
Is Maastricht a Good Contract?*

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Abstract

The Maastricht Treaty calls for the creation of European Monetary Union (EMU) by 1999 but makes accession of individual countries conditional on the fulfilment of specific convergence criteria. The Maastricht transaction trades the replacement of the Bundesbank by a European Central Bank at the centre of European monetary affairs as a reward for prior convergence. This article interprets the Maastricht Treaty provisions as a contract device that organizes a difficult transition to EMU by providing convergence incentives, co-ordinating conflicting national interests and extracting information about candidate countries' 'stability culture'.

I. The Maastricht Transaction

It is stating the obvious to say that the Treaty of Maastricht is a contract. Surprisingly, to date there has been little economic analysis of the obvious. This article proposes to consider the Maastricht Treaty as a contract device that must organize a mutually beneficial transaction, here European Monetary Union (EMU). In order to assess whether Maastricht is a good contract, three possible functions of contracts are explored. First, the Treaty can provide countries with

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extra incentives for desirable behaviour. Second, it can co-ordinate behaviour among different countries to produce a desired outcome. Third, the Treaty can structure behaviour and decision procedures such that relevant information is revealed. As for the content of the Maastricht Treaty, three essential features can be distinguished. Maastricht aims to establish a *single* currency for Europe, it seeks to ensure a *stable* currency and finally it makes entry to EMU *conditional* on fulfilling convergence criteria and *mandatory* for the countries satisfying the criteria (with the exception of the UK and Danish opt-outs).

As explained in the 'strategic view on EMU' proposed in Winkler (1996) the key to understanding the Maastricht contract and the role of the convergence criteria is to recognize that interests and priorities differ across countries and change over time. The country that has most to lose from EMU in terms of both credibility and sacrificing sovereignty, is Germany. Therefore, at Maastricht Germany was willing to trade away the Bundesbank and share sovereignty equally only if the single currency was to become 'at least as stable as the deutsche mark' (DM). Thus there was little question that the statutes of the European Central Bank (ECB) would have to be modelled closely on those of the Bundesbank (Kenen, 1995, p.19). However, central bank independence can be seen at best as a necessary condition for enduring price stability, but it is certainly not a sufficient condition.¹ This is where the convergence criteria come in. They call for inflation and interest rates to be within 1.5 percentage points of the three best performers, and for membership of the exchange rate mechanism (ERM) for at least two years without devaluation on own initiative. The fiscal criteria stipulate a deficit of at most 3 per cent and a public debt of at most 60 per cent in relation to the candidate's GDP. These reference values – together with more qualitative judgements on the sustainability of convergence – formed the basis for the convergence reports submitted on 25 March 1998 by the European Commission and the European Monetary Institute, and hence the final decision on EMU membership taken by the special European Council meeting in early May 1998. The fiscal conditions are to hold also throughout stage III of the Maastricht process and have been supplemented by the Stability and Growth Pact agreed at the Amsterdam summit in June 1997.

The Maastricht criteria have drawn severe criticism from economists, who tend to consider them as arbitrary (Buiter *et al.*, 1993) or superfluous or, worse, as harmful and self-defeating (De Grauwe, 1994). They seem to have little to do

¹ The extensive literature on the credibility of monetary policy points to contractual solutions in the form of rules (e.g. on money supply), delegation to a conservative central bank (Rogoff, 1985) or the use of explicit incentive contracts for central bankers as ways to achieve low inflation (Walsh, 1995). Alternatively, under repeated interaction, incentives to build and preserve a good reputation can also lead to low inflation (Backus and Driffill, 1985). Ultimately, however, price stability requires the support of the population (Lohmann, 1996) and of other institutions of economic policy-making, in particular the wage-setting and fiscal systems (Jones and McNamara, 1996).

with economics. In particular they have little to do with the requirements for an optimum currency area, such as price and wage flexibility, factor mobility or fiscal transfers. Instead, as argued in Winkler (1995), the criteria are best interpreted as indicators of (past, present and future) credibility. In short, in stage II candidate countries are asked to demonstrate their stability orientation before joining EMU. The reasoning is that only a deeply rooted 'stability culture' among EMU members will allow the ECB to produce stable prices at low real costs. In particular, conflicts between the orientation of fiscal and monetary policy are to be avoided (Masson, 1996).

In order to make sense as entry conditions for EMU the convergence criteria must satisfy two requirements. First, the behaviour they induce in stage II must have lasting and beneficial effects on stage III. This could be the case either because convergence is desirable *per se*, e.g. by rendering economies more similar or flexible, or (as argued above) because information about countries' willingness and ability to sustain stability-oriented policies is revealed, which in turn is a condition for the durable success of EMU. Second, the criteria must be seen to address inefficiencies, for example resulting from credibility problems of national monetary policies, political deficit biases of fiscal policy or externalities from unco-ordinated policies across countries. Concentrating on the latter, the Maastricht criteria serve their purpose if they can induce collectively desirable behaviour that would otherwise not be undertaken. In particular the criteria are important if producing convergence and credibility for EMU has public good features, i.e. if it requires individual sacrifice for the common good. One example is fiscal consolidation to the extent that it lowers inflation expectations and long-term interest rates in EMU for the benefit of all participants. More generally, any adjustment that renders Europe's economies, institutions and preferences more homogenous will reduce potential conflicts and losses from centralizing monetary policy in EMU and thereby enhance its stability.

The Maastricht transaction contracts the pooling of sovereignty in a single currency, a 'selling' or 'sharing' of the Bundesbank, in return for the acceptance of German standards for a stable currency. Statutory independence of the ECB alone is regarded as insufficient and therefore is supplemented by a mechanism to organize the production of credibility and reputation via the convergence criteria. Section II explores possible rationales for the Maastricht Treaty provisions by asking what would happen in the absence of any contractual devices. Indeed some commentators such as De Grauwe (1993) have suggested that the decision to form/join EMU should be entirely voluntary and unconditional. It is then investigated how contracts may help in organizing EMU. In Section III, the principal functions of the Maastricht entry conditions are analysed. Section IV concludes that the Maastricht Treaty – on the whole – has worked remarkably

well in spurring convergence efforts across Europe and in securing the timely start of EMU but difficult tasks remain ahead.

II. Maastricht Games and Contracts

The Maastricht Game

The strategic view of EMU starts from the premise that costs and benefits differ across countries and in their time profiles. In particular, countries with a high domestic monetary credibility are concerned about a possible loss of reputation and price stability in EMU. We call the advocate of these interests 'the principal' for the rest of the article, most obviously represented by Germany and the Bundesbank. He prefers that convergence and credibility be established by national effort prior to admission into EMU. For low credibility countries, on the contrary, the whole point of EMU is to gain credibility more cheaply, so they prefer convergence to take place inside EMU. This group includes most candidate countries and will be called 'the agent' throughout the article.² The conflicting interests of the two groups of countries also reflect the long-standing debate between the 'economist' and the 'monetarist' approach to monetary integration (Winkler, 1998).

This set-up of the 'Maastricht game' clearly represents a gross simplification on several counts. First, conflicts of interests are perhaps as likely to be present within countries as between countries. Therefore a more comprehensive analysis would look at a multi-level game that also takes account of interactions on the national domestic stage. In any event, it might be more accurate to think of the principal as the central banks and their allies in the quest for price stability, and the agent as representing those constituencies (and their political representatives) that perceive they will suffer most from Maastricht-induced austerity. Nevertheless, the Maastricht Treaty was concluded between national governments, and therefore it seems justifiable to stick to the 'country representation' of the Maastricht game for the purpose of simplicity in the remainder of the article.

Second, the supranational, European level is also not regarded as a player in its own right and the Maastricht Treaty is primarily seen as a device to coordinate conflicting national objectives, in line with intergovernmentalist approaches to European integration (Moravcsik, 1993). This appears to be a natural assumption at least for the bargaining stage, i.e. before nation-states enter into treaty commitment. During the implementation phase, however, European

²For an account of the role of the criteria in the Maastricht negotiations, see Bini-Smaghi *et al.* (1994), Garrett (1993), Sandholtz (1993), Gros and Thygesen (1992).

institutions surely have an independent role to play³ and, of course, the Maastricht Treaty itself is seen as affecting national incentives.

Third, the set-up chosen may exaggerate the degree of conflict between principal and agent countries, whereas – in reality – the latter could well regard sufficient convergence and fiscal consolidation to be in their own best interest. However, without external commitment, these countries might still find it hard to achieve the desired results as long as they lack credible domestic institutions and suffer from their adverse track record. In this case the differences in objective functions between principal and agent that we assume below could reflect different domestic political and economic constraints rather than conflicting ‘deep’ preferences in inflation and fiscal prudence. Alternatively, the principal may – rightly or wrongly – mistrust the agent’s conversion to a common ‘stability culture’, and therefore ask for additional evidence or reassurances, which would impose apparently ‘excessive’ economic costs on the agent.⁴

In order to concentrate on the strategic interaction between the two groups of countries, consider the following objective functions for principal (P) and agent (A) respectively:

$$U(P) = p(\bar{T}_p + \phi\omega E) + (1 - \phi)\omega E \quad (1)$$

$$U(A) = p\bar{T}_A - \frac{\beta}{2} E^2 \quad (2)$$

The first term in both equations captures the total expected net benefits from EMU, where p is the probability and timing of EMU, \bar{T}_p and \bar{T}_A are the (net) benefits of stage III of EMU to principal and agent respectively. It is reasonable to assume that \bar{T}_p is negative, i.e. the principal would not agree to EMU in the absence of any convergence. Convergence effort is denoted by E , which does not include the convergence that a country would find in its own interest to undertake in preparation for EMU. For the agent the extra Maastricht-induced component of convergence is costly with increasing marginal costs. The higher β the more painful it is for a country to pursue rigid fiscal and monetary policies or unpopular reforms in preparation for EMU.

The principal, on the other hand, is interested in inducing as much prior convergence as possible, where ω is his marginal utility of convergence. There are two possibilities: the principal might be interested in convergence *per se* or he cares about it only if EMU happens. In an alternative interpretation, fraction ϕ of convergence is reversible and thus will be lost if EMU does not materialize. The share $(1-\phi)$ reflects durable convergence, independent of EMU, or the

³ See Sandholtz (1996) on the importance of European institutions and Pomfret (1991) on the EMS as a European co-ordination device.

⁴ The principal’s concern with fiscal discipline and perceived threats to price stability, for example, might compromise the fiscal flexibility that is especially deemed desirable in a monetary union from the perspective of the literature on optimum currency areas in order to offset asymmetric shocks.

temporary utility that even reversible convergence yields during the time it is forthcoming. In the special case of $\phi=0$, the degree of convergence in stage II has no particular value for stage III. For $\phi=1$ convergence only matters for the principal in stage III and only if EMU comes about.

Imagine a simultaneous move game with objective functions (1) and (2) where the principal must decide whether to surrender the Bundesbank for EMU ($p=1$) or not ($p=0$) and the agent decides on the amount E of convergence to undertake. For illustration the following numerical values are assumed henceforth: $\bar{T}_p=-1$, $\bar{T}_A=4$, $\omega=2$ and $\beta=2$. The agent's payoff for each combination of strategies is given first, and the principal's is the second term for each outcome.

Figure 1 gives the unique Nash equilibrium in the bottom-right corner. No convergence is forthcoming and EMU does not happen. The co-operative solution that maximizes joint welfare calls for EMU to happen and for the optimal convergence effort which balances the marginal cost of convergence to the agent with its marginal benefit to the principal. The co-operative solution in the top-left corner, as in the well-known prisoner's dilemma, is not sustainable since, once EMU is assured, the agent has no incentive to undertake costly convergence. Given that, the principal will not agree to EMU. Conversely, if the agent provided optimal convergence, the principal will still refuse EMU unless $\phi \geq 1/2$, i.e. unless there is enough EMU-specific convergence that the principal can only secure by granting EMU. An example of a big ϕ would be the fear that the single market, exchange rate stability and the entire convergence process could unravel unless it is 'locked-in' via EMU. A small ϕ would obtain if countries' convergence behaviour in stage II said nothing about their reliability for stage III or, on the contrary, convergence would continue just the same even in the absence of EMU.

For concreteness, call the players Germany and Italy. Germany holds the key to EMU coming about; Italy can choose convergence (say fiscal rectitude) or otherwise. If Germany commits to EMU it must fear that, *ex post*, with the Bundesbank surrendered, Italy will not produce sufficient and durable convergence. Italy may not resist the temptation to try to have Europe bail out its debt, redirect its priorities towards employment instead of price stability, delay fiscal

		Principal	
		EMU ($p=1$)	No EMU ($p=0$)
Agent	Optimal convergence: $E=1 (= \omega/\beta)$	1,1	$-1, (1-\phi)2$
	No convergence: $E=0$	2,-1	0, 0

Figure 1: The Maastricht Game (Nash)

reform further, etc. Conversely, Italy may fear that painful adjustment E would not be rewarded with EMU entry.

Contracts

There are several ways, in principle, in which the Maastricht Treaty may improve on the inefficient Nash equilibrium of Figure 1. First, by structuring the game by specifying a move order, i.e. *when* decisions are taken. Second, by allocating decision authority, i.e. *who* decides *what*. Third, by altering the payoffs of the game, e.g. by committing players to certain actions, outcomes or procedures, where breach of Treaty carries a penalty. In particular, the Treaty can specify decision rules, i.e. regulate on what basis and *how* are decisions taken. Here, the Maastricht criteria examined in Section III, are a prime example. The Maastricht Treaty deploys a combination of all three options, which will be explored in turn.

The first simple measure the Treaty can take is to prescribe a particular *move order*, i.e. have the players in Figure 1 make their choices sequentially. Then if the agent moves first, he will choose the minimum convergence \bar{E} that is necessary to just entice the principal to go along with EMU. If \bar{T}_p is negative, as before, all that is needed is a positive ϕ , i.e. that some of the prior convergence is EMU-specific and durable. Assume $\phi=3/4$ for illustration; then the top-left corner in Figure 2 will become a Stackelberg equilibrium, i.e. a Nash equilibrium in a game where the agent moves first.⁵

Note that the reverse move order, where the principal commits first, is of no help. In this case the agent would always respond with zero convergence and hence the principal would refuse EMU. Note also that the convergence \bar{E} induced by the efficient move order, will not in general correspond to the efficient amount of convergence of the co-operative solution in Figure 1. In the above example,

		<i>Principal</i>	
		EMU ($p=1$)	No EMU ($p=0$)
<i>Agent</i>	Min. convergence: $\bar{E}=2/3 (= -\bar{T}_p/\phi \omega)$	3 1/3, 1/3	-2/3, 1/3
	No convergence: $E=0$	4,-1	0, 0

Figure 2: The Maastricht Game (Stackelberg)

⁵ Strictly speaking E needs to be slightly greater than two-thirds in order to break the tie between EMU and no-EMU for the principal. Note also that the bottom-right corner still is a Nash equilibrium, but it is not 'subgame perfect': if the agent can move first, he will choose to converge, since he knows that the principal's best response will then be to allow EMU to go through.

the minimal effort is suboptimal (i.e. 2/3 rather than one), but for $\phi < 1/2$ convergence becomes excessive rather than deficient. This inefficiency may be one reason why the Maastricht Treaty not only calls for ‘convergence first’, but also sets minimum convergence requirements. Moreover, Maastricht established a final deadline for EMU in 1999, together with the criteria, and therefore does not leave the decision on EMU in the principal’s hands. This suggests that the move order alone was perceived as insufficient to guarantee an efficient transition to EMU.

The second possibility of improving on the Nash outcome of the Maastricht game concerns the allocation of *decision authority*. The most immediate answer to the prisoner’s dilemma of EMU would be to pool all authority at the European level. If Europe had already achieved full political union, joint decisions would reflect European welfare (or the result of intergovernmental bargaining) and could be legitimately executed and enforced even against individual nations’ interests. For now, however, it seems reasonable to assume that contracts and explicit treaty commitment are necessary for those purposes. Then a two-stage game can be envisaged where, first, players contract over decision rights and, second, play a Nash game in the decision variables allocated previously. If it were possible to contract for a ‘reverse assignment’ of decision rights, then the agent would decide whether EMU would go ahead and the principal could choose the degree of convergence as in Figure 3.

Here the unique Nash equilibrium is the outcome in the top-left corner. The agent will always want EMU to happen and the principal wants to extract the maximal convergence \bar{E} , which will leave the agent just no worse off than in the absence of Maastricht. The Treaty contains some elements of a reverse assignment. At least on paper, it ensures that $p=1$, i.e. that EMU will happen for sure by 1999 at the latest, and it prescribes (qualified) majority voting for the entry decisions. This means the principal could be outvoted, he cannot block EMU single-handedly. As for convergence, the principal has been allowed to impose the Maastricht criteria and also to play a vocal role in their interpretation. Moreover, since several of the criteria are formulated in relative terms, by setting

		<i>Principal</i>	
		Max. convergence: $\bar{E} = 2(= \sqrt{2T_A / \beta})$	$E=0$
<i>Agent</i>	EMU ($p=1$)	0, 3	4, -1
	No EMU ($p=0$)	$-4, (1-\phi)4$	0, 0

Figure 3: The Maastricht Game (Reverse Assignment)

monetary policy for the DM block of currencies the Bundesbank effectively determines the absolute values of the inflation and interest rate criteria.

While the reverse assignment allows a superior outcome compared to the original 'natural assignment' in Figure 1 it runs the risk that the principal imposes excessive convergence on the agent, as compared to the co-operative solution (in the example, $E=2$ instead of $E=1$). Moreover, once the Treaty is concluded and if the principal can effectively control the agent's effort, he could always ask for still more convergence and could make the agent worse off than without Maastricht.⁶ Anticipating this, the agent would refuse to sign away his control over convergence at Maastricht. The main problem with the reverse assignment is that it is difficult to enforce because it is 'unnatural'. Certainly the Bundesbank has already been signed away at Maastricht and Germany can be outvoted in the Council, but still it would be hard to conceive that it could be really coerced into EMU against its will in 1999. Likewise, Germany certainly cannot dictate convergence policies of sovereign partner countries, even with the most rigid interpretation of the criteria.⁷

The Maastricht criteria can be seen as a way around the problems of the reverse assignment. First they seek to protect the agent against demands for excessive and ever greater convergence. Second, they reassure the principal by making his commitment to EMU conditional on sufficient prior convergence. Third and most important, by making entry to EMU conditional on convergence, it becomes in the agent's *own interest* to undertake the convergence effort, without signing away national control. In this way the Maastricht criteria attempt to internalize the externalities in the original Maastricht game and try to achieve the co-operative solution in Figure 1.

It was shown how the Maastricht Treaty might help to solve the prisoner's dilemma of the Maastricht game by specifying who decides what and when. The obvious thing, however, would be to commit to the desired co-operative outcome directly. A *complete contingent contract* would specify the actions to be undertaken by the two sides under all conceivable circumstances and would be perfectly enforceable. Real life contracts, however, are usually incomplete because of transaction costs (Hart and Holmström, 1987). These arise, first, from the difficulty of anticipating all possible eventualities. The ERM crisis of 1992–93 is a prime example of such an unforeseen contingency. Second, there are costs of agreeing and deciding. Third, the imprecision of language makes it difficult to give clear and unambiguous descriptions of the relevant states of the world.

⁶ The principal can impose additional convergence by exploiting the fact that for *any* given level of convergence *ex post*, the agent prefers EMU to no-EMU.

⁷ If the reverse assignment is not fully credible, then the stability of the equilibrium in Figure 3 could be undermined: for $\phi < 1/4$ the principal prefers the bottom-left outcome and will try to prevent EMU after convergence has materialized. Similarly, the agent has every incentive to cheat on convergence to try to achieve his preferred outcome (top-right).

Fourth, legal enforcement of contracts, therefore, is often difficult and costly. Enforcement will be particularly hard if the subjects are sovereign states and the Union has only a limited capacity to impose formal punishment.

A further set of problems arises under private information, i.e. the case where one of the two parties has superior knowledge about the state of the world. In particular policy-makers' true preferences and intentions might not be known to the other party and relevant actions might not be easily observable or at least not verifiable in court. The convergence effort, i.e. measures that contribute to the credibility and stability of EMU both in the run-up to EMU and in stage III itself, cannot be made subject to contract (and therefore enforceable) directly, even if it were observable. For example, it is hard to imagine a contract ruling out all conceivable manipulations of budget figures which have nothing to do with achieving the sustainable and sound public finances the Treaty is interested in.

The Maastricht criteria, therefore, must be understood as a highly imperfect substitute for a fully state-contingent and enforceable 'ideal' complex contract. They had to be simple, visible and equal for all candidate countries, and of course bear at least some relation to the underlying variable of interest, i.e. the willingness and capacity to support and sustain stability-oriented policies. However, the cost of abiding by a crude and inflexible contract to the letter could be very high if important information is disregarded or sizeable shocks (e.g. recessions) intervene in the meantime. A way to get around this problem is not to commit to particular actions or outcomes directly, but to conclude 'relational contracts' (Milgrom and Roberts, 1992). These agree on the objectives and the criteria, the process and procedures of decision-making, not on the decisions themselves. By providing a framework for the decision to move to stage III of EMU, i.e. by defining who decides when, what and how, the Maastricht Treaty constitutes such a relational contract. As such, it preserves the commitment value of a contract (which is necessary to sustain a co-operative solution) while preserving valuable flexibility in the light of unforeseen contingencies.

The principal elements of this relational contract concern the move order discussed above, the automaticity of EMU in 1999 and the joint European decision-making on the application of the convergence criteria. Convergence must precede EMU because it is not easily contractual and enforceable *ex post*. This contrasts with the contractual transfer of sovereignty from the Bundesbank to the ECB, which is clearly observable. Automaticity tries to ensure the principal's commitment to EMU and, more generally, the mandatory participation of high credibility countries, who would confer a positive spillover on EMU by joining. Joint European decision-making (abstracting from the precise voting rules) means that all parties affected by the decisions (in particular the 'outs' as well as the 'ins') are present and, under efficient bargaining, all externalities could be internalized. This presupposes that side-payments, e.g. 'horse-trading'

with other issues such as political union, EU reforms or structural funds, are available to compensate individual countries.

However, problems arise for *ex ante* convergence incentives, which could suffer if countries anticipated renegotiation at the time of the application of the criteria. Depending on bargaining strength, agent countries may fear that they will receive insufficient rewards for prior convergence. Since convergence costs are already sunk at the time of the entry decision, the principal may take advantage of this and extract further convergence or impose additional conditions.⁸ The prospect of opportunistic behaviour could lead countries to undertake less convergence than in the absence of renegotiation. Thus *ex post* bargaining can lead to the distortion of *ex ante* incentives, as in Williamson's (1975) 'hold-up problem'. In the presence of asymmetric information, moreover, additional bargaining inefficiencies are prone to arise (Myerson and Satterthwaite, 1983). Uncertainty about other countries' valuation of EMU or convergence costs may then prevent even a mutually beneficial renegotiation.

One possibility of limiting the negative effects of incomplete contracts that can arise if ambiguities and omissions in the Treaty have to be filled later by bilateral bargaining, is to provide for third party arbitration. This role was partly assumed by the convergence reports prepared by the European Commission and the European Monetary Institute and made public on 25 March 1998. While not binding on the final decision of the European Council on EMU membership, the technical assessment contained in the reports was important in providing a commonly acceptable interpretation of the Treaty provisions. An alternative device to avoid possible bargaining inefficiencies is to conclude (simple) long-term contracts and stick to them rigidly, even in the event of adverse shocks. This may explain the dogged determination of European leaders to stick by 'the Treaty, the whole Treaty and nothing but the Treaty', studiously avoiding a reopening of the Maastricht 'Pandora's box'.

III. The Role of the Maastricht Criteria

The previous section has already furnished several explanations for the adoption of the Maastricht criteria by asking what would happen in the absence of any such conditions. The task of the criteria is to organize a co-operative solution of the Maastricht game. Given the incomplete contract framework proposed as the appropriate reference point, the task of this article is not to defend (or propose) any particular numbers for the criteria. All that matters here is that policy-makers cared enough about them, rightly or wrongly, to include them in the Treaty. Andreas Kees (1992), at the time head of the secretariat of the EC monetary

⁸ One could cite the German-inspired Stability Pact finally agreed at Amsterdam as an example of a concession that was extracted *ex post*, without, however, affecting the Treaty requirements for EMU entry.

committee, where the criteria were conceived, lists three principal functions. According to Kees (p.31), the criteria are not of a technical but of a political nature. They serve as guideposts for the orientation of economic policy, they create pressure for consolidation and they have a signalling function, especially with a view to the financial markets. The main idea was to create a 'dynamic tension', where the prospect of a fixed deadline for stage III would induce and facilitate the necessary adjustments much earlier and in turn create the desired momentum for EMU. The three functions of the criteria are discussed in the following section, starting with the external incentive argument.

Providing Convergence Incentives

As explained before, the Maastricht criteria can serve as a substitute for contracting for optimal convergence directly. For example by making the probability of EMU entry in equation 3 depend on the degree of convergence as measured by the criteria, the incentives of the two parties become more closely aligned. Now it is in the own interest of the agent countries to undertake costly convergence effort. EMU becomes the reward that the principal offers as a function of convergence effort. Ideally the incentive contract should be structured such as to internalize completely the convergence externality in the Maastricht game.

$$U(A) = p(E) \cdot T - \frac{\beta}{2} E^2 \quad (3)$$

With the Maastricht criteria governing entry rather than decisions by the principal and/or the agent, the probability of entry p now is endogenous and an increasing function of convergence effort E . From maximizing equation 3 the agent will choose optimal convergence effort as

$$E^* = \frac{\partial p(E)}{\partial E} \cdot \frac{T}{\beta} \quad (4)$$

The convergence effort will be higher the greater the rewards from EMU (T), the smaller the costs of convergence (β) and the more extra effort raises the entry probability p . In the probabilistic formulation of equations 3 and 4 it is already assumed that there is uncertainty, either about the application of the criteria and/or about the economic transmission mechanism which translates convergence effort into the outcomes relevant for the criteria. As shown in Winkler (1997), the presence of uncertainty about the criteria can actually be beneficial for convergence incentives. The intuition is straightforward: if the criteria were totally precise, countries who are far away from fulfilment will 'throw in the towel', while countries sure about reaching them will no longer exert any further

convergence effort either. For intermediate cases, convergence incentives are weakened, rather than sharpened by uncertainty. Thus, if the aim is to maintain a 'dynamic tension' and maintain the momentum for convergence for the greatest possible number of Member States, then *ex ante* some uncertainty should be kept alive, as long as it influences policy decisions. No country should be ruled out or ruled in, at least not publicly. This also provided a rationale for the EMI and the Commission *not* to do a serious 'dry run' of convergence reports in 1996.

The Stability and Growth Pact

As an alternative (or in addition) to the convergence criteria, incentive effects could also be produced by making the benefits of EMU a function of convergence. An example of this is the Stability and Growth Pact agreed at the Amsterdam summit. The idea, as first put forward by the German Finance Minister Waigel in late 1995, called for automatic sanctions in the form of fines for any breach of the fiscal criteria in stage III of EMU. The concern was that countries that had great difficulty in converging, even under the threat of exclusion from EMU, would be even less likely to do so once that extra incentive had vanished.⁹ Therefore, the Stability Pact was seen as a way of enforcing fiscal discipline inside EMU. However, as a deviation from the original German proposal, the fines envisaged in the Stability Pact will not be applied automatically.

In terms of our model, the Stability Pact has three main effects. First, equations 1–3 can be applied to incentive issues in stage III. Then T would be a negative penalty for the agent and $p(E)$ the probability that it will be imposed, which is now decreasing in convergence. Countries will be more disciplined from equation 4 the greater the fines, the more the risk of incurring them depends on their behaviour and the lower the costs of fiscal austerity. Second, the Stability Pact alters the parameters of the model as applied to stage II. In particular, it should reduce the risks to the principal (raise \bar{T}_p) or render stage II convergence more durable (increase ϕ). Both should help overcome his reservations over EMU. On the other hand, the agent's expected payoffs from EMU \bar{T}_A might well be lower, from the risk of incurring fines. Third, the Stability Pact could make the benefits of EMU a function of prior convergence, i.e. be written as $T(E)$ in equation 3. Thus they could operate in much the same way as the Maastricht criteria and render it in the candidate's own interest to take corrective fiscal action before entering and thereby reduce the risk of incurring penalties in EMU.

⁹ On the other hand, the costs of convergence (e.g. the parameter β in equation 3) should be lower in stage III, if interest rates come down for those countries, making it easier to comply with the fiscal criteria.

Co-ordinating Convergence

Turning to the second principal role of the Maastricht criteria, in order to produce the desired smooth transition to EMU, a co-ordination of individual convergence efforts is required. In fact each country's incentives depend on what other countries are doing. Apart from the usual policy spillovers from fiscal and monetary policies, the various countries' strategies are interdependent via the probability (or timing) of EMU which will be a function of joint effort. Consider two identical agent countries who maximize utility as before in equation 3 above.

$$U(A) = p(E, E_f) \cdot T - \frac{\beta}{2} E^2 \quad (5)$$

Note that in equation 5 the entry probability is also a function of foreign convergence effort E_f . In principle, the externality could be positive or negative. The most straightforward interpretation derives from the simple fact that EMU only happens if at least two countries (often more precisely identified as France and Germany) make the Maastricht appointment. In general, the chances of being admitted to EMU depend on various economic and political considerations involving partner countries. For example, a Maastricht-induced recession next door lowers one's own probability of meeting the criteria. If an important trading partner looks like jumping the hurdle, one's own efforts will intensify in order not to be left behind. If other large countries stay out, the political stigma of exclusion is reduced, and vice versa (witness the acceleration of Spanish and Italian efforts in mid-1996).

If the start of EMU is conditional on a minimal size requirement (even if that is not in the Treaty), again individual convergence which raises the probability of meeting the criteria has public good features. This is because the overall probability that EMU will go ahead as planned is increased, as is therefore the expected payoff for all partner countries.¹⁰ This in turn increases the incentive to converge for everybody. Consider Figure 4 for a simplified illustration of two Nash equilibria, where jointly high effort is assumed to lead to EMU for sure ($p=1$). Other parameter values are as before.

In Figure 4, a country's best response, if no one else converges, is to do nothing either (bottom-right). Conversely, the greater foreign effort, the greater is the home incentive to converge (top-left). If countries start out in a low convergence equilibrium they will not make it to the EMU equilibrium without a co-ordination and commitment device to initiate and support the transition. This suggests that a market-led or voluntaristic approach, which advocates proceeding to EMU 'when the time is ripe' and convergence sufficient, is

¹⁰National convergence effort also has public good features to the extent that each additional entrant increases the size of EMU and thus the size of benefits from a common currency for all other members of the club.

		<i>Foreign</i>	
		High convergence: $E_f=1$	$E_f=0$
<i>Home</i>	High convergence: $E=1$	3, 3	-1, 0
	$E=0$	0, -1	0, 0

Figure 4: The Convergence Game

doomed to failure. The key commitment device that the Maastricht Treaty has furnished to overcome this 'horizontal' co-ordination problem (as well as the 'vertical' one between principal and agent) is to set *both* convergence requirements *and* a firm deadline. Fixing a deadline and *not* imposing a minimum size on EMU should render at least some foreign entry probability close to one and thus provide incentives for other countries to catch up. Other measures to overcome co-ordination failure include the following: pivotal countries could set the standard and go ahead unilaterally (move order, multi-speed EMU), mechanisms of co-ordination, communication and authority can be installed in order to invoke the good equilibrium (e.g. the convergence reports by the Commission, EMI, the EU summit declarations, etc.) and, finally, external commitment should help (e.g. the German Supreme Court ruling of 12 October 1993 insisting on a strict interpretation of the convergence criteria).

However the co-ordination problem resurfaces if the Treaty itself lacks credibility. First, it is politically unrealistic and economically meaningless to conceive of a mini-EMU, especially one that were to exclude either France or Germany. Second (and therefore) a conflict between the deadline and a strict interpretation of the criteria might arise. As long as a delay, a failure of EMU or a relaxation of the entry conditions are perceived as possibilities, the model of co-ordination failure applies as it stands. In particular, this can explain why countries left it until very late, until many years after the signing of the Maastricht Treaty, before they initiated meaningful convergence programmes. In the presence of uncertainty about EMU's fate it was rational to sit and wait, especially as long as other countries did the same.

Given the lack of full credibility of the numerical convergence criteria, moreover, the entry conditions as an incentive device in reality operated as much like relative rather than absolute performance contracts. For example, France was unlikely to try push its deficit below the 3 per cent limit in 1997 as long as it predicted that Germany would not meet the Maastricht targets either. Moreover, the inflation and the interest rate criteria are explicitly relative conditions. How strict they turn out to be depends on the behaviour of the three best-

performing countries. In the event, with some help from faster growth and creative accounting, all countries except Greece managed to satisfy the 3 per cent ceiling once it had become clear that collusion around a more lax reading of the deficit criterion was not on the cards (not least in view of a sceptical German public) and would therefore have left unilateral deviators in a vulnerable position.

There is a further interpretation of the convergence game of Figure 4 that might shed some light on the remarkable acceleration of convergence by countries that until 1996 had seemed unlikely EMU candidates. If the home country is playing against the financial market rather than other countries, then foreign E would capture the markets' level of confidence in the home country. If the market has optimistic expectations on EMU entry, inflation expectations and interest rates fall and therefore also the fiscal burden. This facilitates convergence, the optimistic expectations thus become self-fulfilling and the 'good' Nash equilibrium is realized. Conversely, under pessimistic market expectations (here $E=0$), a vicious cycle ensues and respecting the Maastricht criteria becomes difficult or impossible.¹¹

Building a Reputation for EMU

In order to explore the 'signalling function' of the criteria, recall the original formulation of the 'vertical' game between principal and agent as given in equations 1 and 2. Imagine that the principal does not know the preferences of the agent, in particular he may be unsure about the β in equation 2. If β is high, it is very costly for the agent to produce stability. Thus his joining EMU could undermine performance, e.g. lead to higher inflation or economic and political tensions, in stage III. The principal's payoff in stage III, therefore, can be rewritten as follows (assuming $\phi=1$):

$$U(P) = p(\bar{T}_p + \omega E(\beta)) \quad (6)$$

The degree of convergence and stability in stage III depends negatively on the size of β and therefore the principal has an interest in preventing countries with a high β from joining. Under complete information, he would simply set convergence criteria strict enough such that those countries would find it too costly to satisfy them. At the same time, the entry barrier must be low enough as not to deter countries with a low β . However, it may not be possible to separate the two groups if the low-stability countries have a stronger incentive to join EMU, i.e. a higher \bar{T}_A in equation 2, and if the principal is not allowed to

¹¹ Examples of such multiple expectational equilibria include Calvo's (1988) model on debt default, Obstfeld (1994) on speculative attacks, Eichengreen and Wyplosz (1993) on the EMS crisis.

discriminate against particular countries, even if he knows that their entry could jeopardize EMU performance.

If the principal is not certain about candidate countries' preferences and stability orientation, then high-inflation countries may want to imitate the behaviour of low-inflation countries in order to gain admission to EMU. Conversely, low-inflation countries have an incentive to signal their type, i.e. choose actions that a high-inflation country would not want to follow. As shown in Winkler (1995), making entry to EMU conditional on satisfying convergence criteria can be useful to separate out high-inflation countries and prevent them from joining. In this case, uncertainty about preferences is resolved ahead of EMU and stage III starts with a good reputation and low-inflation expectations. In the event that the two types of countries cannot be separated and both enter EMU, there will be greater uncertainty about what policy the ECB will follow and its reputation will be lower, and inflation expectations and interest rates higher. Even in this case the criteria are beneficial, however, since they induce lower inflation in stage II. This is all the more important as, in the run-up to EMU, reputational incentives diminish for national policy-makers. They will face a finite horizon ('endgame problem') after which they will no longer carry responsibility for monetary policy, and therefore can no longer be 'punished' for bad behaviour individually.

The role for stage II of EMU and of the convergence criteria in such a setting is to induce and help candidate countries to convince the principal and the markets of their stability orientation. Thus the convergence criteria can have an important function with respect to information revelation even if the behaviour they induce seems utterly pointless and destructive, as has been argued by many critics. In a nutshell, candidate countries for EMU play the role of the groom who has to woo a sceptical bride (principal and financial markets) before the EMU marriage. Conversely, the bride devises a set of tough exams and obstacles in order to convince herself of the groom's serious and honest intentions.

France's dogged adherence to the *franc fort* policy against most economic advice is a prime example of a signalling and reputation building strategy. Similarly the latter-day ERM managed to hold together and discipline countries with quite disparate stability traditions, at least until the final reward of EMU (and hence the incentive to converge) was suddenly thrown into doubt with the Danish and French referendums in 1992.

IV. Conclusions

A major, recurrent criticism of the Maastricht Treaty regarded the long 'risky' transition period of stage II. Indeed the obvious way to maximize the probability of EMU was to keep the transition phase as short as possible, i.e. proceed to EMU

quickly. As the article points out, however, the transition was there for a reason: (prior) convergence was a condition for the principal's participation, Treaty commitment was necessary to induce and co-ordinate prior convergence, and behaviour in the transition period revealed useful information. Moreover, if shocks were to have knocked EMU off course in the transition, then perhaps either the economic conditions and the net benefits from EMU or the political commitment were insufficient and therefore it would indeed have been unwise to proceed with EMU. Also, in these two dimensions, the transition was an important testing ground and, while risky, certainly not superfluous. This article has interpreted the Maastricht Treaty and its convergence criteria as a contract device that sought to organize the difficult transition to EMU. It did so by determining the authority, timing and procedures for decision-making and by providing rules and sanctions for behaviour. The Treaty is certainly not a perfect contract and many of its details remain debatable. However, in light of its difficult and multifold tasks, the Maastricht Treaty has proved to be remarkably effective in promoting both convergence and a timely start of a broadly based monetary union as of 1 January 1999.

With the entry decision for initial membership settled, attention has now shifted to how the convergence momentum can be sustained inside EMU. While the threat of exclusion from EMU's first wave provided a powerful incentive and co-ordination device for most countries to satisfy the convergence criteria, it remains to be seen whether the institutional framework of EMU and the sanctions and procedures envisaged under the Stability and Growth Pact will induce fiscal discipline, macroeconomic stability and co-ordination on an ongoing basis. Indeed as has been pointed out in the convergence report of the European Monetary Institute, many countries – while satisfying the entry conditions – are far away from the Stability and Growth Pact objective of fiscal positions 'close to balance or in surplus' over the medium term. Only then could the requirement of fiscal discipline be squared with the need to let automatic stabilizers operate freely inside EMU (Artis and Winkler, 1998). The Maastricht and Amsterdam provisions on budgetary surveillance, discipline and co-ordination are likely to be tested soon.

From 1999, one may expect the players in the Maastricht game to reveal their colours more fully with respect to policy preferences and the durability of convergence. The European Central Bank will take over as the main 'principal' advocate of stability facing a large set of disparate players, and only time will tell whether the Maastricht Treaty – on top of successfully organizing a difficult transition – will also turn out to be a good contract in the long run.

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