Long-Term Bond Variables Creation and Comparision

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Bond spread sources

We examined three sources of long-term bond yield data in order to create our bond spread and bond coefficient of variation dependent variables. The first was the Federal Reserve Bank of St. Louis' **FRED** database which makes available long-term bond yields at a monthly frequency.[1] The second source was the Thomson Reuters **Datastream** service. This data was available on a quarterly basis. It is unfortunately often unclear from the Datastream documentation what the maturity of these bonds is. The final source was for EMBI countries from **Data Market**.[2] Data Market makes this data available at annual intervals. They claim to have sourced their data on the EMBI+ countries from Datastream via the World Bank. However, we were unable to find this data in the World Bank's Development Indicators database.

Case coverage

Table 1 shows the coverage of these three data sets for countries for which we also have FRT data. It is important to note that Data Market is the only source with data for Argentina, Colombia, Ecuador, Panama, Peru, the Philippines, Ukraine, and Venezuala.

Transformations to underlying variables

We made a number of transformations to create our dependent variables. The first was to convert the bond yield data to bond spreads with US 10-year T-bills. For the FRED data we subtracted non-US T-bill annual average yields from annual average FRED US T-bill yields from the same year. We did the same for the Datastream data, this time using the US T-bill data from Datastream. For the Data Market yields we used

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[1] We used the series following the format `RLTLT01%sM156N` where `%s` stands for a given country's ISO two letter country code.
[2] https://datamarket.com/data/set/1dme/jp-morgan-emerging-markets-bond-index-embi#!ds=1dme!x88=7.k.b.9.a.i.4.c.f. g.e.m.2.d.5.h.8.n&display=choropleth&map=world&classifier=natural&numclasses=5

the FRED T-Bill yields to find the spreads, as this source did not include US data. Before doing so, we also divided the yields by 100 to place them on a comparable scale to the FRED and Datastream data.

Being monthly, the FRED data was the only source with sufficient frequency to find bond spread variation with the coefficient of variation. This was found using:

$$\text{Bond}_{\text{cov}} = \frac{sd(x_{c,t})}{\bar{x}_{c,t}} * 100,$$

where x is the long-term bond yield for country c in year t.

Comparision and measurement selection.

Figure 1 shows a scatterplot matrix comparing the three sets of bond spreads for which they have overlapping data. We can see that the data from FRED and Datastream is very similar. However, the Data Market data is notably different to the point where we have to wonder if they data source is measuring the same thing as the FRED and Datastream data.

Though we will lose eight cases, the large differences between the Data Market and other data sources makes it inappropriate to include this data along side the others. As such, we combine only the FRED and Datastream data, with a preference for the FRED data when available. Table 2 shows the sample of cases for which we have this data

The final step in creating our spreads dependent variable was to find the year-on-year change in FRED/Datastream bond spread variable. Figure 2 shows the distribution of this data.

Table 1: Comparision of Available Bond Spread Data Across 3 Sources

ISO2C	FRED Begin	FRED End	DS Begin	DS End	DM Begin	DM End
AR					1994	2014
AT	1990	2015	1985	2015		
AU	1969	2015	1969	2015		
BE	1955	2015	1960	2015		
BG			2002	2015	1994	2013
BR			2006	2015	1994	2014

ISO2C	FRED Begin	FRED End	DS Begin	DS End	DM Begin	DM End
CA	1955	2015	1953	2015		
CH	1955	2015	1953	2015		
CN			2002	2015		
CO					1994	2014
CZ	2000	2015				
DE	1956	2015	1957	2015		
DK	1987	2015				
EC					1994	2014
EG			2010	2015	2002	2008
ES	1980	2015	1987	2015		
FI	1988	2015	1988	2015		
FR	1960	2015	1960	2015		
GB	1960	2015	1963	2015		
GR	1997	2015	2009	2015		
HK			2010	2015		
HU	1999	2015	1999	2015		
IE	1970	2015	2003	2015		
IL	1997	2015	1987	2015		
IN			2003	2015		
IS	1992	2015	2003	2015		
IT	1991	2015	1953	2015		
JP	1989	2014	2004	2015		
KR	2000	2015	2004	2015		
LU	1993	2015				
MA			1995	2015	1994	2006
MT			1997	2015		
MX	2002	2006	1999	2015	1994	2014
NG			2009	2015	1994	2006
NL	1959	2015	1959	2015		
NO	1985	2015				
NZ	1970	2015	1985	2015		

ISO2C	FRED Begin	FRED End	DS Begin	DS End	DM Begin	DM End
PA					1994	2014
PE					1994	2014
PH					1994	2014
PL	2001	2015	1999	2015	1994	2007
PT	1993	2015	1993	2015		
RU	1999	2015	2007	2015	1994	2014
SE	1986	2015	1960	2015		
SG			1998	2015		
SI	2002	2015				
SK	2000	2015	2000	2015		
TR			2010	2015	1999	2014
UA					2001	2014
US	1955	2015	1953	2015		
VE					1994	2014
ZA	1957	2015	1957	2015	2002	2014

Table 2: Bond Spread Data Available From Both FRED or Datastream

Country	Combined Begin	Combined End
Armenia	2004	2015
Australia	1969	2015
Austria	1985	2015
Azerbaijan	2011	2014
Belarus	2004	2015
Belgium	1955	2015
Botswana	2009	2015
Brazil	2006	2015
Bulgaria	2002	2015
Burundi	2008	2015
Canada	1953	2015

Country	Combined Begin	Combined End
Chile	1994	2015
China	2002	2015
Czech Republic	2000	2015
Denmark	1987	2015
Egypt	2010	2015
Finland	1988	2015
France	1960	2015
Germany	1956	2015
Ghana	2009	2015
Greece	1997	2015
Hong Kong	2010	2015
Hungary	1999	2015
Iceland	1992	2015
India	2003	2015
Indonesia	2003	2015
Ireland	1970	2015
Israel	1987	2015
Italy	1953	2015
Japan	1989	2015
Jordan	2004	2015
Kazakhstan	2004	2015
Korea, Republic of	2000	2015
Kyrgyzstan	2009	2015
Latvia	2003	2015
Lithuania	2003	2015
Luxembourg	1993	2015
Malawi	2010	2015
Malaysia	1996	2015
Malta	1997	2015
Mexico	1999	2015
Moldova, Republic of	1997	2015

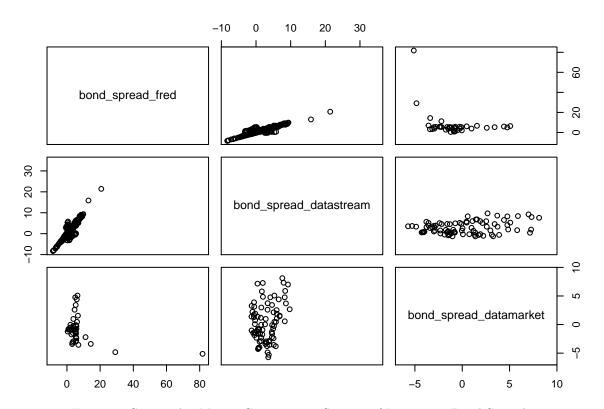| Country	Combined Begin	Combined End
Morocco	1995	2015
Netherlands	1959	2015
New Zealand	1970	2015
Nigeria	2009	2015
Norway	1985	2015
Pakistan	2003	2015
Poland	1999	2015
Portugal	1993	2015
Romania	2007	2015
Russian Federation	1999	2015
Sierra Leone	2008	2015
Singapore	1998	2015
Slovakia	2000	2015
Slovenia	2002	2015
South Africa	1957	2015
Spain	1980	2015
Sri Lanka	2011	2015
Sweden	1960	2015
Switzerland	1953	2015
Taiwan, Province of China	1995	2015
Thailand	2000	2015
Turkey	2010	2015
Uganda	2010	2015
United Kingdom	1960	2015
United States	1953	2015
Viet Nam	2007	2015

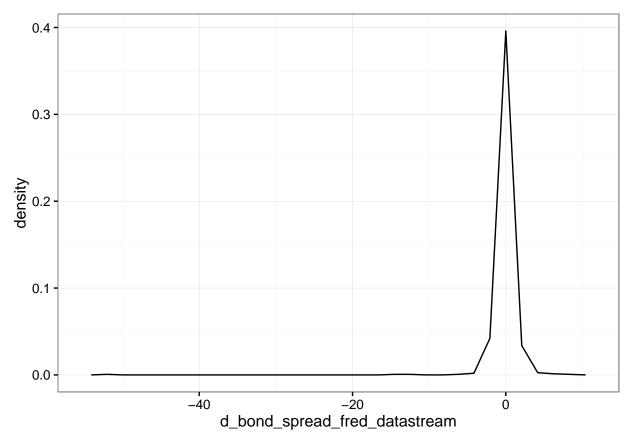Figure 1: Scatterplot Matrix Comparing 3 Sources of Long-term Bond Spreads

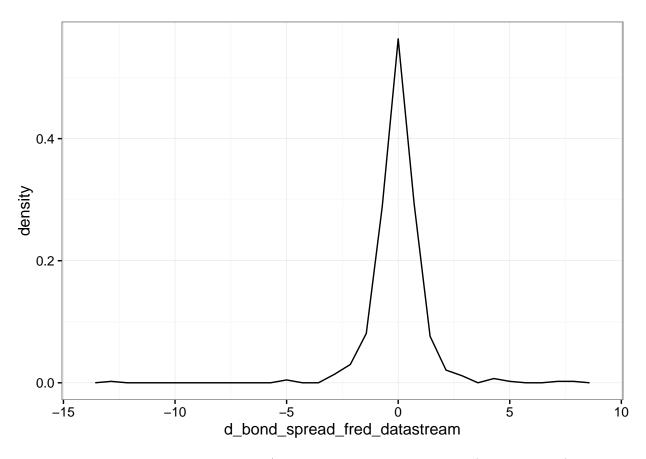Figure 2: Distributions of FRED/Datastream Bond Spread Change

Figure 3: Distributions of FRED/Datastream Bond Spread Change (3 Outlier Drop)