

# How to Link CRSP and Trace

Diego Bonelli and Katsiaryna Falkovich

May 12, 2024

We create a linking table that matches bond issues from TRACE to firms in CRSP. We merge TRACE with Mergent FISD using bonds' 9-digit CUSIPs to get issuer and parent CUSIPs for each bond. We also use TRACE-reported trading symbols, which are firm-level tickers, and company names. The linking process is structured into the following distinct steps:

## Step 1: Matching using issuer CUSIP

We start by matching a bond issue with a CRSP firm (permco) using a 6-digit issuer CUSIP. We use issuer CUSIP as reported by FISD to identify the issuer of a bond and use the first 6 digits of a firm CUSIP in CRSP. The firm needs to have the matching 6-digit CUSIP at the offering date of the bond.

Subsequently, we track the issuing firm forward over time using the CRSP delisting table to accommodate changes in permcos due to mergers or spin-offs. In scenarios where a bond corresponds to multiple firms on the same date, we employ trading symbols to determine the correct match. If, during this period, the TRACE-reported trading symbol aligns with the company symbol in CRSP, we prioritize that match as the primary unique match. However, in instances of multiple matches, we verify whether the bond's trading symbol aligns with the firm's symbol at any point. Matches meeting this criterion are designated as primary links, while others are classified as secondary links.

## Step 2: Matching using parent CUSIP

We proceed by matching the remainig unmatched bonds to CRSP firms using parent CUSIPs. We use parent identifier to get issuer CUSIP(s) of the parent firm. The same parent firm might

consists of several issuers in FISD. If there was a change in the CUSIP or a merger/spin off, the firm will get a new issuer CUSIP but the parent identifier consistently refers to the same firm.

For each bond issue, we match the 6-digit CUSIP(s) of the parent with the firm CUSIP in CRSP.

Using the last available CUSIP match of the parent, we track the parent back in time until the offering date of the bond. We identify periods where the bond is associated with different permcos. Due to complexities arising from mergers/spin-offs, multiple firm paths may lead to the same parent. Here, we utilize trading symbols to identify the path that goes through the correct firms. First, we ensure that the identified path reaches the first symbol match (the symbol matches and is valid in both databases) before the other matched firms. Next, in case of several firm-date matches, we go through the same procedure as in the matching using issuer CUSIP. We keep the matches for which the TRACE-reported trading symbol matches the company symbol in CRSP at the time. In the remaining cases, we keep the matches for which the bond's trading symbol matches the firm's symbol at some point and there are no alternative valid matches.

### **Step 3: Matching using issuer CUSIP without the match at the offering date**

In this step, we relax the requirement set in Step 1, where the firm must have a matching 6-digit CUSIP at the offering date. This relaxation accounts for cases where a firm becomes public after bond issuance. Consequently, we repeat the procedure of Step 1 without requiring CUSIP matches at the offering date.

### **Step 4: Matching using trading symbol**

For the remaining bonds, we resort to matching firms using trading symbols. This necessitates that the trading symbols in both CRSP and TRACE databases are active simultaneously. Matches are considered valid only during periods where dates overlap in both databases.

Following the same procedure as in the preceding steps, we trace matched firms forward using the delisting table. The group with the longest period of valid symbol matches is retained. We

remove 6 cases of multiple firm-bond matches at the same time.

## Step 5: Matching by issuer name and parent name

Finally, we match the bonds using company names. First, we match the name of the issuing firm from FISD with the firm names in CRSP at the offering date. Next, for the remaining bonds, we match parent firm names from FISD with firm names in CRSP at the offering date.

## Linking table structure

date_st	date_end	cusip_id	Permco	link_type	Match_type
link starting date	link_end date	bond cusip	permco	<p>C: (checked) if unique permco-date match or if permco is additionally matched by a valid symbol within the dates.</p> <p>P: (primary) if matched by steps 1 to 3, not unique permco-date match, but is matched by symbol at a certain point.</p> <p>S: (secondary) if matched by steps 1 to 3, not unique permco-date match, and not matched by symbol at a certain point.</p>	<p>I: match by issuer CUSIP</p> <p>P: match by parent CUSIP</p> <p>ID: match by issuer CUSIP without the match at the offering date</p> <p>SD: match by trading symbol</p> <p>IN: match by issuer name</p> <p>PN: match by parent name</p>