

CRSP US STOCK & INDEX DATABASES

KNOWLEDGE BASE

CITIGROUP VOLUME HAS MISSING VALUES FOR FOUR DATES

There are four dates where the daily trading volume for Citigroup, PERMNO 70519, Ticker C, exceeds our database's maximum value (2147483648). Instead of inserting a false value into the database, we have listed the volumes for these dates as -99 (missing). The true trading volume values for those dates:

Date	Volume
20090805	2674463281
20091217	3772638437
20091218	2813696
20101207	3267829406

HOW CAN A SECURITY HAVE A NEGATIVE DIVIDEND AMOUNT?

There are four PERMNOs in the CRSP security universe with negative dividend amounts. In the 1920s, some companies required the payment of assessment fees from their shareholders. These assessment fees are recorded as negative dividend amounts and represent an obligation of the shareholders to make payments. Two securities, Chicago Milwaukee St. Paul & Pacific (PERMNO 11228) and Wallace Murray Corp (PERMNO 15229) fall into that category. Two other securities with negative dividend amounts are more recent: British Airways PLC (PERMNO 71589) and BT Group PLC (PERMNO 66835). These amounts have been verified as installment payments.

CHICAGO MILWAUKEE ST PAUL & PAC

SIC: 400 (Railroads)

PERMNO	DISTCD	DIVAMT	EXDT
11228	2844	-32.0600014	3/2/1928

WALLACE MURRAY CORP

SIC: 3431 (Heating Equipment, Except Electric and Warm Air)

PERMNO	DISTCD	DIVAMT	EXDT
15229	3260	-10.0000000	1/27/1927

BRITISH AIRWAYS PLC

Share code: 36

SIC: 4512 (Air Transportation Scheduled)

PERMNO	DISTCD	DIVAMT	EXDT
71589	1282	-9.9200001	8/12/1987

B T GROUP PLC

SIC: 4813 (Communications Services, Not Elsewhere Classified)

PERMNO	DISTCD	DIVAMT	EXDT
66835	1280	-3.1080000	6/3/1985
66835	1280	-2.7387900	4/2/1986

HOW ARE STANDARD INDUSTRIAL CLASSIFICATION (SIC) CODES COLLECTED?

CRSP does not actively assign SIC codes. We obtain NASDAQ SIC codes directly from the NASDAQ exchange and obtain NYSE, NYSE American, and ARCA SIC codes from Interactive Data (formerly FT Interactive Data). All data providers have told CRSP that they reference SEC documents as SIC code sources.

SIC codes can be useful for rough groupings of industries. Beyond that they should be used with caution—they are not assigned or reviewed with a strict procedure by any government agency, most large companies belong in multiple SIC codes, and they change over time. After the initial SIC code assignment when a company goes public, no government agency ever looks at that code or the company again—quite often a company reports its initial SIC code forever. There are cases in which companies would have obsolete SIC codes from the 1972-coding scheme in their SEC filings from the early 1990s.

The U.S. Department of Labor provides information on the 1987 SIC coding scheme at osha.gov/oshstats/sicser.html.

WHY DOES THE HISTORY FOR POWERSHARES QQQ TRUST ONLY EXTEND TO APRIL 12, 2007?

PowerShares QQQ Trust is an exchange traded fund; there are some special considerations regarding its association with another ETF security, NASDAQ 100 Trust Series I.

- PowerShares QQQ Trust begins its history on April 12, 2007 and the NASDAQ 100 Trust Series ends its history the previous day, April 11, 2007.
- The final distribution recorded for the NASDAQ 100 Trust Series lists PowerShares QQQ as its acquirer.
- Under CRSP's methodology, the security-level identifier, PERMNO, cannot be associated with multiple company-level identifiers, PERMCO. Thus, PowerShares QQQ cannot maintain the same security level identifier as the NASDAQ 100 Trust Series due to the securities having different PERMCO identifiers.
- To merge the return histories of both securities replace the initial null value for PowerShares QQQ Trust with the delisting return of the NASDAQ 100 Trust Series I.

Example:

Company Name	Delisting Payment Date	Delisting Return
NASDAQ 100 TRUST SERIES I	20070412	0.00792

Native Return Series

Company Name	Delisting Payment Date	Delisting Return
NASDAQ 100 TRUST SERIES I	20070411	-0.010519
POWERSHARES QQQ TRUST	20070412	-66
POWERSHARES QQQ TRUST	20070413	0.00202

Merged Return Series

Company Name	Delisting Payment Date	Delisting Return
NASDAQ 100 TRUST SERIES I	20070411	-0.010519
POWERSHARES QQQ TRUST	20070412	-0.00792
POWERSHARES QQQ TRUST	20070413	0.00202

WHY DO MORE NYSE-LISTED SECURITIES HAVE MISSING CLOSING BID & ASK DATA DURING THE PERIOD FROM 20001002 TO 20010518?

In researching the bid and ask quotes, CRSP found a number of questionable data points. Registered market makers, usually off the primary listed exchange, periodically posted noncompetitive quotes that were captured as the closing bid and ask. These quotes had wide spreads, not typical of the day's trading activity. In many cases, spreads were intentionally set as wide as possible with bids close to a penny and asks close to double the market price. Alternate quotes that more closely

represented the trading activity were not immediately available, so a missing value is reported pending further review by CRSP. Roughly 5 % of all bid and ask data points are missing. Over one-third of these occur between October 2000 and May 2001.

WHAT IS THE MEANING BEHIND AN EXCHANGE CODE OF 0?

If an issue leaves an exchange that is covered by CRSP (NYSE, NYSE American, or NASDAQ) and later returns, the gap is marked in the Name History Array with an Exchange Code of 0. During this time, event data is not tracked and time series data is filled in with missing values.

CRSP will resume coverage of the security if it has primary listing on NYSE, NYSE American, or NASDAQ and otherwise fulfills our universe requirements for the stock database. New PERMNO or PERMCO may be assigned, depending on events that took place during the off-CRSP period.

EXAMPLE: PERMNO 83404

Namedt	Enddt	Cusip	Ticker	Company Name	CLS	SH	Ex	SIC
19960430	19990616	71892810	PHYX	PHYSIOMETRIX INC	11		3	3840
19990617	20000611	71892810		PHYSIOMETRIX INC	11		0	3840
20000612	20010823	71892810	PHYX	PHYSIOMETRIX INC	11		3	3840
20010824	20050729	71892810	PHYX	PHYSIOMETRIX INC	11		3	3840

This security ceased trading on NASDAQ on June 16, 1999. It resumed trading on NASDAQ on June 12, 2000. The interval between these dates is represented by a name line with Exchange Code set to zero, and the Ticker field blank.

WHEN A SECURITY IS DELISTED AND THEN BEGINS TRADING AGAIN AT A LATER DATE, DOES CRSP PICK IT UP AGAIN OR IS IT LOST FOREVER?

If an issue leaves an exchange that is covered by CRSP (NYSE, NYSE American, or NASDAQ) and later returns, the gap is marked in the Name History Array with an Exchange Code of 0. During this time, event data is not tracked and time series data is filled in with missing values.

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WHAT IS WHEN-ISSUED TRADING? HOW ARE ISSUES TRADING WHEN-ISSUED HANDLED IN THE CRSP STOCK DATABASE?

Securities trade on a when-issued basis when officially they have yet to be issued, but they trade as if they have been. These transactions are formally settled after the securities have been issued.

INCLUDED IN THE SUBSCRIBER VERSION OF THE STOCK DATABASE

Reorganization - All of the shares of an established security are trading when-issued due to some type of restructuring

EXCLUDED FROM THE SUBSCRIBER VERSION OF THE STOCK DATABASE

- **Leading prices** - All of the shares of a security are trading when-issued at the start of its trading history
- **Additional** - A security issues more shares that trade when-issued, during the same time that the established shares of the security continue to trade regular-way
- **Ex-distribution** - A portion of a security's shares trade when-issued and without entitlement to a particular distribution, during the same time that the rest of its shares trade regular way, with the entitlement to the distribution

WHAT DO THE CHARACTERS IN THE CUSIP NUMBER REPRESENT? WHY DO SOME VALUES IN THE CUSIP FIELD BEGIN WITH A LETTER? CAN TYPE OF SECURITY OR SHARE CLASS BE DETERMINED USING ONLY CUSIP NUMBER?

The CUSIP number consists of nine characters. The first six characters uniquely identify the issuer and have been assigned to issuers in approximate alphabetical sequence. The seventh and eighth characters identify the issue. The ninth character is used as a check digit and is not stored in the CRSP US Stock Databases. The CRSP/Compustat Merged Database (CCM) displays all nine characters of CUSIP number for covered securities. CINS (CUSIP International Numbering System) identifies securities issued outside of the US or Canada that trade internationally. ADRs are issued in the US, so they are not in this category. Values for CINS begin with a letter indicating country or region. While the seventh and eighth characters of the CUSIP number are used to distinguish different issues of the same issuer, there is no absolute scheme for determining type of security or share class solely on their values.

ARE THERE ADVANTAGES TO USING CRSP'S PERMNO INSTEAD OF CUSIP NUMBER?

There are three situations that can cause missed links or mismatches when using CUSIPs from different sources:

1. CUSIPs can change over time for a security due to name changes or capital changes. If a database only contains the most recent CUSIP, or reassigns CUSIPs after trading stops, a backtesting universe identified by CUSIP will continue to drop links to the security data over time.
2. CUSIP allows a mechanism for third-parties to assign an unofficial CUSIP for a security otherwise unassigned. These CUSIPs contain a 9 in the 4th and 5th and/or 7th digit. If different third-parties select a different dummy CUSIP, the link between them can be missed or wrong. This is only an issue before 1968, before CUSIP existed, or in a few cases where foreign issues on US exchanges were assigned ISIN but never CUSIP.
3. CUSIP provides for the possibility of reusing a CUSIP, or equivalently, it may continue a CUSIP after a corporate event that could be considered significant enough to produce a new company or issue.

There is only one known case, PepsiAmericas in 2000 and 2001, when this occurred. CRSP's name history for a security tracks changes in its CUSIP number, accessible by the unique identifier, PERMNO. On CRSP, a PERMNO can be associated with more than one eight-digit CUSIP number over time, but an eight-digit CUSIP number can only be associated with one PERMNO. CRSP never changes or drops CUSIPs that were ever active, so backtesting universes identified by CUSIP always link to the correct data. In the third situation mentioned above, CRSP will assign a dummy CUSIP to the older security to preserve the uniqueness of CUSIP to PERMNO.

HOW ARE SHARES OUTSTANDING DATA COLLECTED AND MAINTAINED?

CRSP primarily relies on vendors for shares data. Shares Outstanding values are reviewed by CRSP researchers when a security is added to our database. Subsequent shares are run through an extensive set of CRSP filters which look primarily for magnitude jumps and drops in share values and reversals of values. Depending on the source, a lag of one or two months may be seen between when changes in Shares Outstanding values occur and when they are reflected in our sources.

WHAT ARE ADRS AND HOW ARE THE SHARES OUTSTANDING COMPUTED?

Companies incorporated in foreign countries and trading on foreign exchanges can be traded in the U.S. stock market as

American Depositary Receipts (ADRs). An investment bank will buy shares of a non-US-traded stock in a foreign market and issue ADR shares on the US market. A depository bank handles the issuance and cancellation of ADR certificates. The depository bank sets the ratio of US ADRs per home country share. This ratio can be less than or greater than 1 in order to get the ADR in a comparable trading range with US equities. CRSP does not have a variable for the ratio of underlying ordinary shares to ADR shares. The shares outstanding values for ADRs listed in the CRSP stock database are ADR shares traded in the U.S. and not the underlying common shares.

WHAT ARE EQUITY SECURITIES AND ARE THEY ALL INCLUDED IN THE CRSP DATABASE?

In general, any security that represents ownership interest in an entity is equity. All the securities listed on CRSP are equity securities, but not all equity securities are listed on CRSP.

The following sharecodes are included on the subscriber version of the CRSP database:

- 10s - Ordinary Common Shares (domestic), Capital Stock, Global Registered Shares
- 20s - Certificates, Americus Trusts (exclusively sharecode 23)
- 30s - ADRs, ADSs (American Depositary Receipts, American Depositary Shares), New York Registry Shares
- 40s - SBIs (Shares of Beneficial Interest)
- 70s - Units (Units of Beneficial Interest, Units of Limited Partnership Interest, Royalty Trusts, Trust Units, Depository Units), ETFs (exclusively sharecode 73)

The following sharecodes are maintained internally by CRSP, but are excluded from the subscriber version of the CRSP database:

- 50s - Warrants
- 60s - Rights
- 80s - Preferred Shares, Capital Income Securities (with interest rate)
- 90s - Bundled units, such as a common packaged with a warrant or right

ARE IPO DATA AVAILABLE?

Daily open prices are available for securities traded on NYSE, NYSE American, and NASDAQ exchanges beginning June 15, 1992. They represent the first trade after market opens. For NYSE, additional daily open prices are available between December 1925 and June 1962. If a security went public on a CRSP-covered exchange under the circumstances described above, its IPO data should be available.

WHY ISN'T AX (ARCHIPELAGO HOLDINGS INC) COVERED IN THE CRSP STOCK DATABASE?

Archipelago Holdings is an unusual case. It has unlisted trading privileges on NYSE American, but its primary listing is on the Pacific Stock Exchange. Per CRSP convention, a security needs to have a primary listing on NYSE, NYSE American, or NASDAQ for coverage in the stock database.

WHY ARE THERE CLOSING BIDS THAT ARE GREATER THAN OR EQUAL TO CLOSING ASKS IN THE CRSP STOCK DATABASE?

This situation would be known as crossed quotations. Basically crossed quotations happens when the Ask price of one Market Maker is the same or lower than the Bid price of another Market Maker. Though it is an unusual condition, it does occur in fastmoving

markets. Exchanges have end-of-day cutoff filters in place for certain situations, but this crossed- quotations event is not filtered, as it is deemed acceptable by FINRA (Financial Industry Regulatory Authority) . Because these cases of conflicting bid and ask values legitimately exist, CRSP also retains these quotes and makes them available in our database.

FOR ANY GIVEN POINT IN TIME, WHY IS THE S&P 500 MEMBERSHIP NOT EQUAL TO 500 IN THE CRSP STOCK AND INDEX DATABASES?

CRSP receives S&P 500 security addition and deletion information directly from Standard and Poor's. Sometimes a security will delist from the CRSP Stock database earlier than Standard and Poor's deletion date. In other cases, Standard and Poor's addition date will include "when-issued" security data which CRSP does not include in the Stock database. Both of these cases will decrease the S&P 500 membership count in the CRSP database.

SEARS HOLDING CORP AND SEARS HOMETOWN & OUTLET STORES PERMCO REVISION AND CLARIFICATION

In 201209, Sears Holding Corp had a rights distribution for Sears Hometown & Outlet Stores, Inc for all of its common shareholders. The rights offering was assigned the CRSP Security Identifier, PERMNO, 95601. NASDAQ assigned the issue identifier, Issuno, and org_id, Compno, 70617 and 60072337, respectively. The org_id assignment is a little inconsistent because the security had the same CUSIP Issuer Code as Sears Holding Corp but was being given a different org_id – 60072337 vs 60019149 and a different ticker. As a result, we assigned the right the same CRSP Company Identifier, PERMCO, as the parent company. In 201210, the Sears Hometown & Outlet Stores, Inc common shares were issued to cover the rights that had been exercised. NASDAQ gave these shares an issue identifier of 71332 and org_id of 60072337. This is the same org_id it gave the right in the previous month even though they have different CUSIP Issuer Codes, but the same tickers. Because the new security had the same org_id as PERMNO 95601, it was given the same PERMCO. Seen all together, it is clear that PERMNO 95601 should not have been given org_id 60072337 and PERMNO 13656 should not have the same PERMCO as PERMNO 89757. To fix the identifiers, we changed org_id for PERMNO 95601 to 60019149 from 60072337 (this is a non-subscriber permno) and changed the PERMCO for PERMNO 13656 to 54517 from 44118.

PERMNO	CUSIP	PERMCO	Compno	Issuno	EX	SIC	Name	Dist	Share	Dlist	Nasd
89757	81235010	44118	60019149	40191	3	5331	4	4	93	1	7

Begdt - Enddt	Htick	DEL	Latest Company Name
20030610-20130830	SHLD	100	SEARS HOLDINGS CORP

PERMNO CUSIP PERMCO Compno Issuno EX SIC Name Dist Share Dlist Nasd

95601 81235011 44118 60072337 70617 3 0 1 0 0 0 10

Begdt - Enddt HTick DEL Latest Company Name

20120912-20121002 SHOSR 0 SEARS HOLDINGS CORP

PERMNO CUSIP PERMCO Compno Issuno EX SIC Name Dist Share Dlist Nasd

13656 81236210 44118 60072337 71332 3 9999 1 0 10 1 3

Begdt - Enddt HTick DEL Latest Company Name

20121012-20130830 SHOS 100 SEARS HOMETOWN & OUTLET STRS INC

After:

PERMNO CUSIP PERMCO Compno Issuno EX SIC Name Dist Share Dlist Nasd

89757 81235010 44118 60019149 40191 3 5331 4 4 93 1 7

Begdt - Enddt HTick DEL Latest Company Name

20030610-20130830 SHLD 100 SEARS HOLDINGS CORP PERMNO CUSIP PERMCO Compno Issuno EX SIC Name Dist Share Dlist Nasd

95601 81235011 44118 60019149 70617 3 0 1 0 0 0 10

Begdt - Enddt HTick

20120912-20121002 SHOSR

DEL Latest Company Name

0 SEARS HOLDINGS CORP

PERMNO CUSIP PERMCO Compno Issuno EX SIC Name Dist Share Dlst Nasd

13656 81236210 54517 60072337 71332 3 9999 1 0 10 1 3

Begdt - Enddt HTick DEL Latest Company Name

20121012-20130830 SHOS 100 SEARS HOMETOWN & OUTLET STRS INC