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EMU, EU, Market integration and consumption smoothing

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EMU, EU, MARKET INTEGRATION AND CONSUMPTION SMOOTHING

NON-TECHNICAL SUMMARY

There is considerable evidence of the impact of EMU on capital market integration in Europe. This impact could lead to better allocation of resources and growth. More modestly, it should mean more risk sharing. Based on the diversification of property claims, members should be able to share asymmetric shocks more broadly. In addition, the impact on capital market integration should mean that more of the non-tradable capital in these countries becomes tradable, which should also facilitate intertemporal substitution. Capital market integration in the EU could make it easier to borrow and obtain insurance based on wealth consisting of domestic real estate, housing and plant and future labor income and could make it easier to switch between lenders and insurers. These changes could then increase the ability of EU households to smooth consumption. The impact of EMU on goods market integration could also improve risk sharing through relative prices. It could reinforce a prior tendency for an adverse supply shock in an individual country to be offset by a rise in relative price of the country's output and thereby stabilize consumption. For all of these reasons, EMU members could then benefit from smoother consumption at home.

However, the efforts to treat the question thus far do not go beyond these general considerations, or if they do, it is to draw inferences about the effects of asymmetric output shocks on consumption smoothing through capital market integration understood as cross-country holdings of property and claims. Instead, we examine the effect of EMU on consumption smoothing directly in response to a broad range of influences and channels of influences. Specifically, we focus on the effect of EMU on consumption smoothing in three different ways: through (1) cross-border financial positions, (2) international trade, and (3) directly or through price and tradability effects.

This approach requires that each country be treated in relation to the rest of the world rather than any particular sub-group since consumption smoothing in the aggregate is the issue. For this reason, in order to apply the proposed new approach, the usual measure of currency union will not do. This measure is bilateral and either zero or one. We need a multilateral measure instead. Therefore, we propose using the ratio of the trade of any country with all other countries with which it shares the same national currency relative to the country's total foreign trade. This measure is closely connected to the theory of optimal currency areas, which emphasize that the benefits of currency union for a nation vary positively with its trade with union members relative to its total trade.

As a benefit of our approach, it yields a result that would be impossible to find with the usual one: namely, that even though EMU has increased international cross-holdings of assets and liabilities, the advantages of consumption smoothing come from elsewhere. Since we control for openness and relative prices, we attribute this effect to an impact of EU membership on the tradability of capital. There is some evidence that the effect on consumption smoothing comes partly through EU membership, but EMU adds to it.

It is particularly interesting to contrast our approach with an important branch of the literature which stems from Asdrubali, Sorensen and Yosha. Our best estimate of the impact of output volatility on consumption volatility is around .65. This means that about 35 percent of the idiosyncratic output shocks are smoothed (we can speak of idiosyncratic shocks since we control for common output movements in our tests by using time-specific effects). This other branch of the literature would then decompose the smoothed fraction of the output shocks between different channels, one of which would be cross-country holdings of assets and liabilities. Since EMU contributes to cross-country holdings of assets and liabilities, the result would be likely to be that EMU stabilizes consumption. Instead, we directly investigate the degree to which the tendency to increase cross-country holdings of assets and liabilities would stabilize domestic consumption. It is then clear that we can get different – even opposite – results. International portfolio diversification affects the dynamics of price and wealth movements and the international correlations between investment yields and thereby may alter the responses of consumption to all shocks, not only asymmetric supply ones. For example, the portfolio diversification might destabilize consumption in response to asset-price shocks. Our procedure would pick this up; the other approach would not. This generally shows the methodological interest of our work and the merits of focusing directly on consumption smoothing as such.

ABSTRACT

We take a new approach to the study of the impact of EMU on consumption smoothing that allows a broader range of channels to enter into view. It is no longer simply a question of the smoothing of asymmetric output shocks via cross-country holdings of property and claims, as is often the case. Consequently, we find that while EMU tends to smooth consumption, it is not through cross-country property and claims. Rather it comes through the promotion of the tradability of capital: specifically, the encouragement of price competition, contestable home markets, ability to borrow and buy insurance at home, and through an increase in the harmonization of regulations. Some of the consumption smoothing may also depend on EU membership rather than EMU as such but EMU adds to it. As a fundamental part of the analysis, the paper uses a new index of currency union which focuses on the ratio of trade with other countries sharing the same currency relative to total foreign trade.

JEL Classification: JEL: F36, F41, E00, G10

Keywords: Capital market integration, consumption smoothing, currency union, European Monetary Union, European Union

UEM, UE, INTEGRATION DES MARCHES ET LISSAGE DE LA CONSOMMATION

RÉSUMÉ NON TECHNIQUE

On considère souvent que l'impact de l'UEM sur l'intégration des marchés de capitaux – bien documentée empiriquement – est susceptible d'améliorer l'allocation des ressources et de favoriser la croissance en Europe. Plus modestement, elle favoriserait le lissage intertemporel de la consommation des ménages de trois façons. D'abord, elle permettrait un meilleur partage des risques grâce à la diversification des titres de propriété dans les pays membres. En outre, la plus forte intégration des marchés des capitaux produite par l'UEM rendrait les capitaux plus facilement « échangeables » ; dans ces conditions, un ménage pourrait s'adresser à de nouveaux préteurs ou assureurs pour obtenir un crédit ou une assurance gagés sur un patrimoine ou sur le revenu futur du travail. Enfin, l'intégration des marchés des capitaux favorisée par l'UEM pourrait améliorer le partage des risques par le jeu des prix relatifs ; elle renforcerait l'effet de compensation d'un choc d'offre négatif dans un pays par une hausse du prix relatif de sa production. Pour toutes ces raisons, les ménages des pays membres de l'UEM pourraient plus facilement lisser leur consommation.

Les efforts pour traiter ces questions sont rarement allés au-delà de ces considérations générales ; s'ils l'ont fait, c'est en considérant le lissage de la consommation uniquement à travers le canal de la détention croisée d'avoirs et engagements. L'apport de notre travail est d'examiner l'effet direct de l'UEM sur le lissage de la consommation suivant une gamme plus large de canaux : (1) la détention croisée d'avoirs et engagements ; (2) les échanges internationaux ; et (3) les effets de prix relatifs et d' « échangeabilité » des biens et des actifs.

Chaque pays doit donc être considéré par rapport au reste du monde et non pas seulement par rapport à un sous-groupe particulier. Pour cette raison, la mesure usuelle de l'intégration monétaire (un ou zéro selon qu'il y a, ou non, union monétaire), bilatérale par nature, ne convient pas. Nous devons recourir à une nouvelle mesure, multilatérale, de l'intégration monétaire. Nous retenons, pour chaque pays, la part dans ses échanges totaux de ses échanges avec les autres membres de l'union monétaire. Cette mesure a l'avantage d'être reliée à la théorie des zones monétaires optimales laquelle considère cet indicateur comme l'un des critères de l'opportunité d'une union monétaire.

Notre approche fournit des résultats qu'il ne serait pas possible d'obtenir autrement. Elle permet de montrer que le lissage de la consommation ne provient pas de l'augmentation de la détention croisée d'actifs produite par l'UEM, mais de l'échangeabilité des biens et des actifs (nous contrôlons pour l'ouverture internationale des pays et pour les prix relatifs). Cet effet dépend de l'UE plutôt que l'UEM, mais l'UEM le renforce.

Il est intéressant de confronter notre approche à la contribution notable à la littérature d'Asdrubali, Sorensen et Yosha (1996). Notre estimation centrale de l'impact de la volatilité de la production sur la volatilité de la consommation est d'environ 0,65 ; cela signifie qu'environ 35 % des chocs asymétriques sur la production sont lissés. Suivant l'approche de ces trois auteurs, ce lissage serait attribuable à différents canaux, parmi lesquels celui de la détention croisée d'actifs. L'UEM contribuant à augmenter cette détention croisée, on parviendrait facilement à la conclusion que l'UEM stabilise la consommation. Pour notre part, nous cherchons à estimer directement la mesure dans laquelle l'augmentation de la détention croisée d'avoirs et engagements stabilise la consommation. Il est clair que nous pouvons parvenir à des conclusions différentes, voire contradictoires. La diversification internationale des portefeuilles affecte la dynamique des prix et les effets de richesse ainsi que les corrélations internationales des rendements des investissements. Elle peut ainsi modifier la réaction de la consommation aux chocs de toute nature, et pas seulement aux chocs asymétriques sur la production. Par exemple, la diversification des portefeuilles pourrait déstabiliser la consommation en réponse à des chocs sur les prix d'actifs. Notre approche permet de distinguer cet effet, ce qui souligne l'intérêt de centrer directement l'analyse sur le lissage de la consommation.

RÉSUMÉ COURT

L'impact de l'UEM sur le lissage de la consommation en cas de chocs asymétriques est souvent appréhendé au travers de la détention croisée des droits de propriété entre membres de l'UEM. Nous adoptons une approche plus large des canaux d'influence. Nous trouvons alors que l'UEM tend à lisser la consommation moins à travers le canal des droits de propriété que par celui de l'ouverture des marchés : l'encouragement de la concurrence par les prix, l'ouverture des marchés internes, la plus grande capacité d'emprunter et de s'assurer et l'harmonisation des réglementations. Le lissage de la consommation provient pour une part de l'appartenance à l'UE plutôt que, spécifiquement, à l'UEM, mais l'appartenance à l'UEM le renforce. Notre analyse se fonde sur un nouvel indicateur de l'intégration monétaire qui rapporte les échanges réalisés avec les autres membres de l'union monétaire à l'ensemble des échanges internationaux.

Classification JEL : F36, F41, E00, G10
Mots-clefs : Intégration des marchés des capitaux, lissage de la consommation, union monétaire européenne, union européenne.

EMU, EU, MARKET INTEGRATION AND CONSUMPTION SMOOTHING*

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1. INTRODUCTION

There is considerable evidence of the impact of EMU on capital market integration in Europe (Rajan and Zingales (2003), Baele et al. (2004), Lane (2006a), Aviat and Coeurdacier (2007), Jappelli and Pagano (2008), De Santis and Gérard (2009), Coeurdacier and Martin (2009) and Kalemli-Ozcan et al. (2010)). This impact could lead to better allocation of resources and growth. More modestly, it should mean more risk sharing. Based on the diversification of property claims, members should be able to share asymmetric shocks more broadly. In addition, the impact on capital market integration should mean that more of the non-tradable capital in these countries becomes tradable, which should also facilitate intertemporal substitution. The impact of EMU on goods market integration could also improve risk sharing through relative prices. It could reinforce a prior tendency for an adverse supply shock in an individual country to be offset by a rise in relative price of the country's output and thereby stabilize consumption. Cole and Obstfeld (1991) emphasize this last channel of influence (see also Heathcote and Perri (2008) and Viana (2010)). For all of these reasons, EMU members could then benefit from smoother consumption at home. However, except for Huizinga and Zhu (2004), efforts to treat the question thus far do not go beyond these general considerations, or if they do, it is to draw inferences about the effects of asymmetric output shocks on consumption smoothing through capital market integration understood as cross-country holdings of property and claims (see, for example, Sørensen et al (2007)). Instead, like Huizinga and Zhu before us, we shall examine the effect of EMU on consumption smoothing directly in response to a broader range of influences and channels of influences.

The outstanding technique for reaching conclusions about risk sharing in the relevant writings derives from Asdrubali et al (1998) (hereafter ASY) (Sørensen et al. (2007), Artis and Hoffman (2007, 2008), Corcoran (2008), Kose, Prasad and Terrones (2009) (hereafter KPT)). The idea there is to analyze the link between consumption in one country relative to a group to output in that country relative to the particular group. So far as the group of countries shares risks, the individual country's consumption relative to the rest in the group should be

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independent of its output performance in relation to the rest. In other words, asymmetric output shocks within the group should affect consumption among the members evenly without particular repercussions on relative consumption between them.[1] The question posed then is whether cross-country holdings of assets and liabilities from any source, including EMU, have reduced the response of relative consumption to shocks to relative output. The answer tends to be positive for membership in the OECD (not necessarily EMU). However, there are some serious limitations to this perspective.

First of all, capital market integration can lead to greater volatility of consumption because of short term capital flows and variable financial risk premia. Earlier studies of international portfolio diversification often come to this conclusion. The possibility is especially strong in countries with low domestic financial development and inadequate prudential rules. Much generally depends on the sources of shocks in combination with habit formation, price stickiness, and, of immediate relevance, the exchange rate system and both monetary and fiscal policy (Razin and Rose (1994), Sutherland (1996), Easterly et al (2000), Buch (2002) and Buch et al. (2005) and Tharavanij (2007)). In general, the studies of the influence of international diversification of property claims on business cycles yield ambiguous results (compare Kose, Prasad, Rogoff and Terrones (2009)). This is easily understood. Suppose, for example, that as international diversification advances, movements in equity prices listed anywhere acquired a destabilizing effect on consumption everywhere (cf. Evans and Hnatkovska (2007)). The tests in the literature stemming from ASY would miss this effect or could only reflect it circuitously, since they focus exclusively on effects that proceed from asymmetric supply shocks via cross-country property and claims.

Secondly, and perhaps more significantly, EMU could affect consumption smoothing independently of cross-country property and claims. For one thing, it may promote trade openness. Such openness may protect against internal shocks but increases vulnerability to foreign shocks. Rodrik (1998) famously emphasized the vulnerability to foreign shocks. In conformity, Karras and Song (1996) report a positive effect of openness on output volatility. KPT (2003) obtain this result for consumption volatility as well (compare Moser et al (2004) and Lane (2006b)). In addition, EMU could also affect consumption smoothing via relative price adjustments. This is the Cole-Obstfeld channel. Finally, it could affect risk sharing by increasing the tradability of capital through greater price competition, more contestable home markets and the greater harmonization of regulations. Capital market integration in the EU could have made it easier to borrow and obtain insurance based on wealth consisting of domestic real estate, housing and plant and future labor income and could have made it easier

[1] A closely related approach, inspired by Backus et al. (1992, 1995) and Baxter (1995), asks to what extent EMU has divorced bilateral correlations in consumption from bilateral correlations in output. For an application, see Imbs (2004a), p. 23 and Table C2 (in sections that disappeared in the published version). See also Imbs (2004b).

to switch between lenders and insurers. These changes then might have increased the ability of EU households to smooth consumption.[2]

These last considerations lead us to propose a different perspective on the effect of EMU on consumption smoothing where the focus is directly on consumption volatility as such and the greater market integration stemming from EMU can affect this volatility through three separate channels: (1) cross-border financial positions, (2) international trade, and (3) directly or through price and tradability effects. In applying this approach, each country must be treated in relation to the rest of the world rather than any particular sub-group since consumption smoothing in the aggregate is the issue. In other words, the issue cannot be simply whether EMU smoothes consumption among members, since this might be entirely at the expense of smoothing of asymmetric shocks with outsiders, in which case no improvement in welfare would follow. In previous applications of the ASY approach, the focus has been on consumption smoothing within a sub-group. This might be regarded as a further limitation.

In order to apply the proposed new approach, the usual measure of currency union will not do. This measure is bilateral and either zero or one. We need a multilateral measure instead. Toward this end, we propose using the ratio of the trade of any country with all other countries with which it shares the same national currency relative to the country's total foreign trade. This measure is closely connected to the theory of optimal currency areas. According to this theory, the benefits of currency union for a nation vary positively with its trade with union members relative to its total trade. The higher this ratio, the greater the economy in transaction costs the country gets from a single money and the less the country loses by adopting a common monetary policy with the rest. This last point has been reinforced by the Frankel and Rose (1998) evidence that bilateral trade increases the symmetry of business cycles between trading partners and thereby leads to convergence of their optimal monetary policies. In addition, the measure results in no confusion with openness. In our sample, the correlation between the measure and openness is around .05 for the world as a whole and .18 within the EMU. There is thus no difficulty combining the measure with openness in the analysis.

Admittedly, the proposed measure concerns breadth or extensiveness rather than mere presence or absence of currency union. But this is not necessarily a drawback, not in analyzing consumption smoothing. Suppose that EMU increases consumption smoothing. Why should the improvement per person be the same in all member countries regardless how much trade they do with one another, as the binary measure would suppose? Why should the improvement not be larger in a member that does an unusually large percentage of its trade with union members, as our measure proposes instead? We shall see as well that the results with our measure correspond fairly closely to those reported in the past in analyzing the effect of EMU on capital and goods market integration.

[2] We are highly indebted to a conversation with Oren Sussman for this line of thought.

Our approach yields a result that would be impossible to find with the usual ASY one: namely, that though EMU has increased international cross-holdings of assets and liabilities, the advantages of consumption smoothing come from elsewhere. Since we control for openness and relative prices, we attribute this effect to an impact of EU membership on the tradability of capital. There is some evidence that the effect on consumption smoothing comes partly through EU membership, but EMU adds to it.

The next section, II, sets forth our basic econometric model. The following section, III, explains our data sources. The one after, IV, discusses the econometric method. The succeeding one, V, presents our test results. Section VI offers some closing discussion.

2. THE ECONOMETRIC MODEL

In this effort to study the impact of EMU on consumption smoothing, we start from the principle that consumers in each country maximize an intertemporal utility function with diminishing marginal utility in consumption; namely:

$$U_t = \sum_{s=t}^{t+T} \beta^{s-t} u(C_s) \qquad u'(C_s) > 0 \qquad u''(C_s) < 0 \tag{1}$$

where β is the personal discount rate of the future, $u(C_s)$ is the utility of consumption in period s, and t+T is the relevant time horizon starting from period t. Based on diminishing marginal utility, there is risk aversion: low volatility of consumption raises welfare. Suppose next we temporarily assume perfect capital markets and equality of the real interest rate r and β. Then people everywhere will consume the annuity value of their wealth W_t or their permanent income $r W_t$; therefore:

$$C_t = r W_t \tag{2}$$

In this context, let us admit four kinds of shocks: shocks to output, tastes, real exchange rates and the price of consumer services relative to capital goods. The taste shocks necessarily affect consumption. In the case of the other three shocks, however, only the permanent variety will necessarily do so. In addition, all effects on consumption could depend on openness.

Let us next recognize imperfections in capital markets: information and contracting are costly; the enforcement of contracts is too; there are numerous interest rates at all maturities and there is credit rationing. Period-consumption now depends on current cash flows as well as wealth. The volatility of consumption goes up and becomes a function of the variance of all the transitory shocks as well as the permanent ones. This volatility is also now conditional not only on openness OPEN but international capital market integration FI (F for foreign) and

domestic credit development DC. The volatility is what interests us since we are concerned with consumption smoothing.

We may then write:

$$CV = f(\boldsymbol{\sigma} \mid FI, OPEN, DC, CU) \quad (3)$$

where CV is consumption volatility, $\boldsymbol{\sigma}$ is the matrix of the variances of the four kinds of shocks. In this formulation, currency union CU can affect consumption volatility by altering FI, OPEN and DC. But it may also affect CV directly. We allow for this because, as mentioned before, CU may alter relevant prices and the tradability of capital. Of course, less CV means smoother consumption.

We then propose a simple 3-equation econometric model consisting of a linear approximation to equation (3) and additional equations for FI and OPEN; namely:[3]

$$FI_{it} = a_{10} + a_{11}\, OPEN_{it} + a_{12}DC_{it} + a_{13}CU_{it} + X_{it}'a_{14} + a_{1t} + \varepsilon_{1it} \quad (4)$$

$$OPEN_{it} = a_{20} + a_{21}\, FI_{it} + a_{22}DC_{it} + a_{23}CU_{it} + X_{it}'a_{24} + a_{2t} + \varepsilon_{2it} \quad (5)$$

$$CV_{it} = a_{30} + a_{31}\, FI_{it} + a_{32}OPEN_{it} + a_{33}DC_{it} + a_{34}CU_{it} + X_{it}'a_{35} + a_{3t} + \varepsilon_{3it} \quad (6)$$

FI refers, quite specifically, to the average of the stock of gross foreign assets and gross foreign liabilities as a percentage of GDP, where foreign assets and liabilities are understood as composed of portfolio equity investment, foreign direct investment, debt (including loans or trade credit), financial derivatives and reserve assets (excluding gold). Trade openness or OPEN is the average of imports and exports of goods and services as a percentage of GDP. CV is the absolute percentage change in private consumption between the last period and the current one. DC is an index or several indices of domestic credit development, to be specified. X is a set of controls, which differs by equation. Among the controls in equation (6), including one for the volatility of output looms as particularly important. i is a country index; t is a time index; and a_t is a set of time specific effects (cf. Lane and Milesi Ferretti (2003, 2004), hereafter LMF). Eq. (6) is obviously a simplified linear approximation of eq. (3), since FI, OPEN, DC and CU appear only separately and not as joint products of the variances of the relevant shocks (which are all included in X). We shall return to this point subsequently.

The primary centers of interest are the respective impacts of CU on CV via FI, $a_{13}(a_{31}+ a_{21}a_{32})$, via OPEN, $a_{23}(a_{32} + a_{11}a_{31})$, and the direct impact on CV or a_{34}. We shall also be most

[3] There could also be a fourth equation for DC admitting a possible effect of CU on CV via DC. For example, the prospect of EMU and its arrival might have accelerated domestic financial development in Finland, Greece, Ireland and Spain, all of which figure in our analysis of EMU (though none of the new entrants since 2004 do). We agree. Omitting the fourth equation is therefore a mere simplification.

interested in the results after dividing up CU between members of EMU, or CUE, and the rest, or CUX. This will allow conclusions about EMU as such and the separate importance of the deeper monetary integration that this system entails. In the other numerous instances of CU, the adoption of a common currency is often unilateral and never signifies the presence of a joint central bank with considerable powers and political independence. In so far as CUE is a factor, it will also be important to check whether the true source of the influence is not really membership in the EU, since the provisions of the Maastricht Treaty could have promoted cross-holdings of assets and liabilities independently of a single money.

The theoretical basis for the three equations in the econometric model deserves separate discussion. The FI one has been the subject of greatest attention thus far. LMF (2004) provide a formal basis for the positive effect of OPEN in this equation in an Obstfeld-Rogoff (2001) two-country theoretical framework with intertemporal utility maximization by households and profit-maximizing firms. According to their formalization, the fundamental factor at work is the inducement of importers to hold foreign assets as a hedge against changes in the terms of trade and the similar inducement of exporters to hold foreign liabilities as a hedge. Yet, as LMF also make clear (see the published 2008 version as well and Aviat and Courdacier (2007)), other, complementary factors will argue for a positive effect of OPEN on FI too. We cite only two. First, exporters and importers have an incentive to try to find home finance for their foreign clients and/or suppliers. Second, trade can spread knowledge of investment opportunities and thereby promote portfolio investment. Portes and Rey (2005) emphasize this last point (without any particular concern with whether FI boosts OPEN or the influence works the other way). There is an earlier literature on the impact of geographical proximity on the composition of international portfolios (see Tesar and Werner (1995) and Ghosh and Wolf (2000)), which clearly suggests a direct link going from trade to portfolio investment via first-hand knowledge and familiarity (cf. LMF (2003)).

The grounds for the reciprocal positive effect of FI on OPEN may be narrower but they exist. The major ambiguity concerns foreign direct investment (FDI). Admittedly, FDI can have a negative effect on OPEN since it may cause production to shift abroad and thereby lower exports, thus OPEN. However, this may not happen since FDI can also spur the exports of intermediary goods (parts) and induce fresh imports of formerly home-produced goods. Further, it can generate trade through entry into new fields of economic activity. The effect of FDI on OPEN is an open question and the microeconomic literature on the issue is varied and complex (cf. de Sousa and Lochard (2009)). However, this same ambiguity does not surround the other elements of FI. In their case, the earlier information channel would clearly argue for a positive effect of FI on OPEN. Just as trade may breed foreign investment through learning, risk-diversifying and profit-seeking financial investment abroad may breed learning of trade opportunities abroad.

With respect to the impact of DC on FI, there could easily be opposite effects on the asset and the liability sides. Domestic financial development should promote asset diversification and profit-seeking investment outside of national frontiers and thereby increase FI. However, by

making credit easier to find at home, domestic financial development may reduce foreign borrowing and thereby reduce FI. Yet, even if the latter is true and DC therefore reduces FI, DC should make it easier to finance foreign trade and should have a positive effect on OPEN.

In principle, the impact of CU on FI would seem positive. With the elimination of a currency, the reduction in transaction costs and related barriers to trade should promote FI. The associated reduction in exchange risks should do the same. True, the elimination of an exchange rate could remove some opportunities to diversify the exchange risks among the opportunities that still remain. But there should be fewer remaining exchange risks (fewer independent sources of exchange losses) and this factor should dominate. By increasing price transparency and the uniformity of prices and competition, CU may also be expected to bolster foreign trade relative to home trade and to raise OPEN.

As concerns the controls X in eq. (4), all legal interferences with the openness of capital markets should clearly reduce FI, regardless whether the interferences are exchange rate restrictions or take other forms (for example, minimal required holdings of home assets by home financial institutions). In addition, LMF (2003) remind us of the relevance of international financial centers. Countries with that status, like the UK and Singapore, would tend to be more open. In principle, business cycle correlations should matter too. Higher positive correlations in expected returns on investments should discourage capital market openness by limiting the opportunities for welfare-improving international diversification of risks on investment (both on the asset and liability sides). The volatilities of real and nominal exchange rates could also be relevant. Greater volatility means a greater incentive to cover and to spread exchange risk.

The gravity model suggests a host of country-specific variables that may be relevant as controls X in eq. (5). These include geographical remoteness, output, population, land area, and geographical status as landlocked or an island. A high quality of roads, rails and telecommunications at home may also stimulate openness. Canning (1998) constructs a relevant index of infrastructure, which Carrère et al. (2009) have updated and show to be highly significant in promoting foreign trade, or at least, bilateral trade. Finally, literacy, linguistic diversity at home and the size of immigrant populations may also matter in curtailing the tendency of foreign languages and information costs to limit foreign trade (Melitz (2008)).

We can be briefer about the signs of the influences of the variables in eq. (6), since this equation has been the object of earlier discussion above. As noted before, the influences of FI and OPEN in this equation could go either way. The same ambiguity surrounds DC. On the one hand, domestic credit development may ease the transfer of saving to investment and thereby the ability to substitute consumption intertemporally. Thereby it may lower CV. On the other hand, the development could also destabilize consumption by promoting asset price bubbles and the spread of financial shocks from abroad. Among the controls X in the CV equation, as noted earlier, the absolute percentage movement in GDP is probably essential.

Without controlling for output movement, there is little hope of discerning any smoothing effects of FI, CD and CU on consumption. In the same connection, movements in the tax burden should matter as perfect Ricardian equivalence is unlikely given imperfections in capital markets (if for no other reason). Any movements in after-tax income should disturb private consumption. As presaged too, controlling for the variance of the real exchange rate and the price of consumption goods relative to other home goods should matter. Theoretically, taste shocks ought to be especially important since they will disturb consumption even if temporary and even if credit markets are perfect. The life cycle hypothesis suggests a number of relevant indicators of such shocks. The age composition of the population, the retirement age and the labor participation rate are a few. The time-specific effect is of particular importance in eq. (6) as it will capture any symmetric shocks to output affecting the entire world as well as any other worldwide shocks, like ones to saving preferences. Controlling for such shocks is essential since CU cannot smooth their effects on consumption.

3. ECONOMETRIC ISSUES

The model poses some basic problems of estimation because OPEN affects FI and FI affects OPEN in eqs. (4) and (5). A similar difficulty arises in eq. (6), where the dependent variable, consumption volatility, can be expected to increase the variance of output or the business cycle. We will deal with these problems in the econometric analysis by instrumenting OPEN in eq. (4), FI in eq. (5) and the absolute percentage change of output in eq. (6). (We also ran tests without instrumenting and using lagged values instead.) Following, we will resort to single-equation GMM estimates of all three equations. This estimation method is efficient for arbitrary heteroskedasticity. (Specifically, we used the STATA routine ivreg2, owing to Baum et al. (2003).) That is the method's advantage over 2SLS. As regards the instruments, we will include the lagged value of the dependent variable in all 3 equations: specifically, the twice-lagged values in eqs. (4) and (5) and the once-lagged value in eq. (6) (where the first lag already refers to data two periods earlier). The country-specific gravity variables will suggest various instruments that can serve for OPEN in eq. (4). In the case of eq. (6), we will use rest-of-world output volatility as an instrument for output volatility. All the instruments (and the lag lengths) are listed in the notes to the tables. These include other lagged values besides the aforementioned one for the dependent variable.[4]

[4] Compare Aviat and Courdacier (2007) who estimated bilateral versions of eqs. (4) and (5) and who also consider cross-country holdings of claims a function of bilateral trade and bilateral trade a function of cross-country claims. They similarly use instruments to handle the resulting econometric issues (though they prefer 2SLS). Of course, the gravity variables that serve them as instruments for trade in the capital-market equation necessarily differ from ours, since these variables are necessarily bilateral ones: for example, distance rather than remoteness and common language rather than linguistic diversity.

It is important perhaps too to explain our preference for GMM-IV over 3SLS, since 3SLS is superior in taking into account the covariance matrix in the disturbances in the stochastic part of our model. We have two reasons for this preference. First, 3SLS would assume homoskedasticity (just as 2SLS does). Second, it would allow each equation to be affected by imprecision in the estimates of the other two. This last problem particularly impresses us. CV has no reciprocal effect on FI and OPEN in the structural part of our model. Therefore, we see no econometric ground for allowing errors in the estimates of FI and OPEN to affect the estimates of CV.[5]

In the subsequent presentation, we will report results for as large a set of country-year observations as we can for our three equations. The coverage is not identical mainly because of differences in the instruments in the three equations. For this reason, we also examined the outcome of limiting the dataset to a uniform set of country-year predicted outcomes. Regarding FI and OPEN, this cuts down the number of observations modestly whereas in the case of CV, it reduces the number of countries in the sample from 125 to 90 and curtails the number of predicted outcomes commensurably. For this reason, we shall present the results for CV (in an appendix). In the case of FI and OPEN, as we have implied, the results hardly change. In all our estimates, we correct the standard errors for clustering by country.

Finally, we need to say a word about our treatment of CU as an independent variable. As defined, CU varies over time with trade with currency union partners. Our model says that CU may affect aggregate trade. A fortiori, it may then affect bilateral trade with union partners. Consequently, CU may be endogenous. In response, we experimented with a constant value for CU by country for the positive values. We took this constant to be the average over the periods of consecutive positive values and zero for the rest of the time.[6] Regression results with the time-varying and time-constant versions of CU show that the two measures yield indistinguishable results in all three equations. Thus, the effect of our CU variable is entirely cross-sectional and not time-dependent in the estimates. Notwithstanding, we shall adopt the time-constant measure.[7] Finally, we found it useful to combine the use of CUE with a dummy variable for the EMU members for 1999, 2000, and 2001 in order better to distinguish the effect of EMU, which begins in 1999, from the effect of EU membership, which goes back earlier to 1993. (The dummy has no importance in any other connection.) It

[5] See also Hayashi (2000, pp. 273-274) for a detailed discussion of the advantages of single-equation GMM estimation.

[6] In principle, this measure may be oversimplified since it fails to take into account the possibility of widely different orders of magnitude for positive values at different times. But France is the only example of note. For this country, CU is small and positive prior to entry into EMU in 1999 and high afterwards. We therefore adopted two separate positive averages of CU for France: a small positive one before 1999 and a large positive one afterwards. Indeed we had no choice since a single average for France over the entire study period would have muddied our measure of CUE.

[7] In addition, we performed a χ^2 C-test (or difference-in-Sargan) to see whether the data supports the null hypothesis of the exogeneity of this variable. (See Hayashi (2000, p. 220) for the definition of the test statistic.) For all our basic equations, the constructed CU variable is exogenous in our model.

can also be argued that EMU only fully arrived with the arrival of the euro as a currency in 2002.

4. THE DATA

We start with a large panel of data for the period 1980-2006 covering as many as 180 countries for some series. The basic source of our data is the World Bank *World Development Indicators*. The relevant series for output, private and public consumption and exports and imports in this dataset are in US dollars at constant 1990 prices. We also employ the data on international financial integration in the LMF (2006) dataset. The authors provided us an updated version of their data going through 2007. All relevant variables in this database are calculated as ratios of GDP. The Beck et al (2009) database on financial structure gave us our different measures of domestic capital market development. As concerns restrictions on capital account, we choose the Chinn-Ito de jure index among the available measures (Chinn and Ito (2007)). The index is continuous and based on the information in the IMF *Annual Report on Exchange Arrangements and Exchange Restrictions.* Separate definitions and sources of the variables in the econometric analysis appear in Appendix A.

5. TEST RESULTS

Tables 1, 2 and 3 provide the results of our GMM-IV estimates for FI, OPEN and CV respectively. In each case, we also present an OLS estimate for comparison. The instruments for the different GMM estimates are the same per table. In general, the diagnostic tests for the validity and relevance of the instruments indicate that we do not face under-identification of our equations or suffer from weak instruments. As regards weak identification, we report the Wald F statistic for the first-stage regressions in all cases and we examined its value against those tabulated in Stock and Yogo (2005) (which we do not report) for different significance levels. There is never evidence of a problem.[8] The Sargan-Hansen J test of overidentifying restrictions serve us to evaluate the validity of our instrument set, i.e., whether the excluded instruments are independent of the error process. The results are reported in the tables, and the P-values indicate that we can never reject the null hypothesis. We turn to the estimates next.

[8] The results from the first-stage regressions are not reported but available from the authors upon request. The Wald F statistic is the Kleibergen-Paap (2006) 'rk' version and is robust in the presence of clustering, heteroskedasticity and autocorrelation.

a) Financial integration

As seen in column 1, Table 1, the positive influence of OPEN on FI comes out clearly. We use logs for both variables. Thus, the elasticity of influence is .65. This is a large effect, which we found to be persistent across different specifications. The next two influences in column 1 refer to the two indices of domestic credit development that consistently enter significantly in the many experiments that we made with the financial variables in the Beck et al (2009) database. One is the (log of) the ratio of liquid liabilities of the financial sector to GDP and the other is the (log of) the ratio of deposit money bank liabilities to total bank (including central bank) assets. The former enters with a positive sign; the latter with a negative one. Both signs agree with theory since, as we noted, lower costs of finance should promote foreign asset holdings while greater ability to borrow domestically should reduce foreign borrowing. In order to confirm both interpretations, we made separate experiments with gross foreign assets and gross foreign liabilities as the measure of FI instead of the average of the two. As expected, in the estimate for assets, the ratio of liquid liabilities to GDP enters still more significantly with the same sign while the second measure becomes insignificant. In the estimate for liabilities, the precise opposite happens.

Our two particular measures of domestic credit development also play a large role in other work of the main architects, Beck et al. (2009), who have experimented widely with them. Regarding the first measure – their favorite one of all – they say:

"Liquid liabilities to GDP is a traditional indicator of financial depth, already used by King and Levine in their seminal paper on finance and growth. It … is the broadest available indicator of financial intermediation, since it includes all banks, bank-like and non-bank financial institutions."

In the case of the second measure of domestic financial development, the authors say:

"Countries where deposit money banks have a larger role in financial intermediation than central banks can be considered as having higher levels of financial development. Both King and Levine (1993) and Beck, Levine, and Loayza (2000) show a positive relationship between Deposit Money vs. Central Bank Assets and economic growth."[9]

[9] Note that the coefficients of the two previous indicators of financial development are not directly comparable with one another even though both of them are ratios, since they have different denominators. In the first case the denominator is GDP and in the second it is total bank assets. If we set the averages of the two indicators the same (in the estimated form or in logs), so that they become of comparable dimension, the elasticity of influence of the first is about one and two-thirds times as large as the second. At .19, the first one's elasticity of influence is also much smaller than that of trade openness (.65). These last two figures are directly comparable since both variables are divided by GDP.

The next variable, a dummy for advanced countries, did not appear in our theoretical discussion, but LMF (2003, 2008) make a case for it and it plays a large role in the relevant literature, which often draws a sharp distinction between developed, emerging and poor countries in analyzing FI. KPT (2009) find this tripartite distinction to be important. In particular, advanced countries appear to have increased their foreign financial assets and liabilities more than the rest since the so-called globalization period began in the 1980s. As seen in column 1, in our study, ADVANCED yields nothing (the distinction between emerging and poor countries does not either). Yet if we restrict the sample to the more recent half of our study period, starting in 1992 (with predicted values starting in 1994), ADVANCED does become extremely significant, as we will see below. Therefore, in accordance with LMF (2008), a fundamental evolution seems to have taken place.[10]

The next three variables in column 1 are not measured in logs, like the preceding, but in original form. The first two display the positive effect of financial centers and freedom of capital movements on FI. As regards freedom of capital movements, as mentioned, we use the de jure measures of Chinn and Ito (2006), which are continuous and time-varying (and where higher values mean more freedom). Both variables enter highly significantly. The third of these variables is, of course, the one of particular interest here: it shows a highly significant effect of currency union. As this effect is a semi-elasticity, the elasticity of influence of CU on FI is the exponential of 1.31 minus one and is extremely high, around 2.7. It is interesting to compare this effect with those of Financial Center and the Chinn-Ito index. All three measures are semi-elasticities, but CU goes from zero to 1 (described as 0-1 in the tables), Financial Center is a binary 0,1 term, and the Chinn-Ito measure is a continuous one going from -1.8 to 2.6. If we correct for these differences in units, currency union and freedom of capital movements appear as having equivalent effects, while the influence of status as a financial center is a multiple of the other two. It is about 4 times larger (all in terms of semi-elasticities).[11]

The last two variables in Table 1 pertain to relative price risk. The estimate in column 1 confirms the theoretical implication that countries whose output is highly positively correlated with the rest of the world's have fewer opportunities for profitable risk diversification. The (log of the) correlation enters with the correct negative sign. This result follows after limiting the measure of correlations to values of .80 and higher, which essentially means omitting some tiny and exceptionally poor places, or war-torn countries of Africa, or, finally, the

[10] ADVANCED consists of the same 21 countries that KPT (2009) term 'industrial' plus Iceland, that is, Australia, Austria, Belgium/Luxembourg, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Spain, Switzerland, Sweden, the UK and the US. Note that if we use either output or output per capita, both of which are continuous variables, instead of the dummy ADVANCED to control for level of development, nothing significant ever emerges, even for the 1992-2006 period.

[11] In order to draw these comparisons, we add 1.8 to the Chinn-Ito measure to make it non-negative like the other two and then we compare the three coefficients at the means of the positive values (therefore for the respective averages of positive values for Chinn-Ito and CU and for 1 for Financial Center).

newborn market economies following the collapse of the Soviet Union (compare Bai and Zhang (2007) and Kehoe and Perri (2004)). By thus restricting the analysis to correlations of .8 or higher, we only lose around 80 observations (less than 5 percent). The last variable, real exchange rate volatility, also enters significantly with the right positive sign. We measure this volatility as the (log of the) absolute annual percentage change in the rate of exchange rate depreciation. But the same result holds if we measure it instead as the standard deviation of this rate of depreciation over the current and 2 or 4 previous years. We lagged the last 2 variables, relating to portfolio risk; this matters for volatility but not for the correlation coefficient which is just as significant without a lag.

Column 2 provides a pooled OLS estimate of the previous equation. The coefficient of openness drops from .65 to .53, which is just what we would expect from negative bias coming from the positive reverse effect of FI on OPEN. Otherwise, the results are much the same except that the coefficients are less precisely estimated on the whole.

The remaining three estimates in column 1 probe more deeply into the impact of CU. The next one, column 3, shows that the influence of CU on FI stems more clearly from the EMU members than the rest. Once we divide CU between EMU members and the rest, the precision of the estimate of CU for the EMU members, CUE, doubles while the estimate for the rest, CUX, drops and remains barely significant at the 10% level. This suggests that the deeper monetary integration in EMU is important and leads to a larger, better defined positive effect. But the interpretation needs corroboration. With the Maastricht Treaty of 1993 and the arrival of EU, the earlier provisions of the Single Market Act of 1987 calling for more capital market integration (more factor mobility, the right of establishment and the absence of capital controls) became more firmly founded in law. This could then be the crux of the matter.

To investigate, we constructed an EU variable exactly on the same lines as the CU one: that is, based on the percentage of trade of members of the EU with the rest relative to total trade with everyone. We then introduced this next variable after the same use of averages as before for CU in order to mitigate the problem of endogeneity. The results are in column 4. The impact of CUE drops but it remains high and very significant while CUX is not affected. This last result agrees with Kalemli-Ozcan et al. (2010), who similarly test the importance of EMU rather than EU membership in promoting capital market integration (based on bilateral evidence). If we base ourselves on the estimates of the influence of currency union in the previous column, 4, rather than column 1, as we are prone to do, the right single-value coefficient is around 1 rather than 1.31 (column 1) and the elasticity of influence of CU on FI is closer to 1.8, which is still high though lower than before (when it was around 2.7). This unitary coefficient also corresponds to a semi-elasticity of influence only around one-fifth as high as that of status as a financial center and about 10% lower than that of freedom of capital movements.

The last estimate shows what happens if we limit the study period to 1992-2006. For this sub-period, experiments show that CUE and EU cannot enter together and we retained CUE, the

more important of the two both in size of influence and statistical significance. A number of the coefficients are notably affected. But the only significant influence that disappears is that of volatility of the real exchange rate. Further, as presaged, ADVANCED becomes highly significant. Of considerable note, the influence of CUE is unaffected.

b. Trade openness

Consider next the estimates of OPEN in eq. (5) in Table 2. In this case, we lag all of the financial stock variables since they are end-of-period values, and by lagging them one period, we effectively use beginning-of-period values, or more exactly in the case of FI and the liquid-liabilities indicator of DC, a beginning-of-period one divided by previous-year GDP.

As seen, FI shows up with a significant positive effect on OPEN. Its coefficient is less than half as high as the one for the reverse effect of OPEN on FI in eq. (4). This weaker effect of FI on OPEN than OPEN on FI accords with our theoretical discussion. It also agrees with Aviat and Coeurdacier (2007), in whose work the issue of the size and relative order of the two influences looms large. Of the two indices of domestic credit development only the ratio of private bank deposits to total bank assets continues to enter significantly as it did in the FI equation. Of note, though lowering foreign borrowing, this last ratio boosts foreign trade, in accordance with theory. The next variable, output, has a familiar place in trade equations. Therefore, we substitute it for ADVANCED (the two clearly interfere with one another). Suppose we temporarily ignore FI and the two credit market variables. In this case, eq. (5) corresponds to a country-specific version of the gravity model (or a version dealing strictly with the issue of domestic relative to foreign trade) where the theoretical proposition of a unitary elasticity of influence of home output on aggregate trade (in levels) is simply imposed. Adding home output in the equation can therefore be seen as a way to test the hypothesis of the unitary elasticity of influence.[12] When the test is performed, output emerges as insignificant at conventional levels (with a coefficient that would signify little deviation from unitary elasticity in any event). We lagged output like the two financial variables for no fundamental reason; this makes no difference.

As regards the gravity variables, remoteness, landlocked, island and quality of infrastructure do not enter significantly and only (log of) land area, literacy and linguistic diversity do so. All three enter with the right theoretical signs. Land area reflects internal distance and should reduce foreign trade. Literacy should promote foreign trade by increasing the ability to cope with the special linguistic problems associated with this sort of trade, including translation. Linguistic diversity, in turn, should increase foreign trade by reducing the ability to avoid linguistic problems by trading at home. The last variable may also be correlated with large

[12] As a subordinate point, the output variable should then be understood to stand partly for rest-of-world output in the context of the gravity model, since the time-specific effects reflecting world output, among other things, are the same for everyone in the equation and only the output variable reflects the small international differences in rest-of-world output.

immigrant communities, who would be more prone to trade abroad. The only insignificant gravity variable that we retain in the equation is (log of) population, which enters with the right negative sign. Larger population size implies wider opportunities to trade at home and avoid the costs of foreign trade. Though this last variable is insignificant, it is only so because of the presence of output in the equation. If output is removed, the negative coefficient of population becomes large and highly significant (as we do not show).

The next result of column 1 in Table 2 says that currency union has no direct effect at all on trade openness. This result holds for CUE as well as CUX. Theory led us to expect a significant positive sign. In fact, there is a positive effect of CU on trade in the model as a whole, but it comes exclusively through the influence of CU on FI, which in turn affects OPEN. Based on column 4 of Table 1 together with column 1 of Table 2, the elasticity of influence of membership in the EMU on OPEN via FI is about .50 ($\exp(1.02)-1 \times .28 \cong .50$). This estimate is also statistically highly significant. Thus, widening membership in EMU sufficiently to increase trade with other members by one percent relative to total trade will raise openness in the membership by half of one percent. In this respect, our results agree with the Rose literature. Of course, Rose's famous conclusion that CU creates trade relates strictly to bilateral trade within the membership. Still, following him, experiments with the impact of currency union on trade with third-countries, based on his measure, have always shown a positive effect of currency union on outsiders too (see, for example, Micco et al. (2003) as well as Rose (2000), table 5c). Thus, the assertion of basic agreement with the Rose literature is reasonable.

Still, there are two qualifications. First, the positive effect of currency union on openness only emerges plainly for the EMU (for CUE) and therefore for the wider degree of monetary integration that this system entails. Second and perhaps more significantly, this positive effect comes exclusively via capital markets or through international portfolio diversification and not via the channels that are usually taken for granted (without particular investigation) in the Rose literature: namely, reductions in trade frictions and increases in price transparency and competition in goods markets.

The next estimate, column 2, offers a pooled OLS estimate of the estimate in column 1. The results are little different except that the influence of literacy is no longer visible. In addition, the coefficient of FI is unaffected, contrary to the expectation that it would drop because of simultaneity bias.

In the last column of Table 2, we repeat the estimate in column 1 over 1992-2005 alone. It now appears that the influence of output on trade is less than unitary. Otherwise little change of any note takes place.

c. Consumption smoothing

We come to the most important part of our empirical results, concerning consumption smoothing. Let us note at the start that we made some experiments with several more sophisticated formulations than eq. (6). Transitory movements in output should disturb consumption less than permanent ones, since it should be possible to smooth their effects on consumption through borrowing whereas it should not be possible to do the same for permanent movements (see inter alia, Asdrubali et al. (1996) and prominently in more recent work, Artis and Hoffman (2008)). Therefore we tried distinguishing permanent and transitory movements of output. The permanent and transitory movements do prove separately significant and of the right relative order but the difference between the estimates of the two is not significant. Therefore we neglect the point. Next, we tried either adding cross-product terms for FI and DC and output volatility or substituting such product terms for FI and the two indicators of DC in eq. (6), on the principle, based on eq. (3), that both financial variables' effects on CV should be conditional on the business cycle. (In these experiments we instrumented output volatility in the same way as in the rest of the estimates of CV.) However, the results do not support the hypothesis; that is, to be more precise, they do not support it any more than the simplified formulation in eq. (6). Furthermore, using the product terms does not alter the rest of the CV equation. Therefore, we report strictly on the simplified eq. (6).

OPEN, FI and CD appear in this equation with a one-year lag. Besides these variables, some reflection of the effect of government financing on the budget constraint of individuals is important, as we have argued. Of the available series, the most appropriate one would seem to be the ratio of tax revenues to GDP. However, the series for this ratio in the World Bank database shortened in recent years and only begins mostly since 1995 and often only since 2000, whereas when Henisz (2004) made his broad international study of policy volatility not so long ago the same database permitted him to begin as far back as 1971. To the best of our ability to determine why, the answer lies in a switch of series for government finance from a cash basis to an accruals basis, beginning in the middle nineties in some countries, in the early 2000s in others, and still to come in the rest. On the other hand, the series for government consumption as a percentage of GDP remains unbroken. Further, for the limited period where we were able to use both series, the two give corresponding results and, if combined, clearly interfere with one another. Therefore, we performed most of our experiments with the government consumption series and will report strictly on those experiments.[13]

[13] Fatas and Mihov (2008) also argue for favoring the government consumption measure to the one for total government revenues (or for government expenditures) in a broad international study of government influence, perhaps more strongly than we do. They maintain that the government consumption series are more comparable internationally and less subject to breaks and definitional changes (for periods where both series exist). Of interest too, in his early attempt to test the theoretical implication of perfect risk sharing by examining the extent to which domestic private consumption can be explained by aggregate world consumption and is independent of idiosyncratic movement of home output, Obstfeld (1994) argued for removing government consumption entirely from output, as well as private and public investment, on the grounds that consumers can only share risks of output changes for the remainder through

Further, we experimented with volatility of relative price movements, including those for nominal and real exchange rates, as theory would require. The only movements that gave any significant results are those concerning the absolute percentage changes in the price of consumption (CPI) relative to the price of GDP. Our negative results with real exchange rates compare well with Ravn (2001) and Kollmann (2009). The movement in the relative price of consumption goods and the rest is then the only one that we report in Table 3. In addition, we made many experiments with other reflections of economic activity and with demographic variables but all of them proved nugatory. We tried movements in ratios of employment to labor, labor force participation rates, sex ratios in the labor force, and ratios of population 0 to 14 and 65 and over to total population. None of these variables emerged as significant. All our measures of volatilities in the CV equation are absolute percentage changes from one year to the next, like CV.

In our estimates in Table 3, we begin without introducing CU. Column 1 shows that a one percent movement in output results in about a 0.68 of one percent movement in consumption. This would imply that .32 of the output movement has no repercussion on consumption, and is certainly consistent with some major smoothing of output shocks. We will come back to this point. Next, our estimate identifies two other sources of consumption volatility. One is the movement in the ratio of government consumption to GDP. A one percent movement in this ratio will produce a movement in consumption of .17 of one percent. The other influence is the movement of the ratio of the consumption price to the production price (lagged). A one percent movement in this next ratio will raise CS by about the same.

Very significantly, the level of international financial diversification, FI, has no discernible tendency to stabilize consumption at all, and OPEN has the opposite one of destabilizing it. One percent of extra trade openness (lagged) increases CV by .007 of one percent. In addition, both of our indices of financial development are totally insignificant. Status as an advanced country arguably has some positive effect on consumption smoothing (a negative effect on CV) but below conventional significance levels (at 13%).

Next, we introduce CUE, the indicator of EMU, and CUX, the indicator of other currency unions. As seen in column 2, CUE emerges as significant with a negative sign, implying a stabilizing effect. The elasticity of influence is small, about .02, but the effect is robust, as earlier trials before arriving at column 1 (ignoring some influences, adding others or using alternative measures of influences) permitted us to see.

The following estimate, column 3, is a pooled OLS one of the preceding. The coefficient of output volatility goes down to .48, in line with expectations since we no longer correct for the

portfolio diversification. Corcoran (2007) adopts Obstfeld's view. This would certainly argue for paying attention to government consumption in the analysis.

positive reciprocal effect of consumption volatility on output volatility. Otherwise, little changes except that the influence of CUE rises perceptibly and becomes more significant while the influence of the volatility of the price of consumption relative to the price of output disappears.

The next three estimates probe more deeply. In column 4, we add the index of the EU. Now CUE becomes totally insignificant, just like CUX, while EU appears as significant instead. Everything else is the same as in column 2. However, this dominance of EU over CUE may stem entirely from the pre-1999 period, when EMU had not yet appeared (whereas in the period since EMU appeared the two influences merge). To investigate this matter, we break up EU into two parts, before and after 1999 (using separate averages of bilateral trade relative to total trade in the two sub-periods for the two measures), and we successively combine pre-1999 EU with either post-1999 EU or CUE in the next two columns. As we see from column 5, in the first experiment EU is fairly equally significant pre- and post-1999. However, in column 6, where EMU (CUE) enters instead of post-1999 EU the impact of CUE is more marked than that of post-1999 EU in the preceding column. In addition, this impact of CUE is stronger and better estimated than that of EU pre-1999. Thus, the comparison favors EMU over post-1999 EU. We made a number of experiments with changes in the instruments in columns (5) and (6) to check the robustness of this result and can report that the influence of CUE is indeed far more reliable than that of either EU pre- or post-1999. As a result, we favor the estimate in column (6). Thus, while the EU may have promoted consumption smoothing prior to EMU, EMU bolstered this influence.

A couple of further robustness tests will close the analysis. In column 7, we repeat the estimate in column 6 for 1992-2006. There is remarkably little change though the significance of both EMU and EU membership drops mildly and the latter only remains significant at the .102 level. The last robustness test repeats all of the previous estimates of CV in table 3 for the smaller dataset yielding predicted values for a common set of country/years (that is, a common one over all three equations). As mentioned earlier, the number of countries for which we have CV estimates in this case falls from 125 to 90. The predicted values also drop from 2248 to 1598. The results are in Appendix B. The estimates agree with the earlier ones rather well.

6. DISCUSSION AND CONCLUSION

We have investigated the impact of EMU on consumption smoothing. We can confirm the impact of EMU on international portfolio diversification that other researchers have shown, perhaps more generally. Earlier work often distinguished between international portfolio allocations in equities, bonds and bank loans, and between the structure of capital flows in these various forms to different destinations. There are many good reasons for this, which we will not rehearse. However, from our perspective, it is reasonable to focus on the effect of

EMU on aggregate international portfolio allocation (even if composition matters). Theory does not yield implications about consumption smoothing from risk sharing via any particular form of contractual obligation or with respect to any particular sub-group of foreigners in the absence of strong assumptions about risk sharing in the form of other contractual obligations or with other parties. Thus, we have taken an aggregate approach, just as similar concern with consumption smoothing recently led Heathcote and Perri (2008) to do the same. Accordingly, we emphasize that EMU has increased members' aggregate holdings of foreign assets and liabilities of all kinds, inclusive of equity, bonds, bank credit, financial derivatives, FDI and foreign reserves. We also find that the impact of EMU on this aggregate explains the similar impact of EMU on trade openness. This has some important implications for the Rose literature, which may sometimes give the impression that the impact of EMU on trade openness stems from reductions in trade frictions and trade risks. According to our results, the influence does not come this way but instead via capital markets. EMU fosters the holding of foreign assets and liabilities and this in turn generates trade.[14]

Notwithstanding, we find no resulting tendency to stabilize consumption. Still, EMU membership does tend to stabilize consumption but does so through a separate channel. The effect is moderate but clear. This other channel cannot be the Cole-Obstfeld one, concerning real exchange rates, since we control for it in our tests. Nor could it be a related one, concerning the price of consumption goods relative to other goods, for which we control too. Thus, we attribute the effect on consumption smoothing to an increase in the tradability of goods or a shift from non-traded to traded goods. EU membership could have facilitated the acquisition of credit and insurance at home and increased the tradability of home capital (including the human form) through more foreign price competition, more contestable home markets and greater harmonization of regulations. The surveys by Baele et al. (2004) and Jappelli and Pagano (2008) point in the indicated direction. Both surveys focus mainly on international correlations between prices and tendencies toward the law of one price. Any tendency toward greater competition in price setting and toward greater price uniformity, affecting physical capital in less liquid forms and human capital, could promote consumption smoothing by improving the tradability of capital and do so apart from any international portfolio diversification or trade in goods. This tendency might also come partly from EU membership independently of EMU while EMU only adds to it. Our results invite such an interpretation.

Though our finding that capital market integration fails to enhance consumption smoothing agrees with much previous work, it does not concur with one important branch of the literature, which focuses on collective risk sharing of asymmetric output shocks. Let us return to the conflict with this literature. Our best estimate of the impact of output volatility on consumption volatility is around .65. This estimate pertains essentially to idiosyncratic or country-specific output movements since we control for common output movements in our tests by using time-specific effects. Suppose we place this estimate in the context of the

[14] Obviously, the strict application of this result to bilateral trade would need separate investigation.

conflicting literature. Then the conclusion would be that about 35 percent of the idiosyncratic output shocks are smoothed. The rest of the analysis in this other literature would then consist of decomposing the smoothed fraction of the output shocks between different channels, one of which would be cross-country holdings of assets and liabilities. Instead, we follow a different route. We directly investigate the degree to which cross-country holdings of assets and liabilities stabilize domestic consumption. It is then clear that we can get different – even opposite – results. International portfolio diversification affects the dynamics of price and wealth movements and the international correlations between investment yields and thereby may alter the responses of consumption to all shocks, not only asymmetric supply ones. As an important example, the portfolio diversification might destabilize consumption in response to asset-price shocks. Our procedure would pick this up; the other approach would not.

In closing, perhaps we should emphasize the methodological aspect of our work. Our study period saw a surge in capital market integration in the world along with considerable financial deregulation in the U.S. and Western Europe. Maybe the same conclusions will not hold up in a different international environment. In the present state of the art it is difficult to know how to deal with this sort of question. However, without retreating from our results and our analysis, we believe to have shown the merits of focusing directly on consumption smoothing as such and that failure to do so may mean over-emphasizing some avenues of influence of various political arrangements, including EMU, on consumption smoothing and ignoring others.

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TABLE 1: Financial Integration (log)

	GMM-IV (1)	POOLED OLS (2)	GMM-IV (3)	GMM-IV (4)	GMM-IV (5) 1992-2006
OPEN : Trade Openness (log)	0.651***	0.533***	0.649***	0.637***	0.601***
	(0.07)	(0.08)	(0.07)	(0.07)	(0.07)
Liquid Liabilities / GDP (log)	0.191***	0.151**	0.189***	0.195***	0.1094*
	(0.06)	(0.071)	(0.057)	(0.06)	(0.0636)
Deposits / Total Bank (incl.	-0.408***	-0.366***	-0.405***	-0.399***	-0.180***
Central Bank) Assets (log)	(0.07)	(0.08)	(0.07)	(0.07)	(0.053)
ADVANCED (0, 1)	0.057	0.027	0.056	0.016	.361***
	(0.09)	(0.11)	(0.09)	(0.09)	(0.094)
Financial Center (0, 1)	0.985***	1.040***	0.988***	0.945***	1.101***
	(0.18)	(0.16)	(0.18)	(0.18)	(0.10)
Chinn-Ito Index	0.111***	0.103***	0.108***	0.107***	0.176***
	(0.026)	(0.03)	(0.025)	(0.025)	(0.025)
CU: Currency Union (0-1)	1.31***	1.276***			
	(0.27)	(0.32)			
CUE: EMU (0-1)			1.340***	1.023***	1.060***
			(0.12)	(0.15)	(0.126)
CUX: CU outside EMU (0-1)			1.053*	1.060*	0.889*
			(0.63)	(0.64)	(0.535)
Maastricht Treaty (0-1)				0.358***	
				(0.13)	
Correlation of home output	-2.95***	-2.373***	-2.940***	-2.986***	-3.822***
with ROW (.8-1) (log, lagged)	(0.74)	(0.947)	(0.74)	(0.735)	(0.873)
Absolute value of exchange	0.0136*	0.010	0.0134*	0.0128*	0.0045
rate depreciation (log, lagged)	(0.0077)	(0.009)	(0.0077)	(0.0077)	(0.10)
Observations	1783	1975	1783	1783	981
Number of Countries	91	101	91	91	91
Time dummy	Yes	Yes	Yes	Yes	Yes
Wald F-statistic (first-stage regression)	2621.87		2750.52	2777.39	1308.22
Sargan-Hansen J Statistic	14.4		14.3	14.57	12.09
(p-value)	(0.21)		(0.22)	(0.20)	(0.36)

Notes: The dependent variable is the measure of financial integration in LML (2007) and is computed from total assets and liabilities available in their study. The standard errors, reported in parentheses, are corrected for clusters across country observations, and robust to heteroskedasticity. GMM-IV is the generalized method of moments estimator. The instruments for OPEN are twice-lagged values of OPEN, once- and twice-lagged values of liquid liabilities and bank deposits ratios, lagged values of population, and remoteness, land area, landlocked, island, literacy and linguistic diversity. The Wald F statistic, from the first-stage regression, is a test of weak identification, and the tabulated values in Stock and Yogo (2005) (not shown) indicate the different significant levels. The Sargan-Hansen test is a test of over-identifying restrictions. Under the null, the test statistic is distributed as chi-square. P-values are reported in the parentheses. The asterisks ***, **, and * indicate that the coefficient is statistically different from zero respectively at the 1% , 5%, and 10% level of significance.

TABLE 2: Trade Openness (log)

	GMM-IV (1)	POOLED OLS (2)	GMM-IV (3) 1992-2006
FI : Financial Integration (log, lagged)	0.277***	0.277***	0.223***
	(0.06)	(0.06)	(0.07)
Liquid Liabilities/GDP (log, lagged)	-0.011	0.099	0.017
	(0.07)	(0.09)	(0.08)
Deposits /Total Bank (incl. Central Bank) Money Assets (log, lagged)	0.431***	0.386***	0.417***
	(0.06)	(0.10)	(0.09)
Output (log, lagged)	-0.054	-0.055	-0.083***
	(0.035)	(0.06)	(0.03)
Population (log, lagged)	-0.053	-0.085	-0.036
	(0.04)	(0.06)	(0.04)
Area (log)	-0.087***	-0.061*	-0.078***
	(0.02)	(0.031)	(0.03)
Literacy rate (0-1)	0.573**	0.453	0.908***
	(0.24)	(0.39)	(0.24)
Language diversity (0-1)	0.185*	0.252*	0.281**
	(0.109)	(0.15)	(0.12)
CUE: EMU (0-1)	-0.229	-0.088	-0.096
	(0.17)	(0.20)	(0.18)
CUX : CU outside EMU (0-1)	-0.025	-0.060	-0.063
	(0.37)	(0.37)	(0.48)
Observations	1836	2241	1082
Number of Countries	93	101	93
Time dummy	Yes	Yes	Yes
R-squared		0.54	
Wald F statistic first-stage regression	1107.80		941.14
Sargan-Hansen J Statistic	11.28		8.39
(p-value)	(0.26)		(0.50)

Notes: The dependent variable is trade openness as measured by the average of the ratio of exports and imports to GDP. The standard errors, reported in parentheses, are corrected for clusters across country observations, and robust to heteroskedasticity. GMM-IV is the generalized method of moments estimator. The instruments for (lagged) FI are twice-lagged values of FI, twice- and thrice-lagged values of liquid liabilities and bank deposits ratios, lagged values of output correlations and the Chinn-Ito index, and remoteness, landlocked and island. The Wald F statistic, from the first-stage regression, is a test of weak identification, and the tabulated values in Stock and Yogo (2005) (not shown) indicate the different significant levels. The Sargan-Hansen test is a test of over-identifying restrictions. Under the null, the test statistic is distributed as chi-square. P-values are reported in the parentheses. The asterisks ***, **, and * indicate that the coefficient is statistically different from zero respectively at the 1% , 5%, and 10% level of significance.

TABLE 3: Consumption Smoothing

	GMM-IV (1)	GMM-IV (2)	Pooled OLS (3)	GMM-IV (4)
Output Volatility	0.681***	0.657***	0.480***	0.659***
	(0.08)	(0.08)	(0.09)	(0.08)
OPEN: Trade Openness (log, lagged)	0.007***	0.007***	0.0076**	0.007***
	(0.0021)	(0.0021)	(0.0029)	(0.0021)
FI: Financial Integration (log, lagged)	0.000	0.001	0.002	0.001
	(0.003)	(0.002)	(0.003)	(0.003)
Liquid Liabilities/GDP (log, lagged)	-0.001	-0.001	-0.002	-0.001
	(0.002)	(0.002)	(0.003)	(0.002)
Deposits to Total Bank (incl. Central Bank) Assets (log, lagged)	-0.003	-0.004	-0.007	-0.004
	(0.006)	(0.01)	(0.008)	(0.006)
ADVANCED (0, 1)	-0.0051	-0.0041	-0.004	-0.002
	(0.0034)	(0.0033)	(0.004)	(0.003)
Volatility of Government Consumption	0.172***	0.174***	0.198***	0.174***
	(0.03)	(0.03)	(0.06)	(0.03)
Volatility of the ratio of CPI to GDP deflator (lagged)	0.162**	0.162**	0.151	0.162**
	(0.064)	(0.0643)	(0.126)	(0.064)
CUE: EMU (0-1)		-0.0229***	-0.031***	-0.0129
		(0.007)	(0.008)	(0.009)
CUX: CU outside EMU (0-1)		0.0173	0.011	0.017
		(0.023)	(0.023)	(0.02)
Maastricht Treaty (0-1)				-0.0125**
				(0.0058)
Observations	2248	2248	2397	2248
Number of Countries	125	125	125	125
Time dummy	Yes	Yes	Yes	Yes
R-squared			0.27	
Wald F statistic first-stage regression	37.56	36.73		36.29
Sargan-Hansen J Statistic	6.57	6.80		6.89
(p-value)	(0.25)	(0.24)		(0.23)

Notes: The dependent variable is the absolute value of the % change in private consumption since the previous year. The standard errors, reported in parenthesis, are corrected for clusters across country observations, and robust to heteroskedasticity. GMM-IV is the generalized method of moments estimator. The instruments for output volatility (the absolute value of the % change in output since the previous year) are rest-of-world output volatility, lagged output volatility, twice-lagged values of liquid liabilities and bank deposit ratios, and twice-lagged values of volatilities of, both, government consumption-GDP ratios and the absolute value of GDP price inflation. The Wald F statistic, from the first-stage regression, is a test of weak identification, and the tabulated values in Stock and Yogo (2005) (not shown) indicate the different significant levels. The Sargan-Hansen test is a test of over-identifying restrictions. Under the null, the test statistic is distributed as chi-square. P-values are reported in the parentheses. The asterisks ***, **, and * indicate that the coefficient is statistically different from zero respectively at the 1% , 5%, and 10% level of significance.

TABLE 3 (CONTINUED): Consumption Smoothing

	GMM-IV (5)	GMM-IV (6)	GMM-IV (7) 1992-2006
Output Volatility	0.663***	0.659***	0.599***
	(0.08)	(0.08)	(0.10)
OPEN: Trade Openness (log, lagged)	0.007***	0.007***	0.0066**
	(0.002)	(0.002)	(0.0028)
FI: Financial Integration (log, lagged)	0.001	0.001	-0.001
	(0.002)	(0.003)	(0.003)
Liquid Liabilities/GDP (log, lagged)	-0.001	-0.001	-0.004
	(0.002)	(0.002)	(0.003)
Deposits to Total Bank (incl. Central Bank) Assets (log, lagged)	-0.004	-0.0038	-0.001
	(0.006)	(0.006)	(0.01)
ADVANCED (0, 1)	-0.0025	-0.0028	-0.0013
	(0.003)	(0.003)	(0.004)
Volatility of Government Consumption+	0.173***	0.173***	0.153***
	(0.03)	(0.03)	(0.03)
Volatility of the ratio of CPI to GDP deflator (lagged)+	0.162**	0.162**	0.220***
	(0.064)	(0.064)	(0.06)
CUE: EMU (0-1)		-0.025***	-0.024***
		(0.008)	(0.009)
CUX: CU outside EMU (0-1)	0.016	0.017	0.005
	(0.02)	(0.02)	(0.03)
Maastricht Treaty (0-1)			
Maastricht Treaty: Pre-1999 (0-1)	-0.0117**	-0.011**	-0.010*
	(0.0058)	(0.005)	(0.0059)
Maastricht Treaty: Post-1999 (0-1)	-0.0184**		
	(0.0071)		
Observations	2248	2248	1398
Number of Countries	125	125	125
Time dummy	Yes	Yes	Yes
Wald F statistic first-stage regression	36.87	36.36	47.06
Sargan-Hansen J Statistic (p-value)	6.94	6.82	7.96
	(0.23)	(0.24)	(0.16)

APPENDIX A: DATA DESCRIPTION

TABLE A1 Variable Definitions

	Definitions and Sources
Trade openness	The average of export and import to GDP ratios. Source: WDI
Financial Integration	The average of total assets and total liabilities to GDP ratios. Source: Lane and Milesi Ferretti (2006) and update from the authors.
Liquid Liabilities/GDP	Liquid liabilities to GDP ratio. Source: Beck et al (2009)
Deposits to Total (including Central Bank) Bank Assets	Ratio of deposit money bank claims on domestic nonfinancial real sector to the sum of deposit money bank and Central Bank claims on domestic nonfinancial real sector. Source: Beck et al (2009)
Consumption smoothing	The absolute value of % change in household consumption expenditure. Source: WDI (2008)
Volatility of government consumption	The absolute value of % change in government consumption to GDP. Source: WDI (2008)
Volatility of the ratio of CPI to GDP deflator	The absolute value of % change in the ratio of CPI to GDP deflator. Source: WDI (2008)
Volatility of output	The absolute value of % change in GDP at constant US 1990 prices. Source WDI (2008)
Currency Union	Trade with countries sharing the same currency relative to total trade. Sources: for trade, UN Direction of Trade Stats and WDI (2008); for currency unions, Glick and Rose (2002), updated with IMF International Financial Statistics.
CUE or EMU	Trade with other EMU members relative to total trade. Source: UN Direction of Trade Stats and WDI (2008).
CUX or Currency Union outside EMU	Trade with other countries sharing the same currency relative to total trade whenever the currency is not the euro. Source: UN Direction of Trade Stats and WDI (2008)
Maastricht Treaty	Trade with other signatories of the Maastricht treaty relative to total trade. Source: UN Direction of Trade Stats and WDI (2008)
Volatility of the real exchange rate	The absolute value of the % change in the real exchange rate. Source IFS and Penn World Tables 6.2 data
Financial Center	Lane and Milesi Ferretti (2006)
Chinn-Ito Index	De jure measure (continuous). Source: Chinn and Ito (2007)
Area	Source: CIA world factbook.
Literacy Rate	Source: CIA world factbook.
Language diversity	Source: Grimes (2000)
Population	Source: WDI (2008)

APPENDIX B: CONSUMPTION SMOOTHING FOR UNIFORM COUNTRY/YEARS

Table B1

	GMM-IV (1)	GMM-IV (2)	Pooled OLS (3)	GMM-IV (4)
Output Volatility	0.582***	0.569***	0.567***	0.578***
	(0.10)	(0.10)	(0.11)	(0.10)
OPEN: Trade Openness (log,	0.011**	0.010**	0.0148*	0.011**
lagged)	(0.0046)	(0.0045)	(0.008)	(0.0044)
FI: Financial Integration (log,	-0.004	-0.004	-0.004	-0.004
lagged)	(0.003)	(0.003)	(0.004)	(0.003)
Liquid Liabilities/GDP (log,	-0.001	-0.001	-0.003	-0.001
lagged)	(0.003)	(0.003)	(0.004)	(0.003)
Deposits to Total Bank Assets	-0.001	-0.001	-0.001	-0.001
(log, lagged)	(0.004)	(0.005)	(0.008)	(0.005)
ADVANCED (0, 1)	-0.0045	-0.003	0.001	-0.001
	(0.0033)	(0.0034)	(0.006)	(0.004)
Volatility of Government	0.200***	0.198***	0.263***	0.198***
Consumption	(0.04)	(0.04)	(0.095)	(0.04)
Volatility of the ratio of CPI to	0.154**	0.155**	0.183	0.155**
GDP deflator (lagged)	(0.067)	(0.067)	(0.157)	(0.067)
CUE: EMU (0-1)		-0.0174**	-0.022**	-0.009
		(0.008)	(0.01)	(0.010)
CUX: CU outside EMU (0-1)		0.009	0.003	0.009
		(0.028)	(0.034)	(0.03)
Maastricht Treaty (0-1)				-0.009**
				(0.0044)
Observations	1598	1598	1706	1598
Number of Countries	90	90	91	90
Time dummy	Yes	Yes	Yes	Yes
R-squared			0.27	
Wald F statistic first-stage regression	16.21	16.20		16.22
Sargan-Hansen J Statistic	5.45	5.57		5.52
(p-value)	(0.49)	(0.47)		(0.48)

Notes: The dependent variable is the absolute value of the % change in private consumption since the previous year. The standard errors, reported in parenthesis, are corrected for clusters across country observations, and robust to heteroskedasticity. GMM-IV is the generalized method of moments estimator. The instruments for output volatility (the absolute value of the % change in output since the previous year) are rest-of-world output volatility, lagged and twice-lagged output volatility, twice-lagged values of liquid liabilities and bank deposit ratios, and twice-lagged values of volatilities of, both, government consumption-GDP ratios and the absolute value of GDP price inflation. The Wald F statistic, from the first-stage regression, is a test of weak identification, and the tabulated values in Stock and Yogo (2005) (not shown) indicate the different significant levels. The Sargan-Hansen test is a test of over-identifying restrictions. Under the null, the test statistic is distributed as chi-square. P-values are reported in the parentheses. The asterisks ***, **, and * indicate that the coefficient is statistically different from zero respectively at the 1% , 5%, and 10% level of significance.

TABLE B1 (CONTINUED)

	GMM-IV (5)	GMM-IV (6)	GMM-IV (7) 1992-2006
Output Volatility^{+}	0.581***	0.574***	0.470***
	(0.10)	(0.10)	(0.153)
OPEN: Trade Openness (log, lagged)	0.011**	0.011**	0.012*
	(0.0045)	(0.0045)	(0.006)
FI: Financial Integration (log, lagged)	-0.004	-0.004	-0.005
	(0.003)	(0.003)	(0.004)
Liquid Liabilities/GDP (log, lagged)	-0.001	-0.001	-0.004
	(0.003)	(0.003)	(0.004)
Deposits to Total Bank (incl. Central Bank) Assets (log, lagged)	-0.001	-0.001	-0.003
	(0.005)	(0.005)	(0.005)
ADVANCED (0, 1)	-0.0012	-0.002	0.0019
	(0.0035)	(0.004)	(0.005)
Volatility of Government Consumption	0.198***	0.198***	0.183***
	(0.03)	(0.04)	(0.04)
Volatility of the ratio of CPI to GDP deflator (lagged)	0.156**	0.155**	0.151**
	(0.067)	(0.084)	(0.076)
CUE: EMU (0-1)		-0.019**	-0.022**
		(0.0083)	(0.0095)
CUX: CU outside EMU (0-1)	0.009	0.0095	0.0042
	(0.03)	(0.03)	(0.04)
Maastricht Treaty (0-1)			
Maastricht Treaty: Pre-1999 (0-1)	-0.010**	-0.0092*	-0.0181***
	(0.005)	(0.0049)	(0.0062)
Maastricht Treaty: Post-1999 (0-1)	-0.0142**		
	(0.006)		
Observations	1598	1598	946
Number of Countries	90	90	90
Time dummy	Yes	Yes	Yes
Wald F statistic first-stage regression	16.25	16.20	16.95
Sargan-Hansen J Statistic (p-value)	5.51	5.53	6.19
	(0.48)	(0.48)	(0.40)

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