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The Painful Arithmetic of Greek Debt Default

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> *"Αλλοίμονο πού κλαίγανε καί δέν ήξευραν τί λέγανε.*
> *"Shame to those that cry and do not know the reason why."*
> *– Ancient Greek Proverb*

Becoming part of the euro zone was a big commitment for Greece. It meant abandoning its control of the printing press, which can be a perpetual means of financing government deficits (spending in excess of taxation). But, after making that commitment, the Greek government ran its fiscal affairs in a profligate manner, not just during the recent crisis, but continually, even during the boom years of 2004-2006.

Given the absence of a printing press to finance its deficits, Greece's profligacy now requires deep fiscal reforms to allow it to repay its debts and also to remain in the euro zone. Unfortunately, there is substantial reason to doubt Greece's ability to meet that challenge. It is unlikely that Greece will be forced to leave the euro zone this year, owing to the likely support of other euro zone countries, which its recent fiscal reforms likely have secured. But within a few years, unless Greece undertakes substantial and additional reforms, it is likely that Greece will leave the euro zone.

How do we know that Greece is really in need of deep fiscal reform, and really at risk of default on its debt? Is it possible that Prime Minister George Papandreou is justified in blaming the Greek crisis on foreign speculators operating in the credit default swap (CDS) market? An analysis of Greece's current problems shows that the Prime Minister's accusations are ill-founded. Greece's current debt and deficit position is unsustainable. If anything, the 4% credit spread on Greek sovereign debt observed at the peak of the February 2010 spike in its interest rates was a muted response to Greece's fundamental problems. Judging from comparable cases, one would have expected much larger spreads. The implicit logic of the 4% credit spread is easy to defend: a 4% observed spread implies (roughly speaking) a market expectation of about an 18% chance of an 18% loss[1]. That implied risk assessment is very optimistic, when one considers Greece's fundamental problems.

The muted market response to Greece's woes reflects an expectation of European assistance to Greece via the proposed European Monetary Fund, which may be established as early as this summer. That assistance will help current debt holders of Greek government bonds to get out of their positions without a loss, but it is unrealistic to expect repeated bailouts of Greece from the rest of Europe. Unless Greece resolves its fiscal problems, it will have to default on its debt and leave the euro zone. It will be difficult to do so, thus the substantial risk of Greece abandoning the euro.

Greece's fiscal affairs have been on an unsustainable path for some time. Greece has now reached a critical point because it has no remaining debt capacity, and therefore, must make immediate and dramatic reforms to avoid having to default on its debts and to be able to stay in the euro zone. Given the structural roots of Greece's spending problems (out-of-control entitlements, and the worst corruption level in the euro zone) it is hard to be optimistic about Greece's ability to make needed reforms.

Greece's Explosive Debt Path

Sovereign debt crises occur when the market refuses to buy new government debt offerings used to repay maturing debts. Fiscal policies that lead to that result are called "unsustainable." Is there a clear mathematical formulation that explains what constitutes an unsustainable path for sovereign debt? A fiscal policy path would not be sustainable if that path implies a debt-to-GDP ratio that eventually rises to infinity (what economists call an "explosive" debt path). An infinite debt-to-GDP ratio implies that debt obligations would be worthless. Even George Papandreou could not pretend to be surprised that the market would be unwilling to buy debts that they knew would ultimately be worthless.

The practical difficulty in inferring whether any actual fiscal policy path is sustainable arises from potential disagreements about which economic forecasts are reasonable along that path. A temporary sharp rise in deficits, for example, does not necessarily imply a permanent rise. Furthermore, an optimistic forecast of booming real economic growth, if credible, could be reassuring even in the face of high momentary deficits because growth would make it possible for governments to raise additional tax revenue with which to repay debt. To ascertain whether Greece's current fiscal path is unsustainable one must take account of reasonable ranges of forecasts for economic growth and interest rates (which affect the cost of servicing debt), as well as the preexisting accumulated level of sovereign debt.

Clearly, Greece's fiscal deficit did not arise from a cyclical shock. Greece has been maintaining very high deficits, not just in recent crisis years (when depressed economic conditions result in deficits for almost all countries), but also during the boom period of 2004-2006, when its deficit-to-GDP ratio averaged 5.2%; its deficit/GDP accelerated to 7.7% (the highest in Europe) in 2008, and now stands at 13% of GDP. That high deficit does not reflect a deep recession; Greek GDP fell about 2% in 2009, much less than the declines seen in much of Europe.

The cumulative effect of these long-lived, out-sized deficits is an outstanding sovereign debt exceeding 123% of GDP. This level of debt relative to GDP is understood by economists to be unsustainable in general, unless a country is expected to generate very large future fiscal surpluses (see Reinhart and Rogoff 2010)[2] . To verify that the combination of this level of debt and the continuing 13% deficits are unsustainable in the Greek case, consider the following question: Given the existing amount of debt, could Greece possibly avoid an explosive debt path without dramatically cutting expenditures or raising taxes? If not, how dramatic would those fiscal policy changes have to be to restore sustainability?

Optimistically, let us assume perpetual nominal GDP growth of 3% (the sum of real GDP growth and inflation in the GDP deflator) and an interest rate of 6% on Greek government debt. These are conservatively optimistic assumptions[3] . 2010 real GDP is expected to shrink by about 4% and Greece's large current account deficit is putting severe downward pressure on wages and prices to restore competitiveness in international markets. Furthermore, judging from past experience, high debt itself will reduce medium-term forecasted growth relative to the recent past, suggesting little possibility of achieving an average 3% nominal growth rate going forward. Rising interest rates will result from European Central Bank tightening in the future, as well as the rising risk premium on Greek debt that will accompany increasing default risk.

Under these assumptions, given the current level of Greek sovereign debt, an average surplus of 4.2% of GDP (before interest payments) would be necessary to avoid sovereign default. With government expenditures other than interest at about 44% of GDP, and tax receipts at about 40% of GDP, that implies that the government must either immediately and permanently cut non-interest spending by about 25%, or immediately and permanently raise taxes by about 28%, or if the two were done in equal combination, cut non-interest spending and raise taxes each by about 14%.

Even being willing and able to embark on such an ambitious agenda of fiscal reform would not guarantee success. First, in the short term, Greece has a massive amount of debt coming due. To avoid default the Greek government must either convince the market immediately that its reform is credible or convince the European Union to roll over the 53 billion euros of its debt that comes due in 2010.

Second, the 3% growth forecast assumed above is very optimistic, and not just because of Greece's short-term problems or default risk. The current account deficit in Greece currently is 13% of GDP, which is as unsustainable as its fiscal deficit. There are three ways for a country to restore external balance: a severe recession (to shrink imports), a currency devaluation (to expand exports and shrink imports), or a miraculous improvement in productivity (to grow exports). Given that no miraculous improvement in productivity is in sight, the scale of the requisite fiscal reform may have to be even deeper, and current account adjustment may require a long period of slow growth.

Fiscal Reform Is Unlikely in the *"Fakelaki"* Society

Can the Greek government engineer the requisite fiscal reform? A massive fiscal reform requires the political will by politicians to impose hardship, and the political will of the population to accept reform. If reform entirely takes the form of spending cuts, faith in reform implies the belief that politicians in the ruling Pasok party will be willing to suggest massive cuts in pensions, and that the voting population will support that change. If reform entirely takes the form of tax increases, not only would it be necessary for politicians and the electorate to support the policy changes; it would also be necessary for the tax collectors to enforce the law and actually collect the taxes.

Thus far, Prime Minister Papandreou's proposed fiscal reforms have won plaudits in Europe. After a skeptical reaction to his initial proposals, European Central Bank leaders embraced the subsequently announced cuts, which they described as "convincing additional and permanent fiscal consolidation measures." European leaders regard the new announced reforms as credible means to reduce Greek deficits to 8% of GDP. It must be admitted that the reforms are bold by past standards. Government wage cuts of 10% are an impressive political achievement for any country. Nevertheless, the tax revenue forecasts rest on confidence in tax collections which is misplaced, and, in any case, reducing the deficit to 8% of GDP simply would not solve the sustainability problem. The spending cuts and/or tax increases need to be several times as large as those that have been announced.

Will Greece follow through with additional large cuts? Unfortunately, the low institutional quality of Greece's political and legal systems makes it difficult to have confidence that the necessary fiscal reforms will be feasible. Greece has the worst corruption score in the euro zone, according to Transparency International, which gives Greece a rating of 4.7. Only Greece and Italy (at 4.8) have corruption scores lower than 5 (i.e., high numbers imply less corruption). It is not a coincidence that Greece and Italy were the two euro zone countries that employed fraudulent accounting practices and derivatives trades to mask the size of their growing government debts (which are now far in excess of the debt-to-GDP ratios of other euro zone countries).

How does corruption limit the capacity for tax and spending reform? Tax avoidance, which relies on bribery to avoid prosecution, is a national pastime in Greece – the envelope used in the bribe even has its own name, the *"fakelaki,"* confirming the age-old adage that the Greeks "have a word for it." Bribery is so rampant in Greece that real estate developers' method of obtaining cheap land is to burn down public land, squat on the burned parcels, and pay off public officials to permit this. Greece's forest fires, particularly in the Peloponnese in 2007, have been a source of public outrage for years, and yet the developers continue to squat on the land with impunity. Is a society that permits that sort of lawlessness capable of tax reform?

According to a recently published study by Katsios (2006), Greece has the largest "shadow economy" (untaxed income base) of any OECD country, which the author argues is related to the corruption of the Greek government through various channels[4] . In 2006, Katsios estimates the Greek shadow economy at 28% of GDP. Second in line behind Greece in the extent of its shadow economy was Italy, at 26%. The tolerance for corruption in Greece makes it virtually impossible to imagine a significant increase in taxation via higher tax rates; increases in tax rates will simply increase the size of the shadow economy, and could actually reduce tax revenues.

Without major anti-corruption reform, fiscal policy adjustment must rely on expenditure cuts alone to achieve budgetary balance. With respect to those government spending cuts, however, it is also hard to be optimistic. High corruption is associated with excessive and wasteful spending that is hard to reverse. The existence of corruption reflects a deep inability to coordinate political action in pursuit of policies that would benefit the nation, including reducing wasteful spending.

Greece has one of the highest levels of "social protection" (i.e., welfare) expenditure in the euro zone. Consider a comparison group of the eight euro zone countries with 2008 per capita annual GDP of less than 27,000 euros, shown in Table 1. Within this bottom half of the 16 euro zone countries, Italy (6,226 euros per capita) and Greece (5,139) show the highest per capita spending on social protection; in contrast, the remaining six countries (Spain, Portugal, Slovenia, Cyprus, Malta, and Slovakia) spend an average of 3,730 euros per capita. Not coincidentally, the average corruption score of 6.1 for those six countries is much higher than those of Greece or Italy.

The high-spending Greek welfare state has encouraged high consumption (why save when the government will do that for you?) and low labor force participation (why not retire and earn a generous pension, or quit and get a welfare check?). Relative to the other low-income euro zone countries, Greece has the highest ratio of household consumption expenditures relative to GDP (70.6%) and the lowest labor force participation rate of people between the ages of 15 and 64 (61.4%).

These data show that Greece, when compared to all other euro zone members, has been most egregious in consuming and enjoying leisure beyond it means, based on government "social protection" spending levels that target a rich country's low poverty rate. Low labor force participation has also been a consequence of these perverse incentives. Together, these various aspects have driven the country into accumulating a massive unsustainable government debt.

The Future for Greece and Other Euro Zone Countries

Taken together, these fiscal, political, and social indicators suggest that Greece's situation is uniquely bad within Europe. Greece has run out of unused debt capacity, and it may lack the governmental institutional quality to make the dramatic fiscal reforms in the public interest that are necessary to restore sustainability in its fiscal affairs.

Can assistance from other European governments solve Greece's debt problems? It is unrealistic to expect France and Germany (which have long-run fiscal solvency problems of their own to grapple with) to permanently and sizably increase their transfer payments to Greece. The assistance currently contemplated, via a newly organized European Monetary Fund, would likely take the form of a low-interest loan to facilitate fiscal reform and give Greece the breathing room necessary to roll over its current debts. A two-year loan, say, at 3% interest, to allow the rollover of the 53 billion euros of debt maturing in 2010, seems quite possible. Such assistance would entail only a small implicit subsidy, equal to a few billion euros (calculated as the sum of the interest rate subsidy multiplied by the annual amount of the loan). Such assistance might work if it were followed by dramatic fiscal reform, but given the high debt-to-GDP ratio and persisting structural deficits in Greece, a loan from the prospective European Monetary Fund cannot fix the problem.

Many observers question whether and how Greece could ever leave the euro zone, given the legal restrictions that seem to prevent it[5] . It is important to recognize, however, that politics cannot repeal arithmetic. Either the deficit problem will be solved or Greece will have to leave the euro. How would the crisis in which Greece would leave the euro zone play out? Judging from other countries' experience historically, the most likely scenario would proceed as follows. Once Greece becomes unable to roll over its debts in the market (say, three years from now) it would default on debt payments and be forced to finance continuing deficits with some form of locally issued "scrip." Once the scrip is issued, the EU will have no choice but to declare it an illegal infringement on the euro. The mere issuance of scrip could create a foreign exchange crisis in the form of runs on Greek banks, as depositors seek to avoid conversion of euro-denominated deposits into the new scrip numeraire. The run on the banks would prompt emergency action by the Greek government to replace the euro with the new "drachma."

What other countries in Europe are at similar risk? As Table 1 shows, Italy and Portugal are at risk if their high deficits persist. Spain is not an immediate concern, as its debt-to-GDP ratio is much lower than those of Italy and Greece, and its pre-crisis deficits were much smaller than those of Greece; indeed, Spain's high deficits in 2008 and 2009 contrast with surpluses for 2004-2006. Cyprus is not an immediate concern either, given its low debt ratio, but its deficits have been accelerating under its new government, and ballooning deficits could become a problem in the future. Italy is the country that is most obviously an immediate sustainability concern, due to its high debt-to-GDP ratio (even higher than that of Greece). On the bright side, Italy's deficits as a fraction of GDP have been much lower than Greece's, which means that fiscal reform in Italy requires less of an adjustment to correct its problem. Still, given its high debt-to-GDP ratio, corruption problem and large shadow economy, Italy is a significant medium-term concern. Italy's corruption problem and large shadow economy bode ill for the capacity of the government to fix its problems by raising taxes or cutting spending.

Table 1

Low Income Countries of the Euro Zone

	GDP/Pop(08)	GDPGr(09)	Corrupt	Cons(07)	Prot(05)	Emp(07)	Def(09)	Def(04-06)	Debt(10)
Slovenia	22.8	-7.4	6.7	52.3	4539	67.8	-5.7	-1.8	34.4
Spain	25.7	-3.6	6.5	57.3	4776	65.6	-11.4	0.9	67.5
Cyprus	24.0	-1.7	6.4	65.7	3807	71.0	-6.1	-2.5	55.2**
Portugal	19.0	-2.7	6.1	64.7	3998	67.8	-6.7*	-4.4	90.9
Malta	19.1	-1.9	5.8	61.1	3104	55.7	-3.8	-3.4	66.8***
Slovakia	18.1	-4.7	5.0	56.0	2258	60.7	-6.3	-2.9	43.0
Italy	25.6	-5.0	4.8	59.0	6226	58.7	-5.3	-3.6	127.0
Greece	**23.6**	**-1.7********	**4.7**	**70.6**	**5139**	**61.4**	**-12.7**	**-5.2**	**123.3**

All data on GDP per capita in 2008, GDP growth (GDPGr) in 2009, and deficits are from Eurostat (the official EU website). Note that data can differ somewhat according to which Eurostat number one uses. I use Eurostat annual forecasts for GDP growth in 2009 (**http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&plugin=1&language=en&pcode=tsi**). Cons(07) is the ratio of consumption to GDP in 2007. Prot(05) is the per capita expenditure in 2005 on "social protection." Emp(07) is the proportion of the population aged 15-64 who are employed. Cons, Prot, and Emp are from Eurostat's Key Figures on Europe: 2009 Edition. Debt measures the ratio of government debt to GDP. Unless otherwise noted, debt-to-GDP figures are for 2010 and are from OECD Annex Table 32.

*For Portugal, 2009 deficit data are from OECD Annex Table 27.
Cyprus's 2010 debt relative to GDP is from **here
***Malta's, 2010 debt relative to GDP is from **here**
****For Greece, data were updated using more recent figures from the quarterly forecasts published by Eurostat, available **here**.

Some economists – notably, Desmond Lachman at the American Enterprise Institute – have argued that Spain and Portugal are at imminent risk of leaving the euro, owing to their current account deficits and competitiveness problems, even though their fiscal arithmetic does not place them at risk. I disagree with that assessment. Given the legal and political barriers to a country's deciding to leave the euro, or being asked to leave the euro via a political or legal process, I doubt that even a severe recession could result in a country's exit. In my view, the force majeure of fiscal arithmetic, not a recession or competitiveness problem, is the key factor in causing an exit from the euro zone.

In Greece and Italy, now is the time for urgently needed political leadership, not finger pointing at financial markets or global banks. Greece and Italy must heal themselves. That process will only begin by their taking a good, hard look in the mirror, and finding the courage to change.

Obviously, the top priority for Greece right now is to make the immediate and massive cuts in public expenditure that are necessary to restore fiscal balance. Cutting expenditures by a total of, say, 14% and promising tax and corruption reforms that would increase taxes by 14% would buy Greece time to make the deep reforms necessary to restore its tax base. Failing those tax reforms, additional expenditure cuts would be needed quickly. Following that path not only would resolve the Greek debt problem, it would help restore Greece's productive competitiveness, increase labor participation, and increase savings, all of which would boost growth and reduce the Greek current account deficit.

Because it is unlikely that tax reform will contribute much to fiscal rebalancing in the short run, Greece will likely face the need to cut expenditures in total by roughly 25%. In the medium term, even if Greece restores fiscal sustainability through expenditure cuts alone, it must address the deeper problems that plague its economy, its taxation system, and its society more broadly, all of which revolve around the problem of endemic corruption. Resolving the corruption problem in Greece would reduce its shadow economy, increase its tax base, and allow Greece to reach its true economic potential.

Is it Possible to Reduce Corruption?

Some will say that this is impossible, that corruption is inherent to Greek and Italian cultures. That is not true. Cyprus, in the face of all its problems, has managed to join the euro, enjoy rapid growth, and maintain its fiscal affairs very responsibly. Cyprus has a much better corruption score (6.4) than those of Greece or Italy, its per capita spending on "social protection" (3,998) has been lower than those of Greece or Italy (at least that was so prior to the recent change in government in Cyprus), and its labor participation rate (71%) is the highest in the Table 1 comparison group. In pointing to these differences I do not mean to suggest that Cyprus is a perfect model, and there is still a large distance between its corruption score and those of many other euro zone countries (the eight euro zone members not shown in Table 1 have corruption scores that average 8.0). In particular, Cypriot law protects corruption too much by restricting freedom of speech directed against corrupt individuals, making it potentially risky for the press or other individuals to name anyone in an alleged corruption scandal until the case has been proven.

With respect to Italy, one recent study of Italy by Guiso, Sapienza and Zingales (2010)[6] points to important differences in civic mindedness (what they call "social capital") within Italy. The authors show that these differences reflect disparate political histories across locations going back several centuries.

Clearly, Greeks and Italians are able to address the challenge of corruption if they want to. Indeed, there is significant evidence that even the most corrupt countries can successfully reduce corruption, and thereby promote growth, if they want to. Fisman and Werker (2010) provide a review of various case studies of successful efforts to combat corruption[7]. Their paper provides a list of concrete and effective anti-corruption measures that the Greek government could and should undertake immediately. The following list includes many of their observations, as well as a few of my own.

Deregulation and Privatization. As has been recognized since ancient times, corruption feeds on regulation and barriers to competition. Evading regulations or prohibitions on various economic activities are the central purposes of bribery. And if those regulations or prohibitions are unpopular, evading them can provide a moral justification for bribery and corruption. Socialized medicine in Greece is a prime example. Given the difficulty in arranging a speedy medical procedure through normal channels, people feel justified in handing the doctor a *fakelaki*, and the underpaid and over-regulated physician feels justified in accepting it. Universities are all run by the state (private universities are effectively prohibited), and are heavily regulated in every imaginable way. Underpaid and overburdened professors who work in horrible job environments consequently feel justified in their openly nepotistic hiring practices, and in devoting most of their time to second jobs.

Unfortunately, there is great political resistance to eliminating unwise regulations and prohibitions on competition by vested interests who benefit from barriers to competition or from receiving bribes. Overcoming those vested interests and promoting competition and economic freedom, however, are central to changing the *fakelaki* culture, and to restoring respectability to government.

One approach to dealing with this problem is the creation of Special Enterprise Zones (SEZs) – regions of a country that are exempted from economic rules that apply elsewhere, and which serve as experiments that can demonstrate the benefits of competition and deregulation. By establishing a few SEZs, the political struggle over liberalization is lessened, since it is much easier to establish an experiment of reform than to execute nationwide reform. For example, Greece could permit several cities and islands to operate without the preexisting limits on entry, and without having to abide by existing national tax law. SEZs can also function as Special Governance Zones (SGZs) where the establishment of laws and regulations, and their enforcement, is also ring-fenced from the existing corrupt system.

In order to implement SEZs/SGZs without running afoul of EU competition policy may require a temporary variance from the EU. That variance – say, permitting SEZs/SGZs to set their own tax policies for an initial period of 10 years – should be granted by the EU, given the huge benefits that would attend the reduction of corruption and the improvements in governance and growth.

Outsourcing Governance and Tax Collection. The governance of these SGZs could even be outsourced temporarily to existing successful governments outside Greece (the list of outsourcing candidates should include Estonia, Denmark, Hong Kong, Singapore, and others with good governance records). This approach has been implemented successfully in the joint venture between China and Singapore in Suzhou Industrial Park, where China outsourced governance to Singapore (which earns very high marks for effective governance).

Outsourcing of tax collection nationwide, or for starters, some part of tax collection, to an independent authority has also proved very effective in reducing corruption in tax collection in other countries. The tax collection authority could either be a new government entity – so long as it has its own independent governance structure, budget, and the freedom to hire and reward employees as it sees fit – or a private company. “Tax farming” to private companies is an age-old tradition, precisely because it solves incentive problems in tax collection related to bribery. Many developing countries are adopting the approach of outsourcing their customs collections. One UK company, Crown Agents, has become a specialist in this niche. The key to success is giving independent authority to someone to structure tax collection in an effective way. This authority does not have to be long-lived; in some cases once effective practices are established, government has successful resumed control of tax collection and preserved reforms.

Establish an Independent Authority To Expose Corruption, Audit Expenditures, and Enforce Anti-Corruption Laws. Crucially, any successful anti-corruption effort must create a truly independent authority to combat corruption. That authority would expose corruption publicly[8] , audit expenditures on public works, welfare programs, and other government projects to ensure that money is truly spent in the ways officials claim it is being spent, and prosecute anti-corruption laws vigorously. That approach has been shown to work well, but only if the anti-corruption authority is permitted to operate with true budgetary and operational independence.

Hong Kong is the model of success. In 1974, at the time of the establishment of Hong Kong’s Independent Commission Against Corruption (ICAC), Hong Kong was one of the most corrupt locations on earth. It now ranks 12th in the world for the high quality of its governance, earning a corruption score of 8.1 from Transparency International. Most imitations of the Hong Kong model, however, have failed (e.g., in Kenya, Nigeria, and Sierra Leone) because they did not vest truly independent authority in the new agency. Hong Kong’s success reflected the fact that the ICAC’s authority ensured that hiring practices, salaries, and enforcement actions were not subject to review by government officials.

Accountability under the Law. Of course, enforcement of anti-corruption laws presumes that the laws on the books actually punish corruption. Greece needs to improve those laws dramatically. The most obvious example is the blanket protection against prosecution which is afforded to members of Parliament, which is widely credited with the rampant corruption of elected officials. Accountability in government must begin with elected officials.

Assemble a Task Force on Anti-Corruption Best Practices. Getting these reforms passed into law will not be easy for Mr. Papandreou. But the Greek crisis is also an opportunity for him, and for Greece's EU neighbors, to apply pressure for real change. An easy step he could take, which would help to improve his chances, would be the creation of a pan-European task force of anti-corruption activists (not government officials) – including representatives from peers like Cyprus, Spain, Portugal, Estonia, and Denmark – to consider these and other ideas for reform.

There is an ancient Greek saying: "Shame to those that cry and do not know the reason why." As we "cry" about the economic crisis of Greece, and the risks of financial and social catastrophe that Greece now faces, let us not forget the "reason why" Greece has come to this point. It is high time to do something about it.

Footnotes

1 If debt holders were "risk-neutral" – meaning that they did not charge a premium for bearing risk – a 4% spread would be consistent with a 20% probability of a 20% loss. Experience and logic, however, indicate that debt holders charge a premium for risk. Under the assumption of a premium of roughly half a percent on Greek debt during the recent February spike in interest rates, the implied expected loss on the debt would be 3.5%, which is consistent with a roughly 18% chance of an 18% loss. Of course, a 3.5% expected loss is also consistent with many other combinations of the probability of loss and the loss given default (e.g., a 10% chance of a 35% loss).

2 Carmen Reinhart and Kenneth Rogoff, "Growth in a Time of Debt," Working Paper, University of Maryland, Department of Economics, January 2010.

3 One could argue that euro zone inflation will rise dramatically within a few years. That possibility, which seems not to be taken seriously by current long-term interest rates on euro-denominated debt, would cause both interest rates and nominal GDP growth rates to rise, and because rising inflation is generally associated with rising inflation risk, interest rates likely would rise by more. Thus a rise in inflation within the euro zone would not imply a more favorable prospect for Greece's avoiding default.

4 Stavros Katsios, "The Shadow Economy and Corruption in Greece," South-Eastern Europe Journal of Economics 1 (2006), 61-80.

5 Phoebus Athanassiou, Withdrawal and Expulsion from the EU and EMU: Some Reflections, European Central Bank, Legal Working Paper Series No. 10, December 2009.

6 Luigi Guiso, Paola Sapienza, and Luigi Zingales, "Long Term Persistence," Working Paper, University of Chicago Graduate School of Business, January 2010.

7 Raymond Fisman and Eric Werker, "Innovations in Governance," Working Paper, Columbia Business School, March 2010.

8 Fisman and Werker (2010) point to an interesting policy experiment by the mayor of Bogota, Colombia in the mid-1990s. He hired mimes to patrol the streets, drawing attention to and making fun of people who violated traffic laws. The idea was to create public awareness of a new coordinated effort to increase respect for the law. It was regarded as a successful effort.