The Relevance of the Keynesian Multiplier Process After Sixty Years

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For many commentators the Keynesian multiplier result that investment expenditure equals voluntary saving was the key result in The General Theory. The major theme of this article is that a correct understanding of the multiplier process by which this equality is achieved is just as important as the result itself. The relevance of this claim is illustrated in the context of the FitzGerald Report's (1993) claim that national saving in Australia is too low.

Introduction

It is a tribute to the originality of his ideas that the relevance of John Maynard Keynes is still being discussed among economists sixty years after the publication of his *General Theory of Employment Interest and Money*. Over the last six decades, there have been many diverse interpretations of what Keynes really meant, as witnessed by the emergence of labels such as Keynesianism, neo-Keynesianism, hydraulic Keynesianism, fundamentalist Keynesianism, new Keynesianism, pre-Keynesianism and post-Keynesianism (both with and without the hyphen). It is not my intention to explore these diverse interpretations in this paper. Rather, I want to concentrate on one aspect of *The General Theory* considered by many commentators to be the major theoretical advance in that work; namely, the multiplier process by which any level of investment expenditure comes to create an equal amount of aggregate voluntary saving. For example, consider the following quotations (see also Robinson, 1937, Chapters 2 and 3):

> Probably the most striking, to a casual reader, of the theoretical doctrines of this book [*The General Theory*] is that which proclaims the necessary equality of Savings and Investment. ... [This] is merely a change in definition - but a change in definition which marks a very important change in point of view. (Hicks, 1936, pp. 238-9)
>
> Keynes's intellectual revolution was to shift economists from thinking normally in terms of a model of reality in which a dog called *savings* wagged his tail labelled *investment* to thinking in terms of a model in which a dog called *investment* wagged his tail labelled *savings*. (Meade, 1975, p. 82)
>
> What is the major analytical innovation of the *General Theory*, its major differentia from the *Treatise*? ... what seems to me to be the really distinguishing mark of the *General Theory* [is] the crucial role of changes in output as an *equilibrating force* with respect to aggregate demand and supply - or, equivalently, with respect to saving and investment. (Patinkin, 1976, pp. 64-5)

More recently, James Trevithick began an article in the *Cambridge Journal of Economics* with the following observation:

> It is universally accepted that Richard Kahn's formulation of the multiplier relation was far and away the most significant independent contribution to the writing of Keynes's *General Theory*. Without the multiplier there would have

been no *General Theory* and no Keynesian macroeconomics. (Trevithick, 1994, p. 77)

It may seem strange that anyone should feel obliged to argue for the relevance of the Keynesian multiplier process after sixty years, since the result that investment equals saving is one aspect of *The General Theory* that was quickly adopted by the mainstream of the economics profession (in the Investment equals Saving relationship of the IS-LM model, for example), and it remains an integral part of most first-year and second-year macroeconomic textbooks. Nevertheless, I think such an argument is necessary for at least four reasons. First, with the exception of post Keynesian texts such as Harcourt et al. (1967, Chapter 10), Chick (1983, Chapter 14) and Davidson (1994, Chapter 3), the orthodox IS-LM approach treats the relationship that investment equals saving as an *equilibrium condition* rather than as the outcome of a dynamic multiplier process of expenditure and income. In contrast, it is worth recalling that the original derivation of the investment equals saving relationship was achieved using *process analysis*, as has been recently explained by James Meade (1993). Second, once the basic methodology of process analysis is understood in this historical context, it is a simple matter to apply it to other examples of deficit spending, particularly in the public sector and in the net export sector. Third, this then leads to a completely different way of looking at the economic system, which is best categorised not by static equilibrium conditions or even by continuous dynamic processes, but as a series of pulses of income and expenditure initiated by deficit expenditure. Fourth, these considerations are relevant for many contemporary policy debates concerning, for example, questions of capital accumulation, budget deficits, balance of payments deficits, national saving rates and inflation.

These four points provide the structure of this paper. The following two sections present basic process analyses of deficit expenditure, in order first to generalise the analysis of investment spending presented by Meade's (1993) paper, and secondly to apply that analysis to other examples of deficit spending. The next section then discusses the image of the economic system that emerges from this analysis. The paper concludes with an illustration of how the Keynesian multiplier analysis is relevant for policy analysis, using for context the FitzGerald Report's (1993) claim that national saving in Australia is too low.

A Process Analysis of Investment and Saving

In a small two-page note in the 1993 volume of the *Economic Journal*, James Meade describes how in 1931 he came to discover that an increase in investment would lead to an increase in voluntary saving by the same amount. Essentially the exercise involved a diagram in which he traced out the impact of a rise in investment on the levels of income and of saving. This took place within a framework in which all income was either consumed or saved (so that there was no government and no external trade) and in which the marginal propensity to save was held to be a fixed constant over the multiplier process. This last assumption was necessary, since Meade relied on the formula for the summation of a geometric series to prove his result. Figure 1 repeats Meade's 'process analysis', but without the fixed marginal propensity to save assumption, and with the initiating event being total investment expenditure rather than just the change in investment.

Figure 1
Process Analysis of Investment and Saving

$$I_0 \rightarrow Y_0 \rightarrow C_1 \rightarrow Y_1 \rightarrow C_2 \rightarrow Y_2 \rightarrow C_3 \rightarrow Y_3 \rightarrow Etc.$$
$$\qquad\quad \downarrow \qquad\qquad \downarrow \qquad\qquad \downarrow$$
$$\qquad\quad S_1 \qquad\qquad S_2 \qquad\qquad S_3$$

The process in Figure 1 is easily explained. Investment expenditure, I_0, generates income for the factors of production involved in the capital goods sector, Y_0. Some of this income is used to finance consumption expenditure, C_1, and the remainder of the income is, by definition, voluntarily saved (including retained profits). The consumption expenditure generates income for its recipients, Y_1, and round 1 of the process concludes. In round 2, the income of the previous round is again allocated between consumption expenditure (generating new income) and voluntary saving. The process continues in this manner, until eventually (or perhaps asymptotically) a round occurs in which no consumption takes place (or, equivalently, all of the previous round's income is voluntarily saved).

Note carefully that throughout the process a 'saving conservation principle' operates, in the sense that once the initial investment takes place, the total value of income not spent on consumption *continuously* (that is, throughout the process, and not just at its conclusion) equals the value of investment expenditure. This is because for every round, r, of the process in Figure 1, the following relationship holds (see Dalziel and Harcourt, 1994).

$$I_0 = \sum_{j=1}^{r} S_j + Y_r \qquad (1)$$

Thus, in every round, the value of initial investment is matched by accumulated voluntary saving *and* by what might be termed the round's involuntary saving (income received, but for which there has not yet been time to allocate it between voluntary saving and further consumption). The process concludes only when this latter term is zero, at which point Mr Meade's Relation between investment and voluntary saving holds, irrespective of the value of the marginal propensity to save in each round. This is recorded here as equation (2), where S is the total accumulated voluntary saving at the end of the multiplier process.

$$I_0 = S \qquad (2)$$

Process Analyses of Deficit Spending

As the introduction to this article discussed, equation (2) is very important in the history of economic thought. This is not only because of its appearance in *The General Theory*, but also because of the issues it raised about the role of the rate of interest in a modern economy. In particular, if equation (2) holds then there is no role for the rate of interest to equilibrate investment and voluntary saving (see, Rogers, 1989, and MacLachlan, 1993, for recent discussions; the role of the interest rate in the Keynesian analysis is explained at the end of this article). The importance of the debate generated by this result, however, has tended to obscure the very general nature of the process analysis in Figure 1.

Figure 2
Process Analysis of Autonomous Consumption (Dissaving)

$$\begin{array}{ccccccccccccc} C_0 & \rightarrow & Y_0 & \rightarrow & C_1 & \rightarrow & Y_1 & \rightarrow & C_2 & \rightarrow & Y_2 & \rightarrow & C_3 \rightarrow Y_3 \rightarrow \textit{Etc.} \\ \uparrow & & \downarrow & & & & \downarrow & & & & \downarrow & & \\ -S_0 & & S_1 & & & & S_2 & & & & S_3 & & \end{array}$$

Consider, for example, the case of autonomous consumption, where households decide to borrow funds to finance expenditure on consumption goods, not out of income, but using accumulated assets as collateral. Figure 2 depicts the resulting process, which is of exactly the same form as Figure 1, except that the analysis begins with the initial dissaving, $-S_0$. Again, a

conservation of saving principle applies, so that using the same logic as before, the following equation holds for all rounds.

$$-S_0 = \sum_{j=1}^{r} S_j + Y_r \qquad (3)$$

Thus, in every round, the value of initial dissaving is matched by accumulated voluntary and involuntary saving. If S is defined as the total accumulated voluntary saving at the end of the multiplier process, *excluding* the initial dissaving, then it is easily shown that the process merely redistributes saving; it does not create or destroy any savings.

$$-S_0 = S \qquad (4)$$

Consider now the presence of a government sector, which is able to be involved in deficit expenditure and which can tax the income and expenditure flows in the multiplier process. Let the initial fiscal deficit, excluding the tax flows generated in the subsequent multiplier process, be written as $G_0 - T_0$. Then Figure 3 analyses the income, tax and consumption flows that follow.

Figure 3
Process Analysis of a Government Budget Deficit

$$G_0 - T_0 \rightarrow Y_0 \rightarrow \begin{matrix} T_1 \\ \uparrow \\ C_1 \\ \downarrow \\ S_1 \end{matrix} \rightarrow Y_1 \rightarrow \begin{matrix} T_2 \\ \uparrow \\ C_2 \\ \downarrow \\ S_2 \end{matrix} \rightarrow Y_2 \rightarrow \begin{matrix} T_3 \\ \uparrow \\ C_3 \\ \downarrow \\ S_3 \end{matrix} \rightarrow Y_3 \rightarrow Etc.$$

The principal change from previous analyses is the tax flows, T_j, in each round, but saving is still defined as the residual item after the tax and consumption payments have been made. The tax flows reduce the value of the government's accumulated budget deficit, so that equation (5) holds in all rounds of the process.

$$G_0 - \sum_{j=0}^{r} T_j = \sum_{j=1}^{r} S_j + Y_r \qquad (5)$$

If the accumulated value of the budget deficit at the end of the multiplier process is denoted as B, and if S is the total accumulated voluntary saving as before, then equation (5) implies that:

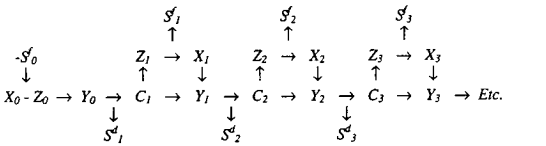
$$B = S \qquad (6)$$

Finally, consider an open economy. Without loss of generality, suppose that the domestic economy operates a balance of trade surplus with the rest of the world, so that it is foreign economies that are engaged in net deficit expenditure with respect to the domestic economy. Following the example of the budget deficit, let $X_0 - Z_0$ be the initial balance of trade surplus, excluding the flows of imports, Z_j, and exports, X_j, that will be generated during the subsequent income and expenditure flows of the multiplier process. Figure 4 contains an analysis of that process.

The analysis in Figure 4 is slightly more complicated than previous ones, because of the need to distinguish between domestic saving, S^d_j, and foreign saving, S^f_j. The process is

initiated by foreign dissaving, $-\mathcal{S}_0$, which leads to an excess of exports over imports. The domestic net income, Y_0, created by this allows domestic consumption expenditure, C_1, and the remaining income is saved, S^d_1. A portion of the consumption goods, however, is imported, Z_1. This creates foreign income, and presumably its own multiplier process, but the aggregate effect is to allow exports and foreign saving that must sum to Z_1. The consumption expenditure on domestically produced goods, plus the exports, X_1, produces new domestic income, Y_1, at the end of the first round. This pattern is repeated in later rounds, so that the following relationship holds in all rounds of the process:

Figure 4
Process Analysis Incorporating International Capital Movements



$$\sum_{j=0}^{r} X_j - \sum_{j=0}^{r} Z_j = \sum_{j=0}^{r} \left(-S_j^f\right) = \sum_{j=1}^{r} S_j + Y_r \tag{7}$$

As was the case in the autonomous consumption example, the aggregate effect is a redistribution of accumulated savings:

$$-\mathcal{S}_0 = \mathcal{S}^f + S^d \tag{8}$$

Implications for Modelling the Macroeconomy

Although the form of the process analysis used in the previous two sections will appear strange to some readers, all economists are very familiar with the multiplier concept and the macroeconomic equality between investment and voluntary saving. As was noted in the introduction to this paper, Hicks's (1936, p. 289) review of *The General Theory* described this as 'a very important change in point of view', and he incorporated it into his famous representation of Keynes's *General Theory* as the Investment equals Saving curve (Hicks, 1937). Yet, as Hicks himself was to acknowledge forty years later, something important was lost in the translation (Hicks, 1976, pp. 288-9):

> There are many passages - many famous passages - in which Keynes proclaims his theory to be *in* time; he makes quite a fuss about it. ... Yet that is not so; there is only a part of the Keynes theory which is *in* time. He has (very skilfully) divided his theory into two parts. There is one, that concerned with the Marginal Efficiency of Capital and with Liquidity Preference, which is unquestionably *in* time; it is basically forward-looking; time and uncertainty are written all over it. But there is another, the multiplier theory (and indeed the whole theory of production and prices which is - somehow - wrapped up in the multiplier theory) which is out of time. It runs in terms of demand curves, and supply curves and cost curves - just the old tools of equilibrium economics. A

state of equilibrium, by definition, is a state in which something, something relevant, is *not* changing, so the use of an equilibrium concept is a signal that time, in some respect at least, has been put to one side.

This view of the multiplier as 'timeless', of course, can be found in *The General Theory* itself (Keynes, 1936, p. 122-5), and this has been the subject of critical comment by post-Keynesian writers such as Joan Robinson (1962, p. 78) and Tom Asimakopulos (1983, p. 229). Further, Hicks's (1937) treatment of the multiplier theory as an equilibrium concept outside of time has certainly become the dominant approach adopted in modern-day textbooks. Even if there is some dispute about what type of equilibrium is represented by Hicks's IS schedule - is it, for example, 'an expenditure equilibrium' (McTaggart et al., 1992, p. 793) or 'a goods market equilibrium' (Wells, 1995, p. 37) - nevertheless there is unanimous agreement in mainstream textbooks that it does not tell us anything about cause and effect (McTaggart et al., 1992, p. 793, and Wells, 1995, p. 40). This is in sharp contrast to the process analysis of the previous two sections, in which the initial examples of deficit expenditure *cause* the subsequent income and expenditure flows until the multiplier process has worked itself out.

Sixty years after the publication of *The General Theory*, therefore, it is relevant to ask again what difference it makes if the multiplier is regarded as a process in time rather than as a condition of equilibrium. My opinion is that the difference is profound, leading us, in Hicks's wonderful phrase, to 'a very important change in point of view'. If I may risk borrowing another metaphor from physics other than the dominant energetics metaphor of general equilibrium theory (Mirowski, 1987 and 1989), then the image conjured up by the process analysis approach to the multiplier is of a series of impulses of waves of expenditure and income, each one initiated by some form of deficit spending leading to subsequent multiplier effects that gradually fade over time. There is no reason to think that these waves of expenditure and income will be of even approximately equal duration, and fluctuations in the quantity of deficit expenditure over time ensures that the initiating impulses vary considerably in strength. The picture that emerges is of a continuously changing and 'kaleidoscopic' series of economic transactions (Shackle, 1974), that nevertheless has a definite underlying logic that is susceptible to analysis and policy influence (Earl and Kay, 1985).

Space does not permit a discussion of all of the implications that flow from this process view of the multiplier, but there is one implication that I do want to highlight, as it is related to my own work in progress. The other half of the Hicksian IS-LM construct, of course, is the LM schedule, which is used to depict combinations of the rate of interest and real gross domestic product at which the money market is in equilibrium. The implication is that a model of money market equilibrium can be constructed separately from the IS model of goods market or expenditure equilibrium, and that the IS and LM schedules then conjointly determine the two dependent variables of the model. This is not the case in the model of this paper. Instead, because the multiplier process is initiated by deficit expenditure, the role of credit-money in financing that deficit expenditure must be fully integrated into the process analysis from the beginning, as was argued by Victoria Chick (1984) in a paper that has been followed up in further work by Allin Cottrell (1986), Peter Earl (1990, Chapter 10) and myself (Dalziel, 1996a, and 1996b). I will return to this point at the end of the following section, which places the discussion of the Keynesian multiplier within a contemporary policy debate.

The Saving Debate in Australia

The previous sections of this article have argued that the Keynesian multiplier process is relevant for economic theorists looking for better models of macroeconomic mechanisms. To conclude, I want to provide an example of the multiplier's relevance for macroeconomic policymakers.

Currently there is widespread concern, although perhaps especially in the United States, that for some economies the ratio of national saving to gross domestic product is too low. The concern arises from a view that inadequate saving either restricts economic growth (by constraining investment) or causes an undue reliance on foreign saving (reflected in a persistent balance of payments current account deficit), or both. The following extract from Michael Boskin's (1990, p. 161) study (see Harcourt and Kitson, 1993, p. 440, for an earlier criticism) is representative of this literature:

> Eventually, however, an advanced economy such as the United States will need to finance its own domestic investment. This implies that, in the long run, domestic investment will be constrained by the available supply of private saving, an event that gives some force to the concern about an apparently low private-saving rate.

Similar sentiments have been expressed in Australia, most notably in a recent report by Dr Vince FitzGerald (1993), commissioned by the Australian Federal Treasurer. The FitzGerald Report reviewed household saving, retirement incomes policy, business saving and government fiscal strategies, before setting out a national saving strategy for Australia. The need for such a strategy was motivated in the Report by four concerns. The first was that the level of national saving in Australia 'is now at it lowest level this century other than in the "national emergencies" of the two World Wars and the Great Depression' (p. 2). The second was that continued growth 'will require sustained strong flows of investment [that] will in turn require strong flows of saving' (p. 4). The third was that a level of overseas debt that is already high means that 'Australia cannot grow with strong investment funded by raising foreign debt further (relative to GDP) indefinitely' (p. 6). Finally, demographic trends mean that 'Australia has not only a national saving problem but also a need for strong retirement saving' (p. 8).

Mark Trethewey (1994) has already observed that Dr FitzGerald's second concern (which in many ways underlies the other three) is completely at odds with what Keynes called the most fundamental of his conclusions within this field; namely, that 'the investment market ... can never become congested through shortage of saving' (Keynes, 1937, p. 222), and in another paper (Dalziel, 1996c) I have addressed the FitzGerald Report's third point of concern, namely that inadequate domestic saving leads to current account deficits in the balance of payments, and hence to rising overseas debt. The basic point of contention, however, which is primarily an unrecognised debate about the relevance of the Keynesian multiplier process, can be illustrated in a simple diagram.

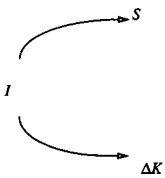
Figure 5
The Neo-Classical Model of Capital Accumulation

$$S \downarrow \Delta K$$

Figure 5 is a representation of the basic framework of the neo-classical growth model introduced by Trevor Swan (1956) and Robert Solow (1956). In that model, the volume of saving, S, determines the level of capital accumulation, ΔK (where K represents the capital stock), so that if the level of domestic saving is less than the actual level of capital accumulation, the domestic saving must be supplemented by foreign saving (implying a balance of payments deficit). This is the theory underpinning the concerns expressed in the FitzGerald Report.

By way of contrast, the basic framework of the Keynesian growth model is drawn in Figure 6. In this model, the level of aggregate saving and the level of capital accumulation are both determined by the level of investment expenditure. The latter relationship between investment expenditure and capital accumulation comes from the definition of investment, while the former relationship between investment and saving is the consequence of the Keynesian multiplier process in Figure 1 above. Recognising the relevance of the multiplier thus leads naturally to the Keynesian emphasis on understanding changes in investment expenditure in order to explain phenomena such as the business cycle, but Figure 6 also provides at least two other important insights.

Figure 6
The Keynesian Model of Capital Accumulation



The first insight allows the concern of the FitzGerald Report about the relationship between saving and capital accumulation to be recast into another familiar framework. From Figure 6, the level of capital accumulation always equals the value of saving since both are determined by the level of investment expenditure. This, however, does not explain how the savings (and the implied equity in the capital stock) are distributed among different agents, but other models do address this question. In the post-Keynesian tradition of Kaldor (1956) and Pasinetti (1962), for example, the interaction of the different saving behaviours of workers and capitalists is analysed to determine the full employment rate of return on capital and warranted income shares of wages and profits. At a global level, it is a simple exercise to show that the different saving behaviours of overseas residents and domestic residents will determine the economy's balance of payments deficit and surplus (Dalziel, 1996c). Thus, the concern of the FitzGerald Report about the size of the Australian balance of payments deficit should be interpreted as a concern about the distribution of ownership of the country's capital stock (which may be valid from a nationalist point of view), rather than as a concern about the constraint imposed by low domestic saving on capital accumulation (which is not valid, at least not from a Keynesian point of view).

The second insight returns to the previous section's observation that the role of credit-money in financing deficit expenditure (including investment expenditure) should be included in the analysis from the start. This is done in Figure 7 below.

Figure 7
The Keynesian Model With Money Flows

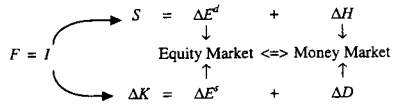


Figure 7 is a neat representation of many of the core elements of the Keynesian analysis of investment expenditure. First, it records the money flows associated with the credit-money created to finance the initial investment expenditure, denoted F in the diagram. It is finance, of course, rather than saving, which Keynes (1937, p. 222) argued could act as a constraint on investment expenditure and hence capital accumulation. Second, the multiplier process is implicitly recorded in the arrow leading from investment expenditure to voluntary saving. Third, the diagram illustrates what Keynes (1936, p. 166) called the second of 'two distinct sets of decisions' concerning an individual's 'psychological time preferences'; namely the decision about what proportion of saving shall be held in the form of equity in the capital stock, ΔE^d, and how much in the form of liquid money, ΔH. Fourth, the bottom row of the diagram records that there is a similar decision for firms concerning how much of their new capital shall be financed by equity issues (ΔE^s, the proceeds of which can be used to retire the original investment finance loans) and how much shall be financed by new long-term debt, ΔD. Finally, the diagram shows how the equity market and the money market must operate together to ensure that $\Delta E^d = \Delta E^s$, and $\Delta H = \Delta D$.

The framework of analysis presented in Figure 7, firmly based on an acceptance of the relevance of the Keynesian multiplier, provides a simple but effective paradigm for ongoing research into contemporary matters of theoretical and policy importance. To give one example from my own current work, the traditional Keynesian analysis of the equity and money markets in Figure 7 produces a theory of the equilibrium interest rate as an alternative to the investment-saving model of classical analysis (still to be found in many mainstream textbooks; see, for example, McTaggart et al., 1992, Chapter 16). If it is accepted, however, that the demand for money balances increases with price rises, then the way is opened for inflation to play a part in achieving equity market and money market equilibrium. This allows a model of monetary inflation without government to be created, providing important insights into the problems being faced by central banks around the world who are attempting to use monetary instruments to maintain price stability (Dalziel, 1995).

Conclusion

The introduction to this article cited James Trevithick's recent observation that 'without the multiplier there would have been no *General Theory* and no Keynesian macroeconomics' (Trevithick, 1994, p. 77). In a session devoted to discussing the relevance of Keynes sixty years on, Trevithick's observation remains an important starting point. Many discussions of the Keynesian multiplier theory during the past sixty years, however, have concentrated on the multiplier's implication that investment expenditure must equal voluntary saving. There is no doubt that this result has been, and continues to be, an essential component of Keynesian macroeconomics. Nevertheless, the major theme of this article has been that a correct understanding of the multiplier *process* by which this equality is achieved is just as important as the result itself. In particular, I have argued that the investment equals saving result is not simply an equilibrium condition, but is a result of a 'saving conservation

principle' that holds continuously throughout the multiplier process until the expenditure flows fade out or are arrested. The second half of the paper then used this insight to construct a simple diagram that incorporates many aspects of Keynesian macroeconomics. This diagram, in my view, provides a useful framework for ongoing research into important theoretical and policy issues that have emerged since the time of Keynes, and for which the Keynesian multiplier process remains relevant sixty years after *The General Theory*.

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* Department of Economics and Marketing, Lincoln University, PO Box 84, Canterbury, New Zealand. The genesis of the ideas contained here lies in discussions I had with Geoffrey Harcourt while I was his guest in the Faculty of Economics and Politics at Cambridge University during the first half of 1994. I am particularly grateful to Geoffrey Harcourt both for his hospitality and for his insightful comments on my research during and after my sabbatical leave in Cambridge. I am also happy to acknowledge again the contributions of my colleagues Peter Earl and Amal Sanyal to the ideas discussed here.

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