WORKSHOP: Price Index Processor System

CPI DEMONSTRATION

CPI SYSTEM OVERVIEW

▸ The CPI System consists of five parts:
1. Data Entry, Editing;
2. Data Diagnosis and Validation;
3. Item Weights Creating, Editing and Distribution;
4. Index Imputation; and
5. Tabulation and Reporting

Installation: System Requirements

▸ **The system requirements are as follows:**

▸ Operating Systems: Windows 98, Windows NT 4.0, Windows 2000, Windows ME, Windows XP – Professional work with the older version of PIPS

▸ **Windows Vista Business, or Windows 7 are recommended for use with PIPS 3.3.2**

▸ Microsoft Office 97 - 2003 is best. MS Office Version 2010 works using the xls format and not the xlsx format which damages the macros in the collection sheets

Installation: System Requirements

- CPU: Pentium-600 MHz or higher
- 512 MB RAM or more
- 60 MB free disk space
- VGA-True Color video mode, displays at 800 x 600 or 1024 x 768 pixels.
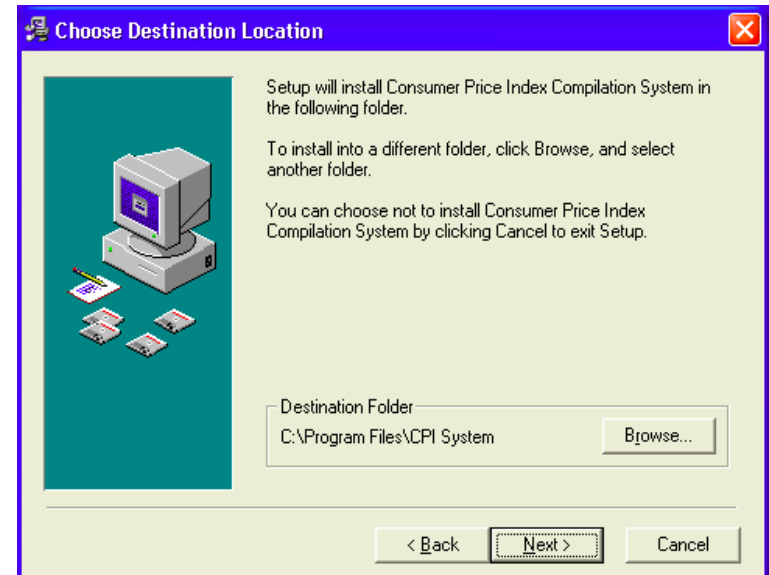- Note a number of PIPS features DO NOT work in Windows 8

Installation: Setup

1. Go to the UNECE site at http://www.unece.org/stats/downloads/SW_CPI_PPI/pips.html
2. Locate the two installation files:
   - CPI Version 3.3.1 (CPI.EXE – 38.3 MB Size)
   - Patch File – Version 3.3.2 (08-20-2011) 2.9 MB
3. Double click CPI.EXE and install the program
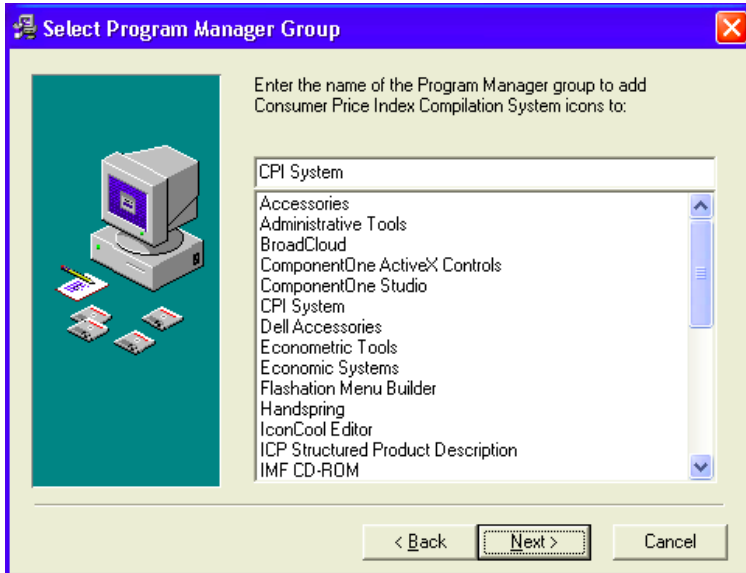
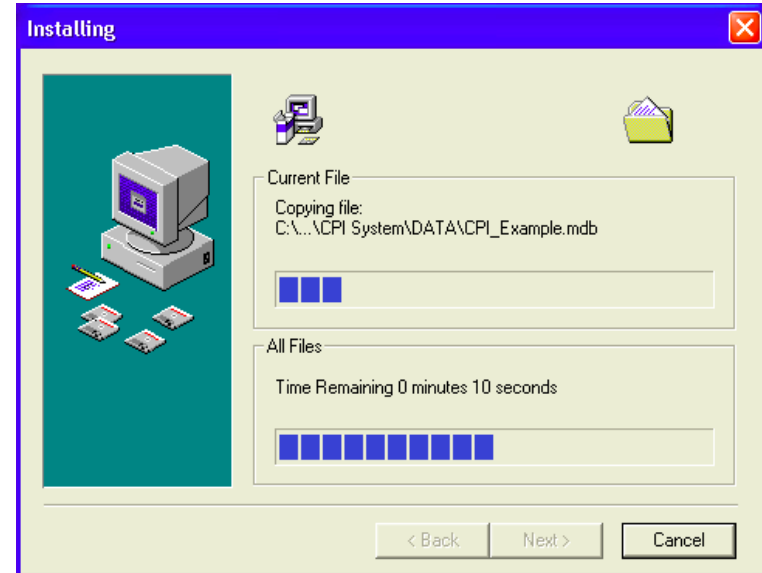# Installation: Setup
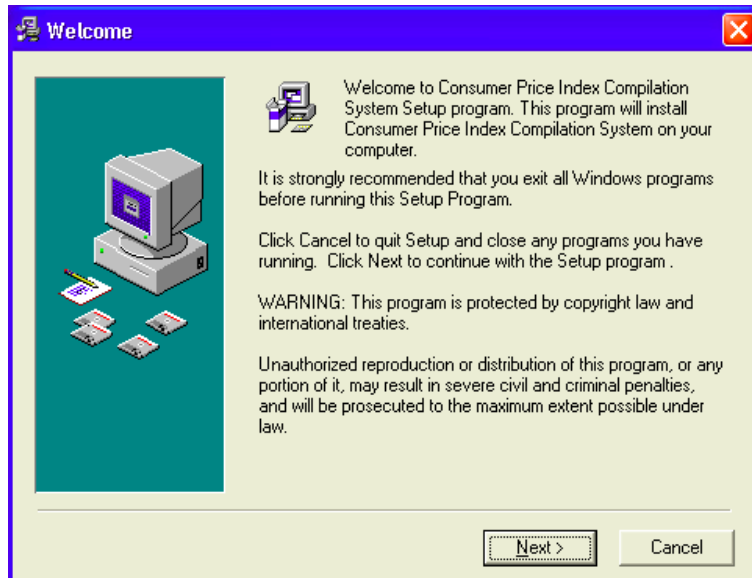
Next=>

Installation: Setup

- Location of Installation:
  - C:\Program Files\CPI System   for older 32bit computers
  - C:\Program Files (x86)\CPI System for 64bit computers

If your corporate setup does not allow users to read and write to files in the Program Files folder, you need to select the "Browse" button and establish a different file location for the

program. Consider creating a "C:\users\name\PIPS\" folder to store the CPI system.
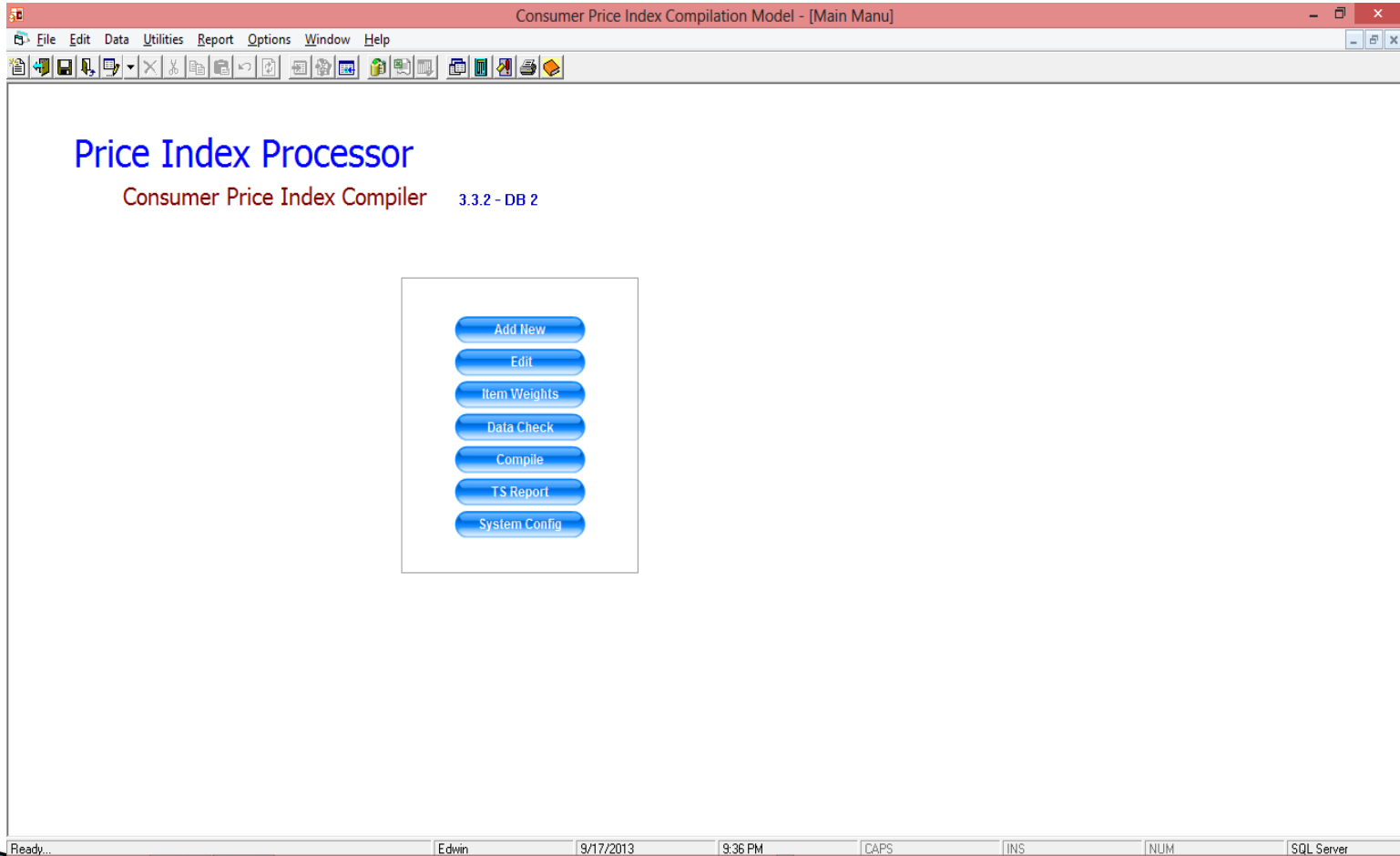
Installation: Setup

Next=>

Installation: Setup

- Installation completes CPI System shortcut icon on the Desktop and in the Program Manager Group is created.

Configuration:

System Configuration:

- Module used to create a new database or to Connect to an existing one
  - Access DB
  - MS SQL DB (Creation of this database is FIRST STEP in converting to SQL DB)
- Specifies path file location
- Weight reference period is set here, at least one compile must be done before proper price reference periods can be set
- Database repair and maintenance is set here – compact and repair
- Index Compilation parameters set here:
  - Jevons (lower level)–Laspeyres (higher level) and
  - Jevons (lower level)–Geometric Laspeyres (higher level)

Index Compilation parameters

- There is a choice between: Laspeyres or geometric Laspeyres formula for the upper level compilation of the index
- Both versions use a "modified" or "two-stage" approach:
  - (Geo) Laspeyres formula is decomposed into three components:
    1. Short-Term Price Relatives (STPRt) of the current period;
    2. Long-Term Price Relatives (LTPRt-1) of the previous period, and
    3. Base Period Weight (W0)
- Last period's cost weights (or base-weighted long-term price relatives, $p_{t-1} q_0$) are updated by the current period's price relatives (p_t/p_{t-1}) in order to obtain the corresponding cost weights ($p_t q_0$).

Loading of Expenditure Weights

- Structure of Weights loaded must conform to basic PIPS weight format
  - Generally we use the mixed format at Level 5, 6, or 7 depending on the level of detail required
  - In mixed format we ensure that subclass level adds up to the class level or the class level aggregates up to the group level etc.
  - If any group/class/sub-class does not contain an expenditure weight, do not attach a product or a variety to it. Errors generated in Pre-compile data check
  - Expenditure weights when uploaded remain fixed generally until next update

Loading of Expenditure Weights

▸ The weights inputted can be price updated to the reference period or can be actual weights.

Loading of Expenditure Weights

One of the two options for the loaded weights will be selected:

- For the arithmetic option the resulting formulas would be a Lowe index (price-updated weights)
  - a Lowe index (price-updated weights)
- Young index (without price updating) the weight reference period precedes the base price reference period.
  - Geometric Young or Cobb-Douglas index

Loading Outlets

- Outlets can be uploaded individually or in bulk
  - 1. Using the "Add New" option on the main menu
  - 2. Click "Batch Edit/Upload"
  - 3. Add outlet to list
  - 4. Click File/Save to CPI Database
- Note:
  - Area Compilable relate to the area for which the summary index is computed

  This is based on a selection of Areas identified in the Weight upload configured.

  Example several areas identified in the weight table can constitute a reporting area

Loading Outlets

- Outlets/varieties can be cloned, this involves:
    - 1. System copying all the information contained in the current outlet to a new outlet *with the exception of the prices*
    - 2. Used to introduce a new outlet or to replace an outlet to allow the deactivation of the original outlet
        - Replace an outlet/deactivate an outlet, weight is copied to the new outlet
        - Add a new outlet, outlet weight for the area needs to be redistributed equally
    - 3. Outlet initiated at the time it is created

Loading Products and Varieties

Loading Products and Varieties

- After loading the outlets
  - Products from the selected COICOP are added in most cases at the 6-digit mixed level
    - At the lowest level of this classification all the associated varieties are equally weighted for the purposes of index computation.
    - NOTE: There must be a weight attached to any product/varieties associated with a product otherwise the system will generate an error in **Pre-Compile Data Check**
  - If possible all varieties should be defined and decided on before hand and entered
    - Avoids duplication of effort since a variety can be assigned to all outlets for which prices will be collected, that is, CREATE ONCE ASSIGN MULTIPLE TIMES

Loading Products and Varieties

- Products and varieties are loaded one at a time
  - *Feature request:* bulk upload of varieties and products as with weights and outlets
- SPD – Structured Product Descriptions can be changed by changing three tables in Access this often needs to be done to ensure local customization of the CPI System which contain many items with names which are not country/region specific.
  - Firstly, the change needs to be made in the tblProd since this table is at the center of all of the CPI computation
  - tblICPSPD and tblSPD also need to be changed in the same exact manner as the changes implemented in the tblProd table since these are the metadata tables which are used to print the collection sheets

Compact and Repair

- Sometimes Access DB may get corrupted or slightly out of sequence, particularly when the user makes a number of substitutions and uses the clone variety feature.

- You can resolve this problem by running the "DB repair and compact" feature on the System Config screen. When it completes, it may say no errors were found or that errors were found and corrected. Click OK and you will get a message "do you want to continue to compact you database?" And you should respond yes.

- You should periodically run the DB repair and compact feature to reduce the size of the DB to make it more manageable. This feature can reduce the size of the DB by 50-75%.

Distribution of Item Weights

▸ The software has an embedded engine to distribute the item weights equally to the individual products and varieties by regions and by products that comprise them. Thus elementary "unweighted" price changes are ascribed equal weighting within each elementary index.

▸ The System also allows the user to revise the outlet, product and variety weights, after the item weights have been distributed, which will reflect the relative importance of the products and varieties.

◦ In the case of the product weights the equal weights for the varieties can be revised by revising the shares

Pre compile data check

- Identifies errors:
  - Badly coded varieties after cloning, all codes for varieties must end in an Alpha Character
  - Assigned varieties without weight
  - Another source of error associated with missing weight in the uploaded expenditure shares table

Loading Prices

1. Create Excel Spreadsheet for update (xls)
   ◦ Can be used with Tablet computers for data collection
2. Entry of individual price items
3. Entry of series of items

Missing Prices: Imputation

- Geometric average price relative for matched observations used to impute missing observation:
- The CPI System will impute missing STPRs, LTPRs, and updated weights based on the information available from other price quotations of varieties in that commodity group. Imputed indices and prices will be stored in the database with a flag. These imputed indices and prices appear in the tabulation in red color.
- The system always uses the next available level index data in the same group or item for the missing index, e.g., if the level 7 index is missing, the level 6 index will be used; if level 6 is missing, then the level 5 index will be used and so on

Treatment of Substitutions and Quality Adjustments in PIPS

1. if the variety description is practically same as the previous one, the price of the replacement can simply be entered to continue the time-series;

▸ add a note to the variety metadata (click the icon on the variety line) stating that a replacement was made on certain date and the only change was a minor detail such as the color or some other characteristic that does not affect the price.

Treatment of Substitutions and Quality Adjustments in PIPS

2. enter the replacement as a new variety and keep the price history of the old variety the same for the new variety;
   - A) clone the old variety to create a new variety (The price history comes with the cloned variety)
   - B) add metadata in the notes for this new variety to describe the reasons for its creation
   - C) deactivate the old variety
   - D) Set the new variety weight to the old variety's weight (format for share weight example 0.334)

Treatment of Substitutions and Quality Adjustments in PIPS

3. enter the replacement as a new variety with no price history
   ◦ the user enters a new variety directly (no cloning involved)
   ◦ the user enters a new variety description and saves the new variety
   ◦ the user enters the current price, and if the previous price was available, enter that price
     • long-term relative method, the user should proceed to estimate the base price externally or have the system estimate a base price

   ◦ have the system estimate the base price

Treatment of Substitutions and Quality Adjustments in PIPS

▸ The user should use an aggregate index for which the ID column has a "0" value. Other values relate to outlet codes in the field. Once the user has identified the index to use to deflate the price, click on the line, right click, and then click on the box saying "select deflator?"

Treatment of Substitutions and Quality Adjustments in PIPS

4. Replacement variety arrives:
   - 1) the user enters the new variety for the product but does not activate it.
   - 2) keep the old variety active and allow the System to impute a price
   - 3) In the following pricing period, the user activates the new variety
   - 4) deactivates the old variety, and sets the new variety's share weight equal
   - to that of the old variety
   - 5) the new variety has both the current period and previous period price available so that the System can use them to compile the index by the two-stage (short-term price relative) estimation method

Quality Control of Data

Non-Statistical
- Use of thresholds – to check whether specific price data has increased more than a designated threshold (20% is the default to flag item)

- Statistical
  - Z-scores of price relatives based on Chebyshev's theorem that applies to all possible price relative distributions (88% within 3SD, 75% within 2SD..otherwise it is an outlier)
  - price relative data are re-sorted in ascending order, and the median and 1_{st} and 3_{rd} quartiles are calculated. Observations that fall outside of the outer quartiles are considered as possible outliers.
  - assume price relatives are log-normally distributed, outliers are observations lying outside of 2SD from mean

Data Status Indicator

- Checking for the completeness of entries into PIPS based on defined
  - Products/Varieties

Thank You