

CORRUPTION AND ECONOMIC RESILIENCE: RECOVERY FROM THE FINANCIAL CRISIS IN WESTERN ECONOMIES

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Abstract

We consider the resilience of a group of 20 Western economies after the financial crisis of the late 2000s. We measure resilience by the growth of real GDP between 2007, the previous peak level, and 2015. The countries exhibit a broad range of experience, from a rise in GDP of 18 per cent in Australia to a fall of 26 per cent in Greece. A substantial proportion of the differences in growth rates can be accounted for by just two variables: the perceived level of corruption and membership of the Eurozone. The euro did have a negative impact on the recovery paths of the Mediterranean economies (Greece, Italy, Portugal and Spain), but their perceived corruption scores in 2007 had a bigger impact, especially on the first three of these economies.

JEL codes: E44, E65, F45.

Keywords: corruption; euro; growth; resilience.

1. Introduction

The redeeming feature of war is that it puts a nation to the test. As exposure to the atmosphere reduces all mummies to instant dissolution, so war passes supreme judgement upon social systems that have outlived their vitality. (Karl Marx, *The Eastern Question*)

Marx himself had redeeming features, in particular the ability to encapsulate a complex phenomenon in a pithy and memorable paragraph. In modern jargon, in the epigraph he is describing the effect of a major shock on a socio-economic system which lacks resilience. An economy may continue to function in benign external conditions, and even appear healthy. But a large shock rapidly exposes any weaknesses in the ability of the economy to adapt and evolve.

The financial crisis of the late 2000s was such a shock. Output began to fall in almost all Western economies during 2008. In a small number, the reduction began in the second half of 2007. But we can effectively consider 2007 as the 'peak' year of the long economic upswing of the 1990s and 2000s. We now have data for 2015, and so can calculate the change in real GDP over the 2007–15 period.

We consider a group of 20 developed economies in western Europe, North America, Australia and Japan. These countries form a reasonably coherent group in terms of the stage of their economic development. We exclude from the group the east European economies which became full members of the European Union (EU) in the 2000s. In general, these recovered strongly. But they are still at a relatively early stage of their integration into the wealthier western European economy, so higher

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growth rates can be expected, in the same way that, for example, Portugal and Spain grew rapidly for a time when they joined the EU in the mid-1980s.

The resilience of these economies in the face of the financial crisis varies very widely. Comparing the percentage growth of real GDP from the peak year prior to the crisis, 2007, with real GDP in 2015 shows that the most resilient economy grew by 18 per cent, whilst the least successful saw its real GDP shrink by 26 per cent between these years.

The purpose of this article is to explain this wide variability in resilience.

2. Data

The average growth (not weighted by size) across the 20 countries over the whole 2007–15 period was only 2.5 per cent,¹ a figure which was usually achieved in a single year in the period from the early 1990s to the crisis of the late 2000s.

In six out of the 20 countries, real GDP was still lower in 2015 than it was in 2007. This is an unusually long period for output to remain below its previous peak level. Ormerod (2010) examines annual real GDP growth in 17 Western economies over the 1871–2007 period. There are 191 episodes of recessions, where a recession here is defined as real GDP being below its previous peak level. The majority of these episodes, 114 of them, lasted for just a single year. On only seven previous occasions over the whole 1871–2007 period had real GDP remained below its previous peak after eight years, yet in the recent past we have a further six examples. So the shock was a very substantial one.

Despite the severity of the shock, some economies recovered reasonably well. In Australia, GDP was 18 per cent higher in 2015 than in 2007. But there is a wide variety of experience within this group of economies. In Greece, GDP was 26 per cent lower.

Pelloni and Savioli (2015) consider the experience of Italy. In 2015, Italian real GDP was 8 per cent lower than it was in 2007. The authors attach considerable importance to the general level of corruption in Italy as a reason for the lack of resilience in the economy. Corruption, for example, creates barriers to both expansion and innovation. Bigoni et al. (2016, p. 1318) suggest that, even within Italy itself, the persistent disparities between North and South are not just due to what they euphemistically term ‘amoral familism’ but to more general ‘persistent differences in social norms’.

Much more generally, an OECD (2013) report considers the question of the relationship between growth and corruption across the world. It notes the strong negative relationship between perceived corruption and the *level* of per capita output which is observed when economies at quite different levels of development are analysed in the same sample. It goes on to say that this does not necessarily indicate direct causation, because corruption is correlated with other variables which are known to affect economies, such as the rule of law and government effectiveness. The OECD (2013, p. 3) also makes the point that ‘in contrast to the strong correlation between perceived corruption and output levels, the correlation between perceived corruption and GDP growth is weak’. Several reasons are put forward, such as the fact that corruption might benefit growth in countries in which the regulatory system is a substantial impediment to growth.

As noted above, however, the 20 countries in the sample examined here are all developed ones, and therefore have a considerable amount in common in terms of their institutional structures. For example, by 2007 Spain and Portugal, the last ones to shed military dictatorships, had been democracies for over 30 years, and of course some of the countries in the sample have a much longer

tradition of representative democracy. And the rule of law generally holds in these countries. Of course, the overall cultures and structures of the economies do exhibit variation. But there is much less variation within this group than across the world as a whole.

The previous major shock to impact on the Western world was the quadrupling of the oil price in 1973–74. This shock ruthlessly exposed specific weaknesses in the institutional structures of certain countries, such as Italy and the UK, in terms of their resilience in the sense of being able to contain and control inflationary pressures. Amongst our sample of countries, Greece, Portugal and Spain had not yet democratised, but the rest enjoyed the broad similarities noted above. Despite this common general framework, the oil price increase led to sharp difference in inflation rates, which persisted for a long time.

In the two decades after 1953, which saw the end of the Korean War (itself an inflationary shock, albeit less dramatic than the one of 1973–74), inflation rates across the West were in general low and similar to each other. It is not the purpose of this article to analyse in detail the subsequent experience but, to illustrate the point, the annual average rate for 1953–72 was 3.6 per cent in the UK and 2.3 per cent in (West) Germany. The oil price increase led to dramatic divergences in inflation rates. In Germany, by 1976 inflation was back down to 4.5 per cent. In the UK, it was 14.6 per cent, having risen above 20 per cent in 1975. Indeed, apart from dipping marginally below in 1978, inflation in the UK remained in double digits until 1982. The militancy of the labour unions in Britain, and their refusal to recognise that real wage reductions were required to contain inflation, led to this outcome. It was only through the labour market legislation of the 1980s and Prime Minister Thatcher's defeat of the coal miners' union that inflation was eventually brought back under control.

We consider here the relationship between economic growth during 2007–15 and the level of corruption in the public sector of each economy. We postulate that, just as was the case with inflation in the 1970s, the shock of the financial crisis exposed fundamental weaknesses in certain economies. These could be contained in favourable economic circumstances, but were laid bare when nations were 'put to the test'.

The corruption score is available from the Corruption Perceptions Index of Transparency International. The score is 'based on how corrupt a country's public sector is perceived to be. It is a composite index, a combination of surveys and assessments of corruption, collected by a variety of reputable institutions. The CPI is the most widely used indicator of corruption worldwide' (Transparency International 2014).

3. Results and discussion

For the 20 countries in the sample, the correlation between the ranks of the corruption score of the countries in 2007 and in 2015 is 0.944. So from a purely statistical point of view, the results are very similar regardless of whether we use the 2007 or the 2015 corruption data. However, it is intuitively better to use the data at the start of the period when determining how much of the differences in growth outcomes it explains.

Figure 1 plots the data for real GDP growth 2007–15 and the corruption score in 2007. The solid line is the fitted line from a regression of growth on the corruption score.²

There does appear to be a kind of 'tipping point' in the relationship, if we use the term in a descriptive rather than technical sense. Transparency scores below 7 seem to have been associated with rather dramatic failures to recover.

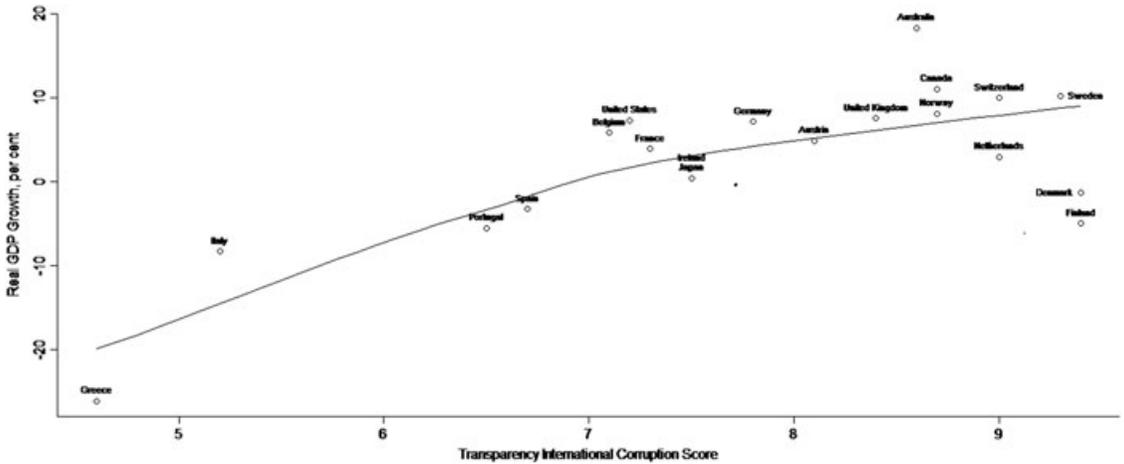


Figure 1: Real GDP growth (2007–15) and corruption score (2007), 20 Western economies.

Sources: OECD; Transparency International's Corruption Perceptions Index (the higher the number, the less perceived corruption).

Figure 1 brings into focus the long-standing issue as to whether observations which are clearly outliers from the rest of the data, such as Italy and Greece with very low transparency scores, should be excluded from the rest of the sample, or whether such observations contain valuable information and so should be retained. There is no definitive answer to this conundrum. However, in this case it does seem appropriate to retain the outliers in the analysis. The whole purpose of the investigation is to check the impact of corruption on economic recovery following a major shock, and so it is important to include in the sample the small number of countries with relatively high levels of corruption.

An obvious question is whether membership of the Eurozone explains the variability in economic recovery in the countries in the sample. The 12 countries which are in the Eurozone³ have an average growth of -1.9 per cent, compared with $+9.1$ per cent of the eight non-euro countries. Even when Greece is excluded, the average euro group growth is still only $+0.3$ per cent.

There is a huge literature on the impact of the euro, and it is not the purpose of this article to discuss it. But the idea that the euro has had a negative impact on growth is widespread. Martin Feldstein (2012, p. 105), for example, wrote: 'The euro should now be recognized as an experiment that failed. This failure, which has come after just over a dozen years since the euro was introduced, in 1999, was not an accident or the result of bureaucratic mismanagement but rather the inevitable consequence of imposing a single currency on a very heterogeneous group of countries.' Recently, the macroeconomic school known as market monetarism has been particularly critical of the negative impact of the euro (for example, Christensen 2016).

Many economists expressed such doubts even before the euro was introduced, including Feldstein himself. The literature is long standing. For example, in a heavily cited paper on optimum currency areas, McKinnon (1963, p. 720) argued that in an open economy, in which exports and imports were relatively high compared with the overall size of the economy, 'any region within a common currency area faced with a loss of demand for its products will be forced to cut its expenditures through a loss of bank reserves and regional income'.

We therefore add a variable to the regression which indicates whether the country was in the Eurozone or not. The linear regression is reported in Table 1.

Table 1: Regression of real GDP growth, per cent, 2007–2015, on corruption and Eurozone membership

	Coefficient	Std. error	<i>t</i> -value
Intercept	-22.474	10.142	-2.216
Corruption score	3.753	1.174	3.196
In/out Eurozone	-7.157	3.132	-2.286

Residual standard error: 6.316 on 17 degrees of freedom

Multiple *R*-squared: 0.5948; adjusted *R*-squared: 0.5471

The equation is in general statistically well specified, as standard tests of specification indicate. The null hypothesis that the residuals are homoscedastic is rejected only at a *p*-value of 0.252 under the standard Breusch–Pagan test, and the null hypothesis that the residuals follow a normal distribution is rejected only at a *p*-value of 0.632 under the Kolmogorov–Smirnov test.

However, the null hypothesis of the linearity of the functional form of the regression is rejected if we use the RESET test at a *p*-value of 0.003. This is not surprising, given the data plotted in Figure 1. Introducing some mild non-linearity by using the local linear regression technique, which despite its name is designed to estimate non-linear relationships, improves the fit even more with the residual standard error falling to 4.796.⁴ This is an effective adjusted *R*-squared of 0.739, compared with the 0.547 of the linear model.

There is a legitimate concern in general that non-linear fits may lead to overfitting. However, this is not the case here. There are three parameters in the linear model, and the effective number of parameters in the non-linear fit is only 3.44. This indicates, to reiterate the point, that there is only a mild amount of non-linearity in the relationship.

The local linear regression technique that is used here is a general and powerful non-linear regression tool. One drawback is that it does not provide an explicit functional form. However, a close approximation to the level of fit reported above for the non-linear regression is obtained by adding the inverse of the corruption score to the regression reported in Table 1. Both this and the level of the score, along with the euro variable, have estimated coefficients that are highly significantly different from zero. The point estimate of the coefficient on the euro variable in this approximation is -6.885 compared with -7.157 in the linear model. The introduction of the inverse variable allows the impact of increases in the corruption score to gradually weaken as the score itself rises, a feature that is obvious in Table 1.

We investigated the robustness of the results with respect to changes in specification. For example, we ran the regression including the countries' scores on the Economic Freedom of the World Index⁵ in addition to the corruption variable. The freedom variable exhibits very little variation across this sample of countries, with the minimum value being 7.2, the first quartile 7.45, the median 7.7, the third quartile 8.0 and the maximum 8.4. The respective values for the corruption variable are 4.6, 7.175, 7.950, 8.775 and 9.4. The freedom variable exhibits only a small amount of variability. It is completely insignificant when included in the regression, the null hypothesis that its estimated coefficient is significantly different from zero being rejected at a *p*-value of 0.850.

We also examined the effect of using growth from 2009, the trough year of the recession, to 2015 as the dependent variable, rather than growth from the previous peak year, 2007. Growth in the four Mediterranean economies is negative regardless of which definition is used. There are two other countries in the sample where GDP in 2015 remained below the 2007 level, namely Denmark and Finland. Using the 2009–15 period makes their growth positive, at 4.7 and 2.8 per cent respectively.

We ran the regression with growth from 2009 to 2015 as the dependent variable, both with and without the growth rates during the recession, from 2007 to 2009. It might be conjectured, for example, that the greater the fall in output during the recession, the more confidence would be dented and therefore the more feeble would be the recovery. However, this variable was completely insignificant (null hypothesis of significance only rejected at a p -value of 0.918). The regression with just the corruption and the Eurozone membership variables as explanatory factors gives virtually the same results whether growth from 2007 to 2015 or from 2009 to 2015 is used as the dependent variable. The adjusted R -squared is in fact slightly higher with the latter, at 0.561 compared with 0.547, although of course the two are not at all statistically significantly different from each other.

Evidence that a causal rather than a purely descriptive relationship has been identified is suggested by the results obtained by analysing growth over a similar length of time prior to the crisis, namely from 1999 to 2007. We use the same source for the corruption data. The Spearman rank correlation between the corruption values in 1999 and those in 2007 is 0.948, so the rankings of the countries in these two years are essentially identical. However, a regression of growth from 1999 to 2007 on the corruption and Eurozone variables gives an R -squared of only 0.017. In other words, prior to the crisis, these two variables explain none of the variation in growth rates across the 20 countries in the sample. Our hypothesis is that a major crisis reveals hitherto unidentified weaknesses which reduce resilience in the face of the shock, and this is supported by the results over the 2007–15 period.

Membership of the Eurozone reduced growth over the 2007–15 period by on average 7.2 per cent. The corruption score in 2007 is measured on a scale of 1 to 10 (the lower the score the greater the corruption), with the average across this group of countries being 7.8. Spain had a score of 6.7, so if its score had been equal to the average of the group its growth would have been + 4.7 per cent instead of – 3.2 per cent. Greece is even more dramatic, because its corruption score was only 4.2. If it had been equal to the group average, growth would still just have been negative, at – 0.4 per cent. But this contrasts sharply with the actual growth of – 26.2 per cent.

The estimated relationship accounts for a substantial proportion of the variation in growth across countries. However, it is not perfect, and some of the actual observations deviate from the level indicated by the regression more than others. In terms of deviations from the relationship fitted by the regression, in the linear model only Greece is more than two standard deviations away from the fit (2.31 standard deviations), and with the mild non-linear model there are no countries whose actual growth is more than two standard deviations away. So there are no major outliers, which might perhaps cause concern.

The deviations of the actual from the fitted values are not the same as those that can be seen in Figure 1, because the euro variable modifies the fitted line. The largest deviation is in fact Australia, where growth was 9.00 percentage points higher than indicated by the regression. Presumably this is due to Australia's close connections with the rapidly growing economies of East Asia. In Germany, growth was 5.63 percentage points higher, which might be ascribed to the fact that Germany is widely thought to have entered the Eurozone at a favourable exchange rate. Certainly, during the lifetime of the euro, German competitiveness within the Eurozone has been enhanced. Intriguingly, Italy's actual growth was 6.39 percentage points higher than the estimated value, although it was of course still negative. Pelloni and Savioli (2015) point out that Italy does still have several highly competitive industrial sectors, so perhaps this is the reason.

There are three countries whose growth performance was clearly worse than the values fitted by the regression. Japan, which has experienced endemic slow growth since its economic crisis in 1989/90, was 5.82 percentage points lower. Greece was 6.38 percentage points lower, though its actual

value was a massive fall of 26.2 per cent. So the collapse in Greek output seems largely of its own making in part due to its high levels of corruption, and in part due to its unwillingness to leave the Eurozone. Finally, Finland was 6.58 percentage points lower than indicated by the regression.

4. Conclusion

The years following the financial crisis have seen a wide variation in the growth performance of the developed economies. Marked differences in the resilience of the economies, in their capacity to recover from the crisis, have emerged.

This is the case regardless of whether growth in real GDP to 2015 is measured from the trough of the recession, in 2009, or from the previous peak year of GDP, 2007. Over the 2007–15 period, for example, Australian real GDP grew by 18 per cent, and that of Greece fell by 26 per cent. In the sample of 20 developed economies which we consider, no fewer than six of them had lower GDP in 2015 than in 2007. This is a truly dramatic lack of resilience. Over the entire 1871–2007 period, there are only seven previous individual examples of these developed economies failing to regain their previous peak GDP level eight years afterwards.

Marx posited that war was the supreme test of social systems that have outlived their vitality. The financial crisis was obviously not a war, but the scale of the shock was huge. The previous major shock to the Western economies was the quadrupling of the oil price in 1973–74. This exposed dramatic differences in the capacity of different economies to recover from an inflationary shock. The financial crisis exposed similar differences in the ability of economies to recover from a negative output shock.

A large proportion of variation in the growth rates over the 2007–15 period in the sample of 20 countries can be explained by just two variables, namely membership or otherwise of the Eurozone and the level of corruption within an economy.

Of course, the period we examine is short, at only eight years, but the results are striking. A great deal is made of the impact of the euro and macro policy in general on the dramatically poor performance of the EU's Mediterranean countries since the financial crisis. However, much of this can be attributed to their internal cultures and institutional structures.

Notes

1. The data are accessed via the OECD statistics website (<http://stats.oecd.org/>), using the links Annual National Accounts, Main Aggregates, Gross Domestic Product, constant prices, national base year.
2. Strictly speaking, it is a mildly non-linear fit, using the local linear regression command *loess* in the statistical package *R*, with the span set equal to 1. See Cleveland et al. (1992).
3. Strictly speaking, Denmark is not in the Eurozone, but as the Danish krone is essentially pegged to the euro under ERM II, we include it in the euro group. Sweden, however, is unequivocally outside the Eurozone.
4. This is with span = 1 in the loess regression. The null hypothesis that residual standard error is the same in the non-linear as in the linear regression is rejected at a *p*-value of 0.0087. In other words, there is a significant improvement in fit.
5. The 2007 values of the data were used, which are available at <http://efwdata.com/grid/WxRvYnU#/Grid>. For some reason, Japan is not in this data set, but its exclusion from the sample makes no difference to any of the results.

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