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A Cross-National Study of Government Social Insurance as an Alternative to Tort Liability Compensation

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Abstract

Litigation rates in the United States have long been considered out of proportion with the remainder of the world, leading to a good deal of economic research trying to understand the causes. Much of that literature has focused on lawyer compensation rules and availability of general damage awards. Another possible reason for differences in national litigation rates is the relative generosity of government social programs. Using a sample of 24 countries over a 12-year period, we test the relationship between the size of government social program payments and liability costs as measured by liability insurance premiums, and find a strong negative relationship, controlling for income, accident rates, and a variety of other factors.

Introduction

As Browne and Schmit (2008) state in their recent article, "Indisputably, U.S. society is viewed throughout the world as excessively litigious." This perception is consistently supported by the periodic Tillinghast Towers–Perrin reports showing that U.S. liability expenditures per capita are much higher than anywhere else (Towers, 2006 and prior years). In fact, Reimann (2003) points out that liability costs in the United States are so much higher than elsewhere that commentators often refer to two global liability systems: the United States and "the rest of the world." The United States is also perceived to be different among industrialized countries in the extent to which social programs are provided, contributing much lower rates of coverage than elsewhere (see Docteur, 2003). Marrying these two concepts, Presser (2002) argues that the European liability system is more stable than the United States, despite increasing use of strict liability in Europe. He suggests that in Europe there is a greater disincentive to sue because "there are no damages, or only minimal damages" due to the availability of national health insurance and government-sponsored plans that protect against

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lost earnings.[1] Galanter (1996) also suggests that the United States' "greater reliance on tort reflects not greater generosity to victims, but less reliance on administrative controls and social insurance." Our purpose here is to test that proposition. Specifically, we test whether or not expenditures on government social programs and legal tort systems are negatively related to one another.

The importance of this question can be observed in two directions. One is the seemingly growing public support for universal health insurance in the United States, which, depending on the political and social mind-set of the U.S. populace, could significantly increase the government's role in financing health care in the future. The other is the diminishment of benefits from government programs throughout much of the European Union (see Staltman, 2002). Greater understanding of the interplay between a social insurance system and the legal liability system in a given country should aid in finding an effective balance between the two. Furthermore, considering only the U.S. liability and social insurance systems, greater understanding of the interaction between them will offer additional ideas of how to address concerns in either.

To test our hypothesis that liability systems and social insurance programs are negatively related, we collect data from 24 countries on both the level of liability costs as measured by insurance premiums (a technique consistent with the Tillinghast reports) and government payments for social programs. Our results indicate that higher levels of government social programs are negatively related to liability costs. This suggests that with any modification to one of these systems, the other is likely to experience a change in the opposite direction. As U.S. policymakers search for ways to reduce liability costs, while many other nations begin the process of reducing government social programs, this result becomes quite important and worth continued investigation.

As introduction, we provide in the next section some background on government social programs and legal systems. We present our empirical model in the third section, methodology and data in the fourth section, followed by results in the fifth section, and conclusions and consideration of future research in the sixth section.

BACKGROUND

Government Social Programs

Around the globe, most governments provide some elements of public support for health and welfare. The extent of such support runs from minimal programs for specified groups to extensive coverage of the entire populace. While overall national economic strength often is a factor in the extent of such programs, it is not the sole factor. The underlying economic philosophy plays a major role in determining government provision of health and welfare programs.

An extensive literature exists on the characteristics, costs, and successes of various government health and welfare programs. We will review this literature to the extent that it provides some background on variations and factors that is relevant to this

[1] Presser (2002) also suggests that general damages in Europe are nonexistent or certainly less than in the United States given limitations imposed by "law or tradition" in European countries.

study of the relationship between government programs and the use of legal liability for compensation of similar types of harms.

We rely heavily on cross-national studies published by the Organisation for Economic Co-Operation and Development (OECD) and the Social Security Administration (SSA) for our discussion (see Adema and Ladaique, 2005; SSA, 2004).Both sources report wide variation across nations in per capita expenditure as well as expenditure related to gross domestic product (GDP) on health and welfare programs. Both also indicate significant variation in the availability and use of private sources of similar protections.

As conveyed by the SSA in their various reports (e.g., SSA, 2004), three general approaches to government programs for health and welfare programs exist. These are: employment-related, universal, and means tested. Employment-related, as the name implies, require connection to the workforce for eligibility, and often base benefits on work-related characteristics such as length of employment and amount of earnings. Financing typically is made through worker and/or employer contributions. Many retirement programs follow this type of arrangement. Health programs in many countries follow something similar, with other means-tested options available to unemployed individuals. In contrast, universal programs have no work-related eligibility criteria, providing flat-rate benefits to all residents or citizens. General tax revenues tend to be the source of financing for universal programs. Health care in the United Kingdom could be categorized in this way. Last, means-tested programs are those available only to individuals whose resources fall below some predefined level. These benefits are also financed primarily through general tax revenues. Medicaid in the United States would be an example of such a program.

Regardless the form of program, however, the benefit levels themselves vary greatly across nations. In our data of OECD countries, the most recent value of government expenditure for social programs per capita ran from a low of $552 in South Korea to a high of $9,319 in Luxembourg. As a percentage of GDP, the range for our sample for all social programs runs from 2.84 percent (South Korea in 1991) to 36.74 percent (Sweden in 1993).

Pensions and health care are the two dominant government expenditures for health and welfare, and of these, the health care costs are most likely to be duplicated by a tort system. Some relative information about health care programs across nations, therefore, is worthwhile. As reported in Docteur (2003), all OECD countries except the United States, Mexico, and Turkey have "universal or near universal coverage" for health insurance, through social insurance, national health service, or private health insurance. Docteur cites the mandatory/compulsory nature of the coverage as the key element to universality. She also says that coverage is necessary but not always sufficient to ensure access to health care due to both remaining financial barriers, such as cost sharing and incomplete coverage, and nonfinancial barriers, such as supply shortages or the inefficient distribution of health care services.

The OECD has identified a variety of concerns with health care, including barriers to access, such as shortages in health care facilities, lack of timely availability of services, and of course cost of health care. Docteur reports that as a percentage of GDP, OECD countries spent in 2001 on average 8.3 percent (13.1 percent in the United States) on

health expenditures. The public share of total spending on health was 72.2 percent for OECD countries in 2001 (44.2 percent for the United States, one of only three countries below 50 percent; Mexico and Korea being the others). The per capita spending on health in 2001 was $1,513 for all OECD countries ($2,168 for the United States; only Norway, Luxembourg, and Iceland were higher). Most of the growth in relative expenditures on health came during the 1970s with 6.2 percent average real annual growth, followed by 3.1 percent and 3.3 percent during the two succeeding decades. One of the policy initiatives intended to reduce costs, which is being considered or has been implemented in many OECD countries is cost shifting from the public to the private sector, with government benefits reduced and expectations of enlarged private benefits making up some of the difference. As this occurs, we could observe increasing pressure on liability systems to fill in gaps left by other sources of compensation.

In addition to overall trends, an understanding of national factors that affect relative expenditures is important to our study and that of many others. The existing literature can assist. In particular, Dao's (1995) results indicate that per capita income and population density are significantly related to variations in levels of government expenditure on defense, housing, social security and welfare, education, and health across nations. However, the level of urbanization appears to influence only government spending on social security and welfare. Population density is important with respect to the government spending of democratic nations on housing, social security, and welfare. It is also related to lower expenditures on national defense spending for small, less developed countries.

As part of a broader study on determinants of productivity, Rivera and Currais (1999) use several important factors influencing health expenditures across countries. Their model of health expenditures includes the percentage of a country's population over 65 years old, the number of physician contacts per person, the number of inpatient beds per 1,000 of population, and the per capita alcohol consumption of individuals older than 15 years. These factors are consistent with what an OECD study of public health expenditures in Belgium (OECD, 2005) identifies as general reasons for increasing public health spending, including excessive consumption of health services and prescription drugs, technological progress, and population aging.

National Tort Systems

Legal systems generally fall into one of two categories: civil law or common law. Typically the distinction is described as a difference in how the law is made. Civil law is formed through codification of rules by legislators and interpreted by judges. Individuals who become judges in civil law jurisdictions typically receive specific training for the judiciary rather than rising from the ranks of the legal profession. Common law, in contrast, is developed through case precedent and judicial interpretation of whatever legislative rules apply. In common law jurisdictions, judges tend to come from the legal profession without specific training as judges.

This description of the two categories of law, however, misses important nuances that differentiate systems within each category. For instance, while the French Civil Code is applied with near purity in citing only legislative code when judicial decisions are made, the German Civil Code uses both existing legislative rules as well as prior court precedent. In Scandinavia, the similarity of civil law to common law is even

more pronounced. The Scandinavian civil law did not arise out of a concerted effort to codify the law as occurred in both France and Germany but rather developed in an unsystematic manner, with reference both to legislation and court precedent.

On a continuum, therefore, we would expect a common law system to adjust most rapidly to changing underlying social and economic systems; next in order are the Scandinavian, German, and French systems. La Porta et al. (1998) found results in economic development consistent with this hypothesis. We anticipate similar results in the tort liability area.

Two recent reports provide specifics on differences in tort systems across national boundaries. They are by the International Academy of Comparative Law (Reimann, 2003) and the European Group on Tort Law (Wagner, 2005). Both present results of country surveys regarding various aspects of tort systems. The Academy of Comparative Law considered only product liability law; the European Group considered tort law generally. The Academy compared results with the United States directly, while the European Group did so only through implication. They both considered the influence of first party and/or government health and welfare programs. Both emphatically conclude that while important differences exist even among civil law countries in Western Europe, those differences pale in comparison with the divergence between the U.S. experience and the rest of the world.

Interestingly, survey respondents for both reports generally dismiss the importance of insurance in the development of litigation. Many of the nations surveyed by the European Group indicate that liability payments are coordinated with government benefits (typically the government has subrogation rights). Yet both reports indicate that the availability of coverage, either first-party such as government payments or third-party liability coverage, does not affect a judge's ruling on liability itself. Yet the authors of the Academy report are quite forceful in stating that when other benefits are available, the incentive to litigate is far less. Furthermore, the authors of these reports present evidence that liability insurers outside the United States pay damages more willingly. Although those damages may be for lower amounts, the quick payment is likely to affect litigation rates in that such claims are unlikely to turn up as official legal suits.

Data to compare variations in litigation rates and costs directly are incredibly difficult to obtain.[2] What is generally agreed by authors of both reports and their survey respondents is that a large divide exists between the United States and the "rest of the world."[3] Both the Academy and the European Group offer some thoughts about reasons for the disparity. The Academy highlights differences in first-party insurance, including government benefits. Coupled with low awards for noneconomic damages,

[2] Tillinghast reported estimated tort costs in 12 countries in 1991. They did not detail their estimation process, nor replicate it for time series analysis. Cross (1998) used these data for a simple regression to test the effect of tort costs on the economy and found no association, unsurprising for a sample size of 12 observations.

[3] The Academy notes that significant differences exist across all nations in both their legal traditions and in the applications of those traditions. Nonetheless, the writers are also very clear that when comparing these variations with that between the United States and all other nations (they refer to the "rest of the world"), the differences are relatively small.

as mentioned above, the value of litigation is far more remote in most other countries than in the United States.

The Academy further notes the importance of: media attention, powerful political groups on each side of the issue, and a greater awareness of potentially litigated situations in the United States than elsewhere. The civil code versus common law difference is also discussed, and likely plays a role, but importantly, both reports also highlight the great variation found across civil codes and also across common law systems. The institutions themselves, rather than the rules, seem to be the dominant forces.

In general, both the Academy and European Group reports express little concern that reductions in government social programs will result in significantly increased litigation. Focusing on U.S. data, however, Yates, Davis, and Glick (2001) (YDG) find evidence that litigation rates do indeed decrease as social welfare payments increase. The authors use the maximum state Aid to Families with Dependent Children (AFDC) payment as a proxy for state social welfare generosity. Litigation rate is defined as the number of tort lawsuits filed per 100,000 residents. When regressing litigation rate on state social welfare generosity, their results show that reducing welfare benefits may "have the unintended consequence of increasing the amount of tort litigation in state courts." YDG is a good initial study of how social policy influences the tort liability system and their results generally support the contention we intend to test here. However, the approach in this article will differ from YDG in several important ways.

One difference between this study and YDG is the social program variable used. YDG uses AFDC benefits as a proxy for a given state's social safety net. AFDC payments are cash welfare payments delinked from health care expenditures and therefore such payments probably do not as closely reflect a government alternative to the tort liability compensation scheme as does our measure of government health expenditures. YDG focuses on litigation rates, limiting their study to only those cases formally litigated. Our study focuses on liability insurance premiums that will include both litigation and liability claims for which a lawsuit may never have been filed, both of which contribute to overall tort costs. YDG's emphasis is on litigation rates whereas our study looks at the costs of liability systems, which ties in more directly with the popular concept of a relative "tort tax" as reported in the Tillinghast Towers-Perrin studies. In referring to the relatively high costs associated with the U.S. legal system, most comparisons are drawn among other developed countries. Our study tests the relationship between social insurance programs and liability costs on the same international basis and therefore our results are consistent with those discussions.

THE EMPIRICAL MODEL

We use an insurance demand approach to test our hypothesis that payments through government social programs are negatively related to liability costs. Mayers and Smith (1983) consider insurance demand within the context of a portfolio of assets, proposing that demand for an insurance contract will be influenced by the correlation of its payoff with the payoffs of other insurance contracts and nonmarketable assets within the portfolio. In the research reported here, government programs are not a

choice variable for individuals, but rather they are compulsory. The complementary asset to government payment is the liability insurance demanded by someone other than the portfolio owner. Demand is therefore not as important a question as is utilization. We extend Mayers and Smith by suggesting that correlations between these portfolio asset payoffs also influence their relative levels of use by the portfolio owner. In other words, as government payments rise, injured parties will see less value in undertaking the costly process of litigation.[4] As liability losses decline, the costs and demand for liability insurance also decline. We model the relationship as follows:

$$\text{Insurance demand} = f(\text{loss}, \text{risk attitude}, \text{regulation}).$$

Our dependent variable is a proxy for the liability system as represented by liability insurance premiums. We measure liability insurance premiums both for automobile liability coverage and general liability coverage. Automobile insurance in the United States represents half of all property-liability premiums paid (Insurance Information Institute, 2006). Outside of the United States where other forms of litigation such as medical malpractice and product liability are much less common, automobile liability is an even larger portion of the market. Much of the debate about the effects of liability systems on U.S. economic competitiveness, however, focuses on business-oriented liabilities, particularly those covered by general liability insurance. As a result, we conduct the analysis using two measures for liability insurance costs. In the first, we use only automobile insurance premiums and in the second we use the combined total of automobile plus general liability insurance premiums. The second analysis is a somewhat smaller sample set due to greater difficulty in obtaining data. Furthermore, we undertake the analysis using two different means of standardization. In one we standardize by each country's GDP. In the other we standardize by population. An advantage of using GDP is the elimination of significant collinearity as described below. Both analyses, however, are similar in results with regard to the variables of interest. We focus on the GDP-standardized results here.

Our measure of interest is the size of government social insurance payments, which reflects the extent to which alternative sources of compensation for loss are available. We consider government health payments to be most closely aligned with compensation available under liability systems and therefore use *government expenditure on health care* to represent compensation for health care needs. We run the analysis with a second measure of government payments that equals the total value of *government expenditure on social programs* as defined by the OECD. Similar to the liability insurance premiums, we standardize government expenditures by GDP (and by population in a separate analysis).

Insurance demand is driven by loss values, risk attitudes, and regulatory influences. We include measures associated with each of these. The underlying losses that should be paid by either government programs or liability insurance are represented by *accidents*, measured as the number of automobile accidents involving injuries per 1,000

[4] Cummins and Tennyson (1996) found that other sources of recovery decreased third-party auto bodily injury liability claim filings. Biddle and Roberts (2003) also found that other sources of recovery decreased the propensity to file workers' compensation claims.

people. We do not have comparable figures for general liability-related accidents. Our assumption, however, is that auto accident rates reflect general levels of safety and overall social norms regarding safety. We also include a measure of the *number of autos owned per capita* to reflect the opportunity for loss. A positive relationship between each of these variables and liability premiums is expected.

In addition to the opportunities for liability losses to be manifested through accident rates and auto ownership, the form of legal system as either *civil* or *common law* also is relevant in determining liability loss potential and loss severity. As discussed in Schmit (2006), civil law would be considered less favorable to plaintiffs in litigation than is common law. Browne, Chung, and Frees (2000) find a positive relationship between common law systems and both motor vehicle and general liability insurance demand.[5] This variable is invariant over time.

Other important factors related to ease of, and therefore potential for, litigation include the costs of time and effort in litigation as well as the availability of legal services. *Urbanization* has been used as a representation of "costs" in personal dimensions to litigation (Danzon, 1986). The theory is that a greater level of urbanization yields more social or "personal" distance among members of the community. With greater distance, people involved in a dispute are less likely to know one another or feel connected to the same community. Suing a friend is considered far more costly than suing a stranger. In addition to a measurement of personal distance, urbanization sometimes is interpreted as availability of legal services, with greater urbanization indicating easier access to legal services, which would make litigation less costly and therefore more likely. A positive relationship between litigation rates and urbanization has been observed in a number of settings, supporting the hypothesis (Browne and Puelz, 1996; Cummins and Tennyson, 1996; Schmit and Yeh, 2003). Using data provided by the World Bank, the percentage of a nation's population that lives in urban areas is used to reflect the level of urbanization.

Thus far, our model discussion has focused on loss values that represent the bulk of costs covered by insurance premiums. Demand, and therefore the size of the insurance market, however, is also affected by risk attitudes. Theoretically and empirically, existing literature demonstrates that gender, education, and income levels can be used as proxies for risk attitudes (Halek and Eisenhauer, 2001; Doerpinghaus, Schmit, and Yeh, 2003; Dohmen et al., 2005). To account for these variations, we incorporate

[5] Further, some literature has delineated legal systems in more refined ways, differentiating across those founded on principles first established in France, Germany, and Scandinavia. La Porta et al. (1998) identified stronger national business development in countries where the more fluid (common law being the most fluid, then Scandinavia, Germany, and France) legal systems are found. We anticipate a similar finding with the common law legal system likely most supportive of plaintiffs, followed by Scandinavian, German, and French. We test this proposition and also include a designation for socialist systems, which did not arise out of one of the other four. The results for the government social program variables are generally consistent with the results reported here. Results for the legal variables, however, appear to pick up country-specific effects rather than legal system effects, given the small number of countries included in any of the four designations. We therefore only report general civil/common law results. Future research with a larger set of country observations should test for the effects of refining the legal system variable.

several variables. Regarding the effect of gender, we include the percentage of the population that is *female*. We anticipate a higher level of insurance in a market with more women. As a measure of education, we include the percentage of the school enrollment in *tertiary education*. The relationship between education and the demand for insurance is inconclusive. Several studies have found evidence that education is positively related to insurance consumption (see, e.g., Browne and Kim, 1993; Li et al., 2007) while others find the relationship to be insignificant (e.g., Browne et al., 2000). Szpiro and Outreville (1998) argue that highly educated people are less risk averse and more willing to take risks, implying that higher education leads to lower demand for insurance. Given the conflicting arguments, the expected relationship between education level and insurance demand is ambiguous.

Because we are using national rather than individual measures in this study, income poses interesting issues in that the overall national measures may be high while significant portions of the populace are financially vulnerable. Saudi Arabia is an example. Thus, ideal measures would consider income distribution across the population, such as the Gini coefficient. Such measures, however, are not generally available on a consistent basis across nations for a large sample of years. As an alternative, we include the percentage of the population that is *unemployed*. As a measure of income, or lack of it, we anticipate a negative relationship between the percentage unemployed and insurance demand. An alternative theory, however, raised by Cummins and Tennyson (1996) is that claims filing costs should be lower for those whose value of time is lower. This suggests that lower wealth or income that accompanies increasing unemployment may increase insurance claims activity and therefore insurance premiums. The overall relationship between insurance demand and unemployment rates, therefore, is ambiguous.

The number of cars per capita, used above as a measure of loss potential, is also available to use as an income measure, with a higher value representing higher overall income. We anticipate a positive relationship between the number of cars per capita and insurance demand.

Furthermore, we standardize the premium and government payment variables by overall national income (GDP), which ought to account for income effects. For the analyses using the size of the population as our standardization measure, we also include *GDP per capita* as an independent variable and anticipate a positive relationship with insurance demand. When GDP per capita is included in the analysis, however, serious collinearity occurs among the independent variables.

Insurance demand will be affected by insurance regulation as well. We would like to include a measure of compulsory insurance levels. These tend to be higher in European Union nations than in the United States. Consistent data across nations, however, are not available. Nonetheless, we are able to incorporate a pricing regulatory variable. We include a measure of whether a country's auto insurance market closely resembles a *tariff* market where a tariff market is defined as one where the government, such as insurance regulators, establishes insurance rates, or acceptable ranges for insurance rates, and insurance companies must adhere to those standards. The relationship between insurance demand and tariff is ambiguous, *a priori*. Prior

literature (Harrington, 1987, and others) has observed mixed results, which appear dependent on market reactions to price regulation.

METHODOLOGY AND DATA

The research reported here involves analysis of the relationship between the size of government programs and the size of tort liability. Our model follows that presented above, with liability costs as a function of losses, risk attitude, and regulation. We also include year dummy variables to account for any changes over time.[6] More specifically, the general form of the model can be written as follows:

$$\begin{aligned} auto\&GLprem_{i,j} = {} & \alpha + \beta_1\, govhealth_{i,j} + \beta_2\, accidents_{i,j} + \beta_3\, carsowned_{i,j} \\ & + \beta_4\, civil_i + \beta_5\, urbanization_{i,j} + \beta_6 female_{i,j} + \beta_7\, education_{i,j} \\ & + \beta_8\, unemployed_{i,j} + \beta_9\, tariff_{i,j} + \sum_{m=10}^{20} \beta_m\, year_j + \varepsilon_{i,j}, \end{aligned} \tag{1}$$

where the subscripts on the variables identify the ith country in the jth year and

$auto\&GLprem_{i,j}$ = automobile and general liability insurance premiums as a percentage of GDP;[7]

$govhealth_{i,j}$ = government expenditure on health care as a percentage of GDP;[8]

$accidents_{i,j}$ = number of accidents per 1,000 population;

$carsowned_{i,j}$ = number of cars owned per 1,000 population;

$civil_i$ = 1 if civil law, 0 otherwise;

$urbanization_{i,j}$ = percentage of population living in urban areas;

$female_{i,j}$ = percentage of population that is female;

$education_{i,j}$ = percentage of population with a tertiary education;

$unemployed_{i,j}$ = percentage of population that is unemployed;

$tariff_{i,j}$ = 1 if tariff on insurance premium rate, 0 otherwise;

$year_j$ = dummy variables for the years 1990–2001; and

$\varepsilon_{i,j}$ = random error term.

Natural logs are taken of all continuous variables in Equation (1).

[6] We also estimate alternative models that include country-specific intercepts. The main conclusions drawn from these models are the same as the ones reported here.

[7] As mentioned earlier, we also estimated models using automobile liability insurance premiums as the dependent variables (*autoprem*).

[8] We also estimated alternative models that use government expenditure on all social programs as our key independent variable (*govtotal*).

Our hypothesis is that the greater the level of government health spending (and total government social programs spending), the lower the need to expend resources in litigating against third parties. A methodological issue we encounter is that government health spending is likely to be correlated with the random error term of liability insurance premiums. To address the potential estimation bias created by this endogenous relationship, the variables *govhealth* (and *govtotal*) are treated as endogenous variables in Equation (1). Variables used to identify the equations for *govhealth* (and *govtotal*) include population density, inflation, the percentage of the population older than 65 (see Dao, 1995; Rivera and Currais, 1999), and all exogenous variables from Equation (1).[9]

Given the cross-sectional and time series data we have, we estimate the two-step general method of moments (GMM) models using robust panel standard errors and cluster adjustment. The two-step GMM estimators use weighting matrices that remain consistent estimates of the covariance of the moments under heteroskedasticity and autocorrelation. It is more efficient than the two-staged least square (2SLS) estimators.[10] As in many economic models, insurance premiums from year to year may be highly correlated and thus lagged insurance premium is a logical explanatory variable. When a lagged dependent variable is included in the model, static panel data methodologies are biased and inconsistent. Arellano and Bond (1991) and Arellano and Bover (1995) developed dynamic panel data GMM estimators, known as the first-differenced GMM estimators, that produce consistent and unbiased coefficient estimates when lagged dependent variables are present. Blundell and Bond (1998) further developed the GMM system estimators that improve upon the potential problem of weak instrument found in Arellano and Bond (1991) and Arellano and Bover (1995). In this article we also estimate dynamic panel data models using the GMM system estimators as a robustness check.

Our data cover 24 countries over the time period 1990–2001.[11] The number of observations for each country varies from 3 to 12, depending on data availability. We obtained data from a variety of sources, including Swiss Re, AXCO, OECD, the World Bank, the U.S. Central Intelligence Agency (CIA), as well as individual countries' insurance association or regulatory bodies. The data most difficult to obtain were the insurance premiums. For Canada and the United Kingdom, we were forced to calculate estimates of automobile liability premiums because available data sources provided only total auto premiums. To calculate the liability portion for Canada and the United Kingdom, we used an estimated percentage of the total auto premium as provided by officials managing the no-fault systems in several Canadian provinces and underwriters from USAA Limited, the USAA company responsible for auto business in the United Kingdom. Our general results do not vary when we include or exclude

[9] Using all exogenous variables in the estimation ensures that important correlations affecting the instrumented values for the endogenous variable are accounted for and therefore biases in the coefficient estimates are reduced.

[10] We also ran the regressions with OLS and the results are substantively the same.

[11] Countries included in our analysis are Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Italy, Japan, South Korea, Poland, Portugal, Slovak Republic, Spain, Sweden, Switzerland, Turkey, United Kingdom, and United States.

TABLE 1
Variable Definitions, Expected Relationships to Tort System Costs, and Data Sources

Variable	Definition	Expected Sign	Data Source
auto&GLprem	Auto liability + general liability insurance premiums written as a percentage of GDP		Swiss Re & AXCO
autoprem	Auto liability insurance premiums written as a percentage of GDP		Swiss Re & AXCO
govhealth	Government expenditure on health care per capita as a percentage of GDP	−	OECD
govtotal	Government expenditure on social programs as a percentage of GDP	−	OECD
accidents	Number of auto accidents involving injuries per 1,000 people	+	OECD
carsowned	Number of private passenger automobiles per 1,000 people	+	World Bank
civil	1 if civil law, 0 otherwise	−	CIA
urbanization	Percentage of urban population	+	World Bank
female	% of the total population that is female	+	World Bank
education	Percentage of school enrollment in tertiary education	?	World Bank
unemployed	% of the total labor force that is unemployed	?	World Bank
tariff	1 if tariff market, 0 otherwise	?	Individual countries' regulatory bodies

Canada and the United Kingdom from the analysis. Variables considered for each country, along with their definitions, sources, and expected relational direction to tort liability costs are given in Table 1. Descriptive statistics for each variable are shown in Table 2.

EMPIRICAL RESULTS

Our model results are reported in Tables 3 and 4. Results from the GMM models with cluster adjustments are reported in Table 3 and the models with Blundell–Bond GMM system estimators are reported in Table 4. There are four models in each table. Our dependent variable for the first two models is the total of automobile plus general liability insurance premiums per GDP (*auto&GLprem*); for the second two models the dependent variable is the automobile liability insurance premiums per GDP (*autoprem*). In models 1 and 3, the independent variable of interest is the total value of government health expense per GDP (*govhealth*). The independent variable of interest in models 2 and 4 is the total value of all government social programs payments (*govtotal*). The main results from the different model estimations are generally consistent with each other.

Table 3 shows the GMM model results with cluster adjustment. We calculate robust estimator of the variance-covariance matrix of the parameter estimates to ensure the

Table 2
Variable Basic Statistics

Variable	Mean	Standard Deviation	Minimum	Maximum
auto&GLprem (% of GDP)	0.734	0.349	0.048	1.582
autoprem (% of GDP)	0.552	0.281	0.042	1.257
govhealth (% of GDP)	5.772	1.413	1.444	8.355
govtotal (% of GDP)	22.043	7.033	2.839	36.737
accidents	3.495	1.979	0.000	8.910
carsowned	373.894	123.668	33.560	576.000
civil	0.833	0.373	0.000	1.000
urbanization	73.659	12.012	50.410	97.140
female	50.883	0.643	49.286	52.264
education	49.664	17.748	13.132	97.350
unemployed	7.638	3.674	0.500	18.800
tariff	0.201	0.401	0.000	1.000

standard errors are consistent with panel-specific autocorrelation and heteroskedasticity. Our primary variable of interest is government expenditure on health (*govhealth*) or total government expenditure on social programs (*govtotal*). In all four models the coefficient of this variable is statistically significant and negative, suggesting that higher government social expenditures are associated with lower private liability costs. These findings support the hypothesis that higher tort liability costs are associated with lower government expenditures on social programs. Importantly, we also find this negative relationship when conducting the analysis under a variety of alternative forms not specifically reported here.[12] These forms include using an OLS analysis rather than two-step GMM approach, and also when we exclude the United States from the analysis in case it is overly influential in the results. This consistency gives us confidence in the results.

For the other independent variables, the number of cars is found to be positively related to insurance premiums in all models, as anticipated. The coefficient for the number of accidents is positive and statistically significant at 1 percent level in model 1. The rate regulation variable was found to be positively significant in model 2 where the dependent variable includes both automobile and general liability premiums. This result provides support to previous findings that regulatory involvement in rate regulation may result in relatively higher insurance costs. The other variables generally show the expected sign, but tend not to be statistically significant. National variations may be too complex to generate such significance.

Table 4 shows the Blundell–Bond GMM system estimators with lagged premiums included as a regressor. The Hansen *J* test does not reject the null hypothesis that the instruments are exogenous, which supports our choice of instruments.[13] A key

[12] Results of these analyses are available upon request from the authors.
[13] Given our small sample size, Hansen *J* test replaces Sargan test of overidentification restrictions.

TABLE 3
Two-Step GMM Regression Estimators With Cluster Adjustment

	Dependent Variable = *auto&GLprem*		Dependent Variable = *autoprem*	
	Model 1	Model 2	Model 3	Model 4
Intercept	−30.219	−47.519	−50.809	−56.587
	(23.524)	(30.243)	(34.556)	(42.493)
govhealth	−1.170***	–	−1.483**	–
	(0.446)		(0.765)	
govtotal	–	−0.700***	–	−0.853***
		(0.225)		(0.334)
accidents	0.101***	0.058	0.079	0.038
	(0.037)	(0.044)	(0.055)	(0.063)
carsowned	1.221***	1.214***	1.249***	1.231***
	(0.250)	(0.198)	(0.387)	(0.260)
civil	−0.261	−0.105	−0.182	0.074
	(0.193)	(0.135)	(0.301)	(0.242)
urbanization	0.002	−0.170	−0.413	−0.726
	(0.416)	(0.470)	(0.571)	(0.644)
female	6.614	10.949	12.223	13.738
	(5.756)	(7.368)	(8.421)	(10.295)
education	−0.309	−0.086	−0.234	0.018
	(0.199)	(0.154)	(0.305)	(0.227)
unemployed	0.025	0.067	0.094	0.104
	(0.095)	(0.116)	(0.116)	(0.134)
tariff	−0.037	0.227**	−0.178	0.079
	(0.109)	(0.115)	(0.198)	(0.153)
R^2	0.80	0.81	0.82	0.82

Notes: Year dummy variables are not reported here. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. Values in parentheses represent robust standard errors.

assumption for the system GMM is that there is no second-order serial correlation in the first-differenced residuals (Arellano and Bond, 1991). In all cases, the null hypotheses of no second-order autocorrelation in the differenced residuals are not rejected, which indicates that our model estimates are consistent. The coefficients of the lagged premiums are positive and statistically significant at 1 percent in all models, which suggests that the current year's premiums are positively related to past premiums. Our key variable of interest, government expenditure on social programs, is negatively significant in all four models, regardless of different ways of measuring insurance premiums and government programs. The findings are consistent with the model results without the lagged dependent variable. Again, we take the continued significance of the relationship between government programs and liability insurance premiums as evidence that our results are robust. While several other control variables remain insignificant, it is interesting to note that the education and unemployment variables are statistically significant in GMM system estimation. Our results show that those highly educated purchase less insurance, which supports Szpiro and Outreville's (1998) argument that people with higher education are more willing to

Table 4
Blundell–Bond Dynamic Panel GMM System Estimators

	Dependent Variable = *auto&GLprem*		Dependent Variable = *autoprem*	
	Model 1	Model 2	Model 3	Model 4
Intercept	4.454	0.612	5.661**	2.781
	(2.970)	(3.788)	(2.774)	(3.306)
Lagged *prem*	0.928***	0.908***	0.968***	0.957***
	(0.050)	(0.071)	(0.033)	(0.043)
govhealth	−0.150**	–	−0.159**	–
	(0.065)		(0.066)	
govtotal	–	−0.119**	–	−0.100**
		(0.049)		(0.048)
accidents	0.011	0.007	0.005	0.002
	(0.009)	(0.010)	(0.008)	(0.009)
carsowned	0.095	0.120	0.065	0.062
	(0.065)	(0.089)	(0.058)	(0.070)
civil	−0.032	−0.014	−0.020	−0.001
	(0.030)	(0.021)	(0.022)	(0.014)
urbanization	0.000	−0.005	−0.003	−0.016
	(0.053)	(0.050)	(0.053)	(0.060)
female	−1.127	−0.191	−1.385**	−0.665
	(0.712)	(0.910)	(0.670)	(0.802)
education	−0.080**	−0.063**	−0.078**	−0.056*
	(0.038)	(0.030)	(0.040)	(0.032)
unemployed	0.029*	0.049**	0.029*	0.044**
	(0.016)	(0.026)	(0.016)	(0.023)
tariff	−0.011	0.025	−0.036	−0.002
	(0.030)	(0.030)	(0.026)	(0.024)
Hansen test (χ^2)	2.01	1.52	0.87	5.57
AR(2) test	0.53	0.57	−0.16	−0.10

Notes: Year dummy variables are not reported here. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. Values in parentheses represent robust standard errors. *Z*-values are reported for the AR(2) test.

take risk. The unemployment variable is positively significant at least at the 10 percent level in all models. This finding is consistent with Cummins and Tennyson's (1996) findings that those with lower incomes are more inclined to file insurance claims due to lower claims filing transactions costs.

Summary and Implications for Future Research

The United States is known throughout the world as a litigious nation. Costs of doing business in the United States are considered much higher as a result, providing disincentives for global companies to include the United States in their market. The United States is also known, however, as less generous in its government social programs than other industrialized nations. Given the fact that most costs involved in litigation are also provided through government programs such as national health insurance or health care in most developed nations other than the United States, a

natural question arises as to whether or not the lack of government social programs is related to the costs of litigation in the United States. Our purpose here is to offer input to answering this question. The answer is particularly important at a time when the United States appears to be moving more toward some form of "universal" health care while other industrialized nations are moving further away from it. Proposals throughout much of the European Union recommend less government involvement in health care. This could have implications for their tort systems.

Using data from 24 countries over a 12-year period, we find a strong negative relationship between the government social program spending and the size of liability costs as measured by insurance premiums. These results hold when considering numerous variations on the underlying model, including a simple OLS analysis rather than two-step GMM estimators, incorporating a lagged dependent variable using dynamic panel data GMM system modeling, excluding the United States from the analysis and defining liability costs more or less expansively.

Because of data limitations, these results are suggestive but not conclusive of the hypothesis that generous social programs have influenced the development of litigation as a means to compensate injured parties. Future research is needed in which more detailed data on the extent of claiming, actual decisions made by injured parties to seek compensation, the degree of compensation received, and the influence of noneconomic damages are available. We encourage insurers to make their claims data more readily available in a format that will lend greater ability to test this theory explicitly.

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