Democracy and Data Dissemination: The Effect of Political Regime on Transparency

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Version 3.1, Aug 2004

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Abstract: Are democracies more transparent than other types of political regimes? The answer to this question is often assumed to be yes. Yet the logic and empirical implications behind this assertion have not been rigorously tested. We investigate theoretically the willingness of policymakers to provide credible announcements of intended inflation and unemployment rates, and show that the availability (or absence) of that data is correlated with regime type, even after controlling for level of development and country-specific effects. We further show that democracies are more willing to report data on a variety of other economic and social indicators. Democracies are indeed more transparent.

Are democracies more transparent than other political regimes? The answer to this question is often assumed to be yes. Indeed, in the minds of many, transparency has become synonymous with democracy. As Shapiro (2003: 200) suggests, "democratic leaders can never be entirely free from a commitment to truth-telling." Yet the logic and empirical implications behind this assertion have not been rigorously tested. As Mitchell (1998: 110) notes, "few scholars have made transparency the focus of study," even though "many literatures discuss transparency or touch on topics related to transparency" (Lindley 1996: 4, cited in Mitchell 1998: 110).

In this study, we build a theoretical argument as to the conditions under which governments prefer to have credible information available about their policy choices and the associated economic outcomes. In an environment of electoral uncertainty, we show that the more accountable are the policymakers to the electorate, the greater are the gains (to both the policymakers and the voters) from transparency.

Our work follows the approach of Bueno de Mesquita, Smith, Siverson, and Morrow (2003), who have developed a comprehensive theory of leadership survival under different political institutions. Their model indicates that leaders of "large coalition systems" – or democracies – have stronger incentives to provide public goods than leaders of "small coalition systems" – or autocracies. They conjecture (2003: 179) that one such public good is transparency, defined as the "ready access to information about how and what the government is doing." To test if democracies are more transparent than non-democracies, they consider whether governments report data on their tax revenue collection and their countries' per capita incomes. They find that leaders beholden to large coalitions for their survival, such as under democracy, are indeed more likely to report information than leaders in other political systems.

We build on this work by developing a theory that explicitly models the incentives of governments to provide information on two areas of interest: inflation and unemployment. The theory starts with a macroeconomic model of the economy where the government determines the inflation rate. The payoff to the government may depend in part on reelection, if the country is a democracy. Next we allow governments to decide whether or not to provide information about their policies. We find that where

governments depend on winning elections for their survival, policy transparency is more likely.

We test the theory using an empirical approach similar to Bueno de Mesquita et al. (2003). To measure transparency, we make use of something that is usually considered a hindrance in cross-national research: missing data. For instance, the World Bank's *World Development Indicators* is a large panel of measures of economic and social performance. For many countries, however, data are missing for certain years. Missing data may be correlated with regime type. If democracies are more transparent than non-democracies, then they should be more willing to report data on economic and social indicators. By the very definition, more transparency implies more information. Do we have more data from democracies than from other regimes?

In what follows, after defining the key terms, we present the argument about why democracies should be more transparent than non-democracies, which is then subjected to several empirical tests controlling for factors such as level of development, participation in international surveillance programs, country and regional specific factors, and duration dependence. We conclude with a discussion of the methodological implications from our findings for studies of democracies.

Defining Democracy and Transparency

We employ a minimalist definition of democracy. Following Schumpeter (1942) and Przeworski, Alvarez, Cheibub and Limongi (2000), we define democracy as a regime in which the executive and the legislature are both filled by "contested elections." Contestation implies multiple parties compete, incumbents have some probability of losing the elections, and all parties comply with the results of the elections. Przeworski et al. have developed a dichotomous measure[1] of regime that follows this definition: democracy is a political system in which key government offices are filled through contested elections. The definition has two parts: "key government office," which they define as the executive and the legislature; and "contested," which implies that more than

[1] Updated by Cheibub (2004) and Cheibub and Gandhi (2004).

one party has some probability of winning office through election.[2] Conversely, dictatorships are regimes in which either the executive or the legislature are not filled by contested elections.

The nature of our study requires this narrow definition. To paraphrase Przeworski et al. (2000: 14-5), we want to know if holding repeated elections induces governmental transparency. As we will show below, our theory pertains specifically to the effect of elections on transparency, so we do not want to employ a measure of democracy that conflates other features of a political system with elections. In particular, we want to avoid measures of regime that define democracies as transparent. If we defined democracies as transparent regimes, this would preclude by fiat our research question.

Note that by employing a minimalist definition of democracy that pertains only to the role of elections in a political system, we can explore interesting possibilities. On the one hand, if we do not find that our measure of democracy is correlated with transparency, we will know that contested elections alone are not sufficient to produce transparent regimes. If, on the other hand, we do find that our measure of democracy leads to transparency, we will know that the minimalist conception of democracy actually covers more territory than just elections, because contested elections actually do cause regimes to be more transparent.

Our study seeks to show that there is both a theoretical and empirical connection between elections and transparency, and we seek to establish this connection through rigorous analysis, not simply by definition.

What is "transparency"? Mitchell (1998: 109) defines transparency as the dissemination of regular and accurate information. Simply put, a transparent political regime is one that provides accurate information about itself, its operations, and the country as a whole, or permits that information to be collected and made available.

We focus here on data complied by the World Bank. The World Bank obtains their data from other international organizations, such as the International Monetary Fund

[2] Sometimes this is obvious, such as when incumbents lose elections and relinquish power. Sometimes it is not, such as when incumbents successively win elections contested by other parties. While this introduces measurement error, it does so in an observable way. We know when we are in the latter situation, and can introduce a second variable to make sure results do not depend on these ambiguous cases. Przeworski et al. have made this variable – TYPEII – available with the rest of their data at: http://pantheon.yale.edu/~jac236/Research.htm.

(e.g., inflation data) and the International Labour Organization (e.g., unemployment), who in turn obtain their data directly from national governments. Much of the data are missing. For example, out of a possible total of 7,854 independent country-years from 1961 to 2002, 37 percent of the observations (2,909) are missing. The data are not available either because governments have failed to report in a timely way, failed to report at all, or in some cases, "data which have been determined to be questionable may be deleted."[3]

In this study, we emphasize the government's willingness to permit credible measures of inflation and unemployment to be made available. Among the many policy instruments at the disposal of the government one of the most important is the control of the monetary base, and hence the inflation rate. Inflation is costly to society at large, but it also has distributional effects. Not only does it redistribute from debtors to creditors, it also acts as a tax on money holdings. Governments therefore use inflation to generate revenues - known as seigniorage - and in the process influence unemployment by the usual Phillips curve trade-off.

This is not to imply that democracies are more transparent on all indicators. The key insight developed here is that in order to avoid being evicted from office when aggregate economic conditions are poor, government can permit credible information about its performance to be conveyed to the voters. In this way, the voters are better able to distinguish poor policymaking (or extractive behavior) from unlucky external shocks, and hence can reward or punish policymakers more effectively at the ballot box. Hence the crucial information that matters are those indicators of policy or performance that are of importance to the voters in making their reelection decisions.

This paper builds on the growing awareness that electoral accountability alone is insufficient to ensure high quality governance and representative policy-making. Adserà, Boix and Payne (2003) show that both accountability and free flow of information (in the form of newspaper circulation) affect the quality of governance; the case of Montesinos in Peru shows that the high price of bribes paid to television station owners relative to judges and bureaucrats indicates the importance of controlling the information flow if

[3] See the World Bank statements about *World Development Indicators*: **http://www.worldbank.org/data/datafaq.htm#cdroms**

democracy is to be subverted (McMillan and Zoido 2004). The importance of freely flowing information has become particularly important among international organizations. Both academics (e.g. Mitchell 1998) and officials at international organizations (e.g. the International Monetary Fund or IMF) have emphasized that transparency is crucial for their operation. In the aftermath of the East Asian Financial Crisis in the late 1990s, for example, the IMF instituted a "Transparency Policy" to make more information about its operations and the operations of its members publicly available. As Erbas (2004: 3) contends, "The importance of transparency in successful economies is becoming increasingly recognized in the literature and in the operational work of international organizations, including the IMF."

We are aware of no study of transparency, however, as a function of domestic political institutions. In *The Moral Foundations of Politics*, Shapiro (2003) makes the case that democracies are more likely than non-democracies to converge on the truth[4], but the argument is suppositional not based on any studies or empirical work. Elsewhere, democracies are simply assumed to be more transparent. Is it true that democracies are more likely to provide accurate information than non-democracies? In the following sections we investigate this question both theoretically and empirically.

The Effect of Democracy on Transparency

Consider a polity with a large number of identical individuals/voters who earn at the start of each period, *t,* an aggregate income normalized to unity. The income is subject to a shock θ_t, drawn from a known distribution independently and identically each period from a finite support with mean 0.

The income and the shock generate the aggregate money balances held at the start of the period $m_t = 1 + \theta_t$ with $Em_t = 1$.

Each period is divided into two subperiods *t1* and *t2*. In *t1* the voter/individual consumes some portion of the money balances c_{t1} and saves the rest for consumption in the second period, c_{t2}. Savings (endogenously determined) is risk free, and for simplicity, earns no interest. There is also no borrowing. Then per period utility is

[4] See especially pages 200-201, 225-6, 230.

$$u(\pi_t) = u_1(c_{t1}) + u_2(c_{t2})$$

where the subperiod utility functions have the usual properties $u_i' > 0$, $u_i'' < 0$ for $i = 1,2$. Second subperiod consumption is determined by the inflation rate, π, to be endogenously determined.[5]

The voters save at rate *s* across the subperiods. The real value of the money balances saved for consumption in the next subperiod depends on the price level, which is controlled by the government via the money supply. If the price in *t1* is p_{t1} and in *t2* is p_{t2} the government taxes savings each period by setting the inflation rate $\pi_t = \frac{p_{t2} - p_{t1}}{p_{t2}}$.

So inflation erodes savings; it can also be thought of as a tax on savings, here in the form of money balances. This tax revenue accrues to the issuer of money, government, and is called *seigniorage* - the real government revenue accrued from printing money (Drazen 2000)[6]. We treat these revenues as pure rents, and accrue to the private benefit of the government policymaker.

Then in each period, consumption in the subperiods is

$$c_{t1} = m_t(1-s)$$

$$c_{t2} = m_t s(1-\pi_t) - \frac{\pi^2}{2}$$

where the last term in the *t2* consumption is the deadweight loss of inflation that recognizes the general welfare costs associated with inflation. We treat this as a public bad (both the voters and the government experience this loss), and we assume the linear-quadratic structure as is common in the literature on central bank credibility (Drazen 2000, Barro and Gordon 1983, Obstfeld 1997, Cukierman, Edwards and Tabellini 1992, Desai et al 2000).

Then

$$u(\pi_t) = u_1(m_t(1-s)) + u_2\left(m_t s(1-\pi_t) - \frac{\pi_t^2}{2}\right).$$

Per period earnings to the government (as a result of the accrued inflation tax) is

[5] Note that discounting across the subperiods is possible and could be part of the definition of u_2.
[6] Desai, Olofsgård and Yousef (2000) treat the inflation tax as the sole source of government revenue, which in their model is used for transfers back to subgroups of voters. Here no transfers occur, and the rents accrue to the policymaker.

$v(\pi_t) = m_t s\pi_t - \frac{\pi_t^2}{2}$ and $Ev(\pi_t) = s\pi_t - \frac{\pi_t^2}{2}$.

Notice that we have set this up with some degree of a conflict of interest between the government and the voters, but there is also some coincidence of interest - both understand that inflation is costly.

Given any (equilibrium) inflation rate, we can solve for the consumers' saving rate. Optimality (and its implied consumption smoothing) requires the expected marginal utility of consumption to be equalized across the subperiods. Hence

$-Eu_1'\left(m_t(1-s)\right) + Eu_2'\left(m_t s(1-\pi_t) - \frac{\pi_t^2}{2}\right)(1-\pi_t) = 0$ or s solves

$$\frac{Eu_2'\left(m_t s(1-\pi_t) - \frac{\pi_t^2}{2}\right)}{Eu_1'\left(m_t(1-s)\right)} = \frac{1}{(1-\pi_t)}. \qquad (1.1)$$

Let this value of s be denoted $s(\pi_t)$.

Both the voters and the government are infinitely lived. There is no savings across periods (only across each subperiod). Each seeks to maximize the discounted sum of the per period utilities. For the voters, $E\sum_{t=0}^{\infty}\delta^t u(\pi_t)$ and $E\sum_{t=0}^{\infty}\delta^t v(\pi_t)$ for the government, where $\delta \in (0,1)$ is the standard discount factor.

Maximal Extraction

Voters save the fraction $s(\pi_t)$ of their income $m_t = 1 + \theta_t$. In the case that the government wishes to maximize the current period extraction, it will choose an inflation rate to maximize $Ev(\pi_t) = s(\pi_t)\pi_t - \frac{\pi_t^2}{2}$. Differentiating,

$Ev'(\pi_t) = s(\pi_t) + \pi_t s'(\pi_t) - \pi_t = 0$ yields $\pi_t = \frac{s(\pi_t)}{1 - s'(\pi_t)}$. Let the solution to this

equation be denoted Π. The government per-period payoff then is

$$V(\Pi) = \frac{\Pi(s(\Pi) - \Pi)}{2}.$$

Elections

At the end of each period and election is held. If the incumbent is evicted, that player earns zero for the rest of the game, and another executive is chosen that is identical in all respects to the incumbent. The election punishes or rewards the past behavior of an executive - voters adopt a retrospective voting rule.[7]

Non-transparency

At the beginning of each period t the executive chooses the inflation rate $s(\pi_t)$, and then nature picks the value of the shock θ_t. The voters do not see the shock θ_t or the inflation rate π_t; they make their best guess as to the inflation rate to expect, π^e, choose their savings rate accordingly. At the end of the period, they observe the end of period utility $u(\pi_t) = u_1\left(m_t\left(1 - s\left(\pi^e\right)\right)\right) + u_2\left(m_t s\left(\pi^e\right)(1 - \pi_t) - \frac{\pi_t^2}{2}\right)$. The government does not announce its actions, nor are they observable - the polity is not *transparent.*

At the end of the period, and based on the utility experienced, an election is held as to whether the incumbent should be reelected. Following Persson, Roland and Tabellini (1997) we assume the voters coordinate on the same reelection rule, and they condition their reelection rule on their observed utility. Voters choose a threshold level of

[7] Since executives are in all ways identical, elections do not serve to choose amongst executives with differing levels of competence or differing attributes. Fearon (1999) suggests that voters care more about selecting competent legislators than disciplining extractive policymakers; Lewis-Beck (1988) provides evidence that voters use retrospective strategies to punish their elected officials when outcomes are poor. See Banks and Sundaram (1993) for a model in which executives display both moral hazard (potentially extractive behavior) and adverse selection (having differing attributes).

utility $\overline{u}$ and will vote to reelect the incumbent if $u(\pi_t) \geq \overline{u}$ and eject the incumbent otherwise.[8]

Note that the incumbent has to take an action (that will impact his/her reelection probabilities) before the shock has materialized. Following Rosendorff (2004), we can define the ex ante probability that any threshold $\overline{u}$ is breached after choosing inflation rate π_t as

$$\phi(\pi_t, \overline{u}) = \Pr\{u(\pi_t) \geq \overline{u}\}.$$

Notice therefore that given any policy choice and threshold, there is always positive probability that the voters choose to evict the incumbent from office. In environments where the executive has not been too extractive, the exogenous shock can be severe enough to induce eviction. Hence the non-transparent environment admits the possibility of "unfair dismissal" - eviction in cases even where the tax was low or moderate.

Assumption: $\phi(\Pi, u) = 0$ for all *u*.

If the executive chooses the maximally extractive level of inflation Π in any period, the distribution of the random shock is such that the threshold is never breached, and the voters throw out the incumbent with certainty.

Regime Type

We characterize each polity by a scalar $\sigma \in [0,1]$, which captures the degree to which the sentiments of the voters are binding on the executive. If the voters' will is always honored, we have $\sigma = 1$; a pure autocracy has $\sigma = 0$. We permit a continuous measure of the degree to which the executive is accountable to the voters. Then the actual probability of keeping office in any period *t* after both π_t and $\overline{u}$ have been chosen is

$$\rho(\pi_t, \overline{u}, \sigma) = \sigma\phi(\pi_t, \overline{u}) + (1 - \sigma).$$

The Executive's Problem

[8] Banks and Sundaram (1998) show that cutoff rules are optimal in the class of retention models like this one. Fiorina (1981) suggests that this threshold behavior is typical of voters.

The executive must choose a policy π_t each period that just balances the benefits of extracting this period, with the reduced probability of being in office and able to extract tomorrow. The threat of eviction acts to reduce the level of extraction today. We can write the (expected) value function associated with the executive's problem as

(1.2) $$V(\pi_t, \bar{u}) = v(\pi_t) + \delta\rho(\pi_t, \bar{u}, \sigma)V(\pi_{t+1}, \bar{u}).$$

Let the optimal response by the executive to threshold $\bar{u}$ be denoted $\bar{\pi}$.

The executive can guarantee, in expected value, a minimum intertemporal value (by taking the maximally extractive action each period) and risking eviction of

$$V(\Pi, u) = \frac{v(\Pi)}{1-\delta(1-\sigma)} = \frac{\Pi(s(\Pi)-\Pi)/2}{1-\delta(1-\sigma)} \text{ for all } \bar{u}.$$

Then the executive's best response is to set inflation each period at

$\bar{\pi}$ if $V(\bar{\pi}, \bar{u}) \geq V(\Pi, u)$, Π otherwise.

The Voters' Problem

Given the behavior of the executive, they will seek to keep inflation as low as possible. So given the best response function above, they will choose a threshold that induces the lowest inflation without inducing the executive to switch to the maximally extractive action. Hence let $\bar{u}$ solve $V(\bar{\pi}, \bar{u}) \geq V(\Pi, u)$.

Then the Nash equilibrium to this game is $(\bar{\pi}, \bar{u})$, and the probability of unfair eviction is $1-\rho(\bar{\pi}, \bar{u}, \sigma) > 0$.

And the executive is kept indifferent between playing $\bar{\pi}$ and playing *s*. Hence the payoff to the executive is

(1.3) $$V(\bar{\pi}, \bar{u}) = V(\Pi, u) = \frac{\Pi(s(\Pi)-\Pi)/2}{1-\delta(1-\sigma)}.$$

We cannot solve for the level of the equilibrium inflation rate explicitly. It must however satisfy $\dfrac{\bar{\pi}s(\bar{\pi}) - \bar{\pi}^2/2}{1-\delta\rho(\bar{\pi}, \bar{u}, \sigma)} = \dfrac{\Pi(s(\Pi)-\Pi)/2}{1-\delta(1-\sigma)}$.

Transparency

Voters do not directly observe π_t; the policymaker announces a policy $\tilde{\pi}$. A new player, a credible source, is informed of the actual policy π_t and makes its determination available to voters: either, yes, the government policy indeed is as announced (or better for the voters), $\pi_t \leq \tilde{\pi}$, or no, the policy is worse than announced, $\pi_t > \tilde{\pi}$. This fits the observed reality - voters receive information that is to some degree reliable - from sources such as the World Bank, independent government agencies, the IMF and other sources. The voter compares this information with what they might have expected given the government's own announcements and their own expectations of government behavior. Voters then choose whether to reelect the incumbent.

The sequence of moves is that government chooses an announcement $(\tilde{\pi})$ and a policy (π_t) simultaneously (but only the announcement is observed by the voters). At the same time the voter chooses the savings rate (*s*). Then the credible source sends its message, and the voter chooses to reelect or not $\phi \in \{1,0\}$. A Nash equilibrium is the pair $\{(\tilde{\pi},\pi_t),(s,\phi)\}$.

Voters will now condition their reelection decision on the announcement. The voter's optimal strategy will be as follows: As before they choose their savings rate according to equation (1), $s = s(\pi_t)$. If $\tilde{\pi} \leq \bar{\pi}$ then they will reelect if they hear the announcement that $\pi_t \leq \tilde{\pi}$; they evict if not. And if $\tilde{\pi} > \bar{\pi}$, they evict.

In any equilibrium $\{(\tilde{\pi},\pi^*),(s,\phi)\}$ where $\tilde{\pi} \leq \bar{\pi}$, and the message sent is that $\pi^* \leq \tilde{\pi}$, the voters reelect, setting $\phi = 1$ and from equation (1.2) we can see that $\rho = 1$; the effective discount factor (see equation) is therefore simply δ, and the expected discounted value of the game (with some abuse of notation) to the government is $V\left((\tilde{\pi},\pi^*),\left(s(\pi^*),1\right)\right) = \dfrac{\pi^* s(\pi^*) - \pi^{*2}/2}{1-\delta}$. If at any point $\phi = 0$, then $\rho = 1-\sigma$; the effective discount rate is $\delta(1-\sigma)$ and the government as before can assure itself of

$V\left((\tilde{\pi},\Pi),\left(s(\Pi),0\right)\right)=\dfrac{\Pi\left(s(\Pi)-\Pi\right)/2}{1-\delta(1-\sigma)}$. In order for π^* to be a best response for the government, it must be that $\dfrac{\pi^* s(\pi^*)-\pi^{*2}/2}{1-\delta} \geq \dfrac{\Pi s(\Pi)-\Pi/2}{1-\delta(1-\sigma)}$ which is equivalent to

$$(1.4) \quad \sigma \geq \frac{1}{\delta}\left[1-\frac{\Pi s(\Pi)-\Pi/2}{\pi^* s(\pi^*)-\pi^{*2}/2}(1-\delta)\right]-1.$$

For the voters, the lowest interest rate feasible is preferred; it is always optimal to reward commitment to a low rate than to punish it. The Nash equilibrium to the game under transparency is as follows:

$$\text{If } \sigma \geq \frac{1}{\delta}\left[1-\frac{\Pi s(\Pi)-\Pi/2}{\pi^* s(\pi^*)-\pi^{*2}/2}(1-\delta)\right]-1$$

$$(1.5) \qquad \text{then } \pi^*=\tilde{\pi}<\bar{\pi} \text{ and } \phi=1;$$

$$\text{otherwise } \pi^*=\Pi, \tilde{\pi}\in[0,1] \text{ and } \phi=0.$$

We are now able to compare the equilibria across the two informational environments, and make a Pareto ordering.

Proposition: *Transparency is preferred to non-transparency by both players when the polity is sufficiently democratic.*

Proof: Under transparency, the government earns $\dfrac{\pi^* s(\pi^*)-\pi^{*2}/2}{1-\delta}$. Under non-transparency, the government earns (from equation(1.3)) $\dfrac{\Pi s(\Pi)-\Pi/2}{1-\delta(1-\sigma)}$. Then for transparency to be preferred to non-transparency, $\dfrac{\pi^* s(\pi^*)-\pi^{*2}/2}{1-\delta} \geq \dfrac{\Pi s(\Pi)-\Pi/2}{1-\delta(1-\sigma)}$ or $\sigma \geq \dfrac{1}{\delta}\left[1-\dfrac{\Pi s(\Pi)-\Pi/2}{\pi^* s(\pi^*)-\pi^{*2}/2}(1-\delta)\right]-1$, which is the condition for the existence of the transparency equilibrium, equation (1.4) above. Of course, transparency is preferred by the voters, since the transparent inflation rate is lower than the non-transparent rate, $\pi^*<\bar{\pi}$, from equation (1.5) above. ■

Hence for any value of δ, the larger is σ, the more likely it is that transparency will be preferred to non-transparency. The more likely the fate of incumbents depends on elections, the more likely information will be provided.

Voters dislike inflation, and attempt to discipline their executives via the ballot box. Since government can be unfairly evicted from office even if rent-shifting has been moderate, executives may be willing to trade away the opportunities for rent extraction (by providing access to credible information about their actions) in return for reducing the risk of being unfairly dismissed. Those policymakers more accountable to their electorates are more likely to be unfairly dismissed, and therefore are more likely to offer up, or provide access to, credible data. Hence those polities characterized by more electoral accountability will be more transparent.

Unemployment

The unemployment rate is related to the inflation rate either by a traditional Phillips curve

$$U_t = -\pi_t$$

or by a more modern expectations adjusted Phillips curve, where a reduction in unemployment happens only when the voters are surprised by inflation that is higher than expected

$$U_t = -\left(\pi_t - E\pi_t\right).$$

In the first case, more information about the inflation rate policy adopted by the government, as in the "transparent" environment is equivalent to more information about the unemployment rate. Hence "transparency" means that a credible announcement of the inflation rate is also a credible announcement of the unemployment rate. And therefore we can draw a similar conclusion about unemployment data that we draw from inflation data: we are more likely to see credible information about unemployment flowing to the voters in democracies than in non-democracies.

In the second case, where the Phillips curve is expectations adjusted, in equilibrium in both the transparent and non-transparent regimes, there is no surprise inflation (since both players operate under the same the informational constraints), and hence in equilibrium in

both regimes, unemployment is zero. In this case the model cannot speak to the informational value of a credible announcement of the unemployment rate. Nevertheless, extending the general logic of the argument, it is not unreasonable that democratic polities are likely to be characterized by better flows of data about the economic variables over which the government asserts some degree of control, for the same reasons as postulated above. Consequently, we might expect to see democracies generate more information about unemployment as well as inflation.

Evidence

The theory suggests that democracies, defined as those polities where elections determine the fate of incumbents, will provide better access to, or permit the publication of, data on inflation and unemployment by sources credible to the voters, such as international organizations.

Do we have more reliable information from democracies than we do from dictatorships? To answer this question we make use of something that is usually considered to be a hindrance in research: missing data. The World Bank Group publishes data on nearly all countries around the world starting as far back as 1960 and up to 2002 (at this writing). The publication, *World Development Indicators*, includes data on hundreds of variables. For variables that are of importance to potential voters, we expect to find more information (less missing data) for democracies than for dictatorships. To test this hypothesis, we create a series of dummy variables coded 1 if data are available and 0 if they are missing for various indicators.

Which indicators do we use? Our theory pertains to inflation[9], and to unemployment[10], so we focus on those; but since our theory has broader implications about the gains to both voters and democratic governments from access to information about government policy more generally, we also look, as an investigation into the generality of the intuition, at a number of other measures of economic performance that

[9] Consumer prices (annual %): FP.CPI.TOTL.ZG.
[10] Unemployment, total (% of total labor force): SL.UEM.TOTL.ZS.

are closely under government control. To get an overall picture of the economic situation, we consider the availability of economic growth as reported by World Development Indicators (2004).[11] To get an overall picture of the conditions of the poor, we follow Ross (2004), who considers infant mortality rates.[12] As for the fiscal activities of governments, we refer readers to the previously mentioned study by Bueno de Mesquita et al. (2003), which found that democracies are more likely than dictatorships to provide tax revenue data.

Because our dependent variables are measures of simply whether or not information is provided, we have no missing observations. Either data are provided or they are not. So our dataset includes all 188 independent countries recognized by the World Bank in 2002.[13] The analysis of each variable begins with the year that data on the variable is first reported by the World Bank.

As a first cut, we use a simple logit analysis to test if democracies are more likely to report data. Our dependent variable d_{it} is coded 1 if country i reports data in year t and coded 0 if data are not reported. We estimate $\Pr(d_{it} = 1) = \frac{e^{\beta' x_{it}}}{1 + e^{\beta' x_{it}}}$, where x_{it} represents the independent variables that determine the decision to report or not, and β captures the effects of these variables. The likelihood function is $L(\beta \mid d_{it}, x_{it}) = \prod_{it} (F)^{d_{it}} (1 - F)^{1 - d_{it}}$, where F represents the cumulative distribution function.

In our first specification, we test the effect only of our dichotomous measure of regime, coded 1 for democracies and 0 for dictatorships as defined above. Table 1 presents the results, which suggest that our hypotheses have some plausibility. For each dummy variable indicating whether information is provided during a given country-year, democracy has a statistically significant positive impact. For our key variables of

[11] GDP growth (annual %): NY.GDP.MKTP.KD.ZG.
[12] Mortality rate, infant (per 1,000 live births): SP.DYN.IMRT.IN.
[13] Some countries, while possessing independent regimes, are not recognized by the World Bank: Greek Cyprus, Nauru, Somaliland, and Taiwan. Countries that ceased to exist before 2002 are not included because the World Bank does not include data on these countries in its publications. This is unfortunate, since it precludes studying a number of independent countries from the post-War period: Czechoslovakia, East Germany, U.S.S.R., West Germany, Yemen Arab Republic (North, Sana), Yemen PDR (South, Aden), and Yugoslavia. The World Bank does report data on many other regions of the world, but these are not independent countries and do not have independent political regimes.

inflation and unemployment, and for the secondary variables of interest, growth and infant mortality rates, we are more likely to have information from democracies than dictatorships.

Table 1 about here

Note that these could very well be spurious results. So far, we have included no control variables. Unfortunately, we do not have a battery of variables that we can use to control for all other possible factors that may influence patterns of missing data because data are also missing for many of these variables. Fortunately, we do have a complete set of data for the most important factors.

First of all, level of economic development may be a factor. More developed states may be more likely to report data because with development comes greater technical capacity to collect data in the first place. As Bueno de Mesquita et al. (2003: 182) note, poor countries "just cannot afford to gather the information." The collection and reporting of data may also simply be a more routine activity in more modern states, as Scott (1999) contends. Level of economic development is especially important to account for because it is correlated with political regime. Democratic regimes are more likely to survive at higher levels of income (Przeworski et al. 2000). So the positive effects of democracy on transparency reported in Table 1 may be driven in part by level of economic development. Fortunately, Heston and Summers (1995) have collected data on per capita in come for nearly all countries with no missing data (at least up to 1990). We use their data, measured in 1985 purchasing power parity dollars, to control for level of economic development.

A second factor that may influence the reporting of data is the degree of scrutiny that a government is under by international organizations. For example, countries participating in programs sponsored by the International Monetary Fund (IMF) are required to submit to increased surveillance of the economy. Like economic development, participation in an IMF program is also important to account for because it is correlated with regime. The IMF has historically been more likely to enter into arrangements with dictatorships (Bandow 1994, Przeworski and Vreeland 2000). To the extent this is true, the effect of democracy in Table 1 may actually be understated.

Fortunately, we have data on all IMF arrangements for all countries and can control for this factor.[14]

Table 2 presents the results when we control for GDP per capita and IMF participation. We employ the same logit statistical model as above, but independent variables now include democracy, GDP per capita, and the dummy variable for IMF participation. As expected, level of economic development and IMF participation appear to have positive and significant effects on transparency. In countries with higher levels of per capita income, we are more likely to have data on inflation and unemployment, as well as on growth and infant mortality rates (although, surprisingly, the effect is not significant for infant mortality rates). In countries participating in IMF programs, we are also more likely to have data on all of the indicators.

Even after controlling for these factors, democracies appear to be more transparent than non-democracies. The effect is strong and highly significant for our key variables of interest, inflation and unemployment, as it is for growth. The effect is positive and significant at the 90 percent level for infant mortality rates.

Table 2 about here

Overall, these are striking results. Data are not missing at random: level of economic development and international surveillance play a role in the likelihood of data being available. So do political institutions. Democracies are more transparent than dictatorships.

As a further step to account for other factors that may be related to transparency, we control for country and regional specific effects. We hesitate to do this because – as is often the case when such techniques are employed – we have no theory about what country-specific factors might matter or which regions are more likely to report data. We could speculate that country-specific effects account for a residual level of information collection technology or culture. Regarding region, we could follow what others have claimed – sometime disparagingly – about "backward" regions of the world (yet see what Hanchard (1999) has to says about this). It may actually be especially important to account for regional effects because they may be correlated with democracy. The

[14] The data come from Vreeland (2003).

growing literature on "diffusion" shows that political regime is correlated across regions (see Gleditsch 2002, Simmons and Elkins 2000). But actually – in the absence of other variables – we simply employ these controls to see if our findings about democracy are robust.

To control for fixed effects, we employ the method suggested by Green et al. (2001). The model, developed by Chamberlain (1980), is sometimes called "the conditional logit model" because one maximizes the conditional likelihood function:

$L(\beta \mid d_{it}, x_{it}) = \prod_i \Pr\left(D_{i1} = d_{i1}, D_{i2} = d_{i2}, ..., D_{iT_i} = d_{iT_i} \mid \sum_t d_{it} \right)$, where T_i is the last observed time for country i. Note that this method involves estimating the 1's and 0's for a particular country, conditioned on the total number of 1's for that country. So, if a country never reports data or reports data all of the time, the conditional probability of observing the data for that country is 1. Such countries have no impact on the overall estimation and are thus dropped from the analysis.

To control for region, we use the basic logit model and simply include a series of dummy variables for each region of the world along with our other independent variables in $\boldsymbol{x}_{it}$. We must leave out one region for identification purposes, and also, as with the fixed effects, if there is no variation in the dependent variable for a given region, the region is dropped.

The dropping of observations is another reason we hesitate to use these methods. If a country or region always/never reports data, this is of importance and should not be ignored. Nevertheless, we employ these techniques simply to test the robustness of our democracy finding.

Tables 3 and 4 about here

Tables 3 and 4 present the results when we control for country specific and regional effects, respectively. Note that the democracy findings for our key variables of interest, inflation and unemployment, are robust. Indeed, when we introduce country specific effects, the effect of democracy on transparency for all of our indicators except growth is positive and highly statistically significant. When introduce regional effects, we get the same. The effects of per capita income and IMF participation are similar to the results presented in Table 2. Interestingly, however, per capita income does not predict data

reporting for infant mortality rates. Democracy has a stronger and more robust effect. Finally, as we suspected, regional effects, while often significant, are not systematic. After we account for democracy, economic development, and IMF participation, a region like Africa is sometimes more likely to report data than certain other regions, sometimes less likely, and sometimes is not significantly different from other regions.

Consistent with the theory presented in the previous section, democracies are more likely to report information about inflation and unemployment. Inflation – which can be directly impacted through monetary policy and government expenditures – and unemployment – which is closely related to the inflation rate via the Phillips curve – should be most influenced by political regimes because democracies should be much more likely to report data. Surprisingly, democracies are also systematically more likely to report data on infant mortality rates. We take this as further evidence of the transparency of democratic regimes. For economic growth, however, which can be impacted by so many factors far outside of the control of specific governments, there is no particular incentive for democracies to provide transparency. So the results on growth in Tables 3 and 4 are not troubling for our theory. In the areas that we most expected transparency – inflation and unemployment – the results are strong and robust.

There is still, however, another factor that must be accounted for in our empirical work: the impact of time. Duration dependence is a phenomenon that political scientists have become increasingly concerned with since the development of new techniques to account for it (Beck et al. 1998). Often the techniques are employed agnostically with little theory behind why time should have some kind of effect on the dependent variable. For our question, however, modeling duration dependence is theoretically appropriate.

There are several reasons to believe that transparency has trended upward over time. First of all, concern with transparency is a relatively new phenomenon. As people have become more concerned with it, data collection has become a priority. Secondly, with technological advances in computing, the ever-improving ability to conduct extensive statistical studies has produced ever-increasing demands for more data. International agencies have received increased incentives to collect and report data. Finally, the technological capacity to collect and store data has also increased with time.

All of these arguments were recently suggested by Carol Carson, who was the Director of the IMF's Statistics Department from 1996 until 2004. She notes an "increasing realization of the importance of internationally comparable data." She cites several factors for the improvement in data collection, including the Internet, "increased recognition, by countries of all sizes, of the importance of the data," and regional organizations that "are also pushing the cause" (IMF 2004: 213).

It is rare that time itself actually has some causal power, and there are obviously other variables that we could use to capture the phenomena that have occurred over time. For example, we could develop a measure of "concern with transparency," or we could look at the resources invested in data collection, or we could track the technological improvements in database capacity. But all of these phenomena will be highly correlated with time. In the absence of better proxies, modeling duration dependence appears to be a better approach.

We employ a Weibull model to capture duration dependence. This approach is quite different from the statistical models we employed above. Instead of simply predicting instances of "reporting" and "not reporting" data (Pr(y=1)), we predict the transition probability of going from "not reporting" to "reporting." Let *T* be a nonnegative random variable denoting the time at which a country reports data. *T* can be specified as a hazard function – the instantaneous probability of reporting data at $T=t$ $(0 < t < \infty)$ conditioned on not having yet reported up to time *t*: $\lambda(t) = \lim_{\Delta \to 0} \frac{\Pr(t \le T \le t + \Delta \mid T \ge t)}{\Delta} = \frac{f(t)}{S(t)}$, where $f(t)$ represents the probability density function of *T* and $S(t)$ represents one minus the cumulative distribution function of *T*. How one models $\lambda(t)$ depends on how one believes that time matters. In our case, we suspect that over time countries have become more likely to report data for the reasons specified above. We also believe that other factors, such as political regime, per capita income, and IMF participation also matter. Thus, we employ the Weibull model: $\lambda(t_i) = pe^{-\beta' x_i}\left(e^{-\beta' x_i} t_i\right)^{p-1}$, where the subscript *i* indicates the country, $\beta' x_i$ are as above – the independent variables and their effects, and *p* is a parameter capturing duration dependence. If *p* is greater than 1, then duration dependence is positive (the probability of reporting increases over time), and if it is less

than 1 duration dependence is negative. To write the log-likelihood function of this model, we require one more variable, δ_i coded 1 if a country eventually reports data and 0 if a country never reports as long as we are able to observe. In the latter case, we say that reporting is "censored." The log-likelihood function is then:

$\ln L(\beta, p \mid t_i, x_i, \delta_i) = \sum_i \left[\delta_i \left(w_i - \ln \frac{1}{p} \right) - e^{w_i} \right]$, where $w_i = p(\beta' x_i + \ln t_i)$ and t_i is the time at which a country reported data if $\delta_i = 1$ or the last observed time if $\delta_i = 0$. Note that this is a simplified description of the model we actually use, because in our data, the independent variables *x* are not constant over time, but vary both over country and over time. We refer readers interested in seeing how time-varying covariates are incorporated to Kalbfleisch and Prentice (1980: 122-6).

We can estimate the Weibull model either considering only the first time a country reports information, or considering every country-year, even after a country has already begun to report. It turns out that once a country begins reporting on each of our indicators, the probability of continuing is random with respect to all of the variables that we tried. Thus, we report results that consider only the first transition – the first instance of going from "not reporting" to "reporting." Results allowing for repeated "events" (available on request) only serve to increase our confidence in our findings.[15]

Table 5 about here

Table 5 presents the results. First, consider the effects of our control variables: per capita income and IMF participation. Unlike in tables 2, 3, and 4, their effects are, by and large, statistically insignificant. Per capita income even has the wrong sign for most of our indicators. IMF participation has a significant positive effect on the reporting of inflation data, but otherwise its positive effects are not statistically significant.

These results are surprising but understandable. The effect of time on transparency is positive for most of our indicators. Consider the row labeled "Duration dependence (ln p)" in Table 5. This parameter describes the propensity to report data over time. For all of our indicators, the value is greater than zero, indicating some positive duration

[15] In addition to the Weibull model, we obtained similar results using Cox regression analysis, in which duration dependence is accounted for but not explicitly modeled, and using Dynamic Probit, where the transition probability is estimated assuming no duration dependence. All of these results are available on request.

dependence. The positive effect is significant for unemployment and infant mortality rates. The likelihood of data becoming available has increased over time. Both per capita income and IMF participation have also trended upward over time. For the most part, levels of economic development have increased over time, and the IMF becomes involved in larger numbers of countries practically every year. Since both of these variables are correlated with time, once we account for the positive trend of reporting data over time, the effects presented in the previous tables virtually disappear.

Note that this does not have to be the case when one employs duration analysis. In their study of the survival of democracies, Przeworski et al. (2000) found that per capita income trumps time when explaining which democracies survive and which break down.[16] In our case, however, time appears to trump per capita income and IMF participation. This is not to say that these variables have no effect. But it appears that the other processes that occur over time, which our duration model is accounting for, have more statistically significant impacts on transparency than these variables.

Turning to the effect of democracy, it appears that the impact of political regime is robust to controlling for duration dependence. For all of our indicators, democracy has a positive impact on the propensity of a country to report data. This is true even for economic growth, although the positive effect is not statistically significant. The same is true for infant mortality rates. For our key variables of interest, inflation and unemployment, the positive effect of democracy on transparency is highly statistically significant.

In sum, using a host of different statistical techniques and variables for which data are available, we show that when it comes to inflation and unemployment, and other indicators that potential voters care about, democracies are more likely to report data than non-democracies.

[16] In the Przeworski et al. (2000) study, if one fails to control for per capita income, democracies appear to "consolidate" over time – becoming less and less likely to breakdown as their tenure as democracies increases. But once one controls for the positive effect per capita income, the so-called "consolidation" effect disappears.

Conclusion

Our substantive conclusion is straightforward: democracies are more transparent than other political regimes. We provide both theoretical arguments of why this is so as well as evidence from data provided by governments to the World Bank. We feel that this finding is intrinsically interesting. It confirms what has often been taken for granted about democracy and transparency. Beyond this, however, our results have at least two important methodological implications for other research on democracy.

The first implication regards the definition of democracy. Debate about the most appropriate measure for political regime abounds. The debate is waged today by proponents of various indicators of democracy, but it stretches back throughout modern political science. Dahl (1971), for example, took issue with Schumpeter's (1942) minimalist conception of democracy when he first introduced his concept of "polyarchy." Dahl argued that contested elections alone were not sufficient to define democracy, because "responsiveness" was also required. And for there to be responsiveness, Dahl listed eight guarantees that were necessary: freedom to form organizations, freedom of expression, the right to vote, citizen eligibility for public office, the right of political leaders to compete for support/votes, alternative sources of information, free and fair elections, institutions to make policy depend on support/votes.

In recent years, Przeworski and his colleagues, Cheibub, Limongi and Alvarez, have proposed a return to the minimalist definition of democracy. They make this suggestion not because other features – such as those listed by Dahl – are unimportant, but rather because they are interested in the relationships among these various other features. So, for example, rather than require the free flow of information as part of the definition of democracy, they restrict the definition of democracy to cover only elections. This allows researchers to test to see if there is, in fact, a relationship between elections and information.

It turns out that there is. As we have shown in our research here, the most transparent regimes are those in which the key offices of the executive and the legislature are filled through contested elections. The relationship between democracy and transparency is a

causal one, not something that must be included by definition. So the minimalist definition of democracy actually covers more territory than just elections.

The second methodological concern that this paper addresses regards missing data. Whether or not information about a country is available is no accident. The availability of data may well be driven in part by political institutions. The implication for cross-national research on democracy is clear: missing data cannot be ignored. Researchers studying the causes and consequences of political regime must be wary that their empirical findings are not driven simply by the subset of observations for which data are available. Fortunately, political scientists have been taking the problems of missing data more seriously. Methods, such as suggested by King et al. 2001, should be employed to address potential biases that may result from missing data. Beyond this concern, however, our paper shows that missing data is not just a problem to be overcome. In many cases, missing data may also be a phenomenon worthy of explanation.

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Table 1: The pooled effect of democracy on transparency

	Inflation	Unemployment	Growth	Infant Mortality Rates
The effect of Democracy	**1.92****	**2.14****	**1.92****	**0.32****
(Standard error)	(0.08)	(0.08)	(0.12)	(0.07)
Constant	0.55**	-1.59**	1.42**	-1.76**
(Standard error)	(0.03)	(0.06)	(0.04)	(0.05)
# of obs.	6,349	3,912	6,349	6,449
Log likelihood	-3157.43	-2159.55	-2218.63	-2883.54

Table 2: The pooled effect of democracy on transparency controlling for level of economic development and IMF participation

	Inflation	Unemployment	Growth	Infant Mortality Rates
The effect of Democracy	**2.36****	**1.41****	**0.61****	**0.27***
(Standard error)	(0.26)	(0.16)	(0.22)	(0.14)
The effect of GDP/capita	0.0006**	0.0004**	0.0003**	0.00001
(Standard error)	(0.00005)	(0.00003)	(0.00005)	(0.00002)
The effect of IMF participation	0.75**	0.47**	1.13**	0.28**
(Standard error)	(0.11)	(0.16)	(0.18)	(0.12)
Constant	-0.29**	-2.77**	1.36**	-2.28**
(Standard error)	(0.09)	(0.16)	(0.10)	(0.10)
# of obs.	3,372	1,350	3,372	3,435
Log likelihood	-1265.81	-560.35	-812.13	-1217.40

Table 3: The effect of democracy on transparency controlling for economic development, IMF participation, and country specific effects

	Inflation	Unemployment	Growth	Infant Mortality Rates
The effect of Democracy	**6.84****	**2.52****	**-0.45**	**0.58****
(Standard error)	(1.37)	(0.56)	(0.87)	(0.22)
The effect of GDP/capita	0.005**	0.001**	0.002**	0.00004
(Standard error)	(0.0006)	(0.0004)	(0.0004)	(0.00004)
The effect of IMF participation	2.81**	0.64*	1.38*	0.36**
(Standard error)	(0.31)	(0.39)	(0.36)	(0.14)
# of ctries	38	36	17	127
# of obs.	996	390	428	3,426
Log likelihood	-267.05	-137.21	-148.78	-1025.29

Table 4: The effect of democracy on transparency controlling for economic development, IMF participation, and regional effects

	Inflation	Unemployment	Growth	Infant Mortality Rates
The effect of Democracy	**1.87****	**1.01****	**-0.71****	**0.30***
(Standard error)	(0.28)	(0.21)	(0.26)	(0.16)
The effect of GDP/capita	0.001**	0.0003**	0.0004**	0.00002
(Standard error)	(0.0001)	(0.00004)	(0.0001)	(0.00003)
The effect of IMF participation	0.74**	0.61**	0.92**	0.28**
(Standard error)	(0.11)	(0.19)	(0.19)	(0.12)
Africa	1.25**	-5.16**	2.86**	-0.14
(Standard error)	(0.29)	(0.59)	(0.32)	(0.40)
South Asia	2.03**	-2.13**		-0.16
(Standard error)	(0.38)	(0.58)		(0.47)
East Asia				0.02
(Standard error)				(0.54)
S. E. Asia	4.23**	-1.35**		0.003
(Standard error)	(0.58)	(0.55)		(0.45)
Oceania		-3.17**	2.59**	
(Standard error)		(0.62)	(0.47)	
Middle East	1.02**	-2.62**	2.30**	-0.02
(Standard error)	(0.32)	(0.53)	(0.31)	(0.42)
Latin America	2.02**	-1.90**		-0.11
(Standard error)	(0.34)	(0.52)		(0.40)
Caribbean	0.80**	-3.26**		-0.46
(Standard error)	(0.37)	(0.58)		(0.46)
East Europe	-0.31	-4.72**		-0.29
(Standard error)	(0.40)	(0.79)		(0.56)
Industrial ctries		-2.16**	4.06**	-0.21
(Standard error)		(0.64)	(0.56)	(0.44)
Constant	-1.64**	0.28	-1.68**	-2.18**
(Standard error)	(0.30)	(0.49)	(0.35)	(0.39)
# of obs.	2,622	1,350	2,272	3,435
Log likelihood	-1160.18	-445.50	-659.83	-1215.94

Table 5: The effect of democracy on transparency controlling for duration dependence

	Inflation	Unemployment	Growth	Infant Mortality Rates
The effect of Democracy	**1.49****	**0.78****	**0.08**	**0.25**
(Standard error)	(0.33)	(0.38)	(0.30)	(0.37)
The effect of GDP/capita	-0.00005	0.0002**	-0.00004	-0.0001
(Standard error)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
The effect of IMF participation	0.43*	0.47	0.14	0.06
(Standard error)	(0.23)	(0.31)	(0.29)	(0.34)
Africa	-2.02**	-1.37*	-2.19**	-7.76**
(Standard error)	(0.47)	(0.82)	(0.78)	(1.58)
South Asia	-1.02*	0.05	-0.03	0.08
(Standard error)	(0.62)	(0.89)	(0.88)	(1.16)
East Asia	-2.12**	1.45	-0.12	
(Standard error)	(0.83)	(1.02)	(0.83)	
S. E. Asia		0.73		0.12
(Standard error)		(0.88)		(1.13)
Oceania	1.04	-1.37	-16.64	
(Standard error)	(1.10)	(1.19)	(998.75)	
Middle East	-1.20**	0.13	-1.86**	0.30
(Standard error)	(0.56)	(0.76)	(0.82)	(1.12)
Latin America	-0.93*	0.49	-0.11	0.17
(Standard error)	(0.51)	(0.62)	(0.81)	(1.06)
Caribbean	-1.81**	-0.50	-0.13	-8.98**
(Standard error)	(0.73)	(0.70)	(1.26)	(1.91)
East Europe	-1.69**	-0.53	-3.34**	
(Standard error)	(0.73)	(0.80)	(1.05)	
Industrial ctries	-0.04		-0.09	0.49
(Standard error)	(0.65)		(0.86)	(1.09)
Constant	-1.17**	-4.46**	0.03	-0.16
(Standard error)	(0.47)	(0.87)	(0.71)	(1.06)
Duration dependence (ln p)	0.08	0.34**	0.10	1.06**
(Standard error)	(0.08)	(0.09)	(0.08)	(0.12)
# of countries:	110	129	98	69
# eventually reporting:	99	70	94	69
# of obs.	765	933	350	157
Log likelihood	-134.30	-110.27	-123.40	-46.44