The Contract Intensity of National Economies (CINE) data are aggregated annually for 187 countries from 1816 to 2010.

### Variable Summaries

<table>
<thead>
<tr>
<th>Full Name</th>
<th>Abbrev.</th>
<th>Name</th>
<th>Brief Description</th>
<th>Coverage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Country Name</td>
<td>cname</td>
<td>Country name.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year</td>
<td>year</td>
<td>Year.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Country Code</td>
<td>ccode</td>
<td>Correlates of War country code.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contractualist Economy</td>
<td>CIEb</td>
<td>Equals 1 if a nation-year has a contractualist economy and 0 if it has a clientelist economy. Equals missing if Transition equals 1 or -1.</td>
<td>1816 – 2010</td>
<td></td>
</tr>
<tr>
<td>Investment</td>
<td>invest</td>
<td>Investments in 2005 international $ / person, 8 year moving average (ma).</td>
<td>1950 – 2010</td>
<td></td>
</tr>
<tr>
<td>Informal Economy</td>
<td>informal</td>
<td>Ratio of all economic flows (formal and informal) to formal economic flows, 8 year ma.</td>
<td>1960 – 2010</td>
<td></td>
</tr>
<tr>
<td>Transition</td>
<td>trans</td>
<td>Nominal variable equals 1 if nation-year is in economic transition, -1 if nation-year is in a possible economic transition, and 0 otherwise. With possible transitions, the start year of the transition is unknown from the data.</td>
<td>1816 – 2010</td>
<td></td>
</tr>
<tr>
<td>Life Insurance</td>
<td>life</td>
<td>Life insurance premiums in force in 2005 international $ / person, 8 year ma.</td>
<td>1960 – 2010</td>
<td></td>
</tr>
</tbody>
</table>

**Citation**: Michael Mousseau (2017) "Contract Intensity of National Economies (CINE), version May-2017" (Date accessed), [http://politicalscience.cos.ucf.edu/people/mousseau-michael/](http://politicalscience.cos.ucf.edu/people/mousseau-michael/).

**Main changes from prior version Sept-2015:**

1. Drawing on migration data, the binary measures Contractualist Economy and Transition are now extended back to 1816 (the previous start year of the measure was 1950). While only one nation had a contractualist economy from 1816 to 1920 (the United States), the extension of the Transition variable to 1816 facilitates the treatment of missing data for
non-transition years as Contractualist Economy equals 0. This greatly extends the temporal and spatial domain of the binary measure Contractualist Economy.

2. Drawing on the COW NMC version 5 (Singer, Bremer, and Stuckey, 1972), the temporal domain is now extended to 2010 (the previous end year of the measure was 2007).

3. It was discovered that the prior identification of the United Arab Emirates (UAE) as a contractualist nation was probably in error, as it resulted almost entirely from linear interpolation of missing data from a single isolated data point. To reduce the risk of this kind of error, isolated data points are now set to missing before linear interpolation. As a result the UAE is now identified as in transition rather than having transitioned.1

4. The variable Contract Intensive Economy (CIE) is no longer estimated over the years 1950 to 1959. This increases the face validity of the measure, since the life insurance data are limited to 1960 to 2010.

5. Missing values in CIE are now estimated using only the variables Investment, Informal Economy, Contractualist Economy, and Transition. This removes the possibility of endogeneity in the estimate posed by the prior inclusion of regional dummy variables.

Variables

1. Life Insurance. Life insurance contracts directly gauge the causal mechanism of economic norms theory of widespread dependency on the state for the enforcement of non-self-enforcing contracts. Life insurance contracts are believed to be the most reliable gauge of non-self-enforcing contracts because they are the least likely of all kinds of contracts to rely on personal forms of trust, since the delivery of service is expected only after the death of the policy holder. Replication steps:

1.1. The variable Inslife obtained from Beck, Demirgüç-Kunt, and Webb (2010) indicates the ratio of life insurance premiums to GDP, with data for 100 nations.

1.1.1. The data for Luxemburg for the years 1997 to 2010 appear to have a decimal point misplaced and were corrected.

1.1.2. As discussed below, missing data is an indication of clientelist economy. To avoid drawing erroneous conclusions from isolated data points, those with continuous gaps of missing data five years or longer were set to missing. Effected data points were Oman (2009) and United Arab Emirates (2009).

1.1.3. 109 data points were linearly interpolated across gaps of five years or less.


1 Isolated data points identified as those with continuous gaps of missing data five years or more ahead and behind the data point. In the original data the United Arab Emirates (UAE) had only one data point above the threshold for contractualist economy (2009), with missing data from 1999 to 2008 and in 2010. Prior interpolation caused the nation to appear above the threshold from 2000 to 2009. This is probably in error, given that missing data indicates clientelist economy (see below).
1.2. The variable *Life Insurance* was calculated as the product of Inslife/100 and *RGDPL* obtained from Penn World Tables, version 7.1 (Heston, Summers and Aten 2012). *RGDPL* indicates real gross domestic product (GDP) at constant (2005) national prices converted to international dollars using purchasing power parity (PPP) rates. As explained by Beck and Webb (2003:54), premiums are best calculated in PPP:

“to account for the fact that the price of nontraded goods relative to traded goods increases with the income level of an economy. Because the death benefit of life insurance policies has to cover the typical household spending on both trade and nontraded goods, using exchange rates biases the insurance density of developing economies downward.”

1.2.1. N = 2,598, 1960 to 2010.

1.3. 40 data points for *Life Insurance* were extrapolated using the variable *Lifedeer* obtained from Beck and Webb (2003), which indicates life insurance premiums per capita calculated with PPP (Germany 1960-1969, Taiwan 1979-2000; Turkey 1979-86).

1.3.1. Nine data points of Lifedeer were first linearly interpolated.  
1.3.2. N = 2,638, 1960 to 2010.

1.4. To model national trends, the variable was transformed to the eight-year moving average.

2. **Investment.** As with life insurance contracts, investment contracts are reliably-dependent on third-party (state) enforcement, since they have strong inter-temporal dimensions.

2.1. The variables *ki* and *RGDPL* obtained from the Penn World Tables, version 7.1 (Heston, Summers and Aten 2012). *Ki* indicates percentage of GDP in private investment in 2005 international $ / person.

2.2. The variable *Investment* calculated as (Ki/100)*RGDPL.

2.3. To model national trends, the variable was transformed to the eight-year moving average.

2.4. N = 8,062, 1950 to 2010.

3. **Informal Economy.** GDP data proxy contractualist economy because they are primarily constructed from receipts of contracts collected by government agencies (Mousseau 2009:66; 2012:476), and economists often overlook non-contractual forms of exchange when they construct data (Polanyi 1957[1944]:45-46). In contrast, energy consumption data must indicate all economic flows in a nation. It follows that if the ratio of the residuals of energy consumption–predicted flows to GDP-predicted flows is greater than one, there are
flows in an economy that are not monitored by the state, or informal. While informal flows can be contractual, enforcement by impartial third-parties is costly and inefficient, so informal flows largely indicate non-contractual, or clientelist/personalist, exchange in an economy. Informal economy is constructed from data on GDP and energy consumption as follows:

3.1. Data on national energy consumption and population were obtained from the Correlates of War Index of National Material Capabilities dataset (Singer, Bremer and Stuckey 1972), and energy consumption per capita calculated.

3.2. To model national trends, both RGDPL and energy consumption were transformed to their eight-year moving averages.

3.3. RGDPL was regressed on energy consumption per capita, with the residuals divided by RGDPL. Values greater than 1 indicate the presence and intensity of clientelist economy.

3.4. N = 6,798, 1960 to 2010.²

4. **Contractualist Economy.** Life Insurance data are missing for roughly two-thirds of all nation-years from 1960 to 2010. These data-points are not missing at random because in economic norms theory missing data are an indication of clientelist economy. There are three reasons for this. First, pressed from below to produce economic growth, contractualist governments are more likely than clientelist ones to establish bureaucracies for the purpose of collecting and posting economic data. Second, the bureaucracies of contractualist governments are more capable than clientelist ones, given that these governments are also pressed from below to effectively enforce contracts. Third, clientelist governments not only lack the capability and willingness to collect and report economic data, they have the opposite incentive of hiding it, since their primary aim is to distribute state rents to supporters with partiality, and this is often done covertly (see Mousseau 2009, 2012).

Since the life insurance data are not missing at random, the two most common methods for handling missing data, multiple imputation and maximum likelihood, are not appropriate for estimating missing values (Yuan 2014). Instead, it makes more sense to use missing data-points as indicators of clientelist economy. However, non-missing data cannot indicate clientelist economy, as some clientelist nations report data. Therefore, in order to use the knowledge that missing data indicate contract-poor economy it is necessary to adopt some threshold in the life insurance data that distinguishes the contractualist nations from the clientelist ones. The steps in constructing the binary indicator for economic type are as follows:

² Coverage is from 1960 to 2010 to match the life insurance data, since this variable is largely used to estimate missing values in life insurance (below).
4.1. The selection of the cut-point in Life Insurance is guided by economic norms theory, which predicts that as a nation transforms from clientelist to contractualist economy a people who once habitually placed their economic securities in tangible property, such as land, would be selecting to place their economic securities in contract. This expectation is corroborated in Figure 1, where we can see annual growth rates in life insurance contracting start going up, above economic growth rates, at about $25 per capita and do not return to a steady-state until about $165 per capita. The data thus suggest the span of $25 to $165 as the transition range from clientelist to contractualist economy, with values greater than $165 indicative of contractualist economy and values below $25 indicative of clientelist economy.

![Figure 1. Growth Rates in Life Insurance Contracting](image)

We cannot be certain that the $25 and $165 cut-points are accurate, but at present knowledge these are the best estimates we have. Figure 2 reports graphs of life insurance consumption for all 25 nations that crossed the $165 threshold and deemed contractualist (see below) from the start year of the data of 1960, whose transition years are known (as listed in Table 1 below). As can be seen, of the 25 nations identified as having transitioned to contractualist economy since 1960, in most cases life insurance consumption rates continued to rise rapidly after crossing the $165 threshold, most approaching $400 within a decade. This suggests confidence in this threshold, and that the exact threshold can make little difference. The $165 cut-point is also almost identical to the median $35 cut-point adopted in prior versions of these data, which drew on an earlier version of the life insurance data and were not transformed using the eight-year moving average.
Figure 2 A. Life Insurance Contracting After Transitions
Figure 2 B. Life Insurance Contracting After Transitions
Figure 2 C. Life Insurance Contracting After Transitions

Malaysia

Greece

Slovenia

Mauritius

Czech Republic

Hungary

Slovakia

Botswana
The most-evident cases of possible error where life insurance contracting did not continue to rise substantially after crossing the $165 threshold are, in order of transitions, Chile, Greece, Hungary, Slovakia, and Botswana. The estimates for these five nations are thus at the greatest risk of measurement error or, if the threshold is accurate, backsliding.

4.2. As a precaution, Life Insurance values above $165 are assumed to indicate contractualist economy only if a nation does not have a substantial Informal sector as indicated with Informal Economy > 1.3

4.3. While missing data indicate clientelist economy, missing data can sometimes occur for other reasons. Therefore two additional precautions were made:

4.3.1. Missing data are assumed to indicate clientelist economy only if Investment (logged) is below the median.

4.3.2. Micro-nations, defined as those with population sizes less than 500,000 in 2010, are removed from the data. This precaution is warranted because missing data for micro-nations are more likely than other nations to be missing for reasons other than clientelist economy.

4.4. Missing values where interpolated by year (244 real changes made).

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3 To avoid losing eight data points for one country with missing data for Informal Economy (West Germany 1962-69), data for the first year with data (1970, Informal Economy <=1) were extrapolated for these data points.
4.5. To avoid inferring contractualist status from single data points, single data points where $\text{CIE}_b = 1$ were set to missing (2 real changes made: Jamaica 2003; United Arab Emirates 1998).

4.6. From 1960 to 2010 seven nations cross the above thresholds but exit the data before the last year of 2010. These missing data points were imputed by country from data on Investment and Year. These cases are: Botswana (2005+); Greece (2009+); Ireland (2010); Malaysia (2010); Mauritius (2010); Portugal (2008+); and Taiwan (2001+).\footnote{Since Botswana and Greece are among the five newly-contractualist nations that did not experience rapid increases life insurance contracting after crossing the $\$165$ threshold (Figure 2), of all seven nations with latter years extrapolated, these two pose the greatest risk of measurement error.}

4.7. The above operations were applied for the years 1960 to 2010: before 1960 there are no data on Life Insurance. For nations that enter the data on or after 1960 and whose economic type is known at the year of entry, data on migration rates were used to extrapolate backwards to 1816. By definition a nation with a contractualist economy must have a robust labor market (Mousseau 2009:60), and the quest for economic opportunity is the most basic motive for migration (Hatton and Williamson 1992:3). It follows that consistent zero net-emigration, when unrelated with war events, indicates the time we can extrapolate backwards that a known contractualist nation had been contractualist, and consistent zero net-immigration indicates the time we can extrapolate backwards that a known clientelist nation had been clientelist.

Drawing on migration data from Mitchell (1992, 3, 125-139, 159-167), Nugent (1992, 63-95), Pierenkemper and Tilly (2004, 96), and the World Bank, a broad search yields only one candidate case of a nation with a clientelist economy having previously had a high steady-state of net-positive immigration. Argentina in the early twentieth century experienced a steady inflow of migrants from relatively poor Italy and Spain. It is assumed that Argentina did not reach contractualist economy at this time because it is not listed in the World Almanac and Encyclopedia’s list of nations with life insurance markets for 1913, even as the Almanac does list other non-European nations with very small life insurance sectors (The Press Publishing Company 1915:339).\footnote{Both the Netherlands and the United Kingdom were net-immigrant nations from the interwar period yet net-emigrant ones after World War II and into the 1970s. These postwar emigrations are assumed consequences of the war and not reflective of economic reversals given that during the post-war period these nations had historically-low unemployment rates and thus highly robust labor markets.}

4.8. Since missing data indicates clientelist economy, all remaining nation-years with missing data on Contractualist Economy were set to zero ($\text{CIE}_b = 0$) if the nation was not identified as in transition ($\text{Transition} = -1$ or 1, see below). 1,277 real changes made.

5. **Transition.** Transition equals 1 when the data indicate a nation-year is in an economic transition whose start year is known from the data, equals -1 if the start year if the transition is unknown, and 0 otherwise. One way the start year of transitions are known is if the nation
fully transitioned from clientelist to contractualist economy within the period of data availability of 1960 to 2010. For instance, if in the year 1961 CIEb = 0, in years 1962-1969 CIEb = missing, and in year 1970 CIE = 1, for this nation Transition will equal 1 for years 1962-1969, and 0 in 1961 and 1970. Nations are also identified as in transition if Life is between $25 and $165, or Life is greater than $165 but the nation has an informal sector (Informal > 1). For many contractualist nations (where CIEb = 1) the start year if transition periods are unknown from the data, including all those whose transitions started before 1960. For instance, the migration data inform us that Great Britain likely transitioned in 1931 (or about), but we cannot know from the data when this nation’s transition began. So before 1931 Transition = -1 for Great Britain. Unknown transition periods can precede known ones. Nations in transition that exit the data are assumed to be in transition to 2010.

Nations identified as having contractualist economies or in transition are listed in Table 1.

6. **Contract-Intensive Economy (CIE).** As discussed above, missing data points in the variable Life Insurance are not missing at random (MAR). This means the two most common methods for handling missing data, multiple imputation and maximum likelihood, are not appropriate for estimating missing values, since these methods are designed to work only when data are MAR (Yuan 2014). Therefore, to allow researchers to make full use of the Life Insurance data, missing values of Life Insurance were singly imputed using the residuals of a regression of Life Insurance on Contractualist Economy, Transition, Investment, and Informal Economy. To retain the full information available in the data, missing values in the binary measures Contractualist Economy and Transition were set to 0 for this estimate, with unknown transitions assumed as known (=1).\(^6\)

\(^6\) For years less than 2009. In the final two years of the data (2009 and 2010) a large number of nations exit the data, suggesting that these missing data points are more likely a consequence of data collection issues rather than reflections of clientelist economy.
Table 1. Nations with Contractualist and Transition Economies, 1776 to 2010.

<table>
<thead>
<tr>
<th>Nation</th>
<th>Transition Years</th>
<th>Nation</th>
<th>Transition Years</th>
<th>Nation</th>
<th>Transition Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>a - 1776</td>
<td>Italy</td>
<td>&lt;1960 - 1989</td>
<td>UAE</td>
<td>&lt;1992 -</td>
</tr>
<tr>
<td>Australia</td>
<td>a - 1920</td>
<td>Cyprus</td>
<td>&lt;1988 - 1989</td>
<td>Oman</td>
<td>1993 -</td>
</tr>
<tr>
<td>Canada</td>
<td>a - 1920</td>
<td>Portugal</td>
<td>1980 - 1990</td>
<td>Trin. &amp; Tob.</td>
<td>&lt;1993 -</td>
</tr>
<tr>
<td>New Zealand</td>
<td>a - 1920</td>
<td>Singapore</td>
<td>&lt;1979 - 1994</td>
<td>Bahrain</td>
<td>&lt;1994 -</td>
</tr>
<tr>
<td>Netherlands</td>
<td>&lt; - 1922</td>
<td>Chile</td>
<td>1981 - 1996</td>
<td>Croatia</td>
<td>1994 -</td>
</tr>
<tr>
<td>Switzerland</td>
<td>&lt; - 1926</td>
<td>Malaysia</td>
<td>1974 - 1997</td>
<td>Namibia</td>
<td>1994 -</td>
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<tr>
<td>Sweden</td>
<td>&lt; - 1930</td>
<td>Greece</td>
<td>1980 - 1997</td>
<td>Brazil</td>
<td>1995 -</td>
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<tr>
<td>Great Britain</td>
<td>&lt; - 1931</td>
<td>Slovenia</td>
<td>1992 - 1997</td>
<td>Colombia</td>
<td>1996 -</td>
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<tr>
<td>Norway</td>
<td>&lt; - 1960</td>
<td>Mauritius</td>
<td>1973 - 1998</td>
<td>India</td>
<td>1996 -</td>
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<td>Denmark</td>
<td>&lt;1960 - 1962</td>
<td>Hungary</td>
<td>&lt;1986 - 2001</td>
<td>Lithuania</td>
<td>1997 -</td>
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<td>Japan</td>
<td>&lt;1960 - 1962</td>
<td>Botswana</td>
<td>1971 - 2003</td>
<td>Qatar</td>
<td>&lt;1999 -</td>
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<td>Finland</td>
<td>&lt;1960 - 1967</td>
<td>Poland</td>
<td>1990 - 2003</td>
<td>Estonia</td>
<td>&lt;2003 -</td>
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<td>Belgium</td>
<td>&lt;1960 - 1972</td>
<td>Panama</td>
<td>1967 -</td>
<td>Lebanon</td>
<td>&lt;2003 -</td>
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<td>France</td>
<td>&lt;1960 - 1975</td>
<td>Venezuela</td>
<td>1979 - b</td>
<td>Russia</td>
<td>2003 - c</td>
</tr>
<tr>
<td>Austria</td>
<td>&lt;1960 - 1977</td>
<td>South Africa</td>
<td>&lt;1979 -</td>
<td>Jamaica</td>
<td>&lt;2004 -</td>
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<td>Ireland</td>
<td>&lt; - 1979</td>
<td>Mexico</td>
<td>1982 -</td>
<td>Peru</td>
<td>2004 -</td>
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<tr>
<td>Israel</td>
<td>1961 - 1981</td>
<td>Thailand</td>
<td>1985 -</td>
<td>Bulgaria</td>
<td>2006 -</td>
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<td>Taiwan</td>
<td>1970 - 1983</td>
<td>Kuwait</td>
<td>&lt;1986 -</td>
<td>Morocco</td>
<td>2007 -</td>
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<td>Spain</td>
<td>1974 - 1987</td>
<td>Argentina</td>
<td>1991 -</td>
<td>Latvia</td>
<td>2008 -</td>
</tr>
</tbody>
</table>

'<=' = start year of economic transition unknown.

a Nation had contractualist economy from year of sovereignty.

b Venezuela exited its transition and reverted back to clientelist economy in 1983.

c Russia exited its transition and reverted back to clientelist economy in 2006.
References


Heston, Alan, Robert Summers and Bettina Aten, Penn World Table Version 7.1, Center for International Comparisons of Production, Income and Prices at the University of Pennsylvania, July 2012.


