CONSULTING ASSISTANCE ON ECONOMIC REFORM II

REPORTS

The objectives of the Consulting Assistance on Economic Reform (CAER II) project are to contribute to broad-based and sustainable economic growth and to improve the policy reform content of USAID assistance activities that aim to strengthen markets in recipient countries. Services are provided by the Harvard Institute for International Development (HIID) and its subcontractors. It is funded by the U.S. Agency for International Development, Bureau for Global Programs, Field Support and Research, Center for Economic Growth and Agricultural Development, Office of Emerging Markets through Contracts PCE-C-00-95-00015-00 and PCE-Q-00-95-00016-00.
This paper has been funded by contract PCE-Q-00-95-00016-00, Delivery Order 9.

A Tax Receipts Monitoring and Forecasting Model for Lithuania

William B. Trautman
Report B
September 2000

For information contact:
CAER II Project Office
Harvard Institute for International Development
14 Story Street
Cambridge, MA 02138 USA
Tel: (617) 495-9776; Fax: (617) 495-0527
Email: caer@hiid.harvard.edu

A TAX RECEIPTS MONITORING AND FORECASTING MODEL FOR LITHUANIA

By William B. Trautman[1]

OVERVIEW

This paper presents a general tax receipts monitoring and forecasting model and shows how it has been applied to Lithuania. The purpose of the model is to generate receipts forecasts as part of the annual budget process and to monitor receipts over the course of the year relative to amounts projected in the budget. The model uses actual monthly receipts data and forecasts receipts for the current and subsequent years based on expected changes in real GDP, the price level, tax rates, and any behavioral effects that may be associated with changes in tax rates. Since the model is based on monthly receipts data, it is possible to update the forecasts on a monthly basis and therefore monitor receipts over the course of the year relative to amounts projected in the budget. The ability to update the forecasts on a monthly basis provides budget officials with a tool for identifying potential receipts shortfalls before they become a serious problem.

The model is particularly applicable to economies in transition, because it requires only a minimal amount of relatively current data and few assumptions. The model is designed so that those with a limited technical understanding of forecasting or computers can input data, adjust parameters, run the model, and interpret the results. The model therefore represents a useful tool which can be integrated quickly and easily into a budget or tax analysis department. The model also establishes a foundation for the development

---

[1] William B. Trautman is a Development Associate at the Harvard Institute for International Development (HIID) and a Research Fellow in the International Tax Program at the Harvard Law School. The model was initially developed while the author was the U.S. Treasury Department's Tax Policy Advisor to the Slovak Ministry of Finance. It has since been adapted for a number of other countries, including Lithuania as part of HIID's CAER Lithuania project. The views expressed in this paper do not necessarily reflect those of the institutions with which the author has been associated.

of more precise forecasting techniques over time. Indeed, as analysts become increasingly familiar with the model, it is hoped that they would refine the model by incorporating more detailed data on the structure of the receipts sources being modeled and macroeconomic measures that more closely proxy the underlying tax bases. A description of the way the model was implemented in Microsoft Access is presented in Attachment A. The input and output forms for the model developed for Lithuania are presented in Attachments 1 to 3.

THE GENERAL MODEL

The model presented in this paper is quite simple. The forecast of receipts for any budget period is equal to actual receipts in the subperiods for which receipts data are available plus projected receipts in the subperiods for which the data are not available. The projected receipts, in turn, are equal to the actual or projected receipts in the comparable subperiod of the previous budget period, adjusted by three factors: 1) the expected change in the tax base holding the tax rate constant, 2) the change in the tax rate, and 3) the change in the tax base associated with the change in the tax rate. The first factor is a weighted average of: 1) the expected change in GDP, and 2) the ratio of actual receipts to date in the current budget period to actual receipts in the comparable subperiods of the previous budget period. The weight varies from 0 to 1 depending on the proportion of subperiods for which actual receipts data are available.

The general form of the model is as follows:

$$T\Big|_y = \mathbf{A}^{\mathrm{T}} \cdot \mathbf{E}\Big|_y + \mathbf{P}^{\mathrm{T}} \cdot \mathbf{F}\Big|_y$$

where $T\Big|_y$ is the estimate of total receipts for a given tax in a given budget period *y*,

A, **E**, **P**, and **F** are vectors of *n* rows, with

a_i = actual receipts in subperiod *i*,

$$e_i = \begin{cases} 1 \text{ if actual receipts data exist for subperiod } i \\ 0 \text{ otherwise,} \end{cases}$$

p_i = projected receipts in subperiod *i*,

$$f_i = \begin{cases} 1 \text{ if actual receipts data do not exist for subperiod } i \\ 0 \text{ otherwise,} \end{cases}$$

and *i* indexes each of the *n* subperiods in budget period *y*. In Lithuania, as well as in the other countries for which this model has been adapted, the relevant budget periods are calendar years, and the subperiods are months.

If $e_i\big|_{y-1} = 1$, then the projected receipts for each tax in a given subperiod *i* of budget period *y* are estimated as follows:

$$p_i\big|_y = \boldsymbol{t}_i\big|_y \cdot \frac{a_i\big|_{y-1}}{\boldsymbol{t}_i\big|_{y-1}} \cdot \boldsymbol{d} \cdot \left(\frac{\boldsymbol{t}_i\big|_y}{\boldsymbol{t}_i\big|_{y-1}} \right)^h \tag{2a}$$

or equivalently,

$$p_i\big|_y = a_i\big|_{y-1} \cdot \boldsymbol{d} \cdot \left(\frac{\boldsymbol{t}_i\big|_y}{\boldsymbol{t}_i\big|_{y-1}} \right)^{1+h} \tag{2b}$$

where $\boldsymbol{t}_i$ is the tax rate applicable to subperiod *i*, δ is a growth factor, and η is the user-defined elasticity of the tax base with respect to changes in the tax rate. If $e_i\big|_{y-1} = 0$, then the projected receipts for each tax in a given subperiod *i* of budget period *y* are estimated as follows:

$$p_i\big|_y = p_i\big|_{y-1} \cdot \boldsymbol{d} \cdot \left(\frac{\boldsymbol{t}_i\big|_y}{\boldsymbol{t}_i\big|_{y-1}} \right)^{1+h} \tag{2c}$$

The growth factor, δ, is a weighted average of: 1) the expected change in GDP, and 2) the ratio of actual receipts to date in budget period *y* to actual receipts in the comparable subperiods of the previous budget period *y*-1, as follows:

$$\boldsymbol{d} = \boldsymbol{a} \cdot \frac{GDP\big|_{y}}{GDP\big|_{y-1}} + (1-\boldsymbol{a}) \cdot \frac{\mathbf{A}^{\mathrm{T}}\big|_{y} \cdot \mathbf{E}\big|_{y}}{\mathbf{A}^{\mathrm{T}}\big|_{y-1} \cdot \mathbf{E}\big|_{y}} \tag{3}$$

where *GDP* is the actual or projected gross domestic product.[2]

The weight, α, varies from 0 when receipts data are available for all subperiods in the current budget period to 1 when no receipts data are available for any subperiod in the current budget period, as follows:

$$\boldsymbol{a} = \frac{n - \sum_{i=1}^{n} e_i\big|_{y}}{n} \tag{4}$$

MODEL CHARACTERISTICS

The model presented in this paper differs in a number of important respects from more typical receipts forecasting models, an example of which is a model developed for Kenya as part of the IMF Institute Financial Policy Workshops.[3] These more typical models are often based on an estimated relationship between annual tax receipts and a proxy for the tax base. Based on this estimated relationship, forecasts of the proxy variable are used to generate receipts forecasts over the relevant budget period. The models are based on variables that proxy (i.e., are correlated with) the tax base, because forecasts of the actual tax base often are not available.

---

[2] The model generally uses nominal GDP as a proxy for the tax base. It uses real GDP in the case of per unit excise taxes, however, because their tax bases are assumed to be invariant with respect to changes in the price level.

One important difference between the models is the scope of the data on which they are based. The Lithuania model is based on the most current twelve months of receipts data that are available, whereas the Kenya model is based on annual receipts data that may go back over many years. Since the forecasts of the Lithuania model are based on actual receipts in a single time period (i.e., subperiod i of budget period y-1), they are more susceptible to random fluctuations in receipts than the Kenya model which effectively is based on receipts averaged over multiple time periods. The forecasts of the Lithuania model, however, are less susceptible to structural changes in the relationship between tax receipts and the proxy variable over the period of the data, because they are based on more current data. Since these structural changes may reflect underlying changes in the economy, the Lithuania model may be more appropriate for countries experiencing significant economic change (e.g., developing or transition economies).

The forecasts of both models depend, in part, on forecasts of the proxy for the tax base (e.g., nominal GDP), presumably from a macroeconomic model of the economy. The forecasts of the Kenya model are based on statistically estimated relationships between tax receipts and the proxy for the tax base. The precision of these forecasts is questionable, given the limited amount of data used to derive the estimates, and given the possibility of changes in the structural relationship over the period of the underlying data. The forecasts of the Lithuania model are based on a growth factor, which is a weighted average of: 1) the expected change in the proxy variable, and 2) the change in actual receipts to date in the current year relative to receipts in the same months of the previous year. While this growth factor may not be entirely satisfactory from a theoretical stand-

---

[3] See IMF Institute Financial Policy Workshops: The Case of Kenya (1991).

point,[4] it attempts to reduce any inaccuracies in the forecasts of the proxy variable by injecting empirical information (i.e., actual receipts) on the change in the size of the tax base in the relevant year.

Both models attempt to account for the discretionary changes in the tax system affecting receipts. The Kenya model makes ad hoc adjustments to the time series of tax receipts in order to ensure that the time series is consistent with current law. In turn, this ensures that the estimate of the relationship between tax receipts and the proxy variable (and therefore the forecast) is unbiased. In theory, the Kenya model accounts for all discretionary changes affecting receipts but, for that reason, cannot be explicit about how the changes affect receipts. The Lithuania model is somewhat more limited in scope in that it only accounts for changes in tax rates, but it is explicit about how those changes affect receipts. The model can therefore be used to estimate the revenue effects of proposed changes in tax rates.

CONCLUSION

This paper has presented a general model for monitoring and forecasting tax receipts and shows how it has been applied to Lithuania. The model generates forecasts of receipts as part of the regular budget process and monitors receipts over the course of the year relative to amounts projected in the budget. Since the model is based on actual monthly receipts data, it can be updated on a monthly basis and used as a tool for identifying potential receipts shortfalls before they become a serious problem. The model is designed so

[4] The difficulty arises from the inconsistency between: 1) the time periods for which the receipts projections are made, and 2) the time periods associated with the growth factor. In particular, the model makes projections only for those months for which actual receipts data are not available. The growth factor, in contrast, is based on the expected change in GDP for the entire year and on actual receipts for those months

that those with a limited understanding of modeling or computers can input data, adjust parameters, run the model, and interpret the results. The model therefore represents a useful tool that can be integrated quickly and easily into a budget or tax analysis department. It can also be used as a tool for educating users about receipts forecasting and revenue estimating. Indeed, as users become increasingly familiar with the model, they can modify the forecasting algorithm in ways that better reflect both the available data and the structure of the receipts sources being modeled.

---

for which actual receipts data are available.

APPENDIX A

MODEL IMPLEMENTATION IN MICROSOFT ACCESS

The tax receipts monitoring and forecasting model for Lithuania is implemented through a series of tables, forms, reports, macros, and modules in Microsoft Access.

TABLES

The model is based on data contained in the following three tables:

Assumptions. This table contains a series of variables representing the elasticities associated with each tax, a series of variables indicating whether or not the tax is imposed on a per unit basis, and variables representing nominal GDP and the price level for the current and subsequent years.

Receipts Actual. This table contains a series of variables representing the actual monthly receipts for each tax and a series of variables representing the monthly tax rate index for each tax. It also contains variables for the year and month of the data. The table has 72 records representing the 72 months between January 1995 and December 2000.

Receipts Projected. This table contains a series of variables representing the monthly receipts projected by the model for each tax in the current and subsequent years and a series of variables containing the amounts in the budget for the current year. It also contains variables identifying the tax and the current and subsequent years. The table has 17 records representing the 17 different taxes.

FORMS

The model uses the following five forms to handle input and output:

Assumptions. This form allows the analyst to modify the data in the Assumptions table, including the elasticities associated with each tax, whether or not each tax is imposed on a per unit basis, nominal GDP, and the price level.

Receipts Actual. This form allows the analyst to modify the data in the Receipts Actual table, including the monthly tax receipts and the monthly tax rate index.

Receipts Projected CY. This form presents the forecast of monthly tax receipts associated with each tax for the current year.

Receipts Projected NY. This form presents the forecast of monthly tax receipts associated with each tax for the next year.

Receipts Projected Summary. This form presents the forecast of annual tax receipts associated with each tax for the current and subsequent years. It also allows the analyst to input tax receipts projections from the budget and presents the projected surplus or deficit.

REPORTS

The model uses the following reports to print out information from the corresponding forms: Assumptions, Receipts Projected CY, Receipts Projected NY, and Receipts Summary.

MACROS

The model uses a series of macros to perform certain functions, including opening forms, printing reports, updating the data, and running the model. The macros Actual, Assumptions, Projected CY, Projected NY, and Summary open the corresponding forms. The macro Print prints the Summary, Assumptions, Receipts Projected CY, and Receipts Projected NY forms. These macros run when corresponding buttons are pressed in different forms. The Update Model macro copies data to the appropriate table and runs the model every time the data are updated on the Assumptions and Receipts Actual forms.

MODULE

The module Model contains the computer code that executes the calculations described in the body of this paper to create the forecasts. The annotated computer code is presented in the following pages.

```
Option Compare Database
Option Explicit

' Dimension Database and Tables

Dim Db As Database

Dim TbA As Recordset
Dim TbS As Recordset
Dim TbP As Recordset

' Define Constants for Array Dimensions

Const TAXES = 17
Const MONTHS = 72

Const RCPT = 1
Const RATE = 2
Const ELAS = 1
Const UNIT = 2
Const CY = 1
Const NY = 2

' Dimension Arrays

Dim Data(1 To TAXES, 1 To MONTHS, RCPT To RATE) As Single
Dim Assume(1 To TAXES, ELAS To UNIT) As Single

Dim Nom_GDP(CY To NY) As Single
Dim Real_GDP(CY To NY) As Single

Dim Receipts(1 To MONTHS) As Single

Dim YTD_PY(1 To TAXES) As Single
Dim YTD_CY(1 To TAXES) As Single

' Dimension Indexes

Dim m As Integer
Dim t As Integer
Dim y As Integer

' Dimension Other Variables

Dim Record As Integer
Dim Alpha As Single
```

```
Function max(x As Single, y As Single) As Single

  If x > y Then
    max = x
  Else
    max = y
  End If

End Function
Function Forecast()

Set Db = CurrentDb()

Set TbA = Db.OpenRecordset("Receipts Actual", dbOpenTable)
Set TbS = Db.OpenRecordset("Assumptions", dbOpenTable)
Set TbP = Db.OpenRecordset("Receipts Projected", dbOpenTable)

' Initialize Data Array (Tax * Month * Receipts and Tax Rate Index)

TbA.MoveFirst

For m = 1 To MONTHS

  Data(1, m, RCPT) = TbA!Personal_Income_Tax
  Data(2, m, RCPT) = TbA!Profit_Tax
  Data(3, m, RCPT) = TbA!Property_Tax
  Data(4, m, RCPT) = TbA!Value_Added_Tax
  Data(5, m, RCPT) = TbA!Excise_Taxes
  Data(6, m, RCPT) = TbA!Customs_Duties
  Data(7, m, RCPT) = TbA!State_Fees_and_Charges
  Data(8, m, RCPT) = TbA!Consul_Tax
  Data(9, m, RCPT) = TbA!Taxes_on_Market_Places
  Data(10, m, RCPT) = TbA!Bank_of_Lithuania_Profit
  Data(11, m, RCPT) = TbA!Natural_Resource_Tax
  Data(12, m, RCPT) = TbA!Tax_on_Fixed_State_Assets
  Data(13, m, RCPT) = TbA!Interest_on_Loans
  Data(14, m, RCPT) = TbA!Stock_Dividends
  Data(15, m, RCPT) = TbA!Penalty_Tax
  Data(16, m, RCPT) = TbA!Pollution_Taxes
  Data(17, m, RCPT) = TbA!Other_Non_Tax_Revenue

  Data(1, m, RATE) = TbA!Personal_Income_Tax_TRI
  Data(2, m, RATE) = TbA!Profit_Tax_TRI
  Data(3, m, RATE) = TbA!Property_Tax_TRI
  Data(4, m, RATE) = TbA!Value_Added_Tax_TRI
  Data(5, m, RATE) = TbA!Excise_Taxes_TRI
```

```
  Data(6, m, RATE) = TbA!Customs_Duties_TRI
  Data(7, m, RATE) = TbA!State_Fees_and_Charges_TRI
  Data(8, m, RATE) = TbA!Consul_Tax_TRI
  Data(9, m, RATE) = TbA!Taxes_on_Market_Places_TRI
  Data(10, m, RATE) = TbA!Bank_of_Lithuania_Profit_TRI
  Data(11, m, RATE) = TbA!Natural_Resource_Tax_TRI
  Data(12, m, RATE) = TbA!Tax_on_Fixed_State_Assets_TRI
  Data(13, m, RATE) = TbA!Interest_on_Loans_TRI
  Data(14, m, RATE) = TbA!Stock_Dividends_TRI
  Data(15, m, RATE) = TbA!Penalty_Tax_TRI
  Data(16, m, RATE) = TbA!Pollution_Taxes_TRI
  Data(17, m, RATE) = TbA!Other_Non_Tax_Revenue_TRI

  TbA.MoveNext
Next

' Initialize Assume Array (Tax * Elasticity and Unit Tax Dummy)

TbS.MoveFirst

Assume(1, ELAS) = TbS!Personal_Income_Tax
Assume(2, ELAS) = TbS!Profit_Tax
Assume(3, ELAS) = TbS!Property_Tax
Assume(4, ELAS) = TbS!Value_Added_Tax
Assume(5, ELAS) = TbS!Excise_Taxes
Assume(6, ELAS) = TbS!Customs_Duties
Assume(7, ELAS) = TbS!State_Fees_and_Charges
Assume(8, ELAS) = TbS!Consul_Tax
Assume(9, ELAS) = TbS!Taxes_on_Market_Places
Assume(10, ELAS) = TbS!Bank_of_Lithuania_Profit
Assume(11, ELAS) = TbS!Natural_Resource_Tax
Assume(12, ELAS) = TbS!Tax_on_Fixed_State_Assets
Assume(13, ELAS) = TbS!Interest_on_Loans
Assume(14, ELAS) = TbS!Stock_Dividends
Assume(15, ELAS) = TbS!Penalty_Tax
Assume(16, ELAS) = TbS!Pollution_Taxes
Assume(17, ELAS) = TbS!Other_Non_Tax_Revenue

Assume(1, UNIT) = TbS!Personal_Income_Tax_IT
Assume(2, UNIT) = TbS!Profit_Tax_IT
Assume(3, UNIT) = TbS!Property_Tax_IT
Assume(4, UNIT) = TbS!Value_Added_Tax_IT
Assume(5, UNIT) = TbS!Excise_Taxes_IT
Assume(6, UNIT) = TbS!Customs_Duties_IT
Assume(7, UNIT) = TbS!State_Fees_and_Charges_IT
Assume(8, UNIT) = TbS!Consul_Tax_IT
```

```
Assume(9, UNIT) = TbS!Taxes_on_Market_Places_IT
Assume(10, UNIT) = TbS!Bank_of_Lithuania_Profit_IT
Assume(11, UNIT) = TbS!Natural_Resource_Tax_IT
Assume(12, UNIT) = TbS!Tax_on_Fixed_State_Assets_IT
Assume(13, UNIT) = TbS!Interest_on_Loans_IT
Assume(14, UNIT) = TbS!Stock_Dividends_IT
Assume(15, UNIT) = TbS!Penalty_Tax_IT
Assume(16, UNIT) = TbS!Pollution_Taxes_IT
Assume(17, UNIT) = TbS!Other_Non_Tax_Revenue_IT

' Create Nominal and Real GDP Arrays (GDP * Current Year and Next Year)

Nom_GDP(CY) = 1 + TbS!Nom_GDP_CY
Nom_GDP(NY) = 1 + TbS!Nom_GDP_NY

Real_GDP(CY) = (1 + TbS!Nom_GDP_CY) / (1 + TbS!Price_Level_CY)
Real_GDP(NY) = (1 + TbS!Nom_GDP_NY) / (1 + TbS!Price_Level_NY)

' Extend Most Recent Tax Rate Index into Future if Equal to Zero

For t = 1 To TAXES
  For m = 1 To MONTHS
    If Data(t, m, RATE) = 0 Then Data(t, m, RATE) = Data(t, m - 1, RATE)
  Next
Next

' Create Receipts Array (Total Receipts By Month)

For m = 1 To MONTHS
  Receipts(m) = 0
Next

For m = 1 To MONTHS
  For t = 1 To TAXES
    Receipts(m) = Receipts(m) + Data(t, m, RCPT)
  Next
Next

' Calculates Record (Number of Months for which Receipts Data Exist)

Record = 0

For m = 1 To MONTHS
  If Receipts(m) <> 0 Then
    Record = Record + 1
  End If
```

```
Next

' Calculates Alpha (Weight on GDP in Growth Factor)

Alpha = 1 - (Record - Int(Record / 12) * 12) / 12

' Calculates Year-To-Date Receipts for Previous and Current Years

For t = 1 To TAXES
  YTD_PY(t) = 0
  YTD_CY(t) = 0
Next

For t = 1 To TAXES
  For m = Int((Record - 12) / 12) * 12 + 1 To Record - 12
    YTD_PY(t) = YTD_PY(t) + Data(t, m, RCPT)
  Next
Next

For t = 1 To TAXES
  For m = Int(Record / 12) * 12 + 1 To Record
    YTD_CY(t) = YTD_CY(t) + Data(t, m, RCPT)
  Next
Next

' Forecast Receipts for Current Year

For t = 1 To TAXES
  For m = Record + 1 To Int(Record / 12) * 12 + 12

    ' Unit Taxes

    If Assume(t, UNIT) = -1 Then
      Data(t, m, RCPT) = Data(t, m - 12, RCPT) _
          * (Alpha * Real_GDP(CY) + (1 - Alpha) * YTD_CY(t) / max(YTD_PY(t), 1)) _
          * ((Data(t, m, RATE) / Data(t, m - 12, RATE)) ^ (1 + Assume(t, ELAS)))

    ' Other Taxes

    Else
      Data(t, m, RCPT) = Data(t, m - 12, RCPT) _
          * (Alpha * Nom_GDP(CY) + (1 - Alpha) * YTD_CY(t) / max(YTD_PY(t), 1)) _
          * ((Data(t, m, RATE) / Data(t, m - 12, RATE)) ^ (1 + Assume(t, ELAS)))
    End If
  Next
Next
```

```
' Forecast Receipts for Next Year

For t = 1 To TAXES
  For m = Int(Record / 12) * 12 + 13 To Int(Record / 12) * 12 + 24

    ' Unit Taxes

    If Assume(t, UNIT) = -1 Then
      Data(t, m, RCPT) = Data(t, m - 12, RCPT) _
          * Real_GDP(NY) _
          * ((Data(t, m, RATE) / Data(t, m - 12, RATE)) ^ (1 + Assume(t, ELAS)))

    ' Other Taxes

    Else
      Data(t, m, RCPT) = Data(t, m - 12, RCPT) _
          * Nom_GDP(NY) _
          * ((Data(t, m, RATE) / Data(t, m - 12, RATE)) ^ (1 + Assume(t, ELAS)))
    End If
  Next
Next

' Copy Forecast to Projected Receipts Table

TbP.MoveFirst

For t = 1 To TAXES
  TbP.Edit
  TbP!CY = Int(Record / 12) + 1995
  TbP!NY = TbP!CY + 1
  TbP!January_CY = Data(t, Int(Record / 12) * 12 + 1, RCPT)
  TbP!February_CY = Data(t, Int(Record / 12) * 12 + 2, RCPT)
  TbP!March_CY = Data(t, Int(Record / 12) * 12 + 3, RCPT)
  TbP!April_CY = Data(t, Int(Record / 12) * 12 + 4, RCPT)
  TbP!May_CY = Data(t, Int(Record / 12) * 12 + 5, RCPT)
  TbP!June_CY = Data(t, Int(Record / 12) * 12 + 6, RCPT)
  TbP!July_CY = Data(t, Int(Record / 12) * 12 + 7, RCPT)
  TbP!August_CY = Data(t, Int(Record / 12) * 12 + 8, RCPT)
  TbP!September_CY = Data(t, Int(Record / 12) * 12 + 9, RCPT)
  TbP!October_CY = Data(t, Int(Record / 12) * 12 + 10, RCPT)
  TbP!November_CY = Data(t, Int(Record / 12) * 12 + 11, RCPT)
  TbP!December_CY = Data(t, Int(Record / 12) * 12 + 12, RCPT)

  TbP!January_NY = Data(t, Int(Record / 12) * 12 + 13, RCPT)
  TbP!February_NY = Data(t, Int(Record / 12) * 12 + 14, RCPT)
```

```
  TbP!March_NY = Data(t, Int(Record / 12) * 12 + 15, RCPT)
  TbP!April_NY = Data(t, Int(Record / 12) * 12 + 16, RCPT)
  TbP!May_NY = Data(t, Int(Record / 12) * 12 + 17, RCPT)
  TbP!June_NY = Data(t, Int(Record / 12) * 12 + 18, RCPT)
  TbP!July_NY = Data(t, Int(Record / 12) * 12 + 19, RCPT)
  TbP!August_NY = Data(t, Int(Record / 12) * 12 + 20, RCPT)
  TbP!September_NY = Data(t, Int(Record / 12) * 12 + 21, RCPT)
  TbP!October_NY = Data(t, Int(Record / 12) * 12 + 22, RCPT)
  TbP!November_NY = Data(t, Int(Record / 12) * 12 + 23, RCPT)
  TbP!December_NY = Data(t, Int(Record / 12) * 12 + 24, RCPT)
  TbP.Update
  TbP.MoveNext
Next

TbA.Close
TbS.Close
TbP.Close

End Function
```

REFERENCES

Bennett, Rob, "More Questions About Revenue Estimates," *Tax Notes*, May 6, 1991, pp. 649-650.

Conly, Sonia and Linda Radey, "Changes in Excise and Payroll Taxes and Their Effect on Total Budget Receipts," Presented at the Eastern Economic Association Meetings, March 10-12, 1988.

IMF Institute Financial Policy Workshops: The Case of Kenya (1991).

Joint Committee on Taxation, *Discussion of Revenue Estimation Methodology and Process* (JCX-31-92), August 4, 1992.

King, J.R., "On the Revenue Effects of Tax Changes," *Fiscal Studies*, Vol. 7, No. 1, February 1986, pp. 51-60.

Sunley, Emil M. and Randall D. Weiss, "The Revenue Estimating Process," *Tax Notes*, June 10, 1991, pp. 1299-1314.

Tolley, George S. and C. Eugene Steuerle, "The Effect of Excises on the Taxation and Measurement of Income," *1978 Compendium of Tax Research* (Washington, D.C.: Office of Tax Analysis, 1987), pp. 67-87.

Attachment 1

A Receipts Monitoring and Forecasting Model for Lithuania

Assumptions

Tax

	Elasticity	Unit Tax?
Personal Income Tax	0.0	○
Profit Tax	0.0	○
Property Tax	0.0	○
Land Tax	0.0	○
Land-Rent Tax	0.0	○
Wealth Tax	0.0	○
Value-Added Tax	0.0	○
Excise Taxes	0.0	◉
Customs Duties	0.0	○
State Fees and Charges	0.0	○
Consul Tax	0.0	○
Taxes on Market Places	0.0	○
Road Tax	0.0	○

Non-Tax

	Elasticity	Unit Tax?
Bank of Lithuania Profit	0.0	○
Natural Resource Tax	0.0	○
Tax on Fixed State Assets	0.0	○
Interest on Loans	0.0	○
Stock Dividends	0.0	○
Penalty Tax	0.0	○
Pollution Taxes	0.0	○
Other Non-Tax Revenue	0.0	○

Macroeconomic Measures

	Current Year	Next Year
% Change in Nominal GDP	0.0%	0.0%
% Change in Price Level	0.0%	0.0%
% Change in Real GDP	0.0%	0.0%

Actual Receipts | Projections for Current Year | Projections for Next Year | Summary | Print

Attachment 2

A Receipts Monitoring and Forecasting Model for Lithuania

Receipts

January 1995

Tax

	Receipts	Rate Indices
Personal Income Tax	110,093	1.00
Profit Tax	21,259	1.00
Property Tax	1,124	1.00
Land Tax	0	1.00
Land-Rent Tax	0	1.00
Wealth Tax	0	1.00
Value-Added Tax	129,636	1.00
Excise Taxes	42,330	1.00
Customs Duties	9,487	1.00
State Fees and Charges	7,506	1.00
Consul Tax	2	1.00
Taxes on Market Places	349	1.00
Road Tax	14,447	1.00

Non-Tax

	Receipts	Rate Indices
Bank of Lithuania Profit	0	1.00
Natural Resource Tax	1,413	1.00
Tax on Fixed State Assets	2,967	1.00
Interest on Loans	0	1.00
Stock Dividends	163	1.00
Penalty Tax	1,867	1.00
Pollution Taxes	670	1.00
Other Non-Tax Revenue	1,723	1.00

Assumptions | Projections for Current Year | Projections for Next Year | Summary | Print

Attachment 3

A Receipts Monitoring and Forecasting Model for Lithuania

Summary of Receipts Projections

Description	1999			2000
	Budgeted	Projected	Surplus	Projected
Personal Income Tax	2,794,600	2,627,414	-167,186	2,627,414
Profit Tax	525,640	397,661	-127,979	397,661
Property Tax	239,691	246,687	6,996	246,687
Value-Added Tax	4,266,212	3,544,126	-722,086	3,544,126
Excise Taxes	1,555,000	1,309,502	-245,498	1,309,502
Customs Duties	251,250	190,309	-60,941	190,309
State Fees and Charges	200,000	196,526	-3,474	196,526
Consul Tax	35,000	14,944	-20,056	14,944
Taxes on Market Places	5,922	7,849	1,927	7,849
Bank of Lithuania Profit	30,000	60,252	30,252	60,252
Natural Resource Tax	52,188	30,342	-21,846	30,342
Tax on Fixed State Assets	12,637	7,832	-4,805	7,832
Interest on Loans	137,133	100,783	-36,350	100,783
Stock Dividends	56,000	26,221	-29,779	26,221
Penalty Tax	53,000	56,207	3,207	56,207
Pollution Taxes	17,627	22,120	4,493	22,120
Other Non-Tax Revenue	60,000	132,278	72,278	132,278
Total	10,291,900	8,971,052	-1,320,848	8,971,052

Assumptions | Actual Receipts | Projections for Current Year | Projections for Next Year | Print