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Creating the Table

Introduction

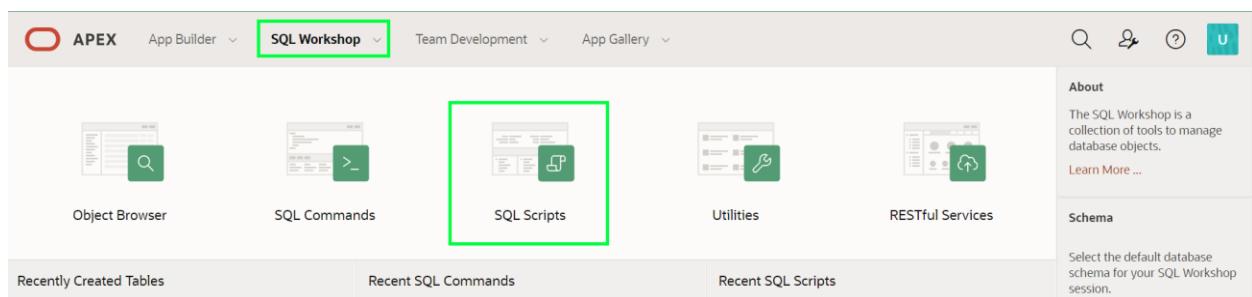
In this lab, you will learn how to create a table by defining the data structures in Quick SQL.

Estimated Time: 10 minutes

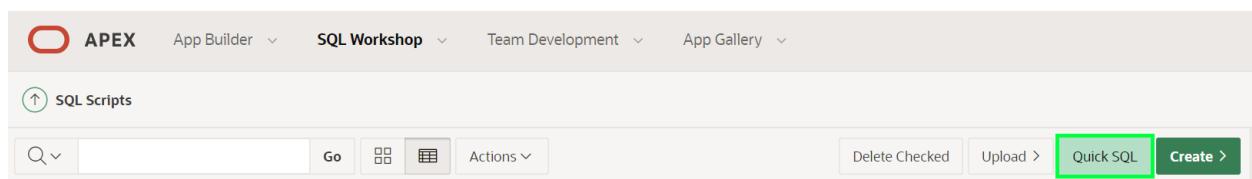
[Collapse All Tasks](#)

Task 1: Open Quick SQL

1. Log into your workspace.
2. Click **SQL Workshop**.
3. Click **SQL Scripts**.



4. Click **Quick SQL**.



Task 2: Enter Shorthand for Tables

Quick SQL provides an easy way to generate the SQL required to create a relational data model from an indented text document. This tool is designed to reduce the time and effort required to create SQL tables, triggers, and index structures.

1. In Quick SQL (left pane), enter the following.

2. Copy **big_mac_index**

3. country_name

4. country_iso

5. currency_code

6. local_price num

7. dollar_exchange_rate num

8. gdp_dollar num

entry_date

Note: By indenting the country_name and subsequent rows, it is indicating that these are columns for the table, big_mac_index, defined in the first row.

Click **Generate SQL**.

The screenshot shows the Oracle APEX SQL Workshop interface. The top navigation bar includes links for Utilities, Quick SQL, App Builder, SQL Workshop, Team Development, and App Gallery. The user profile of Salim Hlayel is visible on the right. The main area has tabs for Quick SQL and SQL, with the SQL tab selected. The SQL tab contains two panes: a left pane labeled "Quick SQL" containing the initial list of columns, and a right pane labeled "SQL" containing the generated DDL and DML code. The "Quick SQL" pane is highlighted with a green border, and the "SQL" pane is highlighted with a pink border. The generated code is as follows:

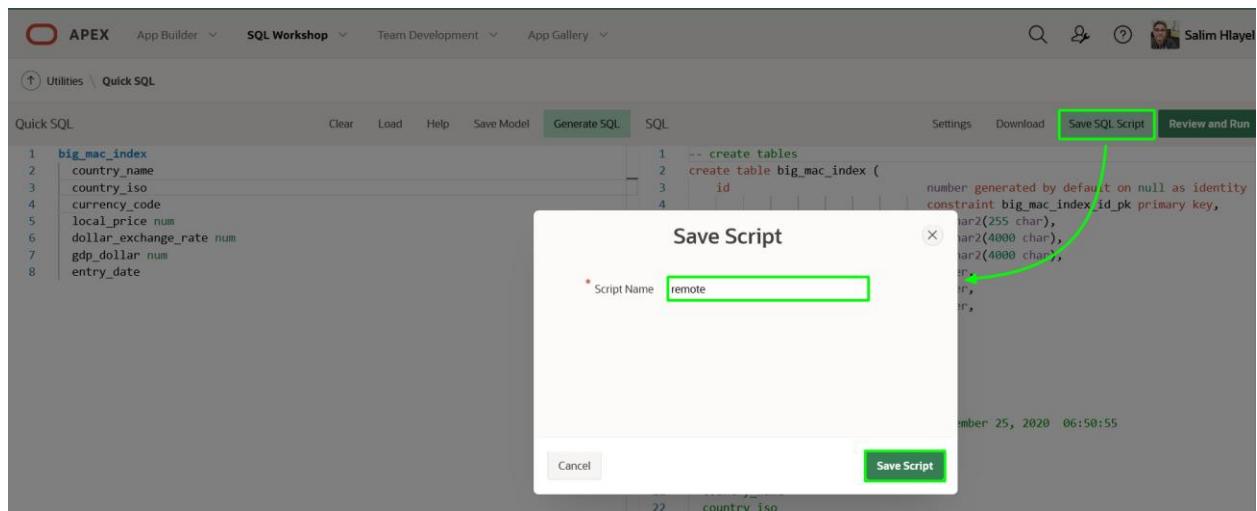
```
-- create table big_mac_index (
  id          number generated by default on null as identity constraint big_mac_index_id_pk primary key,
  country_name varchar2(255 char),
  country_iso  varchar2(4000 char),
  currency_code varchar2(4000 char),
  local_price  number,
  dollar_exchange_rate  number,
  gdp_dollar   number,
  entry_date   date
);

-- load data
/*
big_mac_index
country_name
country_iso
currency_code
local_price
dollar_exchange_rate
gdp_dollar
entry_date
*/
# settings = { PK: "IDENTITY", semantics: "CHAR", language: "EN", APEX: true }
*/
```

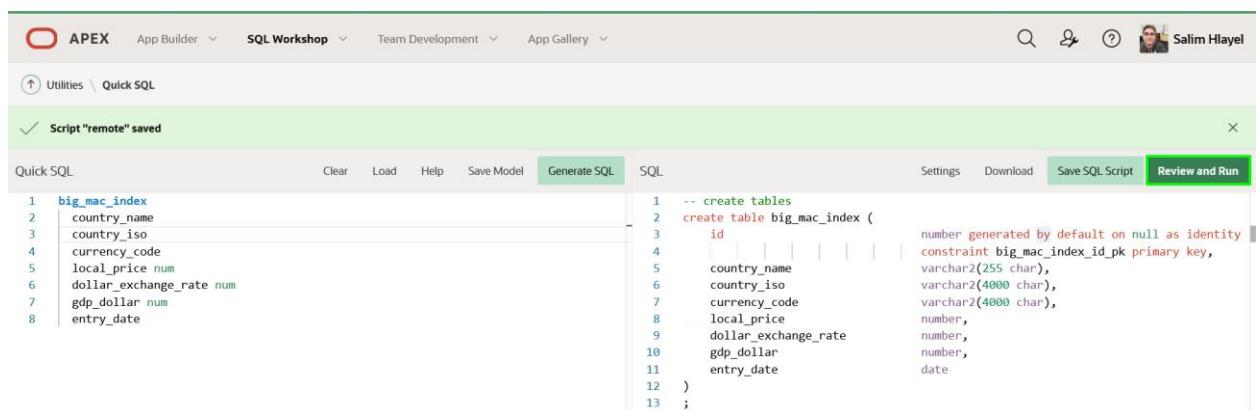
Task 3: Implement the Script

At this stage you have created a SQL statement. However, you first need to save the statement as a script file and then run the script. This will create the database object you defined.

1. In the SQL (right pane) toolbar, click **Save SQL Script**.
2. In the Save Script dialog, for Script Name, enter **remote**.
Click **Save Script**.



3. In the SQL (right pane) toolbar, click **Review and Run**. The script will be displayed in the **Script Editor**, within SQL Scripts.



Click **Run**.

```

1 -- create tables
2 create table big_mac_index (
3     id number generated by default on null as identity
4     constraint big_mac_index_id_pk primary key,
5     country_name varchar2(255 char),
6     country_iso varchar2(4000 char),
7     currency_code varchar2(4000 char),
8     local_price number,
9     dollar_exchange_rate number,
10    gdp_dollar number,
11    entry_date date
12 )
13 ;

```

4. On the Run Script page, click **Run Now**.
5. The Script Results page will be displayed listing the statements processed, successful, and with errors.

Script: remote Status: Complete

Number	Elapsed	Statement	Feedback	Rows
1	0.13	create table big_mac_index (id	Table created.	0

Download row(s) 1 - 1 of 1

1 Statements Processed	1 Successful	0 With Errors
---------------------------	------------------------	------------------

Note: If you do not see 1 statements processed then return to Quick SQL and click Generate SQL, reimplement the Setting, resave the script and then run it again. If you still do not see 1 successful, then review the errors displayed in Feedback within the results.

Task 4: Create the Application

Now that you have created the table you can quickly create an application with a report and form.

1. Click **Create App**.

The screenshot shows the Oracle APEX interface with the SQL Workshop module selected. The results page displays a single row of data from a script named 'remote'. The 'Create App' button in the top right corner is highlighted with a green box.

Note: If you are back on SQL Scripts, and don't see the "Create App" button perform the following steps.

1. Within the Results column, click "1" for the script you just ran.
2. Under View Results, click the magnifying glass. The results page shown above should now be displayed again.
2. In the Create App from Script dialog, click **Create Application**.

The screenshot shows the 'Create App from Script' dialog. It has two tabs: 'Schema' and 'Table Name'. The 'Schema' tab is active, showing 'Schema: BARMAJIYAT'. The 'Table Name' tab shows a table named 'BIG_MAC_INDEX'. At the bottom right, the 'Create Application >' button is highlighted with a green box.

3. In the Create an Application page, enter the following.

- o **Name:** enter **Global Exchange**
- o **Features:** click **Check All**

At the bottom of the page, click **Create Application**.

The screenshot shows the Oracle APEX App Builder interface for creating a new application. At the top, there are navigation links for APEX, App Builder, SQL Workshop, Team Development, and App Gallery. On the right, there's a user profile for Salim Hlayel. Below the header, the title 'Create an Application' is displayed. A form is filled out with the following details:

- Name:** Global Exchange
- Appearance:** Vita, Side Menu

Under the 'Pages' section, there are two pages listed:

- Home:** Blank
- Mac Index:** Interactive Report with Form (`big_mac_index`)

Under the 'Features' section, several options are checked:

- About Page
- Access Control
- Activity Reporting
- Configuration Options
- Feedback
- Theme Style Selection

At the bottom right of the page, the 'Create Application' button is highlighted with a green box.

4. Your new application will be displayed in Page Designer.

5. Click Run Application.

The screenshot shows the Oracle APEX Page Designer interface for the application 'Application 132762 - Global Exchange'. The top navigation bar includes links for Application Properties, About, Tasks, Delete this Application, Copy this Application, and Browse by Facets. The main content area displays various application components and navigation links:

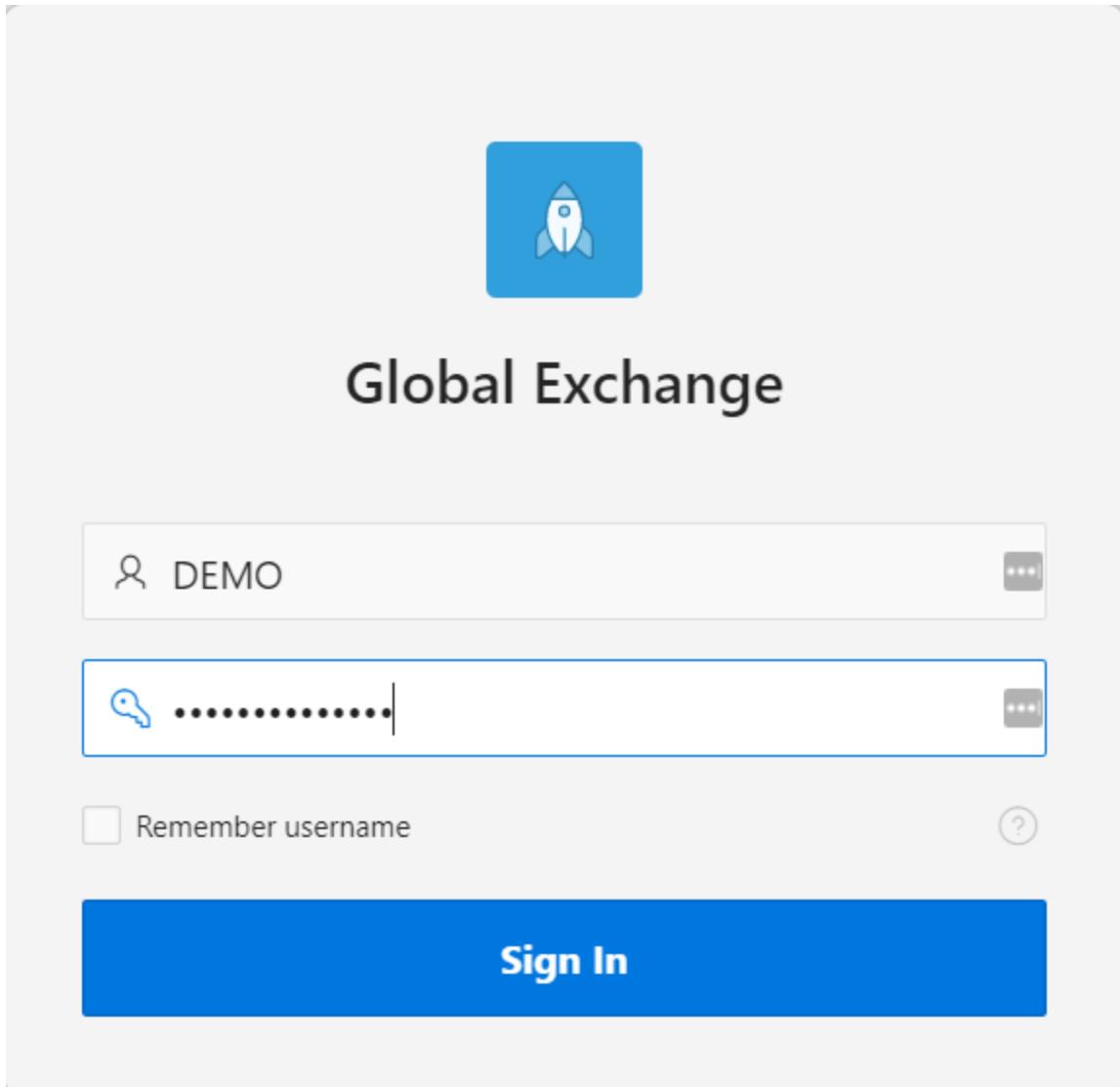
- Run Application:** This button is highlighted with a green box.
- Supporting Objects:**
- Shared Components:**
- Utilities:**
- Export / Import:**

Below the toolbar, there's a search bar and a 'Create Page >' button. The page footer lists several pages:

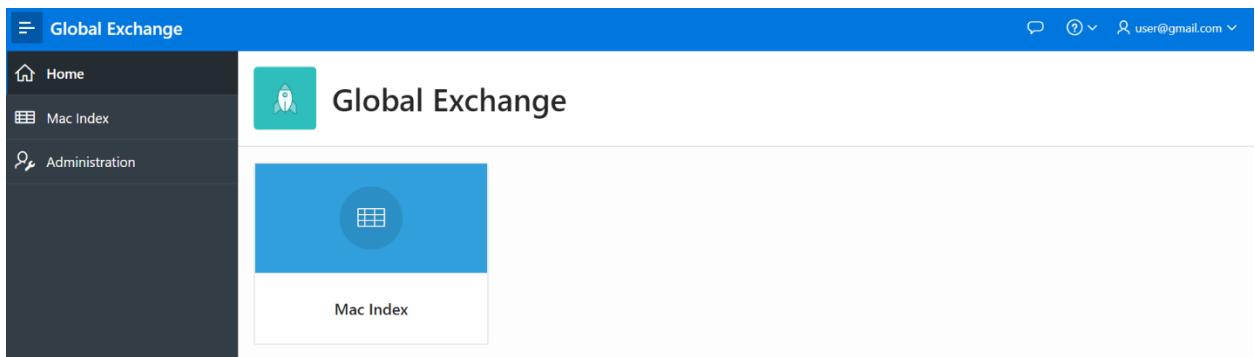
- 0 - Global Page - Desktop
- 1 - Home
- 2 - Mac Index
- 3 - Big Mac Index
- 9999 - Login Page

On the right side, there's a sidebar with sections for About, Tasks, and Recently Edited Pages.

6. In the runtime environment, on the login page, enter your credentials.



7. Play around with your new application.



Note: When you click on Mac Index there will be no data displayed. You don't want to manually enter in data as the table will be populated in the next lab.

Summary

This completes Lab 2. You now know how to utilize Quick SQL to build a simple table and create an application on top of it.

Populating the Table

Introduction

In this lab, you will learn how to insert data into a table from a REST API.

Estimated Time: 5 minutes

Background Information

The **apex_data_parser** is a PL/SQL package which provides an easy interface to parse files from various file formats, including comma-delimited (.csv). The parser is implemented as a table function - so the developer accesses parser results like a table. Therefore, the parser can utilize INSERT ... SELECT statements to insert rows directly into a table from the specified file.

The **apex_web_service.make_rest_request_b** is a PL/SQL function which invokes a RESTful style Web service and returns the results in a BLOB. Utilizing this function within apex_data_parser will allow you to load data from a REST API directly into your table.

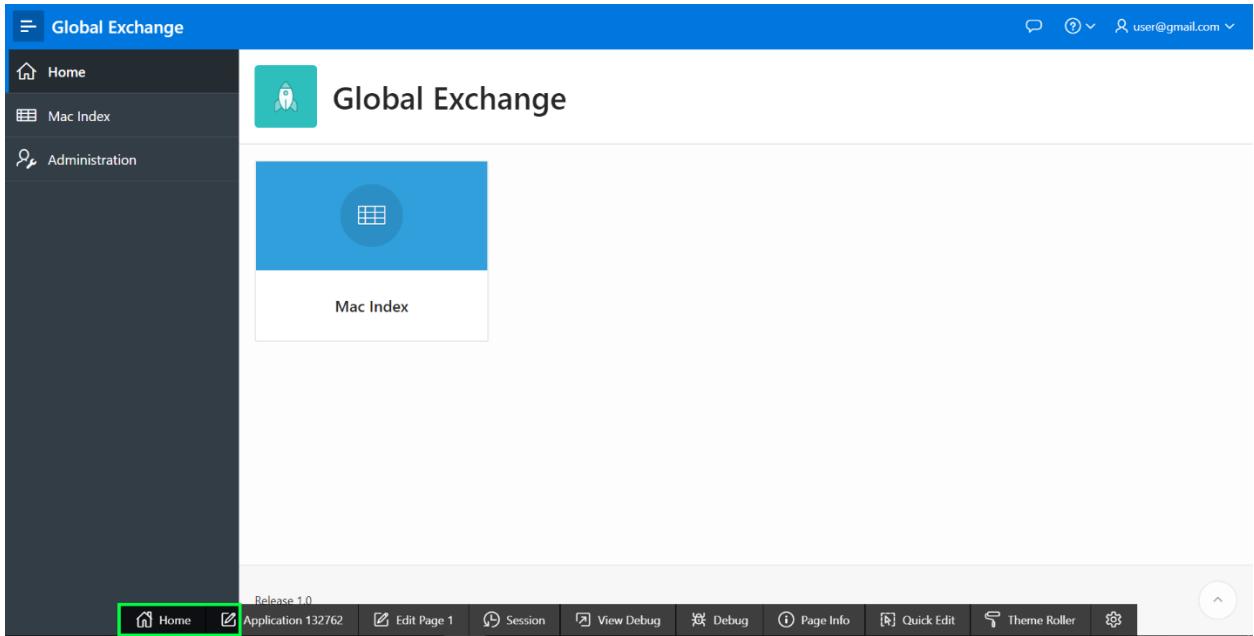
[Collapse All Tasks](#)

Task 1: Create a Script

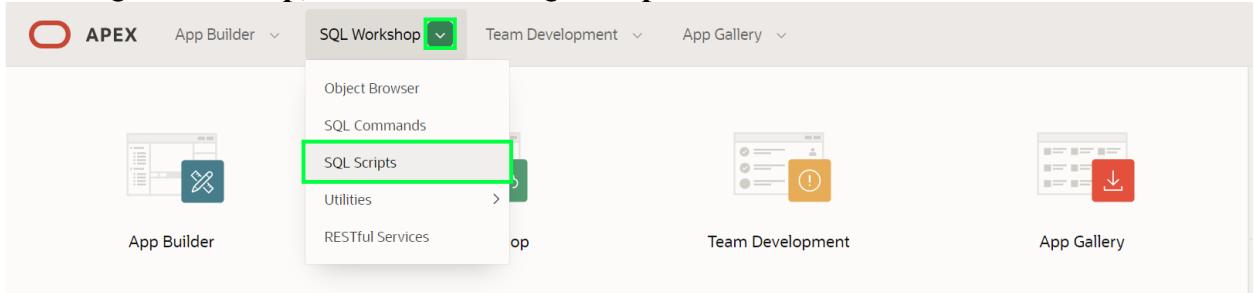
Rather than running a one-off SQL statement to load the data, writing a SQL Script enables the SQL statement to be run repeatedly.

The Big Mac Data is refreshed every 6 months. Therefore, this script can be used twice a year to keep the data current.

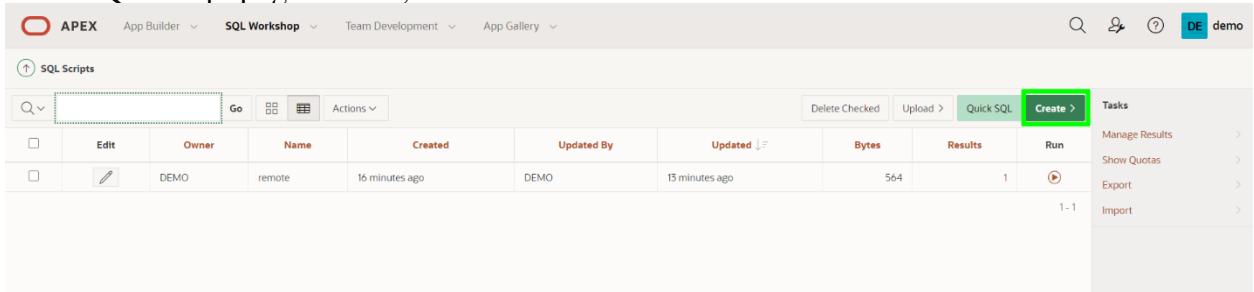
- From the runtime environment, in the Developer Toolbar (bottom of screen), click **Home**.



- Click **SQL Workshop**, and then select **SQL Scripts**.



- In the SQL Script page toolbar, click **Create**.



- In the Script Editor page, enter the following.

- Script Name: enter **Populate BIG_MAC_INDEX**
- Copy and paste the following.

```
5. Copy-- Remove current data

6. delete big_mac_index;

7.

8. -- Load data from The Economist (csv) REST API

9. insert into big_mac_index

10. (country_name, country_iso, currency_code, local_price,
    dollar_exchange_rate, gdp_dollar, entry_date)

11. select col001, col002, col003, col004, col005, col006,
    to_date(col007, 'YYYY-MM-DD')

12. from table(apex_data_parser.parse

13. ( p_content => apex_web_service.make_rest_request_b

14.      ('https://raw.githubusercontent.com/TheEconomist/big-
    mac-data/master/source-data/big-mac-source-data.csv',
     'GET')

15. , p_file_name => 'big-mac-source-data.csv'

16. , p_skip_rows => 1

17. )) ;

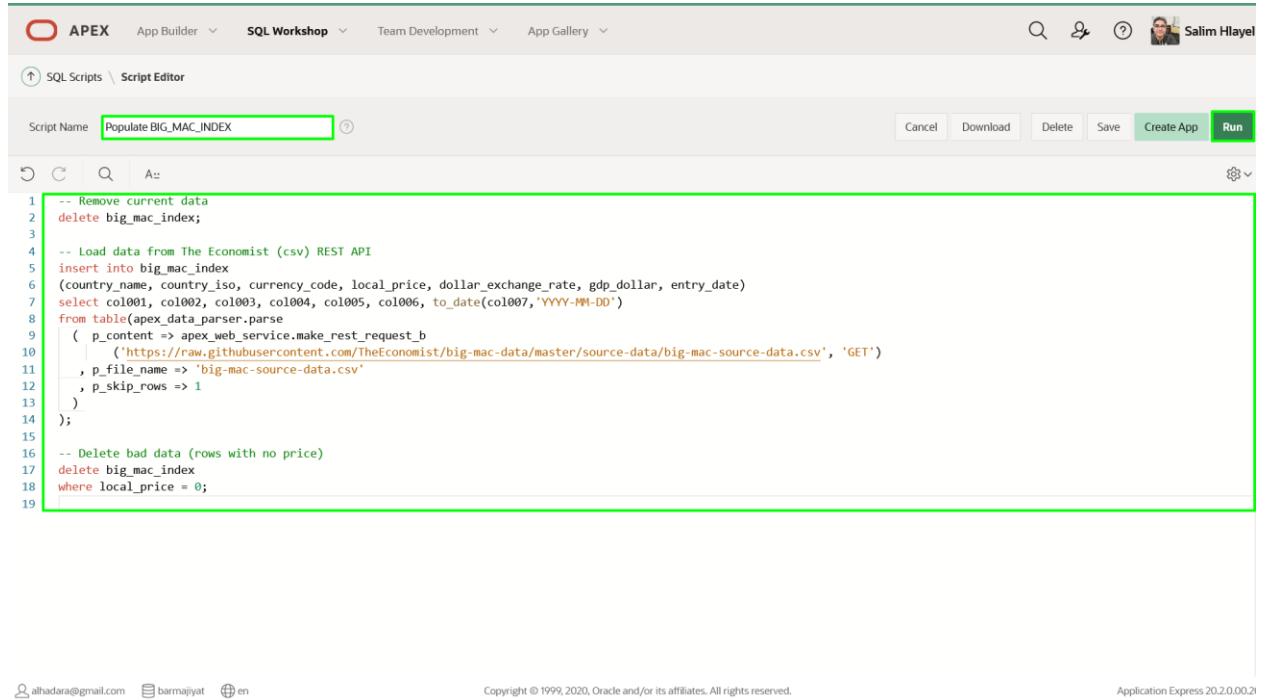
18.

19. -- Delete bad data (rows with no price)

20. delete big_mac_index
```

```
where local_price = 0;
```

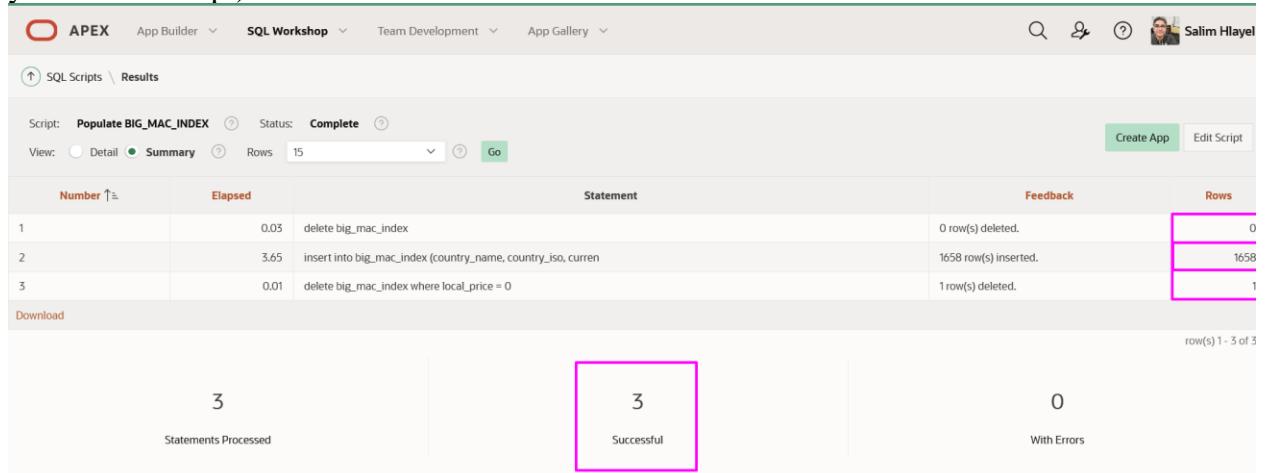
21. Click Run.



```
1 -- Remove current data
2 delete big_mac_index;
3
4 -- Load data from The Economist (csv) REST API
5 insert into big_mac_index
6 (country_name, country_iso, currency_code, local_price, dollar_exchange_rate, gdp_dollar, entry_date)
7 select col001, col002, col003, col004, col005, col006, to_date(col007, 'YYYY-MM-DD')
8 from table(apex_data_parser.parse(
9   ( p_content => apex_web_service.make_rest_request_
10     ('https://raw.githubusercontent.com/TheEconomist/big-mac-data/master/source-data/big-mac-source-data.csv', 'GET')
11   , p_file_name => 'big-mac-source-data.csv'
12   , p_skip_rows => 1
13 )
14 );
15
16 -- Delete bad data (rows with no price)
17 delete big_mac_index
18 where local_price = 0;
```

22. On the Run Script page, click Run Now.

23. The Script Results page will be displayed listing the statements processed, successful, and with errors. In November 2020, Results should show **1658 row(s) inserted** and **1 row(s) deleted**(your number of rows inserted/deleted may differ depending on the date you run the script).



Number	Elapsed	Statement	Feedback	Rows
1	0.03	delete big_mac_index	0 row(s) deleted.	0
2	3.65	insert into big_mac_index (country_name, country_iso, curren	1658 row(s) inserted.	1658
3	0.01	delete big_mac_index where local_price = 0	1row(s) deleted.	1

3 Statements Processed

3 Successful

0 With Errors

Note: If you do not see 3 statements processed successfully then double check your table definition and the script to populate the table.

Task 2: Review the Data

There are several ways to review the data.

1. Navigate to the runtime environment tab or window.
2. In the application menu click **Mac Index**. On the report, click **Entry Date**, and click **Sort Ascending**, to see the latest data.

Country Name	Country Iso	Currency Code	Local Price	Dollar Exchange Rate	Gdp Dollar	Entry Date
Argentina	ARG	ARS	120	42		
Argentina	ARG	ARS	75	37		
Argentina	ARG	ARS	21	8		
Argentina	ARG	ARS	28	9		
Argentina	ARG	ARS	28	9		
Argentina	ARG	ARS	33	14		
Argentina	ARG	ARS	50	15		
Argentina	ARG	ARS	20	4		
Argentina	ARG	ARS	20	4	9,138.18	1/1/2012

Note: Many of the Dollar Exchange Rate values simply show 1.

3. In the APEX Builder tab or window, click **SQL Workshop**, and then select **Object Browser**.

4. In Object Browser, within the list of Tables, click **BIG_MAC_INDEX**. In the middle pane, click **Data**.

EDIT	ID	COUNTRY_NAME	COUNTRY_ISO	CURRENCY_CODE	LOCAL_PRICE	DOLLAR_EXCHANGE_RATE	GDP_DOLLAR	ENTRY_DATE
502	Pakistan	PAK	PKR	210	85.525	-	07/01/2010	
503	Peru	PER	PEN	10	2.8275	-	07/01/2010	
504	Philippines	PHL	PHP	102	46.47	-	07/01/2010	
505	Poland	POL	PLN	8.3	3.1969	-	07/01/2010	
506	Russia	RUS	RUB	71	30.44325	-	07/01/2010	
507	Saudi Arabia	SAU	SAR	10	3.75045	-	07/01/2010	

Note: Review the decimal places on the DOLLAR_EXCHANGE_RATE column. In the next lab you will ensure the data displays properly.

Summary

This completes Lab 3. You now know how to utilize `apex_data_parser` and `apex_web_service.make_rest_request_b` to populate a table in the Oracle database based on a REST endpoint.

Improving the Report

Introduction

In this lab, you will learn how to manipulate an Interactive Report to improve the data displayed and make it easier for users to analyze the data.

Estimated Time: 15 minutes

Background Information

Now you have data loaded into the BIG_MAC_INDEX table you can start reviewing the local price of a McDonalds Big Mac and the exchange rate with the US Dollar.

For any given country, if you divide the Local Price of a Big Mac by the Local Price of a Big Mac in the US, for the same time period, you can calculate the relative exchange rates between the countries based on the Big Mac prices.

If you then subtract the Dollar Exchange Rate from the relative exchange rate, and divide by the Dollar Exchange Rate, then you can determine if the currency is overvalued (positive) or undervalued (negative), against the US Dollar.

While this is not an exact determination of if a currency is overvalued or undervalued against the US Dollar, it is a good approximation using a product which is generally available in most countries.

[Collapse All Tasks](#)

Task 1: Update the Report Query

When the application was generated it utilized the standard table columns. By converting it to a SQL Query and updating the SQL you can include the relative exchange rate to make it easier for people to review the data.

1. From Object Browser, in the APEX Builder Toolbar, click **App Builder**, and then select **Database Applications**.

The screenshot shows the Oracle APEX interface with the SQL Workshop tab selected. In the left sidebar, under 'Object Browser', 'BIG_MAC_INDEX' is selected. The main area displays the 'Database Applications' page for the 'BIG_MAC_INDEX' table. The table has columns: DIT, ID, COUNTRY_NAME, ISO, CURRENCY_CODE, LOCAL_PRICE, DOLLAR_EXCHANGE_RATE, GDP_DOLLAR, and ENTRY_DATE. Two rows are visible: Argentina (ID 1) and Australia (ID 2). The 'Data' tab is selected in the top navigation bar.

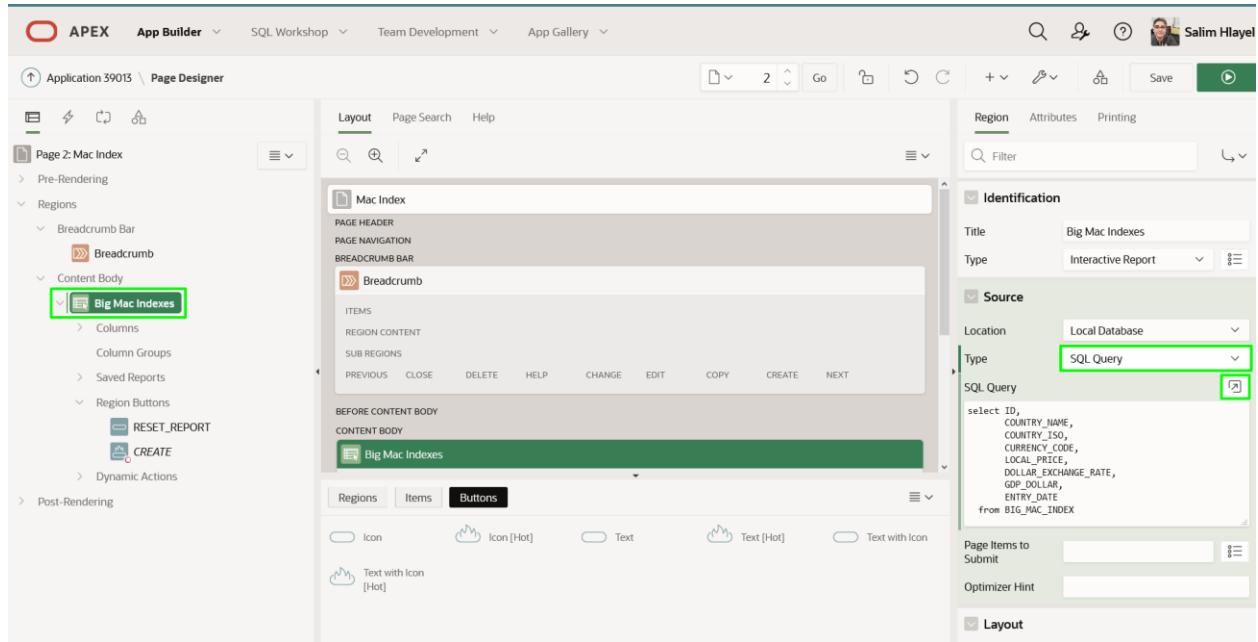
2. In the list of applications, click **Global Exchange**.

The screenshot shows the Oracle APEX interface with the App Builder tab selected. The main area displays a list of applications. One application, 'Global Exchange', is highlighted with a green box. Other applications shown include 'Create', 'Import', 'Dashboard', and 'Workspace Utilities'. The search bar at the top is set to 'Database Applications Only'.

3. From the app home page, click **2 – Mac Index**, which will take you to Page Designer and load Page 2, the report page.

The screenshot shows the Oracle APEX interface with the Application Home tab selected. The main area displays a list of pages for the application 'Application 132762 - Global Exchange'. One page, '2 - Mac Index', is highlighted with a green box. Other pages shown include '0 - Global Page - Desktop', '1 - Home', '3 - Big Mac Index', and '9999 - Login Page'. The 'Edit Application Properties' button is visible in the top right corner.

4. Within Page Designer, in the Rendering tree (left pane), under Content Body, click **Big Mac Indexes** (This is the report region).



In the Property Editor (right pane), enter the following.

- **Source > Type:** select **SQL Query**
- **Source - SQL Query:** click the **Code Editor** icon, and cut and paste the following.

- Copy `select ID,`
- `COUNTRY_NAME,`
- `COUNTRY_ISO,`
- `CURRENCY_CODE,`
- `LOCAL_PRICE,`
- `DOLLAR_EXCHANGE_RATE,`
- `ENTRY_DATE,`

```

o           (local_price / (select local_price from
big_mac_index u

o           where u.entry_date =
l.entry_date

o           and u.country_iso = 'USA'

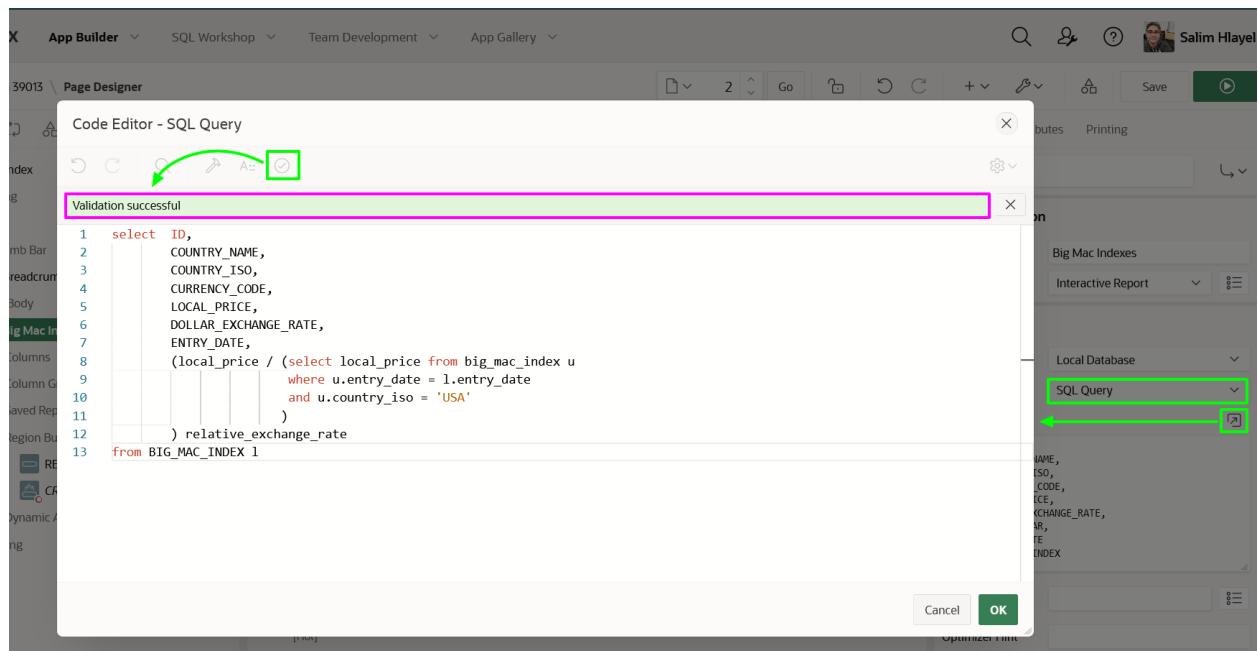
o       )

o       ) relative_exchange_rate

```

```
from BIG_MAC_INDEX l
```

Click **Validate** – Validation Successful will be displayed.
Click **OK**.



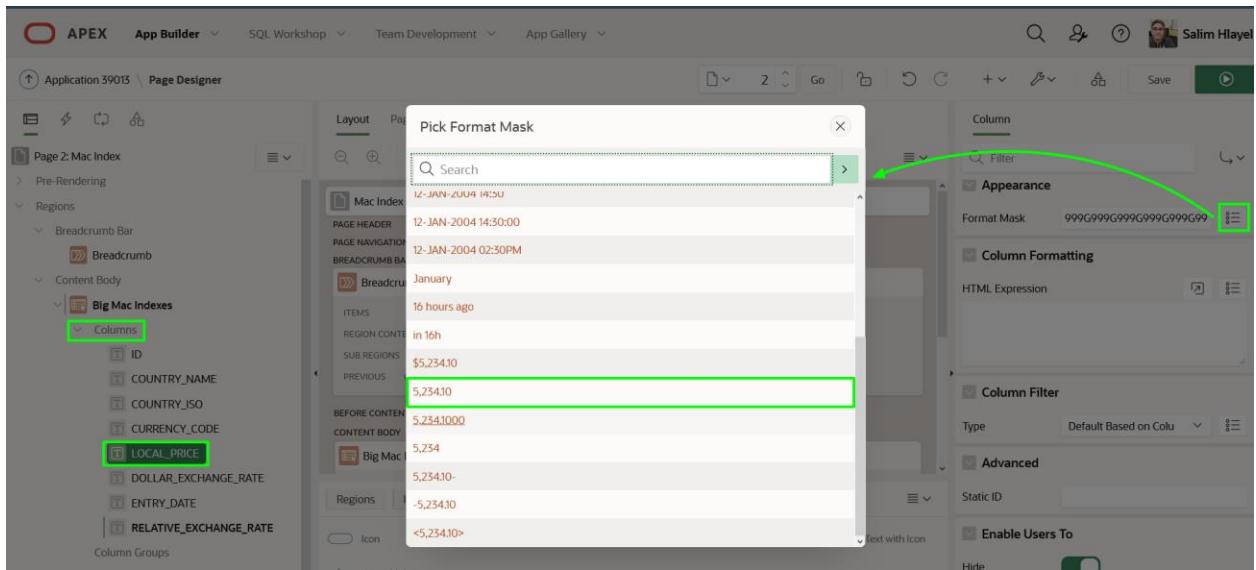
Note: The gdp_dollar column was removed as it is not needed. The inner select is used to get the US price for the same date, in order to calculate the relative exchange rate.

Task 2: Update the Report Columns

Individual report columns need a better format mask to properly display the data.

1. In the Rendering tree (left pane), click **Columns**. Within the list of columns, click **LOCAL_PRICE**.

In the Property Editor (right pane), click the select icon for Appearance > Format Mask. In the Pick Format Mask dialog, select **5,234.10**.



2. In the Rendering tree (left pane), within the list of columns, click **DOLLAR_EXCHANGE_RATE**.

In the Property Editor (right pane), click the select icon for Appearance > Format Mask. In the Pick Format Mask dialog, select **5,234.1000**.

3. In the Rendering tree (left pane), within the list of columns, click **RELATIVE_EXCHANGE_RATE**.

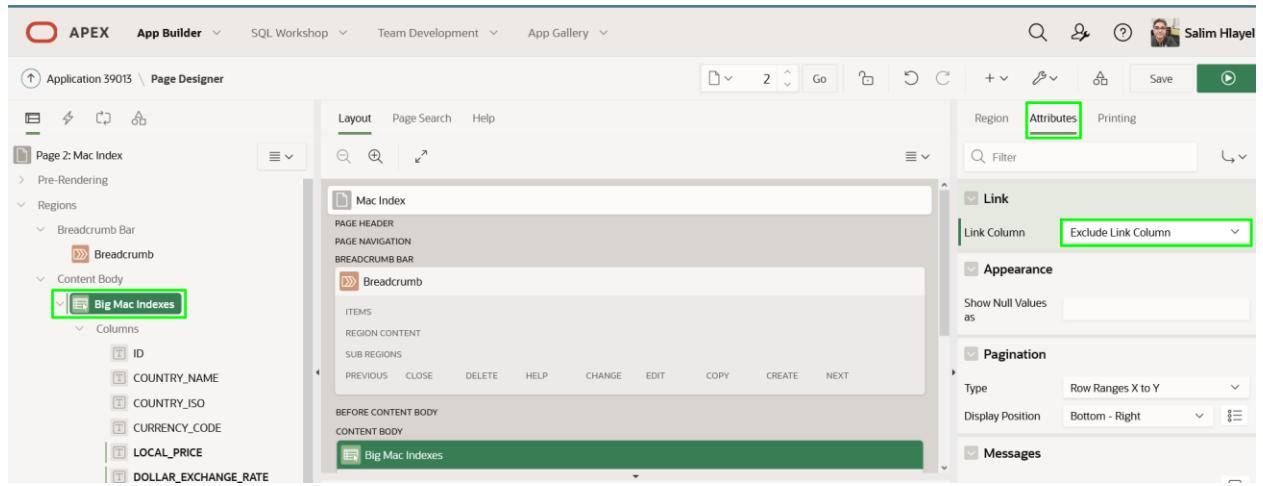
In the Property Editor (right pane), click the select icon for Appearance > Format Mask. In the Pick Format Mask dialog, select **5,234.1000**.

Task 3: Remove Data Entry Components

Given the data is obtained from an external source (The Economist REST API) users of the application should not update or delete existing records, and should not create new records.

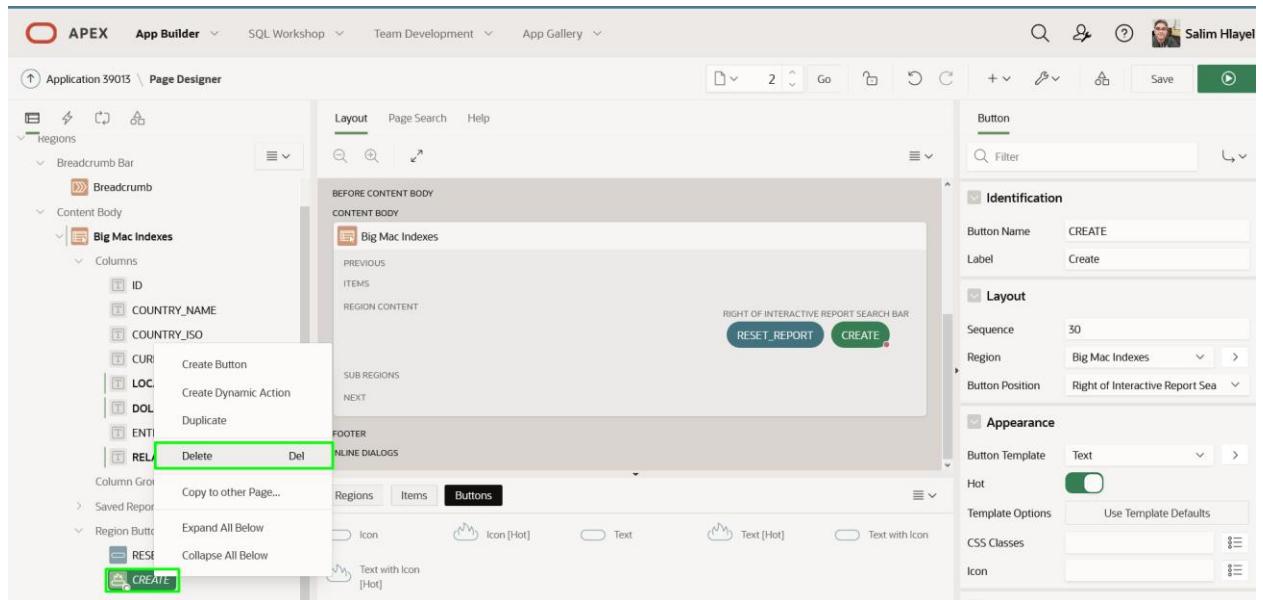
1. Remove the edit icon so end users cannot update or delete records.

In the Rendering tree (left pane), under Columns, click **Attributes**. In the Property Editor (right pane), for Link > Link Column, select **Exclude Link Column**.



2. Remove the Create button so end users cannot add new records.

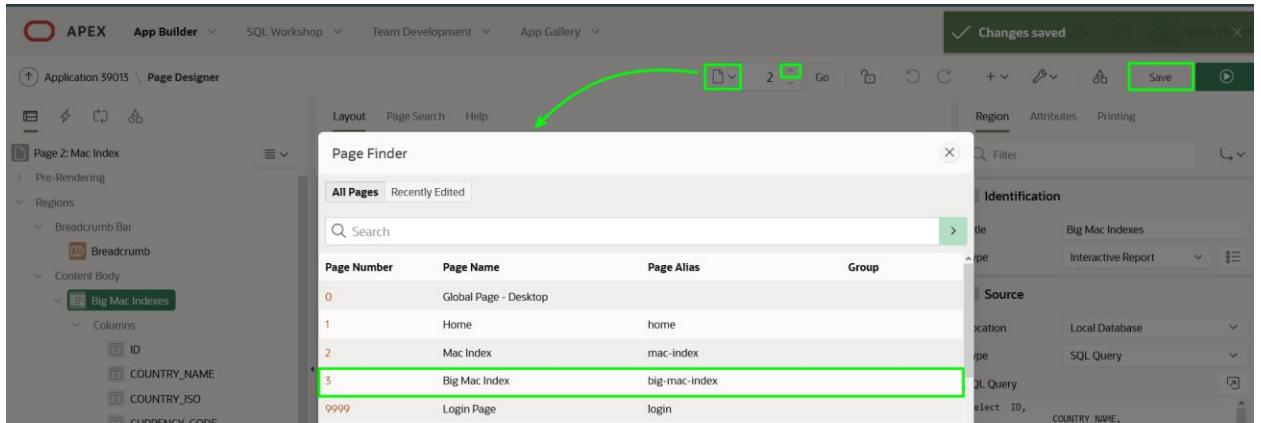
In the Rendering tree (left pane), under Region Buttons, right-click **CREATE**, and select **Delete (Del)**.



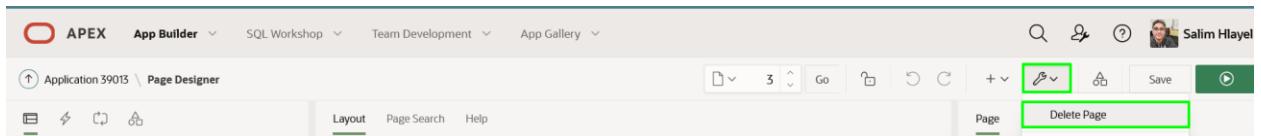
3. It is best, but not mandatory, to remove the Big Mac Index form page altogether. Before moving to Page 3 it is necessary to save the changes you made on Page 2.

In the Page Designer toolbar, with Page 2 selected, click **Save**.

In the Page Designer toolbar, use the page selector, or down arrow, to navigate to **Page 3 - Big Mac Index**.



- On Page 3: Big Mac Index, in the Page Designer toolbar, click **Utilities** (wrench), and then select **Delete Page**.



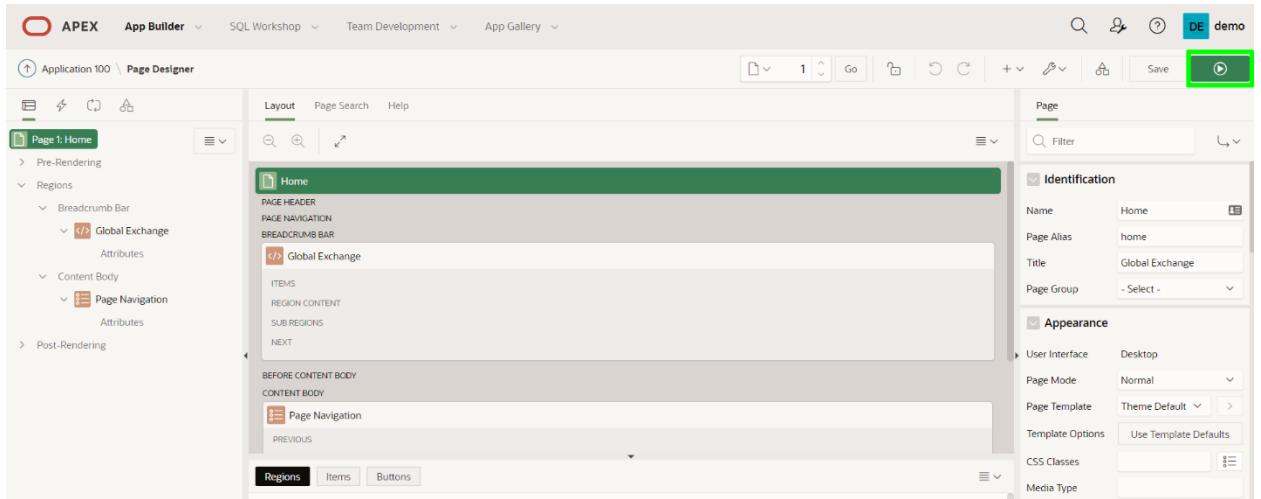
- On the Confirm Page Delete page, click **Permanently Delete Page**.

Note: Page Designer will return to displaying Page 1: Home.

Task 4: Resequence the Report Columns

To resequence the order in which the columns are displayed you need to run the report, and then rearrange the column order in the runtime environment.

- In the Page Designer Toolbar, click **Save and Run**.



2. In the runtime environment, click **Actions**, then click **Columns**.

Entry Date	Country Name	Currency Code	Local Price	Dollar Exchange Rate	Relative Exchange Rate
7/9/2019	Argentina	ARS	120.00	41.8045	20.9059
1/1/2019	Argentina		75.00	37.4550	13.4409
7/1/2014	Argentina		21.00	8.1688	4.3796
1/1/2015	Argentina		28.00	8.6100	5.8455
7/1/2015	Argentina		28.00	9.1350	5.8455
1/1/2016	Argentina		33.00	13.8093	6.6937
7/1/2016	Argentina	ARS	50.00	14.9350	9.9206
7/1/2011	Argentina	ARS	20.00	4.1325	4.9200

3. In the Select Columns Dialog, select **Entry Date**, and then click **Top**.

Click **Apply**.

Code	Local Price	Dollar Exchange Rate	Entry Date	Relative Exchange Rate
	120.00	41.8045	7/9/2019	20.9059
	75.00	37.4550	1/1/2019	13.4409
	21.00	8.1688	7/1/2014	4.3796
	28.00	8.6100	1/1/2015	5.8455
	28.00	9.1350	7/1/2015	5.8455
	33.00	13.8093	1/1/2016	6.6937
	50.00	14.9350	7/1/2016	9.9206
	20.00	4.1325	7/1/2011	4.9200
	20.00	4.3135	1/1/2012	4.7651
	19.00	4.5663	7/1/2012	4.3905

Task 5: Add a Computation

Rather than adding an additional column to the SQL Query for the region, it is also possible to define computational columns from the runtime environment.

The report contains the Dollar Exchange Rate and Relative Exchange Rate columns. If you subtract the Dollar Exchange Rate from the Relative Exchange Rate and then divide that by the Dollar Exchange Rate, you can calculate the valuation of the currency. It is best to display this as a percentage by multiplying the result by 100.

1. In the runtime environment, click **Actions**, select **Data**, then click **Compute**.

Entry Date	Country Name	Iso	Local Price	Dollar Exchange Rate	Relative Exchange Rate
1/14/2020	Argentina	ARG	171.00	60.0656	30.1587
1/14/2020	Australia	AUS		1.4491	1.1376
1/14/2020	Austria	AUT		0.8992	0.6772
1/14/2020	Azerbaijan	AZE		1.6965	0.6966
1/14/2020	Bahrain	BHR		0.3770	0.2469

2. In the Compute dialog, enter the following.

- **Column Label:** enter **Difference %**
- **Format Mask:** select **5,234.10**
- **Computation Expression:** enter the following.

```
Copy (I - F) * 100 / F
```

Click **Apply**.

Compute

Computation

- New Computation -

Column Label

Difference %

Format Mask

999G999G999G999G990D00

Computation Expression

(I - F) * 100 / F

► Examples

Columns	Keypad	Functions / Operators
A. ID	() .	!=
B. Country Name	7 8 9 -	<
C. Country Iso	4 5 6 +	<=
D. Currency Code	1 2 3 *	=
E. Local Price	0 . /	>
F. Dollar Exchange Rate	space ,	>=
H. Entry Date		ABS
I. Relative Exchange Rate		ADD/MONTHS

Cancel

Apply

Note: F references Dollar Exchange Rate and I references Relative Exchange Rate as listed under Columns

Task 6: Save the Report

Currently the changes you have made in the runtime environment can only be seen by you. Further, if you were to log out of the runtime environment and log back in your changes would be lost. In order for everyone to see the revised report you need to save the report as the "Primary" report.

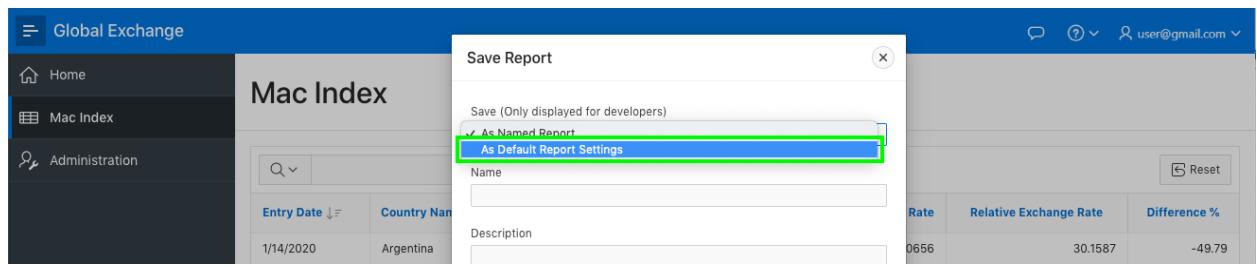
1. In the runtime environment, click **Actions**, select **Report**, then click **Save Report**.



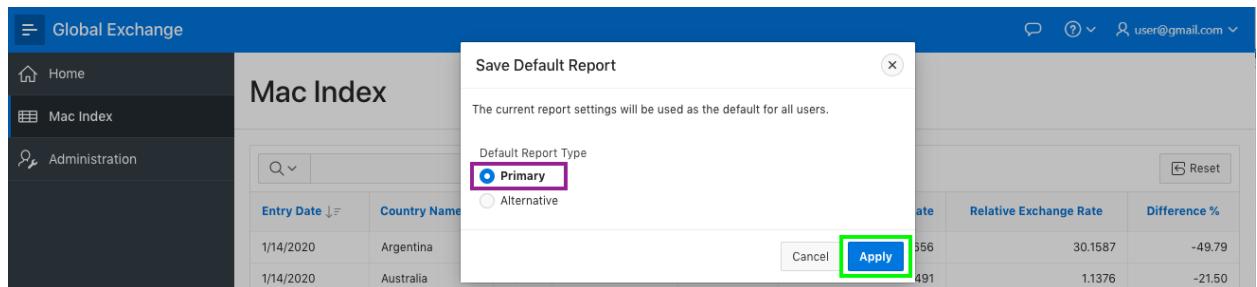
Mac Index

	Entry Date	Country Name ↑↓	Actions	Columns	Currency Code	Local Price	Dollar Exchange Rate	Relative Exchange Rate	Difference %
1	7/9/2019	Argentina		Filter	ARS	120.00	41.8045	20.9059	-49.99
2	1/1/2019	Argentina		Data >	ARS	75.00	37.4550	13.4409	-64.11
3	7/1/2014	Argentina		Format >	ARS	21.00	8.1688	4.3796	-46.39
4	1/1/2015	Argentina		Chart	ARS	28.00	8.6100	5.8455	-32.11
5	7/1/2015	Argentina		Group By	ARS	28.00	9.1350	5.8455	-36.01
6	1/1/2016	Argentina		Pivot	ARS	33.00	13.8093	6.6937	-51.53
7	7/1/2016	Argentina		Report >	ARS	50.00	14.9350	9.9206	-33.57
8	7/1/2011	Argentina		Save Report		20.00	4.1325	4.9200	19.06
9	1/1/2012	Argentina				20.00	4.3135	4.7651	10.47

2. In the Save Report dialog, for Save (Only displayed for developers), select **As Default Report Settings**.



3. In the Save Default Report dialog, click **Apply**.



Summary

This completes Lab 4. In this lab you learnt how to utilize a SQL query as the basis for a report, how to improve how columns are displayed, remove unwanted page elements, manipulate the report layout, and then save it for everyone to utilize.

Adding a Chart

Introduction

In this lab, you will learn how to add a chart page to the application.

Estimated Time: 5 minutes

Background Information

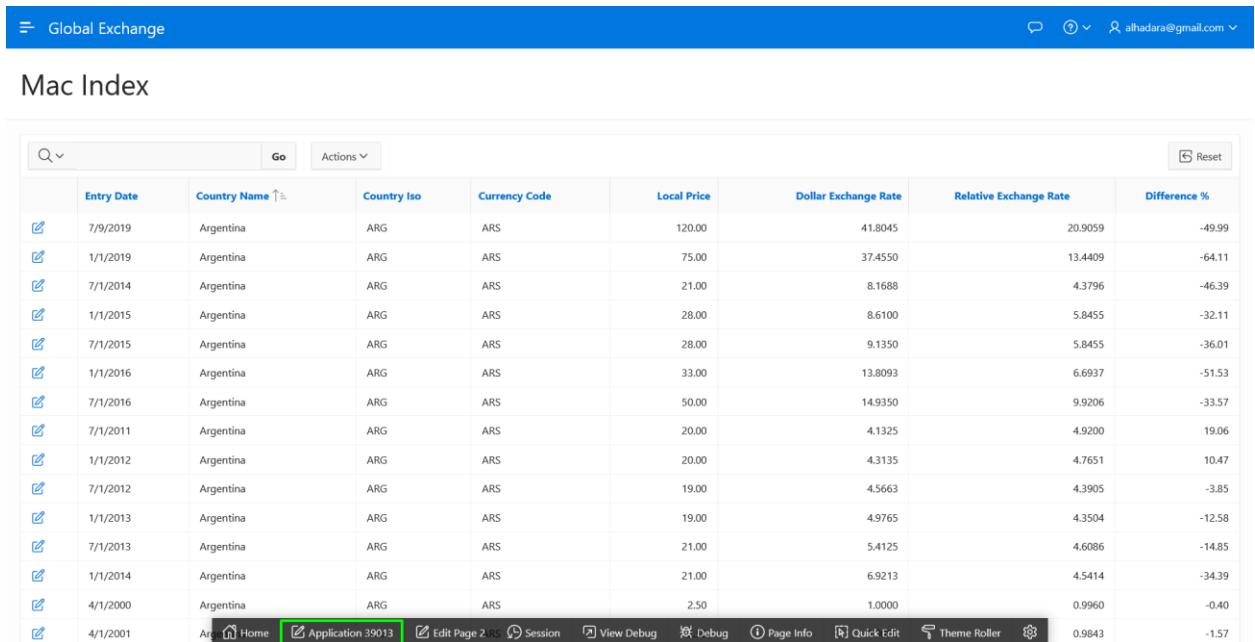
The Big Mac Index includes data for countries over the last 20 years. Therefore, to better visualize trends in a country's exchange rate over time it would be highly beneficial to create a chart that is country specific.

Initially you will create a chart that displays the Dollar Exchange Rate for Australia (COUNTRY_ISO = 'AUS'). Then you will add additional data series.

Collapse All Tasks

Task 1: Create a New Page

- From the runtime environment, in The Developer Toolbar (bottom of the screen), click **Application** ###.

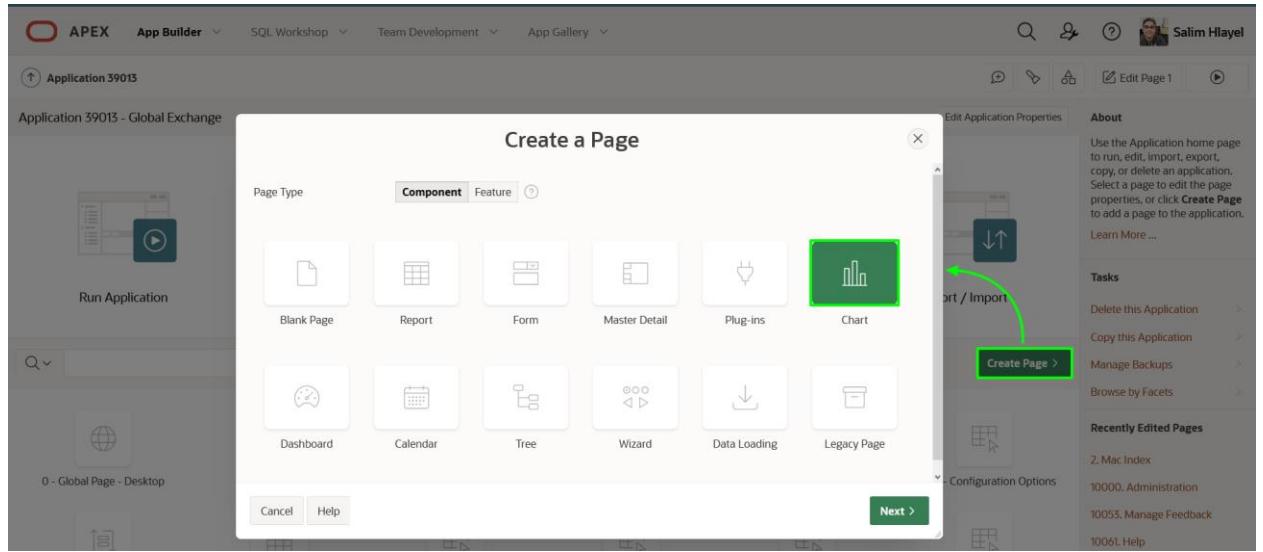


The screenshot shows the Global Exchange application interface. At the top, there is a blue header bar with the title "Global Exchange". On the right side of the header, there are icons for messaging, a user profile, and the email address "alhadara@gmail.com". Below the header, the main content area has a title "Mac Index". The page features a search bar with a dropdown menu, a "Go" button, and an "Actions" dropdown. A table lists data for Argentina, sorted by "Entry Date". The columns include "Entry Date", "Country Name", "Country Iso", "Currency Code", "Local Price", "Dollar Exchange Rate", "Relative Exchange Rate", and "Difference %". The table has 16 rows, each representing a date from July 9, 2019, to April 1, 2001. At the bottom of the page, there is a navigation bar with links for "Home", "Application 39013" (which is highlighted in green), "Edit Page 2", "Session", "View Debug", "Debug", "Page Info", "Quick Edit", "Theme Roller", and a gear icon for settings. The "Application 39013" link is likely the one being referred to in the task instructions.

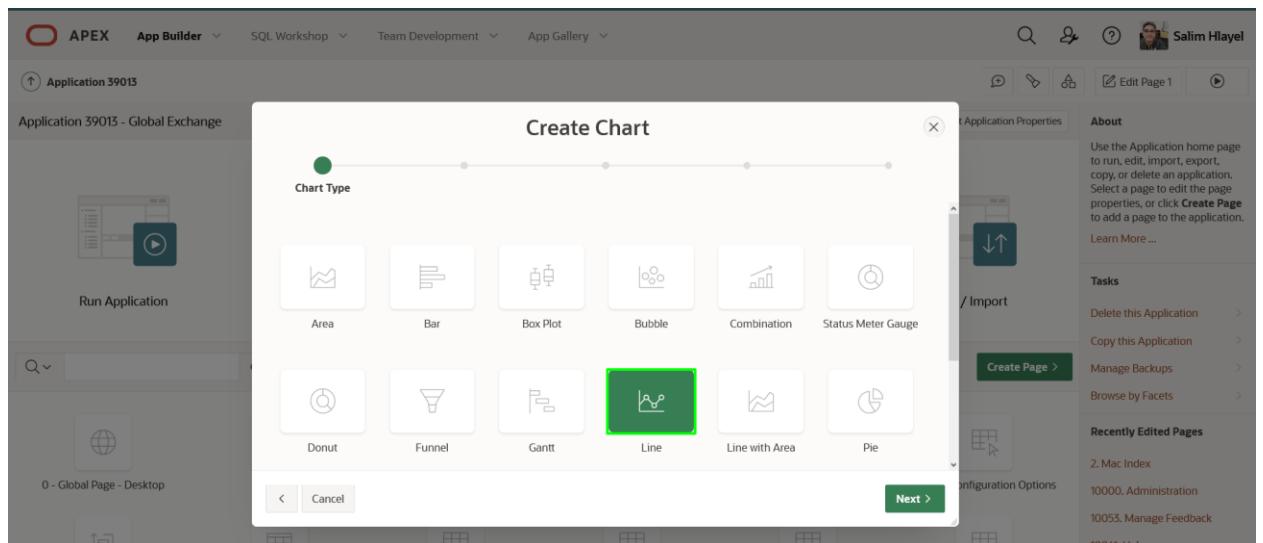
	Entry Date	Country Name	Country Iso	Currency Code	Local Price	Dollar Exchange Rate	Relative Exchange Rate	Difference %
	7/9/2019	Argentina	ARG	ARS	120.00	41.8045	20.9059	-49.99
	1/1/2019	Argentina	ARG	ARS	75.00	37.4550	13.4409	-64.11
	7/1/2014	Argentina	ARG	ARS	21.00	8.1688	4.3796	-46.39
	1/1/2015	Argentina	ARG	ARS	28.00	8.6100	5.8455	-32.11
	7/1/2015	Argentina	ARG	ARS	28.00	9.1350	5.8455	-36.01
	1/1/2016	Argentina	ARG	ARS	33.00	13.8093	6.6937	-51.53
	7/1/2016	Argentina	ARG	ARS	50.00	14.9350	9.9206	-33.57
	7/1/2011	Argentina	ARG	ARS	20.00	4.1325	4.9200	19.06
	1/1/2012	Argentina	ARG	ARS	20.00	4.3135	4.7651	10.47
	7/1/2012	Argentina	ARG	ARS	19.00	4.5663	4.3905	-3.85
	1/1/2013	Argentina	ARG	ARS	19.00	4.9765	4.3504	-12.58
	7/1/2013	Argentina	ARG	ARS	21.00	5.4125	4.6086	-14.85
	1/1/2014	Argentina	ARG	ARS	21.00	6.9213	4.5414	-34.39
	4/1/2000	Argentina	ARG	ARS	2.50	1.0000	0.9960	-0.40
	4/1/2001	Argentina	ARG	ARS				-1.57

- From the Application Home Page, click **Create Page**.

In the Create a Page dialog, for Page Type, click **Chart**.



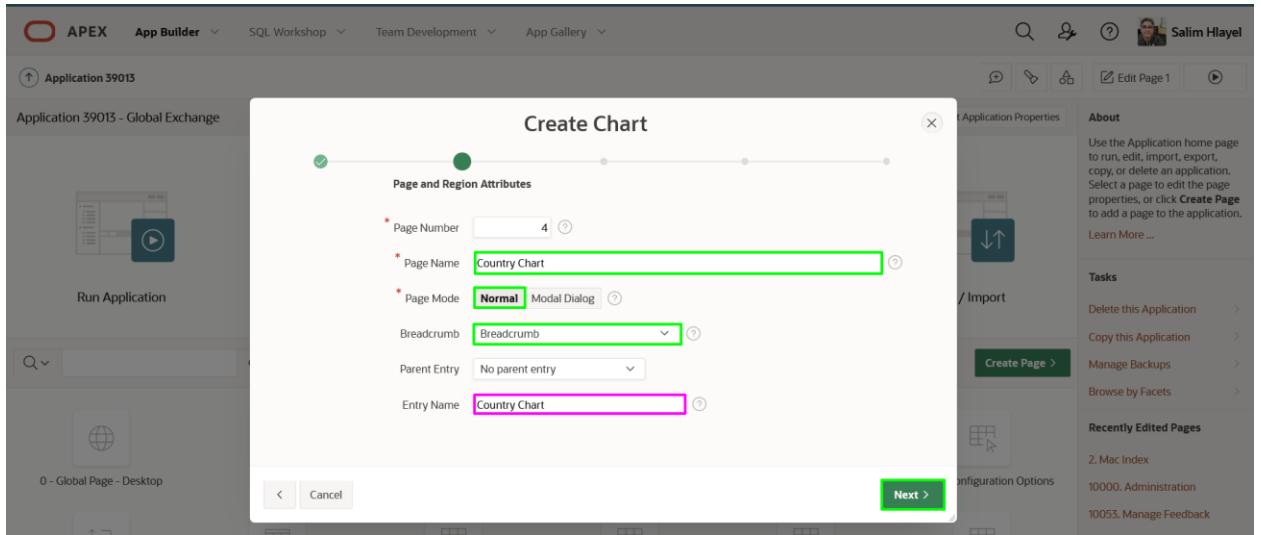
3. In the Create Chart dialog, for Chart Type, click **Line**.



4. In the Page and Region Attributes dialog, enter the following.

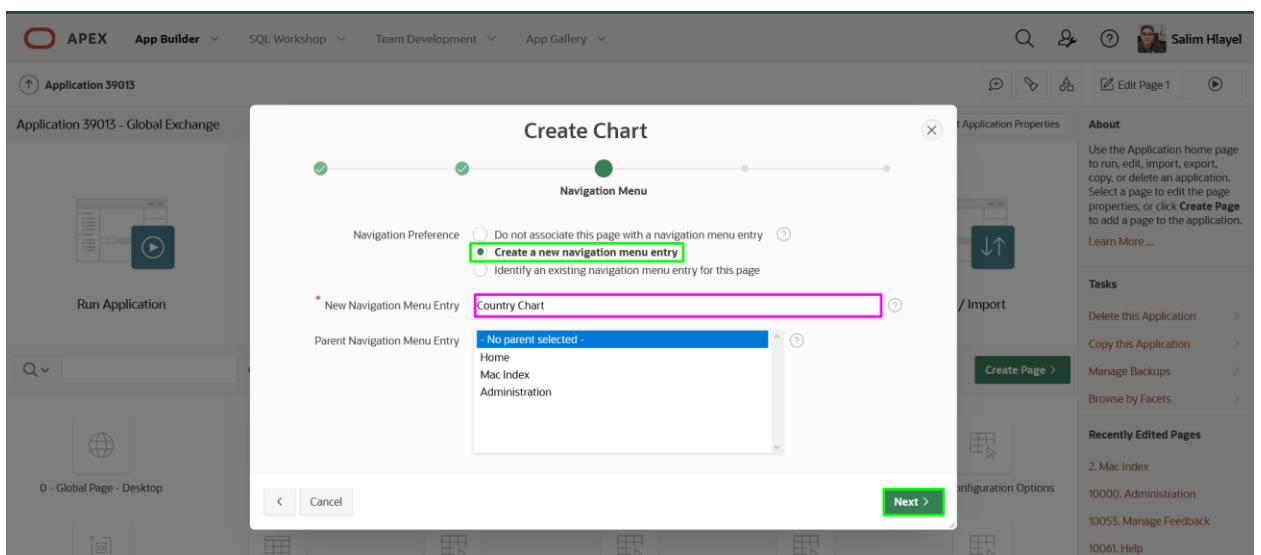
- **Page Name:** enter **Country Chart**
- **Breadcrumb:** select **Breadcrumb**

Click **Next**.



- In the Navigation Menu dialog, for Navigation Preference, click **Create a new navigation entry**.

Click **Next**.



- In the Source dialog, enter the following.

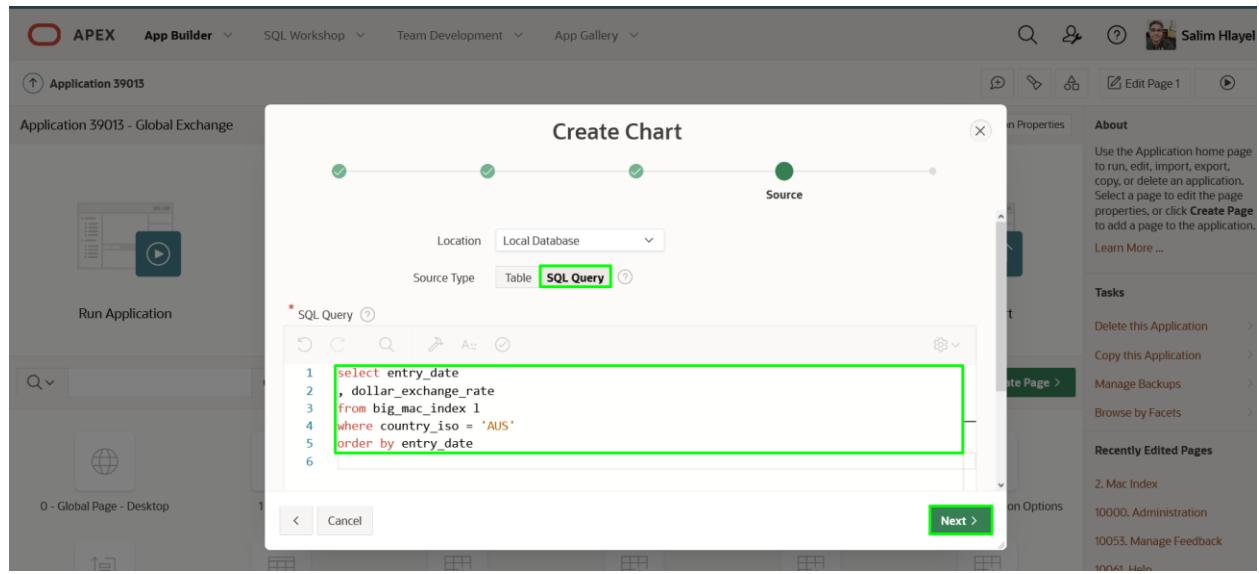
- **Source Type:** click **SQL Query**
- **SQL Query:** cut and paste the following.

- Copy `select entry_date`
 - , `dollar_exchange_rate`

- `from big_mac_index l`
- `where country_iso = 'AUS'`

```
order by entry_date
```

Click **Next**.

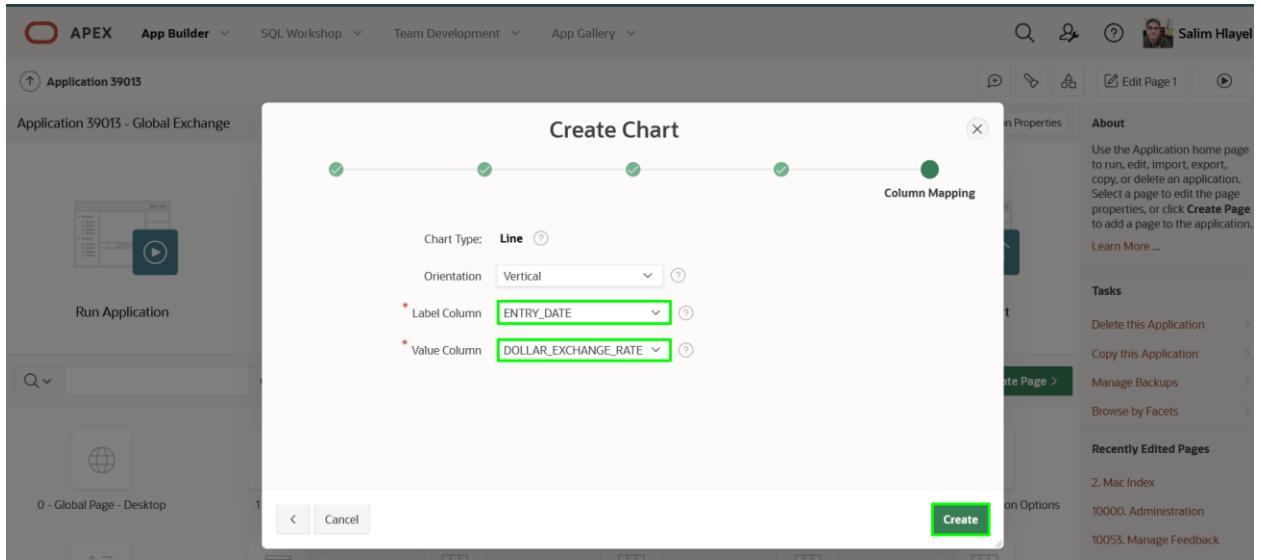


7.

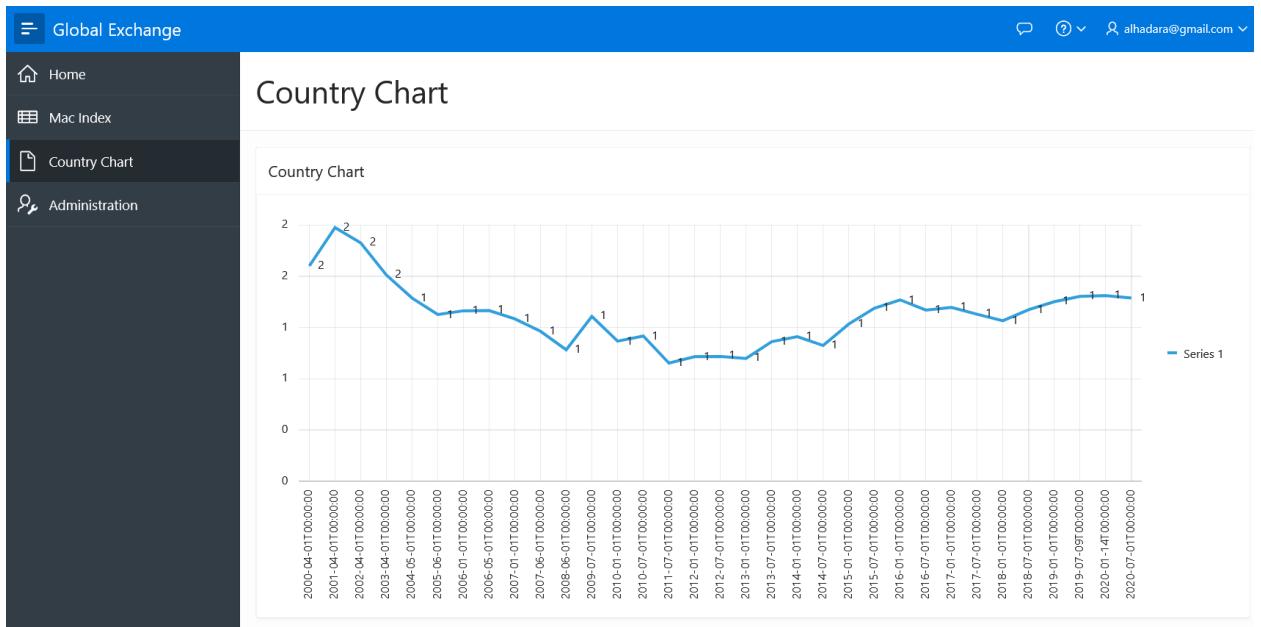
8. In the Column Mapping dialog, enter the following.

- **Label Column:** select `ENTRY_DATE`
- **Value Column:** select `DOLLAR_EXCHANGE_RATE`

Click **Create**.



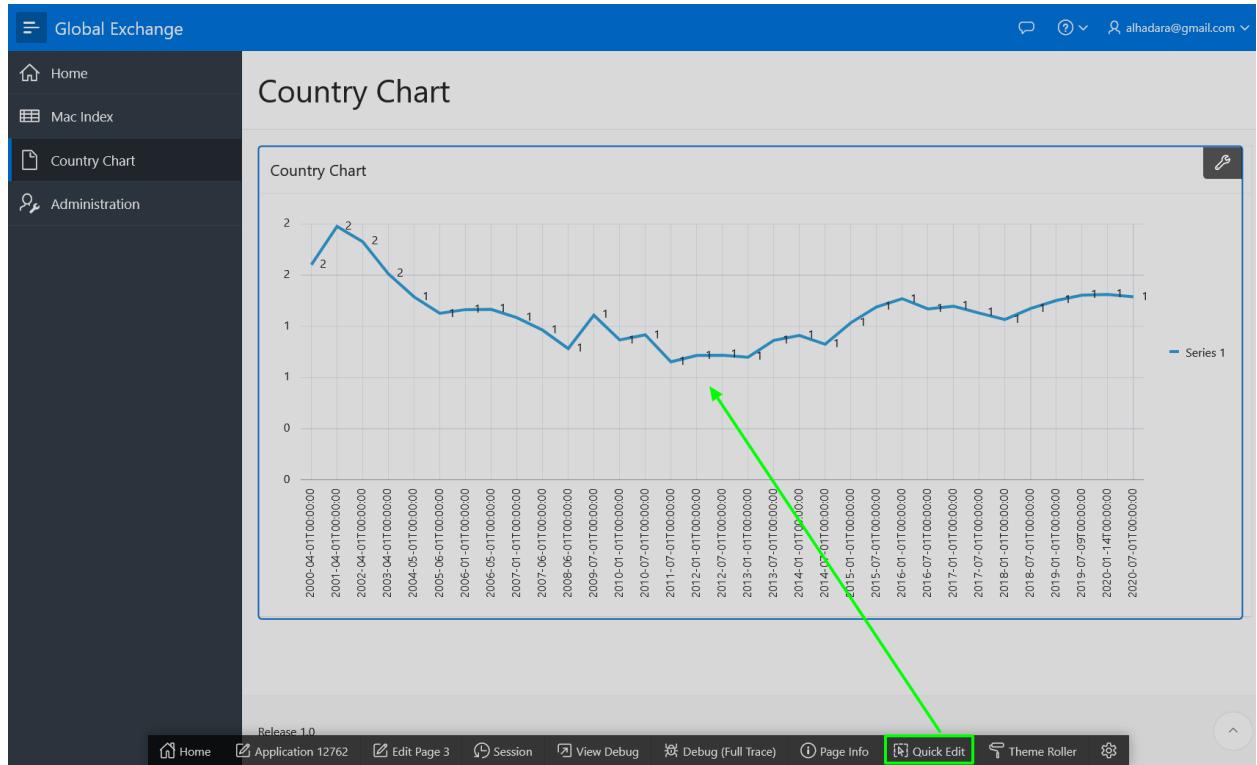
9. In the Page Designer toolbar, click **Save and Run**.



Task 2: Adjust the Chart Attributes

As can be seen by the appearance of the first cut of the chart, there is work to be done. Updating some attributes will help.

1. From the runtime environment, in the Developer Toolbar (bottom of the screen), click **Quick Edit**. Hover over the chart region until it is surrounded by a blue box. Click the Chart.

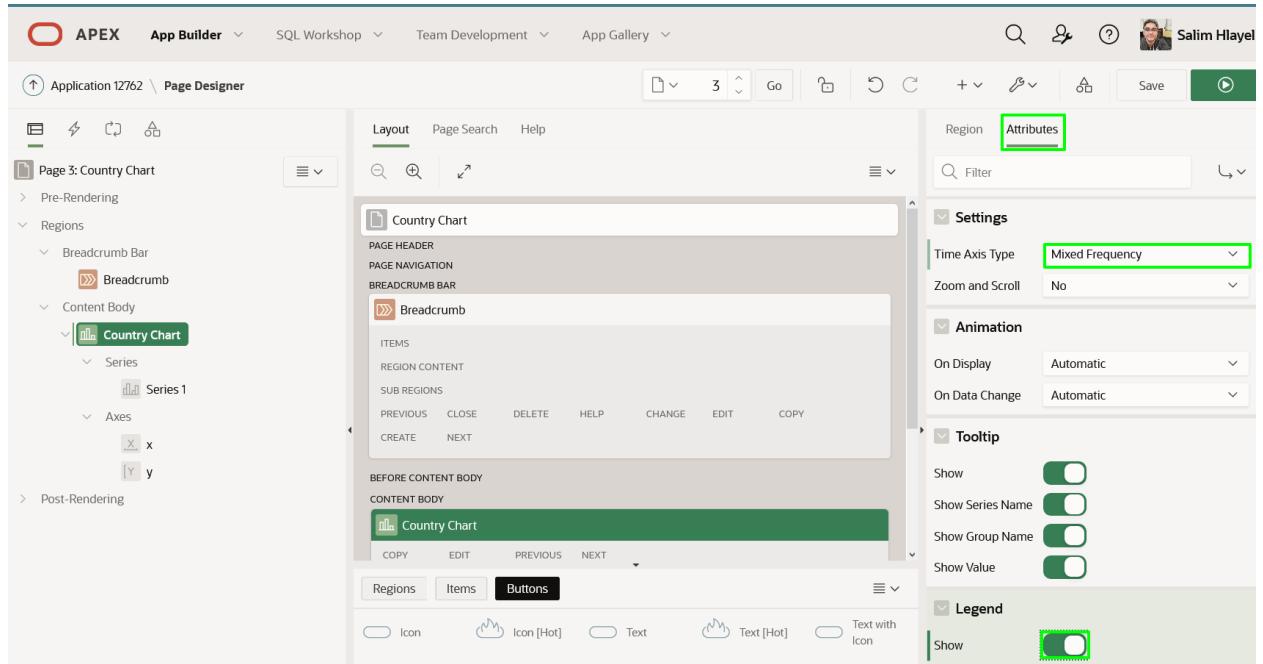


Alternatively, navigate back to the APEX Application Builder tab or window, and then navigate to Page 4.

2. Within Page Designer, in the Rendering tree (left pane), under **Country Chart**, click **Attributes**.

In the Property Editor (right pane), enter the following.

- **Settings > Time Axis Type:** select **Mixed Frequency**
- **Legend > Show:** click **Yes**



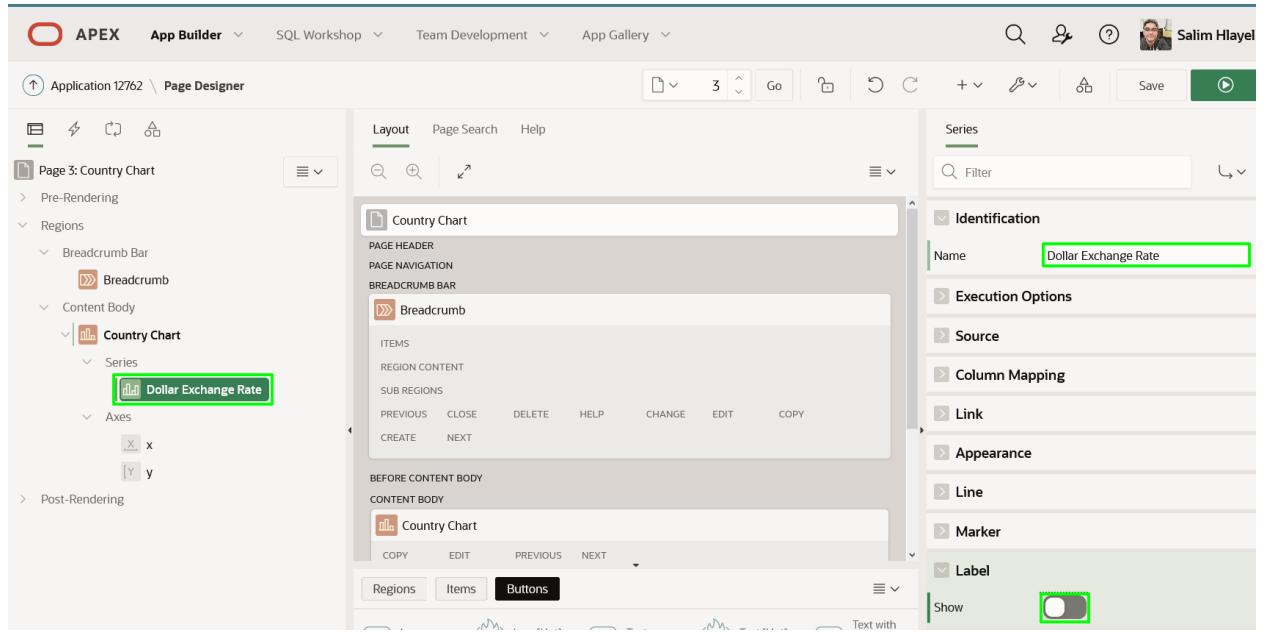
Task 3: Update the Chart Series

Time to update the existing chart line (series), and add a few more data series.

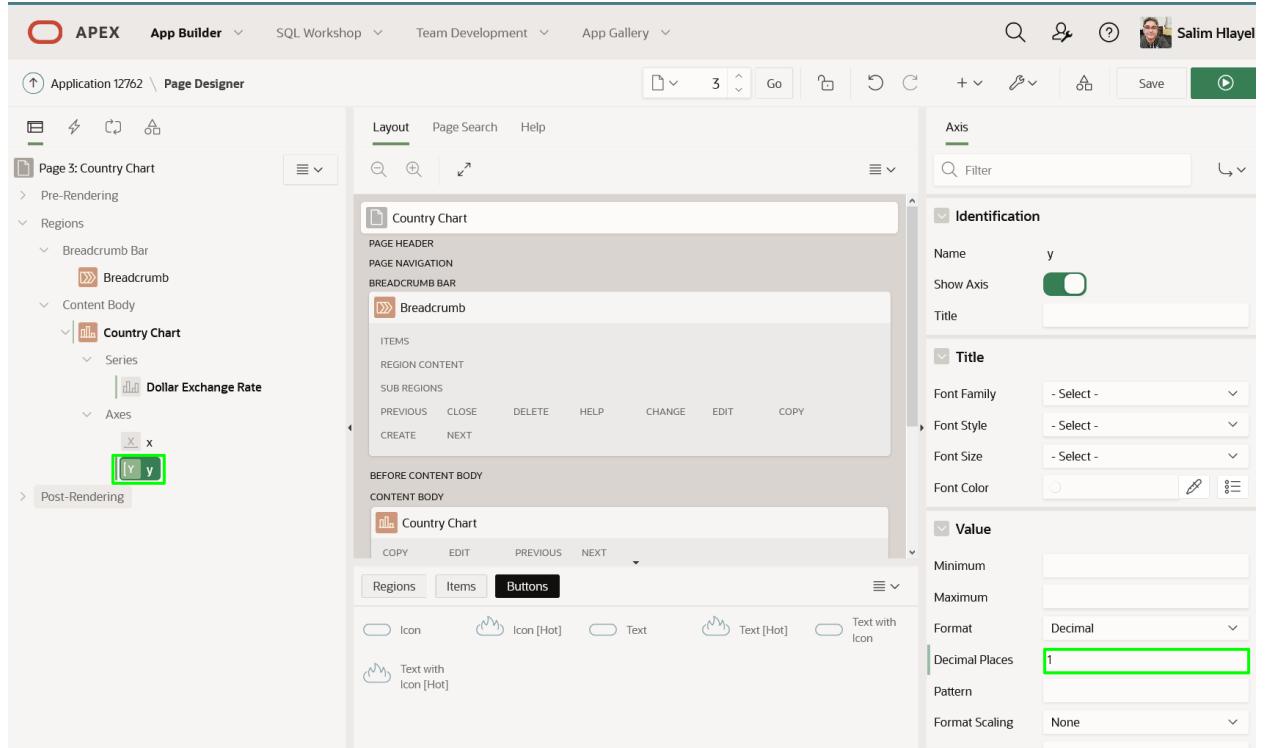
1. Within Page Designer, in the Rendering tree (left pane), under **Country Chart**, click **Series 1**.

In the Property Editor (right pane), enter the following.

- **Identification > Name:** enter **Dollar Exchange Rate**
- **Label > Show:** click **No**

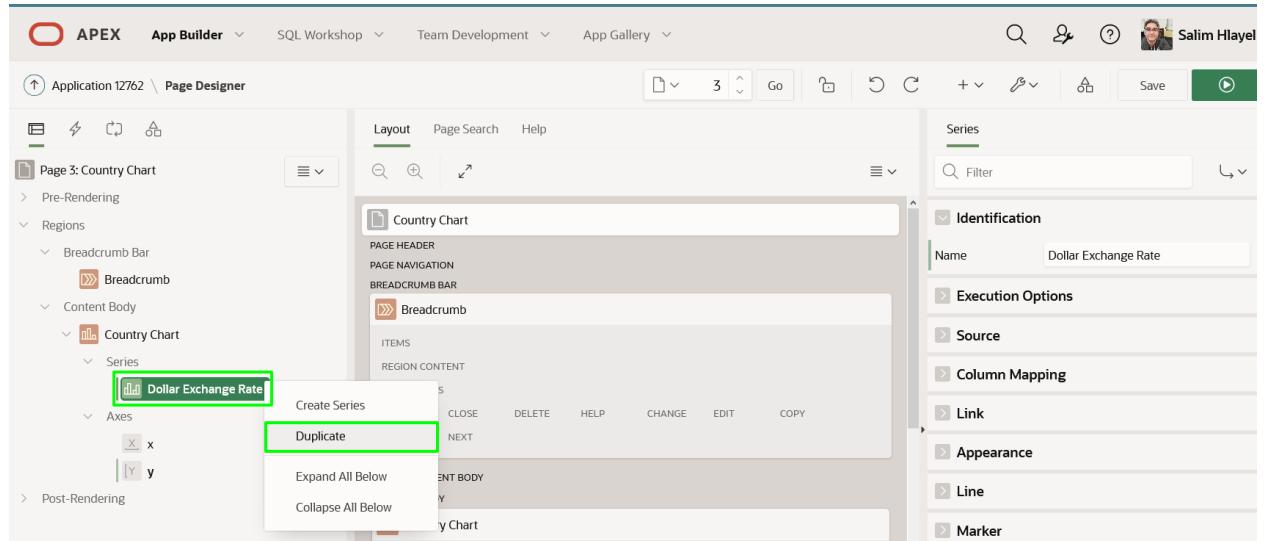


- **Select Axes > y**
- **Value > Decimal Places enter 1**, this will allow the labels on the chart to have decimal values that are more readable.



2. The next two series are very similar to the first, so it is easiest to just duplicate the existing series.

In the Rendering tree (left pane), under **Country Chart**, right-click **Dollar Exchange Rate**, click **Duplicate**.



3. Repeat the step above to create a third series. *Note: You should now have Dollar Exchange Rate, Dollar Exchange Rate_1, and Dollar Exchange Rate_2 or Dollar Exchange Rate_1_1, depending on which series you duplicated to create the third series.*
4. The second chart line (series) is going to display the Relative Exchange Rate.

In the Rendering tree (left pane), under **Country Chart**, click the second series.
In the Property Editor (right pane), enter the following.

- o **Identification > Name:** enter **Relative Exchange Rate**
 - o **Source > SQL Query:** copy and paste the following.
- ```

o Copyselect entry_date

o , (local_price / (select local_price from big_mac_index
 u

o
 where u.entry_date = l.entry_date
 and u.country_iso = 'USA'
)

o) relative_exchange_rate

```

- `from BIG_MAC_INDEX_1`
- `where country_iso = 'AUS'`

```
order by entry_date
```

- **Column Mapping > Value:** select **RELATIVE\_EXCHANGE\_RATE**

The screenshot shows the Oracle APEX Page Designer interface. On the left, the Rendering tree for 'Page 4: Country Chart' is visible, showing regions like Pre-Rendering, Regions (Breadcrumb Bar, Content Body), and Post-Rendering. Under 'Content Body', there is a 'Country Chart' item which has a 'Series' child node containing three entries: 'Dollar Exchange Rate', 'Relative Exchange Rate' (which is highlighted with a green box), and 'Dollar Exchange Rate\_1'. On the right, the Property Editor pane is open for the 'Relative Exchange Rate' series. It shows the following settings:

- Identification:** Name is set to 'Relative Exchange Rate'.
- Execution Options:** Sequence is set to 20.
- Source:** Location is 'Local Database' and Type is 'SQL Query'. The SQL query is:
 

```
AND v.country_iso = 'USA'
) relative_exchange_rate
from BIG_MAC_INDEX_1
where country_iso = 'AUS'
order by entry_date
```
- Column Mapping:** Series Name is '- Select -', Label is 'ENTRY\_DATE', and Value is 'RELATIVE\_EXCHANGE\_RATE' (which is also highlighted with a green box).

5. The third chart line (series) is going to display the Percentage Difference between the currency and the US currency.

In the Rendering tree (left pane), under **Country Chart**, click the third series.  
In the Property Editor (right pane), enter the following.

- **Identification > Name:** enter **Percentage Difference (Y2)**
- **Source > SQL Query:** cut and paste the following:

- Copy `select entry_date`

```
o , ((local_price / (select local_price from
 big_mac_index u

o where u.entry_date = l.entry_date

o and u.country_iso = 'USA'

o)

o - dollar_exchange_rate

o) * 100 / dollar_exchange_rate

o) percentage_difference

o from BIG_MAC_INDEX l

o where country_iso = 'AUS'
```

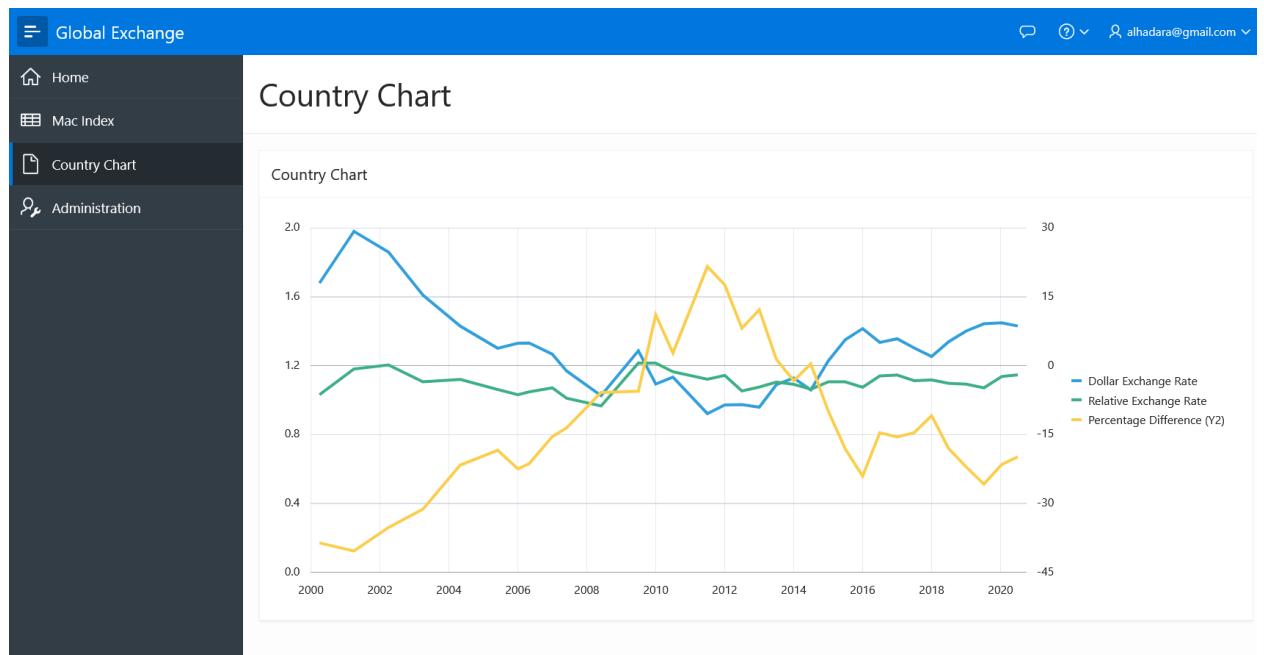
```
order by entry_date
```

- o **Column Mapping > Value:** select PERCENTAGE\_DIFFERENCE
- o **Appearance > Assigned To Y2 Axis:** check Yes

The screenshot shows the Oracle APEX App Builder Page Designer interface. The left sidebar lists the page structure: Pre-Rendering, Regions (Breadcrumb Bar), Content Body (Country Chart with three series: Dollar Exchange Rate, Relative Exchange Rate, and Percentage Difference (Y2)), Axes (x, y, y2), and Post-Rendering. The main area displays two versions of the 'Country Chart' region. The top version shows the chart configuration with three series: 'Dollar Exchange Rate' (blue line), 'Relative Exchange Rate' (green line), and 'Percentage Difference (Y2)' (yellow line). The bottom version shows the rendered chart from the browser. The right sidebar contains sections for Series (SQL query: `- dollar_exchange_rate * 100 / dollar_exchange_rate ) percentage_difference from BIG_MAC_INDEX where country_id = 'AUS' order by entry_date`), Page Items to Submit, Optimizer Hint, Column Mapping (Label: ENTRY\_DATE, Value: PERCENTAGE\_DIFFERENCE), Link, and Appearance (Assigned To Y2 Axis checked). A green box highlights the SQL query in the Series section.

*Note: If you do not check 'Assigned to Y2 Axis' then the chart will not display well, and not look like the following page.*

## 6. In Page Designer, within the Toolbar, click Save and Run.



## **Summary**

This completes Lab 5. In this lab you learnt how to create and modify a chart adding multiple series.

# Adding Chart Criteria

## Introduction

In this lab, you will learn how to add an item to a page, utilize the page item in chart series, and define client-side interactivity.

Estimated Time: 5 minutes

### Background Information

The chart currently has the ISO code for Australia (AUS) hardcoded. By adding a select list with a list of the countries, and then modifying the chart series to utilize this page item you can easily make it easy to review the exchange rate history for any country.

To refresh the chart whenever the country in the select list is changed, you need to utilize a Dynamic Action. A Dynamic Action defines client-side interactivity, and based on a specific action(change in the select list), performs specified functions (refresh), on specified elements (chart region).

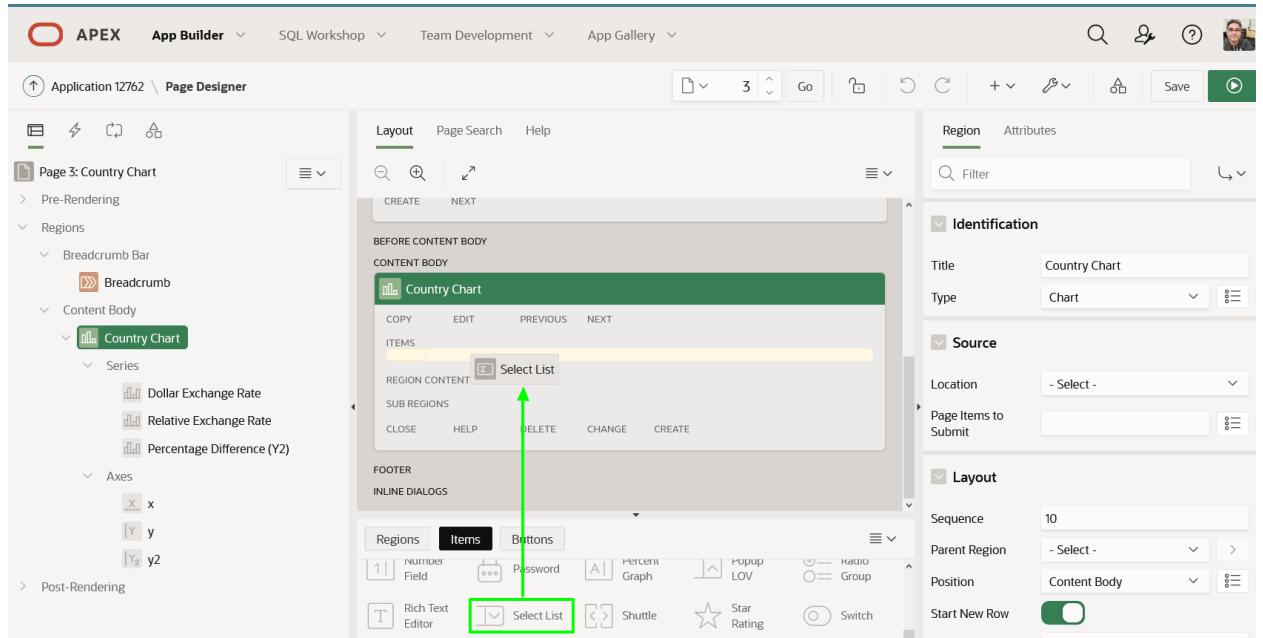
In order for the chart to properly utilize the updated value in the select list, then it is necessary to submit that page item when rendering the chart.

[Collapse All Tasks](#)

## Task 1: Add a Page Item

1. From the Runtime environment, in the Developer Toolbar (bottom of the screen), click **Edit Page X**.
2. Within Page Designer, in the Gallery (center pane, below Layout), click **Country Chart**, click **Items**. Click **Select List** and hold the mouse down. Drag the item up until it is in the Items section within the Country Chart region. Once the Items section expands and the dark yellow box appears, drop the item (release the mouse).

*Note: Make sure that you drag the select list into the Country Chart region.*



3. In the Property Editor (right panel), update the following.

- **Identification > Name:** enter **P3\_COUNTRY**
- **List of Values > Type:** select **SQL Query**
- **List of Values > SQL Query:** cut and paste the following.

- Copy `select distinct country_name d, country_iso r`
- `from big_mac_index`

```
order by 1
```

- **List of Values > Display Extra Values:** click No
- **List of Values > Null Display Value:** enter **Select Country -**

The image consists of two vertically stacked screenshots of the Oracle APEX App Builder Page Designer interface.

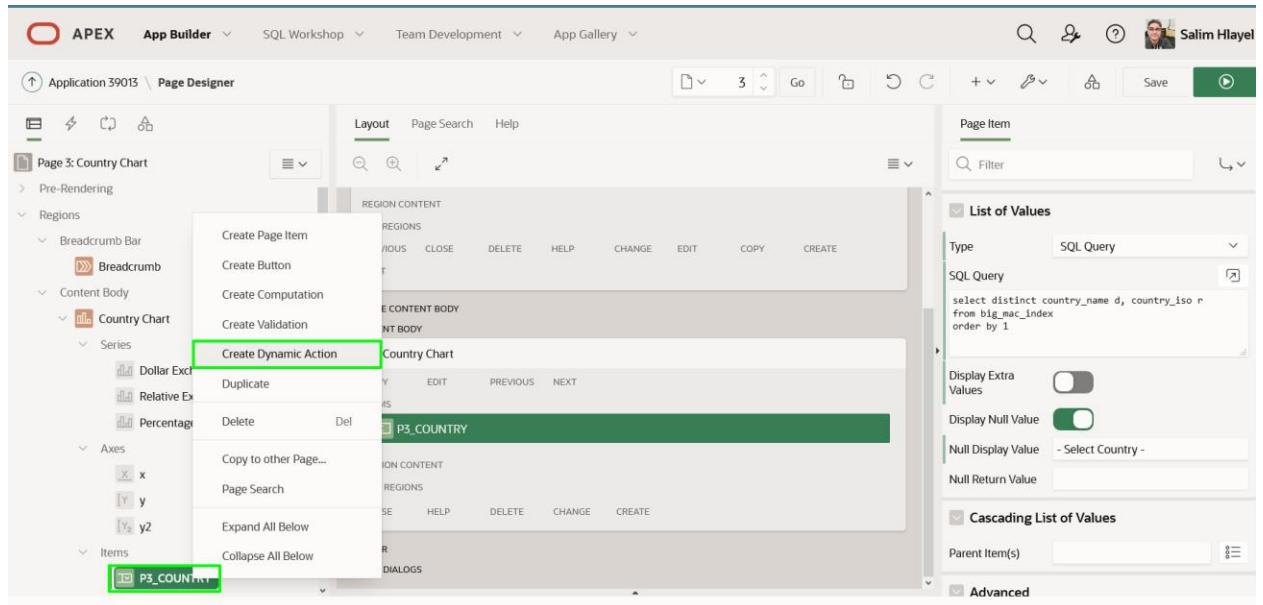
**Screenshot 1:** Shows the configuration of a select list item named **P3\_COUNTRY**. The **Identification** section shows the name as **P3\_COUNTRY** and type as **Select List**. The **Label** section shows the label as **Country**. The **Settings** section shows the page action on selection as **None** and allow multi selection as off. The **Layout** section shows the sequence as 10 and region as **Country Chart**.

**Screenshot 2:** Shows the configuration of the same select list item **P3\_COUNTRY**. The **List of Values** section is expanded, showing the type as **SQL Query** and the query as `select distinct country_name d, country_iso r from big_mac_index order by 1`. Other settings include **Display Extra Values** and **Display Null Value** both set to **On**, and **Null Display Value** set to **Select Country -**.

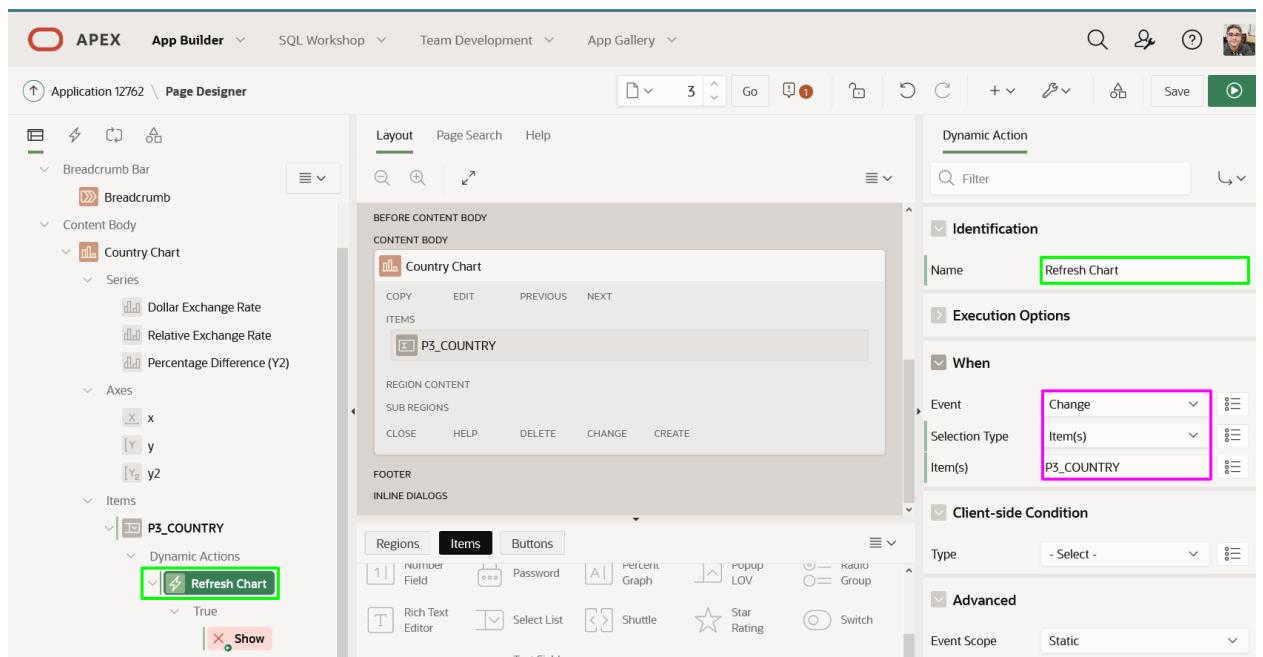
## Task 2: Add a Dynamic Action

In order for the chart to be refreshed when a country is selected from the new item a Dynamic Action must be defined.

1. In the Rendering tree (left pane), right click on **P3\_COUNTRY**, select **Create Dynamic Action**.



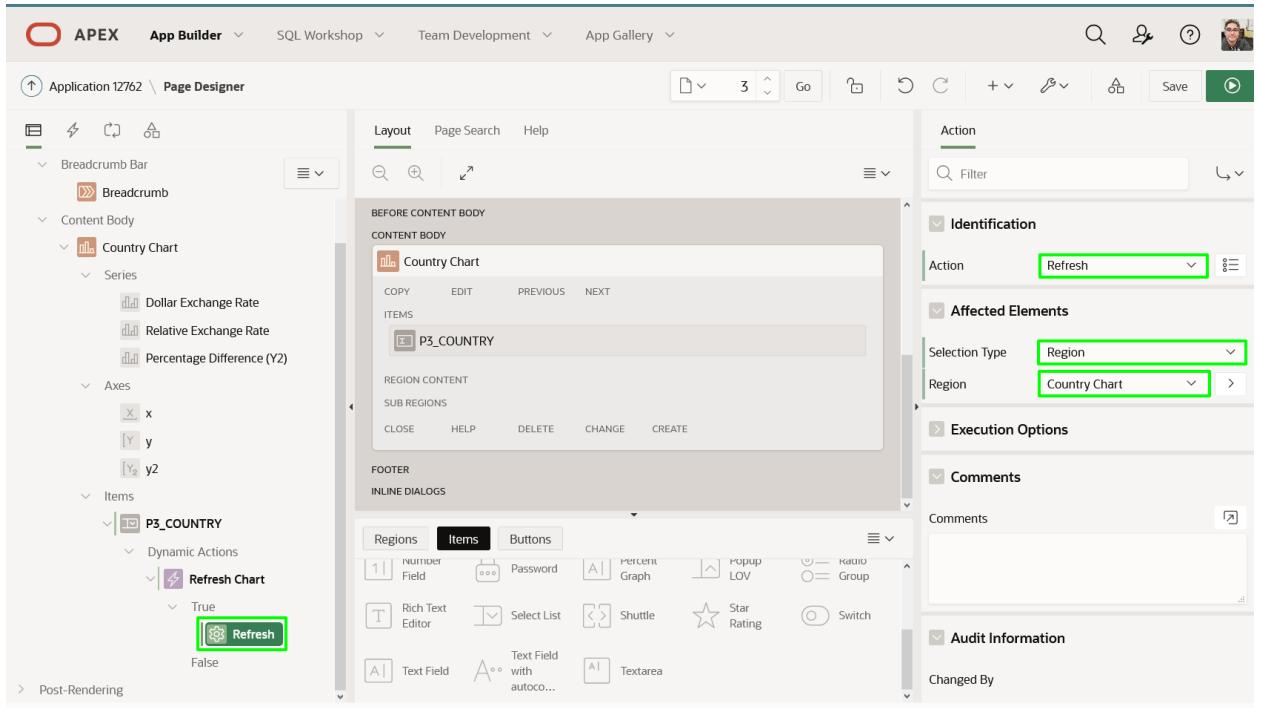
2. In the Property Editor (right pane), for Identification > Name, enter **Refresh Chart**.



3. In the Rendering tree (left pane), under Dynamic Actions > True, click **Show**.

In the Property Editor (right pane), enter the following.

- **Identification > Action:** select **Refresh**
- **Affected Elements > Selection Type:** select **Region**
- **Affected Elements > Region:** select **CountryChart**

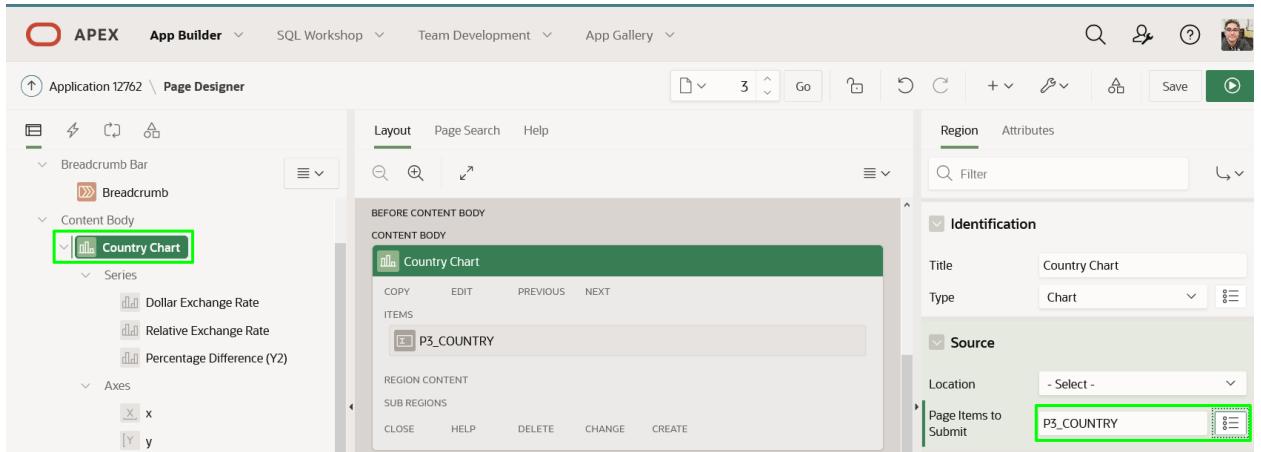


## Task 3: Update the Chart

Currently, all three chart series have the country hard-coded. To ensure the value from the item can be used it must be set in session state. Rather than doing this in each series you can set it once for the chart. Once the item is in session state then it can be utilized in the where condition within each chart series.

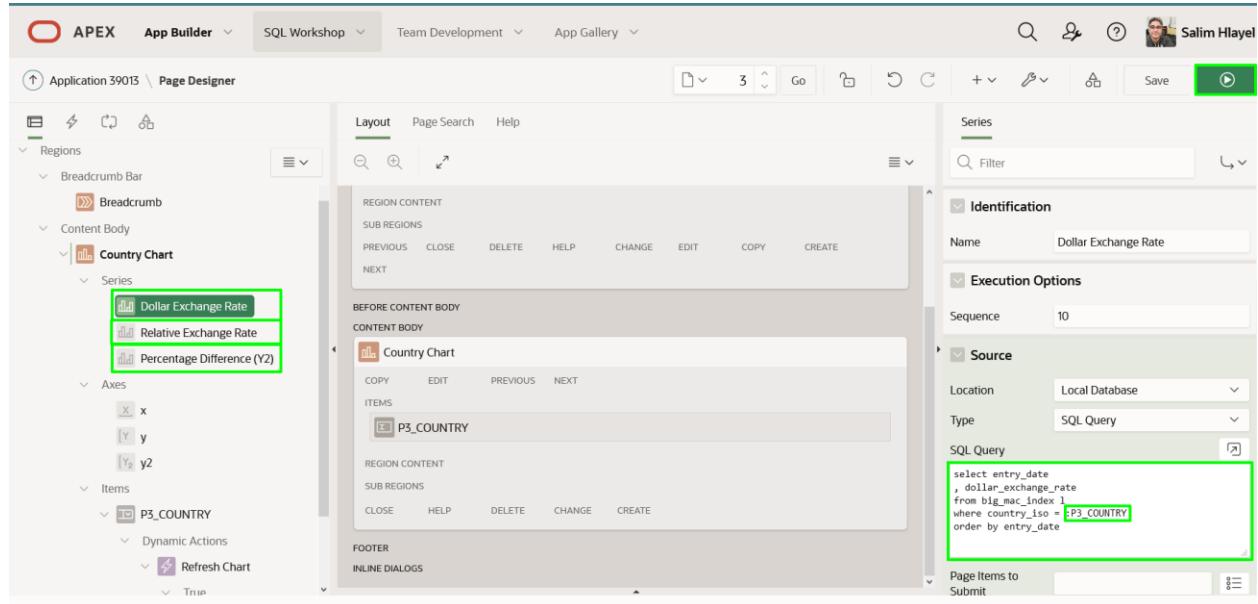
1. In the Rendering tree (left pane), under Content Body, click **Country Chart**.

In the Property Editor (right pane), for Source > Page Items to Submit, select **P3\_COUNTRY**.



2. In the Rendering tree (left pane), under Series, click **Dollar Exchange Rate**.

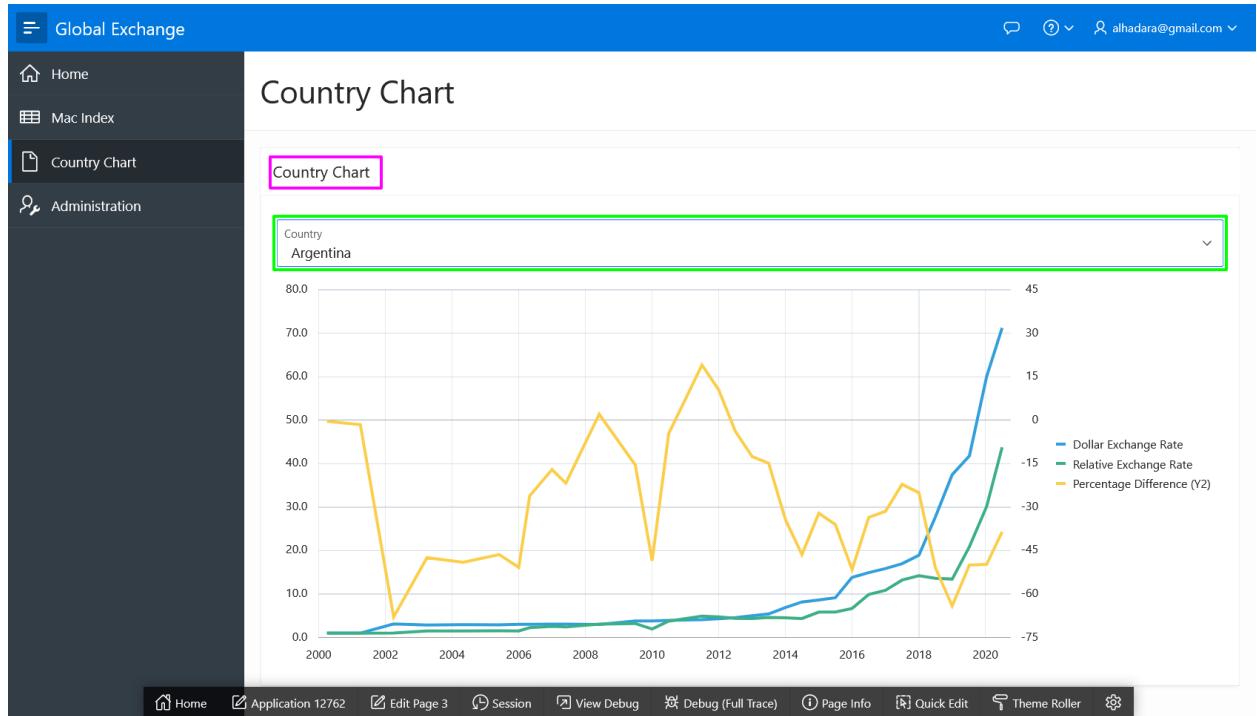
In the Property Editor (right pane), for Source > SQL Query, replace 'AUS' with :P3\_COUNTRY.



3. In the Rendering tree (left pane), under Series, click **Relative Exchange Rate**. In the Property Editor (right pane), for Source > SQL Query, replace 'AUS' with :P3\_COUNTRY.
4. In the Rendering tree (left pane), under Series, click **Percentage Difference**. In the Property Editor (right pane), for Source > SQL Query, replace 'AUS' with :P3\_COUNTRY.

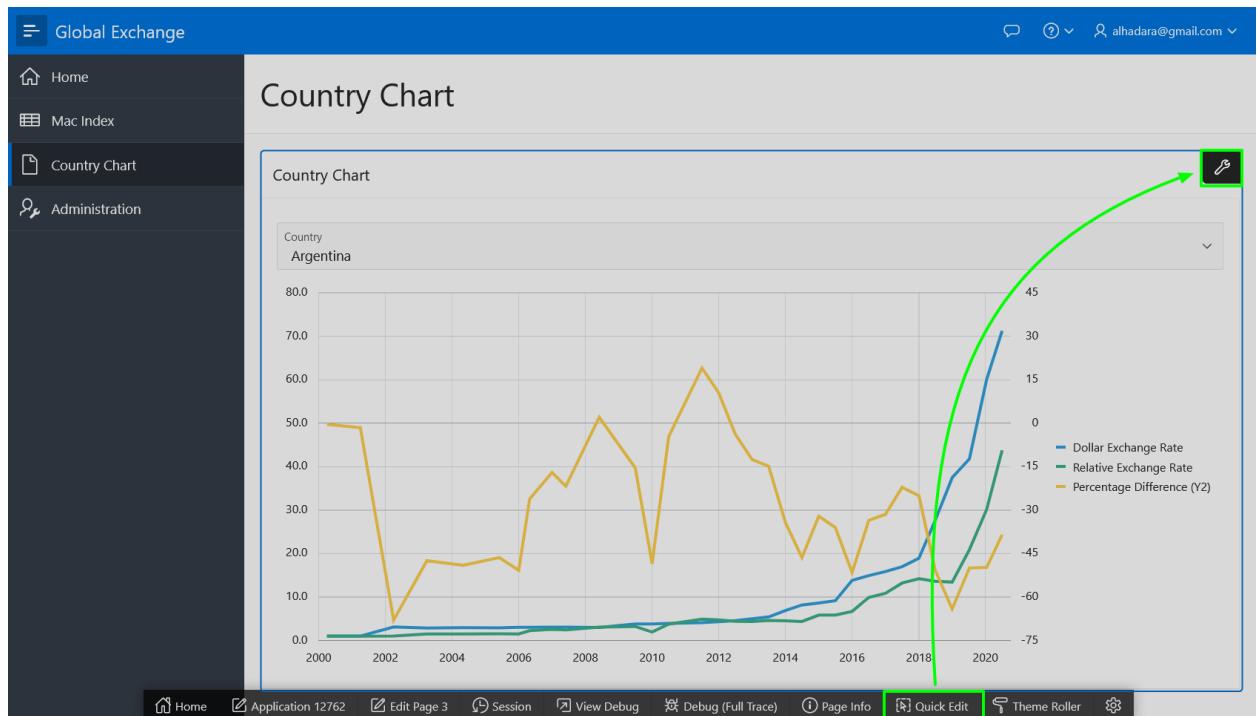
## Task 4: Improve the Chart Page

1. In Page Designer, within the Toolbar, click **Save and Run**.
2. In the Runtime environment, select different Countries.



- Reviewing the runtime environment the region name should be hidden. This can be done from the runtime environment using Live Template Options.

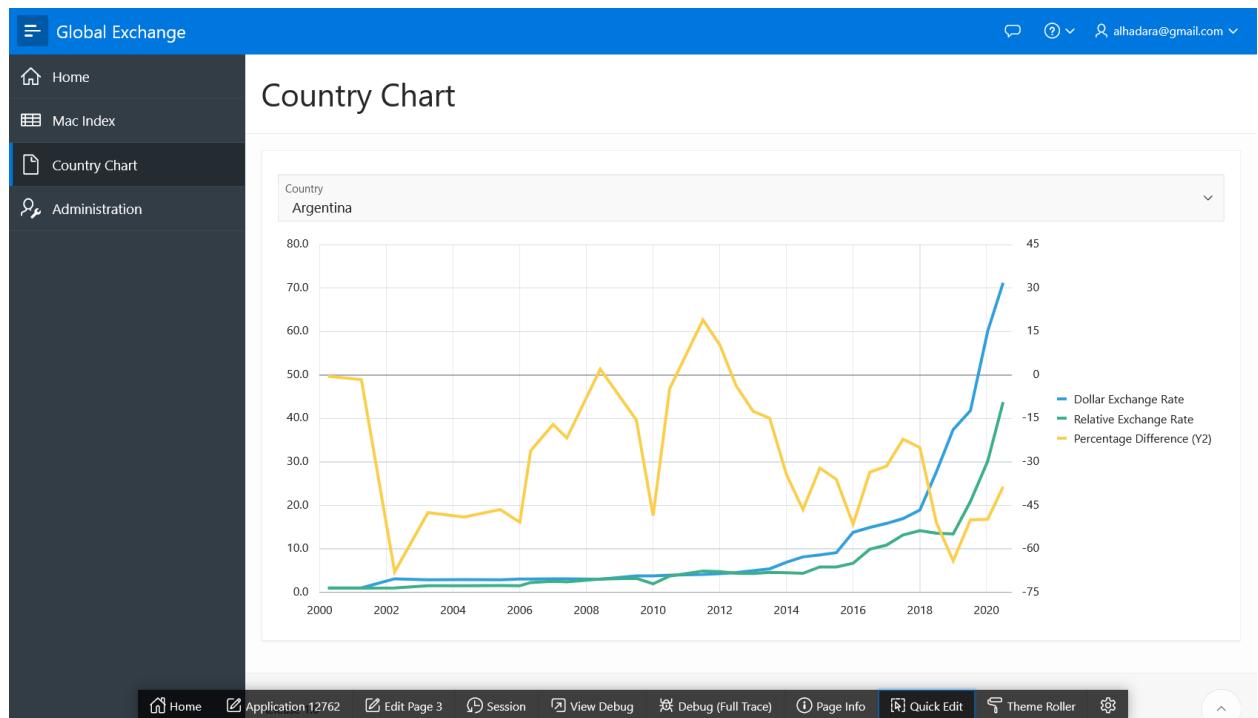
In the runtime environment, within the Developer Toolbar, click **Quick Edit**. Move the mouse up until a blue outline surrounds the chart. Click the **Wrench** in the top right corner of the chart region.



4. In the Live Templates Options dialog, for Header, select **Hidden but accessible**.  
*Note: If an end user is using assistive technology then the region name will be announced.*

Click **Save**.

5. In the Runtime environment, select different Countries.



## Summary