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The Re-Emerging Privilege of Euro Area Membership

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The Re-Emerging Privilege of Euro Area Membership

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Abstract

When the euro was introduced in 1998, one objective was to create an alternative global reserve currency that would grant benefits to euro area countries similar to the U.S. dollar's "exorbitant privliege": i.e., a boost to the perceived quality of euro denominated assets that would increase demand for such assets and reduce euro area members' funding costs. This paper uses risk perceptions as revelaed in investor surveys to extract a measure of privilege asscociated with euro membership, and traces its evolution over time. It finds that in the 2000s, euro area assets benefited indeed from a significant perceptions premium. While this premium disappeared in the wake of the euro crisis, it has recently returned, although at a reduced size. The paper also produces time-varying estimates of the weights that investors place on macro-economic fundmentals in their assessments of country risk. It finds that the weights of public debt, the current account and real growth increased considerably during the euro crisis, and that these shifts have remained in place even after the immediate financial stress subsided.

JEL Classification Numbers: E42, F45

Keywords: euro, euro area, euro crisis, exorbitant privlege, investor perceptions

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I. INTRODUCTION AND OVERVIEW

When the euro was introduced in 1998, one objective was to create an alternative reserve currency that could rival the U.S. dollar and grant benefits to euro area members similar to those the U.S. dollar is often credited with providing to the U.S. economy—famously referred to as "America's exorbitant privilege" by France's former President Giscard d'Estaing (Eichengreen, 2011): a boost to the perceived quality of euro denominated assets that would increase demand for such assets and reduce funding costs of euro area debtors.

Convergence of sovereign bond rates to low levels in the late 1990s and early 2000s—supported by institutional arrangements such as the European Central Bank's (ECB) acceptance of euro area members' government bonds as equivalent collateral—seemed to corroborate such expectations, benefiting especially economies exposed to higher interest rates prior to euro introduction (see, for example, Ehrmann et al., 2011).

However, interest rate convergence disappeared with the euro area crisis, and so did much of the optimism originally surrounding the common currency. Among other things, the crisis exposed deficiencies of the euro area's governance framework that hampered the functioning of the common currency, especially in times of financial strain (see *inter alia* IMF 2013a, 2013b, 2015).

This said, the intense financial stress at the peak of the euro crisis has dissipated, and most economies have entered into a gradual recovery. Moreover, in response to the crisis, euro area policy makers implemented institutional reforms—such as the creation of the European Stability Mechanism, a banking union, and changes to the Stability and Growth Pact—to alleviate governance deficiencies and place the common currency on a sounder footing. The question suggests itself whether these steps have help restore confidence in the euro.

Framed more precisely, the paper seeks to answer questions as follows: did euro area economies benefit from a "privilege" prior to the euro area crisis—i.e., did they obtain a tangible benefit from membership in exchange for ceding monetary policy autonomy? If so, did the privilege survive the crisis? And how has it fared during the recovery? Existence of a privilege would bode well not only for the euro area in its present composition, but it would also maintain an incentive for countries currently outside the euro area to join in future.

As there is no standard definition of "exorbitant privilege", different authors have taken different approaches to analyze it (see McCauley, 2015, or Canzoneri et al, 2013, for a characterization of different concepts). Common are comparing the average return of a country's liabilities with that of its assets (for example, Curcuru et al. 2008, 2010, 2013, Gourinchas and Rey, 2007, Lane and Milesi-Feretti, 2005), and analyzing the return on a risk-free asset relative to that of peers (for example, Maggiori, 2013).

Related work for the euro area has focused mostly on sovereign CDS spreads (in some cases also government bond rates or rating agencies assessments). In a 2013 special edition of the *Journal of International Money and Finance* (JIMF), several papers reported that prior to the euro area crisis, CDS spreads for euro area member countries had been more compressed than what macroeconomic fundamentals would predict—consistent with a privilege associated with membership, at least for higher-risk countries. However, in crisis, i.e., from 2010, fundamentals under-predicted risk spreads, hence privilege reversed.

The authors' interpretation of these phenomena differed somewhat. De Grauwe and Ji (2013) linked excessive risk spreads to a self-fulfilling liquidity crisis in the absence of a lender of last resort for euro area sovereign bonds. Gosh et al. (2013) argued that implicit bail-out guarantees had compressed spreads pre-crisis, but that in crisis, spreads had widened due to insufficient policy options to combat the downturn—i.e., lack of an independent monetary policy and the absence of fiscal space. Aizenman et al. (2013) hypothesized that investors may have priced *expected* rather than current fundamentals, in anticipation of a further deterioration in macroeconomic conditions. An alternative explanation was offered by Beirne and Fratzscher (2013), who linked high spreads to investors *re-evaluating* the risk associated with fundamentals, rather than pricing CDS divorced from (observed) fundamentals.

One component of this paper is that it updates these studies and expands their coverage to the recovery. However, as the focus is on "privilege" and its longer-term evolution—in contrast to the JIMF papers that were occupied with acute financial stress—risk spreads seem an inadequate metric, as these can be highly volatile in the short term. Further, risk spreads are susceptible to liquidity crunches and cross-country spillovers (Calice et. al, 2013, Arezki et al., 2011), including herding contagion unrelated to intrinsic country risk (Beirne and Fratzscher, 2013). This can mask underlying trends and complicate comparisons over time.

Instead, the paper analyzes investor perceptions as revealed in risk surveys, an indicator that displays little short-term volatility but is still sensitive to major macroeconomic developments and changes in the institutional setting (see Figure 1.4 further below). With this concept, euro area membership generates a privilege if investors mark down risks associated with the assets of euro area members by more than macro-economic or institutional characteristics *other than* euro area membership can explain. In this case, euro membership in and by itself generates a premium.

The paper estimates this premium for each of the past 15 years, and therefore traces the evolution of euro area privilege over time. European countries that are not members of the euro area serve as control group. The approach is expanded to allow fundamentals to have a time-varying impact on risk perception. This permits distinguishing two possible channels for deteriorating country risk assessments during the crisis: investors (i) downgrading the value of euro area membership, or (ii) putting more weight on risk-enhancing fundamentals that were concentrated in the euro area, such as high public debt or large external deficits.

This said, the approach is very much "reduced form": while it identifies the existence of privilege from euro area membership (or lack thereof) as a stylized fact, as well as the timing of its emergence or disappearance, it does not tie it explicitly to specific transmission channels or policies. The framework also stops short of analyzing the potential financial consequences of a "perceptions premium".

The remainder of the paper is organized as follows. Section II sketches the empirical approach, including the use of investor perception indices, the basic specification of the empirical model to extract a metric of privilege, and the data sources. Section III reports the results, for both the time pattern of euro area privilege and for other factors that affect country risk perception. Section IV concludes.

II. EMPRICAL APPROACH

The basic specification extracts a metric of privilege from a linear dynamic equation of the following form:

$$(1) \qquad C_{it} = \rho C_{it-1} + \boldsymbol{X}'_{\boldsymbol{it}}\boldsymbol{\beta} + \theta_t + \delta_i + \lambda_t Euro_{it} + \vartheta_t EU_{it} + u_{it}.$$

C is a measure of country risk perception, $\boldsymbol{X}$ a vector of macroeconomic and institutional fundamentals, δ and θ are a country/time-dummies that control for unobserved country characteristics and common macro-economic shocks, and *u* is an independently distributed error term.

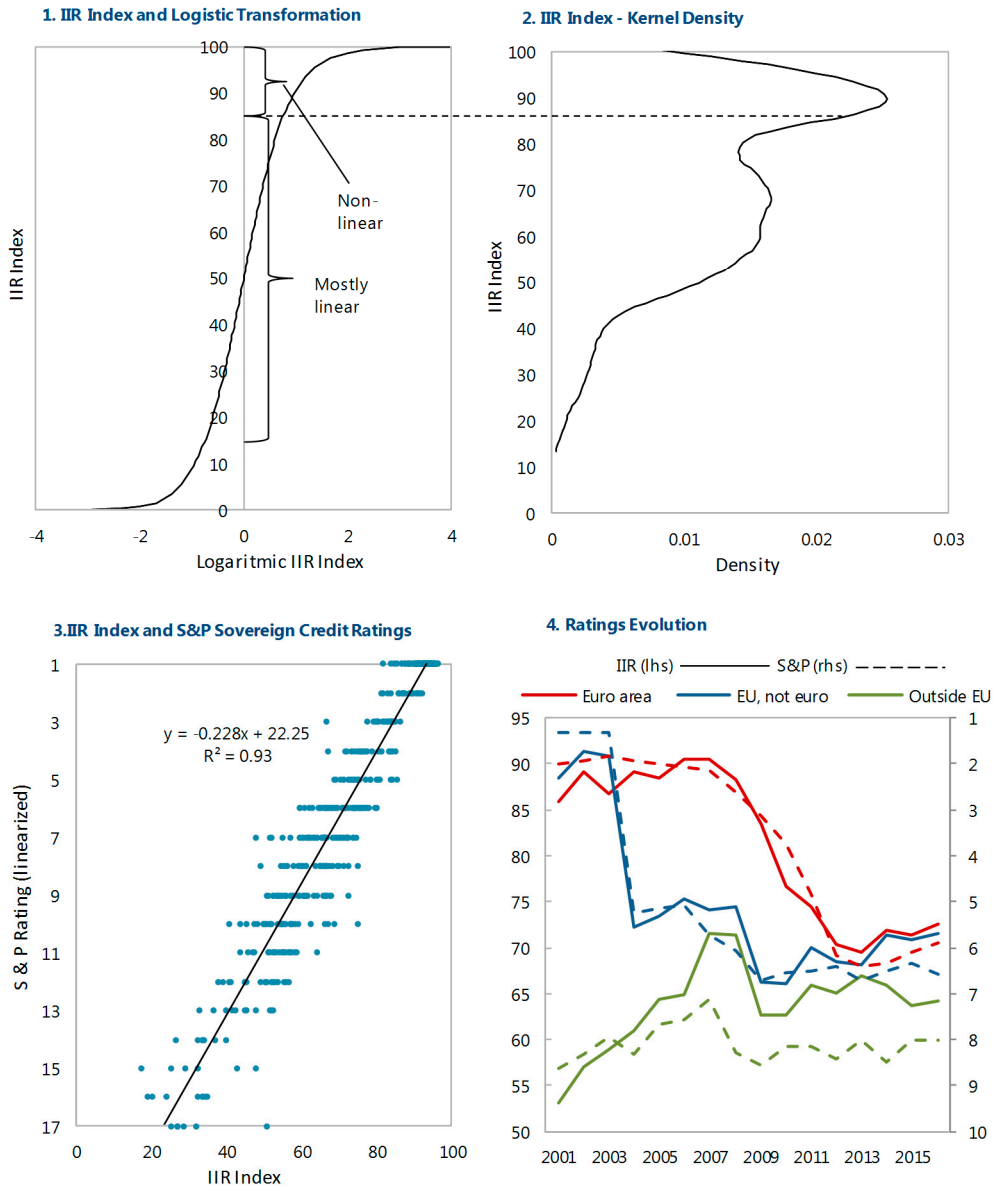
λ_t captures "privilege". It measures the value investors assign to euro area membership in year *t* beyond what is explained by macroeconomic fundamentals. λ_t is estimated for each year separately, to accommodate the possibility that investors' attitudes to euro area membership change. ϑ_t is a similar parameter that measures the value of membership in the European Union (EU).

Equation (1) is estimated with annual data for 2001–2016 for 34 European economies. Time period and sample are determined mostly by data availability. Note that neither membership in the euro area nor in the EU are constant during this period: Cyprus, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia, and Slovenia joined the European Union in 2004, Bulgaria and Romania in 2007, and Croatia in 2013. Slovenia (2007), Cyprus (2008), Malta (2008), Slovakia (2009), Estonia (2011), Latvia (2014) and Lithuania (2015) adopted the euro.

Country Risk Perception

In the basic specification, country risk perception is measured with the *International Investor Country Credit Rating (IIR)* index. The *IIR* index is based on assessments by economists and risk analysts at banks, money market funds and securities firms, who grade countries on a

Figure 1. Measures of Investor Perception



Sources: International Investor Rating Survey, Standard and Poors, and author's calculations.

scale from zero to 100, with 100 representing the least likelihood of default. Responses are then weighed by institutional exposure.[2]

The numerical range of the *IIR* index is constrained by design. In a linear regression context, this renders the index insensitive to changes in fundamentals near its higher and lower end.[3] One way to eliminate this undesirable property is to apply the following transformation:

[2] See http://www.institutionalinvestor.com/Research/6160/Methodology.html#.WOpXh2egvIU.

$$(2) \qquad LIIR_{it} = log\left(\frac{{}^{IIR_{it}}/_{100}}{{}^{(1-IIR_{it})}/_{100}}\right)$$

that yields a *Logistic Investor Rating Index LIIR*. (2) is broadly linear for *IIR* index values between 15 and 85; a range that comprises about two-thirds of the sample (Figures 1.1, 1.2). For the one-third of observations with *IIR* values higher than 85, the transformation re-weighs observations.[4]

For comparison, the paper also reports estimates for a linearized version of the *Standard & Poors sovereign credit ratings (S&P)*. Credit ratings do not measure investor perception directly, but they are often viewed as a yardstick guiding investor behavior. For the regression analysis, ratings are converted into numerical values from 1 (C) to 17 (AAA), imposing equidistance between rating grades.[5] The relationship between this linearized *S&P* index and the (raw) *IIR* index is broadly linear, with 4½ points on the IIR scale corresponding to one rating notch with *S&P* (Figure 1.3). Further, the averages for the *IIR* and linearized *S&P* indices display broadly similar trends across subgroups, with a marked deterioration in the assessments of euro area countries between 2009 and 2012. (Figure 1.4).

Investor perception may be sticky, i.e., current perception may be influenced by past investor perception. To accommodate this possibility, (1) includes lagged perception as a covariate. This gives rise to the well-known correlation between lagged dependent variable and country fixed effects, triggering inconsistent OLS-estimates. To correct for this, equation (1) is estimated with the Arellano-Bond (1991) general methods of moments (GMM) estimator.

Macroeconomic Fundamentals

The fundamentals vector ***X*** includes fiscal and external balances, public debt, per-capita-GDP, real GDP growth, the unemployment rate, inflation, the national investment ratio, and the net international investment position (NIIP). These covariates have been chosen in line with the standard treatment in the literature on country risk,[6] with observations drawn from the IMF's World Economic Outlook (WEO) database. As the *IIR* index is published in the fall, x_{it} is the expected outcome of variable *x* in year *t* at the time of the year *t* WEO fall forecast. For public debt, data are available for only about 94 percent of the observations. A "missing observations" dummy is included for the remaining 6 percent.

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[3] For the same reason, predictions for the *IIR* can lie outside the index' numerical range.

[4] These correspond broadly to countries rated AAA or AA+ with Standard and Poors. As a result, the mean *IIR* rating matches an *S&P* credit score of A, while the mean *LIIR* rating matches an S&P credit score of A+.

[5] There are too many rating categories to estimate a model for categorical variables, such as an ordered probit. The latter would also create difficult specification and estimation issues in a dynamic panel setting. Note that the constrained numerical range exposes the linearized *S&P* index to the same flaw as the raw *IIR* index.

[6] See, for example, de Grauwe and Ji (2013) and the literature quoted therein.

X also includes two variables that interact with euro area membership by design: (i) a dummy for whether a country's currency is floating, and (ii) a variable capturing the degree of euroization of the banking system. Euro area membership sets the "floating" dummy to zero. It also eliminates, for the most part, "euroization", as euro adoption converts euro loans and deposits from foreign to domestic currency.[7] The "floating" dummy is drawn from the de facto classification in the IMF's Annual Reports on Exchange Rate Reports and Restrictions ("free float", "float", or "managed float"). Euroization data come from multiple sources, including the European Bank for Reconstruction and Development (EBRD) and national central bank websites. The variable is also defined as a dummy, taking on value 1 if the share of FX loans *or* deposits exceeded one-third in a given year.[8]

Some covariates are unlikely to be strictly endogenous, as shocks to investor perception may well affect current and future macroeconomic outcomes. To control for this, all flow variables are instrumented with past values, as are the NIIP and euroization, which are subject to valuation changes in response to shifts in investor sentiment.

III. RESULTS

Macroeconomic Fundamentals

Columns (1) to (3) in Table 1 and Figure 2 report basic regression results for specification (1). To facilitate the comparison of parameter estimates, the *IIR* and *LIIR*-based estimates are expressed in "rating agency magnitudes", i.e. they are scaled with the standard deviation of the *S&P* index relative to their own.

The auto-regressive component is large and statistically significant with all three metrics, pointing to a high degree of perceptions stickiness. As for fundamentals, both the *IIP* and *LIIP* indices are affected by a wide range of macro-outcomes that include growth, unemployment, investment, external and fiscal balances, public debt, and the national investment position. Between the two indices, the *IIP* (column 1) puts relatively more weight on the NIIP and real growth, while the *LIIP* (column 2) weights fiscal factors more heavily—suggesting that the latter affect perceptions relatively more for higher-rated countries.

In contrast to the investor survey based indices, the *S&P* credit ratings largely discount fiscal factors (column 3). They do place a significant negative premium on financial euroization, however, equivalent to about one-quarter of a rating point.

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[7] This does of course not hold for loans and deposits denominated in foreign currencies other than euros, notably Swiss Franc loans, that play a role in some Central and Eastern European banking systems.

[8] Th relative roughness of this metric reflects in part that FX loan and deposit data are compiled from different sources and therefore not always exactly comparable. More granular metrics do not improve the fit.

Table 1. Basic Specifications

	2002-2016						2002-2015	
	(1) IIR Rating[1/]		(2) IIR Rating Logistic transformation[1/]		(3) S&P Rating[2/]		(4) IIR Rating Logistic transformation[1/]	
	Coeff.	*t-value*	*Coeff.*	*t-value*	*Coeff.*	*t-value*	*Coeff.*	*t-value*
Controls								
Lagged perception	0.67	18.84***	0.60	19.00***	0.70	15.06***	0.57	16.48***
Per-capita GDP	0.67^(-6)	0.07	8.24^(-6)	1.23	5.31^(-6)	0.73	4.60^(-6)	0.67
Real growth	0.15	4.94***	0.07	2.80***	0.09	4.41***	0.07	2.84***
Investment/GDP	0.03	2.05**	0.02	1.67*	0.01	0.79	0.02	1.49
Unemployment rate	-0.06	-2.47**	-0.06	-3.21***	-0.09	-3.41***	-0.06	-2.54**
CPI inflation	-0.01	-1.38	-0.01	-1.97**	0.01	0.62	-0.01	-1.43
Gen. gov. balance	0.04	2.49**	0.05	3.88***	0.02	1.23	0.06	4.46***
Gen. gov. debt	-0.01	-2.38**	-0.01	-3.14***	-0.005	-0.92	-0.01	-3.20***
External balance	0.03	1.81*	0.03	2.14**	0.04	2.26**	0.04	2.70***
NIIP	0.003	3.35***	0.001	1.59	0.002	2.67***	0.001	1.21
Euroization	-0.14	-0.62	-0.07	-0.45	-0.39	-2.22**	-0.09	-0.55
Floating	0.24	1.53	0.19	1.47	0.13	0.87	0.26	2.08**
Institutional quality	…	…	…	…	…	…	1.81	4.44***
Euro area membership	*Figure 2.1*		*Figure 2.2*		*Figure 2.4*		*Figure 3*	
EU membership	*(not reported)*		*Figure 2.3*		*(not reported)*		*(not reported)*	
Not reported: country fixed effects, time dummies, dummy for missing government debt observations.								
Observations		476		476		476		442
Arrelano-Bond test for autocorrelation in first-differenced errors	*Order 1*	-4.138 (0.000)		-3.610 (0.000)		-2.910 (0.004)		-3.335 (0.001)
	Order 2	-0.673 (0.501)		-0.119 (0.906)		-0.199 (0.842)		-0.399 (0.690)

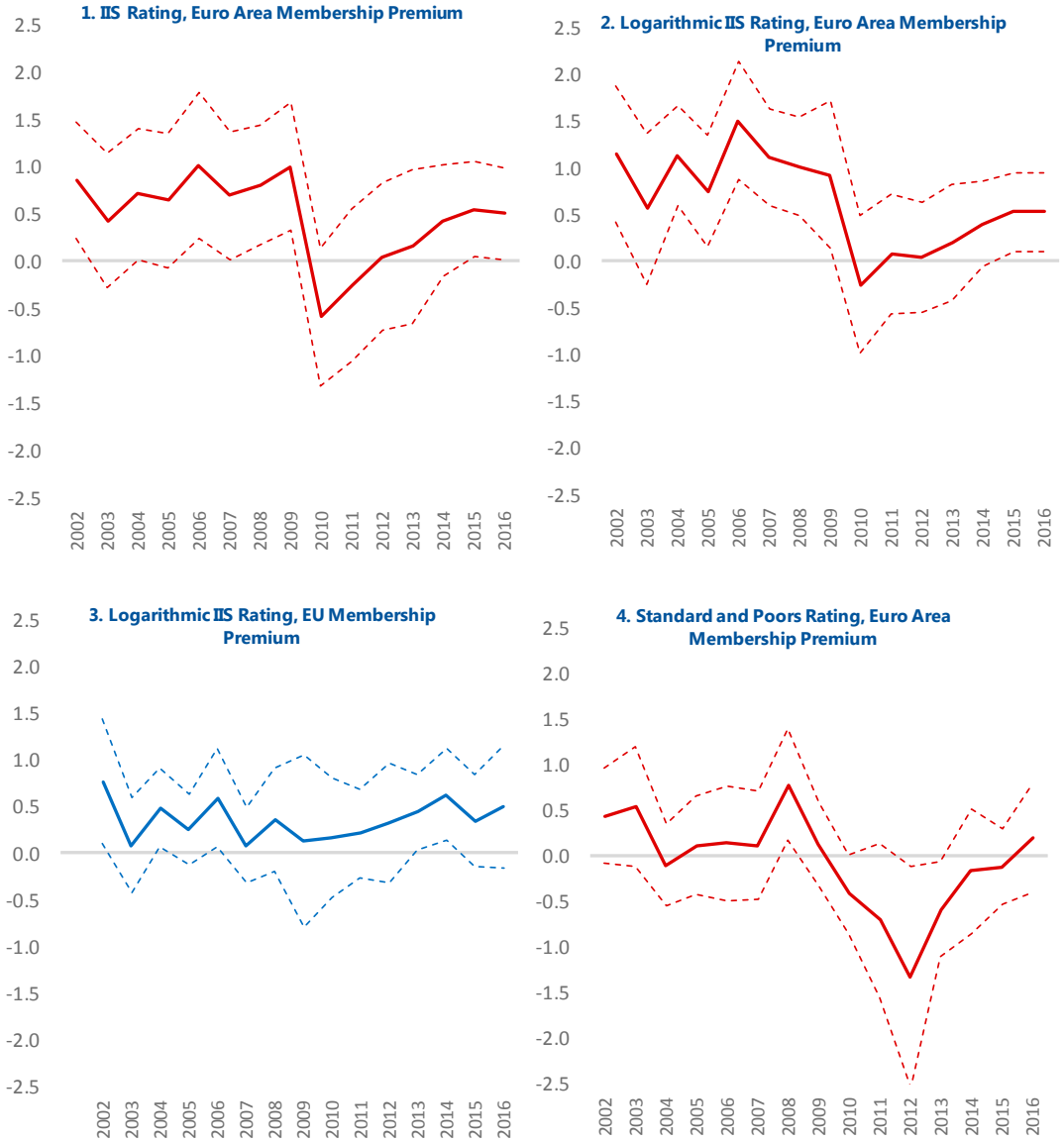
[1/] Normalized with the standard deviation of the S&P rating
[2/] Linearized and inverted
Significance at the 1 (***), 5 (**), and 10 (*) percent level.

Privilege

Figure 2 displays estimates for the euro premium. The *IIR* and *LIIR* based regressions clearly indicate that prior to the euro crisis, euro area membership carried a privilege in the form of a perception bonus equivalent to about one notch with a rating agency (Figures 2.1, 2.2). As clearly, the euro crisis triggered a sharp reassessment that made the premium disappear in 2010. But also this reassessment has not been the last word: the euro area membership premium recovered gradually in subsequent years, and returned to positive significance in 2015, although at only about half its pre-crisis size.[9]

[9] Over the entire observation period, the relative decline in the euro premium is somewhat larger with the *LIIR* index than with the *IIR* index, indicating that investors have marked down the value of euro area membership for highly rated relative to less highly rated countries.

Figure 2. Euro Area Privilege: Basic Specifications
(Scaled to S&P Rating Points, Conditional Mean and 95 Percent Confidence Interval)



Sources: IMF World Economic Outlook, IMF Annual Report on Exchange Rate Regimes and Restrictions, Standard and Poors, International Investor Rating Survey, EBRD, web sites of national central banks, and author's calculations.

It is instructive to compare the euro area membership premium with the premium for EU membership, displayed in Figure 2.3 (for the *LIIR*). The point estimates for the EU premium are positive but typically insignificant, fluctuating between 0 and 0.6. A Wald test fails to reject that all annual EU premia for 2002-16 are equal. By contrast, the corresponding test strongly rejects equality for the annual euro area membership premia. [10]

[10] The $\chi 2(14)$ statistic for equality of the annual EU premia is 14.02 (0.4479), it is 76.60 (0.000) for equality of the euro area membership premia. A time-invariant estimate for the EU premium is 0.38 (t-value 3.05).

Figure 2.4 displays estimates for euro area membership premia extracted from the *S&P* credit ratings. The results differ importantly from those obtained from investor perception indices. First, the estimates show, in general, *no* positive statistically significant premium for euro area membership. An exception is only 2009, i.e. the year right before the euro area crisis.[11] Second, after the euro area crisis, *S&P* downgraded the value of membership for three consecutive years—in 2010, 11, and 12—while investors did so only once, in 2010.[12] By 2012/13, *S&P* assigned a statistically significant *negative* premium to membership of about one rating point. The subsequent recovery brought the *S&P* premium back to neutral territory, but not to positive significance (in contrast to investor perceptions).

Several modifications were performed to check robustness, including: (i) scaling public debt and the general government balance with tax revenue instead of GDP, thus using the "fiscal space" variables proposed in Aizenman et al. (2013), (ii) longer autoregressive lags for investor perception, and lags for macroeconomic fundamentals, (iii) treating more covariates as endogenous, including the euro area membership time dummies (to correct for possible omitted variable bias), (iv) using the Blundell-Bond (1998) GMM estimator instead of Arellano-Bond, (v) limiting the number of instruments in the level equation to prevent over-fitting of endogenous variables, and (vi) using fixed effects estimators instead of GMM.[13] No robustness check changes the broad patterns identified in Table 1 and Figure 2.

Control for Institutional Quality

Strong institutions may facilitate euro area (and/or the EU) membership. If differences in institutional quality between members and non-members go beyond what is reflected in macroeconomic fundamentals, the results reported above would suffer from selection bias.

To control for this, Table 1 column (4) and Figure 3 shows estimates from a regression that adds the Kaufmann et al. (2006) governance quality index as covariate. A drawback is that the index exists (at this juncture) only until 2015, hence no estimate for 2016 can be reported.

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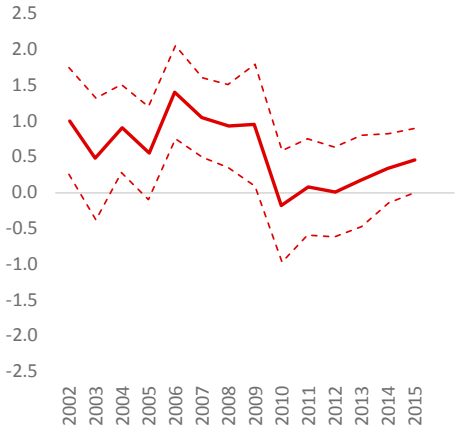
[11] Closer inspection suggests that the premium in 2009 largely reflects rating action in the control group, i.e. sharp downgrades of non-euro area countries (the Baltics, Hungary and Ukraine) during the first phase of the global financial crisis.

[12] Further, ratings uncertainty was exceptionally high during the euro area crisis, as reflected by the doubling of the confidence band around the point estimate of the *S&P* premium. The large rating downgrades between 2009 and 2012—not only by Standard and Poors but also by other rating agencies—have sometimes been interpreted as excessive downgrades beyond what is justified by fundamentals (see, e.g., Vernazza et al., 2013). The interpretation here is that ratings agencies downgraded the value of euro area membership. Note that the negative turning point for the S&P premium coincides with ECB President Draghi's "whatever it takes" speech in 2012, while the turning point for investors was already two years earlier.

[13] Fixed effects and GMM estimates of (1) are remarkably similar. This may be because N exceeds T by less (34 vs. 15) than in many other applications, limiting the advantage of GMM estimators in terms of reducing asymptotic bias.

While institutional quality by itself has a strong impact on investor perceptions, its inclusion does little in terms of changing parameter estimates for the other covariates—suggesting that its impact was mostly picked up by the country fixed effects in the basic specification. Specifically, the evolution of euro area privilege remains practically unchanged. On average, the point estimate for the value of euro area membership is marked down by less than 0.1 points (and that of EU membership—not displayed—by exactly 0.1 points), well within the margin of error.

Figure 3. Control for Institutional Quality (Euro Area Membership Premium, Logaritmic IRR Index)



Sources: as in Figure 2

Time-Varying Coefficients

Specification (1) assumes that investors' assessment of factors *other* than euro (and EU) membership is time invariant. This assumption may not hold, especially not in crisis periods that bring specific risks and vulnerabilities to the forefront.

To address this shortcoming, the model is expanded in the spirit of Beirne and Fratzscher (2013), to allow the parameters for (some or all) macro-fundamentals to vary with time also:

$$(3) \qquad C_{it} = \rho C_{it-1} + \boldsymbol{X'_{1it}\beta_1} + \sum_\tau D_\tau \boldsymbol{X'_{2it}\beta_{2\tau}} + \theta_t + \delta_i + \lambda_t Euro_{it} + \vartheta_t EU_{it} + u_{it}$$

D_τ are dummies that take on value 1 if an observation falls in a specific period τ. Three periods are distinguished—oriented on the customary narrative of the euro area crisis and the estimates in Figure 2: a *pre-crisis* period 2002-09, a *crisis* period 2010-12, and a *recovery* period 2013-16.

In the first step, equation (3) is estimated allowing *all* parameters measuring the impact macro-fundamentals to differ across time periods. The parameters are then checked sequentially for equality across periods, i.e., testing null hypotheses H_o: $\beta_{2pre-crisis} =$ $= \beta_{2crisis} = \beta_{2recovery}$. Wherever a Wald-test does *not* reject H_o at the 90 percent level, parameter equality across periods seems a reasonable assumption, and a time invariant parameter β_1 is included in the final specification. This is the case for general government balance, inflation, national investment, the euroization dummy, and the fixed exchange rate regime dummy (of these, only the general government balance is estimated to have statistically significant impact on perceptions).

For the other macro-fundamentals, the Wald-tests reject time invariance (Table 2). Hence period-specific parameters $\beta_{2\tau}$ are estimated. Results for these parameters—and for the euro premium—are reported in Figure 4.

Table 2. Time-Varying Coefficients

	2002-16 IIR Rating Logistic transformation	
	Coeff.	*t-value*
Controls		
Lagged perception	0.54	12.54***
Per-capita GDP	-2.71^(-6)	-0.51
Real growth	*Figure 4.4*	
Investment/GDP	0.01	0.45
Unemployment rate	*Figure 4.5*	
CPI inflation	-0.01	-1.16
Gen. gov. balance	0.07	4.72***
Gen. government debt	*Figure 4.2*	
External balance	*Figure 4.3*	
NIIP	*Figure 4.6*	
Euroization	-0.15	-1.23
Floating	0.07	0.43
Euro area membership	*Figure 4.1*	
Observations		476
Wald tests for parameter equality		*χ2 (2)*
Real growth		23.05 (0.000)
Unemployment rate		8.59 (0.014)
General government debt		20.67 (0.000)
External balance		13.83 (0.001)
NIIP		21.54 (0.000)
Arrelano-Bond test for autocorrelation in first-differenced errors		-3.495 (0.001) 0.371 (0.710)

Significance at the 1 (***), 5 (**), and 10 (*) percent level.

Euro premium. For the pre-crisis period and the recovery, the time-varying model (Figure 4.1) and the time-invariant model (Figure 2.2) produce near-identical estimates of the euro premium. For the *crisis* period, however, the premium's decline is less dramatic with the time-varying model—consistent with investors re-evaluating not only euro area membership but also fundamentals. This said, the difference between the two models is within the margin of error, and the basic pattern persists: a shift in the euro premium from positive significance until 2009 to insignificance in 2010, followed by a return to significance during the recovery, although at a reduced size.

Macro-fundamentals. Turning to fundamentals, while *public debt* (Figure 4.2) had a negative impact on investor perceptions throughout; its impact more than tripled in crisis. Further, both the *current account balance* (Figure 4.3) and *real GDP growth* (Figure 4.4) became significant influences on country perception only once the crisis erupted. The euro crisis induced investors to take not only fiscal risks more seriously, but they became also sensitive to external risks and economies' capacity to generate growth.

For the crisis period, the results on fundamentals broadly confirm Beirne's and Fratzscher's or de Grauwe's and Ji's findings for CDS spreads. Moreover, they show that crisis-induced shifts in investor attitudes persisted also during the recovery: investor internalized the crisis' lessons even after financial strains had subsided.

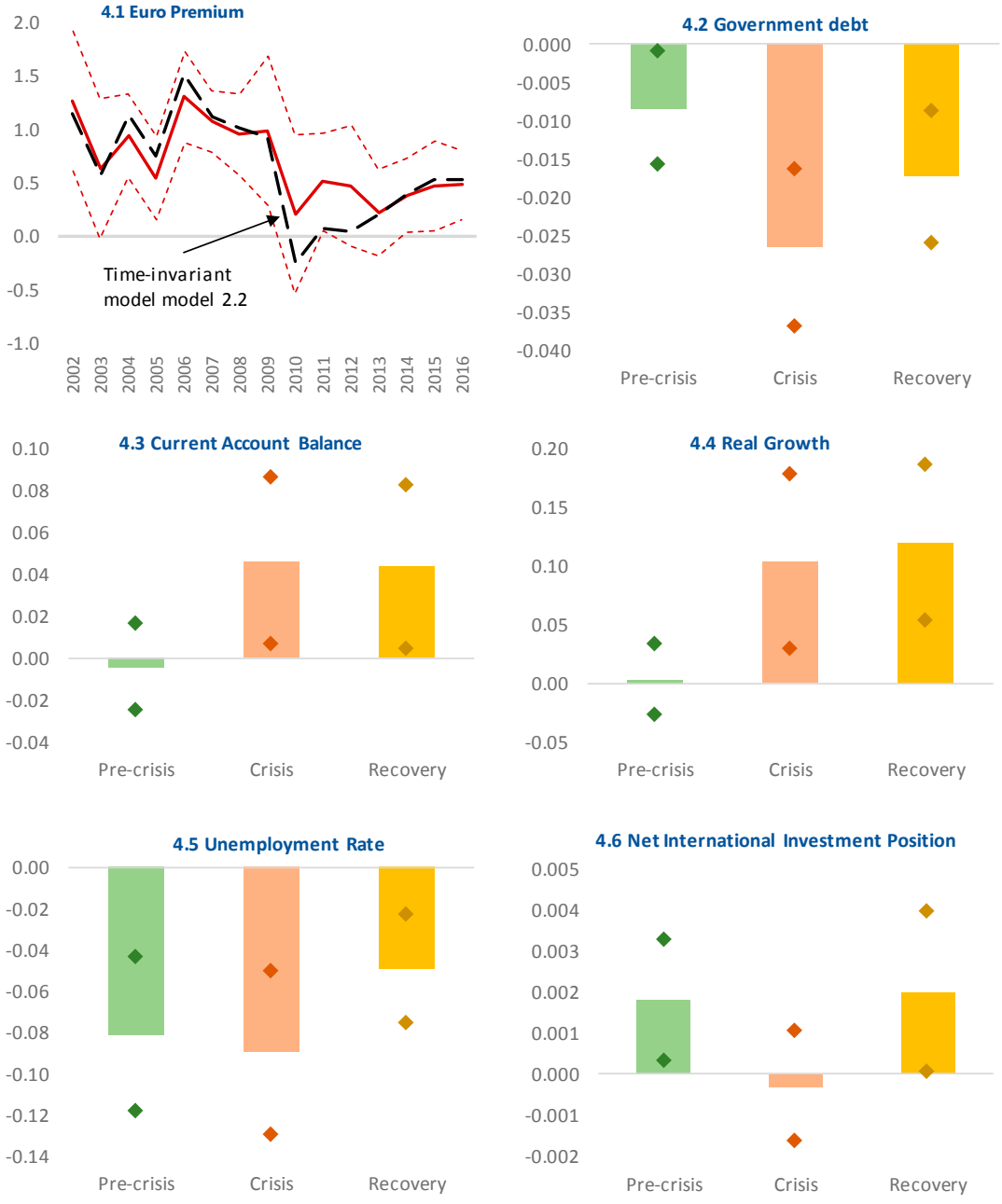
Other changes that the model identifies are somewhat less intuitive. Figure 4.5 suggests that the impact of the *unemployment rate* on country perceptions weakened during the recovery, although it remained a strongly negative factor.[14] And the *net investment position* (Figure

[14] As unemployment is conditional on growth and other cyclical variables, it may capture structural labor market distortions more than cyclical unemployment.

4.6)—a borderline positive influence on perceptions before the crisis and during the recovery—appears to have lost temporarily its significance for perceptions in crisis.

Figure 4. Time-Varying Coefficients

(Conditional Mean and 95 Percent Confidence Interval)



Sources: IMF World Economic Outlook, IMF Annual Report on Exchange Rate Regimes and Restrictions, International Investor Rating Survey, EBRD, web sites of national central banks, and author's calculations

The results were checked for robustness to the cut-off dates, for example by treating 2009 (instead of 2010) as the first crisis year, or by letting the recovery start only in 2014 (instead of 2013). Such variations trigger minor changes in the precise path of the euro premium but always preserve the basic pattern. They also have no substantive impact on the other results.[15]

Overall, the time-varying model identifies two distinct factors driving the deterioration in euro area country risk assessments during the crisis: investors downgraded the value of euro area membership, and they started paying more attention to risks concentrated among euro area members, like high public debt and large external deficits. While the first factor reverted as the recovery took hold, at least in part, the second factor has remained in place.

IV. SUMMARY AND CONCLUSIONS

This paper contains encouraging news for Europe's common currency: after taking a severe hit during the crisis, the euro's reputation has begun to recover. As of end-2016, investors saw euro area membership again as a bonus, even though the associated premium is only half the size it was before the euro crisis.

The paper's empirical approach stops short of identifying the causes for this revival—for example, institutional reforms, unexpected resilience of the currency union, or just the impact of the economic recovery on perceptions. All these options appear possible and plausible; distinguishing between them would seem a worthwhile topic for future investigation. This said, the finding of a resurging euro premium is robust to a wide range of specifications.

The paper also provides some insight into how investors assessed macro-fundamentals before, during and after the euro crisis. The importance of public debt, the current account balance, and the capacity to generate growth increased greatly once the crisis erupted. Further, these shifts have persisted throughout the recovery: investors appear to have learned

[15] An attempt was made to re-estimate the coefficients on macro-fundamentals for each year, rather than grouping years into periods. This exercise quickly encounters constraints, however, as the GMM instrumenting structure sets limits to how many parameters the model can absorb. Moreover, annual re-assessment of (specific) fundamentals can be difficult to distinguish from (general) stickiness of perceptions, especially when fundamentals are affected by common shocks—as one would expect during crisis episodes. A model with annual coefficients for public debt and real growth broadly confirms the results above, although the annual coefficients are somewhat noisy.

Another extension is to interact fundamentals with the annual euro area membership dummies, to test whether their weight in the risk assessment of euro area countries increased disproportionately in crisis. The same limits in terms of absorbable parameters apply also here, hence fundamentals can only be tested one at a time, giving rise to possible omitted variable bias. This said, for public debt, for example, the exercise suggests that investors always weighed it relatively more heavily for euro area economies than for economies outside the euro area. At the same time, there is no evidence of a structural shift in this relationship: when the crisis erupted, investors appear to have increased the weight of public debt broadly proportionately across countries.

their lesson. If so, there are grounds for optimism that the mispricing of country risk in the run-up to the euro crisis may not repeat.

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