



The Case for Integrating Accounting, Finance, and Economics in Teaching the GFC Through a Problem-Based Learning Approach

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Abstract. This paper argues that a key lesson of the GFC of 2008-9 is that our “silo” approach to the disciplines of accounting, finance, and economics (AFE) has not equipped students to deal with complex real world problems such as global financial crises. Such real world problems are interdisciplinary in their causes, effects, and solutions. The paper discusses elements of each of the AFE disciplines that are essential for understanding the GFC, and why courses in economics and finance that seek to address the GFC as a topic need to integrate ideas from these three disciplines. A problem-based learning (PBL) approach is offered as a way forward, through at least one capstone course in a business/commerce degree that brings together the strands from a range of commerce/business disciplines in a case study approach. The paper offers an outline of such a PBL approach to the GFC.

Keywords: interdisciplinarity, problem-based learning, global financial crisis.

1. Introduction

It is now clear that the Global Financial Crisis (GFC) of 2008-9 was caused by the interplay of a myriad of factors, in particular global macroeconomic imbalances, financial system regulatory failure, accounting regulatory failure, macroeconomic policy failure, market failure in pricing of risk, and irrational investor psychology.¹ Historically, major world-wide economic events have influenced the economics discipline and the economics curriculum, but have arguably had less impact on other business disciplines such as finance and accounting. For example, the Great Depression ushered in Keynesian economics; and the oil price shocks of the 1970s contributed to stagflation which led to recognition of the role of aggregate supply and expectations through the expectations-augmented Phillips curve. The GFC of 2008-9 was different in that its roots were more

1. For a book that covers the range of causes - financial, accounting, regulatory and macroeconomic - see Siegel (ed., 2009); for a focus on the sub-prime crisis see Shiller (2008); for a focus on the macroeconomic drivers, see Blanchard and Milesi-Feretti (2009); for a focus on regulatory failure, see Davis (2010).

complex with implications, it will be argued here, for curricula in economics, accounting, and finance.

A cursory look at the standard undergraduate curricula in accounting, finance, and economics (AFE) reveals a rather insular, silo approach to their respective disciplines². There is precious little discussion of balance sheets in the economics curriculum, or market failure in the accounting curriculum, or macroeconomic imbalances in the finance curriculum. Yet a proper understanding of the GFC requires an appreciation of the interplay of these ideas among others. Learning them in disciplinary isolation does not help students to make the connections that are required to understand such a complex social phenomenon as the GFC. Hence the first aim of this article is to make the case for a more interdisciplinary approach to the AFE curricula drawing on what we know about the causes of the GFC.

This article will also argue that it is not just what we teach but how we teach—our pedagogical strategies—that arguably needs to change in light of the GFC. The vast majority of practitioners and theoreticians in the fields of business were blindsided by the GFC—at least by its depth and breadth. This includes of course recent graduates of our best universities. Our students are not only graduating with gaps in their knowledge due to shortcomings in content of their curricula, but the evidence suggests they are graduating without the ability to apply their knowledge to real world problems such as the GFC. A case will be made here for more problem-based teaching and learning strategies. Specific suggestions will be given for how problem-based learning (PBL) could be applied to teaching students about the GFC, integrating the disciplines of AFE.

The paper is organised as follows. Section 2 discusses elements of each of the AFE disciplines that are essential for understanding the GFC, which explains why courses in economics and finance that seek to address the GFC as a topic need to integrate ideas from these three disciplines.³ Section 3 discusses how problem-based learning (PBL) is producing graduates who are better equipped to solve real world problems, such as the GFC, and therefore are better practitioners of their disciplines, especially economics and finance. Section 4 suggests how a topic on the GFC could be designed using a PBL approach. Section 5 concludes the paper.

2. Key Concepts from Accounting, Finance, and Economics

2.1. Debt and Asset Prices in Macroeconomics

The economic recession triggered by the GFC has been described as a “balance sheet recession” (Leijonhufvud 2009).⁴ A balance sheet analysis of the GFC offers insights that are absent from conventional macroeconomic analysis. In

2. A silo approach means a unidisciplinary approach to curriculum.

3. The discussion in Section 2 draws on Guest (2011).

conventional analysis a recession is caused by deficient aggregate demand; but in offering explanations for deficient aggregate demand balance sheets are rarely mentioned, nor are the insights from behavioural finance/economics about investor psychology. These deficiencies of conventional analysis are apparent given the following comments by Luci Ellis from Australia's Reserve Bank (Ellis 2009) about the underlying drivers of the GFC:

Perhaps the most basic underlying driver of the crisis was the inherent cycle of human psychology around risk perceptions. When times are good, perceptions of risk diminish. People start to convince themselves that the good times will go on forever. Then, when the cycle turns, risk aversion increases again, often far beyond normal levels, let alone those seen during the boom.... The effects of this boom-bust cycle of psychology are amplified when investors use leverage. Borrowing to purchase assets is lucrative when asset prices are rising, because all the upside beyond the interest costs goes to the investor, not the lender. But when times are bad and asset valuations are falling, investors' losses are magnified by leverage.

This is a story about the roles of debt, investor expectations and asset prices. The links between these variables are not generally discussed in textbook expositions of short run macroeconomic fluctuations. As evidence, Gray and Miller (2011) reviewed a sample of twelve of the best-selling textbooks prescribed in undergraduate macroeconomics subjects at leading US universities. They found that most texts gave scant, if any, attention to key concepts that would be required to understand the causes, effects and policy responses to the GFC.⁵ For comparison we looked at the introductory economics courses at 12 Australian universities⁶ representing a cross section of geographic regions and university rankings. The aim was to find out the extent to which the course outlines and the prescribed textbooks⁷ discussed the roles of debt and asset prices in affecting aggregate economic activity. We found that debt and asset prices were mentioned in a minority of the textbooks and then only briefly. Asset prices and their effects on wealth are briefly discussed in McTaggart *et al.* (2010) and Layton *et al.* (2009). The role of debt levels and ratios in affecting economic activity is mentioned by Layton *et al.* (2009) and Bernanke *et al.* (2008), but the treatment is very cursory. Expectations or confidence is, again, mentioned briefly but not

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4. The term was coined by Koo (2003) in describing the Japanese recession that began in the early 1990s.
 5. They found that only four of the twelve texts provided any discussion of a financial crisis (broadly defined).
 6. The 12 universities were: University of Queensland, Griffith University, the Australian National University, the University of Western Australia, Edith Cowan University, Flinders University, LaTrobe University, Victoria University, Deakin University, University of New England, University of Wollongong, University of New South Wales.
 7. The prescribed textbooks offered at the 12 universities were: Bernanke *et al.* (2008), Frank *et al.* (2008), Gans *et al.* (2009), Hubbard *et al.* (2008), Jackson *et al.* (2007), Mankiw (2009), Littleboy *et al.* (2009), McTaggart *et al.* (2010), Layton *et al.* (2009), Taylor (2006).

integrated with the role of debt, asset prices and economic activity. For example the role of “a wave of pessimism” or a “crash in the stock market” are acknowledged in Gans *et al.* (2009, p. 777), for example, as factors that may cause the aggregate demand (AD) curve to shift to the left and therefore lead to a short run fall in output. However, a “wave of pessimism” does not capture the critical roles played by debt, expectations and asset prices.

Minsky’s Financial Instability Hypothesis is probably the most widely cited model that formally integrates debt, asset prices and business cycles. For an accessible outline of this model by Minsky himself, see Minsky (1992). The essence of Minsky’s model can be integrated with the mainstream AD-AS (aggregate demand-aggregate supply) model as follows. Households and firms borrow to purchase assets in the expectation that asset prices will rise, which they do initially. As asset prices rise, wealth rises which increases aggregate demand curve (a wealth effect), all else equal. At some point—determined by investor psychology and the level of asset prices relative to their long run trend values—the asset bubble bursts, leading to a rapid reduction in wealth and a decrease in aggregate demand. Lower asset prices for a given level of debt imply an increase in leverage (the ratio of debt-to-assets or debt to equity). This in turn implies an increased risk of insolvency (where the value of debt is greater than the value of assets), which raises the cost of credit and restricts the availability of credit. Firms in this situation respond by reducing debt (“de-leveraging”) which requires firms to sell assets and cut costs. A loss of confidence is evidenced by the process of asset sales which causes further reductions in asset prices and wealth, and hence further reductions in aggregate demand.

2.2. Behavioural Factors in Economics and Finance

The process by which an asset bubble inflates and bursts takes us into the topics of asset valuation and market psychology, neither of which is found in standard macroeconomics courses. Asset valuation requires a consideration of discounted cash flows and the value of related assets taking account of differences in risk. These are standard topics in finance curricula but rarely are they discussed in depth in macroeconomics curricula. The analysis of market psychology—in particular deviations from standard assumptions of rationality in finance and economics—is the basis for the fields of behavioural economics and behavioural finance. While these fields are creeping into economics and finance curricula, they are not properly integrated into topics on macroeconomic fluctuations. The essential idea is that investors are not fully rational but rather “are plagued by present bias, self-serving bias, seeing illusory patterns, reference standards, money illusion and herding” (McDonald 2009, p.251). “Present bias” explains why investors tend to borrow too much when asset prices start rising: overestimate their abilities to save more in the future (to repay debt) than they have been able to in the past. “Self-serving bias” occurs when investors overestimate

their ability to judge, better than other people, when to sell assets before prices start falling. “Money illusion” is the tendency for investors to ignore inflation when evaluating the increase in purchasing power of their assets; and “herding” is the apparent proclivity of investors to follow the majority, popularised perhaps most notably by Shiller (2000).

2.3. Accounting Rules and Balance Sheets

International accounting standards essentially require that financial assets be priced at market or “fair” value. This means for example that financial assets such as mortgage-backed securities (MBS) held on the balance sheets of financial institutions⁸ must be valued at their market prices. So when the value of MBS collapsed in 2008, the value of these assets on balance sheets in turn collapsed. This made it harder for those institutions to raise capital, forcing them to sell assets and restrict lending. The effect was a downward spiral in asset values and in credit provided to businesses.

A discussion of the merits of fair value accounting is beyond the scope of this article. Whether it contributed to the financial crisis has been hotly debated: for example, Magnan (2009) argues that it did, while Laux (2010) argues that it did not. Nevertheless, a proper understanding of how a financial crisis-induced recession occurs requires an appreciation of the basic components of a firm’s balance sheet, along with notions of leverage and solvency. Davis (2010) uses a hypothetical balance sheet of a financial institution to illustrate the range of potential solutions to the immediate financial crisis in terms of financial and monetary interventions. Many students studying economics and finance also study an introductory accounting subject which would cover basic balance sheet concepts. Missing, however, is the application to an issue such as the GFC that requires an integration of the balance sheet relationships with concepts in finance and economics.

The essential ideas can be illustrated very simply using the stylised balance sheets of an investment bank in Figures 1a and 1b below. In Figure 1a the bank’s debt to equity is 9.0 or alternatively its debt to total assets ratio is 0.9. The bank has MBS of \$50m. If the market value of these securities falls by 50% the bank is obliged to “write down” the value of its investment in MBS by \$25m. The corresponding accounting entry is to write down equity by \$25m. However this leaves the firm with negative equity of \$5m: the value of its debt is greater than its assets which means that it is technically insolvent. See Figure 1b. It may still

8. These included investment banks, hedge funds and pension funds (or superannuation funds). Lehman Brothers was an investment bank in the United States that collapsed in September 2008, which triggered the escalation of the sub-prime mortgage crisis into the full-blown GFC. Investment banks and hedge funds formed part of the so-called “shadow banking” system which fell outside the scope of most banking regulations at the time of the GFC.

be able to meet debts as they fall due, depending on the pattern of cash inflow from its assets relative to the pattern of cash outflow required to service its liabilities. However the firm’s creditors and shareholders will both perceive an increase in the risk of losing their investments in the firm. Creditors are likely to call in their loans or refuse to roll them over. And it will be much harder for the firm to raise cash by selling new shares. Hence the bank could be placed under the management of liquidators.

Figures 1a: Stylised balance sheet

Investment Bank A			
<u>Assets</u>	\$m	<u>Equity</u>	\$m
MBS	50	Shareholders' capital	10
Other investments (e.g. corporate & government bonds)	150	Retained earnings	10
	200	<u>Liabilities</u>	
		Long and short term debt	160
		Other	20
	200		200

Figures 1b: MBS written down by \$25m

Investment Bank A			
<u>Assets</u>	\$m	<u>Equity</u>	\$m
MBS	25	Shareholders' capital	10
Other investments (e.g. cash, corporate & government bonds)	150	Retained earnings	10
	175	Unrealised loss on investments	-25
		<u>Liabilities</u>	
		Long and short term debt	160
		Other	20
	175		175

This simple balance sheet exposition can also illustrate the role and limitations of de-leveraging in reducing risk exposure. Given the initial balance sheet position in Figure 1a, if the bank sold \$50m of assets, consisting say of \$25m of MBS and \$25 of other investments, and used the proceeds to pay off debt, it would reduce its debt to assets ratio from 0.9 to 0.87. More importantly, it would no longer be insolvent if the remaining MBS fell in value by 50%. However, de-leveraging does not work if undertaken after the bank has fallen into

a negative equity position. This is simply an arithmetic result—if the debt/asset ratio is greater than 1, a reduction in assets by a given dollar amount and a corresponding reduction in debt will actually increase the debt/asset ratio, not decrease it.⁹ In this case other measures are required to de-leverage such as raising capital.¹⁰ De-leveraging can also fail if: (i) assets that do not have ready market prices, such as non-financial assets, are sold under “stress” which means they are sold at fire-sale prices; and/or (ii) firms are unable to raise new equity (which is quite likely if the firm is seen as having poor prospects). If de-leveraging fails, the firm would be wound up as in the case of the investment bank Lehman Brothers in September 2008. The risk of such a downward spiral towards bankruptcy is greater the higher the level of gearing in the first place.

A balance sheet perspective is also useful in illustrating the process of contagion, which is essential in order to appreciate how damage to a few key financial institutions can spread throughout the economy. For students, the simple insight is that the financial liabilities of one institution are the financial assets of other institutions. Hence in the above example (focusing on risk¹¹), if the firm becomes insolvent its debt of \$160m becomes impaired assets of other institutions which are forced to write them down in value. This in turn increases their leverage and may render some insolvent, which spreads in the same way to other institutions, and so on. The result is an increase in the risk premium on all debt, a contraction in the scale of businesses, difficulty in raising capital, all of which cause lower employment growth which in turn further reduces spending. Hence the process feeds off itself.

2.4. Securitisation

It is helpful for students to understand how MBS are created in the first place, since these played such an important role in expanding balance sheets of financial institutions leading up to the GFC. The notion of a financial security, and the process of securitisation, are usually only touched on in accounting and economics courses but are dealt with in more detail in finance. The different role of mortgage originators (banks for example) and mortgage managers (such as the infamous Freddie Mac and Fannie Mae in the U.S.) is crucial. The simple point for students to understand is that the mortgage originators sell loans to the mortgage managers so that the originators have the cash to make new loans. The

9. The more general arithmetic point is that the closer the debt/asset ratio is to 1, the smaller the effect of a given dollar reduction in both debt and assets on the debt/asset ratio. In the case where the ratio is exactly equal to 1 there is no change in the ratio when a given amount of assets are sold to pay down debt.

10. Another option is for the firm to trade its way out of negative equity but its creditors may not have the patience for that.

11. Uncertainty also has a role which cannot objectively be priced *ex ante* into debt.

mortgage managers package them up into bundles by risk class. These bundles are MBS, which are then sold to investors such as pension funds.

An understanding of the role of all of these concepts from accounting, finance, and economics is necessary for students to fully appreciate the process by which a financial asset bubble is created, bursts and causes a recession.

3. A Way Forward: A PBL Project on the GFC Integrating AFE Disciplines

A PBL approach to teaching and learning the GFC provides a natural way of integrating AFE disciplines. As demonstrated, the GFC is very much a multidisciplinary phenomenon; and it is a highly complex problem that has morphed from one phase to another: a sub-prime mortgage crisis in North America, to a North Atlantic banking crisis, to a recession in most of the major OECD countries, to a Eurozone debt crisis, and possibly (unknown at the time or writing) to a new international recession and collapse of the Euro. As a topic for students it is therefore ideally suited to a PBL approach.

We know that student satisfaction improves when students can see how their discipline helps them to solve problems that they see in the world around them (for discussion in relation to the economics discipline, see Reimman 2004). To achieve this, a useful starting point is a problem-first or inductive approach to teaching and learning. The problem or application is the vehicle for achieving the target learning outcomes. The problems need not have “solutions”—the key to learning is that the students take control, assess the problem, decide what sort of economic analysis is appropriate and apply it. The teacher is the guide rather than the expert source of knowledge at every stage of the task. For further discussion on why and how to apply PBL in undergraduate economics see Forsyth (2010). For a more general assessment of PBL, particularly when compared with conventional lecture-based teaching, see the extensive literature reviews undertaken by Albanese and Mitchell (1993), Vernon and Blake (1993) and van den Bossche *et al.* (2000). The essential conclusions from this large literature are that PBL leads to deeper learning outcomes, improves students’ ability to learn through better use of learning resources, improves knowledge retention and recall skills, improves the ability to apply knowledge to future problems, and provides a more enjoyable teaching experience.

3.1. PBL Through a Capstone Experience

The PBL project outlined below is designed for final year Commerce students who have completed introductory courses in the disciplines of accounting, finance, and economics.¹² Students need to be already familiar with core

concepts. Indeed a project such as this would be ideal for a final year capstone course in a Commerce/Business program.

Capstone courses have three essential features: they synthesise discipline specific knowledge learned in a range of courses in the degree program; they apply this knowledge to real world situations; and they focus on developing skills required in the professional workplace (Holdsworth *et al.* 2009). Capstone courses are ideally suited to fine-tuning graduate attributes—in particular the work-ready skills of critical thinking, working collaboratively and problem-solving (American National Survey of Student Engagement Report 2007). PBL, with its focus on authentic problems and skill development, is therefore a common methodology in capstone courses. Dunlap (2005) demonstrated how PBL in a capstone course was effective in developing self-efficacy which improves students work-readiness.

3.2. PBL Project Design

PBL projects are generally done in small groups of students but this is not essential—the project could be done by individual students if there are objections to group work, due perhaps to the student cohort or the physical learning environment. The essential elements in designing a PBL project are: the key aims in terms of knowledge and skill development, the key tasks for students, the role of the academic instructor as facilitator and the process for interacting with students, the process by which students manage the tasks (e.g. the structure of student groups), timetable and key milestones for completion of the PBL project.

Key student tasks and skill development in a PBL project on the GFC

- *Find* appropriate data, factual information and published analyses on the GFC:
 - What were the key developments in the banking system and when did they occur?
 - What are the current dominant explanations for these events?
 - What have been the consequences for the economies of major OECD countries and developing economies, and for major industries?

12. A multidisciplinary approach is perhaps more problematic in BEcon programs where students are not required to undertake an introductory units in accounting and finance. The arguments presented in this paper, however, make the case for BEcon programs to include some introductory coursework in finance and accounting (which some do already).

- *Identify* appropriate analytical frameworks from the AFE disciplines that could help to explain the causes and effects of the GFC:
 - Macroeconomic models such as AD-AS.¹³
 - Balance sheets explanations of insolvency and contagion.
 - Financial risk/return frameworks such as the CAPM.¹⁴
 - Financial concepts such as derivatives and securitisation.
 - Behavioural finance/economics explanations of “irrational” investor behaviour.
- *Apply, synthesise* and modify (where appropriate) the above concepts and analytical frameworks in order to *integrate* ideas from AFE disciplines:
 - E.g. can the traditional AD-AS model of recessions in macroeconomics be modified to incorporate the wealth effects on aggregate demand of an asset price bubble inflating and bursting, taking account of the role of leverage, insolvency and contagion?
 - Are there any implications of the GFC for the usefulness of the efficient markets hypothesis?
 - Are there any implications of the GFC for the usefulness of the CAPM?
- *Discuss and evaluate* government policy responses to the GFC including measures to prevent future global financial crises, using the concepts and frameworks from AFE disciplines:
 - How can imbalances in global capital flows be addressed?
 - What regulations can prevent the excesses of sub-prime lending?
 - What regulations can ensure that banks have larger capital buffers to protect them from a collapse in financial asset prices?
 - Should governments guarantee bank deposits?

13. Aggregate Demand-Aggregate Supply. See any introductory/intermediate macroeconomics textbook.

14. Capital Asset Pricing Model. See any introductory/intermediate finance textbook.

- Should monetary policy target asset price inflation as well as inflation in goods and services?
- Has fiscal stimulus worked? Are there any lessons for design of stimulus packages?

4. Role of the Academic Instructor

A PBL project is not the same as a group take-home assignment. The academic instructor allocates substantial class time to the project. The PBL project envisaged here is a major project that might run over three or four weeks occupying all of the class time in these weeks. The instructor needs to decide how to use this class time. An initial job for the instructor is to review the introductory conceptual material from the AFE disciplines that the students are being asked to apply. This might require a team teaching approach whereby instructors from other disciplines are brought in. Early on, stimulus material from the media could be provided along with references to the academic literature.

The instructor must be careful not to directly solve the tasks for the students, but rather to focus on the analytical frameworks and concepts. The students must do the application and synthesis. The instructor would allocate class time for students to meet in groups and the instructor would be available to discuss issues with the students.

Student management of tasks

Assuming students are in groups (which as noted above is generally the case for PBL but not essential), students would manage the PBL project in much the same way as they would manage a take-home group assignment. Hence they would establish at the outset and in writing an agreement that specifies: the means of convening and communicating among themselves and with the academic instructor; a timetable for meetings; mechanisms for resolving disagreements regarding contributions by group members; allocation of tasks among group members; significant milestones for completing tasks.

At meetings, students should appoint a “Recorder” to keep “Minutes” of the discussion and decisions taken. Initial meetings might consist of brainstorming relevant ideas including the scope of project and information sources.

Student assessment

Assessment of PBL projects in a capstone course ought to differ from assessment of in other contexts. As always assessment must be aligned with the learning objectives. In PBL we aim to assess student acquisition of skills—in particular critical thinking, problem-solving and the ability to work collaboratively. Knowledge is also relevant but we need to assess holistic rather than atomistic

learning (MacDonald and Savin-Baden 2004); and in a capstone experience it is the application of knowledge that is critical (Holdsworth *et al.* 2009).

Assessment tasks may include performances such as student oral presentations, a *viva voce* to assess knowledge outcomes, and an open book test where students are given stimulus material such as mini-case studies and asked to critically evaluate the material (MacDonald and Savin-Baden 2004). It is important to design assessment tasks that assess independent learning, especially when the same PBL project such as the one above on the GFC is assigned over many years.

5. Conclusion

A lesson for the Commerce/Business curriculum from the GFC is that our “silo” approach to the disciplines of accounting, finance, and economics has not equipped students to deal with complex real world problems such as the GFC. Such real world problems are interdisciplinary in their causes, effects and solutions. One way forward, suggested in this paper, is to design a PBL approach through a capstone course that requires students to integrate key concepts from accounting and finance into macroeconomics, in particular the importance of asset prices, debt, accounting rules, balance sheets in causing financial crises and subsequent recessions.

It is important not to underestimate the challenges that this presents. Academic instructors for example are typically not well-trained in multiple disciplines and are likely to resist attempts to make their curricula interdisciplinary. They are also likely to resist attempts to squeeze out other content in their curricula to make way for content from other disciplines. These issues require leadership from Department Heads and Program Directors, for example in encouraging a team approach to teaching. It may also be necessary to consult accrediting bodies, particularly in accounting and finance, so that curriculum reform such as this does not jeopardise accreditation.

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