



Contents lists available at ScienceDirect

# Journal of Financial Stability

journal homepage: [www.elsevier.com/locate/jfstabil](http://www.elsevier.com/locate/jfstabil)



## Debt, recovery rates and the Greek dilemma<sup>☆</sup>

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### ARTICLE INFO

#### Article history:

Received 7 January 2017  
Received in revised form 14 April 2017  
Accepted 21 May 2017  
Available online xxx

#### JEL classification:

F34  
G15  
G18

#### Keywords:

Debt  
Default  
Renegotiation  
Business cycles  
Open economy

### ABSTRACT

Most discussions of the Greek debt overhang have focussed on the implications for Greece. We show that when additional funds released to the debtor (Greece), via debt restructuring, are used efficiently in pursuit of a practicable business plan, then both debtor and creditor can benefit. We examine a dynamic two country model calibrated to Greek and German economies and support two-steady states, one with endogenous default and one without, depending on creditors' expectations. In the default steady state, debt forgiveness lowers the volatility of both German and Greek consumption whereas demanding higher recovery rates has the opposite effect. In a second order approximation of the model, conditional welfare analysis shows that a policy of immediate leniency followed by harsher terms as the economy grows is beneficial to both creditors and debtors.

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### 1. Introduction

In this paper we examine the interaction between a set of debtors, whom we characterize as Greeks, and a set of creditors, whom we term Germans. We outline the circumstances that may make the Greek debtors choose to renege, to default, on an (unsecured) portion of their debt, dependent on the various costs which

such default entails. The costs and benefits of default are quite complex, and we have modelled these carefully.

In our model, creditors (Germans) can be more or less tough (forgiving being the inverse of tough), in imposing penalties on the defaulting Greeks. We model this as a 'recovery' rate, whereby the German creditors can grab, and use for themselves (i.e. recover), a larger share (a higher recovery rate), of the underlying defaulted assets.

Most of the debate on the costs/benefits of default and renegotiation have primarily focussed on the effects and trade-offs for the debtors (Greeks), while the effects on creditors have largely been ignored, or assumed to be negative.<sup>1</sup> The language of the discussion has been couched within the framework of a "zero-sum" game, and in other words the assumption that any debt relief to Greece must entail a (net present value) transfer of resources from creditors.

What we show is that, under a set of plausible conditions, greater forgiveness (a lower recovery rate) by the creditors currently can benefit both debtors and lenders. These conditions include reasonable prospects for the profitability of future investment by the

<sup>☆</sup> We would like to thank two anonymous referees, the participants of the 2015 SAET conference, 2016 ICFE NRU HSE research seminar, 2016 Oxford Said Business School conference, LSE SRC, Bank of England, Koc University, National Bank of Austria, 4th International Conference on Sovereign Bond Markets at NUS, Sumru Altug, Alexis Belianin, Alexei Boulatov, Emiliano Catonini, John Geanakoplos, Roman Horvath, Serkan Imisiker, Ken Iwatsubo, Christian Julliard, Christoffer Koch, Tryphon Kollintzas, Reinhard Neck, Ken Okamura, Athanasios Orphanides, Han Ozsoylev, Herakles Polemarchakis, David Rappaport, Abdelaziz Rouabah, Christoph Siebenbrunner, Daniele Siena, Martin Summer, Gregory Thwaites, Peter Tufano, Kamil Yilmaz, Alexandros Vardoulakis, Vagelis Vassilatos, Kieran Walsh, and especially Heather Gibson. Peiris was funded within the framework of the Basic Research Program at the National Research University Higher School of Economics (HSE) and by the Russian Academic Excellence Project '5-100'.

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<sup>1</sup> See Zettelmeyer et al. (2013), Ardagna and Caselli (2014) and Broner et al. (2014) for analysis of Greek restructuring episodes since 2010.

debtors (in Greece) and a willingness of the debtors to apply available funds to such investment. If these conditions hold, then the short-term loss to the creditors (Germans) from being more forgiving would be more than matched by longer-term higher returns from their remaining investments in Greece, and an overall lower volatility of German consumption (welfare). In our model, temporary negative productivity shocks are amplified and propagated through financial sector instability (default). That Greek output has been below its potential is reflected, at the very least, by the 25% contraction witnessed over the last seven years.<sup>2</sup>

The events of 2009 brought a major change in Greece's economic conditions.<sup>3</sup> Several different factors contributed to the onset of the crisis in 2009, including increased credit spreads, a collapse of demand globally, and, most importantly, the realisation that the twin deficits and the national Debt-to-GDP ratio were unsustainable.<sup>4</sup> We argue that, in addition to the issues described in Gourinchas et al. (2016), the economic fundamentals of the Greek economy did not suddenly change in 2009, rather, expectations were destabilised. Consequently creditor's expectations about the ability of Greeks to honour their contractual obligations radically changed, and, therefore, credit-spreads rose steeply. In addition, a temporary relative decline in productive efficiency, moved the economy from growth and stability to contraction and instability. In our model, we capture these effects by supporting two steady state equilibria. One where default does not occur, and Greece can freely issue debt at the risk-free rate, and another, the one we emphasise, where default and renegotiation occurs.

Formally, we consider a two country RBC model, describing Greece as the debtor nation, and Germany, the main creditor nation. We combine Greek households and government into a single representative household whose individual decisions (especially default) depend on the aggregate activities of the economy.<sup>5</sup> Greek households can issue both secured and unsecured debt to German households and the possibility of renegotiating on unsecured debt exists. We explicitly model the decision to default and show that, although such default normally exacerbates the volatility of consumption, such volatility may actually be reduced with more lenient debt restructuring terms as the outcome of renegotiation. Put another way, we argue that the key issue is not whether there is a moral duty of creditor nations to transfer resources to Greece, but whether creditors are willing to trade off short-term losses for medium and long-run gains.

In our model debt can be either secured, in which case failure to honour the debt would invoke bankruptcy proceedings which are ruled out, or unsecured, in which case the lender has a limited claim on the existing wealth of the borrower and cannot invoke bankruptcy proceedings. Thus a key feature of the paper is that the possibility of default in equilibrium exists on unsecured debt.

<sup>2</sup> Greece's growth rates were often in excess of 10% during the 1950s, resembling those of modern tiger economies in the late 1990s. Likewise, industrial production increased at a rate of 10% during much of the 1960s. Greece consistently outperformed most European economies for most of the post second world war period. See Bitzenis et al. (2015) for an extended discussion.

<sup>3</sup> Prior to this, Greece had experienced a prolonged period of economic growth, averaging 5% year-on-year, since the late 1990s and, furthermore, Greek credit-spreads above German rates were virtually zero. Creditors and investors viewed Greece as a safe, low-risk, investment destination. Reconciling this with what followed is then challenging, particularly from a modelling perspective.

<sup>4</sup> Gourinchas et al. (2016) describes these as the 'Trifecta' of a Sovereign Debt Crisis, Banking Crisis and Sudden Stop.

<sup>5</sup> In abstracting from fiscal considerations we focus on how the inefficiencies that default, and the subsequent collective renegotiation, affect the efficiency of the path of capital accumulation. We argue in Section 1.2 that political instability in the country means modelling the economy as a time consistent planner, or even government, does not adequately describe the present Greek reality.

We assume that Greek households can only issue non-state-contingent bonds. Debtors may choose to renege on some of their debt obligations, but then suffer a renegotiation cost. In order to be able to borrow again, they must pay this cost and, in this sense, the decision to default is strategic. If debtors default, they incur a welfare cost in renegotiations proportional to the scale of default.

This cost effectively creates a borrowing constraint and stems from Shubik and Wilson (1977) and Dubey et al. (2005) and applied in Tsomocos (2003), Goodhart et al. (2005) and Goodhart et al. (2006). In the RBC literature, our model shares similar features to De Walque et al. (2010). Our closest methodological precursors are Peiris and Tsomocos (2015) (which studies a two period large open international economy with incomplete markets and default); Goodhart et al. (2013), which explores the effect of international capital flow taxation on default and welfare in a deterministic two period large open economy; and Walsh (2015a,b), which consider default in a small open dynamic incomplete markets economy. In these latter two papers, the marginal cost of default depends on the level of wealth, so the propensity to default depends on business cycle fluctuations. We follow this notion here by introducing a macrovariable that governs the marginal cost of renegotiating debt (default), termed 'credit conditions'. This reflects changing motivations and incentives of debtors to make the necessary sacrifices to repay their obligations, as emphasised by Roch and Uhlig (2016).

Ultimately the non-pecuniary default cost methodology and credit-conditions variable allow us to calibrate the model to realised average default/hair-cut rates. We believe that this approach has valid economic grounds and argue that credit-conditions can be adequately captured by an appropriate state variable in order to describe the relationship between loan delinquencies and the capital stock. Meanwhile the debtor country takes the credit-conditions variable as given since creditors are capable of imposing institutional arrangements that are non-negotiable.<sup>6</sup>

German creditors in our model can seize a proportion of defaulted debt. Thus, borrowers effectively incur two additive costs of defaulting: the non-pecuniary cost of renegotiation and a pecuniary punishment via having wealth confiscated. From the point of view of the creditor, the pecuniary seizure of wealth guarantees a minimum repayment rate on debt (possible, for example, due to bargaining power in the renegotiation process). On the other hand, from the point of view of the debtor, the pecuniary cost of default represents a loss of income linked explicitly to default. The literature on sovereign debt has emphasised the long-term impact on output due to default, and in some models this has been described as a direct proportional loss in output.<sup>7</sup> For the sake of simplicity we model the pecuniary cost being enforced in the same date-event that default occurs but our results are robust to having the pecuniary cost spread over several periods, as in Yue (2010). We compare three environments. One where the proportion recovered (recovery rate) is left unadjusted, one where the recovery rate increases, and one where the recovery rate falls. These three environments correspond to potential outcomes following the debt renegotiation process, and the question we focus on is the effect on the creditors of the three policy alternatives.

Our results are consistent with many of the empirical findings of debt, default and renegotiation outcomes documented in Benjamin and Wright (2013). Specifically as in our model, periods of longer defaults are correlated, and the correlation between output and default is slightly negative with default rates reverting once output has recovered to its trend. They emphasise the importance of debt-

<sup>6</sup> Indeed, that was exactly the misconception that contributed to the unsatisfactory attempt to renegotiate the terms of the agreement during the summer of 2015.

<sup>7</sup> See, for example, Asonuma and Trebesch (2016).

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