Central Bank Features and Recession Severity: Evidence from 2008

Samuel Lindquist

October 8, 2020

Abstract

Theoretically, central banks that are more independent and transparent, and thereby presumably more credible, can better influence the expectations and future outlook of economic agents than those that are not. By influencing future expected inflation and interest rates, this channel of monetary policy would impact real economic activity in the short-term. This virtue, applied to recessions, would imply that countries with more credible, transparent, and/or independent central banks are better able to lift their economy from recession than those without said features. Using evidence from the 2008 recession, this paper investigates whether there was a relationship between credibility/transparency/independence and recession severity. In 2008, Transparency had a negative relationship with both inflation change and GDP change, while independence had no relationship with GDP change, and a weakly positive relationship with inflation change.

1 Introduction

There has grown a large economic literature related to the importance of central bank credibility, independence, and transparency, with the consensus being that these features are of eminent importance in order for a central bank to fulfill its mandate (Blinder et al, 2008). The believed importance of central bank credibility and transparency largely hinges upon an assumption of rational expectations. If economic agents were not forward-looking (i.e. if their vision of the future didn’t influence current action), then central banks would have no mechanism by which they could influence economic behavior other than through conventional policy tools such as overnight interbank rates, discount rates, reserve ratios, and the like. It is only through the utilization of expectations that central bank promises about future policy may influence current behavior.

And it is only with the virtue of credibility that central bank promises will be factored into future expectations. If central banks make credible promises and are transparent about future policy action, rational economic agents could incorporate future central bank actions into their economic outlook, and act in such a way that would help fulfill the central bank’s promise ahead of time. The policy of inflation targeting exemplifies this: if credible, a central bank claim to keep inflation at
(or move towards) a certain target could quicken and simplify the process, as inflation levels are a function of expected inflation, and expected inflation is at least in part a function of future central bank policy. Therefore, an inflation target can work its way into current inflation levels, thereby influencing economic variables in real time simply due to the promise of future goals and/or policy.

Central banks that are able to leverage both expectations as well as conventional policy have more instruments in their “toolkit” by which they might affect the economy. This makes carrying out their mandate easier, as the expectations of economic agents do some of the heavy lifting for them. Additionally, they could do so at a lower cost to the economy, as the conventional levers used by central banks can be disruptive (a prime example being Volcker Disinflation). In light of this, credibility becomes quite a desirable feature for a central bank.

Applying this framework to recessions would imply that credible central banks are better at handling recessions than less credible banks, as the former could wield promises about future policy to point expectations in an expansionary direction, where as the latter would only have at its disposal conventional tools (which can be rather impotent in certain environments, like the low interest rate regime we find ourselves in now).

This paper uses GDP and inflation data from the 2008 recession to look at how countries whose central banks had varying degrees of transparency, independence, and credibility weathered the 2008 recession. It finds that countries with more transparent central banks had less severe recessions in terms of percentage change in GDP, as well as change in inflation. These relationships hold up when other institutional aspects of a country are controlled for, such as the degree to which financial systems are intertwined into household wealth, measured in financial assets per capita. With regards to independence, no relationship between independence and GDP change could be measured, while surprisingly, there was a positive relationship between independence and inflation change. Meaning central banks with more independent banks experienced higher inflation change than those with less independent central banks. No relationship between credibility and recession severity could be discerned, however this could just be due to the extreme paucity of data afforded by currently existing credibility indices. With that said, considering that transparency and independence are often considered factors of credibility, their relationships with recession severity no doubt has implications on the conversation of credibility.
2 Data

This paper uses quarterly GDP and monthly inflation data from all OECD countries (as well as others that the OECD database reports, namely, Argentina, Brazil, China, India, Indonesia, Russia, Saudi Arabia, and South Africa) throughout the span of the 2008 global recession. This sums to 45 countries. However, because all eurozone countries are under the European Central Bank, they are treated as one datapoint. Therefore, the regressions and scatterplots in this paper only use 26 data points. The fact that the 2008 recession affected almost every country within the OECD (with the exception of a few, like Australia and Poland) allows us to study how a wide range of countries reacted to a recession without encountering the dangers of comparing data samples across time. Additionally, credibility becomes more important when unconventional tools such as forward guidance (which relies explicitly on influencing expectations) are in heavy use, as they were during the 08’ recession; it is for this reason as well that the Great Recession is apt for study.

Indices for independence and transparency are taken from Dincer-Eichengreen (2014). The index for independence quantifies aspects of central bank structure such as how the Chief Executive Officer of the bank is appointed, how long their term limit is, and whether there is a framework for their removal. These features stand in as a proxy to measure the central bank’s distance from the political institutions of their country. Transparency is divided into subcategories of how the central bank communicates its current policy and future objectives: political transparency refers to how it values the relative importance of different objectives (for example, how highly it values sticking to an inflation target in the name of more volatile output shocks), economic transparency refers to the communication of data and models used by the central bank in forming its economic outlook, procedural transparency refers to the quality and frequency of communication with regards to how the central bank makes policy decisions.

The Dincer-Eichengreen indices measure transparency and independence for almost all the world’s central banks from 1998-2010. However, only a few values are considered in this paper. First and foremost are transparency and independence values from 2008. Changes in independence and transparency from 1998 to 2008 are considered as well, the intuition being that central banks that have been highly transparent or independent for a longer period are more credible than those who have only enjoyed either status for a shorter period.
Indices for central bank credibility are taken from Mackiewicz-Lyziak (2016). This index considers achievement of announced monetary policy targets, past inflation performance, transparency, independence, accountability (independence and accountability rely on indices created by Fry et al. (2000)), country risk (a measure of the quality and trustworthiness of institutions in a given country), and public debt. The weighting of respective sub-indices is extracted from Blinder (2000), in which central bankers and academics were surveyed on how they weigh the importance of different facets of monetary policy, such as “independence” and “[keeping] inflation low” to name a few. To ensure the legitimacy of their credibility measure, it is cross-referenced with another common method for assessing credibility: measuring the distance between target inflation and actual inflation, where the distance between actual inflation from the target is inversely related to credibility (i.e. central banks managing inflation far from their target will be considered less credible than those that come closer to realizing their target). The Mackiewicz-Lyziak index is highly correlated with this distance measurement, thus substantiating its legitimacy.

Data points unrelated to the central bank but relevant to how a country might weather a recession were also collected. Government spending throughout 2008-2009 as a percentage of GDP was collected to measure the magnitude of the government fiscal stimulus/bailout was collected. However, government spending was measured to have a negligible affect in any of the regression models considered, and is therefore excluded from the regression tables below. However, financial Interconnectedness, measured by the per capita value of assets held by households in each country, is considered in one of the models below, as it was measured to have a non-negligible association with recession severity.

3 Methods

In order to judge the severity of 08' recession in each country, the difference between pre-recession maximum values of GDP and CPI and their minimum values (obviously from during the recession) were used to calculate percentage change in GDP and change in inflation from peak to trough. Mathematically:

\[ \Delta GDP = \frac{GDP_{peak} - GDP_{trough}}{GDP_{trough}} \] (1)
\[ \Delta \pi = \pi_{\text{peak}} - \pi_{\text{trough}} \]  \hspace{1cm} (2)

Figure 1, showing Chile’s inflation rate from 2006-2014, makes visually clear the peak and trough points being referred to. Chile was chosen for no reason in particular, and the same treatment is applied to all countries under study for both CPI and GDP in terms of finding minimums and maximums. For deriving \( \Delta \text{GDP} \) in percentage terms, \( \text{GDP}_{\text{trough}} \) must be divided from \( \text{GDP}_{\text{peak}} - \text{GDP}_{\text{trough}} \). This mustn’t be done for \( \Delta \pi \), as \( \pi \) is already a measurement of percent change.

The general regression considered in this paper is

\[ \text{Severity}_{08} = \text{features}_{\text{CB}} + \text{features}_{\text{Financial}} \]

For \( \text{Severity}_{08} \), both \( \Delta \pi \) and \( \Delta \text{GDP} \) are considered in the regressions below as dependent variables. For \text{features}_{\text{CB}}, transparency and independence are considered, both in single variable and multivariate models. For \text{features}_{\text{Financial}}, financial interconnectedness is considered.

4 Results

When considering \( \Delta \pi \) as a measure of recession severity, both central bank transparency and independence are measured to be significant explanatory variables. Referring to Table 1, transparency is shown to have a negative relationship with \( \Delta \pi \), meaning that banks with more transparent central banks experienced lower inflation change during the 08’ recession. This is intuitive considering a major goal of transparency is to influence future inflation expectations. Surprisingly, independence is measured to have a weakly positive relationship with inflation change. This feature is visible in Figure 2, which plots transparency against \( \Delta \pi \). More independent central banks tended to have slightly higher \( \Delta \pi \) than less independent central banks. Additionally, when controlling for indepen-
dence (as Figure 2 roughly does, with a regression line for central banks with an independence score over 60 out of 100 and another for those under 60 out of 100), the relationship between transparency and inflation is shown to be negative, as is corroborated in the Table 1 regression results.

Table 1: Central Bank Features & Inflation Change

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>Dependent Variable - Percent Change in CPI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
</tr>
<tr>
<td>Transparency</td>
<td>-.3825</td>
</tr>
<tr>
<td></td>
<td>(.284)</td>
</tr>
<tr>
<td>Independence</td>
<td>.0101***</td>
</tr>
<tr>
<td></td>
<td>(.0329)</td>
</tr>
<tr>
<td>Financ. Assets</td>
<td>0.0402</td>
</tr>
<tr>
<td>Per Capita</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>(2.702)</td>
</tr>
<tr>
<td>$R^2$ =</td>
<td>.6</td>
</tr>
</tbody>
</table>

Star counts of one, two, and three relate to p-values of .1, .05, and .01, respectively.

Figure 2: Transparency and Change in Inflation

When considering $\Delta GDP$ as a measure of recession severity, only transparency was measured to be significant, not independence. As can be seen in Table 2, the correlation is measured to be
negative (like in Table 1); that is, economies with less transparent central banks experienced a greater shock to GDP. Significantly, the measured coefficient of transparency (a value hovering around -.4 to -.5) was rather robust to the addition of various variables, indicating that omitted variables were not biasing it heavily. Interpreting these regressions literally results in the claim that a one point decrease in a central bank’s transparency (on an index running from 0 to 15) is associated with a .44% larger GDP decrease.

To use a more concrete example, consider the differences between the Swedish Riksbank and the Bank of Lithuania, and how they handled the 08’ recession. The Swedish Riksbank had a transparency score of 9 out of 15 and an independence score of 77 out of 100. Contrast this with the Bank of Lithuania, which had a transparency score of 6 out of 15 and an independence score of 40 out of 100. The two faired the 08’ recession much differently. Lithuania suffered a GDP drop of 7.06% while Sweden dropped 3.85%; Lithuania’s inflation decreased by 12.9% while Sweden’s only decreased by 6.24%. To be fair, interpreting the regressions results in said fashion might convey an undeserved sense of certainty or precision. With that being said, it is appropriate to claim that there is a statistically significant relationship between how economies weathered the 08’ recession and the transparency levels of their respective central banks, thus providing evidence for the theory that central banks who are transparent about their policy are better able to effect economic activity by leveraging the expectations channel.

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>Dependent Variable - Change in GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
</tr>
<tr>
<td>Transparency</td>
<td>-0.442***</td>
</tr>
<tr>
<td></td>
<td>(0.138)</td>
</tr>
<tr>
<td>Independence</td>
<td>-0.0118</td>
</tr>
<tr>
<td></td>
<td>(0.0222)</td>
</tr>
<tr>
<td>Financ. Assets</td>
<td></td>
</tr>
<tr>
<td>per Capita</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10.548***</td>
</tr>
<tr>
<td></td>
<td>(1.287)</td>
</tr>
</tbody>
</table>

\[ R^2 = .31 \quad .01 \quad .34 \quad .54 \]

Star counts of one, two, and three relate to p-values of .1, .05, and .01, respectively.

In both Table 1 and Table 2, financial interconnectedness, measured in financial assets per capita,
is considered as a control variable. The logic for its inclusion is that the 08’ recession was catalyzed by a financial crisis, and therefore countries whose household wealth was more tied up in the financial system would be more vulnerable to incurring greater recession. In the case of $\Delta GDP$ (but not in the case of $\Delta \pi$), the data bears this out, showing a statistically significant, positive relationship between financial interconnectedness and GDP decrease.

The $R^2$ values in regression (3) from Tables 1 and 2 are worth taking note of. These regressions only use independence and transparency as explanatory variables for $\Delta \pi$ and $\Delta GDP$. This certainly isn’t a complete model, as there must be numerous other factors that affect how an economy weathera recession (magnitude of government stimulus, regulations of labor markets, to name a few), yet these regressions have rather large $R^2$ values considering the usage of only two variables: .42 and .34 for $\Delta \pi$ and $\Delta GDP$, respectively. In the case of $\Delta \pi$, an interpretation of $R^2 = .42$ is that variation in transparency and inflation accounts for 42% of variation in $\pi$. This is all to say that the explanatory power of these models—in terms of explaining variation of GDP or $\pi$—is certainly non-negligible.

In the scatterplots in both Figure 2 and 3, varying levels of central bank independence (on a scale from 1 to 100) are shown via differing shades of blue. Less independent banks are lighter blue while more independent banks are darker blue. In Figure 2, this visualization accentuates the fact...
that many independent banks had higher inflation levels than less independent banks.

No relationship between credibility and recession severity could be discerned using data from 2008. A plausible explanation for this, other than the paucity of data mentioned above, could be that 2008 was an unusually severe recession, in which fiscal policy was sure to play an abnormally large role in combatting slumping output. In this regard, it could be that central bank features played a lesser role than during a more average recession.

5 Conclusion

With data from the 2008 recession, this paper shows that central bank transparency had a significant relationship with CPI and GDP decrease, substantiating the claim that central banks who are open about their future policy and outlook are better able to influence economic activity.

The same relation, surprisingly, was not found with regard to independence. Considering that the measured relationship between independence and inflation was only weakly positive, it may be prudent to consider that it simply had no effect. Either way, this finding is surprising considering that central bankers and economists alike have perceived independence to be a preeminent concern in the conduct of monetary policy, and an important contributor to credibility (Blinder 2000). One might have guessed that this sentiment would have shown through in the 2008 recession.

With regards to credibility, the absence of any comprehensive credibility indices applicable to all countries makes direct quantitative measurement difficult. However, independence and transparency have been perceived as two integral pillars of credibility (Ibid.), and so the preceding measurements nonetheless have implications on the question of credibility.

The current COVID-19 pandemic could shed a light on the unimportance of central bank independence in times of recession. There have been calls for “Helicopter Money” by professional economists (Galí 2020) and an extension of the Ways & Means Facility by the Bank of England (opening a direct line of credit between the Bank of England and the British Treasury). Both of these running counter to the sanctity of central bank independence. It could be that, during recessions, economic agents care little about the independence or apolitical nature of the central bank when the situation is dire enough, as they would prefer a strong and dedicated effort, regardless of which arm of the government it comes from.
References


