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Adjusting Taxes for Inflation

By Victor Thuronyi

If we could but learn to number our days...we should adjust much better our other Accounts.

—Abraham Cowley (1667)

Most countries do not adjust their tax system for inflation, or do so only partially. When inflation reaches significant levels, however, its effects on the tax system cannot be ignored. The best remedy is to bring inflation under control; when this is not possible, it is often desirable to adjust the tax system to inflation in some manner. Inflation has come down around the world in most countries as of the time of this revision (2012), and so inflation adjustment of taxes might not be as pressing as it was previously. Even at low inflation rates, however, the distortions caused by inflation can be significant. Even if one is not contemplating to adjust taxes for inflation, it is important for tax policy analysts to understand the issues raised by inflation adjustment, and so this chapter remains relevant for tax policy analysis in all countries. For the few countries with substantial inflation rates, the material here can be used in making decisions on whether and to what extent tax rules should be adjusted for inflation.

This chapter discusses mechanisms of inflation adjustment for different taxes.¹ For taxes other than the income tax, the method of adjustment is relatively simple as a conceptual

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¹There is a large body of literature on inflation adjustment of taxes. To try to cite it all would be beyond the scope of this chapter, which focuses on global adjustment along the lines of that adopted in Latin America, which most of the literature in English does not directly consider. For a survey and analysis of inflation adjustment in Latin America, see Organización de los Estados Americanos, *Inflación y Tributación* (1978). See Keith Rosenn, *Law and Inflation* 295-370 (1982) for a survey of both partial and global adjustment of the income tax in a number of countries. Vito Tanzi, *Inflation and the Personal Income Tax: An International Perspective*. 1st ed. (1980) is a comprehensive study from an economic perspective. Some more recent articles of relevance to developing countries are Dale Chua, *Inflation Adjustment*, in *Tax Policy Handbook* 142 (Parthasarathi Shome ed., 1995) and Milka Casanegra de Jantscher et al., *Tax Administration and Inflation*, in

matter and does not require extensive discussion.² Inflation adjustment of the income tax base is more complex, being related to the questions of timing that make the income tax so difficult to operate. Section III, which forms the bulk of this chapter, is devoted to the income tax. Global adjustment of the taxation of business income in an environment of high inflation is given particular attention for the following reasons. First, it is the only method that can work reasonably well under conditions of high inflation. Second, while it is well understood in the countries that use this method, it is less well known to tax experts in other countries. Third, once one understands global adjustment, one has a solid framework for analyzing partial adjustment methods (which include all adjustment schemes for taxpayers that do not practice double-entry bookkeeping). These differ substantially from country to country, and it would take lengthy discussion to do them justice, because their operation depends very much on how they fit in with the other tax rules of the country in question. This chapter therefore treats partial methods briefly, leaving their detailed analysis to others. Illustrative statutory language and technical commentary on global adjustment are contained in the appendices.

I. Effects of Inflation on Tax Liability—in General

To understand adjustment for inflation, it is helpful to distinguish among three effects³ that inflation may have on real⁴ tax liability. These are (1) erosion of amounts expressed in national currency, (2) erosion of the value of tax obligations, and (3) other effects on the measurement of the tax base. The techniques for compensating for each of these effects are different. They are discussed in sections A through C below. All, some, or none of these may apply to a particular tax. An example of a tax to which none of them applies is an ad valorem excise tax that is collected immediately; such a tax is unaffected by inflation and hence does not need adjustment. By contrast, the effect of inflation on the income tax is particularly complicated because all three effects are present.

A. Erosion of Statutory Amounts Expressed in National Currency

Every time a tax law contains an amount expressed in national currency, the value of this amount is eroded by inflation. Examples are (a) the levels at which the various tax rate brackets for the income tax begin and end, (b) the amount of the personal deduction for the income tax, (c) the amount of excise tax per unit (if this is stated in terms of national currency), (d) the amount of turnover according to which the requirement to register for the value-added tax (VAT) is measured,⁵ and (e) specific amounts for penalties. In the income tax (or any other tax with a progressive rate schedule), the most important amounts expressed in national currency will usually be the exemptions and the rate brackets.⁶

Improving Tax Administration in Developing Countries (Richard Bird & Milka Casanegra de Jantscher eds., 1992). The interested reader can find references to most of the literature by consulting the citations contained in the books and articles cited throughout this chapter.

²See *infra* sec. II.

³These are similar to the categories identified in Hans G. Ruppe, *General Report*, in LXIIa Cahiers de droit fiscal international 89, 119 (1977). See also Tanzi, *supra* note 1, who draws conclusions similar to those outlined here.

⁴"Real" refers to an inflation-adjusted value, as opposed to "nominal," which is an amount in national currency without adjustment for inflation.

⁵See *supra* ch. 6, sec. II(B).

⁶Inflation erodes the value of the income that falls within each of the rate brackets, thereby increasing average rates of tax and increasing the number of taxpayers subject to higher marginal rates. This phenomenon has been called "bracket creep": individual taxpayers whose real

The effects of inflation on revenue caused by the erosion of amounts expressed in national currency do not all run in the same direction. Pushing taxpayers into higher income tax brackets raises revenue. Reducing the real value of fines reduces revenue. In the case of the income tax, because the exemptions, other personal deductions expressed in fixed money amounts, and the rate brackets are so important for revenue, the net effect of the erosion of amounts expressed in units of currency is to increase revenue. In the case of an excise tax with specific rates,⁷ inflation reduces revenue.

The erosion of amounts expressed in national currency can be dealt with in a number of ways, the choice among these being largely a political one.⁸ The most neutral and straightforward approach is to provide in the statute for automatic⁹ adjustment, on a periodic basis, of any amounts expressed in terms of national currency. Another possible approach is to remove amounts expressed in national currency from the statute. For example, excise tax rates can be expressed ad valorem instead of as specific amounts.¹⁰

Inflation adjustment can be limited to specific items, while the value of others is allowed to erode.¹¹ The legislature can also enact periodic adjustments to rate brackets and other items instead of an automatic adjustment mechanism. But, in making these adjustments, the legislature would not be confined to exactly compensating for inflation. It could enact a "tax reduction" that would be spread among different interest groups as the legislature decided.¹² Moreover, by acting with delay, the legislature can allow inflation to have an effect over an interim period.

B. Erosion of Tax Obligations

Taxes are obligations of the taxpayer to the government. Inflation erodes the value of these obligations because of collection lags, which represent the difference between the time that a tax obligation arises (i.e., the time that the taxable event occurs) and the time that the tax is paid.¹³ I use the term "taxable event" here to refer to an economic rather than a legal concept. The length of collection lags varies from tax to tax and often for different transactions covered by a single tax. With the income tax, the taxable event occurs at the time that income is received. The collection lag for the income tax varies according to the type of income. The tax may not be paid until after the end of the year, when the return is due. The

earnings do not increase from year to year find themselves in higher and higher income tax brackets, because their nominal incomes have increased owing to inflation. The same erosion takes place for other amounts in the statute that are expressed in national currency, for example, limits on various deductions, limits of annual turnover below which simplified accounting methods can be used, or amounts of fines.

⁷That is, where amounts of tax payable per unit of product are specified in units of national currency.

⁸There are also some technical issues, the main one being the frequency of adjustment. The appropriate frequency is largely a function of the inflation rate. At low rates, annual adjustment is adequate. At higher rates, wage withholding tables or specific excise tax amounts should be adjusted every month or even more frequently.

⁹"Automatic" refers to a mechanism whereby the tax administration, or the ministry of finance, is directed to publish, at specific intervals (usually annually or monthly), tables setting forth the inflation-adjusted figures, based on a specified price index. *E.g.*, USA IRC § 1(f). There would be no discretion in preparing the table, other than a limited discretion to round amounts up or down.

¹⁰Whether this is wise or not is debatable. *See supra* ch. 8, sec. I(D).

¹¹For example, a limitation on the deduction of home mortgage interest may be enacted. If this amount is not adjusted for inflation, then it is in effect phased out over time.

¹²This was done, for example, in the United States in the 1970s until the brackets were adjusted starting in the early 1980s.

¹³*See Vito Tanzi, Inflation, Lags in Collection, and the Real Value of Tax Revenue*, 24 IMF Staff Papers 154, 155 (1977).

tax on wages may be paid right away if it is collected through withholding. In this case, the collection lag may only be a few days, that is, the difference between the time the wages are paid and the time the withholding agent pays the withheld taxes to the budget. For the VAT, the collection lag is the difference between the date the sale occurs and the date the tax is due (typically, sometime in the following month). Unless the obligation is indexed or unless interest must be paid for the period of the lag, inflation causes the real value of the tax obligation to erode, the extent of the erosion being dependent on the length of the collection lag.

The opposite can also occur. The government often ends up owing an obligation to the taxpayer, for example, when it must make a refund or when the taxpayer is entitled to carry over a deduction, such as a net operating loss deduction. If these are not indexed, their value is eroded.

The effect of inflation on tax revenues caused by collection lags is evident in the case of a sales tax. The taxable event is the sale. One should probably consider the sale as taking place in economic terms at the time when the benefits of use transfer to the purchaser. Depending on the scheme for when tax is due, there will be a certain lag between the sale and the time the tax is paid. The lag can arise, for example, because a sales tax return is filed, and tax paid, sometime after the end of the month (the lag is quite serious at high inflation rates when returns are filed on a quarterly or annual basis).¹⁴

A higher rate of inflation will decrease the effective rate of tax, the decrease being greater the longer the collection lag. If collection lags differ, inflation will decrease the relative yields of those taxes with longer lags. The same effect is produced by an increase in real interest rates, although the effect of inflation is typically more dramatic.¹⁵

The collection lag effect can be dealt with in different ways depending on the type of tax. One approach is to shorten the lag, particularly for those taxes with longer lags, by pushing forward the due date for payment of the tax or by requiring advance payments of tax. Collecting the tax through withholding, instead of through requiring payment with a return filed after the taxable event, will also shorten the collection lag. Another approach is to index tax liabilities for inflation occurring between the taxable event and the time the tax is paid.¹⁶ This is particularly important for taxes (e.g., income tax) for which the collection lag is long and cannot be shortened as a practical matter. A short collection lag, particularly if it is uniform in length for different transactions subject to the tax in question, can also be compensated for by raising tax rates. However, the result will be accurate only if the inflation rate holds constant. To cover cases when tax is paid after the due date, it is important that an adequate rate of interest be charged between the due date and the date the tax is paid.

¹⁴Another question is the definition of when the sale takes place for tax purposes. A collection lag may arise if the law defines the taxable event as taking place after the economic occurrence of the sale. For example, the taxable event may be defined as the time of issuance of an invoice, which may be issued sometime after services are performed and paid for. If the taxable event is delayed to the time of payment, this may not be a problem (as long as interest payments for consumer credit are included in the tax base), since the amount of the payment (including interest) can be expected to be determined taking inflation into account.

¹⁵See *Tanzi*, *supra* note 13, at 159 n.7.

¹⁶Obligations owed by the government to the taxpayer should also be indexed.

C. Measurement of Tax Base

When the tax base is measured in historical units, inflation distorts the measurement of the base.¹⁷ This is easy to see, for example, in the case of a tax such as the real property tax, which is based on historical valuations. On the other hand, the real value of the base of some other taxes, such as sales tax or an ad valorem excise tax, is not affected by inflation at all. This is because the tax base is current market value, which automatically keeps up with inflation.

The income tax presents one of the more complicated cases under this heading. Determination of the income tax base involves adding and subtracting accounting entries made at different times during the year in units of national currency. In the absence of inflation, adding and subtracting these amounts is straightforward, but under inflation the units are not comparable.

It is complicated to conceptualize inflation adjustment of the income tax, because both collection lags and tax base measurement are involved. In abstract terms, the income tax base can be conceived of as consumption plus change in net worth between two points of time that are infinitesimally close.¹⁸ The delay between collecting tax immediately and waiting until the end of the year is a collection lag. The effect of inflation on tax base measurement arises because in order to ascertain the change in net worth, one must subtract net worth at the beginning of the period from net worth at the end of the period.¹⁹ When there is inflation, this exercise should be performed by adjusting the beginning value for the inflation that has occurred during the period. To do so is central to the motivation for the income tax base. The base measures how much the taxpayer could have consumed during the period without altering the value of his or her wealth. A merely nominal increase in wealth should not be counted as giving rise to consumption potential. Only a change in wealth above and beyond inflation can be consumed while leaving the taxpayer's stock of wealth unchanged in real terms.²⁰

¹⁷Strictly speaking, only the effects of inflation on the measurement of the tax base, other than effects arising from the erosion of amounts expressed in the statute in terms of national currency, are included under this heading. For a discussion of effects of inflation and some policy alternatives, see Daniel Halperin & Eugene Steuerle, *Indexing the Tax System for Inflation in Uneasy Compromise* 347 (Henry J. Aaron et al. eds., 1988).

¹⁸The rationale for this is spelled out in Victor Thuronyi, *The Concept of Income*, 46 Tax L. Rev. 45, 65–68 (1990); see also Jeff Strnad, *Periodicity and Accretion Taxation: Norms and Implementation*, 99 Yale L. J. 1817 (1990).

¹⁹The effect of inflation on the measurement of taxable income was recognized by Simons, but he considered that "any attempt to allow systematically for monetary instability in the measurement of taxable income seems altogether inexpedient." Henry C. Simons, *Personal Income Taxation* 206 (1938).

²⁰To convert the value of beginning wealth expressed in beginning-of-the-period currency into end-of-the-period currency, some index must be used. If there has been no change in relative prices, all indices will be the same. Absent this assumption, the choice of index will make a difference. Use of a consumer price index (CPI) is appropriate because it looks at the value of the currency from the point of view of an individual consumer, which makes sense because the income tax is based on considerations of equity between individuals. This is also true of the tax on income of entities, because the owners of entities are individuals. The CPI will only be accurate for the average consumer whose consumption pattern matches the assumptions of the index. Other consumers will assign a different value to the national currency, based on their consumption patterns. Because it does not reflect changes in consumption patterns resulting from relative price changes, the CPI as usually constructed may overstate inflation. See Mark A. Wynne & Fiona D. Sigalla, *The Consumer Price Index*, Economic Review, Federal Reserve Bank of Dallas 1 (Second Quarter 1994). See also Vincent Koen, *Price Measurement and Mismeasurement in Central Asia*, IMF Working Paper (WP/95/82 Aug. 1995). Although this problem of choice of index is not peculiar to inflationary conditions, it tends to be aggravated under such conditions, particularly when the inflation rate is very high, because under these circumstances relative prices tend to change more dramatically than when the general price level is fairly stable. Conceptually, however, the index number problem is of the same nature as the problem of using national currency to measure income where the general (average) price level is stable, given differences in

D. Reason for Categorization

In one sense, it can be said that inflation has only one effect on taxation, as on anything else, which is to erode values expressed in units of national currency. The above categories are therefore all subcategories of this one effect. What distinguishes them is not so much mathematical logic as it is the practicalities of how taxes work. It is helpful to distinguish among these categories in order to understand the effects of inflation on taxation in a concrete and practical way and in order to formulate workable solutions to counteract these effects. For example, one often hears complaints that inflation causes people to be taxed at higher and higher marginal rates (so-called bracket creep). It may seem, therefore, that this is a problem with the rates and that the remedy is to reduce the rates. In fact, it is a problem of the rate brackets being stated in terms of national currency, and the remedy to exactly compensate for this effect would be to adjust for inflation the levels defining the rate brackets, not to adjust the tax rates. In another example, if, as with a VAT under which there are no tax credit carryovers (i.e., where any excess credits are refunded immediately), the only effect of inflation arises from the erosion of the tax obligation (collection lag), then a practical remedy to reduce the effect of inflation would be to shorten the collection lag.

II. Adjustment of Taxes Other Than Income Tax

Inflation adjustment of taxes other than the income tax is straightforward and need not be discussed here in detail. In the case of the VAT, for example, there is not much of a problem, even at high inflation rates, given that the tax is usually collected every month. In a credit-method VAT, the tax base is sales minus purchases taking place during the month. If inflation is high, one might want to index the tax liability for inflation taking place between the occurrence of the taxable event and the payment of tax. If tax is due on the fifteenth of the following month, it would be appropriate to adjust tax liability for one month's worth of inflation, assuming that the average sale and the average purchase take place in the middle of the month. If inflation is really high (more than, say, 20 percent a month), one could require taxpayers to account for sales and purchases weekly or even daily, adjusting each amount for inflation. Of course, this would complicate administration of the tax and may be impracticable. If the VAT law does not allow an immediate refund of excess credits, but instead requires them to be carried over, the carryover needs to be adjusted to maintain the value of this obligation owed by the government to the taxpayer.

The personal consumption tax is not in operation in any country, but has been the subject of academic discussion. This tax can take several forms; here the form discussed by Graetz is assumed;²¹ taxable consumption for a year equals total receipts minus total amounts invested. Such a tax does away with the need to ascertain the cost of particular assets and the time when gains are realized for tax purposes. It might seem, therefore, that no inflation

consumer preferences and changes in relative prices. The extent to which the consumer price index overstates inflation and, hence, may be an inappropriate index to use without adjustment, is beyond the scope of this chapter. I will assume for purposes of this chapter that appropriate adjustments are made so that there is no such overstatement.

²¹See Michael Graetz, *Implementing a Progressive Consumption Tax*, 92 Harv. L. Rev. 1575 (1979).

adjustment is required, because there are no cost recovery deductions based on historic values. There remains, however, the problem of intrayear timing. Consider a simple example. Two taxpayers each receive \$100 in cash, which they immediately spend. The only difference is that one taxpayer receives this amount earlier in the year. The tax base for each will be \$100. However, the taxpayer who receives the amount earlier is able to purchase more valuable goods than the person who receives the same nominal amount later in the year. These problems can be dealt with by calculating the tax base on a monthly basis (or more frequently, if there is significant monthly inflation) and adjusting the tax liability for each month to the time of payment. While this is conceptually simple, inflation adjustment would substantially complicate administration of the tax.

III. Adjustment of Income Tax

A. General Issues

The effect of inflation on the income tax is complex because it consists of a combination of the three effects described above. First, inflation erodes amounts expressed in national currency in the statute, most important, the tax brackets and personal deductions. Second, there is a collection lag, being the difference between the time income is received and the time the tax is paid. Third, the tax base is distorted, because inflation erodes the historic cost of the taxpayer's assets and liabilities.

Costs of acquiring property are accounted for in historical terms. The determination of income from property requires accounting for the cost of the property and allowing the taxpayer to recover this cost. Accounting for the cost in historic terms erodes the value of the cost recovery and overstates the tax base. For example, if property is sold, calculating the gain by subtracting the acquisition cost (measured in historic terms) from the sales price (measured in current units) will inflate the amount of the gain. In the case of depreciation, the amount of depreciation is understated if it is measured on the basis of historic cost. In the case of holding cash, there is no sales event, but cash held at the end of the period will have a lesser value than its historic cost stated at the closing price level, so that there is a loss in inflation-adjusted terms, but no loss if historic cost is used.

In the case of liabilities, inflation distorts the treatment of interest paid on debt. In fact, interest should be divided into two components: real interest and compensation for inflation. The latter is really not interest at all, but is repayment of a part of the principal of the loan.²² Thus, the inflation adjustment of loans requires the inflationary component of interest to be subtracted in determining interest income and expense.

²²The repayment of principal occurs because inflation reduces the real value of the debt. If the value of the debt has gone down, it must be because part of the debt has been repaid. Strictly speaking, under this analysis, the portion of the "interest" payment that should be regarded as repayment of principal should be determined with reference to the anticipated rate of inflation; if the actual rate differs from the anticipated rate, there will be a gain or a loss on the contract to either the debtor or the lender. Thus, there are three elements involved in what is nominally designated as interest expense: (1) interest, (2) repayment of principal, to the extent that the principal is eroded by inflation that was expected by the parties, and (3) to the extent that inflation is less than expected, a payment by the borrower to the lender reflecting the lender "winning the bet" on what inflation would be (the opposite if inflation is greater than expected).

If the tax base is not adjusted for inflation, substantial over- or undertaxation can occur. The overall revenue effect of inflation on the tax base depends on a number of factors. Inflation can increase the tax base (this is particularly likely to happen if the scope for deducting interest expense is limited). In the absence of limitations on the deduction of nominal interest, inflation can erode the tax base, particularly if there is free access to credit and if much interest income escapes taxation, as taxpayers arrange their affairs so as to eliminate instances of overtaxation, and maximize opportunities for undertaxation.²³ On a more abstract level, inflation can be seen as destroying the integrity of all forms of accounting, including tax accounting, based on historic costs. Inflation makes it impossible to add or subtract amounts such as receipts, expenses, inventory balances, and so on, stated at historic costs and occurring on different dates. It is as if these numbers were expressed in different currencies. At high levels of inflation, the tax base becomes virtually meaningless.

So much is common knowledge. What is not so commonly understood is precisely how the income tax base should be adjusted for inflation and whether inflation adjustment is feasible in the actual administration of an income tax. These points are explored below.

The method of adjustment for inflation must be tailored to the methods of accounting that are used under the income tax. In general, one would not want to allow a deduction for an inflation adjustment before the associated inflationary component of income is taken into account in determining taxable income. For example, if an asset is purchased at the beginning of year 1 and is sold at the end of year 5, at which time the gain is taxed, a deduction for the inflationary component of the gain should be allowed only in year 5.

If the asset is financed through debt, and if the interest expense incurred to finance the asset is currently deductible in years 1 through 5, it would be appropriate to adjust the interest deduction for inflation on an annual basis as well, that is, to deny a deduction for the portion of the debt that represents amortization of principal.²⁴ If, however, deduction of the interest expense is deferred until the asset is sold, then it would also be appropriate to defer the inflation adjustment of the interest expense.²⁵

The general implication is that there is no unique, technically "correct" way of adjusting the income tax for inflation. The design of inflation adjustment rules appropriate for a particular country's income tax should be consistent with (1) the expected inflation rates in the country; (2) the rules for determining taxable income, particularly rules relating to the timing of income and deductions; (3) the ability of taxpayers and administrators to apply inflation adjustment rules of different degrees of complexity and the administrative and compliance costs of various alternatives; (4) revenue needs; and (5) transitional and other political accommodations required.

²³See Efraim Sadka, *An Inflation-Proof Tax System?*, 38 IMF Staff Papers 135, 140-41 (1991).

²⁴See *supra* note 22.

²⁵In general, where the inflation adjustment mechanism involves subtracting debt from the opening balance, an adjustment would have to be made for interest expense that is not currently deductible. Inflation adjustment based on the opening balance is the general approach of countries that use "global adjustment." See *infra* sec. III(D).

In general, one can classify inflation adjustment methods into three groups:²⁶ (1) ad hoc adjustment, which is an attempt to eliminate the effect of inflation wholly or partly on particular items, but which is not explicitly based on the current rate of inflation; (2) partial adjustment, which involves explicit inflation adjustment of particular items; and (3) global adjustment, which is a comprehensive adjustment to the taxpayer's accounts and is generally based on the accounting balance sheet.

B. Ad Hoc Adjustment

Ad hoc adjustment is effected through measures that are not explicitly based on calculating the amount of inflation, but that are designed to offset the effects of inflation on particular transactions. Examples are applying a lower rate of tax on capital income, accelerated depreciation, a partial exclusion for capital gains, last-in-first-out (LIFO) inventory accounting, and limitations on the deduction of interest expense or inclusion of interest income. Reducing the length of collection lags is also an ad hoc adjustment. This can be done by speeding up requirements for advance payments, accelerating the due date for final payment, or imposing withholding taxes.

None of these measures is based on the actual rate of inflation for the year. Depending on how they are structured, they may offset the effects of inflation with greater or less accuracy. Most also have other justifications. For example, both accelerated depreciation and preferential treatment of capital gains have been supported on grounds that have nothing to do with inflation, but have also been justified as ad hoc responses to inflation.

The realization rules of the income tax can also act as an ad hoc offset to inflation. At certain holding periods and inflation rates, the benefit to the taxpayer of being able to defer taxation of the gain until realization roughly offsets the detriment of having to pay tax on the inflationary component of the gain.²⁷

Some countries with high inflation rates have required enterprise income tax to be calculated and tax to be paid on a quarterly or monthly basis.²⁸ In a rough way, this has the effect of protecting the tax base from inflation. It is reasonably accurate, for example, for service businesses, where capital is not a material income-producing factor. It does not, however, deal with problems such as the erosion in value of fixed assets or the inflationary component of interest income or expense.

Depending on how they are designed, ad hoc methods compensate for inflation to varying degrees. If the inflation rate is stable and fairly low, it is possible to largely offset the

²⁶For those readers who wish to compare the treatment here with that in Charles E. McLure, Jr. et al., *The Taxation of Income from Business and Capital in Colombia*, ch. 7 (1990), the term in the McLure book "integrated adjustment" corresponds here to "global adjustment," and "ad hoc adjustment" corresponds here to "partial adjustment." That is, McLure uses two terms, while this book uses three.

²⁷See C. Eugene Steuerle, *Taxes, Loans, and Inflation* (1985); R.J. Vann & D.A. Dixon, *Measuring Income Under Inflation* 81 (1990).

²⁸See, e.g., *Lege privind impozitul pe profit*, art. 3, Monitorul Oficial, Jan. 31, 1991 (Romania, profit tax law—repealed 1994); Law of the Kazakh Soviet Socialist Republic of February 14, 1991, Concerning Taxes on Enterprises, Associations and Organizations, art. 8 (repealed 1995)(quarterly calculation of income and payment of tax).

effects of inflation on taxable income by playing around with such adjustments. Ad hoc adjustments can be relatively simple because they do not require explicit calculation of inflation. In general, however, ad hoc adjustments are problematic because they are not completely accurate and, moreover, will retain their accuracy at only one rate of inflation. If the rate of inflation varies, ad hoc approaches will end up over- or undercompensating. Ad hoc adjustments cannot hold the system together if the inflation rate is high or variable.²⁹

Moreover, some types of ad hoc adjustments do not work accurately even if inflation stays the same. Thus, for example, excluding one-half of nominal capital gains from tax will only by coincidence correspond to the inflationary portion of the gain (not to mention problems that arise from the deferral of tax and the leveraged financing of capital assets).

C. Partial Adjustment

Partial adjustment involves adjusting for inflation with respect to particular items of income or deduction, usually by indexing the cost of the capital involved. Most countries that adopt some form of inflation adjustment employ partial or ad hoc adjustments. Because these can take a countless variety of forms and because their design depends heavily on the specific features of the income tax law of the particular country, this chapter does not discuss in detail the problems involved. Instead, it focuses on global adjustment, because the relevant rules provide a conceptual framework within which partial and ad hoc adjustments can be evaluated.

Partial adjustments adopted by various countries include, for example, explicit indexation of the basis of depreciable property and indexation of the basis of property in computing capital gains.³⁰ Interest income or expense may also be adjusted for inflation. Another possibility is a onetime revaluation of the balance sheet, thereby allowing depreciation and capital gains to be computed on the basis of an indexed cost.³¹

Unless they are rather comprehensively applied (perhaps in combination with ad hoc methods), partial methods are dangerous because they can exacerbate imbalances in the system.³² For example, if the only adjustment for inflation consists in indexing the basis of capital assets, then a preference for investment in such assets is created; financing of such investments through debt is encouraged; and an unfair preference is created.

²⁹See Yishai Beer, *Taxation Under Conditions of Inflation: The Israeli Experience*, 5 Tax Notes Int'l 299 (1992).

³⁰See Finance Act 1982, secs. 86–87 (U.K.); J. Andrew Hoerner, *Indexing the Tax System for Inflation: Lessons from the British and Chilean Experiences*, 2 Tax Notes International 552 (1990) (indexation of capital gains); AUS ITAA §§ 160ZH, 160ZJ (indexing of capital gains); Tanzi, *supra* note 1.

³¹See Ruppe, *supra* note 3, at 105. Such a revaluation has been permitted twice in France. The upward valuation of assets was tax free, but a low level of tax was imposed on distributions made out of the revaluation reserve. See Pierre Beltrame, *L'Imposition des revenus* 120–22 (1970); Loi No. 59-1472 du 28 déc. 1959 portant réforme du contentieux fiscal et divers aménagements fiscaux, J.O. Dec. 29, 1959, art. 39 (FRA); FRA CGI art. 238 bis I, 238 bis J. Such a revaluation of the balance sheet clearly does not attempt to properly measure the income of an inflationary period, but it leads to a more realistic measurement of income for a period of stable prices following inflation. Paradoxically, therefore, the only time this inflation adjustment method may be justified is when inflation has ceased. The approach is also defective because it corrects for inflation in favor of the taxpayer, but not in favor of the fisc. Japan allowed several write-ups of the value of fixed assets in the 1950s. See Mitsuo Sato, *National Report—Japan*, LXIIa Cahiers de droit fiscal international 411, 413 (1977).

³²See New York State Bar Association Tax Section, *Report on Inflation Adjustments to the Basis of Capital Assets*, 48 Tax Notes 759 (1990); see also vol. 2, ch. 16.

Partial adjustments are complicated because the balances of assets or debts involved can fluctuate from day to day. For example, the balance of a loan (or of a bank account) can change from day to day, so that an accurate determination of the partial adjustment would require computing the inflation adjustment for each day. A similar problem occurs with inventory. Further, the acquisition cost of an asset may be incurred over a number of different transactions. Shares, for example, can represent reinvested amounts of dividends, which might be received each month over a number of years. Indexing the cost of the shares would require a separate calculation for each of these transactions. And some assets represent improvements that are incurred frequently.

If carefully implemented, partial methods can work as long as inflation remains moderate. At significant inflation rates, partial methods become problematic, so that they must either be extended to everything or replaced by an explicitly global method.

If partial adjustment is applied broadly enough, the result can begin to resemble global adjustment. Conceptually, it is possible to approach inflation adjustment from the point of view of removing the effects of inflation on each transaction that goes into the determination of tax liability—a partial approach applied comprehensively.³³ But the difficulty of this approach is that it requires inflation adjustment of countless transactions. Even a simplified approach would require taking inventory at frequent intervals, such as monthly, which may be commercially impracticable.³⁴ The only feasible way of accounting for each transaction in terms of inflation-adjusted units is to keep accounts in currency of constant purchasing power.³⁵ In a computerised era, one should perhaps keep an open mind as to how much complexity this would involve.

D. Global Adjustment

1. General Issues

Global adjustment refers to a method for comprehensively removing the effects of inflation on the tax obligation as well as the effects on the tax base.³⁶ Global adjustment restates taxable income in terms of the price level prevailing at the close of the year. Global adjustment is based on adjusting items in the taxpayer's opening and closing balance sheet,

³³This is, for example, the general approach of Vann & Dixon, *supra* note 27. John Bossons, *Indexing for Inflation and the Interest Deduction*, 30 Wayne L. Rev. 945, 960–61 (1984), takes a similar approach, calling for the indexing of the cost of all assets. *See also* Reed Shuldiner, *Indexing the Tax Code*, 48 Tax L. Rev. 537 (1993). However, no country has adopted such a "comprehensive partial" approach.

³⁴*See* Vann & Dixon, *supra* note 27, at 90–99.

³⁵*See infra* sec. III(D)(4).

³⁶Previous discussions (in English) of global adjustment include McLure et al., *supra* note 26, at 189–273; Milka Casanegra-Jantscher, *Chile, in Adjustments for Tax Purposes in Highly Inflationary Economies* (proceedings of a seminar held in Buenos Aires in 1984 during the 38th Congress of the International Fiscal Association); Arnold C. Harberger, *Comments, in* Aaron et al., *supra* note 17, at 380. Similar methods of inflation adjustment are often used for accounting purposes in countries with high inflation rates. *See, e.g.*, International Accounting Standards Committee, *International Accounting Standard 29, Financial Reporting in Hyperinflationary Economies in International Accounting Standards 1995*, at 497 (1995). IAS 29 appears to reach approximately the same result as the global adjustment method described in this chapter, but the means of getting to that answer seems to be more complicated, in that "all amounts [in the income statement] need to be restated by applying the change in the general price index from the dates when the items of income and expenses were initially recorded in the financial statements" and, in addition, the "gain or loss on the net monetary position is included in net income." *Id.* at 506. The latter "may be estimated by applying the change in a general price index to the weighted average for the period of the difference between monetary assets and monetary liabilities." *Id.*

rather than on particular items of income or deduction. Because it is based on a balance sheet, it can be applied only to taxpayers who account for their income using double-entry bookkeeping.

The elegance of global adjustment is that it achieves the same effect as adjusting each transaction for inflation during the year, but accomplishes this result by relying mainly on the opening and closing balance sheet. It requires adjusting only a selected number of the transactions that take place during the year, which are much easier to keep track of than movements of inventory and items of income and expense generally.

Global adjustment has been practiced for some time in countries that have suffered from chronic high inflation, although several countries have dropped it when inflation rates came down.³⁷ The method of global adjustment discussed below is based on the rules applicable in Chile, which have been in force since 1974. The rules in other Latin American countries with global adjustment are broadly similar.³⁸ In 1994, Romania adopted global adjustment for its profit tax.³⁹

Because it is based on the balance sheet, global adjustment is easiest to understand as part of the net worth method of determining taxable business income.⁴⁰ In simplified terms, this method determines the taxable income of a business as the difference between the taxpayer's net worth at the end of the year and its net worth at the beginning of the year, with some adjustments. The method is described briefly below and in greater detail in chapter 16.

In an inflationary environment, all the elements of the net worth calculation must be adjusted for inflation. The global adjustment does this by restating each element of the net worth calculation in end-of-the-year prices. In very general terms, therefore, the global adjustment works because the net worth calculation works. This is not to say that the global adjustment method can be introduced in an income tax only if income is determined on the basis of a net worth calculation—it is easy to specify the global adjustments to an income tax that determines taxable income as the difference between income and expenses;⁴¹ indeed, Chile itself uses the income-less-expenses method, rather than the net worth method, in defining taxable income.⁴² The main requirement to apply the global adjustment is the drawing up of an annual balance sheet. When taxable income is determined as the difference between gross income and expenses, the global adjustment can be expressed as a series of additions to and subtractions from taxable income.

³⁷Countries that have employed global adjustment include Argentina (art.94-98 ARG IR), Brazil (repealed by law 8.981 of 1995), Chile, Colombia, Israel, Mexico, and Venezuela.

³⁸See, e.g., VEN COT arts. 173–193; COL ET arts. 329–355 (repealed by Article 78 of Law 1111 of 2006).

³⁹See ROM PT art. 5. The inflation adjustment became effective in 1995 at a time of high inflation, but was subsequently repealed.

⁴⁰See vol. 2, ch. 16, appendix.

⁴¹See Appendix B.

⁴²See CHL IR art. 31.

2. Global Adjustment in the Context of the Net Worth Method

This section explains a set of rules for global inflation adjustment in the context of an income tax that uses the net worth method to determine taxable income. These rules are closely modeled on those of Chile, although they are not identical to the Chilean rules in all respects. Alternatives to some of the rules described in this section are discussed in section 3 and in Appendix A. Appendix A consists of a more detailed statement of the global adjustment, in the form of illustrative statutory language and commentary.

A. SUMMARY EXPLANATION

The global inflation adjustment rules apply to enterprises that prepare, or are required to prepare, financial statements in accordance with accounting or commercial law (accounting balance sheet). The businesses that are required to do this are (in civil law countries) usually specified in the commercial code and may be both legal persons and physical persons.

The net worth method uses the net worth (assets minus liabilities) in the opening and closing balance sheets for the taxable year. The closing balance sheet is based on the accounting balance sheet and reflects both the assets and liabilities of the taxpayer at the close of the taxable year. The opening balance sheet for the taxable year is the same as the previous year's closing balance sheet. The values of items included in the closing balance sheet are adjusted for inflation taking place during the year.

Under the net worth method, taxable income is determined as the difference between closing net worth and opening net worth. It is also, however, necessary to subtract those items that increase closing net worth but that should not be included in taxable income, and to add items that decrease closing net worth but that should not be deductible in determining taxable income.

Accordingly, taxable income for the year is

	(i) the amount of net worth reflected in the closing balance sheet,
less	(ii) the inflation-adjusted amount of net worth reflected in the opening balance sheet,
less	(iii) inflation-adjusted contributions to capital and inflation-adjusted incomes that are not taxable,
plus	(iv) inflation-adjusted withdrawals made in favor of the owners and inflation-adjusted expenses that are not deductible.

EXAMPLE

The opening balance sheet of an enterprise consists solely of 100 units of inventory purchased at \$10 each. The firm has no other assets or debt. The consumer price index for the preceding December is 100. On July 1, (consumer price index for June is 200), the enterprise sells its inventory for \$2,500 and invests the proceeds in a bank deposit that earns \$2,500 to the

close of the year. As of December, the consumer price index has risen to 400. The closing balance consists of \$5,000 in cash.

Taxable profit is calculated as follows:

Closing net worth,	\$5,000
Less inflation-adjusted opening net worth	\$4,000
Equals taxable profit	\$1,000

B. ADJUSTMENT OF OPENING NET WORTH

The amount of opening net worth is adjusted for inflation for the taxable year. The amount of opening net worth is the value of total assets in the opening balance less the value of total debts and reserves in the opening balance. The reserves taken into account for this purpose are only those for which a deduction is allowed for income tax purposes. The opening balance is the same as the closing balance for the previous taxable period. See paragraph (j) below for rules on what is included in the balance. See paragraph (k) below for rules on how to determine inflation for the taxable period.

The inflation-adjusted opening net worth is subtracted in determining taxable income (item (ii) of the formula in paragraph (a) above). In the event that the opening net worth is negative (i.e., debts exceed the book value of assets), this operation results in an increase in taxable income, because a negative number is being subtracted.

C. ADJUSTMENT OF INCREASES IN NET WORTH

Transactions that increase net worth, described below, are adjusted for inflation occurring between the month in which the transaction takes place and the close of the taxable period. The total inflation-adjusted amount of these transactions is subtracted in determining taxable income (item (iii) in the formula in paragraph (a) above).

These transactions consist of contributions to capital and nontaxable income. Contributions to capital are amounts contributed to the capital of the enterprise by its owner or owners.⁴³ Nontaxable income is any receipt of the enterprise that is not included in determining taxable income.

D. ADJUSTMENT OF DECREASES IN NET WORTH

Transactions that result in a decrease in net worth, described below, are adjusted for inflation occurring between the month in which the transaction takes place and the close of the taxable period. The total inflation-adjusted amount of these transactions is added in determining taxable income (item (iv) in the formula in paragraph (a) above).

⁴³As well as amounts contributed by nonowners if these amounts are considered nontaxable contributions to capital under the country's income tax law. See ch. 19.

These transactions consist of distributions and nondeductible expenses. Distributions are dividends, any other withdrawals of property from the enterprise by its owner or owners, and distributions in liquidation of the enterprise. Nondeductible expenses are expenses of the enterprise that are not allowed as deductions in determining taxable income, except for expenses that are added to the capital account of property.

E. VALUATION OF ITEMS IN CLOSING BALANCE

The value of items in the closing balance is adjusted for inflation as provided in paragraphs (f) through (i) below. The closing net worth is determined according to this adjusted balance sheet (item (i) in the formula in paragraph (a) above).

F. VALUATION OF DEPRECIABLE PROPERTY

Assume that the value of depreciable property in the closing balance is determined according to the pooling method,⁴⁴ except for property (such as immovable property) that is valued separately for each asset. Under such a system, depreciation for the year is calculated as a percentage of the pre-depreciation balance for each class of assets. This is equal to the opening balance⁴⁵ --

- (i) adjusted for inflation for the taxable year,
- (ii) increased by the cost of any property in that class placed in service during the year, adjusted for inflation between the month in which the property is placed in service and the end of the year, and
- (iii) reduced by the proceeds of disposition of any property disposed of during the year, adjusted for inflation between the month of the disposition and the end of the year.

G. VALUATION OF INVENTORY

The purpose of the inventory valuation rules is to come up with a value that will approximate prevailing prices as of the end of the year while following rules of thumb that are easily administered.

Goods of a particular type are valued at the cost of the item of that type that has the highest nominal cost, adjusted according to the percentage change in the consumer price index between the month in which the item was acquired and the end of the taxable year. Where there is significant inflation, the item in question will usually be the last-acquired item.

When none of a particular type of goods has been acquired in the taxable year, the goods are valued at their opening balance value, adjusted according to the percentage change in the consumer price index for the taxable year.

⁴⁴See ch. 17.

⁴⁵The opening balance is determined as the closing balance for the preceding year, which takes into account depreciation for that year.

Elements included in closing inventory that are produced, rather than purchased, including work in progress, are valued according to the same principles, in relation to the costs incurred in their production. When costs of producing an item of property are incurred in more than one month, each month's costs are adjusted according to the percentage change in the consumer price index between that month and the end of the taxable year. However, depreciation or amortization of intangibles that is included in production costs is not adjusted because it is already calculated in prices prevailing at the end of the year. When the inventory consists of both finished goods and work in progress of the same type, the work in progress may be valued as a proportion of the value of the finished goods.

H. VALUATION OF FOREIGN CURRENCY ITEMS

Holdings of foreign currency, debt claims or other securities denominated in foreign currency, and debts denominated in foreign currency are adjusted in accordance with prevailing exchange rates as of the end of the year.

I. VALUATION OF OTHER ITEMS IN CLOSING BALANCE

The value of other assets included in the closing balance is adjusted for inflation between the month the asset was acquired and the close of the year or, in the case of assets that are included in the opening balance, for inflation occurring during the taxable year. Assets whose value is fixed in terms of national currency are not adjusted (e.g., cash, debt instruments). Liabilities are adjusted as well. Thus, liabilities denominated in foreign currency or those with an adjustment clause would be adjusted, while those denominated in national currency would not be adjusted.

J. ITEMS TO BE INCLUDED IN BALANCE

The balance sheet used for inflation adjustment is based on the accounting balance sheet, adjusted as necessary for tax purposes. For an enterprise owned by an individual, only the assets and debts of the enterprise are included in the balance sheet (i.e., not the personal assets and debts of the individual).

The assets included in the balance sheet are only those that have a value for tax purposes and are effectively owned by the taxpayer. Thus, for example, assets leased to the taxpayer under a finance lease⁴⁶ are included in the taxpayer's balance sheet because they are effectively owned by the taxpayer even though they are nominally owned by the lessor. The balance sheet does not include entries on the financial balance sheet that represent nominal, transitory, or pro forma values that do not constitute an effective investment. Nominal assets might include, for example, assets on the financial balance sheet such as know-how, trademarks, patents, and concessions that do not reflect capitalized costs incurred by the

⁴⁶I presume that the law sets forth rules describing the circumstances under which a lease will be treated as a finance lease as opposed to an operating lease. E.g., KAZ TC art. 78. See generally International Fiscal Association, *Taxation of Cross-Border Leasing*, 75a Cahiers de droit fiscal international (1990). Assets leased under an operating lease would be included in the nominal owner's balance sheet.

taxpayer. Pro forma accounts reflect responsibilities or other information for the financial accounting of the enterprise (e.g., shares under guaranty, endorsed bills, or discounted bills).

K. MEASUREMENT OF INFLATION

Inflation is determined according to the officially published CPI, which typically reflects prices as of the end of a particular month and is published early in the following month. To adjust opening net equity to the end of the year, it is therefore appropriate to use the index for December. Thus, inflation for 1996 is determined according to the change in the index between December 1995 and December 1996. Transactions occurring during a particular month that need to be adjusted to the end of the year are appropriately adjusted using a mid-month convention that assumes that, on average, transactions occur in the middle of the month. Thus, a transaction occurring in November 1996 that needs to be adjusted to the end of the year is adjusted according to the percentage change between the average of the CPI for October 1996 and November 1996 and the CPI for December 1996 (reflecting 1 1/2 months of inflation).⁴⁷

L. ADJUSTMENT OF ADVANCE PAYMENTS, TAX LIABILITY, AND LOSS CARRYOVERS

The above-described inflation adjustment rules result in a measurement of taxable income in prices prevailing at the end of the taxable year. The amount of tax due is adjusted for inflation between the end of the year and the time of tax payment. Advance payments of tax that are credited against the tax liability are adjusted from the date they are due until this same time. (If an advance payment is paid late, the taxpayer is liable for a penalty.)

Losses that are carried over from one year to the next are also adjusted for inflation. Thus, a loss of \$1,000 for 1995 that is deducted against taxable income for 1996 should be adjusted according to the change in the CPI between December 1995 and December 1996.

M. EFFECT OF GLOBAL ADJUSTMENT ON DEDUCTION FOR INTEREST EXPENSE

The use of debt finance reduces the opening net worth by the nominal amount of the debt, and the closing net worth by the nominal amount of the debt plus accrued interest on the debt. The effect of global adjustment is that, in determining taxable income, the *inflation-adjusted* amount of opening net worth is subtracted. Because the debt decreases the opening net worth, the effect of the inflation adjustment is to increase taxable income by the amount of the debt, multiplied by the rate of inflation. This has the effect of denying a deduction for the inflationary component of interest expense. For example, consider the simple case where the taxpayer starts the year off with zero assets and a debt of \$11,000,000. The closing balance is a debt of \$22,500,000, representing the initial debt plus accrued interest of \$11,500,000 (suppose there is 100 percent inflation, so that this amount of interest is reasonable). Under an unadjusted system, the taxpayer has a loss of \$11,500,000, representing the deduction for

⁴⁷For example, suppose that a dividend of \$500 is paid in November. Suppose that the CPI is 105 for October, 115 for November, and 121 for December. The average of the October and November indices is therefore 110, so that the applicable correction factor is 10 percent (121/110). Therefore, the adjusted amount of the dividend is \$550.

interest expense. Under global adjustment, taxable income equals closing net worth (—\$22.5 million) minus inflation-adjusted opening net worth (—\$22 million), that is, a loss of \$500,000. One would obtain the same result from denying a deduction for the inflationary component of interest expense.

3. *Alternative Approaches*

Under global adjustment, the elements of the closing balance are valued in prices prevailing at the end of the year. However, there is more than one way of doing this. One approach is to try to value property at its fair market value. Another approach is to value the property at book value (usually based on acquisition cost), adjusted for inflation occurring since the last valuation (i.e., inflation occurring since the date of the opening balance sheet or since the property was acquired, if acquired during the course of the year). Strictly speaking, only the second method—valuing property at its acquisition cost plus inflation—is "pure" inflation adjustment. Valuation at fair market value involves not only inflation adjustment, but also the taxation of gains or losses attributable to changes in relative prices. If the fair market value is used for the closing balance sheet, then these gains and losses are taxed, even if they are not realized. This approach may seem desirable to some and undesirable to others.

Some argue that if one is designing inflation-adjustment rules, market valuation should not be employed because this goes beyond inflation adjustment.⁴⁸ If, however, the mandate is to design sensible income tax rules, regardless of whether they are called inflation adjustment, then it is necessary to decide on the merits whether inflation adjustment of the book value or a valuation that approximates fair market value is more desirable. This inquiry must be made separately for each type of asset.

Consider foreign currency. It is most straightforward to value foreign currency included in the closing balance at the exchange rate prevailing at the end of the year. It would, of course, be possible to instead adjust for inflation the acquisition cost of the particular currency. This would require one to keep track of the acquisition dates of foreign currency that is included in the closing balance. If acquired during the taxable year, it would be valued according to the change in the price index between the month of acquisition and the end of the year. If it was on hand at the beginning of the year, then it would be adjusted for the entire year's worth of inflation. For foreign currency, the mark-to-market rule is simpler than pure inflation adjustment. Moreover, valuation at the end-of-year exchange rate makes sense from a policy point of view because it leads to a more accurate reflection of the economic income from foreign-currency-denominated financial transactions.⁴⁹

Instead of trying to devise a "pure" set of inflation adjustment rules, it is better to think in terms of an "inflation-adjusted" system, that is, a set of valuation and accounting rules that, together with the other features of the income tax, ensures that the system is relatively impervious to inflation and is also administrable and desirable under general principles of tax

⁴⁸See, e.g., Harberger, *supra* note 36, at 383.

⁴⁹See Vann & Dixon, *supra* note 27, at 71–72.

policy. Indeed, it may make little sense to pick out particular rules, call them the inflation adjustment rules, and evaluate their structure separately from the rest of the system. The entire set of rules for the income tax should be considered as a whole and evaluated under general principles of tax policy.

4. Equivalence Between Net Worth Calculation and Accounting in Constant Currency

Another way of comprehensively adjusting for inflation is to account for all transactions relevant to income tax in currency of constant value. This has the same effect as global adjustment. Accounting in constant currency means using an artificial currency determined by adjusting the national currency by the change in the CPI. It would be the same as accounting in foreign currency, assuming that the exchange rate for the foreign currency exactly corresponds to the CPI. Of course, this assumption will not hold, and so accounting in constant currency differs from accounting in foreign currency.

Constant currency accounting means that each transaction a taxpayer enters into is accounted for by converting it to constant currency at the exchange rate prevailing on the date of the transaction. In addition, every day the amount of cash held by the taxpayer throughout that day has to be determined, and the resulting loss from holding this cash is determined by subtracting its value in constant currency at the beginning of the day from its value at the end of the day. The books are kept in this constant currency. This means that depreciation, gains and losses, inventory accounting, and so forth are all accounted for in this constant currency, so that the determination of taxable income is not affected by inflation. At the end of the year, the taxable income determined in this constant currency is converted to national currency at the exchange rate prevailing at the end of the year.

A relatively simple example can illustrate the operation of the net worth method and its equivalence to accounting for each transaction in units of currency with constant purchasing power. The facts are set forth in Table 1. The company in question starts out with \$1,100 in cash at the beginning of Day 1. Each day, at the end of the day, it purchases inventory and sells inventory. The number of units bought and sold each day is set forth in columns 5 and 6, and the purchase and sales prices are set forth in columns 3 and 4. Total cash sales are in column 7 and inventory purchased is in column 8. The resulting cash flow is in column 9.

Taxable income is computed as follows on the basis of accounting in constant-value currency. Each transaction is recorded on the books in units of currency with constant value. The gain or loss from holding currency is also taken into account each day. The cost of goods sold is calculated on a first-in-first-out (FIFO) basis. As shown in columns 10 and 11, the units sold each day consist of items purchased on the preceding day and on the day itself. The cost of goods sold is accordingly given in column 12. This is derived by multiplying the number of units by their cost in constant currency. For example, for Day 2, the nine units have a cost of \$130 divided by the price index of 1.3 (i.e., \$100 apiece), and the two units dating from Day 1 have a cost of \$110 divided by 1.1 (also, \$100 apiece), for a total cost in constant currency of \$1,100. Sales revenue is stated in constant currency in column 13 (i.e., each number in column 7 divided by the corresponding price index for that day). Sales profit (column 14) is sales

(column 7) less the cost of goods sold (column 12). Column 15 shows the loss incurred from holding units of domestic currency, which is calculated by taking the amount of currency held during the day (the amount on hand at the beginning of the day), calculating its value in constant units at the end of the day, and subtracting its value in constant units at the beginning of the day. Adding columns 14 and 15 gives the total profit for each day (column 16). The total profit in constant currency for the four days is \$15.79.

Table 2 shows the global adjustment/net worth method of calculating profit. The closing net worth consists of \$1,320 in cash and four units of inventory. Both of these are valued in constant currency in column 1. The inventory is valued on a FIFO basis, with cost stated in constant currency (the units all happen to date from the last period, so their unit cost is \$200 divided by 1.9). Total assets in constant currency are therefore \$1,115.79. The opening net worth is \$1,100 (the company having started out with cash only). The profit for the four-day period is determined by subtracting \$1,100 from \$1,115.79. This gives the same answer as that obtained in Table 1. The example illustrates that global adjustment gives the same result as keeping books in currency of constant value and requires far fewer calculations.

5. Determination of Specific Types of Income

Global adjustment is effective in determining the taxpayer's total taxable income. Things become more complicated if it is necessary to break income down into specific categories. The income tax law may, for example, contemplate special rules for capital gains, business income, or foreign-source income.

TABLE 2. Global Method

Closing cash	1,320
Closing inventory	800
Closing net worth	2,120
Less opening net worth	2,090
Profit	30

Note: Numbers have been rounded to two decimal places.

To create separate categories in an inflation-adjusted system, one would in effect have to allocate the inflation adjustment among different categories of income. Unfortunately, this cannot be done by allocating on a pro rata basis. What would be required to distinguish foreign-source income, for example, from domestic-source income is to create two different balance sheets. One would reflect the assets and liabilities related to the earning of domestic-source income, and the other, those relating to foreign-source income. Inflation adjustment would be separately applied to each, and domestic-source and foreign-source income could be correspondingly determined by applying the net worth comparison to each balance sheet. In some cases, this approach would be problematic because some items can be related to both foreign-source and domestic-source income.

Table 1. Constant Currency Accounting

DAY	1. Price Index End of Day	2. Cash At End Of Day	3. Purchase Price	4. Sales Price	5. Units Bought	6. Units Sold	7. Sales	8. Purchases
0	1	1100						
1	1.1	1000	110	125	10	8	1000	1100
2	1.3	1350	130	150	10	11	1650	1300
3	1.4	800	135	160	10	5	800	1350
4	1.9	1320	200	210	10	12	2520	2000
DAY	9. Cash Flow	10. Goods Sold, Bought This Period	11. Goods Sold, Bought Last Period	12. Total Cost of Goods Sold	13. Inflation- Adjusted Sales	14. Sales Profit	15. Currency Loss	16. Daily Profit
1	-100	8	0	800	909.09	109.09	-100	9.09
2	350	9	2	1100	1269.23	169.23	-139.86	29.37
3	-550	4	1	485.71	571.42	85.71	-74.17	11.53
4	520	6	6	1210.15	1326.31	116.16	-150.37	-34.21
							TOTAL:	15.78

Note: Numbers have been rounded to two decimal places.

Although it is therefore possible to determine separate inflation-adjusted categories of income, it obviously involves considerable complexity. This suggests that it would be better under an inflation-adjusted system to minimize the number of separate categories or to come up with simpler rules to determine the breakdown. For example, in the case of the foreign tax credit, if the foreign-source income is determined in a foreign currency (assuming that the currency does not involve substantial inflation), one could calculate the foreign tax credit limitation according to the ratio of foreign tax paid and foreign-source income in the foreign currency. (The equivalence of inflation adjustment and income determination in a foreign currency is discussed below.) If the income tax is fairly clean, and involves a substantial degree of mark-to-market taxation, then it should be possible to largely do away with special rules for separate categories of income. Indeed, it may be necessary to do away with most such rules in order to feasibly operate a global adjustment system.

6. Limitations on Expenses

Closely related to problems involved where income is broken down into different types are problems having to do with limitations on expenses. In a world without inflation, it is not too difficult to provide limitations on various kinds of deductions, expressed in terms of either an amount of money or a percentage of income. In an inflationary situation, such limitations are difficult to calculate, because expenses may be incurred at different times, so that the nominal amount of the expenses cannot simply be added up. What would be required is to itemize the expenses for each month, adjust these for inflation, and then compare them with the amount of the limitation.

Even more difficult is dealing with a limitation on the deduction for interest expense.⁵⁰ Because the global adjustment has the effect of denying a deduction for the inflationary element of interest expense, it would be incorrect to add up interest expense, compare it with the limit, and deny a deduction for the excess. What would be required is to calculate the amount of real interest expense and to subject only this amount to potential denial. This would require determining the average level of outstanding debt or, alternatively, a method of approximation.

While calculations such as these can be made, the message is that any limitation on deductions becomes substantially more complicated in the context of global inflation adjustment, so that if this method is to work properly, limitations should be kept to a minimum. This would not be true of limits based on a percentage of each expense. For example, if 75 percent of entertainment expense is denied, then the limitation is easy to determine because it applies to the amount of each expense. The amount of deduction denied in each month still has to be kept track of, however, because it is necessary to adjust each month's nondeductible expenses for inflation under the global method.⁵¹

⁵⁰See vol. 2, ch. 16.

⁵¹See *supra* Sec. III(D)(2)(d).

E. Inflation Adjustment of Nonbusiness Income of Individuals

Countries employing global adjustment generally do not apply it to all taxpayers. Because it requires rather sophisticated accounting, global adjustment is restricted to taxpayers using double-entry bookkeeping. Although this would include some individuals with business income, the global adjustment is applied only to the assets and liabilities that are part of the business.

Various combinations of ad hoc and partial methods are applied in different countries to measure taxable income from capital of individuals (other than income subject to global adjustment). For example, in Argentina,⁵² individuals may index for inflation the tax cost of property for purposes of computing gain on disposition and computing depreciation. Moreover, virtually all interest income of individuals is excluded from taxation. Part of the rationale for this exclusion was that it would be difficult to index interest income;⁵³ moreover, given the fact that historically interest rates had often been zero or negative in real terms, it was felt that taxation of interest income would be unnecessary. Interest expense is, however, fully deductible in Argentina if incurred in earning taxable income, and this has resulted in some anomalies, where the associated investment income is not fully taxed on a current basis.

Ad hoc or partial adjustments to the measurement of taxable income from capital of individuals may suffice in a country with moderate inflation. When inflation approaches annual levels of 100 percent or higher, though, there is the problem that an individual's income is computed on an annual basis, without adjustment for changes in the price level during the year. For example, a taxpayer who earns \$100 at the beginning of the year and incurs a deductible expense of \$100 at the end of the year pays no tax, even if the price level is much higher at the end of the year; the real value of the expense is therefore less than that of the income. A solution that has been adopted in Brazil is to require individuals to calculate their income and deductions on a monthly basis, and to index these amounts, together with amounts withheld and estimated tax payments made, for inflation occurring between the month in question and the end of the year. This system of monthly accounting works well for income from services, but the system would not suffice to adjust income from capital, because it does not index the tax cost of property. Combined with partial methods that provide such indexing, monthly accounting can provide an acceptable scheme for taxing individual income, the drawback being the administrative complexity involved in multiplying the number of accounting periods.

The monthly income of individuals does not need to be indexed to the extent that tax liability is satisfied by withholding. In many countries, taxpayers with income from wages have tax withheld currently and are not required to file a return at the end of the year.⁵⁴ Because the tax liability is satisfied currently, there is no need for inflation adjustment of the tax base. The amounts in the withholding tables that are stated in local

⁵²The discussion in this paragraph reflects the law as of 1990.

⁵³For example, the global adjustment does not attempt to separately identify the inflationary component of interest income.

⁵⁴See ch. 15.

currency (i.e., the brackets) must, however, be adjusted on a monthly basis, or even more frequently when inflation rates are very high. If there is over- or underwithholding, then monthly indexing of the over- or underwithheld amounts as described for Brazil would be necessary.

F. Collection of Tax

The above discussion of global adjustment implicitly assumes that tax is paid at the end of the year. In practice, however, the payment of tax is more complicated. First, the tax liability is generally due not at the end of the year, but at the time that the return for the year is due. Second, a considerable portion of income tax liability is satisfied during the year in the form of withholding and payments of estimated tax. The rules for indexing these advance payments of tax must be considered in conjunction with the inflation adjustment rules analyzed above.

Amounts withheld should not be indexed if the corresponding income is not indexed. If, however, monthly indexing of income and expenses is adopted, then amounts withheld and estimated tax payments should also be indexed up to the end of the year, and the net amount due should be indexed from the end of the year until the date of payment.

In the case of companies (and sole proprietorships subject to global adjustment), given that global adjustment expresses the taxpayer's income in terms of the price level prevailing at the close of the taxable year, it is appropriate to adjust amounts withheld and estimated tax payments made for inflation occurring between the time the payment is made and the end of the year. The balance due (tax liability less these indexed amounts), or refund due, if there is a refund, should then be indexed to the time when the tax is paid or the refund is made.

Business losses and capital losses allowed as a carryforward deduction from previous years should also be indexed. In effect, these involve the taxpayer's claims for tax refunds against the government, the value of which should be maintained in real terms.

G. Foreign Currency Translation

An alternative way of looking at inflation adjustment is that it involves the same process as translating into domestic currency the income of a business that keeps its books in foreign currency. As shown above in section D(4), global adjustment is equivalent to keeping books in units of currency with constant purchasing power. The main difference between inflation adjustment and translation of accounts kept in foreign currency therefore lies in the index used to deflate domestic currency: the consumer price index versus the exchange rate.

The net worth/global adjustment method resembles the net worth method used to determine the income of a foreign branch, which has been in use in the United States

since the 1920s.⁵⁵ Under the U.S. net worth method, the income of a foreign branch is determined as the difference between closing and opening net worth, with proper adjustment for profits distributed during the course of the year.⁵⁶ All of the terms of the formula are determined in foreign currency (assuming that the foreign branch keeps its books in foreign currency), but are then translated into U.S. dollars. Fixed assets are translated at the exchange rate prevailing at the time they were purchased. Current assets are translated at the exchange rate in effect at the close of the year. Distributed profits are translated at the exchange rate in effect at the time of distribution.

The purpose of the net worth method, which is to determine the income of the foreign branch or corporation in U.S. dollars, is exactly analogous to the purpose of determining the income of a domestic corporation in units of fixed purchasing power. In performing inflation adjustment, one is in effect translating one currency (nominal units of national currency) into another (currency of a fixed purchasing power); the "exchange rate" at any time is given by the CPI. The general problem, then, can be stated as one of determining in units of currency x the income of a business that keeps its books in currency y . Properly applied, the net worth method of translation into U.S. dollars would have exactly the same effect as the global adjustment rules in a situation where there is no inflation in the United States and where exchange rate changes exactly mirror price level changes in the foreign country in which the branch operates.

This analogy reveals the defects in the net worth method as it was previously applied in the United States. The primary problem is that "current" assets (other than foreign currency and debt) are translated at the year-end exchange rate. Instead, under the inflation adjustment rules set forth above, such assets (e.g., inventory) should either be translated at the exchange rate prevailing at the time of purchase, or marked to market in U.S. dollars at year-end. Valuing them at their foreign currency acquisition cost, translated at the year-end exchange rate, can result in a gross deviation between their true value and their value in the balance sheet. The problem has long been known.⁵⁷ What is remarkable is that it remained uncorrected for so long.

In 1994, the U.S. Treasury issued regulations providing a revised methodology for the net worth method, called the "United States dollar approximate separate transactions method of accounting" (DASTM).⁵⁸ The regulations provide for a rather convoluted calculation for determining the profits of foreign branches that keep their books in a hyperinflationary currency. Total income is determined according to a net worth calculation performed in U.S. dollars. In general, the items included in the balance sheet that is used to determine net worth are valued at the U.S. dollar exchange rate as of the time that the item was acquired.⁵⁹ Certain items denominated in the hyperinflationary currency are, however, valued at the year-end exchange rate (bad debt reserves, prepaid income or expenses, holdings of hyperinflationary currency, and hyperinflationary debt

⁵⁵See Donald R. Ravenscroft, *Taxation and Foreign Currency* 85-87 (1973). I will call it the "U.S. net worth method."

⁵⁶See Rev. Rul. 75-106, 1975-1 C.B. 31; Rev. Rul. 75-134, 1975-1 C.B. 33.

⁵⁷See Ravenscroft, *supra* note 55, at 278-79.

⁵⁸See U.S. Treas. Reg. § 1.985-3. See generally Douglas Hassman et al., *A Practical Guide to Applying DASTM to the Current and Prior Taxable Years*, 10 Tax Notes Int'l 662 (1995); Charles Cope & Robert Katcher, *Final DASTM Regulations Provide Significant Advantages to Businesses Operating in Hyperinflationary Countries*, 9 Tax Notes Int'l 753 (1994).

⁵⁹See U.S. Treas. Reg. § 1.985-3(d)(5).

obligations and financial instruments). This is appropriate for the same reason that items denominated in local currency are not indexed in applying global adjustment (see section D(2)(i) above). By contrast, other "current assets" are valued not at the year-end rate, as under the former net worth method, but rather at the rate obtaining at the time of acquisition. Therefore, the net worth method under Reg. sec. 1.985-3 should result in an appropriate measure of taxable income.

The regulation does not stop at measuring total income according to the net worth method. It also contemplates the translation of income and expenses of the branch (accounted for in foreign currency) into U.S. dollars at the exchange rate for the month in which the income and expenses are incurred. This is not exactly the same as keeping the books in U.S. dollars. For example, gains and losses with respect to foreign currency assets and liabilities are not taken into account under this calculation. The difference between this amount of income and the income determined according to the net worth method is called the "DASTM gain or loss" and, in order to determine the character of income for purposes of the foreign tax credit limitation, the controlled foreign corporations provisions (Subpart F), and the like, this amount is allocated to assets of the branch in a calculation (reminiscent of a Balkan line dance) called the "DASTM 9-step procedure."

The analogy between foreign currency translation and inflation adjustment suggests that another acceptable method of inflation adjustment in a hyperinflationary economy should be to keep books in U.S. dollars or another strong currency. (The year-end result would then be translated into local currency at the exchange rate prevailing at the end of the year.) If every transaction were accounted for in dollars rather than in local currency, the result would be the same as under global adjustment, except that the exchange rate may depreciate at a different rate from the inflation rate⁶⁰ and thereby lead to a substantially different result.⁶¹ If this difference is considered acceptable as a matter of policy, and if there are business reasons for a company to keep its books in dollars, then dollar accounting could be authorized as an alternative mechanism of inflation adjustment. This approach may be complicated for many taxpayers because it requires every transaction to be converted into foreign currency. However, it would not be difficult for taxpayers who already keep their books this way for business reasons. Companies with substantial international operations may find it easier to keep books in one of the major currencies. Keeping foreign currency books is an alternative to inflation adjustment for limited categories of taxpayers in Israel.⁶²

IV. Conclusion

In deciding what inflation adjustment methods to adopt, if any, their administrative costs for taxpayers and for the tax administration should be carefully considered.

⁶⁰Another difference is that, depending on how the global adjustment is structured, the closing balance may involve marking some items to market rather than adjusting them according to the price index.

⁶¹A more complex alternative would be to use a basket of currencies.

⁶²See ISR IT art. 130A.

For example, the global method of inflation adjustment can be adopted only for companies having access to well-trained accountants. A simplified version of the global method can be adopted if inflation rates are moderate. Partial adjustment can be more complicated than global adjustment, because it may require a greater number of calculations. Ad hoc adjustment requires no inflation calculation, and so is administratively the simplest to apply, although, as pointed out, it may involve serious distortions.

Collection lags can be dealt with by shortening the lag; this may require more compliance effort by taxpayers and tax administrators collecting the tax, for example, if more frequent tax payments are required. The collection lag problem can also be dealt with by adjusting tax payments for inflation up to the date of payment. This requires putting into place procedures for this calculation and complicates payment procedures. Such procedures may be required only at higher inflation rates. Similarly, advance payments can be adjusted for inflation, but this also involves additional complexity for taxpayers.

Only global adjustment can eliminate both effects of inflation on the income tax, that is, the erosion of tax obligations and the distortion of the tax base. Partial adjustment, although not a perfect solution, can, if comprehensively applied, eliminate the distortion of the tax base. It does not, however, deal with the collection lag problem because it is confined to adjusting the historical cost of assets and debts. But if inflation is relatively low (i.e., say, about 30 percent a year or less), the collection lag problem on average is not that significant for the income tax and partial adjustments can be reasonably accurate. Partial methods can, however, be problematic at such inflation rates if they are not comprehensively applied. Thus, if some elements of the tax base are adjusted and others are not, serious distortions can arise. Indeed, the total distortion can be worse than if there is no adjustment. For example, if the only adjustment is to the cost of assets for purposes of determining taxable gain and depreciation, while interest is not adjusted, then a severe incentive is created to finance assets with debt. This can easily lead to "negative tax rates";⁶³ that is, instead of collecting tax on the income from a certain asset, the tax rules actually create a tax loss, which can be used to shelter other income and reduce the taxpayer's tax liability.

It is therefore possible in principle to adjust the income tax fairly accurately for inflation. However, accurate adjustment can involve considerable complexity. The degree of complexity depends on the underlying rules of the income tax. In a relatively clean system without a lot of special rules that require drawing distinctions among many different categories of income and expense, the inflation adjustment rules are not excessively complex. Perhaps the most complicated aspect is the inflation adjustment of indirect costs. For example, although inflation-adjusted depreciation by itself is not difficult to calculate, the absorption of depreciation and other expenses into the cost of items being produced by the firm in a context of rising prices is more complicated. If produced items are valued at the cost of production, but these costs are incurred over the course of several months, it is necessary to adjust the production costs incurred each

⁶³See McLure, *supra* note 26, at 67 (1990).

month for inflation in order to express them all in comparable units. Such an exercise is complex, but the complexity is probably not substantially greater than that involved in absorption cost accounting generally.

Where inflation adjustment may become unworkable is in systems that are complex to begin with. If the rules of the income tax impose different substantive rules for different types of income (e.g., if different elements of foreign-source income are subject to separate foreign tax credit limitations), then each of the separate types of income must be calculated on an inflation-adjusted basis. Similarly, if special limitations apply to particular types of expenses, then these expenses must be calculated in inflation-adjusted terms. On the other hand, if the income tax law taxes all corporate income on an evenhanded basis, then the determination of total inflation-adjusted income under the net worth method is straightforward. To take the U.S. system as perhaps the extreme pole, where countless items of income and expense must be separately determined, one can imagine the hypercomplexity that would result from superimposing inflation adjustment rules onto such a system. In contrast, the corporate income tax laws of many developing countries with high inflation rates are relatively simple, taxing all corporate income at a uniform rate and making few or no distinctions among different types of income. In the context of such relatively simple laws, inflation adjustment is feasible.

To the extent that there are concerns about complexity, the global adjustment method can be simplified by applying it only to the opening and closing balances. Instead of adjusting for inflation dividends, contributions to capital, exempt income, nondeductible expenses, and acquisitions of assets during the year according to the month of the transaction, a half-year convention for all these transactions could be used. The timing of transactions occurring during the year that involve either an increase or decrease in net equity (contributions to capital, dividends paid) or the purchase of property subject to inflation adjustment (such as depreciable property or land) is ignored under this approach. Alternatively, the half-year convention could be applied to items involving numerous transactions during the year (e.g., nondeductible expenses), with less frequently occurring items (e.g., dividends) being accounted for on a monthly basis.

Such a simplified approach is similar to the approach Argentina took when it first introduced comprehensive adjustment. Unfortunately, under the very high inflation rates that prevailed in the early 1980s, taxpayers were able to manipulate the inaccuracy of annual adjustment to their advantage. The so-called dynamic adjustment rules, which take into account transactions occurring during the year that involve an increase or decrease in net equity or in the balance of assets subject to inflation adjustment, were consequently adopted in Argentina in 1985. This took care of the problem on a prospective basis, although in the meantime substantial loss carryovers had built up owing, in part, to the inaccuracy of the previous inflation adjustment rules.

The lesson to be learned from the Argentine experience is that, while a global adjustment based on the opening balance sheet might be adequate at moderate inflation rates, once inflation gets close to or exceeds 100 percent a year, the inaccuracy of looking

solely at the opening balance can have such a substantial effect on the computation of taxable income that a more sophisticated system is required.

Going in the opposite direction, a more accurate and slightly more complicated inflation adjustment scheme is needed at much higher rates of inflation (several hundred percent a year or more). The global adjustment system can be adapted by keeping track not only of the month in which a transaction occurs, but also the date of the transaction. Brazil adopted such an approach when inflation exceeded 100 percent a year.⁶⁴

Countries experiencing inflation rates that have been typical of most member countries of the Organization for Economic Cooperation and Development (OECD) (normally below 5 percent a year, with very occasional peaks of up to 20 percent or so over the past 30 years) must consider whether it is necessary to make any adjustments for inflation. Even a low rate of inflation can have a substantial effect on the measurement of taxable income. For example, if the inflation rate is 2 percent and the real rate of interest is 4 percent, the inflationary component is one-third the nominal interest rate of 6 percent. The absence of inflation adjustment can result in a substantial incentive to borrow in order to earn tax-deferred income. Despite the substantial effects of inflation on taxable income, the complexity of explicit inflation adjustment makes ad hoc adjustments attractive. (As discussed above, global adjustment in the context of a tax that is highly complex to begin with can involve substantial complexity.) If properly designed, ad hoc adjustments can work fairly well if the rate of inflation is both low and stable. If the inflation rate fluctuates, then ad hoc adjustments to the ad hoc adjustments may be required.

The global adjustment method is used in practice only by countries with relatively high inflation—30 percent or above—or countries that have had such levels in the past and have consequently already put global adjustment into place. For other countries, the study of global adjustment is important in understanding what would be required to comprehensively adjust business income for inflation. To gauge the consequences of any proposed partial or ad hoc method, its effects can be compared with those produced under global adjustment. If the results differ substantially from those that would obtain under global adjustment, then this would be an important argument against adopting such a proposal in that form.

Appendix A. Global Adjustment Method in Detail

This appendix discusses the global adjustment method, using hypothetical statutory language in the form of excerpts from an income tax law that determines business income under the net worth method. Also included are commentary on this statutory language and examples of its application. The appendix should be read in conjunction with section IV(D) above.

⁶⁴See Hiromi Higuchi & Fabio H. Higuchi, *Imposto de Renda das Empresas* 269-70 (1990).

General Rules for Determining Taxable Business Income

The first element is the net worth calculation, which also serves as the basic rule for determining taxable income, set forth in article 1 as follows:⁶⁵

Article 1. General rules for determining taxable business income

- (1) Except as otherwise provided in this law, in the case of taxpayers who keep, or are required to keep, double-entry books, taxable business income is
 - (a) the value of net worth in the closing tax balance sheet for the taxable period, less
 - (b) the inflation-adjusted value of opening net worth, less
 - (c) inflation-adjusted contributions to capital and inflation-adjusted incomes that are not taxable, plus
 - (d) inflation-adjusted withdrawals made in favor of the owners and inflation-adjusted expenses that are not deductible.
- (2) Net worth is the difference between
 - (a) the total assets in the tax balance sheet, and
 - (b) the sum of the debts of the taxpayer and reserves taken into account under the provisions of this law.
- (3) The inflation-adjusted value of opening net worth is the value of net worth in the opening tax balance sheet, adjusted according to the percentage change in the consumer price index for the taxable year. The adjustment is made even if opening net worth is negative. The opening tax balance sheet is the same as the closing tax balance sheet for the preceding taxable period.
- (4) Inflation-adjusted contributions to capital are contributions to capital made during the taxable period, adjusted according to the percentage change in the consumer price index between the month in which the contribution is made and the end of the taxable period. Inflation-adjusted incomes that are not taxable are incomes that are not taxable under the provisions of this law, adjusted according to the percentage change in the consumer price index between the month in which the income is received and the end of the taxable year.
- (5) Inflation-adjusted withdrawals made in favor of the owners are distributions or other transfers of property in favor of the owners made during the taxable period, adjusted according to the percentage change in the consumer price index between the month in which the distribution or transfer is made and the end of the taxable period. Inflation-adjusted expenses that are not deductible are expenses paid during the taxable period, other than capital expenditures, that are not allowed as deductions under this law,

⁶⁵This article is based on FRA CGI art. 38 and CHL IR art. 41.

adjusted according to the percentage change in the consumer price index between the month in which the expense is paid and the end of the taxable period.

A few points about this article should be noted:

(1) The term "tax balance sheet" (sometimes "balance sheet" for short) refers to the balance sheet used for tax purposes. Because the accounting rules prescribed by the tax law differ in certain respects from the commercial accounting rules, the tax balance sheet will generally differ from the commercial balance sheet. In the case of individuals, assets and debts that are not related to the generation of business income are excluded from the balance sheet for inflation adjustment purposes.⁶⁶

(2) Because the global adjustment is based on the balance sheet, only taxpayers who keep such a balance sheet can apply it.⁶⁷ Therefore, the scope of application of the global adjustment will depend on the rules explaining what taxpayers are required to keep a balance sheet. In many countries, this is defined with reference to the requirements of the commercial code. Any taxpayer with a substantial business should be required to use double-entry bookkeeping and keep a balance sheet.

(3) Under paragraph (3), it is necessary to determine the amount of the taxpayer's liabilities. This requires a distinction between "debt" and "equity." Although rules on this issue must be provided, the problem is not as intractable as it may seem. The reclassification of an item as equity rather than as debt will not completely throw off the net worth calculation because the same item will normally appear in both the opening and the closing balances.

(4) In Chile, the law defines the opening net equity subject to adjustment as "the difference between the assets and debts on the date of the beginning of the commercial year, having removed intangible, nominal, transitory, and pro forma values and others as determined by the National Tax Directorate, that do not represent effective investments."⁶⁸ Circular No. 100 explains the references to nominal, transitory, and pro forma assets as those that result from estimated values.⁶⁹ It gives the following examples of assets that could be nominal assets (which it also calls intangible values): franchises, trademarks, patents for inventions, and concessions. Examples of transitory assets are provisional dividends and personal withdrawals. Pro forma accounts are accounts whose purpose it is to reflect responsibilities or other information for the financial accounting of the enterprise (e.g., shares under guaranty, endorsed bills, discounted bills, contracts in progress). In other words, the types of assets to be excluded in computing opening net equity are those that are either not really part of the taxpayer's assets, although they may be reflected on the balance sheet for accounting purposes, or, as in the case of intangible assets, are assets that in any event should have a zero tax book value. Presumably, it is

⁶⁶See CHL IR art. 41(1).

⁶⁷See CHL IR art. 41; Circular No. 100, of Aug. 19, 1975 [hereinafter Circular]; *reprinted in* Hugo Contreras & Leonel Gonzalez, Manual de Corrección Monetaria 402, 1st ed. (1989) (For those wishing to ascertain the current law in Chile please consider subsequent editions of the book). Inflation adjustment therefore does not apply to taxpayers who determine their income on a presumptive basis. *See id.* at 54; CHL IR art. 34.

⁶⁸CHL IR art. 41(1).

⁶⁹See Contreras & Gonzalez, *supra* note 67, at 413.

not intended to exclude from the calculation intangibles that were purchased by the taxpayer and that accordingly have a positive tax book value.

(5) It is sometimes not clear whether an asset should be treated as owned by the taxpayer and hence whether it should properly be included in the balance sheet. Rules are needed, for example, on the circumstances under which property leased to the taxpayer is treated as owned by the taxpayer and therefore includable in the balance sheet (and conversely, the circumstances under which property nominally owned by the taxpayer and leased to someone else under a finance lease may be properly treated as not part of the balance sheet).⁷⁰ As with the debt-equity problem, the gravity of the problem is diminished by the offsetting effects of the opening and closing balances.

(6) The second sentence of paragraph (3) makes it clear that the adjustment should also be made when there is negative opening net equity. This is the opposite of the rule applicable in Chile.⁷¹ As a matter of logic, there is no reason to treat a negative amount differently from a positive amount as far as inflation adjustment is concerned.

(7) Paragraphs (4) and (5) refer to items being "received," distributions being "made," and items being "paid." The implication is that the time that a transaction is taken into account for purposes of inflation adjustment is according to the cash method, even if the taxpayer uses the accrual method of accounting. This issue has not always been dealt with clearly in countries with global adjustment. For example, with respect to dividends, in Chile it is considered that a dividend that is declared and available to the shareholder but not yet paid is a diminution of net equity on the date so available.⁷² In such a case, however, the funds to be devoted to the payment of the dividend are still earning taxable income for the corporation; accordingly, paragraph (5) considers the distribution as not taking place until it is actually paid.

(8) Compare the wording of paragraphs (4) and (5) with the Chilean law,⁷³ which provides that "increases in net equity taking place during the year" are adjusted according to the difference in the price index between the last day of the month preceding the increase and the last day of the month preceding the month of the balance sheet. The same treatment applies to decreases in net equity. "Personal withdrawals of the entrepreneur or partner, dividends distributed by corporations, and any amount invested in goods or rights that the law excludes from the net equity are considered in any event decreases in capital and are adjusted in the manner described above." The above language has led to a problem of interpretation in Chile because it does not make clear whether the profits of each month of the current year should be treated as "increases in

⁷⁰See *supra* note 46.

⁷¹See Contreras & Gonzalez, *supra* note 67, at 88–89; Circular No. 27. (Mar. 8, 1976) (Chile), *reprinted in id.* at 457–58.

⁷²See Contreras & Gonzalez, *supra* note 67, at 207.

⁷³CHL IR art. 41(1).

net equity."⁷⁴ Literally, these profits are increases in net equity, but the logic of inflation adjustment would not call for their adjustment.

Article 2. Valuation of assets and debts in closing balance

(1) In applying article 1, assets (other than inventory) and debts included in the closing tax balance sheet are valued as prescribed in this article.

(2) The values of assets (other than assets described in paragraphs 3–8) are adjusted according to the percentage change in the consumer price index. The value of an asset on hand at the beginning of the year is adjusted according to the percentage change in the consumer price index for the taxable year. The value of an asset acquired during the taxable year is adjusted according to the percentage change in the consumer price index between the month in which it was acquired and the end of the taxable year.

(3) Assets for which depreciation is allowed under article [] (relating to depreciation deduction)⁷⁵ are valued according to the balance of the depreciation pools at the end of the taxable year, reduced by the depreciation for the taxable year.

(4) Debt claims and debts (other than those described in paragraph 6) are valued by including accrued interest (including original issue discount or market discount) and accrued adjustments to principal (including adjustments under an adjustment clause).

(5) (a) Foreign currency; and

(b) debt claims, other assets, or debts denominated in foreign currency

are valued at the prevailing foreign exchange rate at the end of the taxable year.

(6) Publicly traded securities are valued at their market quotation as of the end of the taxable year.

⁷⁴See Contreras & Gonzalez, *supra* note 67, at 198, reporting a Supreme Court decision holding that monthly profits of the current year should not be treated as an increase in net equity for purposes of the inflation adjustment rules; Oficio No. 3,231 (June 9, 1976) (CHL), *reprinted in id.* at 460

⁷⁵Assuming that pooled depreciation with a declining balance method is used, the balance of each pool at the end of the year would be valued as follows under the depreciation article: The balance of a pool at the end of the taxable year is the amount determined as follows (but not less than zero):

- (a) the inflation-adjusted balance of the pool at the end of the preceding taxable year; less
- (b) the inflation-adjusted amount allowed for the preceding taxable year as depreciation; plus
- (c) the inflation-adjusted cost of assets added to the pool in the taxable year, less
- (d) the inflation-adjusted amounts received from the disposal of assets in the pool during the taxable year.

The items in the preceding paragraph are adjusted for inflation as follows. Items (a) and (b) are adjusted for inflation for the current taxable year. Item (c) is adjusted for inflation between the month in which the asset is added to the pool and the end of the taxable year. Item (d) is adjusted for inflation between the month in which the asset is disposed of and the end of the taxable year.

(7) Gold or silver bullion or coins are valued according to the market price as of the end of the taxable year.

(8) Cash and assets denominated in national currency are valued at their nominal value.

Article 3. Valuation of inventories and unfinished products

(1) In applying article 1, assets and unfinished products included in the closing inventory are valued as provided in this article.

(2) Goods of a particular type are valued at the cost of the last-acquired item of that type, adjusted according to the percentage change in the consumer price index between the month in which the item was acquired and the end of the taxable year. The preceding sentence applies only if the last-acquired item was acquired during the taxable year.

(3) If no item of such type has been acquired in the taxable year, the goods are valued at the value in the opening balance, adjusted according to the percentage change in the CPI for the taxable year.

(4) Goods included in closing inventory that are produced, rather than purchased, including unfinished products, are valued according to the same principles, in relation to the costs incurred in their production.

(5) For purposes of this article, an acquisition at an artificial price will be ignored.

Comments on Articles 2 and 3

(1) As discussed above, the general approach under articles 2 and 3 is to value items at prices prevailing at the end of the year. In performing this exercise, assets that are denominated in units of national currency, that is, cash, bank deposits, debt instruments, and the like (e.g., preferred stock) are not adjusted for inflation. The reason for this is that the value of such items does not increase with inflation. However, when a debt instrument contains an adjustment clause, whereby the nominal amount of the obligation is increased (typically, in countries with high inflation, the adjustment clause will be some formula related to inflation), then under article 2(4), the debt instrument is valued at its nominal amount.

(2) The general rule of article 2(2) is to adjust the tax cost for inflation occurring either during the year or since the time of acquisition. This is also the general approach for depreciable property. Valuation rules for other specific types of property are provided in paragraphs (4) through (8), and in article 3.

(3) In general, paragraphs (4) through (7) of article 2 provide for valuation at market value or an approximation of market value. In particular, paragraph (4) contemplates full accrual for financial instruments.⁷⁶ As Vann and Dixon point out, such accrual taxation is essential in an environment of global adjustment.⁷⁷ Of course, implementation of this principle is a challenge, requiring the development of detailed regulations.

(4) The valuation at year-end prices of foreign currency, foreign-currency-denominated debt instruments, publicly traded securities, and gold and silver is easier because market quotations exist. There are some definitional issues: foreign-currency-denominated debt instruments need to be distinguished from equity, and "publicly traded" and "securities" must be defined.

(5) Under article 3, the closing inventory balance is valued according to a set of rules that have the general effect of valuing the inventory at the acquisition or production cost as of the end of the year.⁷⁸ These rules require the division of inventory into different products, because it is necessary to decide when the last item of a particular product was purchased. The most difficult problem is the specification of production costs and their allocation to different months. Taxpayers should be allowed a fair amount of flexibility to fashion cost accounting rules that are suitable to their production methods and accounting capabilities.

Examples

EXAMPLE 1

At the beginning of the taxable year, a firm owns only one asset, land, with a book value of \$100. It has indebtedness of \$80, so that its opening net equity is \$20. The stylized facts in this example are the following:

- (a) The annual inflation rate is 50 percent;
- (b) The nominal interest rate is 55 percent;
- (c) At the end of the year, the firm earns \$44 from the sale of services. The firm uses this money to pay interest on the loan in the amount of \$44.

The firm's balance sheet at the beginning of the year and the inflation-adjusted balance sheet at the end of the year appear as follows:

OPENING BALANCE SHEET

Assets		Liabilities	
Land	\$100	Debt	\$80
		Net equity	\$20

⁷⁶The same is contemplated under the rules of Chile. See Contreras & Gonzalez, *supra* note 67, at 301.

⁷⁷See Vann & Dixon, *supra* note 27, at 78.

⁷⁸See CHL IR art. 41(3). The rules for valuing inventory are more complicated than those stated in the text; the details are in the appendix.

CLOSING BALANCE SHEET

Assets		Liabilities	
Land	\$150	Debt	\$80
		Net equity	\$70

Notice that without inflation adjustment, taxable income is zero. The gross income of \$44 is offset by the interest deduction. The problem with this result is that \$40 of the interest deduction is the inflation component of the debt. If a deduction for this amount is denied, the taxable income becomes \$40.

To reach this result under the global adjustment method, we need to ascertain the taxpayer's opening net worth. This is the difference between the total value of the taxpayer's assets and its debts, as shown on the opening balance sheet.⁷⁹ This amount is multiplied by the change in the price index between the beginning and the end of the year.⁸⁰ In Example 1, inflation-adjusted opening net worth is 150 percent of \$20, or \$30.

Therefore, under the net worth calculation set forth in article 1 above, taxable income is as follows:

Closing net worth	\$70
Less inflation-adjusted opening net worth	\$30
Equals taxable income	\$40

EXAMPLE 2

This example illustrates a more complex case involving the calculation of depreciation and valuation of inventory under inflation. The following assumptions apply:

- (a) the inflation rate is 100 percent;
- (b) the real interest rate is 5 percent;
- (c) given (a) and (b), the nominal interest rate, with interest payable at the end of the year, is 110 percent;
- (d) the firm owns one machine, the depreciation rate on which is 20 percent; and
- (e) at the beginning of the year, the firm has 100 units of inventory that cost \$10 a unit.

⁷⁹See CHL IR art. 41(1).

⁸⁰For simplicity, the example refers to adjustment for inflation occurring between the beginning and the end of the year (or between a given month and the end of the year). The actual adjustment mechanism in Chile does not use the price indices for the month of January (or any other month for transactions that occur during the year) and December, but rather uses the index for the last day of November of the current year and of the preceding November (or, in general, of the month preceding the transaction). See CHL IR art. 41(1). This is presumably done as a matter of convenience, so that tax liability can be calculated immediately after the end of the year without awaiting publication of the price index for December 31.

Given these facts, the firm's opening balance sheet is as follows:

OPENING BALANCE

Assets		Liabilities	
Machine	\$1,000	Debt	\$1,000
Inventory	\$1,000	Net equity	\$1,000
Total assets	\$2,000		

The only activity occurring during the year is that, on December 31, the company sells 90 units for \$2,100 and manufactures 125 units at a cost of \$2,100 in cash and \$400 allocated depreciation,⁸¹ for a total cost of \$2,500. The taxpayer borrows an additional \$1,100 on December 31 to cover the interest payment made on that date. The closing balance will therefore be as follows:

Closing Balance

Assets		Liabilities	
Machine	\$1,600	Debt	\$2,100
Inventory ⁸²	\$2,700	Net equity	\$2,200
Total assets	\$4,300		

Taxable income therefore is \$2,200 (closing net worth) less \$2,000 (inflation-adjusted opening net worth), which equals \$200.

In this case, without an inflation adjustment based on balance sheets, one could eliminate the effect of inflation by providing partial adjustments:

- (a) calculate depreciation allowances using an indexed cost;
- (b) calculate the cost of goods sold by using indexed FIFO (the same result would obtain in this case under LIFO); or
- (c) deny a deduction for the inflation component of the debt.

With this set of partial adjustments, depreciation increases from \$200 to \$400 (because this is a cost of production, the depreciation is not currently deductible, but is included in the cost of inventory), the cost of the 90 units sold would double from \$900 to \$1,800, and the deduction for interest expense is reduced from \$1,100 to \$100. Accordingly, taxable income is determined as follows:

Sales	\$2,100
Less cost of goods sold	\$1,800
Less real interest expense	\$100
Equals taxable income	\$200

The result under comprehensively-applied partial adjustment is the same as under global adjustment, due to the assumption that all activity takes place at the end of the year.⁸³

⁸¹Notice that the depreciation is computed on the basis of the inflation-adjusted tax cost of \$2,000.

⁸²The 135 units of closing inventory are valued at \$20 each, which is the most recently incurred unit cost of production. In this example, the same result would be reached by indexed FIFO (i.e., adjusting the initial \$10 cost for inflation to \$20).

⁸³See *supra* sec. IV, fourth paragraph.

EXAMPLE 3

This example is a little more complicated than Example 2, in order to illustrate the effect of the timing of transactions taking place during the year.

The opening balance consists solely of \$1,000 of inventory, consisting of 100 units purchased for \$10 each.

On July 1 (price level 200), the company sells its inventory for \$2,500. Consider two variants. Under variant *A*, the company distributes a dividend of \$2,500 on the same day. Under variant *B*, it invests \$2,500 in the bank, receiving interest of \$2,500 for the remainder of the year.

The closing balance on December 31, at a time when the price level has risen to 400, is therefore

- Variant *A*: 0 cash and 0 net worth.
- Variant *B*: \$5,000 cash and \$5,000 net worth.

Taxable income is computed as follows:

	Variant A	Variant B
Closing net worth	\$0	\$5,000
Less inflation-adjusted opening net worth	\$4,000	\$4,000
Plus inflation-adjusted distributions	\$5,000	--
Equals taxable income	\$1,000	\$1,000

Notice what difficulty a partial approach would have in dealing with this case. A profit of \$500 on the sale of the inventory could be computed, but the calculation would require adjusting the opening inventory for inflation only up to the time of the sale rather than to the end of the year. This would not be difficult to do in this example, but what about more complicated cases involving numerous sales during the year? The \$2,500 of interest income in variant *B* could be eliminated under a partial approach. This would leave taxable income of \$500 under both variants, which would be fine if the tax year were closed and tax paid on July 1, but disastrous for the tax collector if tax were not paid until after the end of the year.

Appendix B. Global Adjustment in the Context of Income-Less-Expenses Method of Determining Taxable Income

Summary

In the case of an income tax where taxable income is calculated as the difference between gross income and expenses, the inflation adjustments to be made are the same as explained in Appendix A, but instead of being embodied in the net worth calculation they take the form of additions to and subtractions from taxable income. The result reached is the same as under the net worth method. (The adjustments are described here in summary form; for detailed explanation of the terms used, see Appendix A.)

The inflation adjustment rules apply to enterprises preparing financial statements and are based on the value of assets and liabilities included in the balance sheet of the enterprise. The values of items included in the closing balance sheet are adjusted for inflation taking place during the year. The total amount of these inflation adjustments is added to taxable income.

The amount of net worth (assets minus debts) in the opening balance sheet is adjusted for inflation, and this adjustment is subtracted from taxable income. The adjustment is corrected for certain transactions resulting in a change in net worth that take place during the course of the year. The inflation adjustment to transactions resulting in an increase in net worth is subtracted from taxable income. The inflation adjustment to transactions resulting in a decrease in net worth is added to taxable income.

The net effect of inflation adjustment on taxable income is the algebraic sum of these adjustments, which are described below.

Adjustment of Opening Net Worth

The amount of opening net worth is adjusted for inflation for the taxable year. The amount of this adjustment is subtracted from taxable income.

In the event that the opening net worth is negative, the above operation results in an increase in taxable income because a negative number is being subtracted.

Adjustment of Increases in Net Worth

Contributions to capital and nontaxable income are adjusted for inflation occurring between the month in which the transaction takes place and the close of the taxable period. The total amount of these adjustments is subtracted from taxable income.

Adjustment of Decreases in Net Worth

Distributions to owners and nondeductible expenses are adjusted for inflation occurring between the month in which the transaction takes place and the close of the taxable period. The total amount of these adjustments is added to taxable income.

Adjustment of Items in Closing Balance

The value of items in the closing balance is adjusted as described in Appendix A, depending on the type of asset or debt. The amount of the adjustment, that is, the difference between --

- (1) the adjusted value of the asset or debt; and
- (2) its historical cost, if acquired during the year, or its value on the previous balance sheet,

is added to taxable income (subtracted in case of adjustment of a debt).