

## **Stable Growth in an Era of Crises: Learning from Economic Theory and History**

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### **Abstract**

The financial crisis and the Great Recession to which it gave rise exposed the deep flaws in standard macro-economic models, and in the way those models were deployed. In this paper, based on a talk given to the Turkish Economic Association in November 2012, Joseph E. Stiglitz discusses the range of these deficiencies and the ways in which the models must be reformed.

The paper first examines five particular issues in the current policy debate and explains why the standard model provides a misguided framework for addressing them. The paper identifies the fundamental flaws in the standard model, and argues that in trying to fine tune the models for “normal” periods, it failed to address the more profound question of how to explain deep downturns, including slow recoveries.

A central lacuna is the lack of attention to credit and the institutions providing it. It explains how a better understanding of banks would have led to better ways to recapitalize the banking system than those employed in the aftermath of the crisis. Finally, the paper relates all of these issues to the ongoing Euro crisis, showing in particular that the structure of the euro, though seemingly designed to improve the efficiency of resource allocations, has actually created an unstable and inefficient system.

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## 1. Introduction

No one would, or at least should, say that macro-economics has done well in recent years.<sup>1</sup> The standard models not only didn't predict the Great Recession, they said it couldn't happen—bubbles don't exist in well-functioning economies of the kind assumed in the standard model. Not surprisingly, even after the bubble broke, they didn't see the full consequences, and they haven't provided good guidance to policymakers in responding to the crisis. A half decade after the bursting of the bubble, US unemployment is still high—with almost one out of six Americans who would like a full-time job not being able to get one. The government is still financing almost all mortgages.

So, too, our standard models didn't predict the follow-on Euro crisis, neither its occurrence nor its evolution. The test of science is prediction—and one should have some skepticism of a model that can't predict the two biggest macro-events of the last 80 years. A model whose predictive ability is so weak can hardly be relied upon for policy guidance.

In my Adam Smith lecture before the European Economic Association (Stiglitz, 2011), I delineated what I thought were the major deficiencies in the standard model, the Dynamic Stochastic General Equilibrium Model, that evolved out of the representative agent models popular in earlier years. As I emphasized, it is fully appropriate for a macro-economic model to be dynamic, to be stochastic, and to aim for general equilibrium. And any model is a simplification of reality, so it is not a criticism that many things are not included in the model.

The model is, however, rightly criticized for leaving out several aspects of the economy that are central to understanding economic performance in these crises, for making behavioral assumptions that are questionable at best, and for focusing excessive attention on certain aspects of economic behavior that are not central to short-run macro-economic performance.

My talk this afternoon has five sections. The first four are devoted to discussing the general deficiencies in the model, particularly as they apply to understanding this crisis. This should provide guidance to thinking about how macro-economics can and should be reformed. Section 2 looks at five particular issues in the current policy debate and explains why the standard model either does not address them, or provides a framework for addressing

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<sup>1</sup> It is striking that Edward C. Prescott once alleged that this is the “golden age of economics.” (See his April 2006 lecture at Trinity University in San Antonio, Texas, available at [http://www.trinity.edu/nobel/Prescott/Prescott\\_Webquotes.htm](http://www.trinity.edu/nobel/Prescott/Prescott_Webquotes.htm) (accessed June 12, 2013).

them that is misguided. Section 3 focuses more narrowly on the deficiencies in the currently fashionable standard model, largely from a theoretical perspective. Section 4 suggests that part of these deficiencies arises from the fact that it has focused on the wrong question; it suggests the questions it should have focused upon. The fifth section looks at one issue in particular that was central to the policy debates four years ago: the best way to recapitalize the banking system.

In the last part of this paper, I focus more narrowly on the issue of the day, the Euro crisis.

## **2. What's Wrong with Current Macro-economics**

Before turning to a more general theoretical discussion of the deficiencies in the standard model, I want to discuss five key issues that have become part of recent policy debates.

### **Current Policy Debates**

#### **A. The Multiplier<sup>2</sup>**

There has been considerable discussion of the magnitude of the multiplier associated with government spending, with critics of expansionary government spending suggesting that it is low, zero, or even negative. They look at the experience of different countries over long time periods. Such analyses should be an important warning of the foolishness of mindless regressions. Of course, when the economy is at or near full employment, the multiplier (correctly measured) will be low. Even then, measurement problems (GDP is not a good measure of economic output, providing only a biased estimate of economic performance when the share of government expenditure increases.<sup>3</sup>) and econometric problems bedevil such analyses. But the question is, what will the multiplier be when there is a high level of unemployment and large underutilization of capacity? Since we have not had the levels of unemployment and capacity utilization that we are now experiencing since the Great Depression of the 1930s—and the structure of the economy was markedly different during the Great Depression than now—there is no way we can, with confidence, extrapolate the experiences of previous post-Depression downturns to the current situation.

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<sup>2</sup> For a discussion of some of the issues raised here, see Solow (2012).

<sup>3</sup> See Stiglitz, Sen, and Fitoussi (2010).

Economic theory, though, provides a compelling framework for analysis. The problem is lack of aggregate demand. Government spending increases aggregate demand. We can identify leakages (from savings and imports) and, on the basis of that, calculate the multiplier. Traditional analyses, based on downturns of short duration, focused on one-period multipliers: two years from now, the thinking went, the economy would presumably be back to full employment, and the multiplier would be zero. But this downturn is long term, so in calculating the multiplier, we should calculate the impacts not just for this period, but for subsequent periods as well.

For the United States, this kind of analysis yields a multi-period multiplier (with reasonable values of savings and import coefficients) in the range of 1.5 to 2.

The next question is: are there reasons to believe that there are reactions from market participants that will amplify or reduce these effects, i.e., are there "crowding in" or "crowding out" effects? Again, in normal periods, the Central Bank, worried about an overheated economy, raises interest rates and tightens credit, discouraging investment. The result is that government spending crowds out private investment. But now, the Fed is committed to keeping interest rates low and doing what it can to increase the availability of credit. This explains again both why estimates of the multiplier based on normal periods are irrelevant, and why, in this case, the multiplier will not be reduced by crowding out of investment. There may, in fact, be crowding in of investment—if government spending, for instance, goes to public investment, and public investment is complementary to private investment. Alexander Field (2011), for instance, makes a persuasive case for the theory that infrastructure investment during the Depression enhanced private-sector productivity, and that this helped lay the foundations for strong growth after World War II.

Barro-Ricardo, reasoning similarly, suggests that the increased indebtedness of government will lead to more savings (to offset future tax liabilities). There is little evidence of such an effect in recent years; in fact, the Bush tax cuts gave rise to soaring deficits, which were followed by savings falling to near zero.<sup>4</sup> To believe in the Barro-Ricardo model, one would have to hypothesize that in the absence of the tax cut, savings would have been markedly negative.

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<sup>4</sup> The St. Louis Fed tracks personal savings rate on its website at <http://research.stlouisfed.org/fred2/data/PSAVERT.txt> (accessed October 31, 2012); the historically low personal savings rates during the Bush years are clear here. See also Delli Gatti *et al.* (2012a and 2012b).

The criticisms of the hypothesis are well known: it ignores capital constraints and distributive effects. Indeed, there may even be "crowding in" of consumption. First, if government spending is for high-return investment, in a period such as the current one where government can borrow at a negative real interest rate, the government's balance sheet will be improved; thus (in the world of rationality, in which taxpayers see through the public veil), savings would be reduced.<sup>5</sup> Moreover, if, as we have already noted is the case now, the downturn is likely to extend for several periods, some of today's savings will be for future consumption; with rational expectations, individuals would then know that incomes in future periods will be higher than they otherwise would have been, meaning that their lifetime budget constraint has moved out. This leads to increased consumption today (Neary and Stiglitz, 1983).

Of course, a good multiplier analysis takes into account the fact that different kinds of expenditures have different multipliers. What matters is not what the average multiplier has been in the past, but the effect of a well-designed expansionary policy today. We have suggested that spending on investments in the US today on education or research has a far higher multiplier, say, than on contractors in Iraq. (Stiglitz, 2010c)

For some highly indebted countries, the additional borrowing to finance expansionary investment oriented fiscal policy would come at a high price; they would have to pay increasingly higher interest rates, which might constrain what they could spend overall on output-expanding projects.<sup>6</sup> In principle, the market should realize this, in which case the greater indebtedness could lead to a lowering of interest rates. But there is no shortage of evidence of market irrationality; and whether justified or not, if increased indebtedness leads to higher interest rates, governments may have to employ another strategy, making use of the balanced-budget multiplier.

Traditional analyses suggested that the balanced-budget multiplier is unity. But well-designed increases in taxes and expenditures can have a balanced-

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<sup>5</sup> Government expenditures do not even have to be investments: if government consumption expenditures and private consumption expenditures are complements, then there will be crowding in of consumption. Moreover, there is another channel through which crowding in of investment, to which we already alluded, takes place: when government investment and private investment are complements.

<sup>6</sup> Rogoff and Reinhart (2010) suggested, furthermore, that increased indebtedness beyond a 90 per cent debt GDP ratio would lead to significantly lower growth. Putting aside the fact that their analyses ignored the central point we have emphasized—the forms of expenditure and the circumstances of the economy make a big difference—their work has since been thoroughly discredited. See, e.g. Herndon, Ash, and Pollin (2013). (In addition, they ignore critical issues of causality.)

budget multiplier that is much larger, plausibly twice the traditional number, e.g., tax hikes at the very top reduce consumption by far less than the increased expenditures expand it. Taking advantage of crowding in of consumption and investment can further enhance the balanced-budget multiplier.

### **B. Contractionary Expansion<sup>7</sup>**

There have been some discussions of instances in which government cutbacks have been associated with economic expansion. Some have suggested that these benefits arise from supply-side responses (e.g., as a result of the lower tax rates, now or in the future, a kind of balanced-budget multiplier emerges that is in the opposite direction of that just discussed). But in situations such as the current one, where aggregate demand is limiting output, supply-side responses can even increase unemployment and have an adverse effect on output: the downward pressure on wages shifts the distribution of income towards profits, lowering aggregate demand. This suggests that the few instances of government cutbacks bringing on expansion must be special and peculiar. And indeed that is the case: they happened in small countries that had the good fortune to have exports expand more than enough to fill the gap in aggregate demand caused by reduced government expenditures. They are also typically instances where (a) the country's trading partners were growing, so the export market was expanding; and (b) the country had a flexible exchange rate, so it could quickly become more competitive by lowering interest rates or undertaking other policies that affect the exchange rate. Beyond exchange-rate management, government policies (industrial policies and even budget policies) can influence the extent to which exports expand.

For Europe and America now, the notion that exports could fill the gap created by reduced government spending is a chimera, especially in view of the current global slowdown.

### **C. Deleveraging**

There are many in Europe and America who have pinned their hopes for a quick recovery on deleveraging. There was excess private (mainly household) debt prior to the crisis—especially so once the housing bubble had broken. This indebtedness puts a damper on household spending. However, households are working down this debt. Once they do so, consumption will recover.

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<sup>7</sup> For an excellent discussion of these issues, see Baker (2010), Jayadev and Konczal (2010), and IMF (2010).

High levels of indebtedness do have an adverse effect on consumption, both because of the real wealth effect and because of the effect it has in imposing borrowing constraints (which my own work on imperfect capital markets, arising out of asymmetric information, has emphasized). Still, it would be foolish to think that even after deleveraging, consumption will return to anything like it was before the crisis.

The use of representative agent models has obscured what was going on in the US before the crisis: the bottom 80% were consuming approximately 110% of their income. Even after they deleverage, even after the financial sector is fully restored, we shouldn't expect them to consume, on average, more than 100% of their income. With the top 20% garnering for themselves some 40% of national income, and with their savings rate being roughly 15%, one should expect a national savings rate of some 6%—somewhat higher than we see today but somewhat lower than the prevailing rate in the US in earlier decades. The continuing rise in inequality provides a further argument for why we should not expect a return of the savings rate to pre-crisis levels.

The puzzle is why hasn't the US savings rate increased even more (from slightly more than zero to around 4.5% today). The answer may have to do with slow adjustments in consumption patterns, which are aspects perhaps not adequately incorporated into the traditional models.

If, of course, we do get recovery of the economy through consumption, we should be worried: it would mean a return to unsustainable patterns of the kind that marked the pre-crisis days.

(Interestingly, the representative agent model without financial constraints would suggest that leverage doesn't matter at all. Debt simply reflects an ownership claim on a stream of returns—a transfer of money from debtors to creditors; but such transfers have no effects in this model.)<sup>8</sup>

#### **D. The Liquidity Trap and the Zero Lower Bound**

Before the crisis, many economists argued that monetary policy was the main vehicle for regulating macro-economic activity, which the government carried out by manipulating interest rates. I have never found convincing evidence of this; indeed, the relationship between real interest rates and investment (especially outside of real estate) is hard to establish. In most models, if

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<sup>8</sup> Of course, in an open economy model, if individuals in a country become indebted to those abroad, it lowers their wealth, and thus their standard of living. This just affects who gets the benefits of the country's output, not the level of output or its rate of growth.

nominal and real interest rates are both put in the right-hand side of a regression, nominal interest rates appear to have more importance.

In this crisis, the Fed (along with other central banks) has lowered interest rates to near zero—real interest rates have become negative-- without producing much of a stimulative effect—indeed, far less than was desired or hoped. I was not surprised, knowing that this situation was only a result of the flawed modeling of investment in the standard model, where credit availability, risk, and risk aversion are given short shrift. (I will return to this subject in more detail below.)

Those who believe in the standard model have suggested that its fundamental problem is the "zero lower bound" on interest rates, a variant of the Keynesian liquidity trap. But the situation during the Great Depression was completely different from today's. Then, prices were falling at 10% a year, so the real interest rate, as interest rates approached zero, was 10%.<sup>9</sup> Today, the real interest rate is -2%. There is no reason to believe that if (expectations of) the inflation rate were to rise to 4% or even 6%, and the real interest rate fell to -4% or -6%, there would be a surge in investment. After all, there is excess capacity in many sectors, and especially in real estate. Getting funds at a lower rate is no reason to boost one's excess capacity. (To be sure, there is a fast enough rate of inflation to make the real interest rate negative enough to *perhaps* stimulate investment. But the uncertainty brought about by this change in economic policy would itself have adverse effects on investment.<sup>10</sup>)

Again, the use of overly simplistic models has obscured some potentially important adverse effects of lower interest rates, including lower long-term interest rates achieved through Quantitative Easing. This would have the potential to partially or totally offset the alleged benefits assumed to arise, particularly if the interest elasticity of investment is small. There are, for instance, complex distributive effects. Traditionally, over the long run, creditors have been considered better off than debtors; that being the case, the redistributive effects seen in this scenario would be expected to enhance aggregate demand. However, if debtors have long-term fixed-interest contracts, and if

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<sup>9</sup> What should matter (in the standard theory), of course, for investment is the real product interest rate, not the real consumption interest rate, and when there are large changes in relative prices, as occurred during the Great Depression, these can differ markedly.

<sup>10</sup> Some (Woodford, 2003, 2009) have suggested that what is required is a credible commitment to inflation (e.g., through price-level targeting, which implies when there is less than normal inflation now, perhaps due to deflationary pressures arising from excess capacity, there will be higher than normal inflation in the future). But even if the expected real interest rate were the critical determinant of investment (which we suggest it is not), there is no way that the monetary authority could commit itself to such a policy.

there are groups like the elderly who are dependent on the income from government T-bills and bonds, the effects may well turn out to be negative. This is especially so because the marginal propensity of the elderly to consume may be higher than that of mortgagees. If Quantitative Easing leads to commodity booms (a question that remains in contention), then there is a distributive effect from households to commodity producers, which almost surely has a downward impact on aggregate demand.

In a world of full rationality, as assumed in the traditional models, there is a further negative effect: the long-term bonds that the Fed is buying now will be sold back at a capital loss. The government is (in effect) buying long-term bonds at a peak price. Therefore, under the Barro-Ricardo hypothesis, households should rationally include the expected capital loss in their budget constraints, and thus reduce consumption. (This is the case whether or not accounting rules require the government to recognize the loss, or whether or not the Fed goes through machinations to avoid selling them at a loss by holding them to maturity.)

Finally, in the standard putty-clay model, firms, able to get access to (long-term) capital at a very low interest rate, will invest in highly capital-intensive technologies, because wages have not fallen as much as the cost of capital. But this means, at any given level of demand for output, employment will actually be reduced. Thus, loose monetary policy today *may* be setting up the conditions for a jobless recovery in the future. Even today the outlines of such a situation are already visible. The knowledge that weaker demand for labor lies ahead affects consumption demand directly and indirectly, as it puts further downward pressure on wages, worsening the distribution of income.

(The import of this is *not* that we should have tight monetary policy. It is that we cannot rely on monetary policy for our recovery, and that other government policies have to be put in place to offset the potential and real adverse effects that we have described.)

### **E. The New Normal<sup>11</sup>**

Finally, some have argued that there is a new normal: we should just resign ourselves to the acceptability of a 7% or 8% rate of unemployment. It is structural, they say, a result of the mismatch of workers to jobs. There is much to indicate that, while structural problems may exist, there is also a deficiency in aggregate demand. If serious bottlenecks were afflicting the labor market, we would expect to see, for instance, wages for those laborers rising and—given the downward rigidity of wages—fairly rapid run-ups in average wage

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<sup>11</sup> See also Konczal (2011).

en the downward rigidity of wages—fairly rapid run-ups in average wage rates.

My own research with Bruce Greenwald and other colleagues<sup>12</sup> has emphasized the need for structural transformation as the solution to the underlying problem; but even then, we show that government expenditures can reduce unemployment and lift welfare; in addition, we argue that government policies aimed at facilitating structural transformation can be particularly effective. The existence of a structural problem does not mean that we should sit idly by and accept high levels of underutilization of resources indefinitely.

### 3. Key Failings

Modern macro-economics grew out of an attempt to reconcile traditional Keynesian macro-economics with micro-economics (Greenwald and Stiglitz, 1987a). There were two ways to achieve that reconciliation—try to adapt macro-economics to the micro-economic model of the time, or try to glean from macro-economics insights about what was wrong with the traditional micro-economic models and reform them accordingly. Much of the mainstream of economics took the former course. This was an ironic state of affairs because it was occurring just at the time that standard micro-economics was itself under attack, from the proponents of theories of imperfect and asymmetric information, game theory, and behavioral economics.

The standard representative agent model, and the work that grew out of it, had several flaws. It ignored information imperfections, couldn't embrace information asymmetries, and disregarded the insights from game theory and behavioral economics. My own research into equilibrium models with asymmetric information but rational expectations clearly demonstrates that there are many important phenomena that simply cannot be explained even within that model, even if it is able to explain many phenomena that the standard model with perfect information fails to account for.<sup>13</sup>

Once one went beyond the standard model, one could easily explain market failures, including markets that did not clear. Indeed, the presumption that markets were efficient (Adam Smith's invisible hand) was reversed by the Greenwald-Stiglitz theorem (1986), which showed that whenever there was asymmetric information or imperfect risk markets—that is, essentially always—markets are not constrained Pareto efficient (taking into account the costs of obtaining information and creating risk markets). That has some im-

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<sup>12</sup> See, for instance, Delli Gatti *et al.*, (2012a and 2012b).

<sup>13</sup> See Stiglitz (1982).

portant implications: privately profitable transactions may not be socially desirable. The banks may have incentives to engage in contracts with each other that make, for instance, the economic system more unstable (which they did).

Ongoing work in financial economics and macro-economics is providing a fuller taxonomy of the systemic biases in market allocations, e.g., Jeanne and Korinek's work (2010, 2012) showing that there may be excessive borrowing, especially in foreign currencies, or Yildiz's work (2011) pointing to excessive leverage on the part of banks. The intuition behind these results is simple: interventions (e.g., taxes) have a second-order direct effect on welfare, but a first-order effect in shifting constraints, such as self-selection constraints, incentive-compatibility constraints, or borrowing constraints, and in the welfare effects of the induced changes in prices and price distributions. As Greenwald and Stiglitz point out, in such situations, pecuniary externalities matter.<sup>14</sup>

Today's standard model began from a framework that didn't, and couldn't, embrace the kinds of market imperfections and market failures that could explain macro-economic behavior. There was no role for agency costs or externalities, no analysis of incentives for transparency or non-transparency, and no explanation of why financial institutions would have had incentive structures that led to excessive risk taking and short sighted behavior.

While it is important to derive macro-behavior from micro-foundations, it is crucial that we derive it from the *right* micro-foundations, consistent with actual behavior.<sup>15</sup> And, indeed, it is hard to reconcile macro-behavior *under the old-fashioned standard micro-models* with reasonable specifications, e.g., labor supply, risk aversion.

Over the years, as the deficiencies of the standard model have become apparent, a Ptolemaic attempt has been mounted to repair it through such amendments as adding on additional constraints, allowing for some individual heterogeneity, etc. But as I explained in my Smith lecture, these attempted patches remain unsatisfactory. They obviously failed in both of the recent crises, proving themselves to be largely irrelevant. Part of the problem is their

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<sup>14</sup> Earlier, Stiglitz (1982) showed the welfare effects of changes in price distributions as a result of changes in investment allocations. Again, markets were not in general (constrained) Pareto efficient.

<sup>15</sup> Ironically, even much of their criticism of Keynesian behavior as being "untheoretical" is itself ungrounded; it didn't take into account the Mantel-Sonnenschein results showing that micro-theory puts few restrictions on aggregate demand functions. Of course, if one makes unreasonable assumptions, such as that all individuals are identical, then there are strong restrictions.

tendency to focus too much on things of second-order import and too little on things of first-order importance. As I said before, all models are simplifications, and some may be useful in providing insights into one problem, others into another problem. The task before us is to formulate models that employ the simplifications that are most relevant for understanding short-run macro-economic behavior.

Among the central flaws of the standard model are its excessive reliance on rational expectations, in ignoring distribution, and its failure to model the credit system (banking, securitization), including paying insufficient attention to crucial institutional details (e.g., the design of the mortgage system). If everyone were identical, these issues would be irrelevant. Finance is uninteresting if the person can only borrow from himself. As I noted before, there can't be information asymmetries (apart from acute schizophrenia).

Rational expectations are particularly unhelpful in understanding periods of structural transformation, as when the economy goes from agriculture to manufacturing or from manufacturing to the service-sector economy—simply because such transformations happen rarely, and those particular transformations have never happened before. We have argued that the Great Depression is intimately associated with the former transition, the Great Recession with the latter.

The disparity between the standard model and reality inevitably leads to intellectual incoherence on the part of policymakers attempting to be guided by it. For example, in the standard model, diversification leads to lower risk, so policymakers argued for the removal of capital controls, unleashing the free flow of capital across international borders, thereby enhancing diversification. And some policy makers actually fervently believed in the model: as the crisis erupted, they believed that diversification would enable the US to easily weather the coming storm.

But in the wake of that crisis, attention has shifted to contagion. Contagion suggests a disease. Countries that are more interdependent are more likely to suffer from contagion. Suddenly, interdependence no longer seems like such a virtue. Indeed, in epidemiology (from which the term contagion comes), the appropriate response is quarantining the afflicted patients.

A coherent model would incorporate the advantages of diversification prior to the crisis and the disadvantages after a crisis (and crises have been a regular feature of the global economy since the period of liberalization began, in 1980). But none of the standard models did this.

The underlying mathematical structures of the standard model also have to be changed: when there are non-convexities, risk diversification can amplify rather than reduce risk, and non-convexities are pervasive in the economy (see Stiglitz, 2010a, 2010b). Even before the crisis, there had been work showing how the architecture of the economic system could worsen financial fragility, leading to bankruptcy cascades and systemic risk (Allen and Gale, 2000; Greenwald and Stiglitz, 2003; Delli Gatti *et al.*, 2006; Battiston *et al.*, 2007, 2012a, 2012b; Gallegati *et al.*, 2008). Since then, there have been many more studies.<sup>16</sup>

One of the most significant failures of the standard model was its inability to provide an adequate analysis of the supply of credit (Greenwald and Stiglitz, 2003). Credit is not the same as money (though in normal times, credit supply and money supply are related). In standard theory, there is no credit rationing, nor is there a liquidity “problem,” though, of course, in times of crisis, the focus is on liquidity. The standard theory cannot explain the lack of availability of credit—even to banks that are allegedly “solvent” but illiquid.

Ironically, most macro- models, even those used by Central Banks, do not have a “banking sector”—yet it was problems in banks that were at the heart of the crisis. Not surprisingly, given the absence of a banking sector, most macro- models do not have a “shadow banking sector” either—and therefore they have nothing to say about the shift from the banking to the shadow banking sector, which has proven so problematic for our economy.

So too the standard models focused on the real T-bill rate, the rate at which government can borrow. But what matters in borrowing is the interest rate at which companies can borrow, not the interest rate at which the government can borrow, and the spread between the two is highly variable, an endogenous variable that has to be explained.

Nor did the analyses of banking regulation before, or after, the crisis incorporate basic insights of modern financial economics—like the Modigliani-Miller theorem, suggesting that additional leverage does not improve the efficiency of the banking system, or the Grossman-Stiglitz theorem, holding that fundamental informational problems would arise in any attempt to move towards securitization of products like mortgages.

The fundamental point is that one cannot summarize the financial sector in a money-demand equation. (And even worse, the money-demand equation doesn't reflect the realities of the modern financial sector, where cash-management accounts mean that there is essentially no opportunity cost to

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<sup>16</sup> Haldane (2009), Haldane and May (2010), De Masi *et al.* (2011).

holding money, where most transactions are mediated through credit, not money, and where most transactions are exchanges of assets, not income-generating transactions).

While the standard model focuses too little attention on the determinants of the supply of credit, it focuses too much attention on the problem of intertemporal maximization—not surprising, given the historical evolution of the model. But such intertemporal maximization problems provide little insight into the short-term variations in the level of consumption (savings rates), which are at the heart of short-term macro-economic analyses. And interestingly, none of the policy discussions even refer to such models.<sup>17</sup>

#### **4. An Example: Bank Recapitalization**

Earlier I remarked on the absence of detailed modeling of the financial sector, including financial constraints and the determinants of the supply of credit. Summarizing the financial sector in a money-demand equation may work (in some sense) in normal times, but not now, or in other times of crisis (such as East Asia in the '90s).

Banks continue to play an important (though diminished) role in the supply of credit. They are the repository of institutional knowledge (information) that is not easily transferred; their internalization of information externalities results in better incentives for the acquisition of information. They are still the locus of most SME lending (and variability in SME investment and employment is central to understanding macro-economic variability).

Without good models of banking, monetary authorities had little to say about the best way of restructuring banks. The inability to restart lending to SME's in the aftermath of the crisis should not be a surprise; but it is not, as some have suggested, just the standard liquidity trap, where Keynes focused on the difficulty of getting interest rates to zero: how could it be, with interest rates near zero and real interest rates negative? Rather, it arises from the fact that even zero T-bill rates may not induce banks to lend (Greenwald and Stiglitz, 2003).

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<sup>17</sup> Part of the reason is that with durable goods, the flow of consumption services is detached from the flow of expenditures, which can be affected by borrowing constraints, expectations, and perceptions of risk, including the risk of unemployment. While these variables can be incorporated into a more fully specified intertemporal maximization model, doing so is complex, and doing so in a way that is adequate for short-term macro-economic analysis requires models with enough heterogeneity to incorporate some who are capital constrained and some who are not.

Much of the discussion paid little attention to the consequences of how banks would be recapitalized (except among some members of both the Bush and Obama Administrations, who suggested that private money was better than public money—in spite of the unimpressive record of the private sector prior to the crisis, wasting money on a scale beyond the ambitions of most governments). The implicit assumption was that bank managers would treat government-provided funds just like any other source of funds. But an alternative, and perhaps more plausible assumption, is that in the absence of a change in control, bank managers would maximize the expected utility of profits to the old owners (caring little about the returns to the government).

Consider the problem facing many governments: whether to provide funds through preferred shares or equity. We can analyze the consequences by hypothesizing that the bank maximizes the utility ( $U$ ) of the profits accruing to private owners,  $\pi$ ,

Max EU ( $\pi$ )

where  $\pi = \max \{(1 - \alpha)(Y - rB - r_g B_g), 0\}$

where  $\alpha$  represents the dilution to government (through shares and/or warrants),  $r_g$  is the coupon on the preferred shares,  $B_g$  is the capital injection through preferred shares, and  $r$  is the cost of (government insured) deposits to the bank. ( $U'' < 0$  reflecting risk aversion.)

We can distinguish three states of nature (assuming we can order the states by the level of macro-economic activity, denoted by  $\theta$ )

- (a)  $\theta \leq \theta_1$  : bank goes bankrupt
- (b)  $\theta_1 \leq \theta \leq \theta_2$  : old owners make no profit, but bank does not go bankrupt
- (c)  $\theta \geq \theta_2$  : bank makes profit for old owners, preferred shares are fully paid

Different financial arrangements affect the size of each region and the weight put on each. If the government charges an actuarially fair interest rate on preferred shares, then  $r_g > r$ , so the region in which old owners make no profit is actually increased. On the other hand, the larger the fraction of government compensation that takes the form of shares, the smaller the region (a) and (b), and the less distorted is the decision making.

It is easy to show in this simple model that the optimal way to provide finance to banks is full share ownership, while the worst (with respect to decision making) is injecting capital just through preferred shares (the route actually chosen).

A full modeling of the banking sector is obviously more complex. But what should be clear is that the simplistic macro- models had little if anything to say about these critical issues—and much of the conventional wisdom was simply misleading.

## **5. Asking the Right Questions<sup>18</sup>**

Despite the flawed assumptions underlying the standard model, confidence in it persisted partly because attention was directed at the wrong question. The real objective of macro-economic models is not to improve our forecast a little bit when things are going well, but to predict the “big” events, critical turning points, like the beginning of a recession. The loss in welfare in failing to predict and deal well with the financial crisis—a loss in output in Europe and the United States that now amounts to trillions of dollars—is an order of magnitude greater than any gain that might have arisen from an increased ability to fine-tune the economy when things are going normally.

The three questions it should have focused on are, in the context of deep downturns:

1. What causes economic fluctuations?
2. How do we explain rapid declines?
3. How do we explain slow recoveries?

The standard model’s failings with respect to the first are particularly telling: it assumed that the sources of the disturbances were exogenous “technology shocks,” not endogenous—not the credit and other bubbles. What is remarkable is that such endogenous disturbances have been at the root of major fluctuations since the beginning of capitalism. Yet the standard models ignored history (Kindleberger, 1978), as well as theoretical advances (Minsky, 1982) that could have offered possible explanations of these endogenous fluctuations.

In the standard neo-classical model, the economy has buffers that help absorb shocks, rather than amplify them. Moreover, in the absence of war, state variables (that seemingly should be determining economic behavior) change slowly. Why, then, can the state of the economy change so quickly? Models with financial market imperfections (Greenwald-Stiglitz, 1987b, 1988a, 1988b, 1988c, 1990, 1993a) give rise to financial accelerators and provide part of the answer; the fact that DSGE models have incorporated such constraints in recent years is a move in the right direction. But I don't believe that

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<sup>18</sup> This section draws upon Stiglitz (2011).

even these fully account for the seeming "fragility" of the economy. A broader range of models needs to be considered (Stiglitz, 2011, 2012).

In many ways, the most important puzzle is how to explain slow recoveries. After all, the country's physical, human, and natural resources today are essentially the same as they were before the crisis, yet output in some countries is still lower than it was before the crisis. In a representative agent model, even debt would not be a problem, since it would be money we owed to ourselves: it doesn't change net worth. And if debt does matter, it implies that distribution also matters and in fact that distribution is of first-order importance. But our standard macro-models, which typically pay scant attention to distribution, now cannot enlighten us as to why it should matter so much. But even if debt matters, in the standard neo-classical model, there is still a full employment equilibrium. One might have thought that policy analyses would focus on what that equilibrium looks like and how we might attain it. By contrast, some of the policy prescriptions seem to have us move away from that equilibrium: lowering wages could lower aggregate demand, leading to still more unemployment.

With Bruce Greenwald and several of my other colleagues, we have constructed models in which economic downturns, such as the current one, persist because, in the process of structural transformation, those in the dying sector get "trapped" by mobility costs. Government spending, and especially industrial policies, can lead to higher output and lower unemployment, thus facilitating the transition.

## **6. The Fundamental Flaws in the Eurozone Framework**

The Euro was a political project, conceived to help bring the countries of Europe together. It was widely recognized at the time that Europe was not an optimal currency area.<sup>19</sup> Labor mobility was limited, the countries' economies were vulnerable to different kinds of shocks, and there were divergent long-term productivity trends. While it was a political project, the politics was not strong enough to create the economic institutions that might have given the Euro a fair chance of success. The hope was that over time, that would happen. But, of course, when national economies were doing well, few felt the impetus to "complete" the project, and when a crisis finally occurred (with the global recession that began in the United States in 2008), it was hard to think through carefully what should be done to ensure the success of the Euro.

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<sup>19</sup> See Mundell (1961).

I and others who supported the concept of European integration hoped that when Greece found itself in crisis, in January 2010, European leaders would display both an understanding of what needs to be done to ensure the stability of Greece and the survival of the Euro and enough commitment to European solidarity to ensure that the requisite steps were undertaken. That did not happen, and, swiftly, a project originally designed to bring Europe together became a source of divisiveness. Germans talked about Europe not being a transfer union—a euphemistic and seemingly principled way of saying that they were uninterested in helping their partners, as they reminded everyone of how they had paid so much for the reunification of Germany. Not surprisingly, others talked about the high price they had paid in World War II and the enormous German debts that had been forgiven at the end of the War. Selective memories played out, as Germans talked about the dangers of high inflation; but was it inflation or high unemployment that had brought on the National Socialist government? Is it inflation or unemployment that will fuel the political unrest that lay ahead?

Greece was castigated for its high debts and deficits; it was natural to blame the crisis on excessive profligacy, but again there was selective memory: Spain and Ireland had low debt-to-GDP ratios and a fiscal surplus in the years before the crisis. Therefore, no one could blame these countries' predicament on fiscal profligacy. At the same time, it was clear that Germany's prescription—more severe and more effectively enforced budgetary cutbacks—was not going to help Greece climb out of its hole. On the contrary, there was every reason to believe that this very prescription—known as austerity—would deepen the crisis. Indeed, by so manifestly showing their profound ignorance of the fundamentals underlying the crisis, the authorities scared the markets. Even if they had understood what was at stake, even if they repeatedly reiterated their commitment to the European project, their display of enormous resistance to undertaking the necessary reforms *in the European framework* surely contributed to the markets' loss of confidence, helping to explain why each of the so-called rescue measures turned out to be only temporary palliatives.

In the remainder of this section, I describe several of the underlying *structural* properties of the Eurozone that, if not make the continuation of this crisis or the occurrence of future crises inevitable, certainly make them likely. (What is required is not so much the structural adjustment of the individual countries, but the structural adjustment of the Euro framework.) Many of these are associated with rules that reflected the neo-classical model, with the associated neo-liberal policy prescriptions fashionable (in some circles) at the time of the creation of the Euro.

Europe made two fundamental mistakes: First, it enshrined in its “constitution” these fads and fashions, the concerns of the time, without providing for enough flexibility when responding to changing circumstances and understandings. And secondly, it failed to notice that even at that time, the limitations of the neo-classical model had been widely exposed—the problems posed, for instance, by imperfect competition, information, and markets to which I referred earlier. Likewise, the neo-classical model failed to recognize the many market failures that require government intervention, or in which government intervention would improve the performance of the overall economy. Most importantly from a macro-economic perspective, there was the widespread belief that so long as the government maintained a stable macro-economy—typically interpreted as maintaining price stability—overall economic performance would be assured. By the same token, if the government kept budgets in line (kept deficits and debts within the limit set by the Maastricht Convention), the member countries’ economies would “converge” so that the single currency system would work. The founders of the Eurozone apparently thought these budgetary/macro-conditions were enough for the countries to converge, i.e., to have sufficient “similarity” for a common currency to work. They were wrong. Equally misguided was the focus of the founders of the Eurozone on government failure, not market failure, and thus they circumscribed the actions that governments could take, setting the stage for the market failures that would bring on the Euro crisis.

So too, much of the framework built into the Eurozone might have enhanced efficiency, *if Europe had gotten the details right and if the neo-classical model were correct*. But the devil is in the details, and some of the prescribed provisions led to inefficiency and instability. The following paragraphs illustrate what I have in mind.

*Free mobility of factors without a common debt leads to inefficient and unstable allocation of factors.* The principle of free mobility is to ensure that factors move to where (marginal) returns are highest, and if factor prices are equal to marginal productivity, that should happen. But what individuals care about, among other things, is the after-tax returns to labor, and this depends not only on the marginal productivity of labor (in the neo-classical model) but also on taxes and the provision of public goods. Taxes, in turn, depend in part on the burden imposed by *inherited debt*. This can be seen in the cases of Ireland, Greece, and Spain. All three were facing towering levels of inherited debt (a debt that had not swollen to its current levels by making investments in education, technology, or infrastructure, i.e., through the acquisition of assets, but through financial and macro-economic mismanagement in the case of Greece and Ireland or as a result of a crisis that was not of their own mak-

ing, in the case of Spain). This implies migration away from these highly indebted countries to those with less indebtedness, even when marginal productivities are the same; and the more individuals move out, the greater the “equilibrium” tax burden on the remainder becomes, accelerating the movement of labor away from an efficient allocation.<sup>20</sup> (Of course, in the short run, migration may bring positive benefits to the crisis country, as it reduces the burden of unemployment insurance and enhances domestic purchasing power as the remittances from abroad sent by the emigrants roll in. Whether these “benefits” to migration outweigh the adverse effects in the short run noted above is an empirical question. The outward migration also hides the severity of the underlying downturn, since it means that the unemployment rate is less, possibly far less, than it otherwise would be.)<sup>21</sup>

*Free mobility of capital and goods without tax harmonization can lead to an inefficient allocation of capital and/or reduce the potential for redistributive taxation, leading to high levels of after-tax and transfer inequality.* Competition among jurisdictions can be healthy, but there can also be a race to the bottom. Capital goes to the jurisdiction that taxes it at the lowest rate, not where its marginal productivity is the highest. To compete, other jurisdictions must lower the taxes they impose on capital, and since capital is more unequally distributed than labor, this reduces the scope for redistributive taxation. (A similar argument applies to the allocation of skilled labor.) Inequality, it is increasingly recognized, is not just a moral issue: it affects the performance of the economy in numerous ways (Stiglitz, 2012).

*Free migration might result in politically unacceptable patterns of location of economic activity.* The general theory of migration/local public goods has shown that decentralized patterns of migration may well result in inefficient and socially desirable patterns of location of economic activity and concentrations of population. There can be congestion and agglomeration externalities (both positive and negative) that arise from free migration. That is why many countries have an explicit policy for regional development, attempting to offset the inefficient and/or socially unacceptable patterns emerging from unfettered markets.

In the context of Europe, free migration (especially that arising from debt obligations inherited from the past) may result in depopulation not only of certain regions within countries but of certain countries. One of the important

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<sup>20</sup> Interestingly, this problem has long been recognized in the theory of fiscal federalism/local public goods. See, e.g., Stiglitz (1977, 1983a, 1983b).

<sup>21</sup> By the same token, if some of the burden of taxation is imposed on capital, it will induce capital to move out of the country.

adjustment mechanisms in the United States (which shares a common currency) is internal migration; and, if such migration leads to the depopulation of an entire state, there is limited concern.<sup>22</sup> But Greece or Ireland are, and should be, concerned about the depopulation of their homelands.

*The single-market principle for financial institutions and capital, too, can lead to a regulatory race to the bottom, with at least some of the costs of the failures borne by other jurisdictions.* The failure of a financial institution imposes costs on others (evidenced so clearly in the crisis of 2008), and governments will not typically take into account these cross-border costs. That is why either there has to be regulation by the host country (Stiglitz and members of a UN Commission of Experts, 2010), or there has to be strong regulation at the European level.

Worse still, *confidence in any country's banking system rests partially on the confidence in the ability and willingness of the bank's government to bail it out—and/or in the existence of (1) institutional frameworks that reduce the likelihood that a bailout will be necessary, (2) special funds set aside should a bailout be necessary, and (3) procedures in place to ensure that depositors will be made whole.* Typically, there is an implicit subsidy, from which banks in jurisdictions with governments with greater bailout capacity benefit. Thus, money flowed into the United States after the 2008 global crisis, which failures within the United States' financial system had brought about, simply because there was more confidence that the United States had the willingness and ability to bail out its banks. Similarly, today in Europe: what Spaniard or Greek would rationally keep his money in a local bank, when there is (almost) equal convenience and greater safety in putting it in a German bank?<sup>23</sup> Only by paying much higher interest rates can banks in those countries compete, but that puts them at a competitive disadvantage; and the increase in interest rate required may be too great—the bank would quickly appear to be non-viable. What happens typically is capital flight (or, in the current case, what has been described as a capital jog: the surprise is not that capital is leaving, but that it is not leaving faster). But that sets in motion a downward spiral: as capital leaves, the country's banks restrict lending, the economy weakens, the

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<sup>22</sup> Some see an advantage: buying influence over that country's senators because it is less expensive.

<sup>23</sup> The exit from Spanish banks, while significant—and leading to a credit crunch—has been slower than some had anticipated. This, in turn, is a consequence of institutional and market imperfections (e.g., rules about knowing your customer, designed to curb money laundering), which, interestingly, the neo-classical model underlying much of Europe's policy agenda ignored. There is far less of a single market than is widely thought to exist.

perceived ability of the country to bail out its banks weakens, and capital is further incentivized to leave.

There are two more fallacies that are related to the current (and inevitable, in the absence of policy and structural reforms) failures of the Eurozone. The first is the belief that there are natural forces for convergence in productivity, without government intervention. To be sure, there can be rising returns (reflected in clustering), the consequence of which is that countries with technological advantages maintain those advantages, unless there are countervailing forces brought about by government (industrial) policies. But European competition laws prevented, or at least inhibited, such policies.<sup>24</sup>

The second fallacy is the belief that it is necessary and almost sufficient by itself, for good macro-economic performance to have low and stable inflation maintained by the monetary authorities. This led to the mandate of the European Central Bank to focus on inflation, in contrast to that of the Federal Reserve, whose mandate includes growth, employment, and (now) financial stability. The contrasting mandates can lead to an especially counterproductive response to a crisis especially one accompanied by cost-push inflation arising from, say, high energy or food prices. While the Fed lowered interest rates in response to the crisis, the continuing inflationary concerns in Europe meant that the Fed's actions were not matched by reductions there. The upshot was an appreciating Euro, with downward effects on European output. Had the ECB taken actions to lower the Euro's exchange value, it would have stimulated the economy, partially offsetting the effects of austerity. As it was, it allowed the US to engage in competitive devaluation against it.

These beliefs also meant that the ECB (and Central Banks within each of the member countries) studiously avoided doing anything about the real-estate bubbles that were mounting in several of them. This was in spite of the fact that the East Asia crisis had shown that private-sector misconduct—not that of government—could bring on an economic crisis. Europe similarly paid no attention to the run-up in current-account balances in several of the countries.

*Ex post*, many policymakers admit that it was a mistake to ignore these current-account imbalances or financial market excesses. But the then underlying ideology provided no framework (it still doesn't) for identifying good "imbalances," when capital is flowing into the country because markets have rationally identified good investment opportunities, and distinguishing them from bad ones, i.e., those that are attributable to market excesses.

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<sup>24</sup> Even the World Bank has changed its views on industrial policies; yet views about industrial policies are to a large extent enshrined in the Eurozone's basic economic framework. See Lin (2012), Lin and Stiglitz (2013), and Lin, Patel, and Stiglitz (2013).

### The immediate problem

The most immediate problem facing the Eurozone is that creating a single currency took away two of the critical adjustment mechanisms (interest rates and exchange rates) and didn't put anything in their place. The United States has an economic framework that deals with most of the problems described earlier: two-thirds of all government expenditures occur at the national level, and the states are restricted (by their own constitutions) from incurring debt, other than for capital projects.<sup>25</sup> Most banks rely on Federal deposit insurance. States are not restricted from engaging in "industrial policies," and poorer states have actively recruited firms to locate in their jurisdictions.<sup>26</sup>

Some hoped that internal devaluation would serve as an effective substitute, i.e., domestic wages and prices would fall. But there are three fundamental problems with this solution: (a) it is hard to coordinate such decreases, and in the absence of such coordination, there can be large and costly changes in relative prices; (b) because debt is denominated in Euros, and thus is not contingent on domestic wages and prices, debt burdens increase—with adverse consequences seen in bankruptcies and disruptions of the domestic financial system; (c) the decrease in collateral values and incomes (especially relative to debts) would have tightened financial constraints, with first-order adverse effects on the economy. Most importantly, if internal devaluation were an effective substitute for nominal devaluations, then the gold standard would not have been an impediment to adjusting to the disturbances surrounding the Great Depression; it would not have been the case that those countries that abandoned the gold standard earlier would have done better. In the case of Argentina prior to its 2001 crisis, prices did fall, but not enough—again, an internal devaluation is not a substitute for exchange-rate adjustment.

Europe has responded to the crisis by refusing to recognize that there were any structural problems with the EU arrangements. Like the IMF and the US Treasury in so many other crises (including the 2008 crisis), it initially saw the problem as a liquidity crisis, a temporary loss of confidence; if the IMF, ECB, and the Commission showed that they stood behind each of the countries, confidence would be restored and the crisis resolved. All that was required was a temporary injection of funds (a loan to the bank or the country). But, of course, such loans don't improve the balance sheet of the country (or

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<sup>25</sup> These constitutional requirements have, in recent years, been subverted by the creation of unfunded pension liabilities, which may create within the States some of the same adverse dynamics described earlier for Europe.

<sup>26</sup> However, this has created, to some extent, a race to the bottom, the adverse dynamic that we described as characterizing Europe.

the bank), and if the problems are more fundamental, then they can have negative effects on other claimants, especially if the bailouts are senior to other creditors and even more so if a high interest rate is charged. That's why the East Asian bailouts and the Argentine bailouts had little discernible effect. It is not surprising that neither did the European sovereign bailouts; it is only surprising that it took Europe's leaders so long to recognize this. Later, the ECB lent money to the banks, to lend onward to the governments, to help support bond prices (lower sovereign yields), in the long-term refinancing operation (LTRO) program. Because the money provided to the banks was lent at close to a zero interest rate, and the banks could lend the money onward at much higher rates, this program was, in effect, a massive gift to European banks. The fact that European officials looked at the take-up of the program as a measure of "success" (as well as the *temporary* reduction in sovereign risk premiums) was perhaps symptomatic of a lack of understanding of the underlying problems. To be sure, there were real effects from the hidden recapitalization of the banks. But the effects on sovereign risk premiums were temporary: only coercion would induce them to permanently put a disproportionately large fraction of their balance sheet in these highly risky assets.

Indeed, there was something especially peculiar about Europe's attempt at a bootstrap operation, whereby lending to the government would help bail out the banks, and lending to the banks would help bail out the governments.

But at least this bootstrap attempt didn't have the adverse effects of austerity: predictably, austerity brought growth down, and as austerity spread throughout Europe, it helped bring on a European-wide recession, weakening the banks at the same time that it had disappointing fiscal benefits. As growth slowed and the ranks of the unemployed increased, revenues declined (from what they otherwise would have been) and expenditures (e.g., for unemployment benefits) climbed.

European officials who prescribed austerity suggested, when these programs were first adopted,<sup>27</sup> that by now those who adopted their programs would be on their way to restored prosperity.<sup>28</sup> They have been wrong, and repeatedly so. They have repeatedly underestimated the magnitude of the downturn that their policies would bring about, and as a result, they have con-

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<sup>27</sup> For example, British Conservative David Cameron in his April 2009 speech, "The Age of Austerity," expounded on austerity not as just a short-term strategy but as a philosophical shift that would restore the vibrancy of Britain's economy. Without it, he said, "[W]e risk becoming once again the sick man of Europe. Our recovery will be held back, and our children will be weighed down, by a millstone of debt." The actual results of austerity in Britain have not lived up to his promises, to say the least.

<sup>28</sup> This section is a revised version of the preface to Stiglitz (2012).

sistently underestimated the fiscal benefit that would be derived: deeper downturns inevitably result in lower revenues and higher expenditures for unemployment and social programs. Though they then try to shift the blame back on to the crisis countries for missing the fiscal targets, the fact is that it is their misdiagnosis of the problem and the resulting wrong prescription that should be held accountable. Spain and Greece are in Depression—there is no other way to describe the situation—and that depression is largely a result of misguided policies foisted on these countries (though their own leaders are to blame, for having acquiesced, but only as seeing, perhaps wrongly, that the proposed “solution” was better than the alternative).

Today, the problem in Europe is inadequate overall demand. As the downturn continues, banks are less willing to lend, housing prices decline, and households become poorer and poorer and more uncertain of the future, depressing consumption further. Europe’s problem today is lack of aggregate demand, and austerity exacerbates that problem.

No large economy—and Europe is a large economy—has ever emerged from a crisis at the same time that it has imposed austerity. Austerity always, inevitably, and predictably makes matters worse. The only examples where fiscal stringency has been associated with recovery are in countries where reductions in government spending are offset by increases in exports. These are generally small countries, typically with flexible exchange rates, and where trading partners are growing robustly. But that is hardly the situation confronting Europe’s crisis countries today: their major trading partners are in recession, and each has no control over its exchange rate.<sup>29</sup>

European leaders have recognized that Europe’s problems will not be solved without growth. But they have failed to explain how growth can be achieved with austerity. Instead, they assert that what is needed is a restoration of confidence. However, austerity will not bring about either growth or confidence. Europe’s sorry record of ultimately failed policies—after repeated attempts to fashion patchwork solutions for economic problems it was misdiagnosing—have undermined confidence. Because austerity has destroyed growth, it has also destroyed confidence, and will continue to do so, no matter how many speeches are given about the importance of confidence and growth.

The austerity measures have been particularly ineffective, because the market understood that they would bring with them recessions, political turmoil, and disappointing improvements in the fiscal position, as tax revenues

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<sup>29</sup> Alesina and Ardagna (2010) have tried to propagate the idea that expansionary contractions are possible. But there is a growing consensus that their analyses are badly flawed, and that that is not the case. See, e.g., IMF (2010), Baker (2010), and Jayadev and Konczal (2010).

declined. Rating agencies have downgraded countries instituting austerity measures, and rightly so. Spain was downgraded as the first austerity measures were passed: one of the rating agencies believed that Spain would do what it promised, and it knew that that meant low growth and a worsening of its economic woes.

By the same token, while structural reforms will be important for future growth and standards of living in many of the European countries, including those currently afflicted with crisis, structural reforms take time. They affect long-term standards of living, but structural rigidities did not precipitate the crisis. It was a financial and real-estate crisis that did that.<sup>30</sup> Most of the structural reforms are supply-side measures, but as I noted, the problem today is an inadequacy of demand; worse, many of the structural reforms will exacerbate that problem, especially those that end with lower wages and have adverse distributional effects.

### **Responding to the crisis**

This analysis of the fundamental flaws underlying the Eurozone suggests a set of policies that *might* help resolve the crisis. I say *might*: these reforms are necessary to make the Euro work, but they are not necessarily sufficient. The divergence between an optimal currency area and the Eurozone—the divergences, for instance, in economic structures that can give rise to desired changes in exchange rates, either in the short run in response to shocks, or in the long run in response to systemic differences in productivity and inflation trends—may be too large to make a system of a single currency work.

### **Mutualization of debt**

The first necessary reform is a common fiscal framework—more than and fundamentally different from an austerity pact, or a strengthened version of the growth and stability pact. As I noted, it was not overspending that brought on Spain's or Ireland's problems.

One of the basic problems confronting the Eurozone is that current arrangements have effectively meant that countries were borrowing in a currency over which they had no control—much like developing and emerging markets that borrowed in dollars or Euros. There is no risk that the US will ever default on its debt, owed in dollars, simply because it controls the printing presses (a fact that at least one of the rating agencies seems unaware of).

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<sup>30</sup> As is the case in the United States, there may be deeper problems: structural transformation that is required by the decline in manufacturing employment and globalization.

The value of those dollars might diminish were it to resort to such measures, but (politics aside) there is unlikely to be any event of sufficient moment to change expectations of inflation so dramatically as to bring on a crisis.

What is required then is “mutualization” of debt—European-wide debt, owed in Euros. This would make Europe’s debt similar to America’s debt, and with Europe’s overall debt-to-GDP ratio lower than that of the US, presumably interest rates would be comparable. Such mutualization would lower interest rates, allowing more spending to stimulate the economy and restore growth.

Mutualization of debt could be accomplished through a number of institutional mechanisms (Eurobonds, ECB borrowing and on-lending to nations). How to design such a system (in a way that did not lead to excessive borrowing) would take me beyond this paper. For now, I simply note: the position of some in Europe against such mutualization—claiming that Europe is a transfer union—is wrong on two counts:

(a) It exaggerates the risk of default, at least the risks of default *if* debt is mutualized. At low interest rates, most of the crisis countries should have no trouble servicing their debts.<sup>31</sup>

Of course, in the absence of debt mutualization, there is a serious risk of partial default (which has already happened in the case of Greece). The irony is that existing arrangements may actually lead to larger losses on the part of creditor countries than a system of well-designed mutualization.

(b) Any system of successful economic integration must involve some assistance from the stronger countries to the weaker. (The desirability of such transfers, even in the absence of economic integration, was evidenced by the Marshall Plan after World War II and the large debt forgiveness of Germany by the Allies. More recently, Europe itself has provided substantial funds to new entrants, to enable their economies to converge.)

### **A common financial system**

The second necessary reform is a common banking system—with deposits insured by a European-wide deposit insurance fund, and with common regulations and a common approach to resolution of insolvent banks. I have already explained why a common deposit insurance fund is required: without that, funds will flow from the banking system of “weak” countries to the banks in strong countries, weakening further those already having problems.

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<sup>31</sup> The exception is Greece, for which there has already been debt restructuring.

But without a common regulatory system, a system with a common deposit insurance scheme could be open to abuse.

But a common regulatory system should have scope for taking different macro-prudential stances in different countries, or even regions within a country. We described earlier how having a single Central Bank took away an important instrument of adjustment—the interest rate. But there are a host of other regulatory provisions (such as capital adequacy requirements) that can be adjusted according to the macro-economic circumstances.<sup>32</sup> Lending standards for mortgages should, for instance, be tightened at a place or time where there appears to be the risk of a bubble forming.<sup>33</sup>

Further reforms that are desirable and perhaps even necessary if the Euro is to survive entail a move towards tax harmonization, restricting the race to the bottom in capital taxation, and eliminating the distortions caused by tax competition among countries. Industrial policies that would allow those behind to catch up are necessary to prevent further divergences within the countries of Europe.

### **Towards debt restructuring**

For most Eurozone economies, these reforms would, for now, suffice. But there may be some (like Greece) where the cumulative impact of past mistakes (not only their own past budgetary mistakes, but also those that were forced on them in the early responses to the crisis) is such that more is needed. They will have to restructure their debts.

Debt restructuring is an essential part of capitalism. Every country has a bankruptcy law that facilitates the restructuring of debts in an orderly way. Though after the Argentine crisis there were calls for the creation of sovereign-debt restructuring mechanisms, one of President Bush's many sins was to veto that initiative<sup>34</sup>. In the subsequent years, when there were no sovereign-debt crises, there was little concern about the issue. Elsewhere, I have described what such a mechanism might look like (Stiglitz, 2010b)<sup>35</sup>. But in the absence of such a mechanism, countries have to act on their own—as Argentina showed were possible.

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<sup>32</sup> One of the lessons of the crisis was that monetary authorities relied excessively on interest rates.

<sup>33</sup> This was evidenced, for instance, by a rapid increase in housing prices relative to income, or by an abnormally rapid expansion of credit.

<sup>34</sup> Though a few others joined in opposition.

<sup>35</sup> There is also need in many cases for private debt restructuring, e.g. of mortgages. For how this might be done, see Stiglitz and Zandi (2012) or Stiglitz (2010c).

But if some country needs debt restructuring to enhance growth, it should be done quickly and deeply. And one shouldn't feel too sorry for the creditors: lenders have been receiving high interest rates reflecting such risks.<sup>36</sup> There is some evidence that, on average, they are more than compensated for such risks. By the same token, as we noted earlier, the costs to the economies doing the restructuring may be less than widely assumed. Both theory and evidence suggest that countries that do such restructuring can later regain access to global financial markets, often quickly; but even if, going forward, countries have to rely on their own savings, the adverse consequences may be far less than the benefits they receive from the debt restructuring.<sup>37</sup>

Argentina has also shown that there is life after debt and that there are large benefits to the reform of monetary arrangements. Indeed, there are good reasons to believe that a deep debt restructuring will have positive benefits—providing more fiscal space for expansionary policies, so long as the government does not have a primary deficit. It is important that the debt write-down be deep—otherwise, the lingering uncertainty about the possibility of another debt restructuring will cast a pall over the recovery. And because of the uncertainty about future growth, and therefore of debt sustainability, GDP-indexed bonds may represent an effective form of risk-sharing (which can be thought of, at the sovereign level, as the equivalent of the conversion of debt into equity, at the corporate level—see Miller and Zhang, 2013, and Griffith-Jones, 2013).

### **The end of the Euro?**

The analysis of this paper has suggested that prospects for the 17-nation Eurozone's survival, in its current form, are bleak. Its end, as was its creation, is as much a matter of politics as economics. European leaders continually affirm their commitment to do what is required to sustain it; but at the same time, key European leaders have shown that they do not seem to understand what is required to sustain it, and have ruled out many of the necessary measures. They have continually repeated a mantra—that one has to restore confidence and grow the economy—as they have put forth measures that have undermined long-term confidence and have put the economy into recession.

Even when most European leaders seem to have eventually grasped what is required, there are two overriding snags: can they achieve the unanimity required, given differences in the perspectives, interests and politics in the different countries; and can they achieve the requisite agreements fast enough?

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<sup>36</sup> Or they should have done so, had they done their due diligence.

<sup>37</sup> As the paper by Sandleris (2012) points out, the costs may be less related to those imposed externally, and more related to failures of the government to deal effectively with the internal disturbances associated with debt restructuring, e.g., to the financial system (banking, insurance, and pensions).

The incongruence between the pace of markets and that of the politics could present a separate problem for the survival of the Euro. Indeed, the slow pace at which the fundamental cracks in the system are being addressed is already causing problems: the financial sector in the crisis countries continues to be weakened, both as austerity exerts its toll on the individual economy and as capital flees that country. This means that the magnitude of the assistance that eventually may be required is likely to be far greater than it would have been had the reforms been undertaken earlier.<sup>38</sup>

Many European leaders have recognized that *eventually* a single banking framework, with common regulations, deposit insurance, and resolution, will be necessary. But others argue that such a dramatic reform must be done carefully, in a step-by-step process. First, there must be common regulations, and when the regulatory system has been “proven,” Europe can go on to the next stage(s). Were there not an ongoing crisis, such an argument would have some merit. But those with capital in, say, the Spanish banks will not wait: the benefits of waiting are nil, the risks are substantial. And so, while European leaders dither, the banking system will be weakened.

ECB lending (in the unlimited amounts promised, provided that the country requests it and subjects itself to conditionality) may delay the day of reckoning. But one should be clear that the issue facing, say, the Spanish banks is not just one of liquidity. If the funds are accompanied by the austerity conditionality that has marked earlier programs, unaccompanied by any program that would lead to growth, then the banks will continue to get weaker; and even the anticipation that this might be so will contribute to funds leaving the banks. What is necessary for a return of “confidence” in the banking system is (a) a belief that further losses will be limited; and (b) the government has the resources and willingness to rescue the bank, should it run into problems. But under current policies, not only are the banks’ losses likely to continue to mount, each government’s ability to rescue its banks will continue to deteriorate.

Alternatively, those with funds in Spanish banks might be willing to keep their funds there, were they confident that Europe will step into the breach. But Europe’s equivocation has not helped, a timorousness stoked by Northern Europe’s attempts to limit its exposure, in response to domestic political pressures. After recognizing in the summer of 2012 that the “bootstrap” approach would not work, and that Europe’s support would have to go directly to the banks, there appears (as this paper goes to press) to be some backtracking—perhaps the legacy “debts” will not be covered. After recognizing that there

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<sup>38</sup> The slow pace of reforms has led to other problems: Ireland, one of the first countries to receive assistance, is concerned that later countries will get a better “deal.”

needs to be a common financial framework, again there appears to be some backtracking: perhaps only the large banks should be included. (While the failure of a single small bank would not itself cause large systemic effects throughout Europe, the failure of a number of small banks could; and what is at stake is not just the “systemic risk” of Europe’s financial system, but the capacity of the Spanish banking system to provide credit, especially to SMEs, and this credit may be even more dependent on the strength of the smaller banks than on that of the larger banks.)

There is likely to be turmoil in the process of the restructuring of the Eurozone, and the resulting downturn could be significant. But under the current regime, the prospects for crisis countries are truly bleak: for some, depression as far as the eye can see. Europe has offered no alternative vision.

The current regime is also undermining the legitimacy of democratic economic institutions. The European project was a top-down initiative. There was a *very* short period of prosperity<sup>39</sup>—based in some countries on access to credit at irrationally low interest rates. The promises of *sustained* prosperity were not delivered upon. The rules of the game not only failed to deliver on sustained macro-economic growth, they also have led to widening inequality, with governments restrained in their ability to redress growing inequities. Evidently, the elites created a system that seems to have done well for those at the top.

In many quarters, there is concern about the ceding of effective economic power—originally to Brussels’ bureaucrats, but increasingly to German politicians, undermining national democracies.

There are a variety of ways by which the current form of the Eurozone might end. There was, of course, in its creation the assumption that it would never end (though monetary arrangements have frequently had to be changed), and so there was no provision for contingencies similar to that which the Eurozone is now facing. It might end by the ECB refusing to discount the bills of the banks of a member country—in effect, ceasing to act as a Central Bank for that country, and forcing the country’s old Central Bank to resume that role. Or it might end in a popular uprising against the continued depression forced on the crisis countries by Europe’s leaders.

However the breakup of the Euro occurs, it is likely to be costly. Nevertheless, there are several options for reducing those costs. There is growing agreement among economists that the least costly form of break-up would entail Germany leaving the Euro. The New Euro (so defined) would almost

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<sup>39</sup> Monetary arrangements often have a short life span—witness the ERM. Even the Bretton Woods system (fixed exchange rates) lasted less than three decades.

surely depreciate relative to the Mark, correcting current-account imbalances within Europe, strengthening growth in crisis countries, and enabling those countries to more easily meet their debt obligations.

At the same time, the stronger Mark would enable Germany to easily meet its debt obligations. Some creditors might feel that they were being cheated, being paid back in the depreciated (New) Euro; but credit contracts are typically unindexed, and there are a host of contingencies that affect the real value of what is repaid. Creditors receive a risk premium for bearing those risks. Whatever happens has distributive consequences; other ways of having the Eurozone dissolved entail adverse effects on borrowers.

## 7. Concluding Comments

Most crises are manmade. They are not caused by famines or other natural disasters. They are often the result of unstable market processes—not a sudden change in government policies. On the other hand, government policies can affect the likelihood of the occurrence of crises and their consequences. Government policies can affect countries' exposure to risk and the structural stability of the system as well as impede or facilitate adjustments. The elimination of automatic stabilizers, and their replacement in some cases by automatic destabilizers, has introduced new instabilities into the economic system. Deregulation and financial and capital-market liberalization have provided new opportunities for destabilizing market processes and opened up new channels by which the instabilities in one country can affect others (Delli Gatti *et al.*, 2006).

We have seen how institutional changes surrounding the Eurozone—intended to create a more stable and prosperous economy—played out in ways that were, at the time of the founding of the Euro, largely unanticipated, but which—at least in hindsight—were totally understandable given the structural flaws in the Eurozone institutional arrangement. We have seen, too, how the policy responses to the crisis, as it unfolded have, in many cases, only made matters worse.

There are alternative policies that would enhance stability and, should a crisis occur, be more likely to restore the economy to prosperity. But to adopt these policies, one has to break out of the ideological straitjacket of market fundamentalism/neo-liberalism and much of conventional economics.

There was no sudden change in the underlying state variables describing the European economy, no war that wiped out large portions of its physical and human capital stock, not even an innovation or an economic transformation that would have led to rapid obsolescence of its capital stock. There have, of course, been sudden changes in expectations, and in our understandings:

we know (or at least we *should* now know) that markets are not necessarily quickly self-correcting, that under-regulated markets can give rise to bubbles and credit excesses, that Greece or Spain having the same currency as Germany does not mean that Greek or Spanish debt is as safe as that of Germany, and it may not even fully eliminate exchange-rate risk and, in ways that we have explained, may actually increase default risk.

Crises are complex events, and it is inevitably overly simplistic to find a single-causal explanation. Still, it should be clear that the Euro crisis, like so many other crises, is more attributable to market excesses than to government profligacy. If government is to be blamed, it is for a failure to tame the (repeated) market excesses. (And even when there is government profligacy, the market is almost always a co-conspirator—lending excessively at easy terms, in its irrational optimism about the prospects of repayment.) Prevention entails understanding how to curb the excesses, and how to design institutional arrangements that limit the opportunity for such excesses. Resolution entails understanding how to ensure that, after a crisis, resources are put back to use as quickly as possible.

With or without such excesses, economies are exposed to shocks; different institutional arrangements heighten the exposure to such shocks, amplify the effects, make the effects more persistent, and impede adjustment afterward. Market forces by themselves may not only lead to endogenous disturbances (like bubbles), but may respond to shocks in a destabilizing way. Government intervention (e.g., through debt restructuring, countercyclical macro-policies, and well designed bank recapitalizations) can reduce the enormous costs that have traditionally been associated with crises.

Crises are perhaps an inherent feature of capitalism. But they do not have to be as frequent, as deep, and as costly as they have been.

The standard macro-economic models ignored history—which had shown that capitalism had been marked by large fluctuations, with great suffering, since the start. The models equally ignored key market failures that help explain persistent inefficiencies and instabilities. In doing so, policymakers using those models may have violated the central principle of Hippocrates: do no harm. The policies and institutional arrangements based on these simplistic models and theories created the pre-conditions for these crises and have contributed to the slow recovery from this Great Recession—a downturn that, while not as deep as the Great Depression, may begin to rival it in duration.

## References

- Alesina, Alberto and Silvia Ardagna, (2010), "Large Changes in Fiscal Policy: Taxes versus Spending," in *Tax Policy and the Economy*, Jeffrey R. Brown (ed.), vol. 24 (Chicago: University of Chicago Press, 2010), pp. 35-68.
- Allen, Franklin and Douglas Gale, (2000), *Comparing Financial Systems*, Cambridge, Mass.: MIT Press.
- Baker, Dean, (2010), "The Myth of Expansionary Fiscal Austerity," CEPR, Washington, DC.
- Battiston, Stefano, Domenico Delli Gatti, Bruce Greenwald, and Joseph E. Stiglitz, (2007), "Credit Chains and Bankruptcy Propagation in Production Networks," *Journal of Economic Dynamics and Control*, 31(6), pp. 2061-2084.
- Battiston, Domenico Delli Gatti, Mauro Gallegati, Bruce Greenwald, and Joseph E. Stiglitz, (2012a), "Liaisons Dangereuses: Increasing Connectivity, Risk Sharing, and Systemic Risk," *Journal of Economic Dynamics and Control*, 36, pp. 1121-1141.
- Battiston, Stefano, Domenico Delli Gatti, Mauro Gallegati, Bruce Greenwald, and Joseph E. Stiglitz, (2012a), "Liaisons Dangereuses: Increasing Connectivity, Risk Sharing, and Systemic Risk", *Journal of Economic Dynamics and Control*, 36, pp. 1121-1141.
- Battiston, Stefano, Domenico Delli Gatti, Mauro Gallegati, Bruce Greenwald, and Joseph E. Stiglitz, (2012b), "Default Cascades: When Does Risk Diversification Increase Stability", *Journal of Financial Stability*, 8 (3), pp. 138-149.
- De Masi, G., Y. Fujiwara, M. Gallegati, and B. Greenwald and J. E. Stiglitz, (2011), "An Analysis of the Japanese Credit Network", *Evolutionary and Institutional Economics Review*, 7 (2), pp. 203-232.
- Delli Gatti, Domenico, Mauro Gallegati, Bruce Greenwald, Alberto Russo, and Joseph E. Stiglitz, (2006), "Business Fluctuations in a Credit-Network Economy", *Physica A*, 370, pp. 68-74.
- Delli Gatti, Domenico, Mauro Gallegati, Bruce Greenwald, Alberto Russo, and Joseph E. Stiglitz, (2012a), "Mobility Constraints, Productivity Trends, and Extended Crises", *Journal of Economic Behavior and Organization*, 83 (3), pp.375-393.

- Delli Gatti, Domenico, Mauro Gallegati, Bruce Greenwald, Alberto Russo, and Joseph E. Stiglitz, (2012b) "Sectoral Dislocations and Long-Run Cycles", in the *Global Macro Economy and Finance*, F. Allen, M. Aoki, J.-P. Fitoussi, N. Kiyotaki, R. Gordon and J. E. Stiglitz, eds., IEA Conference Volume 150 (3), Hounmills, UK and New York: Palgrave, pp. 61-97.
- Field, Alexander, (2011) *A Great Leap Forward: 1930s Depression and U.S. Economic Growth*, New Haven: Yale University Press.
- Gallegati, Mauro, Bruce Greenwald, Matteo Richiardi, and Joseph E. Stiglitz, (2008), "The Asymmetric Effect of Diffusion Processes: Risk Sharing and Contagion", *Global Economy Journal*, 8 (3), Article 2, available at <http://www.bepress.com/gej/vol8/iss3/2/> (accessed March 29, 2011).
- Greenwald, Bruce and J. E. Stiglitz, (1986), Externalities in Economies with Imperfect Information and Incomplete Markets", *Quarterly Journal of Economics*, Vol. 101, No. 2, May 1986, pp. 229-264.
- Greenwald, Bruce and J. E. Stiglitz, (1987a), "Keynesian, New Keynesian, and New Classical Economics", *Oxford Economic Papers*, 39, March 1987, pp.119-133.
- Greenwald, Bruce and J. E. Stiglitz, (1987b), "Imperfect Information, Credit Markets, and Unemployment", *European Economic Review*, 31, pp. 444-456.
- Greenwald, Bruce and J. E. Stiglitz, (1988a), "Information, Finance Constraints, and Business Fluctuations", *Symposium on Monetary Theory* (Proceedings of Taipei), Institute of Economics, Academia Sinica, pp. 299-336.
- Greenwald, Bruce and J. E. Stiglitz, (1988b), "Imperfect Information, Finance Constraints, and Business Fluctuations", in *Finance Constraints, Expectations, and Macroeconomics*, M. Kohn and S.C. Tsiang, eds., Oxford: Oxford University Press, pp. 103-140.
- Greenwald, Bruce and J. E. Stiglitz, (1988c), "Money, Imperfect Information, and Economic Fluctuations", with B. Greenwald, in *Finance Constraints, Expectations, and Macroeconomics*, M. Kohn and S.C. Tsiang, eds., Oxford: Oxford University Press, pp.141-165.
- Greenwald, Bruce and J. E. Stiglitz, (1990), "Macroeconomic Models with Equity and Credit Rationing", in *Asymmetric Information, Corporate Finance, and Investment*, R. B. Hubbard, ed., University of Chicago Press, pp. 15-42.

- Greenwald, Bruce and J. E. Stiglitz, (1993a), "Financial Market Imperfections and Business Cycles", *Quarterly Journal of Economics*, 108 (1), pp. 77-114.
- Greenwald, Bruce and J. E. Stiglitz, (2003), *Towards a New Paradigm of Monetary Economics*, Cambridge: Cambridge University Press.
- Griffith-Jones, Stephany, (2013), "From Austerity to Growth in Europe: Some Lessons from Latin America", In International Economic Association, Volume on the 2012 Pretoria, South Africa Roundtable on Industrial Policy.
- Haldane, Andrew G., (2009), "Rethinking the Financial Network", Address to the Financial Students Association, Amsterdam, April. Available at <http://www.bankofengland.co.uk/publications/speeches/2009/speech386.pdf> (accessed October 31, 2012).
- Haldane, Andrew G., and Robert M. May, (2010), "Systemic Risk in Banking Ecosystems", Working Paper, University of Oxford.
- Herndon, Thomas, Michael Ash, and Robert Pollin, (2013), "Does High Public Debt Consistently Stifle Economic Growth? A Critique of Reinhart and Rogoff", University of Massachusetts, Amherst Political Economy Research Institute Working Paper No. 322, Available Online at [http://www.peri.umass.edu/fileadmin/pdf/working\\_papers/working\\_papers\\_301-350/WP322.pdf](http://www.peri.umass.edu/fileadmin/pdf/working_papers/working_papers_301-350/WP322.pdf) (accessed May 31, 2013).
- IMF, (2010), *Economic Outlook*, chapter 3.
- Jayadev, Arjun and M. Konczal, (2010), "The Boom not the Slump: The Right Time for Austerity", The Roosevelt Institute, August 23.
- Jeanne, Olivier and Anton Korinek, (2010), "Excessive Volatility in Capital Flows: A Pigouvian Taxation Approach", *American Economic Review*, 100 (2), pp. 403-407.
- Jeanne, Olivier and Anton Korinek, (2012), "Managing Credit Booms and Busts: A Pigouvian Taxation Approach", NBER Working Paper No. 16377, available at <http://www.nber.org/papers/w16377.pdf> (accessed October 2012).
- Kindleberger, Charles, (1978), *Manias, Panics, and Crashes: A History of Financial Crises*, New York: Basic Books.
- Konczal, Mike, (2011), "Dramatic Job Revisions Bust Structural Unemployment Myths", The Roosevelt Institute, May 11, available at <http://www.rooseveltinstitute.org/sites/all/files/JobOpeningCorrections.pdf> (accessed October 31, 2012).

- Lin, Justin Yifu, (2012), *New Structural Economies: A Framework for Re-thinking Development Policies*, Washington, DC: The World Bank.
- Lin, Justin Yifu and Joseph E. Stiglitz, (2013), Introduction to International Economic Association volume on the 2012 Washington DC roundtable on industrial policy..
- Lin, Justin Yifu, Ebrahim Patel, and Joseph E. Stiglitz, (2013) Introduction to International Economic Association volume on the 2012 Pretoria, South Africa Roundtable on Industrial Policy.
- Miller, Marcus and Lei Zhang, (2013), “Beyond austerity: an SPV to save the Eurozone?” in International Economic Association volume on the 2012 Pretoria, South Africa Roundtable on Industrial Policy.
- Minsky, Hyman P., (1982), *Can “It” Happen Again? : Essays on Instability and Finance*, Armonk, NY: M.E. Sharpe.
- Mundell, Robert, (1961), “A Theory of Optimum Currency Areas”, *The American Economic Review*, 51 (4): pp. 657-665.
- Neary, P. and J. E. Stiglitz, (1983), “Toward a Reconstruction of Keynesian Economics: Expectations and Constrained Equilibria”, *Quarterly Journal of Economics*, 98, Supplement, pp. 199-228.
- Prescott, Edward C., (2006), Lecture at Trinity University in San Antonio, Texas, available at [http://www.trinity.edu/nobel/Prescott/Prescott\\_Webquotes.htm](http://www.trinity.edu/nobel/Prescott/Prescott_Webquotes.htm) (accessed June 12, 2013).
- Reinhart, Carmen M. and Kenneth S. Rogoff, (2010) “Growth in a Time of Debt”, *American Economic Review* 100 (2), pp. 573-578.
- Sandleris, Guido, (2012), “The Cost of Sovereign Defaults: Theory and Empirical Evidence”, Business School Working Papers, No. 2, Universidad Torcuato Di Tella.
- Solow, Robert, (2012), “Fiscal Policy”, in Olivier Blanchard, David Romer, Michael Spence, and Joseph Stiglitz, eds., *In the Wake of the Crisis: Leading Economists Reassess Economic Policy*, Cambridge, Massachusetts: The MIT Press, pp. 73-76.
- Stiglitz, J. E., (1977), “Theory of Local Public Goods”, in *The Economics of Public Services*, M.S. Feldstein and R.P. Inman, eds., MacMillan Publishing Company, pp. 274-333. (Paper presented to IEA Conference, Turin, 1974).

- Stiglitz, J. E., (1982), "Information and Capital Markets", in William F. Sharpe and Cathryn Cootner, eds., *Financial Economics: Essays in Honor of Paul Cootner*, Prentice Hall, New Jersey, pp. 118-158. Also NBER Working Paper No.678. Reprinted in *Selected Works of Joseph E. Stiglitz, Volume II*, Oxford: Oxford University Press, forthcoming, pp. 55-84.
- Stiglitz, J. E., (1983a), "The Theory of Local Public Goods Twenty-Five Years After Tiebout: A Perspective", in *Local Provision of Public Services: The Tiebout Model After Twenty-Five Years*, G.R. Zodrow, ed., New York: Academic Press, pp. 17-53.
- Stiglitz, J. E., (1983b), "Public Goods in Open Economies with Heterogeneous Individuals", in *Locational Analysis of Public Facilities*, J.F. Thisse and H.G. Zoller, eds., Amsterdam: North-Holland, pp. 55-78.
- Stiglitz, J. E., (2010a), "Contagion, Liberalization, and the Optimal Structure of Globalization," *Journal of Globalization and Development*, 1 (2), Article 2.
- Stiglitz, J. E., (2010b), "Sovereign Debt: Notes on Theoretical Frameworks and Policy Analyses", in *Overcoming Developing Country Debt Crises*, B. Herman, J.A. Ocampo, and S. Spiegel, eds., Oxford: Oxford University Press, pp. 35-69.
- Stiglitz, J. E., (2010c), *Freefall: America, Free Markets, and the Sinking of the World Economy*, New York: WW Norton
- Stiglitz, J. E., (2011), "Rethinking Macro-economics: What Failed and How to Repair It", *Journal of the European Economic Association*, 9 (4), pp. 591-645.
- Stiglitz, J. E., (2012), *The Price of Inequality*, New York, W.W. Norton (Spanish edition published by Taurus).
- Stiglitz, J. E., José Antonio Ocampo, Shari Spiegel, Ricardo Ffrench-Davis, and Deepak Nayyar, (2006), *Stability with Growth: Macroeconomics, Liberalization, and Development*, The Initiative for Policy Dialogue Series, Oxford: Oxford University Press.
- Stiglitz, J. E., A. Sen, and J.P. Fitoussi, (2010), *Mismeasuring Our Lives: Why GDP Doesn't Add Up*, New York: The New Press. (The original report of the International Commission on the Measurement of Economic Performance and Social Progress was published in 2009; it is available at <http://www.stiglitz-sen-fitoussi.fr/en/index.htm> (accessed May 16, 2011).

Stiglitz, J. E., and Mark Zandi, (2012), "The One Housing Solution Left: Mass Mortgage Financing", *New York Times*, op ed, August 12.

Stiglitz, J. E., and members of a UN Commission of Experts, (2010), *The Stiglitz Report: Reforming the International Monetary and Financial Systems in the Wake of the Global Crisis*, with Members of the Commission of Experts of the President of the United Nations General Assembly on Reforms of the International Monetary and Financial System, New York: The New Press, 2010.

Woodford, Michael, (2003), *Interest and Prices: Foundations of a Theory of Monetary Policy*, Princeton University Press.

Woodford, Michael, (2009), "Convergence in Macro-economics: Elements of the New Synthesis", *American Economic Journal: Macro-economics*, 1 (1), pp. 267–279.

Yildiz, Izzet, (2011), "Leverage and Default Risk of Financial Intermediaries under Asymmetric Information", Working Paper, Columbia University, September.