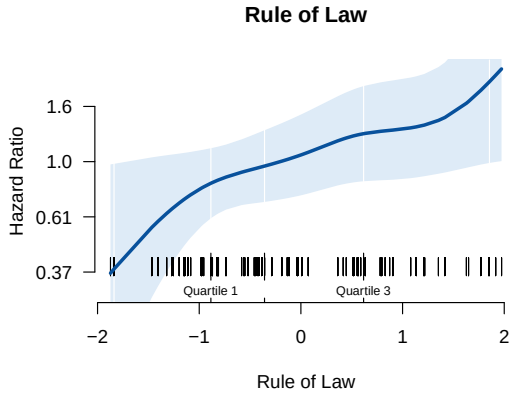


5.4.3 Model 3: Transit

	Hazard Ratio	Lower 95% CI	Upper 95% CI	p-value
Sum of Roads	1.033	1.014	1.053	0.001
Sum of Roads Nonlinear				0.001
US Pressure	1.493	0.552	4.042	0.430
Rule of Law	1.501	1.120	2.011	0.007
Rule of Law Nonlinear				0.001
Ratification	1.392	0.925	2.095	0.112

Table 17: Table 4, Model 1.
1172 complete cases (43 events). There were 0 p-values less than .05 in the NPH tests with a global p-valiue of 1.000

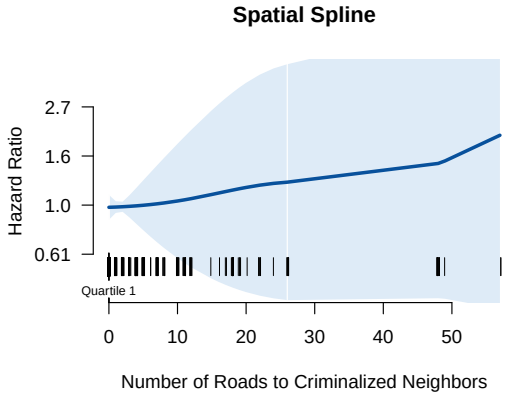


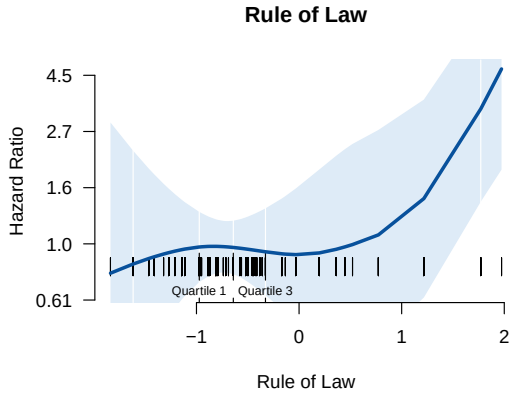


5.4.4 Model 4: Internal

	Hazard Ratio	Lower 95% CI	Upper 95% CI	p-value
Sum of Roads	1.007	0.982	1.033	0.583
Sum of Roads Nonlinear				0.009
US Pressure	2.148	0.725	6.363	0.168
Rule of Law	1.890	1.468	2.433	0.000
Rule of Law Nonlinear				0.000
Ratification	1.149	0.634	2.083	0.647

Table 18: Table 4, Model 1.
803 complete cases (26 events). There were 0 p-values less than .05 in the NPH tests with a global p-valiue of 1.000



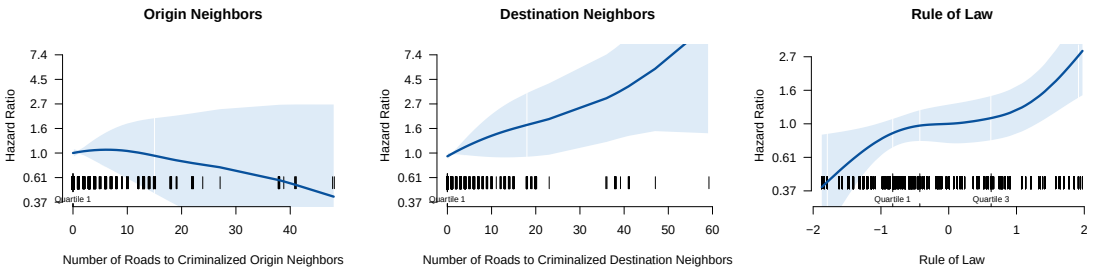


5.5 Figure 7: Externalities by Neighbor Exposure Category

These models are not included as a table in the original paper but do appear in Figure 7. The full model and results are below as well as a visualization with all non-linear variables.

	Hazard Ratio	Lower 95% CI	Upper 95% CI	p-value
Origin	0.977	0.952	1.003	0.081
Origin Nonlinear				0.007
Destination	1.033	1.007	1.059	0.011
Destination Nonlinear				0.003
Transit	0.999	0.949	1.051	0.964
Rule of Law	1.516	1.217	1.889	0.000
Rule of Law Nonlinear				0.001
US Pressure	2.444	1.396	4.279	0.002
Ratification	1.639	1.197	2.244	0.002

Table 19: Results Table for Figure 7
2196 complete cases (79 events). There were 0 p-values less than .05 in the NPH tests with a global p-valiue of 1.000



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