LONG-TERM SCARRING FROM THE FINANCIAL CRISIS

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It is useful to look at the distinction between transitory and permanent effects of a crisis. Financial crises normally bring on a recession, and the output costs can be large, as Hoggarth and Saporta (2001) discuss. In the majority of cases since 1970 in the OECD countries output returns to its trend level and there is no permanent effect. However, there may have been a permanent scar on the level of output in Japan after its crisis in the early 1990s, making the crisis and subsequent recession much more costly. This may reflect the nature and length of the crisis, as the banking sector was left to flounder for some years before its rescue toward the end of the crisis period. This appears to have left a permanent scar because risk premia were subsequently higher, and real asset prices have not fully recovered.

Economists think of output being determined, at least in the long run, by factor inputs and technology and not by demand. It is common to summarise these factors into a production function, and we may write this in Constant Elasticity of Substitution (CES) form as

\[ Q_t = \gamma (\delta^\rho K_t + (1 - \delta)(L_t e^{\text{tech}_{lt}})^{\rho - 1})^{1/(\rho - 1)} \]  

(1)

where \( Q_t \) is output, \( K_t \) is capital input, \( L_t \) is labour input and labour augmenting technical progress is denoted \( \text{tech}_{lt} \). There is some evidence that the elasticity of substitution, \( \sigma = 1/(1 + \rho) \) is around 0.5 (see Barrell and Pain, 1997). The elasticity of output with respect to capital is therefore approximately the output capital ratio multiplied by the factor share, as can be seen from (1) as \( \rho = 1 \) in this case and \( \delta \gamma \) is the factor share.

\[ d \log(Q_t)/d \log(K_t) = (Q_t/K_t)^\rho \delta \gamma^\rho \]  

(2)

We may write the associated cost minimising factor demands as

\[ \log(K_t/Q_t) = a_t - \sigma \log(\text{user}_t) \]  

(3)

where \( \text{ruage} \) is the real wage per unit of labour input and \( \text{user}_t \) is the user cost of capital at \( t \). We calculate the user cost of capital according to a standard Hall-Jorgensen formula:

\[ \text{user}_t = \frac{\text{pd}_t}{\text{py}_t} \left[ \text{wacc}_t + k_{dep}_t - \Delta \ln \left( \frac{\text{pd}_t}{\text{py}_t} \right) \right] (1 - \text{ctax}_t) \]  

(5)

where \( \text{pd}_t \) is an investment deflator, \( \text{py}_t \) is the GDP deflator, \( \text{wacc}_t \) is the real cost of finance, \( k_{dep}_t \) is the depreciation rate, \( e \) denotes expectations and \( \text{ctax}_t \) is the corporate tax rate. The real cost of finance as defined by Brealey and Myers (2000), \( \text{wacc}_t \), can be written as the weighted average cost of capital,

\[ \text{wacc}_t = b_t(E_t/P_t) + (1 - b_t)(c_t(lrr + \text{corpw}_t) + (1 - c_t)lrr + \text{iprem}_t)) (1 - \text{ctax}_t) \]  

(6)

This weights together the cost of equity finance which depends on the earning price ratio (E/P) and cost of debt finance. The weights are given by the share of capital in the economy that is listed on the stock market which we denote \( b_t \). The cost of debt finance follows from the average of bank and corporate bond borrowing costs, where \( c_t \) is the share of borrowing that comes from banks. Borrowing costs are adjusted by the corporate tax rate, reflecting the tax deductibility of borrowing. They are calculated as the risk-free long real interest rate (\( lrr_t \)), plus a measure of corporate spreads (\( \text{iprem}_t \)) and corporate bank borrowing margins for (\( \text{corpw}_t \)). In our analysis below, corporate spreads are calculated as the absolute difference between average corporate bond yields and yields on 10-year government bonds. In general, we can expect bank borrowing costs and bond spreads to move together, because if one source of finance becomes more expensive then firms can substitute into the other.

The recent financial crisis has resulted in a perception that risk has been underpriced, and that going forward investment decisions would take account of an increased
price for risk. A higher price for risk would increase the effective user cost of capital as it would raise \textit{iprem} and \textit{corpom} directly in the user cost, as well as increasing the equity premium in that market. These increases in risk premia and hence in the user cost of capital would reduce the equilibrium capital stock and the sustainable level of output. Figure 1 presents estimates for the UK with stochastic bounds around it, and the figure suggests that the long-run effect of the crisis on sustainable output was around 3 to 5 per cent, with the rise in risk premia that has resulted from the crisis inducing a 3 per cent fall in sustainable GDP. The UK is also likely to see an impact on output from a significant amount of return migration to the New Member States, especially as Poland, the major recent source of migrants, is one of only two OECD economies not experiencing a recession (the other is Australia, also a major migrant source for the UK). Barrell, Gottschalk, Kirby and Orazgani (2009) suggest that this could reduce output by up to \( \frac{3}{4} \) of a per cent by 2015. Weale (2009) suggests that there are also other UK-specific factors in national accounting procedures that will increase the apparent loss of output in the UK.

There are several ways to arrive at similarly based estimates for the other European economies, and we look at these countries in this note, and evaluate the factors that may make the effects differ across countries. Our estimates use the same assumptions for risk premia as in Barrell and Kirby (2009), where we assume that they increase by around 300 basis points, returning to levels not seen since before the early 1990s when the Great Moderation began. The decline in the user cost of capital we saw over this period is discussed in Barrell, Holland, Liadze and Pomerantz (2009). The effects on output are based around our model NiGEM, and depend upon the user cost of capital and the production function in the model as well as observed capital–output ratios and degrees of openness. A rise in risk premia across the OECD would decrease investment, and hence put downward pressure on real interest rates, which might fall by up to 1½ percentage points by 2020, offsetting some of the negative effects on output that follow from the initial shock.

The financial crisis has been accompanied by a fiscal debacle, with significant declines in revenue in almost all major economies leading to the emergence of large structural imbalances. We expect debt stocks in the EU to rise to 80 to 100 per cent of GDP (or more in Italy and Belgium) over the next five years, and that this will put upward pressure on real interest rates. As a consequence the user cost of capital will rise and sustainable output will be further reduced. For each 1 per cent of GDP

![Figure 1. Stochastic bounds around UK GDP projections](image)

Note: 95, 90 and 80 per cent confidence bounds around the October 2009 forecast as compared to the July 2008 forecast.

![Figure 2. Output scars and the capital–output ratio](image)

Note: Difference in output induced by crisis shocks in 2020 as compared to the ratio of capital to real GDP in 2009.
increase in the OECD-wide structural government deficit (and hence 20 per cent of GDP increase in the structural debt stock) we might, from NiGEM simulations, expect the real interest rate to rise by 0.7 percentage points by 2020, which would in turn reduce sustainable output by a similar percentage.1

In this note we combine a 300 basis point rise in risk premia with a 1 per cent of GDP structural deterioration in the government budget balance, and we look at its effects on output across the European economies. As we can see from figure 2, the effects vary, with output in the Euro Area settling around 3 per cent lower than it would otherwise have done in 2020. This is similar in scale to the pure risk premium related output scar in the UK. This average effect covers a degree of internal variation driven by structural differences between economies. The more open the economy the less the effect (with a correlation of 0.4) and the higher the user cost of capital in 2009 the smaller the effect we would see (with a correlation of –0.41).2 Perhaps more interestingly the correlation with the total capital to total output ratio is –0.53, and the pattern is given in figure 2. The higher the capital–output ratio the larger the effect on output of a given rise in the user cost of capital, and hence the larger the impact of an increase in long real rates and risk premia.3 In figure 3 we plot the relationship between the output loss and the elasticity of substitution in the production function. The more elastic is the substitution possibility the greater the fall in output, with a correlation of –0.58, much as we would expect. If the capital–labour ratio could not change (a fixed proportion production function with an elasticity of substitution of 0), then output would be unaffected by the rise in capital costs which would all be absorbed into profits.

NOTES
1 Hence a 2 per cent of GDP rise in the structural deficit over the foreseeable future would offset the downward pressure on real interest rates that follow from the rise in risk premia.
2 We exclude Ireland from the graphs and correlations because its GDP, and hence its capital output ratio, have been significantly distorted by the impact of transfer pricing by Euro Area based US subsidiaries.
3 As the log of equilibrium capital depends on the log of the user cost, any given absolute change in risk premia or long real rates is a smaller percent change in the user cost, the higher the user cost.
4 We use total capital rather than business sector capital as we would be excluding many productive public sector assets as well as the housing stock.

REFERENCES