

Leverage and Asset Bubbles: Averting Armageddon with Chapter 11?

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Preliminary and incomplete – comments welcome

Abstract

The current financial crisis poses severe challenges for central bank policymaking; but the widely-used DSGE paradigm - designed to analyse the control of inflation - seems ill-suited to understanding the origins of the crisis or designing measures to resolve it.

The relevant macroeconomic framework must surely include high leverage and overvalued collateral assets, where capital restructuring is the key to crisis resolution. The usual ‘bankruptcy’ procedures for doing this are not designed to handle macro shocks hitting the whole economy : they would fail to internalise the price effects of asset ‘fire-sales’ required to satisfy margin calls. We use a simple model of credit-constrained borrowers to show how “super” Chapter 11 procedures can play a crucial role in preventing asset price correction triggering widespread economic collapse. (Timely cuts in interest rates - which act as transfers from lenders to borrowers - will also help.)

To cope with the financial shock, balance sheets need ‘restructuring’: what about the microfoundations of conventional macroeconomics?

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Introduction: Financial crisis – and intellectual challenge

Some observers see the meltdown threatening Western financial markets as the price to be paid for distorted incentives in the financial system which encourage excessive risk-taking. If financial institutions convince their creditors that high returns due to tail risk are riskless and pay out the excess returns as bonuses, then it is only a matter of time before disaster strikes, Foster and Young (2008), Rajan (2008). Others trace the problem to industry-wide externalities. If bank equity rises with asset prices, the size of the balance sheet consistent with a given value at risk also rises, and financial intermediary demand will act pro-cyclically, with periods of heady expansion followed by fierce deleveraging, Adrian and Shin (2007).

These views are not inconsistent, of course - and their interaction may be a source of market mayhem. Moral hazard and externalities need to be combined to analyse the issues and assess plans for avoiding financial collapse, it seems. How is this to be done? Is the current DSGE paradigm², developed as a framework for macroeconomic and monetary policy, robust enough to handle current issues?

Curdia and Woodford (2008) clearly believe it is fit for purpose – with due allowance for ‘financial frictions’. All that is needed, apparently, is to adjust the Taylor rule for interest rate setting in the light of unusual spreads in financial markets, lowering the policy rate when the Libor spread widens³. “The effects of a worsening of financial intermediation, they tell us, are likely to be limited. Changes in the wedge have important distribution effects, but small aggregate effects. Monetary policy still works. Indeed, optimal monetary policy remains simple” - to the summary made by Blanchard (2008). There is a role for an interest rate spread: but, as Goodhart pointed out in discussion, no account is taken of default.

Though the DSGE paradigm focuses on intertemporal aspects of behaviour, nevertheless - with common knowledge and rational expectations built in, and credit

² i.e. Dynamic Stochastic General Equilibrium with a representative agent possessed of rational expectations, as in Woodford's *Interest and Prices* for example..

flows and leverage left out- it seems peculiarly ill-suited for analysing current developments in capital markets. Writing earlier this year – before the dramatic bank rescues of October - Paul DeGrauwe chided fellow macroeconomists in academia as well as those working in central banks over their ‘cherished myths fallen victim to economic reality’ and warned:

There is a danger that the macroeconomic models now in use in central banks operate like a Maginot line. They have been constructed in the past as part of the war against inflation. The central banks are prepared to fight the last war. But are they prepared to fight the new one against financial upheavals and recession? The macroeconomic models they have today certainly do not provide them with the right tools to be successful (DeGrauwe, 2008)

One of the current authors has explored an alternative macroeconomic paradigm that takes asymmetries of information into account, Greenwald and Stiglitz (1990), Hellman et al. (2000), Stiglitz and Greenwald (2003). For the purpose at hand - to study the dangers posed by ‘excessive leverage’ and how emergency capital reorganisation can help - we turn instead to a model of heterogeneous agents - wealth-owners with ‘deep pockets’ who face diminishing returns and productive borrowers who have constant returns but need to secure their debts by collateral for reasons of non-contractability.

The framework we use - where the dumping of collateral generates significant negative externalities - was originally designed by Kiyotaki and Moore (1987) to show that technology shocks would have more persistent real effects than foreseen in the Real Business Cycle literature. Can it be used to show why financial shocks – asset price corrections in particular - could have more profound effects than conceived of in the current macroeconomic paradigm – and to illuminate the role of capital restructuring and interest rate cuts in crisis management ?

We preface our answer with a sketch of key ingredients of the current crisis - and some of steps actually being taken by central banks and treasuries in their ‘fight against financial upheavals and recession’.

1 Financial Developments – and Rescue Plans

A decade or so of low interest rates and steady economic growth encouraged rapid expansion in the balance sheets of highly leveraged institutions (HLIs). In the US, for example, the ‘shadow banking system’ expanded so swiftly that by 2006 “the combined balance sheets of investment banks and hedge funds was over 50% of commercial banks’ balance sheets”, Adrian and Shin (2007 p15). Much of this expansion was, however, based on rising asset prices increasing the equity base of the HLIs: and the authors cited warned of severe de-leveraging if and when asset prices were to fall.

Among the assets acquired in this lending boom were securitised subprime mortgages designed to ensure that poorer families could get on to the housing ladder.

The basic idea of a subprime loan recognizes that the dominant form of wealth of low-income households is potentially their home equity. If borrowers can lend to these households for a short time period, two or three years, at a high, but affordable interest rate, and equity is built up in their homes, then the mortgage can be refinanced with a lower loan-to-value ratio, reflecting the embedded price appreciation. ... So, the mortgages were structured so that subprime *lenders effectively have an (implicit) option on house prices*. After the initial period of two or three years, there is a step-up interest rate, such that borrowers basically must refinance and the lender has the option to provide a new mortgage or not, depending on whether the house has increased in value. *Lenders are long real estate, and are only safe if they [are correct in the belief] that house prices will go up*. Gorton(2008). Italics and square parenthesis added.

By buying securites backed by subprime loans (so-called ABSs), shadow banks were acquiring assets with substantial ‘tail risk’. But if house prices were substantially above equilibrium - as Case and Shiller (2008) argued was the case and current developments confirm – a process of correction in housing prices would wipe out the option values embedded in the tranches of ABSs - leading to bank runs driven by fears of insolvency⁴. This, according to Gorton (2008), is how the bursting of the house price bubble could create a systemic crisis.

⁴ And a freeze of interbank lending to boot.

How is the crisis being handled? Initially by *ad hoc* crisis management, where investment banks in the US were allowed to fail or taken over with government support - and key mortgage granting institutions nationalised or taken over, both in the US and the UK. Ultimately, however, systemic solutions are being tried in the US and elsewhere⁵.

The first step was the Paulson TARP (Troubled Asset Relief Program) proposal - for the US taxpayer to provide funds to purchase troubled assets from financial institutions. By contrast, the UK alternative involves tax-payer financed capital injections for the banks. Eight eligible banks have committed to raise capital to the tune of £48 billion, with three quarters being made available from the government. To give banks the incentive to repay the taxpayer in a reasonably short order, a quarter of the capital raised is to be in the form of preference shares paying a dividend of 12%. As revised, the Paulson plan now also allows for capital injections, though the preference shares only carry a charge of 5%. In both countries there are also substantial government guarantees available on inter-bank lending so as to unfreeze this market and bring down Libor. (Details from M. Wolf (2008))

In his influential critique of the original Paulson proposal, Zingales (2008) argued that the best way to think of managing the US financial crisis is through the lens of US bankruptcy law. 'In Chapter 11, companies with a solid underlying business generally swap debt for equity: the old equity holders are wiped out and the old debt claims are transformed into equity claims in the new entity which continues operating with the new capital structure. Alternatively, the debt-holders can agree to cut down the face value of debt, in exchange for some warrants.'

What of the fact that financial firms are based on confidence and can ill brook the law's delays? 'Since we do not have time for a Chapter 11 and we do not want to bail out creditors', he continued, 'the lesser evil is to do what judges do in contentious

⁵ In addition there has been unprecedented liquidity provision by central banks, together with sharp cuts in interest rates, particularly in the US.

and overextended bankruptcy processes, to cram down a restructuring plan on creditors...As during the Great Depression and in many debt restructurings, it makes sense in the current contingency to mandate a partial debt forgiveness or a debt-for-equity swap in the financial sector.’ In short, what Zingales proposed - and what is now being implemented in the US and elsewhere – is a type of “super Chapter 11”.⁶

In what follows, credit constraints provide an explanation of why financial shocks can lead to exaggerated behaviour of asset prices, and how the risk of financial meltdown can be checked by “super” Chapter 11 intervention. The same framework also highlights the potential contribution of monetary policy: interest rate cuts can assist Chapter 11 operations by transferring resources from lenders to credit-constrained borrowers in crisis.

2(a) Asset Allocation and Pricing in the Presence of Credit Constraints

In the framework of Kiyotaki and Moore (1997), hereafter KM, there are two sectors: first, a credit-constrained sector whose holdings of a durable asset (land) are largely financed by short-term borrowing. KM call the agents in this sector ‘farmers’ and we could think of these as yeoman producer/consumer households or small businesses (and the financial institutions that help to package their mortgages for sale to the second sector). The latter contains deep-pocket wealth owners (and their financial agents) who finance the first sector. A more complete treatment would identify an intermediary banking sector⁷: but here we make do with two.

Households are borrowed up to the hilt and happily postpone consumption of traded goods to some later date⁸: so their flow of funds accounts show land holdings, denoted k_t , evolving as:

$$\text{Land Accumulation} = \text{Income} + \text{Net Borrowing}$$

or, in symbols,

⁶ As a procedure for crisis resolution in East Asian countries in 1997/98, we proposed a type of Super Chapter 11, Miller and Stiglitz (1999): now, it seems, the same medicine is needed for financial hegemonies.

⁷ See, for example, Gai *et al.* (2008)

⁸ Note that KM also include the production and current consumption of non-traded goods.

$$q_t(k_t - k_{t-1}) = \alpha k_{t-1} + b_t - Rb_{t-1} \quad (1)$$

where b_t is the amount of one-period borrowing, to be repaid as Rb_t (so R is one plus one-period interest rate), q_t is price of land, and α measures the productivity of land in this sector.

Non-contractibility imposes limits on borrowing, however. Specifically, KM assume each household in this sector uses an ‘idiosyncratic’⁹ technology’ (and retains the right to withdraw labour) so they may credibly threaten creditors with repudiation. This puts a strict upper limit on the amount of external finance that can be raised, as debt contracts secured on land are the only financial instruments that lenders can rely on. The rate of expansion of the highly-leveraged, credit-constrained agents is thus determined not by their inherent earning power but by their ability to acquire collateral.

The credit constraint, assumed to bind at all times, is that borrowing gross of interest matches the expected value of land, i.e.

$$b_t = E_t q_{t+1} k_t / R \quad (2)$$

Note that the degree of leverage is keyed to expectations of future prices, with more lending when capital gains are in prospect (as in Gorton’s account of sub-prime lending cited above). With perfect foresight of future land values (an assumption relaxed in the next section), substitution into (1) yields an ‘accumulation’ equation for households who use all their net worth to make down payments on land:

$$\text{ACC} \quad (q_t - q_{t+1} / R) k_t = \alpha k_{t-1} \quad (3)$$

where the expression in parentheses on the left is the down-payment required to purchase a unit of land and the term on the right measures both the productivity of those in this sector and their net worth¹⁰.

Deep-pocket investors equalise expected returns of using land as a productive asset themselves and on lending (on a secured basis) at the rate of interest R :

⁹ Idiosyncratic in the sense that once production has started at date t , only s/he has the skill necessary to produce output at $t+1$, i.e., if s/he were to withdraw labour between t and $t+1$, there will be no output at $t+1$, only the land k_t

¹⁰ By definition, the net worth of property companies at the beginning of date t is the value of tradable output and land held from the previous period, net of debt repayment, i.e. $(\alpha + q_t)k_{t-1} - Rb_{t-1} = \alpha k_{t-1}$.

$$\text{ARB} \quad f'(k_t) + E_t q_{t+1} - q_t = (R-1)q_t \quad (4)$$

where $f'(k_t)$ is the marginal productivity of land in the *unconstrained* sector (expressed as a function of k_t the amount of land in the constrained sector, assuming the total amount of land is fixed¹¹).

This arbitrage condition can be rewritten to show how the ‘down payment’ by the borrower has to match the ‘user cost’ of land in the other sector:

$$q_t - q_{t+1} / R = f'(k_t) / R = u(k_t) \quad (5)$$

where $u(k_t)$ is the discounted marginal productivity of land for deep-pocketed investors (where there is also a one period lag in production). Substituting (5) into (3), gives the simple dynamics of household asset accumulation in this framework:

$$u(k_t)k_t = \alpha k_{t-1} \quad (6)$$

where the absence of asset prices in (6) reflects the assumption of perfect foresight.

For analytical simplicity assume the user cost is a linearly related to k_t so:

$$u(k_t) = (\beta_0 + \beta k_t) / R \quad (7)$$

where β corresponds to the second derivative of the production function in the unconstrained sector, i.e. measures the rate of decline in the marginal productivity of land used by deep pocket investors and the discount factor $1/R$ reflects one-period lag in production. So the dynamics of asset allocation and prices in the absence of shocks become:

¹¹ Note that, with diminishing returns in production in the unconstrained sector, where output is $g(\bar{k} - k_t)$, defining $f'(k_t) = g'(\bar{k} - k_t)$ implies that $f'' = -g'' > 0$ i.e. households face a rising cost of acquiring land.

$$\text{ACC} \quad (\beta_0 + \beta k_{t+1})k_{t+1} / R = \alpha k_t \quad (8)$$

$$\text{ARB} \quad q_{t+1} = Rq_t - (\beta_0 + \beta k_t). \quad (9)$$

Note that this process has two points of stationarity. There is a stable equilibrium, $k^* = (R\alpha - \beta_0) / \beta$, $q^* = (\beta_0 + \beta k^*) / (R - 1)$, where land is - subject to credit constraints - allocated efficiently in terms of its productivity. But there is another - inefficient and unstable - equilibrium, $k^* = 0$, $q^* = \beta_0 / (R - 1)$, where credit-constrained households lose all their property. A key issue considered below is whether there are forces which might throw the system into the inefficient equilibrium, at least for a while. Meantime, consider the dynamics of convergence of land holdings to the ‘good’ equilibrium as illustrated in Figure 1.

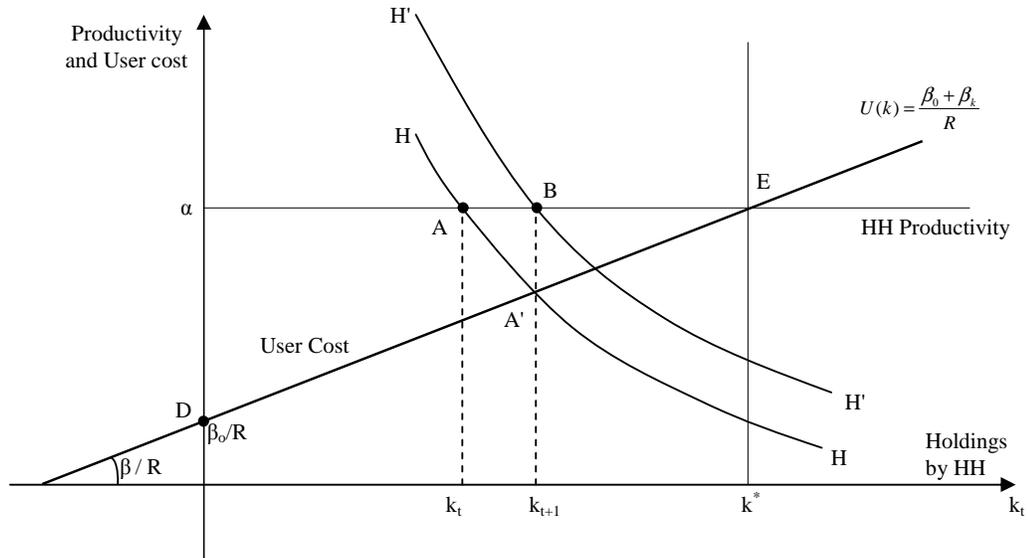


Figure 1 Asset accumulation by productive HH

The horizontal and sloped upward-sloping lines show the (constant) marginal productivity of land in the household sector and its ‘user cost’ (its discounted productivity in the other sector) respectively: and the Figure illustrates how the path to k^* from an initial value of $k_t < k^*$ is determined. Equation (6) indicates that net worth, αk_{t-1} , is used solely to acquire land at the user cost $u(k_t) = (\beta_0 + \beta k_t) / R$ in period t ,

so the points labelled A and B lie on the rectangular hyperbola HH in the figure. (On the same principle, land holding in periods $t+1$ can be found by shifting the hyperbola to the right as shown). The fact that household net worth, αk , increases as k approaches k^* from below reflects the fact that, with credit rationing, the relatively high productivity of land in this sector is only realised with delay.

What about the price of land? As rationing checks household demand, the value of land is determined by deep pocket investors present as the discounted value of 'user cost', i.e.

$$q_t = \sum_{s=0}^{\infty} u(k_{t+s}) / R^s \quad (10)$$

where this is measured along the path towards equilibrium.

To study prices and quantities together, we linearise the system around equilibrium to obtain:

$$\begin{bmatrix} k_{t+1}^0 \\ q_{t+1}^0 \end{bmatrix} = \begin{bmatrix} \lambda & \dots & 0 \\ -\beta & \dots & R \end{bmatrix} \begin{bmatrix} k_t^0 \\ q_t^0 \end{bmatrix} \quad (11)$$

where variables are measured from equilibrium (so $k_t^0 = k_t - k^*$, $q_t^0 = q_t - q^*$). It is immediately clear from (11) that the system has saddle path dynamics, as indicated in

Figure 2, $\lambda = \frac{R\alpha}{\beta_0 + 2\beta k^*}$ the stable root on the eigenvector SS leading to

equilibrium, and R the unstable root on the vertical through E.

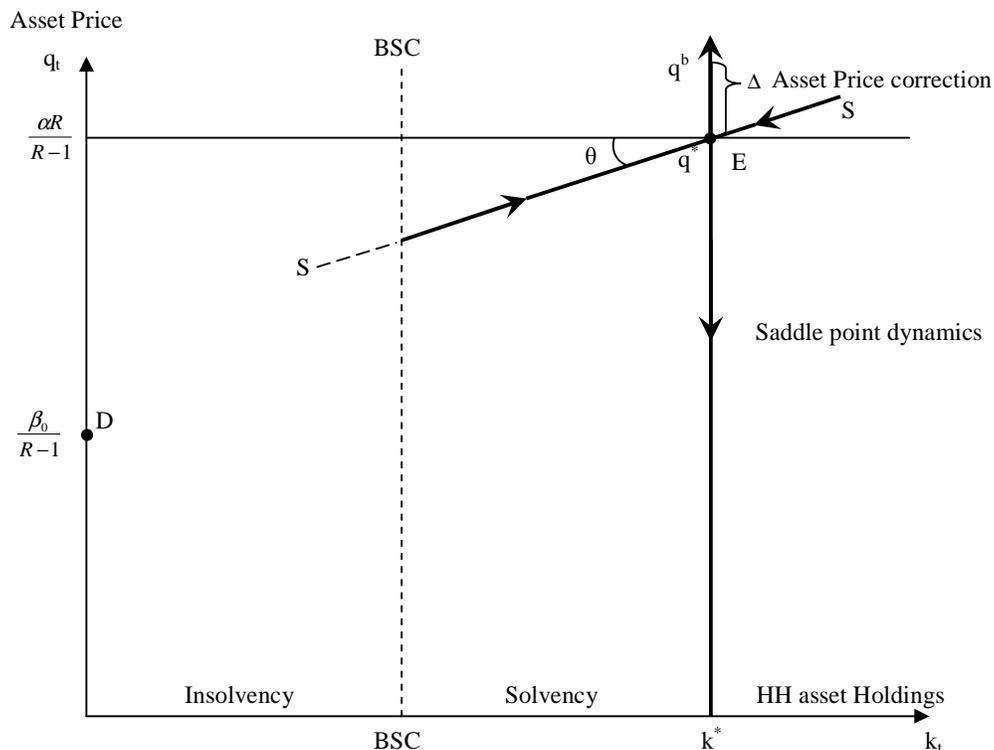


Figure 2 Price - Quantity Dynamics

The sensitivity of land prices to land sales depends on the slope of the stable path denoted

$$\theta = \frac{\beta}{R - \lambda} > 0 \quad (12)$$

which is effectively a weighted average of productivity in the two sectors.

What of the second equilibrium, shown as D? There the low land price reflects the low marginal productivity of ‘deep pocket’ investors - who own all the land in this case. So far the dynamics may suggest global convergence. But what if there is a negative shock to the net worth of credit-constrained agents: might it not trigger widespread bankruptcy?

2(b) A Bursting Bubble, De-leveraging and Disaster

Expectations have, till now, been taken to be correct. But what if forecasts turn out to be wrong – and households who have borrowed heavily against overvalued

collateral¹² - face a sudden fall in asset values? So long as the shock (the ending of overvalued land prices) comes after they have put in their labour and committed their net worth, producer/consumer households cannot unilaterally bargain a debt write-down: faced with margin calls, they will – like US farmers in the 1930s - have to sell assets to ‘pay down’ their debts: there will be ‘fire sales’ of land.

The Real Business Cycle literature to which Kiyotaki and Moore were contributing typically deals with technology shocks: but here we focus on a financial shock - a negative asset price correction. Gorton’s (2008) analysis - of how the programmes written for pricing mortgage-backed assets failed account for the possibility of house prices falling – does suggest that the US housing market may have experienced a classic speculative bubble, where assets are held largely for capital gain, a possibility consistent with the framework we are using if agents are not fully rational. Note that, for stationary allocation of land at k^* , the price may be stable at $q^* = \beta k^* / (R - 1)$; but prices may also, consistent with arbitrage, diverge from equilibrium moving along the vertical line through E in the Figure 2 (and evolving as $q_{t+1}^0 = Rq_t^0$) assuming that lenders blithely ignore the possibility of the bubble bursting¹³.

Say that the bubble bursts when land values reach q^b . As the volume of loans reflects the high price of land that was expected, there will be a loss of household net worth as prices fall and this will require a reduction of borrowing. Households attempt to deleverage by selling land, but these ‘fire-sales’ of collateral assets further reduce their price. Will the loans get repaid, or will the squeeze be counter-productive - driving all borrowers bankrupt?

The relevant initial condition involves correcting HH net worth in equation (8) for the error of forecast. So k_t and q_t are implicitly defined by

$$(\beta_0 + \beta k_t)k_t / R = [\alpha - (q^b - q_t)] = [\alpha - (q^b - q^*) - (q^* - q_t)]k^* \quad (13)$$

together with pricing equation (11) above. On the left is the total net-of-borrowing cost of holding land k_t and on the right the ‘corrected’ net worth of the households.

¹² i.e. collateral valued higher than indicated by the path that converges to the ‘good’ equilibrium, see (11).

¹³ Allen and Gale (2008) indicate how asset bubbles may reflect agency problems, as when risk-shifting leads to over-pricing of risky assets.

Given the linearization, the initial condition can be rewritten as

$$(\beta_0 + 2\beta k^*)k_t^0 = [-(q^b - q^*) - q_t^0]k^* = [-\Delta - \theta k_t^0]k^* \quad (14)$$

where $(q^b - q^*)k = \Delta$ is the initial ‘excess borrowing’ and $q_t^0 k^* = \theta k_t^0 k^*$ is the financial accelerator due to fire-sales that this induces.

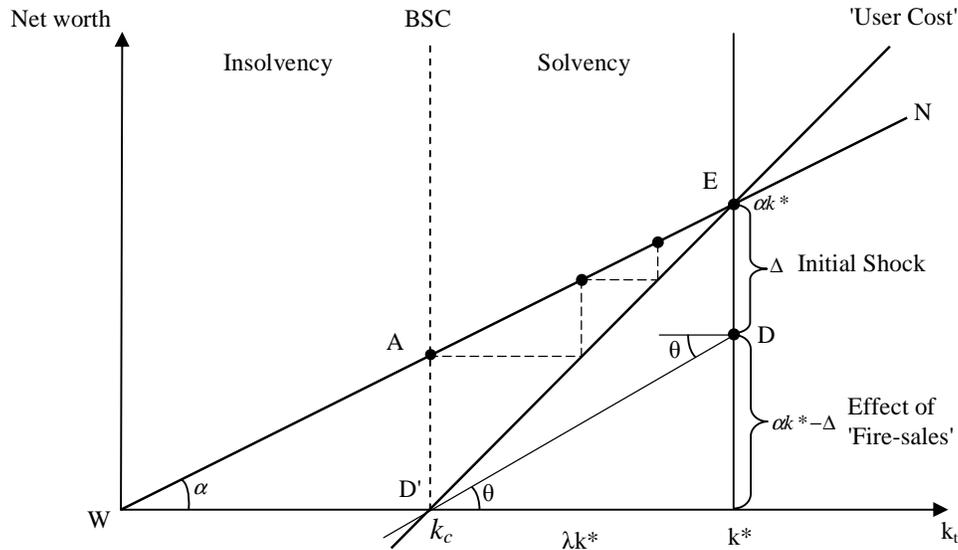


Figure 3 Net worth of credit ‘constrained’ agents

To see whether the system will survive without a crash, we plot the two sides equation of equation (14) separately in Fig. 3, using the linearised version around equilibrium where the user cost of land is shown as UU (with equilibrium at point E where the it crosses the line αk_t). In the absence of shocks and bubbles, the net worth of constrained households lies on the line NW passing through the origin with slope α . But for land holdings of k^* , their net worth immediately after the asset price correction - where the overshooting term $q_t - q^*$ has been replaced by the approximation $\theta(k_t - k^*)$ - appears as DD' with slope θ . Note that household net worth can fall below its equilibrium at E for two reasons: first because of debts contracted before the correction which will now exceed the value of their collateral assets as shown by Δ (the distance ED in the figure); second because asset prices may fall below equilibrium as collateral is sold to meet margin calls – what KM (1997, p.212) refer to as the ‘knock-on effect’. (It is

because the latter depends on the volume of disposals, that the net worth function DD' slopes downward to the left in the figure.)

There will only be a return to the 'good equilibrium' if these two curves intersect *without triggering insolvency*. This is illustrated in the figure the intersection at D' - the special case where the shock is large enough to drive net worth temporarily to zero, but not below. The productivity of land remaining in the hands of credit constrained households will restore net worth to A in the next period, and allow for gradual recovery to E thereafter, as shown in the Figure.

A smaller shock will lead to less land sales and faster recovery. But a larger shock rules out any intersection where borrowers remain solvent and will - absent intervention - lead to collapse as credit-constrained households lose their land holdings. Hence the distance ED, measured algebraically as $(\alpha - \lambda\theta)k^*$, indicates the size of the largest financial hit consistent with survival of household enterprises without intervention and the location of k_c identifies the Balance Sheet Constraint, BSC.

In fact this model of highly leveraged borrowers is extremely vulnerable to adverse shocks. Highly leveraged borrowers with very little net worth can easily become insolvent. If their net worth were only 5% of assets held as collateral for loans, a correction of asset prices in excess of this would be enough to wipe out their net worth - even before fire sales begin. The system becomes a good deal more robust if borrowers are subject to a margin requirement which provides an *ex ante* buffer against such losses, Edison et al (2000), Gai *et al.*(2008). The recent recapitalisation of banks in the UK reflects is surely designed to create such a buffer, as discussed below.

(3) Averting Melt Down

(a) Capital restructuring

To prevent melt-down may call for prompt capital restructuring: but customary legal procedures are not designed to handle macro shocks hitting the whole economy.

Bankruptcy law is meant to solve problems of creditor coordination in the absence of contracts that might otherwise do the job, and Chapter 11 of the US bankruptcy code aims to restructure credits so as to avoid premature liquidation (and to divide up the assets in the case that liquidation is necessary). But mechanisms designed to handle small, idiosyncratic shocks cannot cope with wide-spread macroeconomic shocks. In normal times, bankruptcy conveys information about the quality of a firm's management: but not in financial turmoil when the storm hits all boats. Nor can individual cases take account of externalities.

Restructuring to internalise the price effects of asset 'fire-sales' due to margin calls in the midst of a crisis requires an override of normal procedures – what we refer to as “super” Chapter 11 – and three operations are considered here: a debt-equity swap, a temporary capital injection, and a debt write-down. How this works in practice - at least for banks - has been vividly demonstrated in the recent restructuring of bank balance sheets in the UK and USA.

(A) Debt-Equity Swap

Capital restructuring under Chapter 11 bankruptcy frequently involves a debt-equity swap, where lenders become owners - relieving the borrower of collateral requirements and interest payment obligations, Zingales(2008). In Figure 4, for example, the excess debt ED owed to the wealth owner could be swapped for equity of the same value. [To avoid the moral hazard problem of equity ownership in the Kiyotaki and Moore (1997) framework, it would be necessary for ownership rights to be taken an agency which has ways of enforcing payment beyond those available to private creditors.]

(B) Capital injection

A key feature of the UK rescue plan has been the provision of (voluntary) capital injections in preference shares or unsecured debt. How can this avoid a meltdown if it is designed to be temporary? The answer, broadly speaking, is by checking the deleveraging process that follows a shock to net worth, and so limiting the negative externality of asset sales.

To see how this works, assume that the initial financial shock would lead to collapse but deep-pocket lenders – fearful of systemic risk – provide unsecured financing C when the shock occurs, to be repaid as CF one period later, where R is the gross market rate of interest. To avoid the moral hazard problem of unsecured lending, assume that (as in the current crisis) the capital injection is arranged by the government which we may assume has ways of enforcing payment beyond those available to private creditors.

If the amount provided is the minimum required to avert collapse, then, as shown in Fig. 4, this extra capital would be just sufficient to shift the financing constraint up from NN to ensure a first period equilibrium at C . The figure illustrates the case where borrowers are able to repay the temporary finance with interest in the very next period: repayment lowers the net worth constraint (by RC) but the borrowers are, nevertheless, able to reverse some of their fire-sales of land and there is convergence back to equilibrium at E as shown.

Algebraically, the minimum amount of temporary financing required can be determined in the linearized case from the condition that

$$(\beta_0 + 2\beta k^*)k_i^0 = [-(q^b - q^*) - q_i^0]k^* = [-\Delta - \theta k_i^0]k^* + C \quad (15)$$

where k_c is the point of zero net worth shown in Fig. 4.

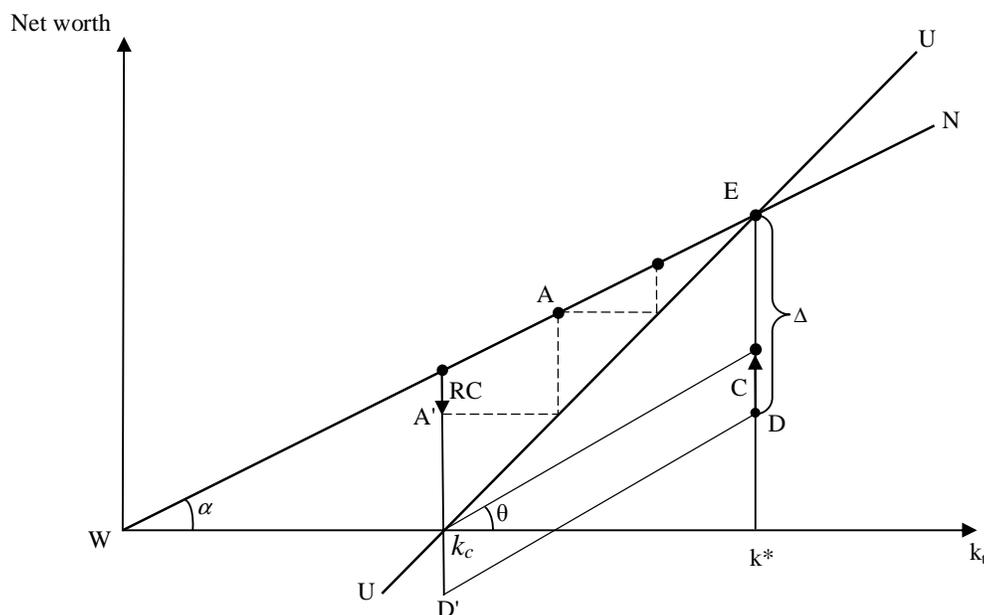


Figure 4 Temporary capital injection (C) to avert insolvency

The amount of temporary finance provided may of course exceed this minimum¹⁴ (shifting the financing constraint by more than C in the figure and reducing the impact of the shock on land prices): the essential feature is to avoid the threat to solvency posed by massive fire-sales of collateral assets.

(C) Loan Write-Downs

What about debt forgiveness? A loan write-down is another way of avoiding the negative externalities caused by loan enforcement programmes.

We need bankruptcy reform allowing for homeowners to write down the value of their homes and stay in their houses, in addition to the help that the current legislation proposes. [Furthermore], the government could assume part of the mortgage, taking advantage of the lower interest rate at which it has access to funds and its greater ability to demand repayment. In return for the lower interest rate – which would make housing more affordable – it could demand from the homeowner the conversion of the loan into a recourse loan (reducing the likelihood of default), and from the original holders of the mortgage, a write down of the value of the mortgage to say 90% of the current market price. (Stiglitz (2008))

¹⁴ As some say the UK bank rescue was designed to do.

(b) Monetary policy: emergency rate cuts

It is not only legal restructuring that can ameliorate the conditions of those who have borrowed heavily against overvalued assets whose prices are being ‘corrected’. Timely adjustment of interest rates can also help. The idea is simple enough – to stabilise the prices of those assets whose collapsing values are threatening the system. A cut in real interest rates at the time the bubble bursts - and for a while thereafter¹⁵ - will generate a transfer from lenders to borrowers, and help to limit the fire-sales at the root of the crisis.

What if interest rates are cut for a while to help indebted households in crisis by generating an unanticipated increase in their net worth. The jump in price which takes account of the size and duration of the interest rate cut and the endogeneity of land holdings is shown in Figure 5.

¹⁵ For quite some time, if Japanese experience is any guide

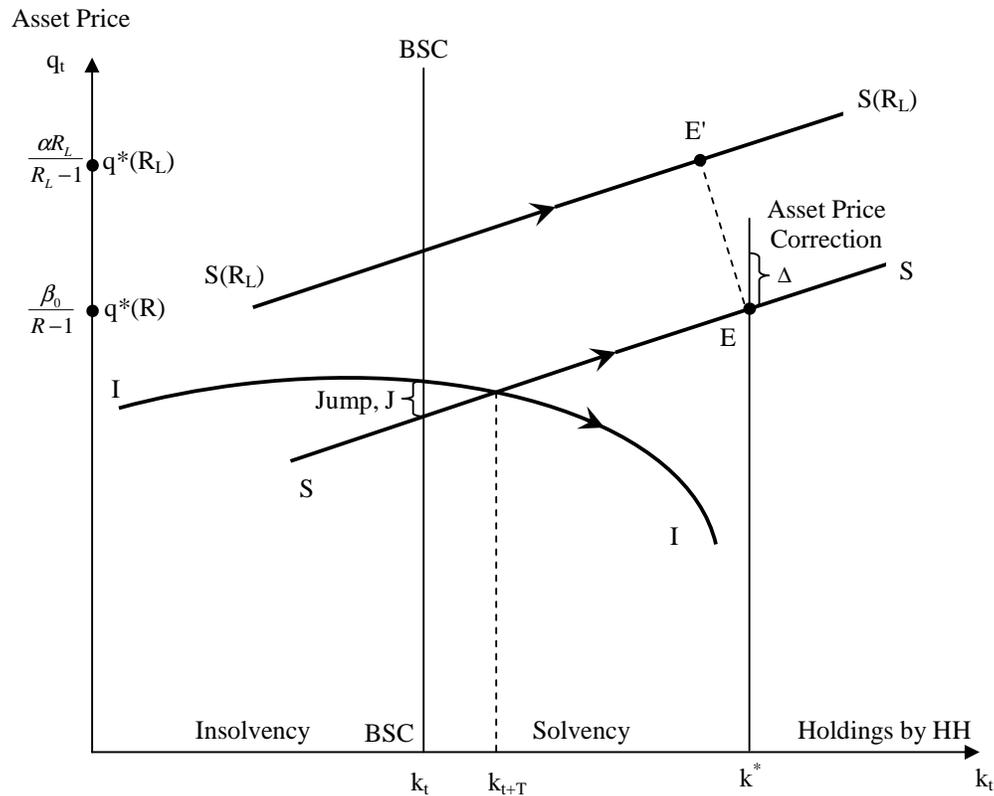


Figure 5 Checking 'fire-sales' by temporary interest rate cut

The lines labelled SS and $S(R_L)$ show the price paths leading to equilibrium for rates that are *permanently* high or low. The impact on the price of land due to a *temporary* cut in rates expected to last for T periods is shown by the integral curve II , along which it will take T periods to travel from $k(t)$ to $k(t+T)$.

The height of this curve above SS , shown by J , is the capital gain in question.

When this term is inserted into the initial condition:

$$(\beta_0 + 2\beta k^*)k_t^0 = [J - (q^b - q^*) - q_t^0]k^* = [J - x - \theta k_t^0]k^* \quad (17)$$

fire-sales will be reduced which should help avoid mass insolvency. A rate cut is no panacea: but it goes hand-in-hand with a programme of capital restructuring.

4) Conclusion (Tentative and incomplete: to be rewritten in light of FSR October 2008)

The framework used here is very much an iconic ‘reduced form’: it would more satisfactory to model the process of intermediation explicitly, for example - and to take international dimensions into account. But the message is clear enough - that credit conditions matter a lot and emergency steps to restructure balance sheets are crucial for fixing problems of excessive leverage. This stands in sharp contrast to the view from conventional DSGE models - that ‘the effects of a worsening of financial intermediation are likely to be limited’ and can be handled by interest rate cuts alone. But it seems to correspond broadly-speaking to what has actually been done.

Paul de Grauwe’s warning - that conventional models fail to connect with the issues at hand - carries another message. It is not only bank balance sheets that have to be to be restructured: the micro-foundations of macroeconomics needs similar treatment. Issues of heterogeneous agents and asymmetric information, of externalities and coordination games, are too important to be left out of the picture. What is needed - as John Muellbauer has succinctly put it - is for orthodox macro to catch up with modern micro.

In the meantime, economic history may help in designing preventive measures. It may well be necessary, for example, to reintroduce the Glass-Steagall Act in some form to reduce risk-taking in the banking sector which provides credit for households and small business - and a means of payment for everyone. The traumatic experience of Sudden Stops in Emerging Markets may also provide useful lessons¹⁶: critics of the procyclicality of finance to emerging markets, such as Griffith-Jones and Ocampo (2007), may find their analyses have a wider application. A measure proposed by Goodhart and Persaud (2008), for example, is to vary bank capital requirements - making them high in boom times and lower in slumps¹⁷.

¹⁶ Furman and Stiglitz (1998)

¹⁷ The effect of varying the loan to value ratio over the cycle in the KM model is explored in Silonov (2008).

The international spread of the financial crisis means that preventive measures must function in a global context - as the Basel Rules for prudential banking were supposed to do. But events have shown that that Basel II is misconceived. As was pointed out *ex ante* by Keating et al (2001) in a prescient critique from the LSE, it offers no guarantee of systemic financial stability¹⁸. It needs to be replaced.

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¹⁸ See also Alexander et al. (2006 pp. 40,41 et seq.) for another warning of the inadequacy of Basel II in respect of systemic risk.

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