CENTER FOR FINANCIAL STUDIES

CFS Working Paper Series

No. 545

Otto Randl and Josef Zechner

Sovereign Reputation and Yield Spreads: A Case Study on Retroactive Legislation

Center for Financial Studies | Goethe University | Theodor-W.-Adorno-Platz 3 | 60323 Frankfurt am Main | Germany
Phone +49 69 798 30050 | Fax +49 69 798 30077 | info@ifk-cfs.de | www.ifk-cfs.de

The CFS Working Paper Series

presents ongoing research on selected topics in the fields of money, banking and finance. The papers are circulated to encourage discussion and comment. Any opinions expressed in CFS Working Papers are those of the author(s) and not of the CFS.

The Center for Financial Studies, located in Goethe University Frankfurt's House of Finance, conducts independent and internationally oriented research in important areas of Finance. It serves as a forum for dialogue between academia, policy-making institutions and the financial industry. It offers a platform for top-level fundamental research as well as applied research relevant for the financial sector in Europe. CFS is funded by the non-profit-organization Gesellschaft für Kapitalmarktforschung e.V. (GfK). Established in 1967 and closely affiliated with the University of Frankfurt, it provides a strong link between the financial community and academia. GfK members comprise major players in Germany's financial industry. The funding institutions do not give prior review to CFS publications, nor do they necessarily share the views expressed therein.

Center for Financial Studies | Goethe University | Theodor-W.-Adorno-Platz 3 | 60323 Frankfurt am Main | Germany
Phone +49 69 798 30050 | Fax +49 69 798 30077 | info@ifk-cfs.de | www.ifk-cfs.de

Sovereign Reputation and Yield Spreads: A Case Study on Retroactive Legislation*

Otto Randl and Josef Zechner

7th June, 2016

Abstract

This paper uses recent legislation in Austria to establish a link between sovereign reputation and yield spreads. In 2009, Hypo Alpe Adria International, a bank previously co-owned by the regional government of Carinthia, had been nationalized by Austria's central government in order to avoid a default triggering multi-billion Euro local government guarantees. In 2015, special legislation retroactively introduced collective action clauses allowing a haircut on both the bonds and the guarantees while avoiding formal default. We document that legislative and administrative action designed to partly abrogate the guarantees resulted in a loss of reputation, leading to higher yield spreads for sovereign debt. Our analysis of covered bonds uncovers an increase in yield spreads on the secondary market and a deterioration of primary market conditions.

*Both authors are affiliated with WU Vienna University of Economics and Business, Department of Finance, Accounting and Statistics, Welthandelsplatz 1, A-1020 Wien, Austria. Corresponding author is Josef Zechner, E-Mail: josef.zechner@wu.ac.at. We thank Gabriela Kovácová for excellent research assistance. We acknowledge valuable comments by Florian Nagler, Peter Mooslechner and Markus Stix.

1 Introduction

Reputation plays an important role in financial markets as it potentially resolves the inherent conflict of interest between capital seekers and investors. For corporate debt markets, Diamond [1989] shows that issuers with a short credit history face a comparably high cost of debt and act opportunistically in their decision whether to accept a high default probability. In contrast, issuers with a long track record of complying with contractual arrangements have built up reputation, which allows them to borrow cheaply going forward. For such issuers reputation itself becomes a valuable asset. Reputable issuers are reluctant to default as they realize that the potential short term gain is more than offset in the long run by higher financing costs. In sovereign debt markets, reputation may be of particular importance as sovereigns are not subject to standard bankruptcy regulations and they have the possibility to ex-post change the institutional and legal framework to influence the value of claims they have issued in the past.

However, the long-term benefits from building up reputation in the sovereign debt market may not be fully internalized in the political process, for example due to inter-generational conflicts of interest or simply due to the specific cycle of election periods. Existing empirical evidence on the value of reputation for sovereigns is largely focused on the impact of sovereign defaults, both in terms of capital market exclusion and increased cost of borrowing. In a review article, Panizza, Sturzenegger, and Zettelmeyer [2009] find weak

evidence for theories of reputation in sovereign debt markets. In contrast, the survey by Tomz and Wright [2013] concludes that defaulters temporarily lose access to capital markets and subsequently pay substantially higher interest rates. A recent empirical estimate for the increase in borrowing costs is given by Cruces and Trebesch [2013], stating a range of 3-4%.

Identifying the value of sovereign reputation in capital markets empirically is challenging, since most events signal information about both the sovereign's ability to repay debt claims as well as its willingness to do so. Only the latter should be related with the value of reputation. For example, if Argentina decides to default on its debt, this may signal something about the country's decision makers' expectations about the future ability to repay debt as well as its governance structure which affects the country's willingness to pay.

This paper presents an empirical study to shed light on whether reputation effects are indeed present in the sovereign credit markets. It involves the Federal Republic of Austria, a sovereign rated Aaa by Moody's and AA+ by S&P and Fitch so that its short- and medium-term ability to pay for its debt is not in question. More specifically, the study focuses on the debt restructuring of Hypo Alpe Adria International Bank AG, a large regional bank that was initially co-owned by the regional government of Carinthia, before being sold to Bayerische Landesbank in 2007. In the wake of the financial

crisis, in December 2009, the bank was nationalized through a purchase by the Republic of Austria for EUR 1. At this time, the bank had bonds outstanding which were guaranteed by the province of Carinthia, with a face value of about EUR 20 billion.

By November 2014 it became apparent that the bank's business model was no longer viable and the bank's assets and liabilities were therefore largely transferred to HETA, a run-down corporation. At that time the estimated value of the assets was significantly below the face value of the remaining debt that was guaranteed by Carinthia. Since Austrian provinces' have almost no possibilities to levy their own taxes, they rely almost exclusively on tax transfers from the federal government. There was thus some legal dispute on the extent to which the federal government is in fact liable for Carinthia's guarantees. Since the Republic of Austria had already injected approximately EUR 5.5 billion in capital during until December 2014, there was mounting pressure from opposition parties and the popular press on the federal government to stop using tax payers' money to honor Carinthia's debt guarantees.

From summer 2014 to fall 2015, a series of legislative and administrative actions made clear that the Austrian government was indeed going to repudiate at least some contractual terms of HETA bonds. For example, in the fall of 2014, Austria was the first EU country to implement the Banking Recovery and Resolution Directive into national law (Bundesgesetz über die Sanierung und Abwicklung von Banken, BaSAG) which explicitly states that

the law can be applied not only to banks, but also to run-down corporations like HETA. The most striking single event was the administrative decision from March 1, 2015 by the Austrian Financial Markets Authority (FMA) to indeed apply BaSAG to HETA and impose a temporary moratorium on any payments of interest or principal repayment, including those on debt guaranteed by the regional government of Carinthia.

The moratorium created the possibility for the Republic of Austria to subsequently introduce the legal basis for a collective action clause for HETA bonds. This actually happened in October 2015, when Austria changed the *Finanzmarktstabilitätsgesetz* to allow the federal minister of finance to make a repurchase offer to certain HETA bondholders. If such a repurchase offer is accepted by a two-thirds majority, it limits the claims of the non-consenting bondholders against the province of Carinthia. To our knowledge, a similar change in legal terms of bonds has been implemented just once in recent years, in the case of the Greek bond restructuring [see Zettelmeyer, Trebesch, and Gulati, 2013, for a detailed description]. We provide a detailed narrative of the background of the HETA restructuring attempts and the offer to bondholders in appendix A, and refer to Müller and Zahradnik [2015] for a description from a legal perspective.

Media reports, comments by analysts, and reports by rating agencies around the time of the introduction of the moratorium indicate that this moratorium may have triggered a reputational loss, not just for the regional

government of Carinthia, but also for the central government and other, non-governmental issuers from Austria. The specific circumstances are of particular interest to the analysis of the effects of reputation on borrowing costs since we can focus on those Austrian issuers for which this event could not have affected their perceived *ability* to repay debt, but it may have had an effect on the market's perception of their *willingness* to pay.

We therefore focus our analysis on the cost of borrowing of the Republic of Austria itself and on covered bond issues. In the case of the Republic of Austria, if anything, the effect on the ability to repay its sovereign debt should have improved, rather than deteriorated in the wake of the moratorium. This is so since the moratorium created additional opportunities to limit the value of Carinthia's guarantees, and thus the potential liabilities of the federal government as well. If we find negative effects on the perceived credit risk of the Republic of Austria, it is likely to occur via changes in the perceived willingness to pay. To this end we analyze changes in yields of long-term government bonds, changes in CDS spreads, and changes in the spreads of central government bonds issued under foreign law relative to local law government bonds.

We believe that the covered bond market is also well suited to explore reputation effects. This is so, since the credit risk of a covered bond is substantially determined by the quality of the assets pledged and the legal uncertainties whether creditors will actually be able to seize the pledged assets of a defaulted issuer. Since we use a sample of covered bonds with

real estate as collateral, it is unlikely that there will be significant direct effects of the introduction of the moratorium on the value of those assets. By contrast, introduction of the moratorium may significantly affect the trust that the financial market puts in the legal quality of the asset pledge behind the covered bonds. We therefore explore effects of the moratorium on the primary market for covered bonds as well as on long-term credit spreads for a representative sample of Austrian issuers of covered bonds.

We compare long term financing costs of Austrian issuers relative to benchmark countries from three months before the moratorium to three months thereafter. Based on long term government bond yields, CDS spreads, and the foreign law bonds to domestic law bonds yield spread, we find an increase in the relative refinancing cost for the Austrian central government of 7 to 15 basis points. Relative yields of covered bonds increase by 6 basis points for debt collateralized with mortgages. Yield changes of regional government bonds and covered bonds collateralized with public loans are even more pronounced but might incorporate other effects than changes in reputation. Using a series of Chow tests, we find compelling evidence for the existence of structural breaks in the time series of relative refinancing costs, and high probabilities for their timing around the announcement day of the HETA moratorium. Therefore we provide strong evidence that reputation impacts the pricing of debt instruments even for issuers with strong fundamentals.

The remainder of this paper is structured as follows. In section 2, we

outline the empirical methods. We present the results in section 3. Section 4 concludes.

2 Empirical Strategy

We are interested in the change of the long-term spread of selected groups of Austrian issuers relative to appropriate benchmarks, caused by the loss of reputation due to HETA legislation. Based on the narrative of events, we choose March 1, 2015 as the point in time where the most severe loss of reputation took place. This specific choice of a single-day event is likely to bias our results against finding effects, because (1) the loss of reputation might have been more gradual, and (2) financial markets tend to anticipate events at least partly.

We measure the impact on financing costs, reflected by changes in spreads of government debt yields, credit default swaps (CDS), and yields of covered bonds. We hereby consider the time period from December 1, 2014 to May 31, 2015. For central government bonds, we download zero curves directly from Bloomberg, select a long term maturity (15 years)[1], and calculate the difference between Austrian and benchmark yields. To analyze the impact from the loss of reputation due to HETA driven legislation on government bond yields, we have to define a proper benchmark. German government

[1]We select 15 year maturity as this is the average maturity at issuance needed to match the average maturity of outstanding Austrian government debt.

bonds might have benefited from liquidity events and excellent economic fundamentals. Therefore we form a peer group which is better comparable but did not experience a loss of reputation in the financial market. We employ Belgium, Finland, France, and the Netherlands as benchmark countries, which are the closest comparable countries within the Eurozone with respect to credit ratings and liquidity.[2] Table 1 provides credit ratings as of March 2015. Other Eurozone countries with the exception of Germany either have lower ratings or a too small government bond market (e.g., Luxembourg). Similarly, we compare the change in Austrian government CDS spreads relative to benchmark countries' CDS. We use 5-year USD CDS from Datastream. We provide tickers of the actual series used for yields and CDS in appendix B, table 5.

For the other security types that we investigate, yield curves are not readily available. These are Austrian bonds issued under foreign law, regional government bonds, and covered bonds. Here we proceed by estimating spreads over a benchmark curve, and extracting the long term spread component. For Austrian government bonds issued under foreign law we

[2]While the Netherlands join Germany as a AAA-rated sovereign issuer, German government bonds serve as the true riskfree asset in the Eurozone. Yields of German Bunds might be more severely distorted from the European Central Bank's quantitative easing programme than government bond yields of other countries. Under the ECB's public sector purchase programme, the share of purchases in a national central bank's home market is determined by the ECB's capital key, which gives Germany a weight of 25.6 percent. Germany's 2014 budget surplus contrasts with an average Eurozone deficit of 2.6 percent according to Eurostat, rendering its government bonds scarce relative to those of other Eurozone countries.

Table 1: Ratings as of March 2015

	Rating		
	Moody's	S&P	Fitch
Austria	Aaa	AA+	AA+
Germany	Aaa	AAA	AAA
Netherlands	Aaa	AAA	AAA
Finland	Aaa	AA+	AAA
France	Aa1	AA	AA
Belgium	Aa3	AA	AA

use the Austrian (domestic law) zero coupon government yield curve as a benchmark. For regional government bonds in CHF, we use the Swiss government bond curve, and for covered bonds the German government bond yield curve. To analyze long term spreads using a set of individual bonds, we have to account for the fact that bonds change their characteristics over time, in particular their time to maturity. In addition, there is only a limited number of bonds available, so we cannot directly compare the maturities we are interested in. We therefore resort to parametric estimation of the long term spread, similar to the approach of Nelson and Siegel [1987] for modeling yield curves. In order to mitigate estimation problems that stem from a small number of bonds, we resort to a two step procedure. In the first step, we estimate slope, curvature, and long term spread from equation 1, keeping the parameters constant over time for each bond group.[3] The objective function

[3]The bond groups for which we estimate equation 1 separately are foreign law government bonds, regional government bonds, and covered bonds.

that we minimize is the sum of the squared pricing errors over all bonds i of group g and all dates t:

$$\min_{\beta_0,\beta_1,\beta_2} \sum_{i=1}^{N_g} \sum_{t=t_0}^{T} \left(P_{i,t} - \sum_{m_i=m_t>t}^{M_i} \frac{CF_{i,m_i}}{(1+y_{t,m_i}+s_{t,m_i})^{m_i-t}} \right)^2, \tag{1}$$
$$\text{where } s_{t,m_i} = \beta_0 + \beta_1 \frac{\tau}{m_i - t}\left(1 - e^{-\frac{m_i-t}{\tau}}\right) + \beta_2 e^{-\frac{m_i-t}{\tau}}$$

where $P_{i,t}$ is the market price of bond i at time t, m_i are the dates of cash flows CF_{i,m_i} (later than t), y_{t,m_i} is the benchmark (government) yield curve at time t with maturity m_i, and $\tau = 0.1368925$ years, i.e., 50 days.[4] In the second step of the estimation procedure, described in equation 2, we obtain a time series of long-term spreads. Here we use β_1 and β_2 from equation 1 as constant input parameters and estimate a separate long term spread component $\beta_{0,t}^{(j)}$ for each point in time t and for every subgroup j of issuers. We perform this step for subgroups j, as we estimate the long term spread components of covered bonds separately for Austria and the benchmark countries, and distinguish covered bonds according to the type of collateral.

$$\min_{\beta_{0,t}^{(j)}} \sum_{i=1}^{N_j} \left(P_{i,t} - \sum_{m_i=m_t>t}^{M_i} \frac{CF_{i,m_i}}{(1+y_{t,m_i}+s_{t,m_i})^{m_i-t}} \right)^2, \tag{2}$$
$$\text{where } s_{t,m_i} = \beta_{0,t}^{(j)} + \beta_1 \frac{\tau}{m_i - t}\left(1 - e^{-\frac{m_i-t}{\tau}}\right) + \beta_2 e^{-\frac{m_i-t}{\tau}}.$$

[4]We do not optimize over τ but follow the discussion in Nelson and Siegel [1987] who state that in their data best fitting values of τ have a median of 50.

We calculate relative spreads d_t^g as differences in the long term spread components of the long term spreads of Austrian (AT) minus benchmark (bm) countries' bonds. For covered bonds (cb), we calculate $d_t^{cb} = \beta_{0,t}^{(cb,AT)} - \beta_{0,t}^{(cb,bm)}$, separately for bonds collateralized by mortgages and public loans, respectively. For Austrian foreign law bonds (fl), we set the relative spread $d_t^{(fl)} = \beta_{0,t}^{(fl)}$, and for regional government bonds (rb) $d_t^{(rb)} = \beta_{0,t}^{(rb)}$. Finally, we compare $d_{t<t^*}^{(g)}$ with $d_{t>t^*}^{(g)}$ for all groups g, with t^* = March 1, 2015. This is our main measure of interest. For all sets of bonds we test for a structural break at t^* using an F-test [Chow, 1960]. The bond sets are summarized in table 2, with additional details provided in tables 6, 7, and 8 in appendix B.

3 Results

In this section, we first provide evidence for the increase in the yields of government bonds relative to the appropriate benchmarks. Next, we quantify the impact on the spread of outstanding covered bonds, and analyze developments in the primary market for these bonds.

3.1 Central government

We compare (1) changes in yields of long-term government bonds, (2) CDS, and (3) spreads of central government bonds issued under foreign law relative to local law government bonds. Figure 1 illustrates our main findings.

Table 2: Calculation Methods Employed

Type of bonds	Calculation of main spread measure
Government bonds	15-year zero coupon yield of Austrian government bonds minus arithmetic average of benchmark countries' zero coupon yields (Belgium, Netherlands, France, and Finland).
CDS	5-year USD Austrian government CDS minus arithmetic average of benchmark countries' 5-year CDS.
Foreign law bonds	Long term spread of Austrian foreign law bonds above the Austrian government zero coupon yield curve. Two-step parametric estimation.
Local government bonds in foreign curreny	Long term spread of local government bonds issued in CHF above the Swiss government zero yield curve. Two-step parametric estimation.
Covered bonds	Long term spread of covered bonds issued by Austrian bank minus the long term spread of covered bonds issued by a benchmark countries' bank. Spreads are modeled in excess of the German zero coupon government yield curve. Two-step parametric estimation, where the long term spread is estimated separately per type of collateral.

Yield comparison with benchmark countries The left hand chart of figure 1 shows a marked increase in Austrian 15-year government bond yields relative to the benchmark countries. While Austria is still able to refinance its debt at a lower rate than its peer group, this advantage has halved around the announcement date of the HETA moratorium. The increase of approximately 9 basis points would be difficult to explain by a deterioration of Austria's ability to pay, since the legislation was designed to reduce the impact of HETA losses on the Austrian budget. The magnitude of the increase indicates that the cost due to a loss of reputation from ex-post changes in con-

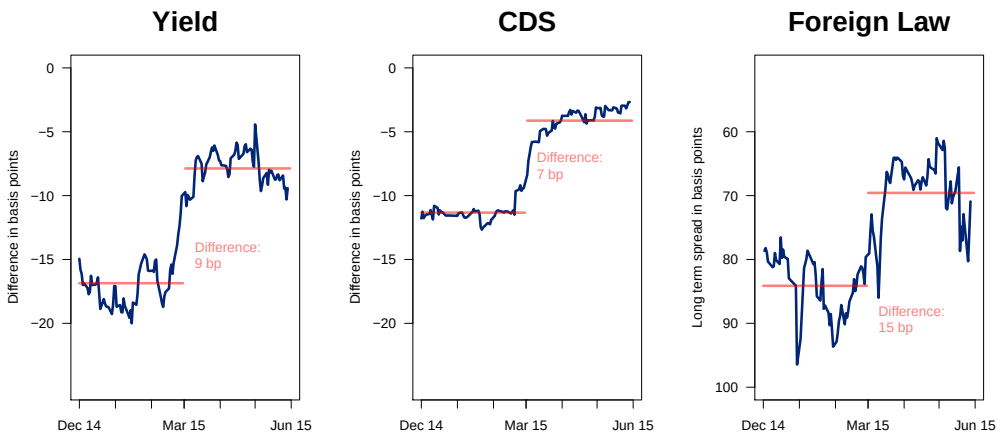
tractual terms dominates potential short term savings.[5] A potential caveat is a possible distortion from the start of the ECB's Public Sector Purchase Program which started on March 9, 2015 and might have had a country and maturity-specific impact on government bond yields, confounding the effect from the moratorium.

CDS The findings from changes in yields are confirmed when comparing 5-year USD CDS of Austria versus the benchmark countries. While CDS of Austria trade lower than the benchmark, this advantage has been reduced by 7 basis points over the six months investigated (see the center chart of figure 1). It seems quite unlikely that the ECB's bond buying program which started on March 9 had a direct but country-specific impact on 5-year USD CDS around March 1.

Foreign law bonds In the right hand chart of figure 1 we plot the time series of the long-term yield spread of Austrian government bonds issued under foreign (English) law in excess of local law bonds. Employing the

[5]The possible long term economic impact on public finances is difficult to quantify due to different impact on central versus regional governments, variations of the magnitude for different maturities, the possibility of effects dissipating or reinforcing over time, and changing debt levels and financing needs. Yet a back-of the envelope calculation indicates that a severe loss in reputation could be very harmful in the long run. Just an increase in financing cost of 9 basis points applied to the value of Austrian government bonds outstanding as of December 2015 of about EUR 291 billion leads to an annual increase in interest expense of EUR 262 million. The potential cost could be reduced by optimally selecting maturities at issuance since in unreported results we find shorter-dated bonds to respond to a smaller extent than longer-maturity bonds. On the other hand, our estimates might be downward biased due to partial anticipation of this event.

Figure 1: Central Government



The diagrams in the figure illustrate changes in the Austrian central government's cost of financing. Diagram *Yield* shows the difference in 15-year zero coupon yields of Austrian government bonds minus the average of the benchmark countries. The chart labeled *CDS* shows the difference in 5-year USD CDS of Austria versus the benchmark countries. Diagram *Foreign Law* shows the development of the spread of bonds issued by the Austrian government under English law versus locally issued bonds. For ease of comparison for this chart the y-axis goes from higher to lower spreads.

estimation method described in section 2, we generally observe a positive spread which is consistent with the lower liquidity of these bonds. However, we find that this spread drops around March 1, 2015. Note that a lower foreign to local law spread is equivalent to a higher financing cost for local law bonds. Therefore the direction of the change is consistent with our prior findings, even if the magnitude of the change might be affected by the small number of foreign law bonds and their low liquidity. Our findings appear in line with Chamon, Schumacher, and Trebesch [2015] who provide evidence that a sizable legal safety premium is observed only for weak debtors.

Statistical significance To assess the statistical and economic significance of our findings, we report detailed results in table 3. For government bonds, the column labeled *yield* reports summary statistics for the difference of Austrian zero-coupon yields with 15 years maturity relative to the benchmark countries. The sub-periods are marked by a statistically significant difference of 9 bp in the level of this spread. A Chow test clearly indicates a breakpoint around March 1, 2015; among all possible breakpoints between Jan 1, 2015 and April 30, 2015,[6] the F-value of a Chow test is lower for 97% of all dates than for March 1, 2015. This indicates that March 1, 2015 is a reasonable choice for the structural break. Column *CDS* shows that the economically significant deterioration of 7.2 basis points in CDS levels compared to benchmark countries is also statistically significant. The third column, *FL*, reports statistics of the yield spread of foreign law bonds over the Austrian government curve. Presumably due to low liquidity, foreign Austrian law bonds are traded at higher yields. This difference shrank by about 15 basis points, which can equivalently be interpreted as evidence that a legal safety premium is emerging. The magnitude of the effect is consistent with the observations by Chamon et al. [2015] for high quality debtors.

[6]To ensure a sufficient number of data points in each one of the F-tests we perform, we exclude the first month and the last month of the period analyzed from the search for breakpoints.

3.2 Regional government and covered bonds

Regional government bonds As further evidence, we analyze the long term component of the spread of regional government bonds issued in foreign currency (i.e., CHF) relative to the foreign (i.e., Swiss) zero coupon government yield curve. A list of the bonds is provided in appendix B, table 7. Bond buying under the ECB's quantitative easing programme does not have a direct effect on this set of bonds. The increase in the yield spread equals approximately 27 bp, as seen in the left hand chart of figure 2. While our sample does not comprise bonds from the region of Carinthia, the uncertainty related to regional governments might exacerbate the impact from reputational concerns. Column *regional* of table 3 shows that the difference is statistically significant, and there is clear evidence for a structural break around March 1, 2015.

Covered bonds Covered bonds are of particular interest in our analysis because to value these instruments investors have to assess both the creditworthiness of the issuer and the quality of the pledge; this comprises the legal environment that determines whether it will actually be possible for a creditor to seize the pledged assets of a defaulting issuer. Prokopczuk and Vonhoff [2012] find in their analysis of the European covered bond market that a significant portion of the variation in covered bond spreads can be attributed to the legislative framework, especially during crises. We obtain a sample of covered bonds from Bloomberg using the search criteria summarized in table

8 of appendix B, and split the sample into bonds backed by public assets and instruments collateralized by mortgages. We only use bonds for our empirical analysis that were assigned an initial rating of AAA or AA+ equivalent by S&P, Moody's or Fitch. While covered bonds should have relatively low sensitivity to adverse events given the high and multi-layer level of protection, investors who saw the value of a public guarantee reduced might update their evaluation of potential legal enforcement risks to actually seize pledged assets in case of a default. The center chart of figure 2 refers to bonds collateralized by loans to the public sector. It displays the difference in the long term component of credit spreads of Austrian bonds minus the spread of the peer group. The red lines correspond to the means before and after March 1, 2015, respectively, with a difference in spreads equals to 10 bp. While one could argue that the value of outstanding public loans as collateral might have changed due to the moratorium and feed through covered bond prices, this argument is unlikely in the case of covered bonds collateralized by mortgages. The right hand chart of figure 2 shows an increase in relative spreads of 6 basis points for this group of bonds. Both differences are statistically significant. The evidence for a structural break around the event date can be seen in table 3 from columns *public* and *mortgage*.

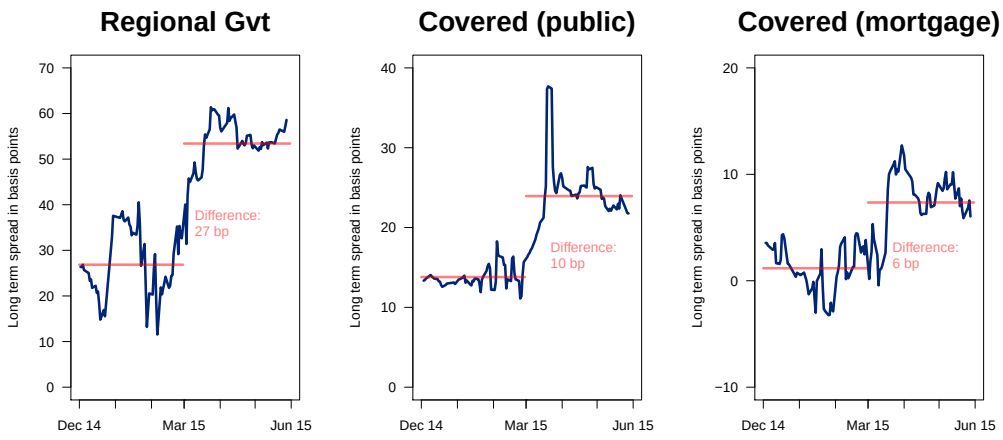
Primary market for covered bonds Higher spreads of outstanding covered bonds should be associated with bond issuance. Therefore we identify a sample of newly issued covered bonds where we hand collect deal sheets

Table 3: Statistical and economic significance

	central government			regional	covered bonds	
	yield	CDS	FL	gvt	public	mortgage
< March 1, 2015						
Mean	-16.86	-11.33	84.12	26.85	13.80	1.17
St.dev.	1.98	0.70	4.75	7.39	1.37	2.29
Min.	-20.00	-12.67	76.54	11.55	11.10	-3.23
1st Qu.	-18.52	-11.58	80.30	21.75	13.06	-0.05
Median	-17.07	-11.43	82.98	25.75	13.49	1.31
3rd Qu.	-15.88	-11.23	88.06	33.53	14.10	3.20
Max.	-10.03	-9.19	96.46	40.52	18.27	4.47
> March 1, 2015						
Mean	-7.87	-4.13	69.57	53.42	23.94	7.35
St.dev.	1.33	1.14	5.61	5.69	4.21	3.10
Min.	-10.83	-8.37	61.01	31.39	16.30	-0.43
1st Qu.	-8.75	-4.75	65.62	52.31	22.16	6.23
Median	-7.75	-3.75	67.84	53.70	23.99	7.84
3rd Qu.	-6.83	-3.33	72.92	56.94	25.17	9.47
Max.	-4.43	-2.67	85.99	61.39	37.69	12.72
difference						
Mean	8.99	7.20	-14.55	26.57	10.14	6.18
conf.lb.	8.40	6.88	16.46	24.12	8.99	5.17
conf.ub.	9.57	7.53	12.64	29.01	11.29	7.18
p-value	0.000	0.000	0.000	0.000	0.000	0.000
breakpoint						
F	1062.1	1538.0	218.0	425.9	273.2	144.8
p-value	0.000	0.000	0.000	0.000	0.000	0.000
quantile	0.966	0.954	0.867	0.915	0.831	0.783

The first three columns provide summary statistics for financing costs of Austria's central government: 15-year yield spreads relative to benchmark countries, 5-year USD CDS spreads relative to benchmark countries, and the yield of foreign law bonds minus local law bonds. Column *regional gvt* summarizes the long term spread component of regional government bonds in CHF above Swiss government bonds. The last columns relate to the long term spread components of covered bonds, separately for collateral type public loans and mortgages. The sample period from December 1, 2014 to May 31, 2015 is split into subsamples ending/starting at March 1, 2015. The interval from *conf.lb.* to *conf.lb.* states 95% confidence intervals for the differences in means > March 1, 2015 minus < March 1, 2015. The breakpoint analysis reports the F-value of a Chow-est for a structural break at March 1, 2015. Quantile states the percentage of daily Chow-tests in the period from Jan to Apr 2015 that give lower $F-$values than the breakpoint test at March 1st, 2015.

Figure 2: Regional and Covered Bonds

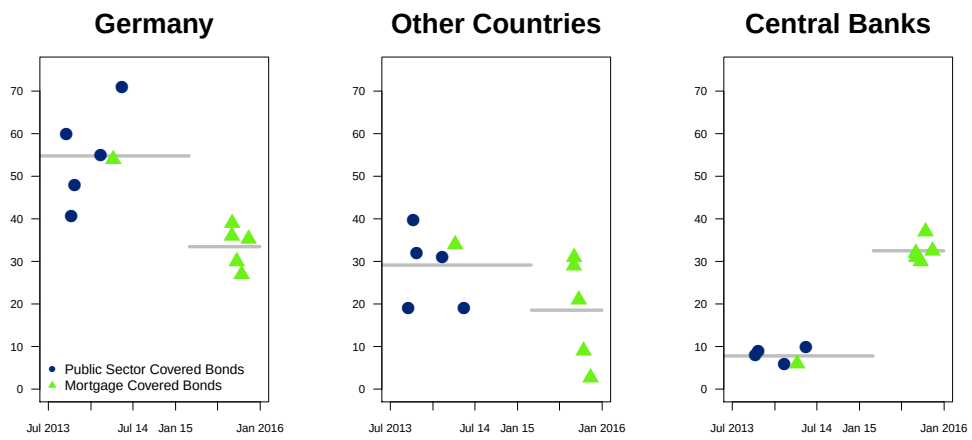


The figure displays estimates for the change in financing costs of regional government bonds and covered bonds. The left hand chart shows for regional government bonds issued in CHF the long term spread component above Swiss government bonds. The middle (right hand) chart shows the time variation in the difference in the long term spread component of covered bonds collateralized with public loans (mortgages) issued by Austrian banks relative to benchmark countries' banks.

to analyze the investor base. We describe the selection process in table 9 in appendix B. To obtain a meaningful sample size, we extend the selection criteria for the primary market analysis to include also covered bonds collateralized with mortgages and a longer time period from July 2013 to December 2015. Figure 3 illustrates the market base for these bonds. The left hand and center charts show clearly that the proportion of covered bonds issued by Austrian banks and sold to foreign countries has sharply diminished after March 2015. The average proportion of German investors shrank from 55% to 33% and the proportion of countries other than Germany or Austria from 29% to 19%. Consequently, the domestic market increased in importance.

This shift could happen thanks to increased purchases from central banks, increasing their share of primary market covered bond emissions from 8% to 32%. Furthermore, figure 3 illustrates that the type of collateral of newly issued Austrian covered bonds was primarily constituted by claims against governmental entities up to mid-2014 but mortgages after mid-2015. Thus, debt claims against Austrian governmental entities were basically no longer used as collateral by issuers of covered bonds after the HETA moratorium.

Figure 3: Primary Market for Covered Bonds Issued by Austrian Banks



The charts show the proportion of investor groups in the primary market for covered bonds issued by Austrian banks from July 1, 2013 to December 31, 2015. There are separate charts for investors from Germany, other countries, and bonds sold to central banks. Blue circles indicate public sector covered bonds, green triangles real estate covered bonds. Horizontal lines are mean values before and after March 1, 2015, respectively.

4 Conclusion

This paper finds significant effects of ex-post changes to HETA bond contracts on interest rate spreads of Austrian government bonds and covered bonds issued by Austrian financial institutions. We interpret these effects as resulting from a loss of reputation and trust in investor protection. Specifically, we find that around the announcement of the HETA moratorium on March 1st 2015, 15-year Austrian government bond yields increased by 9 basis points relative to a group of peer countries. This finding is confirmed by analysis of the dynamics of Austrian CDS compared to benchmark countries. We also find that yields of Austrian government bonds issued under Austrian law increased relative to those issued under foreign law. Data indicate that the implications for regional governments are even more pronounced: yields of regional government bonds increased sharply. In the absence of legal uncertainty, covered bonds collateralized by mortgages should not be affected by lower creditworthiness of a sovereign. Our finding of a relative increase of 6 basis points in long term yields therefore points towards legal uncertainty being priced. We also document changes in the primary market: issuance of public sector covered bonds dried up; mortgages were used as collateral for covered bond issues after the HETA moratorium. In addition the data show a dramatic drop in the purchases of covered bonds by foreign investors, especially those from Germany. This drop was partly compensated by increased demand by the Eurosystem via its PSPP quantitative easing program. Taken

together, our results provide strong empirical support for the hypothesis that the reputation of the Austrian public sector has been adversely affected by the announcement of the HETA moratorium. Thus, it appears that even highly rated sovereigns are not immune to changing perceptions of capital market participants and that these effects do not require outright sovereign defaults. We believe that the theoretical and empirical analysis of the channels through which such reputation effects may occur is a promising area for future research.

References

Marcos Chamon, Julian Schumacher, and Christoph Trebesch. Foreign law bonds. Can they reduce sovereign borrowing costs? Working Paper, 2015.

Gregory C. Chow. Tests of equality between sets of coefficients in two linear regressions. *Econometrica*, 28(3):591–605, 1960.

Juan J. Cruces and Christoph Trebesch. Sovereign defaults: The price of haircuts. *American Economic Journal: Macroeconomics*, 5(3):85–117, 2013.

Douglas W. Diamond. Reputation acquisition in debt markets. *Journal of Political Economy*, 97(4):828–862, 1989.

Bernhard Müller and Andreas Zahradnik. Die Bürgschaft: Ein Kärntner "Drama" in mehreren Akten. *ecolex*, 11:933–936, 2015.

Charles R. Nelson and Andrew F. Siegel. Parsimonious modeling of yield curves. *Journal of Business*, 60(4):473–489, 1987.

Ugo Panizza, Federico Sturzenegger, and Jeromin Zettelmeyer. The economics and law of sovereign debt and default. *Journal of Economic Literature*, 47(3):651–698, 2009.

Marcel Prokopczuk and Volker Vonhoff. Risk premia in covered bond markets. *Journal of Fixed Income*, 22(2):19–29, 2012.

Michael Tomz and Mark L. J. Wright. Empirical research on sovereign debt and default. *Annual Review of Economics*, 5:247–272, 2013.

Jeromin Zettelmeyer, Christoph Trebesch, and Mitu Gulati. The Greek debt restructuring: an autopsy. *Economic Policy*, 28(75):513–563, 2013.

A Institutional background

Originally founded as a local bank, in the years before the financial crisis Hypo Alpe Adria International AG expanded rapidly into southeastern Europe. The expansion strategy was facilitated by its ability to issue bonds guaranteed by the regional government of Carinthia, one of nine federal provinces of the Republic of Austria and a co-owner of the bank. In 2007, EU legislation put an end to further guarantees and in the same year the region sold its stake to Bayerische Landesbank who continued the rapid expansion. On the brink of bankruptcy in 2009, HETA was nationalized by the Austrian government. One rationale for nationalization was to shield the Austrian economy from potential repercussions of its then fifth-largest bank collapsing. Another reason was to avoid payments on EUR 20.1 billion bonds guaranteed by the regional government of Carinthia, an amount that likely would require cash transfers by Austria's central government to avoid a default of the region with only about half a million inhabitants. After years of bad news about the quality of the assets and the need of further capital injections by the tax payer, in 2014 the Austrian government and authorities established a strategy to impose a part of the losses on the bondholders despite the existing guarantees, while still avoiding a default of the region. Müller and Zahradnik [2015] describe the legal developments which can be summarized as follows: In August 2014 a law (HaaSanG) declared subordinated Heta bonds and the associated guarantees non-existent. While

this law later was nullified, it made the government's intention clear: The original contractual terms should be modified ex-post, in a way detrimental to investors. In late 2014, the Austrian parliament decided that the Austrian law to implement the European Banking Recovery and Resolution Directive, BaSAG, would also be applicable for liquidation entities without banking license. This paved the way for a potential bail-in of HETA creditors; seemingly the Austrian government was willing to at least partially repudiate contractual terms of HETA bonds. On March 1, 2015, the Austrian Financial Markets Authority (FMA) imposed a temporary stop of any payments of interest or redemption amounts including those on debt guaranteed by the regional government of Carinthia. To many market participants the decision was surprising as it includes senior and guaranteed debt. The limited time frame of debt relief, up to May 2016, made it obvious to market participants that the government would take further steps to implement BaSAG on HETA.[7] In July 2015, the Austrian Constitutional Court nullified HaaSanG because it was opposed to fundamental property rights. In October 2015, the law on the stability of financial markets (FinanzmarktstabilitätsG) made it possible to introduce ex-post collective action clauses to HETA bond terms that would also enable a binding vote to limit the regional government's outstanding guarantees.

[7]Market participants perceive the development as a reputation crisis, as exemplified in a research report by Privatbank Berenberg from May 1, 2015: *"Die jüngsten Rating-Downgrades und insbesondere deren Begründung stehen symptomatisch für eine Vertrauenskrise in den Finanzplatz Österreich, die seit dem HETA-Schuldenmoratorium immer weitere Kollateralschäden nach sich zieht."*

The strategy envisaged by the government can be seen as coercive since it gives leeway to push creditors towards accepting a potentially unfair offer. In principle an investor should not accept an offer that is below the fair value of his claim. To see why the ex-post introduction of collective action clauses can be detrimental to investors, consider the following simple structure of an offer, outlined in table 4. The liable party offers a vote to reduce the notional amount to A but pays those investors who vote *yes* a premium of B. Hence, if the vote goes through, accepting investors receive $A + B$, while opposing investors get only A. If the offer fails, everyone gets the fair value, C. If investors cannot coordinate, a single investor cannot influence the outcome and will therefore find it optimal to consent, even if $A+B < C$.[8] The ex-post introduction of the possibility to make such an offer to a dispersed investor base is therefore problematic.

[8]Note that while legislation, political developments, and rulings by the Austrian financial market's authority FMA made it clear that an offer as outlined was planned, the details became clear later, in January 2016. In simplified terms with the value of the assets denoted by W_A and the value of the guarantee by the regional government of Carinthia denoted as W_H, for senior guaranteed HETA bonds one can now set $A = \min(100; W_A + 10, 97)$, $B = \max(0; 64, 03 - W_A)$, and $C = \min(100; W_A + W_H)$.

Table 4: Possible Payoff in a Coercive Exit Scenario

		Outcome of the offer	
		Acceptance	Rejection
Decision by investor	Accept	$A + B$	C
	Reject	A	C

B Bond samples used for analyis

Table 5: Sources for yield curves and CDS

Series	Source	Ticker
Austria EUR zero yield	Bloomberg	I063
Belgium EUR zero yield	Bloomberg	I006
Netherlands EUR zero yield	Bloomberg	I020
Finland EUR zero yield	Bloomberg	I081
France EUR zero yield	Bloomberg	I014
Germany EUR zero yield	Bloomberg	I016
Switzerland CHF zero yield	Bloomberg	I082
Austria USD 5-year CDS	Datastream	ATG5$AC
Belgium USD 5-year CDS	Datastream	BEG5$AC
Netherlands USD 5-year CDS	Datastream	NLG5$AC
Finland USD 5-year CDS	Datastream	FIG5$AC
France USD 5-year CDS	Datastream	FRG5$AC

Table 6: Austrian government bonds issued under English law

BB Ticker	ISIN	coupon	maturity
ED258400 Corp	XS0182592062	5.125	2034-01-02
EJ032409 Corp	XS0749005343	2.452	2029-10-19
EJ032453 Corp	XS0749005186	3.560	2029-10-19
EK508109 Corp	XS1114343798	0.300	2019-09-27

Table 7: Regional government bonds in foreign currency

BB Ticker	ISIN	coupon	maturity
AF242970 Corp	CH0288977520	0.200	2020-08-07
EI150578 Corp	CH0110335871	2.125	2017-08-15
EK539035 Corp	CH0256886505	0.375	2021-04-27
EK539053 Corp	CH0256886539	0.500	2022-10-27
UV810467 Corp	CH0296231951	0.350	2023-09-22

Note: These bonds are issued by the region of Lower Austria.

Table 8: Search criteria for covered bonds in Bloomberg

Criterion	values
Security Status	Active
Currency	EUR
Exchanges	Luxembourg, Frankfurt, Vienna, Amsterdam, Brussels, NOMX Helsinki or Euronext-Paris
Maturity-Type	Bullet
Coupon Type	Fixed
Coupon Frequency	Annual
Sector/Industry Group	Banks
Country of Risk	Belgium, Netherlands, Finland, France, or Austria
Is Covered	Yes
Initial Rating	At least one AAA or AA+/Aa1 by S&P, Moody's, or Fitch
Deal Size	$\geq$ EUR 500 million
Issue Date	$\leq$ 1.1.2014
Maturity Date	$\geq$ 1.1.2017

Note: We obtain a sample of 145 bonds, 34 from Austrian issuers (13 collateralized with public loans and 21 with mortgages) and 111 from benchmark countries (19 collateralized with public loans and 92 with mortgages).

Table 9: Search criteria for covered bonds - primary market analysis

Criterion	values
Issue Date	$\geq$ 1. Juli 2013
Country of Risk	Austria
Sector/Industry Group	Banks, Financials
Is Covered	Yes
Deal Size	$\geq$ EUR 500 million
Spread to mid swaps at issue	non-missing

Note: The Bloomberg search using the above criteria gives us 16 bonds. For 10 bonds out of this sample (plus one that fulfills the criteria but is not result of the search) we are able to obtain deal sheets that provide detailed primary market information. Original sources for the deal sheets are Commerzbank (3 deal sheets), Erste Bank (2), Natixis (2), DZ Bank (2), LBBW (1), and Societe Generale (1).

CENTER FOR FINANCIAL STUDIES

CFS Working Paper Series

Recent Issues

All CFS Working Papers are available at *www.ifk-cfs.de*.

No.	Authors	Title
544	Alexander Muermann and Thomas Rauter	*Prestige and Loan Pricing*
543	Daniela Kremslehner and Alexander Muermann	*Asymmetric Information in Automobile Insurance: Evidence from Driving Behavior*
542	Ester Faia	*Sovereign Risk, Bank Funding and Investors' Pessimism*
541	Patrick Augustin, Menachem Brenner, Gunnar Grass, Marti G. Subrahmanyam	*How do Insiders Trade?*
540	Patrick Augustin, Valeri Sokolovski, Marti G. Subrahmanyam	*Why Do Investors Buy Sovereign Default Insurance?*
539	Carlo Altavilla, Marco Pagano, and Saverio Simonelli	*Bank Exposures and Sovereign Stress Transmission*
538	Volker Brühl	*How to define a Systemically Important Financial Institution (SIFI) – a new perspective*
537	Markus K. Brunnermeier, Sam Langfield, Marco Pagano, Ricardo Reis, Stijn Van Nieuwerburgh, Dimitri Vayanos	*ESBies: Safety in the tranches*
536	Günter W. Beck, Hans-Helmut Kotz, Natalia Zabelina	*Prices and consumer purchasing preferences at the border: evidence from a*