The Economic Determinants of Democracy and Dictatorship
How does economic development influence the democratization process?
Most economic explanations for democracy can be linked to a paradigm called modernization theory.

Modernization theory argues that all societies pass through the same historical stages of economic development.

Although modernization theory was originally developed by economists, it was later taken up by political scientists.
moves from being immature or “traditional” to being mature or “modern,” it needs to change to a more appropriate type of government. Dictatorships might be sustainable in immature societies, but this is no longer the case in mature societies once they develop economically. Przeworski and colleagues (2000, 88) summarize modernization theory in the following way:

As a country develops, its social structure becomes complex, new groups emerge and organize, labor processes require the active cooperation of employees, and, as a result, the system can no longer be effectively run by command: The society is too complex, technological change endows the direct producers with autonomy and private information, civil society emerges, and dictatorial forms of control lose their effectiveness. Various groups, whether the bourgeoisie, workers, or just the amorphous “civil society,” rise against the dictatorial regime, and it falls.

In effect, democracy is “secreted” out of dictatorship by economic development. Although Przeworski and colleagues (2000) highlight modernization theory’s claim that countries will become democratic as they develop economically, Lipset (1959, 75) argues that modernization theory also implies that democracy will be more likely to survive in economically developed countries—as he puts it, “the more well-to-do a nation, the greater the chances that it will sustain democracy.” In sum, classic modernization theory predicts that economic development will help both (a) the emergence of democracy and (b) the survival of democracy. The basic outline of classic modernization theory is shown in Figure 6.1.

For many people, the terminology used by modernization theory and its implications are unsettling. After all, the theory suggests that all countries, once they mature, will eventually come to look like the United States and Western Europe. In effect, countries just need to grow up—rather like a baby growing up into a responsible adult. Attempts have since been made to change the terminology used to describe these “primitive” countries. These countries used to be called primitive, but scholars started to refer to them as “backward.” As this

Figure 6.1 Classic Modernization Theory

<table>
<thead>
<tr>
<th>“Traditional” society</th>
<th>“Modern” society</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large agriculture</td>
<td>Small agriculture</td>
</tr>
<tr>
<td>Small industry</td>
<td>Large industry</td>
</tr>
<tr>
<td>Small service</td>
<td>Large service</td>
</tr>
<tr>
<td>Dictatorship</td>
<td>Democracy</td>
</tr>
</tbody>
</table>
Classic modernization theory predicts that as countries develop economically, they are

1. more likely to *become* democratic

   *and*

2. more likely to *remain* democratic.

A central implication is that we should see a strong relationship between economic development and democracy.
new terminology took on negative connotations of its own, “backward” countries soon became “third world” countries. With the collapse of the Berlin Wall (see Box 8.3, “A Brief History of East Germany, 1945–1990”), this new term began to seem outmoded because the “second world” countries—the command economies behind the “iron curtain”—were no longer set apart from the rest of the world in the way they once were. In addition, “third world” began to take on negative connotations because the term implied that these countries were somehow behind the “first” and “second” worlds. As a result, scholars started referring to these countries as “underdeveloped.” This too has recently changed to “developing” countries. Although scholars have changed the terminology of classic modernization theory and felt disturbed by the implication that all countries will eventually come to look like the United States and Western Europe, we should not let political correctness stop us from asking whether this theory is actually falsified or not in the real world. Just because we do not like some of the implications of our theory is not a good reason to reject it—we have to ask what the empirical evidence says. Is classic modernization theory falsified or not?

One of the central implications of modernization theory is that there should be a strong relationship between how economically developed a country is and whether it is a democracy. But is there a positive relationship between income and democracy? Let’s look at some data. Figure 6.2 graphs the proportion of countries that are democratic at different levels of income, 1950–1990.
The data are consistent with two different stories linking income and democracy.

1. **Classic modernization theory** predicts that democracy is more likely to emerge and survive as countries develop and become richer.

2. The **survival story** predicts that democracy is more likely to survive as countries develop and become richer, but it is not more likely to emerge.
Why might increased income help democratic survival?
Why might increased income help democratic survival?

Suppose you are a rich person living in a democracy.

- Autocracy is a big gamble.

Suppose you are a poor person living in a democracy.

- Autocracy is less of a gamble.
Principles of Comparative Politics

Scientists find themselves in this type of situation, they must try to deduce additional hypotheses from their theories in the hope that these additional hypotheses will help them decide which of the competing theories is most consistent with the observed world. As we saw in Chapter 2, competing stories will always share some implications in common (otherwise they would not be explanations for the same phenomena), but they must always differ in others (otherwise they would not be different explanations). It is up to the political scientist to identify these divergent and discriminating implications and come up with a critical test to identify which story is most consistent with the observed world.

Boix and Stokes (2003) graphically show how modernization theory and the survival story expect increased income to affect the probability of transitioning to democracy and the probability of transitioning to dictatorship. We reproduce their basic plot in Figure 6.3. Note that both modernization theory and the survival story predict that the probability of a transition to dictatorship decreases as income increases (the solid lines in both panels slope down). In other words, both stories predict that increased income helps democratic survival.

What about the emergence of democracy? Although modernization theory predicts that a transition to democracy increases with income (the dotted line in the left panel slopes up), the survival story predicts that the probability of a transition to democracy is unaffected by increasing income (the dotted line in the right panel is flat).

Note that the probability of any type of transition is simply the sum of the probability of a transition to dictatorship and the probability of a transition to democracy weighted by the

Source: Adapted from Boix and Stokes (2003).

Figure 6.3 Expected Probability of Regime Transitions as Income Increases according to Modernization Theory and the Survival Story

<table>
<thead>
<tr>
<th>Expected Probability of Regime Change</th>
<th>Income</th>
<th>Modernization Theory</th>
<th>Survival Story</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Transition to dictatorship</td>
<td>Transition to democracy</td>
</tr>
</tbody>
</table>
6: The Economic Determinants of Democracy and Dictatorship

The probability that a country will experience any kind of regime transition declines with increased income. This is because the survival story predicts that increased income increases democratic stability (fewer transitions to dictatorship) but has no effect on the stability of dictatorships (no effect on transitions to democracy). In contrast, the effect of increased income on the probability of any kind of regime transition is ambiguous in modernization theory. This is because higher average incomes increase the stability of democracies but reduce the stability of dictatorships—modernization theory does not tell us which effect is stronger. In sum, then, modernization theory and the survival story share two implications in common but differ on two as well. All four implications are summarized in Table 6.1.

We now evaluate the implications of both modernization theory and the survival story using data from Przeworski and colleagues (2000). As predicted by both stories, democracies are more common in rich countries than poor countries (Implication 1). We saw this earlier in Figure 6.2, which showed that the proportion of countries that were democratic at different levels of income was larger when income was high than when income was low. This result is further confirmed by Figure 6.4, which plots the number of years that all countries (country years) have lived under democracy or dictatorship at different levels of income between 1950 and 1990. As you can see, when countries are very poor (say, when GDP per capita is below $2,000), almost 9 out of every 10 country years in the data set are lived under dictatorship. When countries are relatively rich, however (say, when GDP per capita is above $8,000), virtually all the country years in the data set are lived under democracy. For a broad swath of countries in between (say, when GDP per capita is between $4,000 and $6,000), there are about as many country years under democracy as there are under dictatorship.

The two critical implications that allow us to distinguish between modernization theory and the survival story concern (a) the frequency of regime transitions in general and (b) the effect of increased income on the probability of democratic transitions in particular.

### Table 6.1 Implications from Modernization Theory and the Survival Story

<table>
<thead>
<tr>
<th>Modernization theory</th>
<th>Survival story</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Democracy is more common in rich countries than poor countries.</td>
<td>2. Transitions to dictatorship become less likely as income increases.</td>
</tr>
<tr>
<td>3a. Transitions to democracy become more likely as income increases.</td>
<td>3b. Transitions to democracy are unaffected by increases in income.</td>
</tr>
<tr>
<td>4a. Regime transitions may or may not become less likely as countries become richer.</td>
<td>4b. Regime transitions become less likely as countries become richer.</td>
</tr>
</tbody>
</table>
This equation tells us that the probability of a regime transition given a particular level of income is equal to the total number of transitions at that income level divided by the number of cases (or country years) that could have transitioned at that income level.

As you can see, there is no strong relationship between income and the probability of a regime transition. Specifically, it does not appear that the probability of a regime transition decreases linearly with income as the survival story predicts. Thus, the evidence presented in Figure 6.5 would seem to falsify one of the implications of the survival story (Implication 4b, Table 6.1). In contrast, an increase in the probability of a regime transition when levels of income are low, as shown in Figure 6.5, is consistent with modernization theory; a certain amount of resources may be necessary for any change to take place. A decrease in the probability of a regime transition at high levels of income, as shown in Figure 6.5, is also consistent with modernization theory; by this point democracy should have emerged in nearly all countries, and there is no reason according to modernization theory for it not to survive.

As predicted by both stories, democracies are more common in rich countries than in poor countries.
Although the evidence suggests that the survival story is incorrect when it predicts that the frequency of regime transitions declines linearly with income, the key implication that allows us to discriminate between the survival story and modernization theory has to do with whether increases in income actually make democratic transitions more likely. In Figure 6.5, we looked only at the effect of increases in income on regime transitions in general. We now need to examine the effect of increased income on transitions to democracy and transitions to dictatorship separately. The probability of transitioning to democracy is calculated as

\[
Pr \ (\text{Transition to Democracy} \mid \text{Income Level}) = \frac{\text{Number of Transitions to Democracy}}{\text{Income Level} \times \text{Number of Dictatorial Country Years}}
\]

and the probability of transitioning to dictatorship is calculated as

\[
Pr \ (\text{Transition to Dictatorship} \mid \text{Income Level}) = \frac{\text{Number of Transitions to Dictatorship}}{\text{Income Level} \times \text{Number of Democratic Country Years}}
\]

Income has relatively little effect on the probability of a regime transition.

Figure 6.5: Probability of Regime Transitions as a Function of Income, 1950–1990

Source: Data are from Przeworski and colleagues (2000).
But we should examine the effect of increased income on transitions to democracy and transitions to dictatorship separately.
The kind of transition a country experiences is a function of income.
The economic determinants of democracy and dictatorship are much more likely to occur than transitions to dictatorship. For instance, the probability of becoming democratic is six times larger than the probability of becoming dictatorial when GDP per capita is greater than $6,000.

In sum, the evidence we have just presented suggests that the observed world looks more like the one envisioned by modernization theory than the one envisioned by the survival story. The bottom line is that additional income is positively associated with both the emergence and survival of democracy. This is entirely consistent with the predictions of classic modernization theory.

### A Variant of Modernization Theory

In the previous section, we examined the claim made by classic modernization theorists that countries are more likely to become democratic and stay democratic as they become wealthier. One common criticism of classic modernization theory is that it lacks a strong causal mechanism and that it simply relies on an empirical correlation between income and democracy (Acemoglu and Robinson 2006; Rueschemeyer, Stephens, and Stephens 1992). We now examine a variant of classic modernization theory that explicitly provides a causal mechanism linking economic development and democracy.

#### Table 6.2: Modernization Theory and the Survival Story: A Summary of the Evidence

<table>
<thead>
<tr>
<th>Modernization theory</th>
<th>Survival story</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Democracy is more common in rich countries than poor countries: YES</td>
<td></td>
</tr>
<tr>
<td>2. Transitions to dictatorship become less likely as income increases: YES</td>
<td></td>
</tr>
<tr>
<td>3a. Transitions to democracy become more likely as income increases: YES</td>
<td>3b. Transitions to democracy are unaffected by increases in income: NO</td>
</tr>
<tr>
<td>4a. Regime transitions may or may not become less likely as countries become richer: YES</td>
<td>4b. Regime transitions become less likely as countries become richer: NO</td>
</tr>
</tbody>
</table>

Additional income appears to increase both the emergence and survival of democracy, as predicted by classic modernization theory.
But what is the causal mechanism linking economic development and democracy?
A variant of modernization theory states that it is not income per se that encourages democratization, but rather the changes in the socioeconomic structure that accompany wealth in the modernization process.

This variant of modernization theory incorporates a predatory view of the state.
According to modernization theory, all societies move through a series of stages.

Specifically, we see a shift from a focus on agriculture to a focus on manufacturing and services.

Some scholars have argued that these changes in early modern Europe played a crucial role in the creation of representative government in England. Why?
Structural changes in the economy produced a shift in economic power away from traditional agricultural elites who controlled easily observable assets to a rising class of wool producers, merchants, and financial intermediaries who controlled assets that were more difficult to observe.

The key point is that the state can tax or predate on only those assets that they can observe (or count).
The increased ability of the gentry to hide their assets from state predation changed the balance of power between modernizing social groups and the traditional seats of power such as the Crown.

The Crown now had to negotiate with the new economic elites in order to extract revenue.
In return for paying their taxes, the economic elites demanded limits to state predation.

This resulted in the supremacy of Parliament over the Crown.
But why a stronger parliament?
A credible commitment problem or a time-inconsistency problem occurs when (i) an actor who makes a promise today may have an incentive to renege on that promise in the future and (ii) power is in the hands of the actor who makes the promise and not in the hands of those expected to benefit from the promise.

The establishment of a strong parliament is designed to solve the credible commitment problem by keeping power in the hands of the recipient of the promise.
The introduction of a more limited state occurred earlier and more definitively than it did in France.

This was because of the unique structure of the economy that early modernization had produced in England.
Exit, voice, and loyalty game.

In the prehistory of the game, the Crown has confiscated the assets of a segment of the elite represented by Parliament.
The Parliamentarians have three options.

1. **Exit**: Disinvest from the economy.

2. **Voice**: Petition the Crown for protection against future confiscations in exchange for a promise to continue investing in the economy.

3. **Loyal**: Keep investing and paying taxes.
If the Parliamentarians decide to use voice and petition the Crown, the Crown can respond in one of two ways. First, it can accept the new limits on its power to tax (accept). In this case, we assume that the Parliamentarians will happily continue to invest their assets and the economy will grow. Second, it can reject the new limits (reject). If the Crown rejects the limits, then the Parliamentarians must choose whether to continue investing as before (loyalty) or withdraw substantial portions of their assets from the market (exit). Depending on whether the Parliamentarians continue investing their assets, the economy will either stagnate or grow. This strategic interaction between the Parliamentarians and the Crown is shown in Figure 6.7, going from top to bottom.

As you may recall from our analysis of game-theoretic models in Chapters 3 and 4, we cannot say what we expect the actors to do unless we can make statements about how they evaluate the potential outcomes. In what follows, we use the same payoffs as we did when evaluating the EVL Game in Chapter 3.4

According to the story we have been telling, the Crown is dependent on the Parliamentarians—the Crown needs their money. In regard to the payoffs in our model, this means that \( L > 1 \). For now, let us assume that the Parliamentarians have credible exit threats, \( E > 0 \). In other words, the Parliamentarians have mobile assets and the value they get from

4. To see where these payoffs come from, we encourage the reader to refer back to Table 3.2 in Chapter 3.
Solving the EVL Game When the Parliamentarians Have a Credible Exit Threat, $E > 0$, and the Crown Is Dependent, $L > 1$

The subgame perfect equilibrium is (Demand limits, Disinvest; Accept limits).

The Crown in **England** was dependent on the Parliamentarians for revenue, $L > 1$. The Parliamentarians had mobile assets, $E > 0$. 
The Crown in France was dependent on the Parliamentarians for revenue, \( L > 1 \). The Parliamentarians did not have mobile assets, \( E < 0 \).
The English monarchy in early modern Europe accepted limits on its predatory behavior because it depended on elites with credible exit threats (mobile assets).

The French monarchy in early modern Europe did not accept limits on its predatory behavior because it depended on elites who did not have credible exit threats (fixed assets).
The argument we have just made helps alleviate some of the concern that political theorists, such as Locke, had with Hobbes’s solution to the state of nature. Recall from our discussion in Chapter 4 that Hobbes saw the creation of a powerful state that would hold its citizens in “awe” as the solution to the “war of all against all” and the “solitary, poor, nasty, brutish, and short” life that characterizes the state of nature. Although theorists such as Locke recognized that the creation of the state might solve the problem that citizens have with each other, they thought that it created a potentially more troubling problem between the citizens and the state. By surrendering control over the means of violence to the state, what was to prevent the state from using its power against its citizens? The argument we have just presented illustrates that there are some conditions under which the state will voluntarily agree to accept limits on its predatory behavior: when the state depends on a segment of society with mobile assets. Under these conditions, the citizens need not fear state predation.

**Natural Resources and Democracy**

In addition to providing a causal mechanism linking the process of modernization to the emergence of representative government, our variant of modernization theory also provides an explanation for something called the political resource curse (Barro 1999; Ross 2001, 2012). According to the political resource curse, countries that depend on revenue from natural resources, such as oil, diamonds, and minerals, will find it difficult to democratize. You might think that having natural resources would be a blessing as these resources provide access to “free” or “unearned” income that can be used to build democracy and improve the material well-being of citizens. The empirical evidence, though, consistently shows that countries that rely heavily on revenue from natural resources are unlikely to democratize. They are also prone to corruption, poor governance, and civil war.

**Table 6.3 Summary of Outcomes in the Exit, Voice, and Loyalty Game**

<table>
<thead>
<tr>
<th>Parliamentarians</th>
<th>Crown</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Is autonomous</td>
</tr>
<tr>
<td></td>
<td>( L &lt; 1 )</td>
</tr>
<tr>
<td><strong>Have a credible exit threat</strong></td>
<td>Poor dictatorship</td>
</tr>
<tr>
<td>(mobile assets)</td>
<td>(unlimited government, stagnant economy)</td>
</tr>
<tr>
<td>( E &gt; 0 )</td>
<td></td>
</tr>
<tr>
<td><strong>Have no credible exit threat</strong></td>
<td>Rich dictatorship</td>
</tr>
<tr>
<td>(fixed assets)</td>
<td>(unlimited government, growing economy)</td>
</tr>
<tr>
<td>( E &lt; 0 )</td>
<td></td>
</tr>
</tbody>
</table>

**Natural resources**

Natural resources are naturally occurring substances that are usually considered valuable, such as oil, diamonds, and minerals.
Representative government is more likely to emerge and survive when the rulers of a country depend on a segment of society consisting of a relatively large number of people holding liquid or mobile assets.

**Barrington Moore:** “No bourgeoisie, no democracy.”
Hobbes saw the creation of a strong state as a solution to the security dilemma between individuals in the state of nature.

One problem with this solution was that individuals now had to worry about being predated upon by a strong state.

Our variant of modernization theory indicates that there are conditions – a state dependent on citizens with credible exit threats – under which states will voluntarily agree to limit their predatory behavior.
How do natural resources influence the democratization process?
According to the political resource curse, countries that depend on revenue from natural resources, such as oil, diamonds, and minerals, will find it difficult to democratize. They are also more prone to corruption, poor governance, and civil war.
Demand-side explanations emphasize how resource revenues reduce both the citizens’ demand for democratic reform and government responsiveness to that demand.

Resource revenues mean that taxes are low and governments are autonomous from citizen demands.
Supply-side explanations focus on how resource revenues enable dictators to resist pressure to democratize and help them to consolidate their hold on power.

Resource revenues can be distributed as patronage to preempt or coopt opposition groups, or used to repress them.
When it comes to the political resource curse, resource dependence is more important than resource abundance.

The political resource curse is about the emergence of democracy, not the survival of democracy.
How does foreign aid influence the democratization process?
Aid optimists think that foreign aid can spur democratization efforts.

Aid pessimists think that foreign aid has a negative effect on democratization reforms.
Foreign aid can hurt democratization efforts.

By freeing governments from the need to raise taxes and providing them with access to ‘slack resources’ that can be strategically used to reward supporters and coopt opposition groups, foreign aid increases the autonomy of recipient governments from the demands of their citizens.
Is there a foreign aid curse?

- Click here (9:39-16.48)
Foreign aid can help democratization efforts, but only if:

1. the recipient country is dependent on foreign aid;

2. the aid donor wants to promote democratic reform;

3. the aid donor can credibly threaten to withdraw the aid if its demands for reform are not met.

Any democratic reforms that do occur are likely to be limited in scope.
How does economic inequality influence the democratization process?
It is commonly argued that economic inequality undermines democracy.

The possibility that the poor would expropriate the rich through the ballot box makes democracy appear costly to elites.

As a result, they often step in to block attempts at democratization – right-wing coups.
However, the empirical support for this line of reasoning is quite weak.

Our variant of modernization theory suggests that economic elites do not need to worry that the poor will expropriate them if they have credible exit threats.
Economic inequality should only be bad for democratization in those countries where the economic elites do not have credible exit threats.

Recent evidence that land inequality is bad for democracy but that income inequality is not.
Our variant of modernization theory suggests that democracies should produce reasonably good economic performance.

There will be greater heterogeneity in economic performance among dictatorships.

Some dictatorships will perform well, while others will perform poorly.
Political scientists often use statistical analyses to evaluate their theoretical claims.
The starting point for most statistical analyses is a theoretically-derived hypothesis.

A hypothesis makes a falsifiable claim about the world.
A hypothesis links a dependent variable to an independent variable.

A **dependent variable** is an outcome or thing we want to explain.

An **independent variable** is what we think will explain or determine the value of the dependent variable.
Hypothesis: An increase in $X$ (independent variable) leads to an increase in $Y$ (dependent variable).

Democratization Hypothesis: More economic development is associated with higher levels of democracy.
To evaluate a hypothesis, we must first collect data on $X$ and $Y$ for each of our units of analysis.

The **units of analysis** refer to the entities that we’re talking about in our theory.
Once we have the relevant data, we put them into a spreadsheet so that we can start the statistical analysis.

A spreadsheet essentially stores data in a tabular form.

We typically refer to the information in a spreadsheet as the data set.
contains columns and rows. Each row corresponds to a particular unit of analysis; they are our observations. For example, the rows might correspond to different countries or individuals. Each column refers to some category that contains information about each observation. For example, one column might contain the names of the units of analysis. Other columns might contain the values for the dependent variable or the values for an independent variable. Rows and columns intersect to form cells. Each cell contains a particular piece of information about a particular observation. We typically refer to the information in a spreadsheet as the data set.

Suppose we want to test the hypothesis that an increase in $X$ leads to an increase in $Y$. And let's suppose that we have collected information about $X$ and $Y$ for 100 observations or units. A snapshot of our data set is shown in Table 6.7. We can see that the value of $Y$ is 0.92 for observation 1 and 2.28 for observation 100. The value of $X$ is 2.37 for observation 3 and 0.13 for observation 98. Had we collected other pieces of information about our units other than just $Y$ and $X$, we would have put them in separate columns to the right or left of the $X$ column.

Recall that we want to see whether there is a positive relationship between $X$ and $Y$. Are higher values of $X$ associated with higher values of $Y$? One place to start is by producing a scatterplot that plots the $Y$ values in our data set against the $X$ values. This is precisely what we do in Figure 6.10. Each of the 100 circles shown in gray represents one of the ($X$, $Y$) pairs, say ($X$ = 0.50, $Y$ = 0.92), in our data set. As you can see, higher $Y$ values do tend to be associated with higher $X$ values—the circles slope upward to the right. This is consistent with our hypothesis.

While there appears to be a clear pattern in the scatterplot, we can see that not all observations with a high $X$ value are associated with a high $Y$ value, and not all observations with a low $X$ value are associated with a low $Y$ value. To better summarize the observed relationship between $X$ and $Y$, we can add a line that "best fits" the cloud of points in the scatterplot.

### Table 6.7 A Snapshot of a Data Set

<table>
<thead>
<tr>
<th>Observation</th>
<th>$Y$</th>
<th>$X$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.92</td>
<td>0.50</td>
</tr>
<tr>
<td>2</td>
<td>0.71</td>
<td>0.96</td>
</tr>
<tr>
<td>3</td>
<td>3.24</td>
<td>2.37</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>98</td>
<td>0.44</td>
<td>0.13</td>
</tr>
<tr>
<td>99</td>
<td>2.80</td>
<td>1.65</td>
</tr>
<tr>
<td>100</td>
<td>2.28</td>
<td>1.63</td>
</tr>
</tbody>
</table>
There appears to be a positive relationship between $X$ and $Y$.

But not all observations with a high value of $X$ have a high value of $Y$, and not all observations with a low value of $X$ have a low value of $Y$.

To better summarize the observed relationship between $X$ and $Y$, we could add a line that ‘best fits’ the cloud of data points.
Dependent Variable, Y

Independent Variable, X

![Scatter plot with a linear trend line](image-url)
The equation for a line is:

\[ Y = mX + b \]

\( m \) is called the coefficient and indicates the slope of the line.

\( b \) is called the constant and indicates the value of \( Y \) when \( X \) is 0.
The equation for a line is:

\[ Y = mX + b \]

\[ m > 0 \] indicates that the line slopes up and to the right, suggesting a positive relationship between \( X \) and \( Y \).

\[ m < 0 \] indicates that the line slopes down and to the right, suggesting a negative relationship between \( X \) and \( Y \).

\[ m = 0 \] indicates a horizontal line, suggesting that there is no relationship between \( X \) and \( Y \).
Dependent Variable, Y

Independent Variable, X

$Y = 1.05X - 0.05$
The key thing to note here is that the coefficients you see in a table of statistical results essentially describe slope relationships—each coefficient describes the slope of the relationship between some independent variable $X$ and the dependent variable $Y$. So the next time you see a table of statistical results, look at the sign of the coefficients (positive, negative, or zero) and think slope relationships.

In parentheses beneath the coefficient (and the constant) is something called the standard error. The standard error is essentially a measure of uncertainty. The sloping line in Figure 6.10 is the line that best fits our data, but it's only an estimate of the relationship that exists between $X$ and $Y$ more generally. The standard error gives us a sense of how certain we are that the “best-fit” line we find in our data reflects the more general relationship. The smaller the standard error relative to the size of the coefficient, the less likely it is that a relationship that exists in our data does not exist more generally. We will return to the role of the standard error shortly.

We've clearly identified a pattern in our data. There appears to be a positive relationship between $X$ and $Y$. But how confident are we that we've identified a real relationship that is not driven by the peculiarities of our data? Our data are “noisy” and perhaps the pattern we have observed has arisen by chance. Perhaps there is no relationship between $X$ and $Y$ outside of our data set. This is where statistical significance tests come in. Whenever we've identified a pattern in our data like the one in Figure 6.10, it is incumbent on us to conduct a significance test to see how likely it is that we've identified a real relationship.

If you take a statistics class, you'll find out that there are many, many different types of significance tests. However, they all have the same basic structure. 

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**Table 6.8**

A Table of Statistical Results Capturing the Pattern Shown in Figure 6.10

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Model 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>$X$</td>
<td>1.05*** (0.06)</td>
</tr>
<tr>
<td>Constant</td>
<td>-0.05 (0.10)</td>
</tr>
</tbody>
</table>

**Number of Observations**

100

***$p < 0.01$***

---
The coefficient tells us the slope of the relationship between some independent variable, $X$, and the dependent variable, $Y$.

The standard error is a measure of uncertainty and gives us a sense of how sure we are that the ‘best-fit’ line we find in our data reflects a more general relationship between $X$ and $Y$. 
There appears to be a positive relationship between $X$ and $Y$.

But how confident are we that we’ve identified a real relationship that is not driven by the peculiarities of our data?
A **significance test** is used to see how likely it is that we’ve identified a real relationship or pattern in our data.

**Step 1**: Measure the strength of the pattern in the data.

**Step 2**: Ask whether the pattern is strong enough to be believed.
Step 1 requires calculating a test statistic, $T$.

In our particular example, the test statistic is equal to the coefficient divided by the standard error.

The key point is that the larger the test statistic, the stronger the pattern in the data.
At least three factors influence the strength of the pattern in our data:

1. the raw effect size
2. the amount of noise in the data
3. the amount of data in our sample
Intuitive Ideas about the Strength of Patterns in Our Data

Figure 6.11
Note: The three columns each depict two slightly different patterns between $X$ and $Y$. The pattern in the top panel is always weaker than the corresponding pattern in the bottom panel. The two patterns in each column indicate how raw effect size (left column), the noise in the data (middle column), and sample size (right column) influence the observed strength of the relationship between $X$ and $Y$. 

- **Raw Effect Size**
  - Less Convincing Pattern
  - More Convincing Pattern

- **Noise**
  - Less Convincing Pattern
  - More Convincing Pattern

- **Sample Size**
  - Less Convincing Pattern
  - More Convincing Pattern
Step 2 involves calculating something called a \textit{p-value}.

A \textit{p-value} indicates the probability of observing a pattern as strong (or stronger) than the one we see in the data set ($T$) if, in fact, there were no pattern in general.

When the \textit{p}-value is very small, we rule out the possibility that the pattern we observe in our data occurred by chance.
Political scientists often use cutoffs in the $p$-value to determine whether they have identified a statistically significant relationship.

For example, it is common for us to say that we’ve identified a ‘statistically significant’ relationship if the $p$-value associated with a test statistic for a particular variable, $X$, is less than 0.05.

To help readers determine if a particular pattern in the data, such as a slope coefficient, is statistically significant, we often place stars next to the relevant coefficient in the table of results.
If a pattern is not considered statistically significant (no stars), then we are saying that we do not consider the $p$-value to be sufficiently small for us to rule out the possibility of no relationship between $X$ and $Y$.

In other words, we are unwilling to rule out the possibility that the pattern we observe in the data may have arisen by chance.
How does a country’s status as an oil producer, its income, and its economic growth affect the probability that it will become a democracy?
Next to each independent variable (in the other columns) is a coefficient with a corresponding standard error beneath it in parentheses. The sign of the coefficient is important because it tells us the slope of the relationship between the independent variable and the dependent variable. A positive coefficient indicates that an increase in the independent variable is associated with an increase in the probability that a country will become a democracy. A negative coefficient indicates that an increase in the independent variable is associated with a reduction in the probability that a country will become a democracy. If the statistical analysis reveals that there is no relationship between an independent variable and the probability that a country will become a democracy, then the coefficient will be zero. The coefficients basically describe particular patterns (positive, negative, none) in the data between the independent variables and the dependent variable.

Are the patterns described by the coefficients likely to be found outside of this data set? One concern is that the pattern indicated by the coefficients could have arisen because of chance elements in this particular data set, rather than because they capture some relationship in a broader sense. This is where the standard errors come in. The standard errors are measures of uncertainty, and they help us to determine how confident we should be in our results. We tend to be confident that we have found a pattern in the data that is likely to be found more generally when the standard error is small relative to the size of its corresponding coefficient. Typically, as a rule of thumb, we say that we have found a statistically significant relationship whenever the coefficient is bigger than twice the size of the standard error.

**Table 6.4 Economic Determinants of Democratic Emergence**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP per capita</td>
<td>0.00010***</td>
<td>0.00010***</td>
</tr>
<tr>
<td></td>
<td>(0.00003)</td>
<td>(0.00003)</td>
</tr>
<tr>
<td>Growth in GDP per capita</td>
<td>–0.02***</td>
<td>–0.02***</td>
</tr>
<tr>
<td></td>
<td>(0.01)</td>
<td>(0.01)</td>
</tr>
<tr>
<td>Oil production</td>
<td>–0.48**</td>
<td>–0.48**</td>
</tr>
<tr>
<td></td>
<td>(0.24)</td>
<td>(0.24)</td>
</tr>
<tr>
<td>Constant</td>
<td>–2.30***</td>
<td>–2.27***</td>
</tr>
<tr>
<td></td>
<td>(0.09)</td>
<td>(0.09)</td>
</tr>
<tr>
<td>Number of observations</td>
<td>2,407</td>
<td>2,383</td>
</tr>
<tr>
<td>Log-likelihood</td>
<td>–233.01</td>
<td>–227.27</td>
</tr>
</tbody>
</table>

**Note:** Data are from Przeworski and colleagues (2000) and cover all countries from 1946 to 1990. The results shown in Table 6.4 come from a dynamic probit model. Standard errors are shown in parentheses.

\[ **p < 0.05; ***p < 0.01 \]
Emergence of Democracy

- Increased income makes democratic transitions more likely.
- Increased economic growth makes democratic transitions less likely.
- Oil production makes democratic transitions less likely.
How does a country’s status as an oil producer, its income, and its economic growth affect the probability that it will remain a democracy?
be expected to reduce the probability of a democratic transition by 23 percent. Finally, how much less likely would it be for a country like Burkina Faso in 1987 to have become a democracy in 1988 if it were an oil producer? The answer is 66 percent less likely. In other words, a dictatorship with a GDP per capita of $500 and a growth rate of –2.15 percent is 66 percent less likely to become a democracy if it is an oil producer than if it is not an oil producer.

Throughout the chapter, we claimed, in line with classic modernization theory, that economic development affects not only the emergence of democracy but also the survival of democracy. In contrast, we argued that the political resource curse applies only to the emergence of democracy and not to the survival of democracy. Using the same data as before, we now examine how a democratic country's status as an oil producer, its income, and its economic growth affect the probability that it will remain a democracy. The results of our new statistical analyses are shown in Table 6.5.

The dependent variable is the probability of democratic survival. As a result, whether a coefficient is positive or negative now tells us whether an increase in our independent variables is associated with an increase or decrease in the probability of democratic survival. So what do the results tell us? First, we can see that the coefficient on GDP per capita is positive and statistically significant. This indicates that increased income, as measured by GDP per capita, increases the probability of democratic survival. This result is consistent with the claim made by classic modernization theory that higher levels of income help democracies survive. Second, the coefficient on growth is positive and significant. This indicates that economic growth helps democracies survive. In other words, good economic performance

<table>
<thead>
<tr>
<th>Table 6.5</th>
<th>Economic Determinants of Democratic Survival</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dependent variable: Probability that a country will be a democracy this year if it was a democracy last year.</td>
<td></td>
</tr>
<tr>
<td><strong>Independent Variables</strong></td>
<td><strong>1946–1990</strong></td>
</tr>
<tr>
<td>GDP per capita</td>
<td>0.00020***</td>
</tr>
<tr>
<td></td>
<td>(0.00004)</td>
</tr>
<tr>
<td>Growth in GDP per capita</td>
<td>0.04***</td>
</tr>
<tr>
<td></td>
<td>(0.01)</td>
</tr>
<tr>
<td>Oil production</td>
<td>–0.21</td>
</tr>
<tr>
<td></td>
<td>(0.269)</td>
</tr>
<tr>
<td>Constant</td>
<td>1.13***</td>
</tr>
<tr>
<td></td>
<td>(0.13)</td>
</tr>
<tr>
<td>Number of observations</td>
<td>1,584</td>
</tr>
<tr>
<td>Log-likelihood</td>
<td>–149.71</td>
</tr>
</tbody>
</table>

***p < 0.01
Survival of Democracy

• Increased income makes democratic survival more likely.

• Increased economic growth makes democratic survival more likely.

• Oil production has no effect on democratic survival.
Many, though certainly not all, of the regimes in this region of the world were dependent on oil revenue. In an age of Twitter and the Internet, we recognized that protest could spread quickly, but it was not clear to us that the process of democratization could be sped up appreciably. In an opinion piece written at the time, Michael Ross (2011, 5) reminded us that "no country with more oil wealth than Venezuela had in 1958 when it transitioned to democracy has ever successfully democratized." Our knowledge of the political resource curse led us to claim that there was little hope that many of the regimes that had faced widespread opposition during the Arab Spring would transition into stable democracies.

We finished this chapter in the second edition of our book by showing estimates of per capita oil and gas production in several countries in the Middle East and North Africa (Ross 2012). We reproduce these estimates here in Table 6.6. We noted at the time that if the structure of a nation's economy places constraints on the propensity to democratize, then, all other things being equal, we would expect countries near the top of this list to be much less likely to democratize than countries near the bottom of this list. Removing autocrats from office is a necessary, but not sufficient, condition for democratization. We were not surprised that it was the rulers of Tunisia and Egypt—countries with the lowest levels of per capita oil and gas production in Table 6.6—who were the first leaders to lose their grip on power.

<table>
<thead>
<tr>
<th>Country</th>
<th>Oil Income Per Capita (2009 Dollars)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Qatar</td>
<td>$24,940</td>
</tr>
<tr>
<td>Kuwait</td>
<td>$19,500</td>
</tr>
<tr>
<td>United Arab Emirates</td>
<td>$14,100</td>
</tr>
<tr>
<td>Oman</td>
<td>$7,950</td>
</tr>
<tr>
<td>Saudi Arabia</td>
<td>$7,800</td>
</tr>
<tr>
<td>Libya</td>
<td>$6,420</td>
</tr>
<tr>
<td>Bahrain</td>
<td>$3,720</td>
</tr>
<tr>
<td>Algeria</td>
<td>$1,930</td>
</tr>
<tr>
<td>Iraq</td>
<td>$1,780</td>
</tr>
<tr>
<td>Iran</td>
<td>$1,600</td>
</tr>
<tr>
<td>Syria</td>
<td>$450</td>
</tr>
<tr>
<td>Yemen</td>
<td>$270</td>
</tr>
<tr>
<td>Egypt</td>
<td>$260</td>
</tr>
<tr>
<td>Tunisia</td>
<td>$250</td>
</tr>
</tbody>
</table>