odbc — Load, write, or view data from ODBC sources	

Description	Quick start	Menu	Syntax
Options	Remarks and examples	Reference	Also see

# Description

odbc allows you to load, write, and view data from Open DataBase Connectivity (ODBC) sources into Stata. ODBC is a standardized set of function calls for accessing data stored in both relational and nonrelational database-management systems. By default on Unix platforms, iODBC is the ODBC driver manager Stata uses, but you can use unixODBC by using the command set odbcmgr unixodbc.

ODBC's architecture consists of four major components (or layers): the client interface, the ODBC driver manager, the ODBC drivers, and the data sources. Stata provides odbc as the client interface. The system is illustrated as follows:



odbc list produces a list of ODBC data source names to which Stata can connect.

odbc query retrieves a list of table names available from a specified data source's system catalog.

odbc describe lists column names and types associated with a specified table.

odbc load reads an ODBC table into memory. You can load an ODBC table specified in the table() option or load an ODBC table generated by an SQL SELECT statement specified in the exec() option. In both cases, you can choose which columns and rows of the ODBC table to read by specifying *extvarlist* and if and in conditions. *extvarlist* specifies the columns to be read and allows you to rename variables. For example,

. odbc load id=ID name="Last Name", table(Employees) dsn(Northwind)

reads two columns, ID and Last Name, from the Employees table of the Northwind data source. It will also rename variable ID to id and variable Last Name to name.

odbc insert writes data from memory to an ODBC table. The data can be appended to an existing table or replace an existing table.

odbc exec allows for most SQL statements to be issued directly to any ODBC data source. Statements that produce output, such as SELECT, have their output neatly displayed. By using Stata's ado language, you can also generate SQL commands on the fly to do positional updates or whatever the situation requires.

odbc sqlfile provides a "batch job" alternative to the odbc exec command. A file is specified that contains any number of any length SQL commands. Every SQL command in this file should be delimited by a semicolon and must be constructed as pure SQL. Stata macros and ado-language syntax are not permitted. The advantage in using this command, as opposed to odbc exec, is that only one connection is established for multiple SQL statements. A similar sequence of SQL commands used via odbc exec

would require constructing an ado-file that issued a command and, thus, a connection for every SQL command. Another slight difference is that any output that might be generated from an SQL command is suppressed by default. A loud option is provided to toggle output back on.

set odbcdriver unicode specifies that the ODBC driver is a Unicode driver (the default). set odbcdriver ansi specifies that the ODBC driver is an ANSI driver. You must restart Stata for the setting to take effect.

set odbcmgr iodbc specifies that the ODBC driver manager is iODBC (the default). set odbcmgr unixodbc specifies that the ODBC driver manager is unixODBC.

## Quick start

List all defined data source names (DSNs) to which Stata can connect odbc list.

List available table names in MyDSN odbc query "MyDSN"

Describe the column names and data types in table MyTable from MyDSN odbc describe "MyTable", dsn("MyDSN")

Load MyTable into memory from MyDSN

odbc load, table("MyTable") dsn("MyDSN")

## Menu

#### odbc load

 $\label{eq:File} \mbox{File} > \mbox{Import} > \mbox{ODBC} \mbox{ data source}$ 

#### odbc insert

File > Export > ODBC data source

## Syntax

```
List ODBC sources to which Stata can connect
```

odbc <u>li</u>st

```
Retrieve available names from specified data source
```

odbc query ["DataSourceName", verbose schema connect\_options]

List column names and types associated with specified table

odbc describe ["TableName", connect\_options]

Import data from an ODBC data source

```
odbc load [extvarlist] [if] [in], { table("TableName") | exec("SqlStmt") }
[load_options connect_options]
```

Export data to an ODBC data source

odbc insert [varlist] [if] [in], table("TableName")
 {dsn("DataSourceName") | connectionstring("ConnectStr") }
 [insert\_options connect\_options]

Allow SQL statements to be issued directly to ODBC data source

```
odbc <u>exe</u>c("SqlStmt"),
   {dsn("DataSourceName") | connectionstring("ConnectStr") }
   [connect_options]
```

Batch job alternative to odbc exec

```
odbc sqlfile("filename") ,
```

```
{dsn("DataSourceName") | connectionstring("ConnectStr") }
[loud connect_options]
```

Specify ODBC driver type

set odbcdriver { unicode | ansi } [, permanently ]

```
Specify ODBC driver manager (Mac and Unix only)
```

```
set odbcmgr { iodbc | unixodbc } [, permanently ]
```

DataSourceName is the name of the ODBC source (database, spreadsheet, etc.)

ConnectStr is a valid ODBC connection string

TableName is the name of a table within the ODBC data source

SqlStmt is an SQL SELECT statement

filename is pure SQL commands separated by semicolons

extvarlist contains sqlvarname varname = sqlvarname

connect_options	Description
user(UserID)	user ID of user establishing connection
password(Password)	password of user establishing connection
$\underline{d}$ ialog(noprompt)	do not display ODBC connection-information dialog, and do not prompt user for connection information
<u>d</u> ialog(prompt)	display ODBC connection-information dialog
<u>d</u> ialog(complete)	display ODBC connection-information dialog only if there is not enough information
<u>d</u> ialog(required)	display ODBC connection-information dialog only if there is not enough mandatory information provided
dsn("DataSourceName")	name of data source
<pre>f connectionstring("ConnectStr")</pre>	ODBC connection string

\*dsn("DataSourceName") is not allowed with odbc query. You may not specify both DataSourceName and connectionstring() with odbc query. Either dsn() or connectionstring() is required with odbc insert, odbc exec, and odbc sqlfile.

load_options	Description
* <u>t</u> able(" <i>TableName</i> ")	name of table stored in data source
* <u>e</u> xec(" <i>SqlStmt</i> ")	SQL SELECT statement to generate a table to be read into Stata
clear	load dataset even if there is one in memory
noquote	alter Stata's internal use of SQL commands; seldom used
lowercase	read variable names as lowercase
sqlshow	show all SQL commands issued
allstring	read all variables as strings
<u>datestr</u> ing	read date-formatted variables as strings
<u>multis</u> tatement	allow multiple SQL statements delimited by ; when using exec()
bigintasdouble	store BIGINT columns as Stata doubles on 64-bit operating systems

\*Either table("*TableName*") or exec("*SqlStmt*") must be specified with odbc load.

insert_options	Description
* <u>t</u> able(" <i>TableName</i> ")	name of table stored in data source
<u>over</u> write	clear data in ODBC table before data in memory is written to the table
<u>ins</u> ert	default mode of operation for the odbc insert command
quoted	quote all values with single quotes as they are inserted in ODBC table
sqlshow	show all SQL commands issued
as("varlist")	ODBC variables on the data source that correspond to the variables in Stata's memory
block	use block inserts

\*table("TableName") is required for odbc insert.

# Options

- user (*UserID*) specifies the user ID of the user attempting to establish the connection to the data source. By default, Stata assumes that the user ID is the same as the one specified in the previous odbc command or is empty if user() has never been specified in the current session of Stata.
- password(*Password*) specifies the password of the user attempting to establish the connection to the data source. By default, Stata assumes that the password is the same as the one previously specified or is empty if the password has not been used during the current session of Stata. Typically, the password() option will not be specified apart from the user() option.
- dialog(noprompt | prompt | complete | required) specifies the mode the ODBC Driver Manager uses to display the ODBC connection-information dialog to prompt for more connection information.

noprompt is the default value. The ODBC connection-information dialog is not displayed, and you are not prompted for connection information. If there is not enough information to establish a connection to the specified data source, an error is returned.

prompt causes the ODBC connection-information dialog to be displayed.

complete causes the ODBC connection-information dialog to be displayed only if there is not enough information, even if the information is not mandatory.

required causes the ODBC connection-information dialog to be displayed only if there is not enough mandatory information provided to establish a connection to the specified data source. You are prompted only for mandatory information; controls for information that is not required to connect to the specified data source are disabled.

- dsn("*DataSourceName*") specifies the name of a data source, as listed by the odbc list command. If a name contains spaces, it must be enclosed in double quotes. By default, Stata assumes that the data source name is the same as the one specified in the previous odbc command. This option is not allowed with odbc query. Either the dsn() option or the connectionstring() option may be specified with odbc describe and odbc load, and one of these options must be specified with odbc insert, odbc exec, and odbc sqlfile.
- connectionstring("ConnectStr") specifies a connection string rather than the name of a data source. Stata does not assume that the connection string is the same as the one specified in the previous odbc command. Either DataSourceName or the connectionstring() option may be specified with odbc query; either the dsn() option or the connectionstring() option can be specified with odbc describe and odbc load, and one of these options must be specified with odbc insert, odbc exec, and odbc sqlfile.

- table("*TableName*") specifies the name of an ODBC table stored in a specified data source's system catalog, as listed by the odbc query command. If a table name contains spaces, it must be enclosed in double quotes. Either the table() option or the exec() option—but not both—is required with the odbc load command.
- exec("SqlStmt") allows you to issue an SQL SELECT statement to generate a table to be read into Stata. An error message is returned if the SELECT statement is an invalid SQL statement. The statement must be enclosed in double quotes. Either the table() option or the exec() option—but not both—is required with the odbc load command.
- clear permits the data to be loaded, even if there is a dataset already in memory, and even if that dataset has changed since the data were last saved.
- noquote alters Stata's internal use of SQL commands, specifically those relating to quoted table names, to better accommodate various drivers. This option has been particularly helpful for DB2 drivers.
- lowercase causes all the variable names to be read as lowercase.
- sqlshow is a useful option for showing all SQL commands issued to the ODBC data source from the odbc insert or odbc load command. This can help you debug any issues related to inserting or loading.
- allstring causes all variables to be read as string data types.
- datestring causes all date- and time-formatted variables to be read as string data types.
- multistatement specifies that multiple SQL statements delimited by ; be allowed when using the exec() option. Some drivers do not support multiple SQL statements.
- bigintasdouble specifies that data stored in 64-bit integer (BIGINT) database columns be converted to Stata doubles. If any integer value is larger than 9,007,199,254,740,965 or less than -9,007,199,254,740,992, this conversion is not possible, and odbc load will issue an error message.
- overwrite allows data to be cleared from an ODBC table before the data in memory are written to the table. All data from the ODBC table are erased, not just the data from the variable columns that will be replaced.
- insert appends data to an existing ODBC table and is the default mode of operation for the odbc insert command.
- quoted is useful for ODBC data sources that require all inserted values to be quoted. This option specifies that all values be quoted with single quotes as they are inserted into an ODBC table.
- as ("*varlist*") allows you to specify the ODBC variables on the data source that correspond to the variables in Stata's memory. If this option is specified, the number of variables must equal the number of variables being inserted, even if some names are identical.
- loud specifies that output be displayed for SQL commands.
- verbose specifies that odbc query list any data source alias, nickname, typed table, typed view, and view along with tables so that you can load data from these table types.
- schema specifies that odbc query return schema names with the table names from a data source. Note: The schema names returned from odbc query will also be used with the odbc describe and odbc load commands. When using odbc load with a schema name, you might also need to specify the noquote option because some drivers do not accept quotes around table or schema names.
- block specifies that odbc insert use block inserts to speed up data-writing performance. Some drivers do not support block inserts.

permanently (set odbcdriver and set odbcmgr only) specifies that, in addition to making the change right now, the setting be remembered and become the default setting when you invoke Stata.

## **Remarks and examples**

When possible, the examples in this manual entry are developed using the Northwind sample database that is automatically installed with Microsoft Access. If you do not have Access, you can still use odbc, but you will need to consult the documentation for your other ODBC sources to determine how to set them up.

Remarks are presented under the following headings:

Unicode and ODBC Setting up the data sources Listing ODBC data source names Listing available table names from a specified data source's system catalog Describing a specified table Loading data from ODBC sources

### **Unicode and ODBC**

Stata supports accessing databases with Unicode data through Unicode ODBC drivers on the following platforms:

- Microsoft Windows through ODBC driver manager (version 3.5 or higher).
- Unix through unixODBC driver manager with ODBC drivers compiled for unixODBC. Stata does not support Unicode drivers when using iODBC as your driver manager. Stata requires that the driver support UTF-8.
- macOS through unixODBC driver manager with ODBC drivers compiled for unixODBC. Stata does not support Unicode drivers when using iODBC as your driver manager. Stata requires that the driver support UTF-8.

Stata supports non-Unicode databases through ASCII drivers with all driver managers.

#### Setting up the data sources

Before using Stata's ODBC commands, you must register your ODBC database with the ODBC Data Source Administrator. This process varies depending on platform, but the following example shows the steps necessary for Windows.

Using Windows 10, follow these steps to create an ODBC User Data Source for the Northwind sample database:

- 1. On the Start page, type ODBC Data Sources. From the list that appears, select the ODBC Data Sources Desktop App.
- 2. In the Data Sources (ODBC) dialog box,
  - a. click on the User DSN tab;
  - b. click on Add ...;

c. choose Microsoft Access Driver (\*.mdb,\*.accdb) on the Create New Data Source dialog box; and

d. click on Finish.

3. In the ODBC Microsoft Access Setup dialog box, type Northwind in the Data Source Name field and click on Select.... Locate the Northwind.mdb database and click on OK to finish creating the data source.

Using Windows 7, follow these steps to create an ODBC User Data Source for the Northwind sample database:

- 1. From the Start Menu, select the Control Panel.
- 2. In the Control Panel window, click on System and Security > Administrative Tools.
- 3. In the Data Sources (ODBC) dialog box,
  - a. click on the User DSN tab;
  - b. click on Add ...;

c. choose Microsoft Access Driver (\*.mdb,\*.accdb) on the Create New Data Source dialog box; and

d. click on Finish.

4. In the ODBC Microsoft Access Setup dialog box, type Northwind in the Data Source Name field and click on Select.... Locate the Northwind.mdb database and click on OK to finish creating the data source.

### Technical note

In earlier versions of Windows, the exact location of the Data Source (ODBC) dialog varies, but it is always somewhere within the Control Panel.

### Listing ODBC data source names

odbc list is used to produce a list of data source names to which Stata can connect. For a specific data source name to be shown in the list, the data source has to be registered with the ODBC Data Source Administrator. See Setting up the data sources for information on how to do this.

#### Example 1

. odbc list	
Data Source Name	Driver
dBASE Files	Microsoft Access dBASE Driver (*.dbf, *.ndx
Excel Files	Microsoft Excel Driver (*.xls, *.xlsx, *.xl
MS Access Database	Microsoft Access Driver (*.mdb, *.accdb)
Northwind	Microsoft Access Driver (*.mdb, *.accdb)

In the above list, Northwind is one of the sample Microsoft Access databases that Access installs by default.

### Listing available table names from a specified data source's system catalog

odbc query is used to list table names available from a specified data source.

### Example 2

```
. odbc query "Northwind"
DataSource: Northwind
Path
      : C:\Program Files\Microsoft Office\Office\Samples\Northwind.accdb
Customers
Employee Privileges
Employees
Inventory Transaction Types
Inventory Transactions
Invoices
Order Details
Order Details Status
Orders
Orders Status
Orders Tax Status
Privileges
Products
Purchase Order Details
Purchase Order Status
Purchase Orders
Sales Reports
Shippers
Strings
Suppliers
```

### Describing a specified table

odbc describe is used to list column (variable) names and their SQL data types that are associated with a specified table.

### Example 3

Here we specify that we want to list all variables in the Employees table of the Northwind data source.

. odbc describe "Employees", dsn("Northwind") DataSource: Northwind (query) Table: Employees (load)

Variable Name	Variable Type
ID	COUNTER
Company	VARCHAR
Last Name	VARCHAR
First Name	VARCHAR
E-mail Address	VARCHAR
Job Title	VARCHAR
Business Phone	VARCHAR
Home Phone	VARCHAR
Mobile Phone	VARCHAR
Fax Number	VARCHAR
Address	LONGCHAR
City	VARCHAR
State/Province	VARCHAR
ZIP/Postal Code	VARCHAR
Country/Region	VARCHAR
Web Page	LONGCHAR
Notes	LONGCHAR
Attachments	LONGCHAR

#### Loading data from ODBC sources

odbc load is used to load an ODBC table into memory.

To load an ODBC table listed in the odbc query output, specify the table name in the table() option and the data source name in the dsn() option.

#### Example 4

We want to load the Employees table from the Northwind data source.

```
. clear
. odbc load, table("Employees") dsn("Northwind")
E-mail_Address invalid name
- converted E-mail_Address to var5
State/Province invalid name
- converted State/Province to var13
ZIP/Postal_Code invalid name
- converted ZIP/Postal_Code to var14
Country/Region invalid name
- converted Country/Region to var15
```

. describe					
Contains data		0			
Variables		9 18			
		10			
Variable	Storage	Display	Value		
name	type	format	label	Variable label	
ID	long	%12.0g			
Company	str17	%17s			
Last_Name	str14	%14s		Last Name	
First_Name	str7	%9s		First Name	
var5	str28	%28s		E-mail Address	
Job_Title	str21	%21s		Job Title	
Business_Phone	e str13	%13s		Business Phone	
Home_Phone	str13	%13s		Home Phone	
Mobile_Phone	str1	%9s		Mobile Phone	
Fax_Number	str13	%13s		Fax Number	
Address	strL	%9s			
City	str8	%9s			
var13	str2	%9s		State/Province	
var14	str5	%9s		ZIP/Postal Code	
var15	str3	%9s		Country/Region	
Web_Page	strL	%9s		Web Page	
Notes	strL	%9s			
Attachments	strL	%9s			

Sorted by:

Note: Dataset has changed since last saved.

#### Technical note

When Stata loads the ODBC table, data are converted from SQL data types to Stata data types. Stata does not support all SQL data types. If the column cannot be read because of incompatible data types, Stata will issue a note and skip a column. The following table lists the supported SQL data types and their corresponding Stata data types:

SQL data type	Stata data type
SQL_BIT	byte
SQL_TINYINT	
SQL_SMALLINT	int
SQL_INTEGER	long
SQL_DECIMAL	double
SQL_NUMERIC	
SQL_FLOAT	double
SQL_DOUBLE	
SQL_REAL	double
SQL_BIGINT	string
SQL_CHAR	string
SQL_VARCHAR	
SQL_LONGVARCHAR	
SQL_WCHAR	
SUL_WVARCHAR	
SQL_WLUNGVARCHAR	
SQL_TIME	
SQL_DATE	
SQL_TIMESTAMP	
SQL_TYPE_TIME	double
SQL_TYPE_DATE	
SQL_TYPE_TIMESTAMP	
SQL_BINARY	
SQL_VARBINARY	
SQL_LONGVARBINARY	

You can also load an ODBC table generated by an SQL SELECT statement specified in the exec() option.

### Example 5

Suppose that, from the Northwind data source, we want a list of all the customers who have placed orders. We might use the SQL SELECT statement

SELECT DISTINCT c.ID, c.Company FROM Customers c INNER JOIN Orders o ON c.[Customer ID] = o.CustomerID

To load the table into Stata, we use odbc load with the exec() option.

```
. odbc load, exec('"SELECT DISTINCT c.ID, c.Company FROM Customers c INNER JOIN
> Orders o ON c.ID = o.[Customer ID]"') dsn("Northwind") clear
. describe
Contains data
Observations:
                           15
    Variables:
                            2
Variable
              Storage
                         Display
                                    Value
                                    label
                                                Variable label
    name
                 type
                          format
TD
                         %12.0g
                long
                str10
                         %10s
Company
```

Sorted by:

Note: Dataset has changed since last saved.

The *extvarlist* is optional. It allows you to choose which columns (variables) are to be read and to rename variables when they are read.

#### Example 6

Suppose that we want to load the ID column and the Last Name column from the Employees table of the Northwind data source. Moreover, we want to rename ID as id and Last Name as name.

. odbc load	id=ID name=	="Last Name	", table("	Employees")	dsn("Northwind")	clear
. describe						
Contains da Observation Variable	ta ns: es:	9 2				
Variable name	Storage type	Display format	Value label	Variable	label	
id name	long str14	%12.0g %14s		ID Last Name	9	

Sorted by:

Note: Dataset has changed since last saved.

The if and in qualifiers allow you to choose which rows are to be read. You can also use a WHERE clause in the SQL SELECT statement to select the rows to be read.

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#### Example 7

Suppose that we want the information from the Order Details table, where Quantity is greater than 50. We can specify the if and in qualifiers,

·	odbc load if	Quantity>50,	table("Order	Details")	dsn("Northwind")	clear
	sum Quantity					
	Variable	Obs	Mean	Std. Dev.	Min	Max
	Quantity	10	177.7	94.21966	87	300

or we can issue the SQL SELECT statement directly:

. odbc load, exec("SELECT \* FROM [Order Details] WHERE Quantity>50")

```
> dsn("Northwind") clear
```

. Sum Quantity		sum	Quantity
----------------	--	-----	----------

. Dum quantity	,				
Variable	Obs	Mean	Std. Dev.	Min	Max
Quantity	10	177.7	94.21966	87	300

#### Example 8

To use odbc insert, you must have an SQL table already created in your data source. If you do not, you can use odbc exec to create a table in your data source. For example, one might create a table in an Oracle database with the SQL command below:

You must create a table using the correct data type for each table column for your data to transfer correctly. Note that the SQL syntax to create a table differs across data sources, as do column data types.

### Reference

Crow, K. 2017. Importing WRDS data into Stata. The Stata Blog: Not Elsewhere Classified. https://blog.stata.com/2017/ 09/19/importing-wrds-data-into-stata/.

### Also see

[D] jdbc — Load, write, or view data from a database with a Java API

[D] export — Overview of exporting data from Stata

[D] import — Overview of importing data into Stata

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