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Economics Department

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FINANCIAL INDEXATION AND INTEREST RATE POLICY IN ICELAND

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Bjarni Bragi Jónsson*

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Abstract

Iceland´s experience of rapid post-war inflation developments prompted a unique experiment with a near-comprehensive financial indexation that may be worthy of consideration for a number of individual countries as well as for international capital markets. The indexation policy came to its full fruition with such an articulated system as from 1979, while credit terms were still administered in detail by the Central Bank. The following period thus became ripe with experiences of running such a system and reaping its benefits. The problem of measurement of inflation was solved by a composite, weighted index of consumer and construction prices, and later to include wages, while finally the preference was for consumer prices alone. This simplification minimized the problem of time lag from measurement to application that had proved considerable under accelerating inflation into higher doule digits. Prior to indexation the stock of financial savings had seriously deteriorated in real and relative terms, mainly due to accumulated effects of negative real interest. With indexation, followed within a few years by free interest formation, the tide was turned over to rapid accumulation of financial capital that soon brought about internal demand equilibrium and restored the role of interest and demand policies in general, as well as greatly improving the external debt position. Bond issues rose to prominence pari passu with indexation with resulting multiplication of market instruments which developed further through share issues and stock exchange operations. The overall achievement has been one of a highly modernized financial system. While thus aiming at protecting the financial system against the ravages of inflation, no illusions were held as to indexation leading to an easy solution of inflation itself. However, it has obviously eliminated the inflation gains of the public at large, and thus stamped out the inflation mentality and substantially eased the task of disinflation.

Keywords: Indexation, interest rates, financial savings, Iceland

JEL: E21, E31, E42

* Central Bank of Iceland, retired. This working paper is a highly condensed version of a book in Icelandic in the Central Bank special reports series (Jónsson, 1998), containing extensive documentation and tabulations, omitted here for the sake of brevity. That study, and thereby this paper, draws extensively upon materials and reports compiled by, and fruitful discussins with, the CBI staff, to whom the author owes more thanks than can be expressed individually. Opinions expressed are those of the author, not necessarily supported by the Central Bank.

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Introduction

Over the post-war period of half a century Iceland has had a unique experience of relatively high and variable inflation and of almost all sorts of measures to combat or live with inflation. For most of this period more or less extensive measures to adjust financial values for inflation have been resorted to, and over the last two decades these have taken the form of an elaborate and near comprehensive system of financial indexation. From this follows that Iceland´s experience of financial indexation is no less unique than that of inflation itself. This has occasionally been reported on an international forum, though mainly in its formative stages. Hence, a clear and concise overview of this system, through to its effects and achievements, is considered worthwhile to present to international readers.

For this purpose, mainly a descriptive and historical study is called for, without ambition or pretense of any generalized, theoretical conclusions but with recognition of lessons of experience that speak clearly for themselves. Logical presentation, however, requires a brief expression of economic fundamentals and legal premises basic to the design of the indexation system as well as a description of factual economic conditions for embarking upon it. These are dealt with in the following three chapters.

Further three chapters are devoted to the approaches and experiments through which ideas of technical design were tested, for later to be combined into a coherent whole. An integral part thereof was to devise the regulating credit terms index, the developments of which are described and evaluated in a separate chapter. With the advent of liberalized interest rates in mid-eighties, forms and norms proliferated, leading to complicated relations of terms to deposit duration and to options of switching between indexed and other terms. The consequences of these in terms of balance and risk, and the reactions of the authorities to them, are dealt with in the last of these chapters.

The following five chapters present a statistical description and evaluation of the credit system under increasing application of indexation, formal as well as by principle of interest rate formation. Quantitative developments are traced to the end of 1996, following the original, domestic purpose study, as by then all the important lessons of experience had been reaped. The first of these chapters set out the basic factors of the coverage of formal indexation and the resultant developments of real interest rates. By means of that, the effects of real interest rates can be evaluated as exerting a decisive influence on the preservation and formation of financial capital. The last two of these quantitative chapters show the most important conclusions in terms of real volume of financial savings as well as their relationships with gross domestic product.

Although this is a study of factual experiences in economic terms, not of the political issues involved, some reference to policy aspect in a wider socio-economic context is not easily avoided and, therefore touched briefly upon in the third last chapter. That is followed up by some suggestions as to possible parallels for countries in a similar situation and for the international financial forum in general. Some of the last chapters contain various hints at conclusions, leaving them to be stated in only the most condensed form in the customary conclusions chapter.

Economic fundamentals

For centuries and even millennia *price waves* have hit the at any time more developed and active world. Rarely have these waves been neutral or *general inflation* in the sense of impinging almost evenly on all categories of prices: product, input, raw material, factor and asset prices. Alternatively, *price relationships* have changed in a manner sensed as deterioration in the form of *high prices* relative to income of important segments of society, the term dearth (in the early meaning, or in Icelandic dýrtíth - literally time of dear or high prices), being appropriate, the classical harvest or natural yield fluctuations being a case in point. General and neutral inflation is only to be expected when generated by pure *monetary expansion*, possibly in conjunction with aggregative *income unit* determination in the fashion of the Keynesian wage unit. Otherwise we are faced with an abstract average measure not necessarily experienced by many individuals in particular. In the modern age, however, the overall monetary and income and price forming forces have become so overwhelming relative to the natural, specific and divisive forces, that public consensus prevails of controlling the *general level of prices*, in the conviction of not thereby distorting real economic relationships.

What would constitute an appropriate measure of the general price level has, however, not always been as apparent, at least not until the basic concepts of economics had been clarified and ordered within a coherent system. In the initial stages prices in markets of quite different nature were thought of as constituting the overall price level: product prices at primary, intermediary and final stages, along with wages and salaries and asset prises. This is mentioned here as it has resounded in the history of financial indexation in Iceland. With the clarification rendered by modern analysis and, in particular, the national accounts system, a clear distinction within the system of economic flows is drawn between final product prices, commodities and other inputs and factor prices, with asset prices as a class apart. Price indices of final products, goods and services, have a direct bearing on choices between consumption or physical investment and financial savings, based on the monetary unit, thus unequivocally qualifying for financial indexation. Input and factor prices, on the other hand, are one step removed, having still to be impacted by productivity and market forces before entering the scene of value judgments inherent in allocative decisions. Asset prices, real as well as on paper, although being a factor of collateral value against loans, are ruled out as a normal price measure due to their fluctuating nature in response to short term monetary management and changing market sentiment.

The choice of a realistic measure of the general price level is on the one hand a valid answer to the question of what should be the *goal of price stability* and the corresponding one of which measure to select for *financial indexation*. Theoretical economists have nontheless had reason to ponder over the choice between indexing to the price or the wage level. The reason for this is the one given above that it is not self-evident to target prices when natural shocks, e.g. failure of harvest or catch, cause a rise in prices at given wages. Wages would then have to be forced down to achieve price stability, an exceptional process in modern times. Conversely, rising productivity normally creates conditions for greater increase in wages than prices. The other optional *goal of wage stability* would thus normally call for a falling price level in face of potential inertia to that end, and wage and salary earners would have to be reconciled to the prospect of enjoying the productivity increase in the form of general price

reductions instead of specific income increases, which goes against the grain of organized labour. A compromise could be worked out by targeting a stability measure of the wage and salary level following the trend path or moving average of productivity. This would raise all sorts of complications, conceptual, technical and psychological and has not knowingly gained any backing.

Types of inflationary distortions are of two basically different natures. That of eroding the stock of price information, necessary for planning and decision making is a costly nuisance rather than causing similar harm and havoc as involved in massive depreciation of financial capital being "burnt up" in inflation. The initial real inflation transfer from creditor to debtor is harmful enough in itself, but is also liable to put an end to granting loans on corresponding terms. Sources of finance for real investment hence dry up, strangulating economic growth. When, however, the interest rate is changeable to the extent of compensating for inflation and paid upon accrual, the real schedule of amortizations becomes distorted with the result of much higher real downpayments in the former part and lower in the latter part of maturity, with an unforeseen and possibly unbearable burden on the respective business. Coping with this by repeated refinancing can appear untrustworthy and prove costly and problematic.

Fundamentally, the choice is always between two ways to solve this issue: by *preventive measures* against inflation or by *corrective action* to eliminate distortions, that is by financial indexation, the former being of an *ex ante* nature, the latter *ex post*. The desired degree of price stability is a simpler and more tension free and thereby a more desirable solution, if as secure and not requiring sacrifice of other goals. There is no suggesting that prevention can be entirely avoided and traded for indexation, while serious doubts can be raised as to the possibility of eliminating inflation to a stable bottom level that would leave negligible problems, in its height or variation, for the operation of credit systems. Experience of advanced market economies lends little support to the idea of eliminating inflation without suffering, although no clear cut trade-off between inflation and unemployment with relative stagnation is thereby implied. What would be considered a costly level and variation of uncompensated inflation has not been adequately discussed. A very low and stable level of inflation can be compensated through nominal interest without appreciable distortion of amortization schedules on medium term loans and thereby liquidity. Unforeseen swings in inflation present a more serious prospect of actual loss and can thus occasion contractual linkage to current market interest rates. From informal observation of world financial markets a suggestion may be ventured that for the level of inflation not to be considered uncomfortable it must not exceed 1.5 per cent, and its variability should be limited to the range of 0.5-1 per cent, at annual rates. Otherwise, losses can amount to appreciable proportions of low current real interest rates, so that indexation or other security arrangements would be called for. Any assessment of this kind is naturally dependent on specific inflation experiences and nature of markets but, even in the present environment, indexation of long bonds is argued for and practised, mainly on government bonds mostly intended for pension funds and other retirement purposes. This seems to imply that any increase in inflation over present levels would occasion spreading of indextion down the time scale of maturities. For a society with widespread financial indexation and much higher inflation in fresh memory, this arrangement allows of lower real interest rates and constitutes a safety valve not to be lightly dismissed.

Economic developments of past decades in Iceland, as well as of several similarly situated peripheral countries, present a different context and narrower options in this respect. Explosionary experiences of World War II and its contractive aftermath sent reverberations generated by continued social tensions through decades, with alternating excessive income settlements and consequent devaluations, which were also occasioned by variable external fortunes. The obvious and simple solution of raising interest rates to take the wind of demand out of the sails and still the waves of the wage struggle did not appear as practicable as among more advanced market economies, as so high interest payments would have drained seriously the financial resources of industries and created hardships. Furthermore, very high interest rates, formally unconnected with inflation, would have given no promise of their reduction *pari passu* with the income and price moderation called for. Formal indexation, for long practised with wage and salary rates, therefore gradually gained adherence and application within the credit system and was enacted in 1979 as an almost comprehensive system of credit terms.

Such a comprehensive system of financial indexation can be regarded as a way of running a national economy *as if no inflation existed*, with corresponding requirements of applying real terms to accounting and income tax systems, which has been the case in Iceland but is outside the scope of this discussion. The largest factor by far of uncertainty and risk, that of inflation, is thereby removed from financial operations, granting opportunity for unprecedented perfection in real outcomes. A basic premise for this is that people at large are motivated in actual decisions by real interest rates and yield unobscured by the veil of money, seemingly a plausible assumption. Despite removal of the inflation factor, much enough remains by way of real risk, connected with economic cycles, inadequate financing and mismanagement, to occupy financial markets administering and spreading financial risk. Value guarantees and real interest rates have been dealt with in general terms by some of the best minds in economics, such as Marshall, Irving and Keynes, without much prescription for application being given.

Financial indexation is liable to give rise to opposition based on different views and interests. Where inflation has been endemic and debtors have grown accustomed to inflation gains from loans, they naturally defend their entrenched position, contending that business is unable to bear the burden of normal real interest rates. It must, however, be borne in one way or another, so the question only remains of its technical form or expression and of a suitable adjustment period for this cost to be put in its proper place. Opposition of a diametrically opposite kind occurs where inflation was previously a menacing threat, such as Germany is a clear example of. Then it is not considered defensible to acknowledge the existence of inflation in any orderly way, as it should rather be combatted by full force. Should this economic pshycology be well founded, yielding satisfactory results without much sacrifice, it carries with itself a certain justification, while a well informed public opnion could possibly allow of indexation where rationally applicable. In advanced financial markets some tacit antipathy can probably be sensed, on the ground that indexation presents a *competitive alternative* to established methods of the market to insure against and spread risk, more akin to betting and lottery. There are, however, indications that some market agents specialize in indexation, thus challenging others to participate. At any rate, justification is hard to find for doing away with competition from this angle. In a well established indexation system opposition could be

revived by the scent of prospective inflation gains for debtors, against which it is safer to keep vigilant guard.

A special case of opposition is based on the unsophisticated notion that *indexation of both loans and wages* is inextricately bound together by reasons of conformity and equity, so that one of them should not be permitted or implemented without the other. This argument, though, is hardly set forth any more, probably due to wage-earners obvious interest in accumulation and preservation of their pension funds and also because both types of indexation are legally permitted, although the labour market has wisely refrained from applying it, mindful of the fact that wage indexation has not preserved the standard of living but accelerated inflation. Nevertheless, it should be emphasized that wages and salaries are not comparable magnitudes to financial capital with respect to indexation. *Loans are to their full amount handed over* to the borrower in the expectation of receiving their full value back as they fall due after years or decades as the case may be. During that period the lender has generally no opportunity to renegotiate the credit terms in view of changed circumstances and has therefore a valid reason to secure the value of repayment by any practicable means. Only by reclaiming full original real value can he count *interest* on top of that *as actual income*, comparable with wages and salaries that always qualify as income, indeed varying in real value as compared with earlier times. Conversely, labour is not handed over in the form of a stock value but as a *service through the passing of time*, and the time validity of its terms is limited collectively by the length of contract and individually by the right to terminate employment. Remuneration of labour is thus frequently renegotiated in view of changed conditions, on both the collective and individual level. Furthermore, the overwhelming weight of labour´s share in overall cost and demand makes it utterly impracticable to fix it for any length of time. The ideal of guaranteeing real wages was based on the notion that economic growth and real wage progession were dynamic magnitudes in steady advance, without risk of backtracking. This ideal was not sustainable in a cycle-prone economy and, with the added unconditional claim of full employment, it perpetuated inflation with a chronic risk of its acceleration. No such socially backed, monopolistic pressure is, on the other hand, present in the credit market. As a corollary to this logical distinction between wages and financial capital, indexation of the former has very little chance of guaranteeing their real value, while that of the stock of finance has it to the full extent.

Legal premises

Indexation and interest rates have been enacted and regulated by law, and a framework of legally binding rules for them thereby created. At their enactment and interpretation for implementation, legal premises embodied in the constitution and judiciary theory and court practice come to be considered side by side with economic fundamentals discussed above. Although charging interest prevailed in the earliest civilizations, it is well known that economic and market oriented views on interest rates have fared badly through later history in comparison with religious and philosopical notions. The misguided Aristotelean teaching that money was barren and could not generate yield in the same way as living nature came to be embodied in doctrines of the Church, leading to a ban on interest rates and punishment for usury. Being unable to see money interest rates as a mirror reflection of net natural yields, Aristoteles might

though have found reason to accept price compensation to keep real value intact. Jews, being under no inhibition against charging interest to others than their own kin, took over credit operation through the middle ages, until Calvinist societies started to loosen these knots, leading to gradual liberation through other Protestant societies and later all the Christian or Western world.

In Iceland, as elsewhere, the Catholic church exerted its influence against charging of interest that according to fashion of its time was called "lease of money" or "of dead money", the term for money being the same as for livestock. Being far removed from centres of church power, Icelanders could allow themselves a fair amount of circumvention. With the advent of the *tithe* that primarily served the purposes of the church, a norm of natural yield as well as an interest rate of 10 per cent of principal was instituted and came to be embodied in the law of the Commonwealth (the *Grágás* or Grey Goose). The practices of leasing livestock or its counterpart in "dead money" seems to have alternated freely, giving considerable scope for circumvention when the church pressed harder for its principles towards the end of the 13th century. However, the coercion in favour of this concrete form of leasing has undoubtedly proved a harmful detriment to a possible development of a domestic credit system, leaving the economy more dependent on external sources of finance than would have been the case. In the later ages interest was permitted in law but the royal executive could dictate its maximum which in March 1815 was set as 4 per cent. That was done along with other measures of settling dislocations from the Napoleonic wars, and those included an interesting example of the principle of indexation applied on a sliding scale between one fifth to unity to war time debt of the preceding five years. These measures, applied to both Denmark and Iceland, followed the example from Preussia and Saxony after the Seven Years War 1756-63 and thereafter from the so-called *Wienerpatent* of Austria in 1811. Fittingly, the decree for Iceland was signed by the king in Vienna while attending the congress famous for its dancing!

From then on through the nineteenth century the trend was towards liberalization, by the initiative of the reinstituted Althing (Parliament). As from 1855 the 4 per cent maximum was only applied to mortgages on fixed assets, other interest rates being unregulated. The same decree stipulated 1 per cent surcharge for overdue claims and softened the penalty for usury. The first legislation on interest rates after the Constitution enacted in 1874 was passed in a liberal vein in 1890. It legalised 4 per cent interest rate, if an unspecified interest rate was negotiated, and raised the ceiling on mortgages to 6 per cent. From then on, however, the tide was turning with the advent of domestic state-owned banking. World war I and the Great depression gave added impetus to economic interventionism, leading to a legal 8 per cent maximum on all interest rates from 1933, irrespective of price developments. From 1952 the interest charged by the National Bank (*Landsbanki*) was made a legal norm and, with the separation of its central banking department from its commercial bank operations, all interest rates came to be dictated by the former, subject to government approval. Although well intended to introduce purposeful economic management, this move opened the way for opportunistic political intervention, jeopardizing the stability and soundness of the credit system for three decades.

Thereby, the important distinction was blurred between the respective regimes of *private law*, regulating dealings of persons in an objective manner, and *public law*, dictating administrative action in the public policy spheres (*res publica*). In contrast to highly developed mar-

ket economies, this was a more natural sentiment in an outpost like Iceland, where banks and credit funds grew out of the public domain, closely linked to public finance and largely state-guaranteed, externally and even internally. The credit market developed along oligopolistic lines, and liberalization of interest rates was under these circumstances widely interpreted as handing one-sided power over to the banks. To rectify this situation, a change in public opinion as to judicial relationships was called for, going hand in hand with quick positive results of financial liberalization.

Publicly administered interest rates easily invited a dominating emphasis on the politically expedient *debtors´ protection*. This principle was not only applied to the intermediary institutions with dominant market power but carried further to the general detriment of savers. In an inflationary economy this partial objective was most easily served by *nominalism*, i.e. by strict adherence to original nominal value of principal and without regard for inflation in the determination of interest rates. Nominalism was a legally binding interpretation under this regime of directives. Even when linking of loans to the exchange rate was not overtly banned, such unauthorized contracts were invalidated by *ex post* legal action connected with devaluations, whether or not foreign exchange had been lent.

This ideology inevitably influenced the definition of *usury as a punishable action*. The concept of usury as relating to indecently high interest rates is based on a moral notion, thus defining punishable action. Considered in the context of economic reality, which can give rise to widely varying market equilibrium rates, a certain high rate of interest cannot in itself constitute usury in the punitive sense, the lender having also to undertake wilful action of suppressing the choice of borrower, coercing him to borrow at obviously unreasonable terms, even with the deceitful purpose of acquiring his property through sale under duress. In open and free competition a reasonable norm of interest rates should result, and such coercive action should only be possible under mono- or oligopolistic conditions. Higher than permitted rates under such circumstances do not, however, require any action on behalf of lenders. Although borrowers are then usually better off by borrowing at a higher rate rather than being denied a loan, lenders became *ipso jure* guilty of usury by fulfilling such a demand at a rate making it worthwhile to part with their funds rather than employing them to their own needs. This, admittedly, should be regarded a breach of administrative law rather than a misdeed to a private person. Thus, the capital shortage caused by official maladministration created the guilt of those individuals trying to solve it - a kind of Say´s law of justice creating its own guilt - whereas in reality the guilt should be on the hands of the authorities! From this paradox there could be no escape until indexation and market clearing interest rates had worked their way. Usury, however, due to difficulties of disintermediation, apparently never constituted a major problem.

Through a costly process of trial and error the conclusion was reached that credit terms must as a general rule be based on the mutually supporting *principles of freedom and sanctity of contract*, the former being a precondition of a viable financial market equilibrium and the latter a condition of maintaining indispensable confidence. The sanctity question was put to the test three times in the course of the *credit terms index* by which financial indexation came to be regulated.

Economic conditions for indexation

The principal economic conditions for financial indexation in Iceland may be counted as follows: 1. High rate of inflation and far in exess of that of other advanced economies, 2. Officially administered interest rates not allowing the credit market scope to adapt to inflation, and 3. Consequent stagnation and relative depletion of the stock of financial savings leading to eccessive accumulation of external debt.

Inflationary developments started during the second world war, partly in line with slack economic management elsewhere but mainly generated by external forces that national authorities were unable to cope with. Large increases in fish export prices and labour demand for defence projects pressed and bid up wages while military occupation authorities hindered a logical appreciation of the króna. Through domestic industries and services this generated a typical war time inflation in the interval of 24-29 per cent in 1940-43. The prospect of having to cope with post-war international competition prompted serious efforts to contain it within the interval of 2.1-7.6 per cent through 1944-49. Partly, however, inflation was suppressed and latent rather than eliminated, the prevailing system of wage indexation being the chief reason for the suppression. Unrealistic fixity of the rate of exchange was a time bomb that was discharged in 1949-50, and an unyielding and militant position of trade unions perpetuated chain reactions through wage settlements, further accentuated by wage indexation. Inflation averaged 22.4 per cent in 1950-52, largely inherited from previous years of the war and its aftermath. Economic contraction from external sources in the early fifties gave priority to inflation combatting, to the average of 3.7 per cent in 1953-61, admittedly with some accumulation in the lagoon of latent inflation.

By hindsight it may be asked whether the long term prospect for inflation may have been decided in the sixties. Instead of pressing inflation down to one digit points, with some tolerance of limited unemployment, a policy of conciliation with claimant unions opened the way for incomes policy settlements that proved costly in terms of missing opportunities for containing inflation through demand management. Fateful in particular proved later the lifting in 1965 of a previous ban on wage indexation with the negative justification that basic increases could be as serious a threat. Over the period 1962-72 the average of a very uneven year on year inflation was 12 per cent, peaking at 21.7 per cent in 1969 after a major devaluation, and next to that 19.5 per cent in 1964 after a basic wage explosion of previous year. After the end of the long period of the so-called "restoration" government, all brakes on collective bargaining seemed to be broken, resulting in average 46.5 per cent inflation over 1973-83, lowest 31 per cent in 1976-77 but highest on annual basis 84.3 per cent 1983. Shorter periods could yield still higher increases per annum.

In these decades the conclusion came to be reached that sufficient price stability to safeguard the stock of savings was not attainable, instead full price compensation of financial capital would have to be charged at whatever cost to debtors. Gradualism in combatting inflation had proved a deep-rooted weakness, so accustomed as wage earners and debtors had become to the indirect subsidy implied therein. A definitive solution had thus been so delayed as always giving the disruptive forces opportunity for renewed initiative. The shift of opinion in favour of financial indexation implied the view of inflation as a bad habit to be disposed of swiftly, for an adaptation to be forced through the income distribution mechanism while the

going was good. There were no illusions that adaptation would be free of pain and strife, nor that indexation would automatically bring about disinflation, although suggestions were made that it would eliminate the gains for active agents of causing inflation. But solid foundations would be laid for demand management, holding out prospects for improved living standards in the long run from enhanced economic discipline and more effective competition.

After limited experiments from the mid-fifties, these general conclusions were expressed in a cautious legislation in 1966, authorizing the Central Bank to permit financial indexation upon application. Hazardous economic developments and political upheavals of the following decade factually invalidated this law, postponing the matter for a fresh initiative by law from April 1979, to be implemented when inflation was about to reach its climax. At that juncture it proved a decisive force in compelling politicians to take determined action against inflation, mainly in 1983 by doing again away with the vicious circle of wage indexation. Thereby, inflation fell to 29 per cent in 1984 and crept gradually downwards to a single digit in 1991 and to around 2 per cent over the last few years, or to a commensurate level with the developed world. The impossibility, due to financial indexation, of negotiating away from the real burden of debt, thereby augmenting consumption, was an important condition for this achievement. Another factor was the secure outcome in terms of real interest rates, rendering its limitation easier to deliver to labour and making its effect for economic balance more predictable, whether as a threat or promise.

Official intervention in credit terms is another main factor in the distortions caused by inflation, as it prevents the market reactions which would otherwise tend to equilibrium. Implied in such an equilibrium is not only the compensating level of nominal interest rates but also such form of credit terms that maintains the *real schedule of amortizations* and thereby the average life of loan contracts that would be seriously distorted by double digit inflation. It remains puzzling how little has been heard of formal value linking of financial objects in historical cases of very high inflation. This may be due to late development of reliable price indices but probably also to ingrained reluctance of market participants to rely on such sophisticated abstractions.

History abounds with prejudice against charging of interest, always on moral grounds of some sort, in antiquity and middle ages taking the form of religious and philosophical reasoning but in the modern era based on social equity considerations, relating to income distribution and creation and sharing of employment opportunities. These views either reflect dominant economic thinking of their times, or are expressed in and justified by fashionable economic theory. When liberal economic reasoning had largely done away with previous prejudices, Keynesian theory spread the in this context irrelevant consolation of the savings/investment identity, implying that authorities would be free to dictate the level of interest rates according to the needs for expansion and employment. Leaving aside the possible justification for this under depressed conditions in a large and relatively closed economic area, this proved a highly misleading guidance in a very small economy lacking external scope for expansion. Such a policy might have worked with strict adherence to testing by free market forces but, when implemented at the behest of authorities, it invited arbitrary political decisions, dictated by ill-informed popularity. A growing financial market imbalance ensued, calling for rationing of credit with inevitable arbitrary political and regional favours and misallocation of capital.

Of these phenomena there exist little if any statistical data but abundant anecdotal evidence.

Iceland possesses the particular characteristics of being a very small economy and very open to natural and export market fluctuations, as well as being a closely knit society with contagious sentiment. Governments have thus often been squeezed in a pincer between ongoing inflation and a supply shock. Being under close scrutiny from social forces demanding equity, the wielding of discretionary power has proved very difficult, leading to strong temptation to take the line of least resistance. Almost invariably, this consisted of giving up the claim of full value repayment of debt, which resulted from passively hiding behind the principle of nominalism and partly implied the giving away of public funds. This kind of sacrifice did not, however, last long or produce much result by way of stability, as it came to be taken for granted and did not prevent new initiatives of claimant interest groups. It gradually dawned upon the political leadership that the only way to cope with such situations would be to let impersonal market forces have its role to play and abstain from discretionary action, other than through operations in the market.

The authorities were responsible for all interest rates decisions until 1984, not only the general level through some key rates but for the whole spectrum of rates, dictating the form and manner of competition to serve customers and, naturally this called for restrictions on opening up new branches. Although the Central Bank endeavoured to co-operate to initiate new forms, mainly along with emerging indexation, that could not be a substitute for freedom of action within a competitive environment. The depressing results in term of real interest rates are clearly illustrated in figure 8, showing negative rates of total domestic credit in most years until 1983, often in the interval of 10-20 per cent, except in years of special price stops. A definite improvement occurred from 1979 with the legalization of general indexation, but only with partial liberalization of interest rates in 1984 and its completion in 1986 were positive real interest rates securely based. Until then, different subsectors of the domestic credit system varied greatly in this respect. Marketable bonds consistently carried rather high positive interest rates from their inception in 1964 and investment loan funds led the way of indexation among credit institutions to the extent that real interest rates were not appreciably negative from 1981. Current operational lending of the banking system, a natural domain of conventional interest rates rather than indexation, was on the other hand treated as a matter of discretion, delaying stable positive results until the liberalization of 1984-86.

Stagnation and decline of the financial stock came to be the final and most definitive reason for general financial indexation. The depletion caused by inflation occurred on a massive scale, amounting in the period 1972-83 to an annual sacrifice in the interval of 4-10 per cent of contemporary GDP, totalling about half of it, or 243 billion krónur measured by the yardstick ofthe 1996 GDP. This required fresh savings to fill in the financial gap instead of allowing of a net increase and, with adequte incentives for voluntary savings lacking, this was to a large degree accomplished by earmarked fiscal revenue and compulsory personal savings. Accounting for that, however, the stock of financial savings declined by 23 billion krónur at 1996 prices between 1972 and 1975, or by 15 per cent, and did not recompense for that until 1979. A greater part of that decline occurred in bank savings, until then carrying a much greater weight than later, depressing it below previous levels until 1981. Other financial sub-

sectors both enjoyed more institutional savings and employed indexation earlier. The financing of such savings burdened several industries with final incidence on consumers, giving rise to the policy of gradually abolishing it along with the restoration of voluntary savings.

The constant price real measure quoted above is, however, not a satisfactory yardstick for a growing economy, so the current ratio to GDP has been resorted to. By that measure, an appalling decline in the relative value of the stock of financial savings occurred over the seventies, with a stagnation from previous levels well into the nineties. Most dramatic was the outcome of bank savings, deposits and notes, that tumbled from near 40 per cent of GDP in 1971 to roughly 20 per cent in 1980, or relatively by almost a half, and reached the former level only with bank issued market bonds included towards the end of the period. Other institutional savings than those of pension funds declined by a similar ratio. Total stock of financial savings rose previously to a peak of 72 per cent of GDP in 1969, from then to fall by 27 per cent or 3/8 parts to only 45 per cent of GDP.

These adverse developments were regarded as unsustainable and intolerable and were to a large extent reflected in debt accumulation abroad. The net external debt position had been limited to some 10 per cent of GDP in the mid-sixties, and to some 20 per cent at the onset of seventies, after domestic prices had adjusted to recent large devaluations. From then on the debt position increased in big jumps, related to major devaluations, without receding much between them, so the long term trend was for a substantial increase to above 50 per cent of GDP in the mid-nineties and, after some respite, again around 1993. In terms of real volume at constant external prices, a steady increase appears from 1970 to 1992 with some slowdown from 1990. As from 1993 the relative net debt position has declined by some 10 per cent but the volume measure somewhat less. The unfortunate developments of financial savings and external debt proved sufficient to call forth the legislation in the spring of 1979 for a comprehensive system of financial indexation, followed later by liberalization of interest rate determination in a free and competitive market.

Approaches, experiments and technical design

Before a fully articulated financial indexation was put in place, a public *debate* about such a procedure had been going on for at least a quarter of century, and committees had been set down to elaborate on the conditions for finacial savings, of which they had given their *opinions*. The first actual *experiment* with indexation was conducted in 1955 in the housing sector, where a need for balance between rights and responsibilities was most apparent, and developed over more than a decade to be later drastically limited by legislation. Full and uninterupted indexation started with savings certificate issues of the Treasury from 1964. The momentum thereby gained was employed to pass a general legislation of financial indexation in 1966, but this did not enjoy favour with the dedosit banks and was so cautiously phrased that the external shocks soon to emerge prevented its implementation. The next steps were taken from 1972 in bonds sold by investment loan funds to occupational pension funds, so urgently requiring hedging against inflation.

These moves put the deposit banks in an unfavourable competitive position in view of rising inflation and tarnished their public image. To meet this challenge, they started in 1976 to take special *surplus interest rate deposits*, with 6 per cent added to ordinary interest rates in

the beginning, and linked to a permission to add a fraction of it to corresponding credit as well as to all credit. This provided some incentive to hold deposits but did little to mark deposit rates as a whole up to inflation. A generalization of this principle was attempted a year later by a systematic inclusion of a *price compensation factor* into the interest rate decisions of the Central Bank. This was not backed by any explicit political initiatives and, thus, met with some inertia until the need for further steps became obvious. The ensuing deliberations then gave impetus to the fully articulated and comprehensive *financial indexation system* enacted in april 1979. In its beginning it was regulated by monetary authorities, thus lacking the flexibility and adaptability following later with its becoming part of a market determined credit terms system. With a partial interest rate liberalization from 1984 and almost a complete one from 1986, the character of the indexation system changed from being an authoritative system to becoming one of voluntary choice between credit terms favoured by the market. Its widespread popularity has, of course, been based on its security in real terms, rendering premiums for price risk unnecessary, while one of the main concerns of authorities has been the possible misbalance of indexation between the sides of credit institutions´ balance sheets.

The legislation of this system in 1979 was backed by a unique *technical design* for comprehensive implementation, that by and large remained in force, despite variation of detail, such as in the form and time limits of accounts, relating in particular to the changeable and special terms deposits. For the principle of indexation to be applied also to the ordinary short term deposits and credit of the banks, to the extent considered desirable, the choice was given of two technical forms of indexation, further described below.

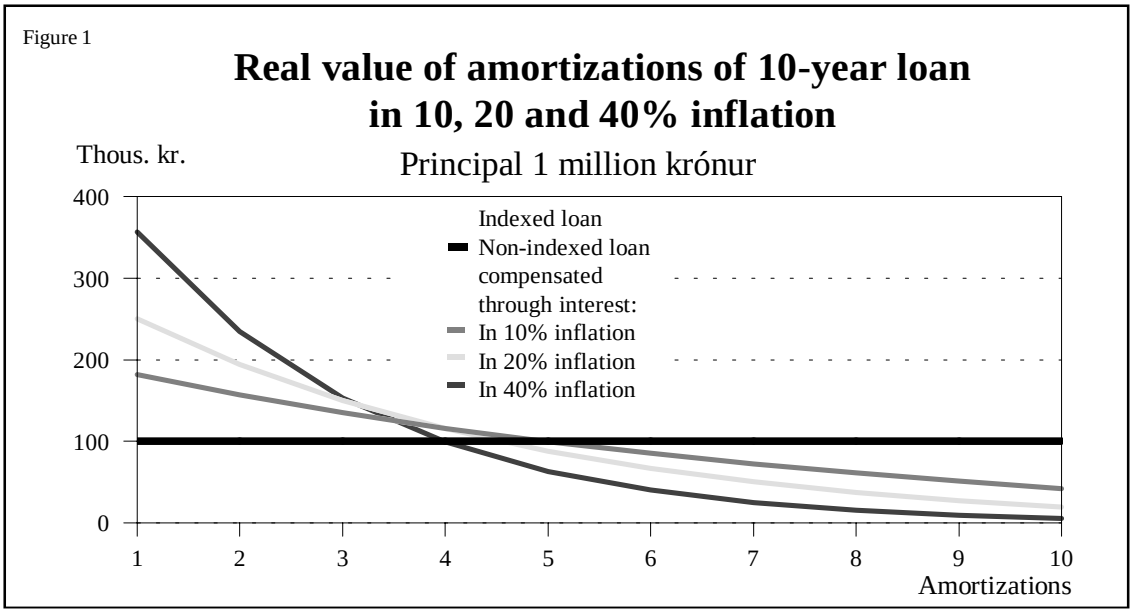
Formal linking to a price index is the conventional and simple method of indexation, suitable to middle or long term amortization loans. Then the amortization schedule is worked out at the original value of the loan, or at its basic index level, whether by equal amortizations with separate interest or annuity of payments including interest. In the case of changeable interest rates through maturity, their amounts or a fresh annuity for its remainder must be recalculated with each change of interest rates. Formal indexation does not affect the real content of those series but calls for all the magnitudes, relating to any particular date: amortization, interest and residual principal to be inflated by a ratio, having the index in force at each particular time as a numerator (multiplicator) and tbe base index as a denominator (divisor). Such payments are usually made payable at the same date and, while it may be desireable that this date is at the beginning of the month, or otherwise following upon a fresh index figure, no bother is made of correcting for the rise missed within each month. The reason is partly that such discrepancies are likely to even out through the period of each loan and, at any rate, to carry minimal overall weight.

Nontheless, the *exact time linkage* of an index to a loan is bound to present a certain problem. As a rule the paradox is at hand that for a full certainty of a correct, numerical value of an index to be obtained, the price change must have taken place, been measured and announced, so the factual price level may have changed further still at the time of actual payment. If it is attempted to cope with this by estimating price developments to the very day of payment, the risk remains of the factual index not coinciding with its forecast. At the starting point in 1979 a special *credit terms index* was established, combining the two official price indices, with the *cost of living index* weighing two thirds and the *building cost index* one third,

thus giving the price reference a wide scope and a sensible weighting between consumption and investment. An added motivation was that these indices could support one another, as each was calculated at a quarterly interval at different months, so one month in three went without a new index figure. In view of these circumstances, the Central Bank judged that a safer implementation would be attained by computing the credit terms index by known values only, when these were at hand, with the added estimate of a one month´s rise in the one month out of three, when that was not the case. This led to a constant average delay of 50 days from the measurement of prices to their entering in force to determine the nominal value of formally indexed deposits and loans, of which 30 days is the minimum one month delay from computation of a price index to its entering into force, as the case is at present.

Indexation by a price compensation factor is a method designed to attain real stock value and intended real interest rate on shorter loans and financial accounts, i.e. the ordinary functions of deposit banks. In the case of amortization loans, the rule applies that the price compensation factor is added to the principal that, thereuopon, is divided by the remaining number of downpayments to arrive at the nominal value of each, and so forth at each accrual. *Basic interest rate* then forms the other part of total interest rate, intended to be paid upon falling due. The interest rate as a whole in conjunction with inflation in the respective period, determines the economic result reflected in real interest rates, the distinction into these two factors having significance only for payments and thus liquidity which, therefore, has not been decided with great precision. The method, however, lends itself to match basic with real interest, thus getting it paid out on accrual. For that the price compensation factor is to be adjusted exactly to the evaluated inflation level, and intended real interest rates to be inflated by the same ratio to form the basic rate. The sum of basic interest and compensation factor then coincides with the total nominal interest producing the intended real interest payment. Instead of the simple multiplicative relationships of formal indexation here enters an additive split-up of total interest. Inflating both principal and real interest to the price level at the date of payment gives the same result as with formal indexation, the difference in execution being that the latter works with a real schedule for the maturities as a whole, whereas the former works with one period at a time.

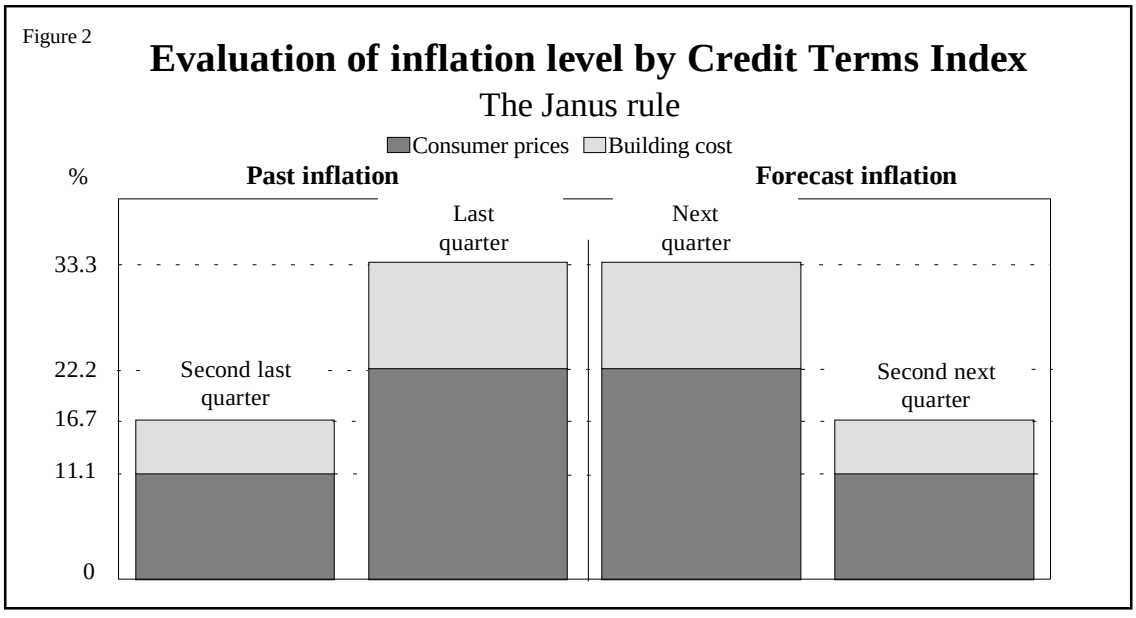
Figure 1



The psychological difficulty, arising from money illusion, of gaining public acceptance of full indexation under high inflation is aptly illustrated by a numerical example of a 10 years loan with 6 per cent real interest rate under 40 per cent inflation, leading to 8.4 per cent basic interest rate when that form applies. In this example the nominal value of principal keeps rising up to the 7th payment and is then more than three times its original amount, and even the amortization is then higher than the original principal. First with the 8th payment does the principal start falling, and the 9th does of necessity half it and the 10th end it. Interest to be paid only declines after the principal has done so, with the 9th payment, while amortization and total annuity rise throughout, the latter to a threefold original principal. Even with incomes rising as much or more than prices, this could be difficult to understand and accept. A fall in real incomes, on the other hand, could conceivably occasion real interest rate decline.

The advantage of indexation by way of an *even payments burden until maturity* is illustrated in figure 1, showing real amortizations of a 10 years loan in 10, 20 or 40 per cent inflation. Interest is left out as it adds nothing in principle, the real duration of a loan being expressed through its principal. A fully indexed loan by either method forms the basic scenario, generating constant real terms amortizations. In the other three cases inflation is compensated by correspondingly higher interest paid on accrual, without any part of it being added to the principal. By that principle real amortizations are very high in the beginning, varying with inflation and falling through the middle to become very low towards the end. This implies that the original lending for a term of 10 years is largely invalidated by the method of interest payments. These distorted amortization schedules intersect with the original one between the 4th to after the 5th payment. At mid-term, after the 5th payment, 69 per cent of real principal have been repaid under 10 per cent inflation, 80 per cent under 20 per cent, and 91 per cent under 40 per cent inflation. Only in the lowest case some semblance of the original duration of loan is retained, and there is some experience to suggest that inflation up to that level is tolerated for a considerable time without indexation being attempted, despite quite a bother with refinancing. The higher two cases obviously represent an invalidation of a loan contract in real terms.

Figure 2



The determination of interest rates containing price compensation with reference to current inflation naturally called for an *evaluation of the inflation level* at each particular time. That gives rise to questions about the relevance of past as well as prospective inflation, already discussed, as well as about the time span back and forth to be taken into account. As a matter of fact, the interest rate is as a rule determined for some time to come, to be reviewed on any upcoming occasion, over a considerable period three dates of each month, the 1st, 11th and 21st, having been employed for those revisions. Inflation projections should accordingly be the focus of such decisions. Public expectations, however, tend to be strongly influenced by recent experiences, giving occasion to take these into account. A viable adjustment system of this kind also calls for a evening out of sudden and large price fluctuations through gradual accumulation of interest, instead of revaluation according to the index at a point of time. This kind of problem mainly prevailed in the period of rare but big devaluations, and then the oligopolistic preconditions for such *ex post* corrections were present to a greater extent than in the later era of free financial markets. The solution of this problem was approached through application of the socalled Janus rule, carrying equal weights of past and prospective inflation over a whole year at any time with, however, double weights on the more pertinent last and next quarters, each evaluation thus being composed of six quarterly weights. Figure 2 shows this composition of relative weights, along with the respective weights of the indices basic to the credit terms index as it was composed to the end of 1988. By this rule and with reasonable foresight but without a chronic one-sided error of forecasting, all the highs and lows of inflation should be accumulated into the financial stock to an approximate equivalence with formal indexation.

This method of evaluating the inflation level was, however, an unlegalized operational rule of the Central Bank, and some other compositions were also monitored, such as two quarters or four months weighed together in the same way. With slower and more even inflation, the emphasis gradually moved over to the shorter scales, and with the advent of free interest rate formation the deposit banks gained independence from such Central Bank intervention but grew more demanding of reliable inflation forecasts from its economic department. In the wake of the so-called national conciliation income settlement at the beginning of 1990 a gentlemans' agreement of interest rate moderation was couched in the terms of reference to inflation one month back and two forwards, centering on the month for which each decision was immediately valid. As matters have developed, no particular rule can be regarded as being in force. Deposit banks as well as other market participants naturally review the inflation prospects at any time, along with a host of other market conditions, also tending to even out small short-lived and erratic fluctuations.

Further measures were needed to link together, on the one hand, formally indexed credit terms, implying revaluation at certain dates and, on the other, interest accruing on a day-to-day basis. Deposits are entered on index-linked accounts at any date of month but, for reasons of expediency, are formally indexed for whole months without regard for the exact date of entry. Price compensation plus real interest is then lacking from the date of entry to the end of that month and, correspondingly, from the beginning of the month of discharge to its date of entry. For both of these subperiods a special rate of *compensation within a month* has been applied, inclusive of real interest, and added to the balance to be indexed or paid out.

More precisely defined the credit terms index, when composed of two or three indices, was computed as a *geometric average* of its basic indices that, accordingly could be combined into one formula without having to synchronize their bases. This formula was given the base value of 100 by the application of a constant, that was altered upon any later rebasing of the basic indices to link to its former value at the rebasing date, thus rendering a continuous index. The development of the credit terms index, not least in comparison with other economic magnitudes and the fate of wage indexation, gave rise to political dissent, resulting in important changes of design and composition. Also, the time lags inherent in the process had implications not readily perceived from the start. At the onset of indexation, inflation was very high and accelerating over the coming four years. Upon entering into force with the base value 100 at the beginning of June 1979 the real time credit terms index had risen to 106.4, so the valid index measured only 94 per cent of the actual level. The difference was bound to figure as a price rise after that to be compensated in indexed loans. This would not be harmful under a constant rate of inflation, yielding a constant deviation due to time lag. In the event, however, it accelerated strongly up to March 1983, yielding insufficient indexation until then and doubling the lag deviation to around 12 per cent in March-April. Sudden disinflation from then on led to an overly strong indexation for a while, but since the autumn of 1983 the deviation lag has been insignificant and receding, most often between 1 and 2 per cent and almost nil at the end of the period under study.

Developments of the credit terms index

It did not last long before *changes in the basic design of the CTI* were occasioned by a general feeling of a heavy debt burden under the supply shocks of the early eighties, possibly influenced by the extra weight caused by the time lag, but more specifically by the need to speed up the impact of disinflation and later to take explicit account of the changing fortunes of labour. As part of the disinflation undertaken in the summer of 1983 it was decided to speed up or "juvenate" the index and reduce the time lag to the practicable minimum of a month, coinciding with monthly computation of the basic indices from the Statistical Bureau. This implied dropping two thirds of a month out of their continuity, taking a new price rise into account instead. This was done by apllying the old formula up to September 1983 and the new one from then on, which in the view of the professional *reference committee* instituted by the law would yield a similar result to the end of the year as by the old formula. This measure met with general accord, as the new formula led to a more timely computation of the CTI.

Initiatives were also taken to soften the impact of the disinflation measures on real earnings by diluting the CTI base with inclusion of a wage index, and proposals abounded of turning the weights round or issuing a special index with such a composition for housing loans. Legal prohibition of wage and salary indexation from that time also, by analogy, posed a serious danger to the very existence of financial indexation. In the event, the rising vested interest and economic power of the pension funds probably proved decisive in staving off this threat and avoiding the confusion of operating with two distinct indices in the growing bond market. Instead, a special *wage index for equalization of loan payments* was instituted in June 1985, granting households the right of systematic delays of payment, when the CTI rose faster than a combined index of wage rates and earnings. At that time, a boom was already rising, rendering this measure less urgent.

The next recession starting in 1988, naturally, did not fail to arouse the same reaction in favour of a wage factor in the index. An *expert committee* was set up in the middle of 1988 to make proposals for *preventing misalignment* between incomes and credit terms. Its deliberations centered around the feasibility of legalizing changed composition of the CTI, despite the widely held conviction that sanctity of contract would prevent that as far as former commitments would be concerned. The committee, however, opinioned that no such yardstick could be guarateed for all times in face of changing social conditions, so the legislature could make such a change enforcable.The reference committee, already cited, declared such an index to become a new one, unsuitable to be directly linked with the former index. The Central Bank´s economic department concluded that such a threefold index might show similar results as the former in the long run and would have more benign fluctuations for households. Weighing these considerations together, the government decided to implement this change by issuing a regulation according to the law, effective as from January 1989. This change called for the enactment of a new index of the general level of wage and salary earnings per hour of work, but without direct effects of variable labour time, or of share allotment or similar factors. Against this new design of the CTI, it was argued i.a. that, including the direct measurement of labour cost in the former base indices, it brought its total weight up to 49 per cent, and even up to 59 per cent including the most direct causal relationships.

With economic recovery from 1994, as well as partly from reasons of self interested opportunism, the argument gained new force that financial indexation should take account only of final product prices, but not of factors of production. It was foreseen that earnings would rise faster than prices in the near future, and this the trade unions saw through a magnifying glass and contended that through debts of households it would unduely dent the income gains to be made and impede collective bargaining. Needless to say that much of these arguments confused one-time asset effects with recurrent income effects, or omitted the greater interest of households on the side of financial assets than debts. The added reason for simplification was, however, also advanced that the indexed papers were not faring well on external markets,

Figure 3

Credit Terms Index compared with its component indices

January values, June 1979=100

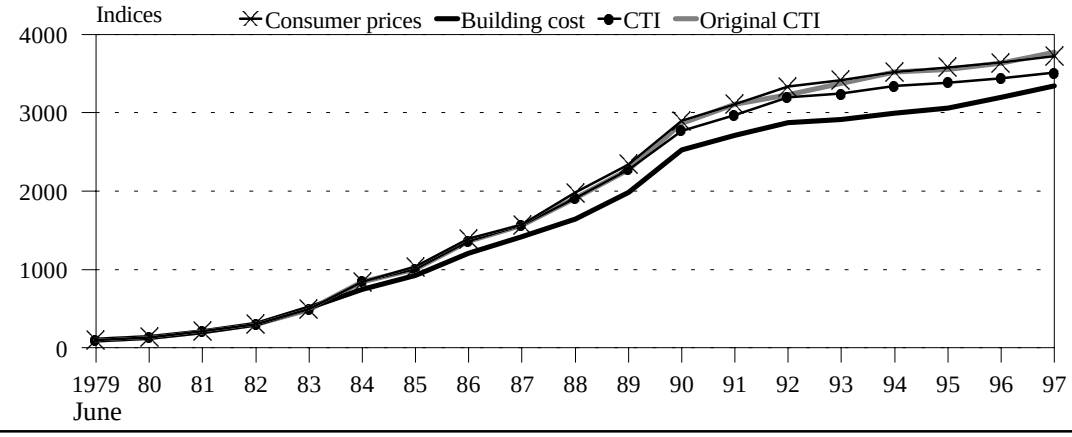
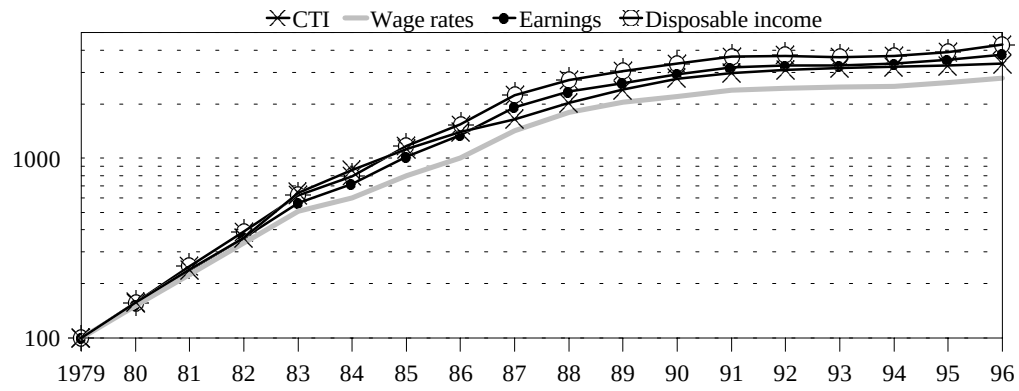


Figure 4

Credit Terms Index compared with wage rates and earnings

Annual averages, 1979=100. Log scale



being complicated and badly understood and with greater perceived risk of being changed than a singular index. The only index fully qualifying for this need was the cost-of-living index. New legislation in March 1995 changed its name to the *consumer price index*, whereupon it was by inclusion into an *act on interest rates* given the validity of credit terms index and linked to the old one for obligations from the past. With this arrangement, the responsibility of issuing this regulating index was handed over to the Statistical Bureau which in itself is desirable, as it carries no responsibilities for economic policy or administration. Despite some earlier experience of officially dictated changes in the credit terms index, this well founded last move, supported by the atmosphere of a freely functioning financial market, gives reason for hope of it being the final intervention of its kind.

Comparison of the credit terms index through time with either its basic indices or with income indices is problematic because of the effects of time lags of the CTI. The comparison of factual developments of prices and wages with with the CTI valid at any time seems, however, meaningful enough to consider. This is shown with the basic indices and incomes in figures 3 and 4. The basic indices first took turns at leading, but from 1983 building costs lagged, mainly due to the direct labour content, measured by wage rates, as well as probably to the customary lag of devaluations after domestic costs and prices. This gap fluctuates with the economic cycle, peaks in 1988 but narrows from then on, although concealed by the arithmetic scale of figue 3. From 1989 the valid CTI deviates downwards from that of the original formula to the maximum of 6.8 per cent at the beginning of 1997. This, however, is roughly comparable to the time lag distortion from the start, thus outweighing it. Over the whole period consumer prices coincide almost exactly with the original CTI, without dilution by wages, supporting the claim to quality of the former. On that more rigorous measure, formal interest rates could have been on average some half percentage point lower than the valid index through the whole period for the same real result.

The comparison of figure 4 has a bearing on the socially oriented criticism levelled against the CTI, drawn on the proportionally valid logarithmic or potential scale. Wage rates are lowest throughout, being a measure of the collectively negotiated factor of income generation.

Until 1986, earnings also lag somewhat after the CTI but outstrip it from then on. Disposable income of all households, including the effects of taxation and social policy, on the other hand, outpace it for all the period apart from 1983-84. The general overview of these developments seems to invalidate the criticism that financial indexation has been unduly harsh on wage and salary earners and households in general.

Time related and switching terms and indexation balance

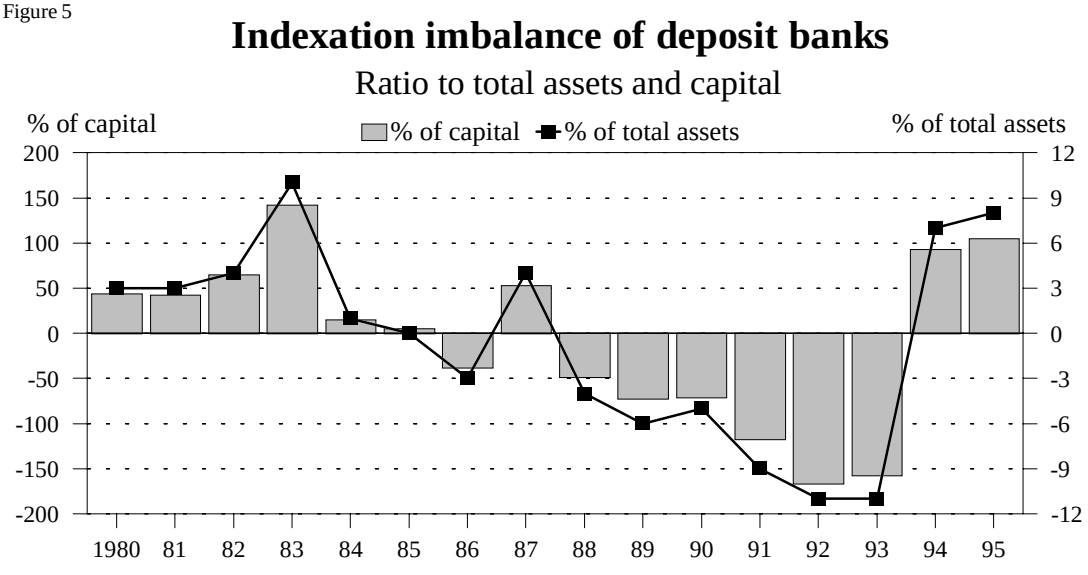
Time is a key concept of both credit terms and inflation and, hence, at the core of the reason and justification for financial indexation. Contractually binding time-span of credit commitments has been of value, in the commercial as well as economic policy sense, long before indexation, and from its onset was considered relevant to decisions on what to index. Previous, small distinctions between sight and time deposits of various lengths of term proved ineffective in face of mounting inflation losses, with the consequence that such limits were taken less seriously and ever larger sums came to be untied, increasing the risk of run on deposits. Bonds and longer term loans came to be given priority which gave the investment loan funds generally free play to index their loans, while the deposit banks came to be presented with a host of complications for prudential or political reasons.

Despite legislation of comprehensive indexation from June 1979, the political authorities showed reluctance of its implementation, imposed an adjustment period of a year and half for the attainment of minimum targets for interest rates, and initially banned indexed deposits but permitted indexed loans to a minimum of 4 years. A year later the ban on deposits was lifted in favour of a minimum term of 2 years but without much results, so by legal intervention in February 1981 the minimum was lowered to 6 months but without interest, placing an unmistakable political stamp on that action, and the lending minimum was lowered to 2½ years. This move heralded a policy of liberating these terms, so that from April 1982 to July 1988 indexed deposits could be down to 3 months, while the credit minimum varied somewhat erratically between a year and half and 6 months. The tide of policy was then turning again. The strong results from indexation, the approach to price stability and a more intense competition in the wake of interest rate liberalization made the authorities more keenly aware of perceived market rigidities caused by direct linking with indexed bond rates, as well as of the possible risk associated with mismatch between indexed assets and liabilities. This caused policy to turn again towards lengthening of indexed terms on both sides. For deposits the minimum increased to 6 months from mid-1988, and to one year from mid-1993, and finally to 3 years from the beginning of 1998. On the side of loans, or assets of banks, the minimum was lengthened to 2 years from mid-1988 and to 3 years at beginning of 1991, to revert again to 2 years at mid-1993 and 3 years from beginning of 1996, in the effort to improve the match, and finally to 5 years at beginning of 1998. The policy has been declared to raise that mark still to 7 years at the beginning of 2000 pari passu with not permitting indexed deposits. Going so far seems to be in contrast with the generally liberal policy adopted, still more so as a commensurate degree of risk has hardly been aptly demonstrated. This has, however, to be finally decided by the authorities then in charge. This measure implies that deposit banks will have to finance indexed loans through bond issues as well as with their own capital.

A particular relationship of indexed to non-indexed terms occurred with the socalled *switching terms*, causing certain deposits to switch from one type of terms to the other to give depositors the higher of the two alternatives. As with most other anomalies in the market, the occasion for this rose from misguided attempts at official control. In the inflation binge up to 1982-83 the banks suffered from adminitrative delay in raising interest rates and then tried to make it up by delaying the lowering of interest rates in the coming disinflation. This led to a large flow of deposits from indexed to unindexed terms, in the amount of 3.4 billion krónur in eight months to end of April 1984. This led to a considerable mismatch, indexed loans being some 15 per cent greater than indexed deposits, and to a corresponding deterioration of banks profits. The disparity of instantaneous adjustments in the indexed section as against the politically accentuated lag in the nominal interest section came to have varied consequences. Banks withdrew new indexed loans for some time and introduced switching terms to prevent repeated flux of doposits, while the authorities from then on adopted a vigilant stance towards mismatch of indexation. Essential features of these terms were nominal interest terms backed by the guarantee of corresponding indexed terms over a reference period of 6, 3 or even 1 month, should that formula yield better terms to the depositors, while they retained net gains on the other side. An accumulation of several periods were thus bound to be more costly to the banks than a consequent outcome of either formula. This method, as well as the long version of the Janus rule, implied the assumption that the banks could regain the balance by ex post interest rates increases, which again implied oligipolistic market conditions. As a more intense competition ensued, mainly as a result of the indexation and real interest rate policy, a more acute concern of risk gave rise to the policy of minimizing it.

At the beginning of 1989 the first step was taken of harmonizing the reference periods of switching terms to the longest period of 6 months. A year later the rule was imposed that indexation could only apply to deposits tied or unmoved over 6 months. Switching terms were then limited to tied deposits, while through so-called *special terms*, indexation could apply to the same duration of untied deposits. From the middle of 1993 these minimum periods were lengthened in line with the rules already described, and from the beginning of 1995 untied

Figure 5



deposits could not be indexed. While deposits tied for12 months, and 6 months successively thereafter, were allowed to be indexed, as well as regular installments on long term savings, the switching of terms was then discontinued and replaced by high unindexed rates linked to a high termination charge to be relinquished after a suitable duration.

These developments brought the issue of *indexation mismatch and associated risk* into sharp focus and led to their close scrutiny by the bank inspectorate and monetary authorities. This degree of awareness was partly occasioned by past conditions of high and jerky inflation, and a more basic research of such risk under up-to-date conditions seems to be called for. It is lessened by the fact of inflation being a principal consideration on either side. The risk, however, arises from this consideration being automatic under indexation but dependent on discretionary reaction under the nominal regime. The fundamental reason for monitoring an indexation balance is that anything can happen and you cannot insure after the event. It is, however, possible to generalize about likely losses or gains. Distinction is drawn between *positive mismatch*, when more assets are indexed than liabilities, and *negative*, when the opposite is the case. These nomenclatures refer to risk of inflation rising from a relatively low to a higher level. In such a case the positive variant is liable to bring gains from instantaneous rise of net indexed assets, set against lagged accumulation of interest on deposits, contrary to the losses from a negative balance, when the instantaneous rise occurs on the liabilities side. All this is turned upside down under the opposite developments of disinflation. Needless to say that prudential concern has mainly been directed towards the risk of negative mismatch under rising inflation. As a matter of fact, however, the mismatch of deposit banks was generally positive during the phase of rising inflation up to 1983 but negative under lower and falling inflation in the period 1988-93. Hence, it is difficult to pinpoint any particular losses from this cause after the one in 1984 cited above. Figure 5 shows the total balance or mismatch of the deposit banks at end of years 1980-95 as percentages both of own capital and total assets. In terms of sheer proportions it does not seem substantial in more than three years on either side but in both phases it is sensibly related to the direction of inflation, with the further consolation that real interest rates have in the latter years been higher on unindexed than indexed loans. The awareness of the mismatch first became acute with its increase on the negative side in 1991 and the measures to deal with it mainly date from that and later years.

These measures fell into four categories: 1. Regulation of lengths of deposits and loans permitted to be indexed, 2. Limitations on the practice of switching and special terms of deposits, 3. Rules about allowable mismatch for each institution, and 4. Indexation and interest rate swaps between the Central Bank and the deposit banks. The first two have already been dealt with. The third stipulated that as from the middle of 1993 each deposit bank should strive to keep the mismatch within 20 per cent of its capital. In that endeavour this limit was overshot on the positive side already next year which, however, was not regarded as a problem. The fourth measure constituted a unique experiment with implementing the technique of swaps in Central Bank deals in the market to further its policy. The swaps covered the period of September 1993 to December 1994, taking departure from the initial mismatch of Krónur 24,5 billion, to be run down by 3.5 billion in each four month subperiod. For each of these the Central Bank swapped (credited) a certain real interest for a (debit of) nominal interest corresponding to the real interest rate and the Bank´s own inflation forecast for the coming four

months. Thus, it not only indemnified the banks for the accepted mismatch but also took responsibility in terms of cash for its own inflation forecast. The Central Bank gained from lower than forecast inflation in the first period, lost in the next two, while in the fourth inflation was exactly on the mark. Thereupon, both parties agreed that the reason for further swaps or other measures against mismatch had evaporated.

Coverage of formal indexation

Quantification of the coverage of financial indexation, and how it spred through the financial markets from a slight beginning to overwhelming importance, is an important element in the evaluation of its significance. For this, all the statistical data at the disposal of the Central Bank have been marshalled, and a substantial amount of new information has been compiled in order to form a coherent whole. Due to voluminous internal dealings between different sections of the credit market, a great deal of double counting would ensue. To prevent that and secure a meaningful aggregate to work with, the final credit from the credit system to the active sectors outside it, have been analysed into the three main categories of formally indexed, non-indexed or nominal interest rate, and foreign exchange linked terms. Greatest significance is attached to the distinction between indexed and nominal terms on domestic financial capital, as these determine its growth conditions, while the exchange-linked terms apply mostly to foreign capital and are externally determined, even to the extent of its re-lending to nationals. It should be borne in mind, however, that after the legislation of 1979 became effective the bulk of nominal terms also followed the guidelines of value guaranteeing through the price compensation factor of interest rates.

The principal sections of the credit market to be dealt with are: 1. Marketable securities, 2. Investment loan funds, 3. Banks and savings banks (deposit institutions), and 4. Pension funds and insurance companies. *Marketable securities* were the first to form a continuous series and reliable presence in the market, starting with government savings certificates in 1964 and issued ever since. They were index-linked from the beginning, as experience had shown that only such papers could be floated in the market, and carried high interest rates on top of that to avert any risk of failure. Indexed Treasury lottery bonds were added in 1972, with unindexed interest rates. An insignificant attempt was made at issuing exchange-rate linked bonds from 1984, based on the SDR-unit, as well as an abortive attempt at unindexed Treasury bills, renewed in 1986 and gaining safe footing only from 1989. With the addition in 1985-86 of bond issues of banks, investment loan funds and leasing companies, the indexed bond market gained still more headway, forming a basis for operations of the new stock exchange. A substantial element was added by indexed housing bonds in 1989, for financing individual house purchases, and further by building fund bonds in 1992, for collective financing of the public housing funds. Finally, business enterprises and municipalities started to issue marketable bonds in 1994. All this flora has grown out of the original seed of marketable indexed bonds, these still amounting to some 86-89 per cent of the total over a decade, while unindexed papers, mainly Treasury bills for cash management have been in the 10-13 per cent interval, but exchange-linked bonds have remained below 2 per cent. Despite the overwhelming weight of indexed bonds, an important development has been the increased marketability and maturities of unindexed bonds which, according to declared policy should rule the roost up to a maturity of 7 years from the year 2000.

The *investment loan funds* have over this century been an important branch of the financial sector. As public agencies, pooling the scant resources of a small emerging capital market, they have played a similar role as private investment banks and real credit institutions in developed market economies. Being largely administered by politically appointed interested parties, not least representatives of debtors, they gradually showed the weaknesses to be expected, mainly with the onset of inflation, failing to consolidate their financial position by means at their disposal. These funds have now been mostly unified into an industrial investment bank, about to be privatized, and a publicly operated housing credit system. This chief distinction has been maintained throughout, and the industrial side further organized along the lines of industrial classification, with special funds still intact catering for regional and communal purposes.

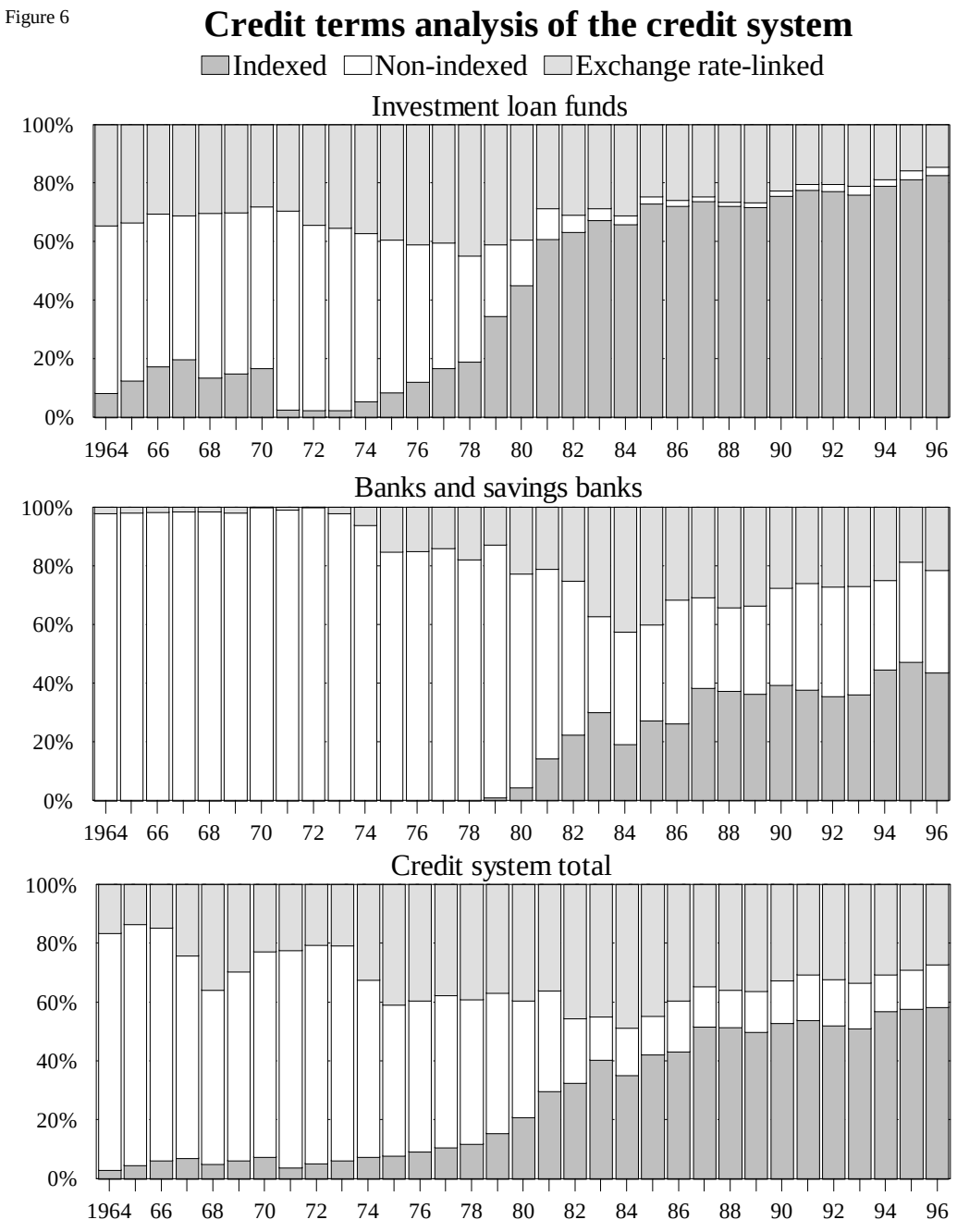
The very first experiment with financial indexation in Iceland was made by one of the *housing loan funds*, the State Building Fund, in 1955 in an attempt to promote savings for housing purposes as well as to imbue the working population with financial responsibility to reciprocate for the public efforts and outlays expended for that social purpose. This indexation was only partial, starting with indexing one fifth of the loans but increased gradually up to a half in the mid-sixties, then interwoven with the fashionable incomes policy. That policy actually also came to include provisions for a large share of growing pension funds to be channeled to the housing loan funds. With further excesses of such a policy the law was enacted in 1972 that the sum of interest rates and price compensation on the principal must not exceed 7.75 per cent, at the very turning point to a greatly accelerated inflation. This measure all but annulled previous indexation, measuring for some years around a half of the loan stock, so a fresh start had to be made with 30 per cent indexation from 1974, rising stepwise to the full amount from 1979. Thereby, the stock of indexed housing loans grew in percentages of the total from 9 in 1974 to 40 in 1978, and then with fully indexed new loans to 75 in 1980 and 94 in 1982, culminating with 97-99 per cent over the period 1983-96. With the unindexed stock having petered out, housing loans have been indexed to the full extent, the minor exception being temporary credit.

Industrial and regional loan funds operated with some 55 per cent domestic unindexed funds and 45 per cent foreign exchange-linked funds over a period prior to indexation, and it even happened that funds took on the loss from devaluation, thus protecting the interests of debtors. The dearth of voluntary savings due to increased inflation was partly met by earmarked indirect taxes, mainly from the respective industries, and direct fiscal grants, as well as by government enforced lending of 10 per cent of deposits increse from banks, but also increasingly from external borrowing, the stock of which in some years amounted to 60 per cent. With initiatives from most of the funds sorely lacking, indexation made a very slow start in the late sixties, only making headway with partial indexation when the centrally operating Development Fund started to sell indexed bond to pension funds from 1972 and, further, when legal compulsion to apply such terms was added in 1975 and backed by the government from then on. By 1973 the indexed share of domestically financed loans was only 5.3 per cent, incresing gradually to 28.5 per cent 1978 and jumping with the new law to 58 per cent in 1979, to grow onwards to 97 per cent in 1988. Since then, with increased faith in the currency and more varied operations of the funds, unindexed loans have regained some of their share to

around 10 per cent over half a decade. As a part of the total both domestic categories increased their share over the last few years, as the foreign share declined from 63 to 51 per cent between 1993 and 1996.

Investment loan funds as a whole, top section of figure 6, show the share of external capital much diluted from above, as housing credit does not employ any foreign funds. This is accentuated still by the greatly increased weight of the housing subsector during the period, from 22 per cent in 1964 to 72 in 1996. Over the first decade of the period the indexed share of the total is almost exclusively the housing share diluted over the total, while, since 1974 the industrial funds are following in the wake of housing funds, catching up in 1979 and treading a similar path since then. In the earlier phase of indexation up to 1970 its share varied in the

Figure 6



interval of 13-29 per cent of domestic funds, falling to 4 per cent in the next years due to the legal limitation cited above. From some 9 per cent in 1974, a gradual increase brought it to 34 per cent in 1978 and a jump to 59 in 1979, from which it developed into some 97 per cent over the period 1985-96. These remain the approximate proportions despite minimal inflation over the last few years as the funds wish to play safe on the basis of established technique, while fuller experience with inflation control is being gained. Their sources of funds lying mainly in the bond market which, thereby, must be expected to lead the way into the spread of unindexed terms over the medium and perhaps to some extent into the long term maturities.

Banks and savings banks have been the least likely to adopt formal indexation as these cater mainly for short and current account credit lines, constantly being reviewed without a fixed amortization schedule. They had, however, the same reason as other branches to fend off the inflation induced decline of loanable funds, while the technique to that end came largely to be different, mainly that of the price compensation factor of formally nominal interest rates already described. With more hectic inflationary developments, however, the banks felt urged to compete also in formally indexed terms. The section on banks in figure 6 is based on that formal distinction, notwithstanding that, with the regime from 1979 in full operation, all credit has been value-guaranteed and all but the most liquid deposits. The numerical basis of that section is all financial assets of banks from the indexed balance analysis cited above which are almost identical with total credits.

The real contraction of deposits, and still greater relative to GDP, started and grew increasingly serious in the seventies. Hence, the conventional method of requiring deposits into the Central Bank to channel to export industries and public sector financing became no longer adequate, leading to growing external and exchange linked finance for the export industries, up to some 40 per cent of bank credit in 1983-85. Increasing strength of the banking system with indexation is shown by the halving of that external dependence till the end of period, despite full outward liberalization being implemented. In the meantime, indexation made a slow start due to time limitations already described and its development was jerky up to 1986 for the same reason as well as due to official intervention and changing advantage of indexed relative to non-indexed terms. Indexed deposits (or financial liabilities, not shown in figure 6), dependent on favour and faith of depositors, grew more steadily, to 31 per cent of krónur-denominated debts in 1983, and to 61 per cent in 1988 and finally 64 in 1993, to fall again to 43 per cent at the end under the pressures of prudential control discussed above. Indexed financial assets, mostly credits, on the other hand, backtracked on their growth path in 1984 and 1986 to 33.5 and 38.5 per cent of domestically financed credits but from 1987 reached a level through fluctuations between 49 and 59 per cent without a clear trend. As percentages of total financial assets, including the foreign component, this was an interval of 36-47 per cent.

Pension funds and insurance companies more or less followed the example of either investment loan funds or deposit banks, depending on form and length of loans and within permissible limits. These are of minor significance and reliable data are lacking, so separate estimates are not shown but included in the credit system total.

Credit terms analysis of the credit system as a whole, including the two branches not shown separately, is given in the bottom section of figure 6. The credit system is thought of as a consolidated whole of domestic and external lenders to the active domestic sectors outside it. By

aggregation the trends appear more regular than those of the constituent parts, while breaks in the sectional trends are modestly reflected. The larger fluctuations of external credit clearly reflect the heaviest supply shocks to the economy, such as in 1967-69, 1974-76 and 1982-85. These were aggravated by the lack of preparedness to cope with them and have left some enduring mark on the debt position. The last adversities of 1989-93, however, hardly shine through at all, most certainly thanks to the maturity and strength gained by the domestic credit system, as well as to improved economic administration.

The analysis of domestic credit is more regular with the cyclical swings of external credit left out. The indexed component depicts the S-shaped curve familiar with trends from near nil to a level of relative saturation. In the first and abortive phase it grew from less than 4 to almost 10 per cent of domestic funds between 1964 and 1970, or from 3 to 7.5 per cent of total credit, to drop again to below 5 or 4 per cent respectively in 1971. From then on the increase was evenly gradual to almost one fifth of domestic credit or 12 per cent of total credit in 1978. With the comprehensive legislation of 1979 it jumped by increasing steps to 74 per cent of domestic credit or 55 per cent of the total in 1983. Since 1987 the indexed share has flutuated between 77 and 82 per cent of domestic credit or 50 and 58 per cent of total credit. The relative increase of the indexed share over the last three years is largely caused by the relative decline of external debt.

Although this study is concerned with the outward boundaries of the credit market, in its dealings with the active sectors or final users of financial services, a mention should be made of *indexation in the intermediary role* that the Central Bank played over an extended period. In Iceland central bank operations were given a wider scope than customary among developed market economies, mainly to act as a buffer to absorb external shocks and secure regular operation of the export industries and the public sector. The principal instrument to that end has been the extension of reserve requirements from the core needs of monetary policy to such an intermediation of financial savings. The blocking of deposits for these ends started with the stabilization program of 1960 and was further emphasized by the establishment of a separate central bank in 1961. It was regulated in the double form of an incremental ratio, for long being 30, 25 or 20 per cent of total deposits, and an maximum average ratio, starting with 20 per cent and rising to a peak of 28 per cent in 1979, which, being reached, dictated the incremental ratio as well. With rising competition for this financing as against a dwindling deposit base, the need was felt for a special ajustable blocking of up to 5 per cent in 1981-82, lifting the total to 33 per cent. On top of that came the commitment of banks to lend 10 per cent of their deposit increase to investment loan funds. This massive involvement naturally did not allow of the traditional principles of no interest rate on blocked accounts to be applied, thus levying a kind of tax on deposit banking for the enforcement of national interest rate policy. Initially, the principle adopted was one of indemnifying the banks for their deposit interest expenses plus some markup on top of that, mainly in the range of 2-3 per cent, but falling far short of making up for the loss of earning credit interest. With the advent first of the index premium deposits and then formal indexation, corresponding terms were introduced on blocked deposits from these sources, the indexed accounts from mid-1980 bearing 2 per cent and for some time 2.5 and 3 per cent, real interest rates. The very large step was taken in March 1987 to unify blocked accounts into one with indexation but without interest rates, thus fulfilling

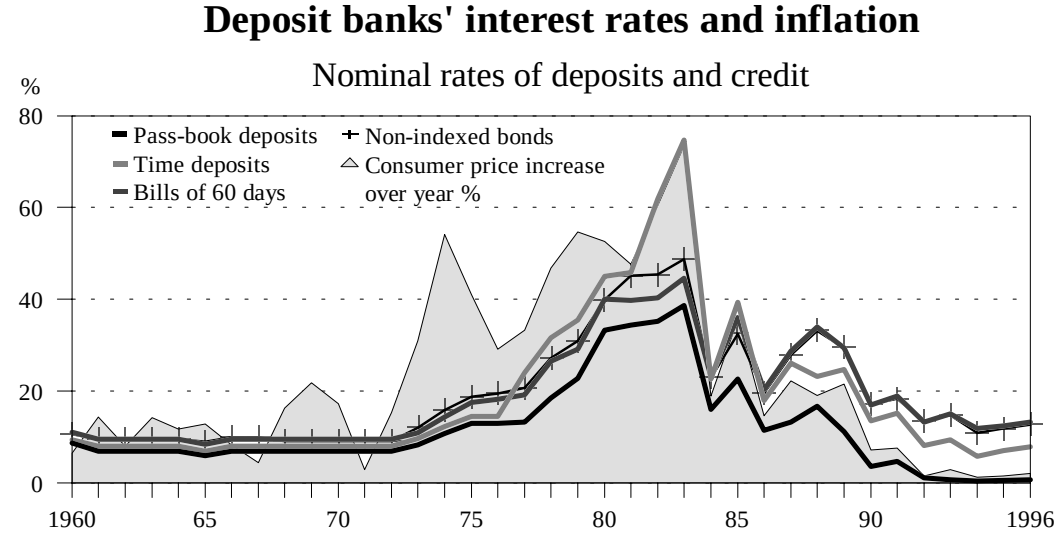
the doctrine of no interest rate under a fixed value regime but after a year it was again deemed necessary to add 2 per cent real interest rate, to be raised in 1993 to 3.5 per cent. So it remained until May 1998 when, in line with the general trend of deindexation within the banking system, the terms of blocked accounts shifted again to nominal terms with 5.5 per cent interest rate. Generally speaking, the path of deposit requirements over the last two decades is a testimony to the success of the indexation and real interest rate policy. After its real influence came to be felt the required ratio fell rapidly to the present one of 4 per cent on ordinary deposits or 2.5 per cent on time deposits and bonds, and, the repurchase of export and produce loans having been gradually abandoned, the required ratio has regained its purpose for general monetary management

Real interest rate developments

Guaranteeing the maintainance of full real value of financial obligations through indexation or other technical means, important as it is, only forms a solid basis on which to build real growth of financial capital and attain dynamic balance in its allocation among competing uses. The real interest rate is the main instrument to achieve these ends, whether formally stipulated as such on top of indexation or resulting from the difference of nominal interest rate over inflation. As noted above, the previous chapter only distinguishes the coverage of formal indexation from that of nominal interest rate but does not draw the dividing line between maintaining full real value or not. Such a dividing line and, thereby, the evaluation of real interest rates and their contribution to real savings has consequently been reserved for this chapter. Towards its end, it will be argued that, by force of sheer inertia and its compounding power, as well as positive incentives for savings, the real interest rate is the most potent factor of growth of real financial capital.

The intention here is not to tell the whole story of interest rate policy in Iceland but to treat it as a parallel to financial indexation and account for the interplay between these two mutually dependent factors. In the post-war setting of fully administered interest rates, there were trial runs at the activation of ordinary interest rate prior to general indexation, mainly with the

Figure 7

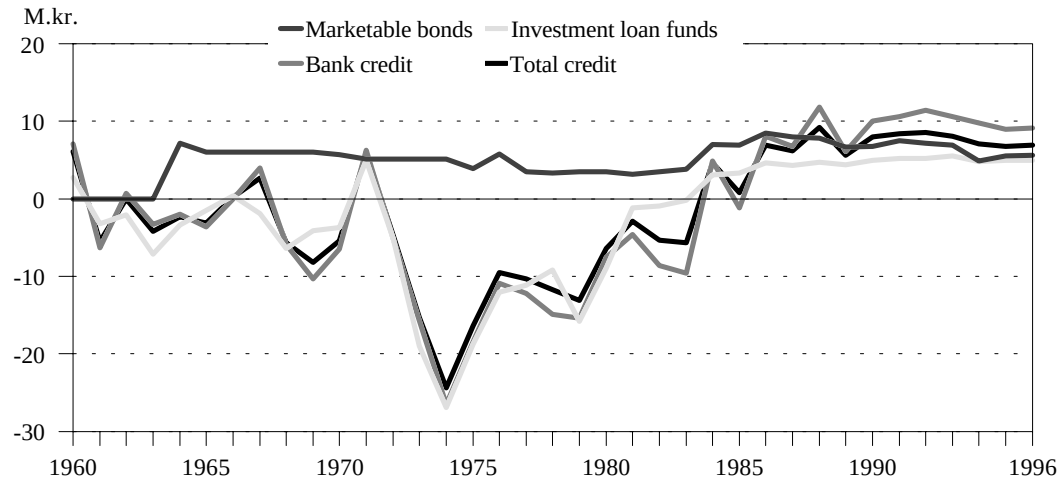


stabilization program of 1960 and later in the mid-seventies. The former, in the face of adversities, petered out as an active policy, while the latter shaded over into the indexation policy. These interactions are best observed with the help of figure 7, showing some fairly standardized types of deposits and credits of the development banks from 1960 to 1996 against the backdrop of inflation within each year. Over the first years, real rates are moderately negative, with positive rates emerging in years of particular price stabilization efforts, mainly in 1967 and 1971. From then on and due mainly to a combination of overheating and full wage indexation, price developments became explosive while interest rate policy came gradually to be reactivated, notably with the interest rate premium arrangement from 1976. Even with the comprehensive indexation system of 1979 and completion of its adjustment period to the end of 1981, only time deposits, mainly indexed, fully tracked inflation from 1982, but so and still better, of course, did fully indexed bond credits.

Over the great inflation bulge of 1972-83 the monetary authorities were seeking opportunity to let interest rates catch up with rising or meet falling inflation in order to make up for the consequent loss of real financial capital and restore the effectiveness of the interest rate as a tool of demand management for, among other ends, to subdue inflation itself as the root cause of a host of difficulties. An extraordinary opportunity for this presented itself as a result of the draconian measures to combat inflation in 1983. For this end it sufficed to moderate interest rate reductions, and the opportunity was seized to free interest rate determination, first in two steps in January and August 1984, and then finally in November 1986 after the enactment of liberalizing law on both the commercial banks and the Central Bank. Figure 7 shows that this resolve was put again to the test in 1985 and also that since 1986 all the rates shown are well above inflation, rapidly falling to an internationally comparable level from 1992. The exception from positive real interest rates, though, still consists of pass-book deposits and then, of course, chequing accounts, the problem of charging payments and such like services outside the interest rate margins still remaining partly unsolved. This important shift of policy implemented with the legislation of 1986 signified that the authorities did not trust themselves for further discretionary direct determination of interest rates, over and above the effects of guidance through market operations. To avoid further political manipulation, credit market participants had to be thrown into cold water to adjust and swim for the shore as best they could. This entailed considerable hardships in unprecedented high real interest rates before the market could adjust to more moderate levels and the society at large had learned to live with it.

For the evaluation of combined effects of indexation and real interest rate policy it is necessary to review *developments of domestic credit* as a whole. This is done in the form of weighted average real interest rates for the main branches and total of domestic financial capital, a result of complicated calculations too long and detailed to be of interest here, also covering the period 1960-96. *Marketable bonds* occupy a special position, the Treasury savings certificates being indexed from the start and bearing a generous 7.2 per cent interest rate, soon to be lowered to 6 and later 5.1 and even down to 3.2 per cent in 1981. Harsh competition in a tight market then forced it up to 7 and 8.5 per cent respectively in 1984 and 1986. After that it moderated to a reasonable level well below bank credit pari passu with flourishing multiplicity of bonds of all sectors. The line for bonds in figure 8 is drawn according to the aver-

Figure 8

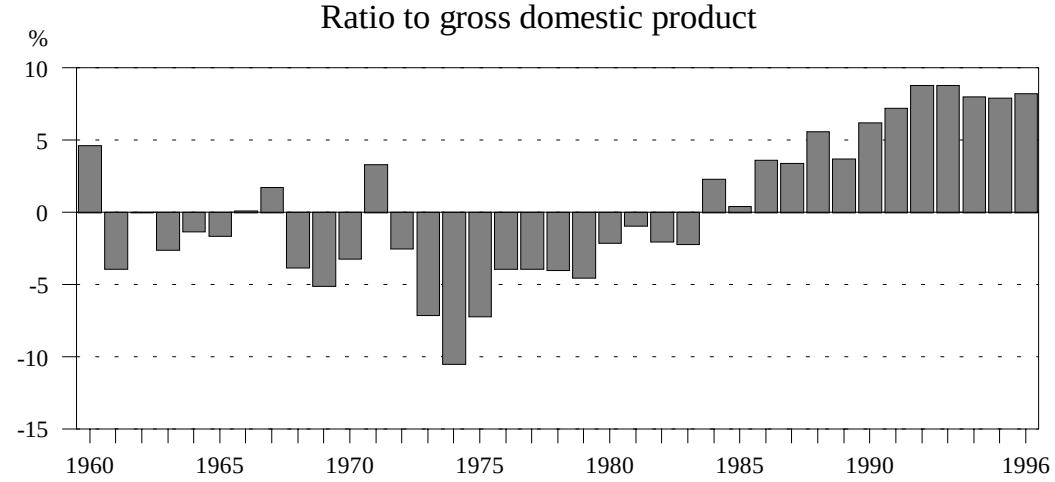


age accruals on the dominating Treasury bonds, and the same weighted, due to imperfection of data for other bonds, into the credit system total. The remaining chief subsectors of bank credit and investment loan funds often coincide remarkably well, not least in the extremes dictated by inflation, their common denominator. The banks tend to show higher results when interest rates were reactivated or inflation subdued, whereas loan funds with more indexed loans first show more even results and from 1979 lead the way of recovery of real rates. With the opportunity afforded to the banks by the interest rate liberalization of 1984-86 these relations get turned upside down, reflecting greater risk and actual credit losses in bank operations. By their weights these two subsectors between them dictate the total average real interest rate of the credit system.

The period under review can be subdivided with reference to active interest rate policy as well as resistance to inflation, and thereby to its results in terms of real interest rates. From these criteria four subperiods can be discerned: 1. Period of inadequate nominal interest rates and incipient indexation coupled with considerable inflation resistance over the first decade to 1971; 2. Suppressed interest rates and other demand policies with a lapse into a great inflation bulge and only emerging partial indexation up to the comprehensive legislation of 1979; 3. Adjustment period of indexation with inadequate real interest rates until the stepwise interest rate liberalization of 1984-86; and 4. Free market formation of interest rates from 1986, with or without indexation and under considerable threat of renewed direct intervention, as severe supply shocks were encountered in some of these years. During this last phase of developments the nature of indexation changed considerably from a policy measure of administrative control to a freely available financial market norm.

The results of these different phases of policy appear clearly in figure 8. Negative real interest rates of 24.4 per cent in 1974 and 15-16 per cent in 1973 and 1975 was simply horrendous, and almost as strong adjectives could be used about negative outcomes of around and over 10 per cent in a few more years. Almost as serious was the fact that continuous negative interest rates over all but four years from 1961 to 1983, or a total of nineteen years, was sapping the strength of the credit system. In its turn, the recovery has been uninterupted since

Figure 9



1984 with exceptionally high real interest rates, peaking with 9.2 per cent in 1988 and staying at 8 per cent or above in 1990-93, before receding to more moderate levels below 7 per cent since 1996.

Effects of real interest rate developments

Data on real interest accruals on the stock of domestic financial capital lend themselves to interesting observations of their direct effects in a macroeconomic context as well as on that stock. Figure 9 shows total real interest accruals as a ratio to GDP. The columns below zero signify the total of inflation transfers within the economy, sometimes called the inflation tax, while the positive columns, of course, show the share of real financial earnings. The inflation loss, or gross depletion of financial stock, reached amazing proportions, of 10.5 per cent of GDP in 1974, 7 per cent in 1973 and 1975, and some 4-5 per cent in a few years. The total of all the negative percentages reaches 50 per cent, the total of inflation sacrifice of savers up to

Figure 10

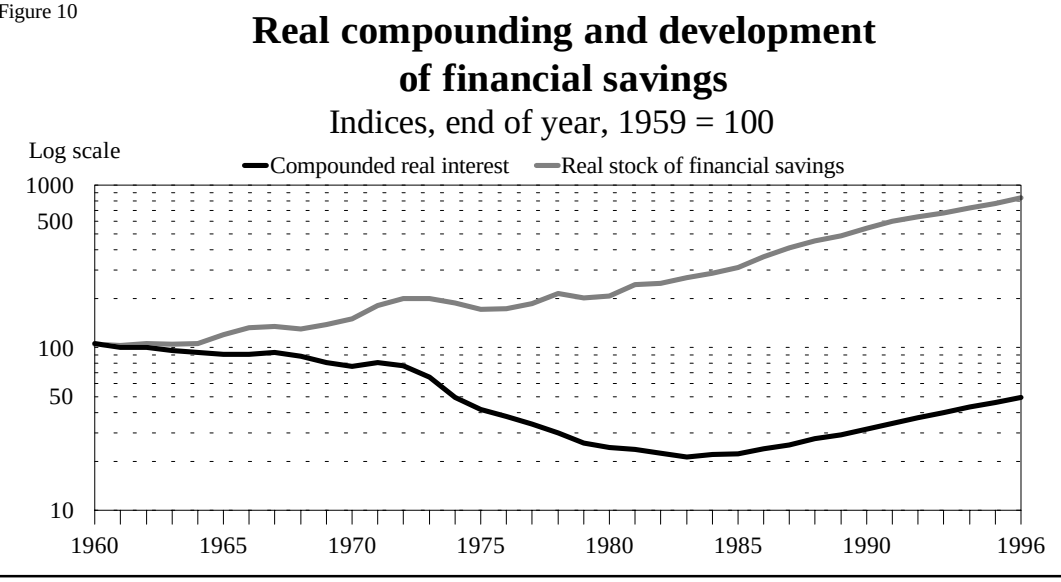
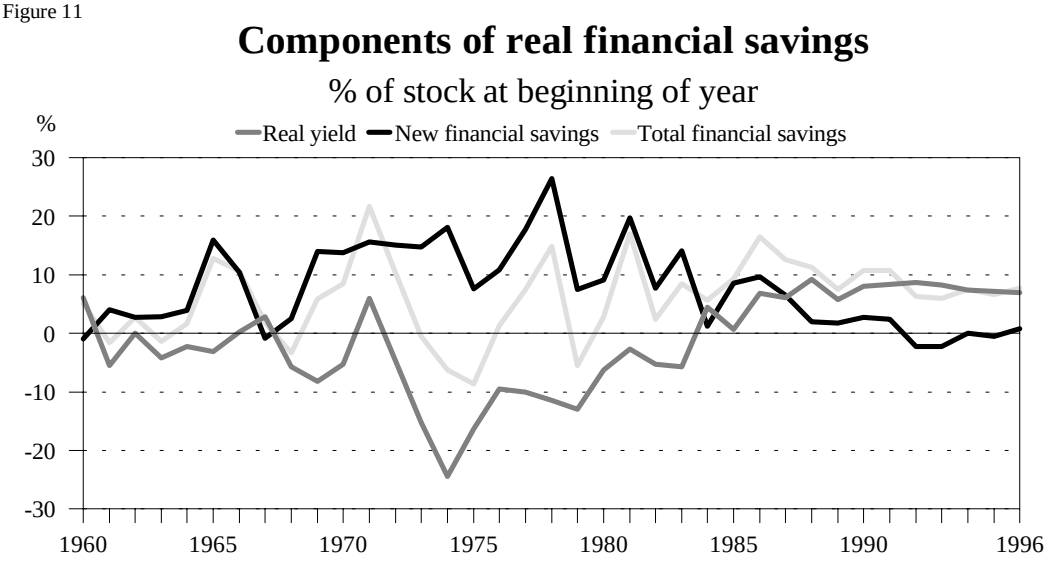


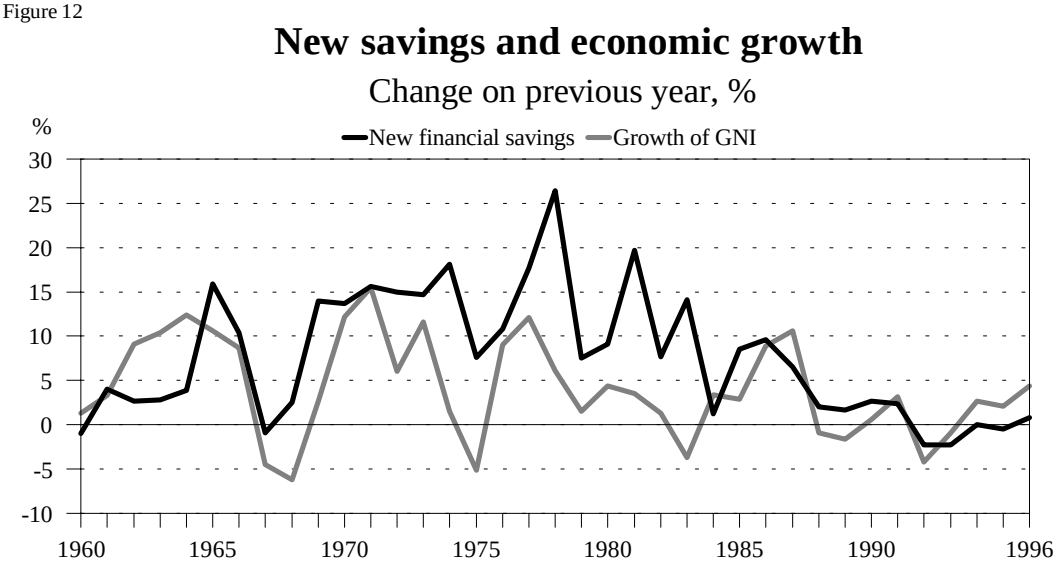
Figure 11



1983 equalling for once one half of GDP. The consistently positive returns from 1984, with a ratio between 8 and 9 per cent through 1992-96, on the other hand, totals three fourths of GDP. In neither case is a year-to-year compounding of real interest rates taken into account.

An accumulative approach is justified, however, in gauging the *effects on the stock of financial savings*. Such a calculation is presented in figure 10 where the average real interest rate is compounded through the period and compared with the actual development of the real financial stock. The lower line of accumulated interest alone shows a slow decline by about one fifth over the period of resistance to 1969-71. This would have been the fate of the original stock without further additions. Despite that negative effect, the actual financial stock about doubled over the same period, the main reasons being both that private hopes for real returns had not yet been dashed and that public efforts for collective savings were considerable. From then on, the depletion was much faster, shedding further three fifths by the compounding process until 1983 with only 21 per cent of the original stock left. The actual real

Figure 12



stock, however, only declined to 1975 but recovered to 1978-80, for thereafter to enter a phase of vigorous growth. To this, obviously, contributed a widespread opportunity of gainful savings and later a general economic upswing. Taking a new departure from 1983, the bottom year of compounded interest, both series can be depicted as almost straight lines, the compounded one increasing by 133 per cent or 6.7 per cent annually, forming a solid basis for the considerably faster actual increase by 208 per cent or 9 per cent annually. The relative 32 per cent increase of actual trend above computed, however, mainly occurs in the period up to 1991, after which interesting variations happen.

A case can be argued for a fundamental difference, of kind rather than degree, between the yield accruing on resting balances and new financial savings added on top of that. The former may rest in its place by sheer force of inertia, supported by the comfortable experience of positive returns, while the latter requires a discretionary action based on willpower and perceived preferences, in which the rate of interest or return is bound to play some part, along with income experiences, previous accumulation, users surplus on durables, and what not. This distinction, at least, seems to call for the search of somewhat different causal factors of each component. It should not, however, be overdone as there is reason to believe that it is most important in the incipient phase of a strong financial recovery, while there is little prospect for a point of saturation to be reached for many savers. At that stage and onwards, however, savers are more likely to view their financial savings as a whole and without consideration of such a distinction, and still more so when wider opportunities such as that of holding shares or other direct investment present themselves, such as the case has increasingly been in Iceland of late. This qualification should, though, not distract from the appreciation of positive returns, whether to be viewed as an independent compounding effect or a factor in complicated assesment of a multiple set of preferences.

The composition of annual real financial savings along these lines appears in figure 11, in terms of percentages of total stock of finance at the beginning of each year. Real yield or interest repeats the same percentages as given for total credit in figure 8, while new savings are calculated as a residual factor. Of course, the use of whole years is somewhat arbitrary as the distinction could be a little different on a half- or quarter-yearly basis. For most of the period, up to 1983, the yield curve lies at the bottom and is mostly negative. New savings are then substantial and most of the years making up for the negative yield, and sometimes well above that. They relate rather closely to economic growth and its cyclical movements, either simultanously or with a one year lag, as shown by figure 12, relating the ratio of new savings to previous stock to changes in real national income. With the initiatives provided by indexation and real interest rates from 1976, albeit limited in scope at first, new savings appear much greater than explained by growth, although following a similar longer trend. Important changes occur from 1984, a landmark year of recovery. Both components are from then on generally more stable and positive, adding up to the total that stayes on top. The low level of new savings from 1988, negative in 1992-93, is compatible with both the economic setback and possible effects of relative saturation of the need for financial balances after the great buildup of previous years. The causal relationships appear very complicated, relating both to flow and stock effects, and do not lend themselves to sweeping theoretical generalizations without closer study. The fact remains, that unless the stock of financial capital is maintained by protective

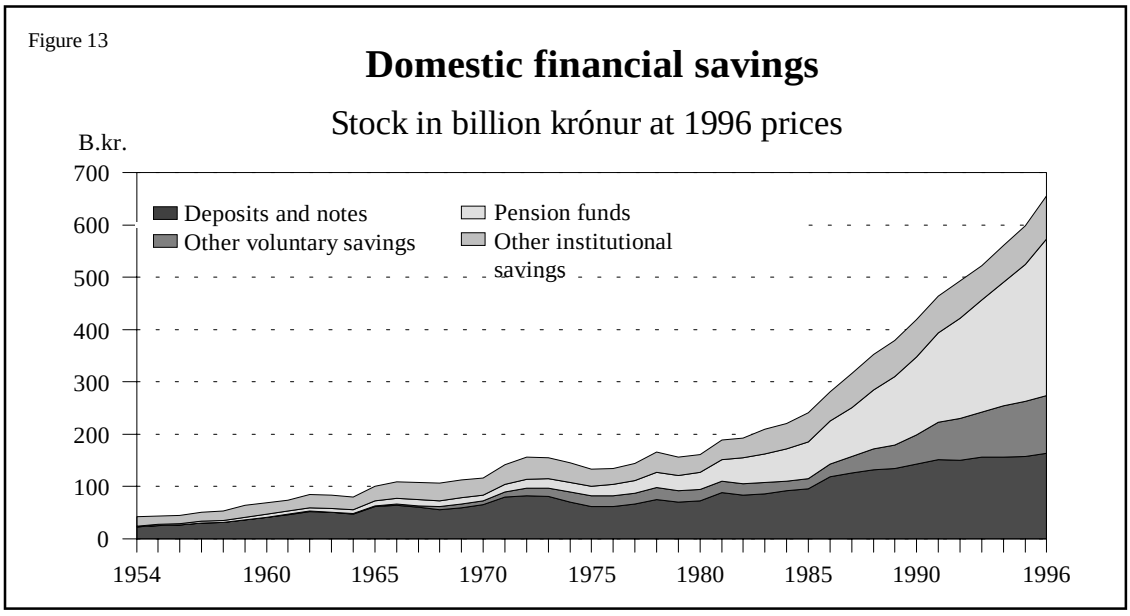
measures akin to indexation and gradually augmented by some minimum yield, great efforts must be expended to the end of only staying put.

Financial capital development

The final test to which the indexation and interest rate policy will here be put is that of the development of the stock of financial capital, both as viewed in real terms or volume growth and relative to the needs of the growing economy. The series used have mostly been worked out from 1954 and to 1996 as before, and they distinguish between four main categories of domstic savings, as well as adding external credit, and also between four borrowing sectors. Following up on previous analysis it is natural to start with the volume of financial savings, drawn up on an artihmetic scale in figure 13, despite the long period, for not to distort internal proportions. A quick glance at it reveals that only two savings categories were important at the beginning: voluntary savings in banks, in the form of deposits and notes, and other institutional savings than in pension funds, mainly public savings in the form of earmarked revenue and profits of public financial institutions. The share of pension funds was very small at first but grew to gradually overshadowing the rest. Other voluntary savings, i.e. outside the banks, emerged with Treasury savings certificates in the mid-sixties and grew to take third place at the end.

Relative growth rates of the subsectors and the resulting multiples of the original are best discussed in the light of a condensed table like the following. Division into sub-periods is here dictated by the most important watersheds of actual trends, mainly of total financial savings. The subperiod of 1954-62 is separated from the rest, also in the calculations for the overall period, to avoid inordinately high incipient growth rates of some categories distorting longer term growth rates. Shifts in savings patterns show in slow growth of deposits and other institutional savings but very high and generally rising rates of other free savings (mainly bonds) and pension funds. These latter two have occupied the best position to enjoy indexation as well as the higher longer term interest rates.

Figure 13



Growth and multiples of real financial capital by periods

Years	Deposits and notes	Other voluntary savings	Voluntary savings total	Pension funds	Other institutional savings	Institutional savings total	Financial savings total	Net external debt	Financial capital total
Annual growth:									
1954-62	11.1	.	11.2	20.2	4.3	6.2	9.1	14.8	9.9
1962-72	4.6	38.0	6.2	10.1	5.1	6.3	6.3	9.4	6.9
1972-79	-2.2	6.2	-0.6	7.5	-2.3	1.2	0.1	13.0	4.0
1979-85	5.1	-1.3	3.8	16.1	7.6	11.8	7.5	8.7	8.0
1985-96	5.1	16.7	8.2	14.0	3.6	10.6	9.5	2.2	7.0
Overall:									
1954-96	4.8	.	6.1	13.4	3.6	7.3	6.7	8.9	7.1
1962-96	3.4	16.7	5.0	11.9	3.5	7.5	6.2	7.6	6.5
Multiples:									
1954-96	7.3	.	12.2	196.5	4.5	19.2	15.5	36.5	18.2
1962-96	3.1	193.3	5.2	45.2	3.2	11.8	7.7	12.1	8.5

Some of the first subperiod growth rates obviously carry little significance as even small beginnings can show in very high growth such as is the case with pension funds and external debt and in second period with bond issues in "other free savings". For the same reason some overall period growth rates and multiples of these components can be untypically high, even when limited to the shorter period from 1962. The main issue, of course, is the distinction between saving domestically or having to borrow abroad. The growth rate of domestic savings started very high but fell fast to near nil over the seven years from 1972 to 1979, in which bank and "other institutional" savings decreased by more than 2 per cent annually. With the restoration by indexation and market interest rates, domestic savings showed accelerating growth, through 7.5 to 9.5 per cent in the end period, with the same branches as before relatively stag-

Figure 14

Financial sources of credit system - stock at end of year

Percentages of financial savings stock

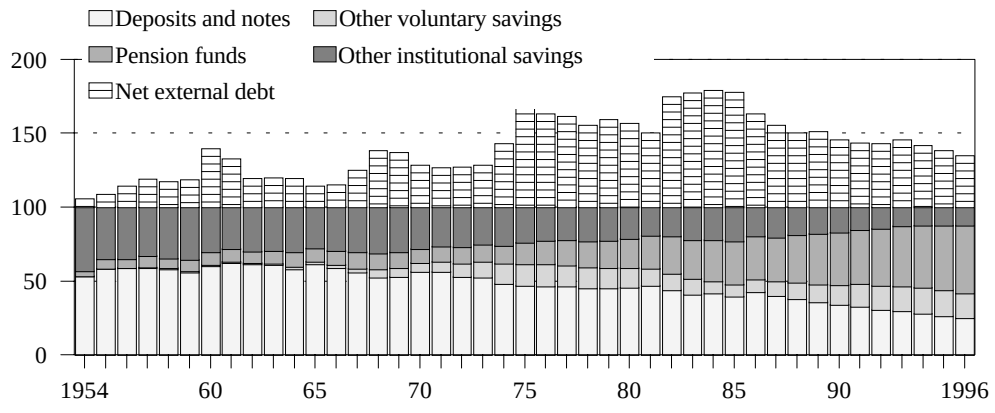
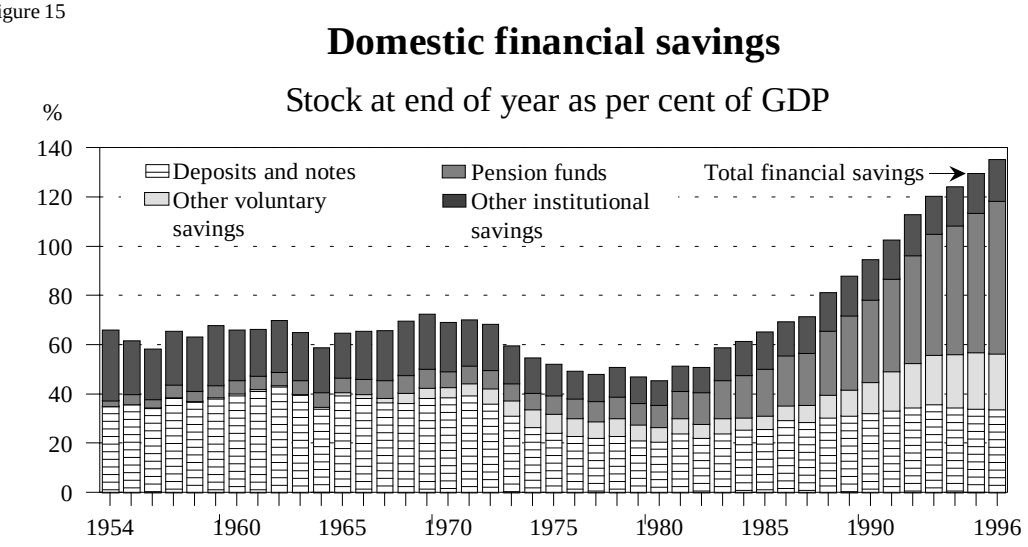


Figure 15



nant. External debt moved in the opposite direction, largely to counterbalance the variation of savings, down to a trickle in the last period. Total supply of credit, however, gives a clear indication of shortage in the middle period, with only 4 per cent annual growth, while the decline from 8 to 7 per cent credit growth at the end, in a free and open regime, seems rather an indication of circumspection and economy in the use of capital in response to equilibrium interest rates. The total achievement of a 15-fold increase of financial stock since 1954 or almost 8-fold since 1962 is in itself impressive. By comparison, the much greater multiple of external debt can be regarded as exessive but also partly natural with regard to the opening up of the economy and, at any rate, seeking balance towards the end.

The description of trends leads naturally to the question of whither they have taken the *composition of the stock of financial capital*. This is expressed in figure 14 in percentages of the stock of financial savings at end of each year and at current prices. Thereby, the great shifts in the respective roles of different branches of the credit system come out more clearly than before. Deposits and notes started the period off with 53 per cent of savings and rose to a maximum of 62 per cent in 1961. After maintaining a similar position over some years, their share gradually declined, most rapidly from 1986, to only 25 per cent in 1996. Reluctance for long to allow banks to index their funds or manage their interest rates as well as the incidence of monetary targeting proved impediments to their growth, but even more so the modern trend for securitization that they have met by running own securities branches. This trend is reflected both in the irregular increase of "other voluntary savings" to 15 per cent in 1976 and finally some 17 per cent in the last years, and still more so in the voluminous increase of pension funds to 46 per cent of savings in 1996, pari passu with the decline of other and more interventionist institutional savings from 43 per cent at the beginning to 12.5 at the end. Instead of the composition of voluntary and institutional being 53 and 47 per cent at the beginning it ended up with 42 and 58 per cent in 1996.

The other main feature of figure 14 is to show the proportion to which the stock of domestic savings is augmented by external capital at disposal for domestic agents. It starts by less than 6 per cent to increase soon by leaps and bounds, mainly in connection with external

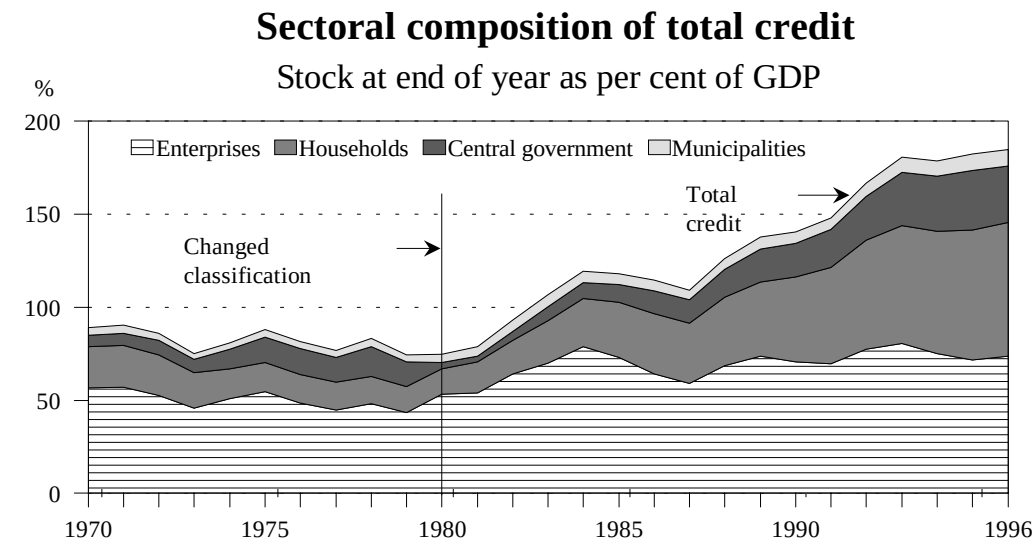
schocks, leading both to devaluation and heavy borrowing as well as to appreciation in krónur terms of previous debt. Preliminary tops were reached with 39 per cent in 1960 and 68 per cent in 1975 and an all time high of 75-79 per cent in 1982-85, with substantial declines in between, not the least due to the recovery each time to a higher real exchange rate. Since the long awaited maturity of the credit market in 1986 there has been a solid decline of foreign indebtedness to only 34 per cent of savings stock in 1996, or to less than half the top level. It should be noted, however, that the exchange rate of the króna was utterly unrealistic at the beginning of the long period, the real rate then about double that of 1996, and also immediately prior to the big devaluations of 1960, 1967-68 and 1975. When account is taken of this by calculating at 1996 prices and exchange rate throughout, the first half period to 1975 shows a much higher and more smoothly moving external share with, however, little difference in the latter half

Relative developments of savings and credit

The real volume of financial savings need not be a satisfactory yardstick. Much greater attention in the discussion has been devoted to its development in relation to gross domestic product, this being a realistic measure of the challenge faced by the domestic credit system. The same can also be said of the national wealth but, given the relative constancy of its ratio to GDP, this should boil down to a similar conclusion. This measure indicates a much more serious setback than that viewed in real volume terms, while the recovery in relation to the rather slow growth of past decade or so appears no less spectacular. Figure 15 presents a general overview of domestic financial savings stock from end of year 1954 to 1996 as a percentage ratio to GDP of the same year. This long period falls distinctly into three subperiods similar to those introduced before. The first up to 1972 was one of resistance to difficult rather than intolerable inflation and of rather weak monetary management to cope with it. It is characterized by fluctuations around a slightly rising trend while the ratios were still far below that generally prevailing in other developed countries and utterly insufficient for the needs of development, as witnessed by the growing dependence on external borrowing. Bank savings of close to 40 per cent and other institutional savings than in pension funds of some 24-30 per cent were the mainstay of savings, while the meagre beginnings of pension funds and private bond investments were important enough to account for a rising trend of the total from some 60 to around 70 per cent of GDP.

It is a matter of interpretation and emphasis whether the second period is defined to the trough in 1980 or including the recovery to the previous level up to 1986. The previous ratios of bank savings and "other institutional" were just about halved to some 21 and 10 per cent in 1979-80, so the total declined by a quarter of GDP to 45 per cent. It took six years to 1986 for the total to recover to the 1970-72 level, after 14 years of subnormal ratios, indicative of financial shortages, but then the composition had changed drastically with most of the recovery accounted for by pension funds alone. This point of recovery, defined only by equality with previous level, however, carries no causal significance as the same forces of real interest rates and their incentive effects continue uninterrupted with the buildup of financial stocks and without any sign of saturation into the nineties. Such signs start to appear in voluntary savings as from 1993, with decline of the banks savings ratio by two points to 34 per cent in 1996 and,

Figure 16



private bond investments barely making up for that, the voluntary savings ratio was almost stagnant over the last four years at 56-57 per cent of GDP. Throughout the recovery, by far the greatest increase occurred with the pension funds, from 9 per cent in 1980 through 20 in 1986 to 62 in 1996, or by more than a half of GDP over 16 years, the increase having accelerated substantially with high real interest rates since 1988. Including some increase in the ratio of other elements, institutional savings increased from 19 per cent in 1980, through 34 in 1986 to 79 in 1996, or by a full 60 per cent of GDP. The total stock of financial savings into the credit system has then tripled since the trough of 45 per cent in 1980, through the recovery level of 69 in 1986 to 135 per cent of GDP in 1996. That should be close to parity with many developed countries, not least when account is taken of that growing purchases of shares by the public is here not included.

Finally, an overview is given in figure 16 of the *sectoral composition of total credit* in the economy, also as a ratio to GDP, but in this case with foreign borrowing included and only available from 1970. Comparability through time is impaired by a reclassification made from 1980, when public enterprises were moved from the government to the enterprise or industrial sector. To a large extent, this side of the matter is a reflection of that of savings with the main exceptions that, on the one hand, the trough is here largely evened out by foreign borrowing and, on the other, that during the recovery the foreign debt is for some time depreciated by rising real exchange rate and, towards the end, substituted for by rapidly rising domestic savings. The sectoral composition brings important lessons, on similar lines as from financial liberalizations abroad, albeit embarassing to some. Originally, the chief purpose of restoring the credit market was thought of as to strengthen the industrial base for a renewal of vigorous economic growth. This purpose was fulfilled to the extent of industrial sector credit attaining 79 per cent of GDP in 1984, up from 43 per cent in 1979, and varying between 59 and 81 per cent from then on. With this basic need catered for, rather unexpectedly, other and higher level needs and aspirations came to the fore, mainly for housing and infrastructure as well as other direct needs of households. The strength of households for acquiring loans lay both in the bidding for their deposits and, in the field of public housing loans, in the political

bidding for their votes as well as in growing financial strength of their occupational pension funds. Household debt, starting with 22 per cent of GDP in 1970, sank to 13 per cent in 1980 to grow again rapidly to 72 per cent in 1996, almost as much as enterprises. With growing accumulation of household debt, to above annual disposable income of households, it has increasingly been regarded as problematic, mainly by well meaning politicians. That argument, however, overlooks the facts that the debt accumulates in tandem with a commensurate increase of assets and that such borrowing is mostly in response to positive opportunities rather than to negative pressures to maintain consumption in face of real income decline. Undoubtedly, however, credit could be employed more profitably on the margin by industrial investment. The public sector, starting with 10 per cent of GDP in 1970 and reclassified to 8 per cent in 1980, from then on increased its stock of debt fast to reach an average of 40 per cent of GDP in the last two years. Altogether, the credit stock first fell from 89 per cent of GDP in 1970 to 74 per cent in 1979, to grow again fast to 185 per cent in 1996, still more than in the case of savings in line with parallels among developed countries.

Credit terms policy in wider socio-economic context

Criticism of indexation and real interest rate policy has not been lacking. It has mainly been founded on the desire to ligthen the debt burdens for the less well off and young upcoming people in the beginning phase of asset accumulation as well as for the relatively weak, often regionally based, industries offering these people a growing base of employment. Obviously, this touches upon a perennial problem of how to lift the lower socio-economic echelons to the general level by various measures of incentives or support. Solutions of that are many-faceted and not limited to providing low cost financial capital, a policy that according to the experience traced here seems bound to backfire in harsh shortage of that universal good. In greatest generality, the conclusion is that financial markets in general must not be distorted for such benign policies, while specifically designed and targeted policy measures to that end ought to be pursued.

Debate on the less sophisticated public opinion level has been handicapped by limited understanding of the conceptual complexities involved. The most common conceptual errors are to treat revaluation of debts for neutral inflation as real cost, to compare revaluation of financial stock at a point of time with an income or expenditure flow over a year, or to account for the appreciation of debt without at the same time taking the corresponding appreciation of assets into account. Assets and debts are meant to last for a number of years and are as a rule, whether individually or as an aggregate, normally some multiple of annual flows, so their cost must be spread over their expected lifetime, and the same goes for their appreciations. Consequently, even modest revaluations can easily overwhelm annual income flows and appear to crowd out other outlays, if not treated in a proper manner of real concepts. Furthermore, the power of accumulation by compound interest, as well as the accelerating process of financial intermediation, dictates a prolonged rise of the ratios of financial stocks to flows.

The criticism alluded to above was sharpened by two unfortunate incidents of developments in the nineties. The first sprang forth from the extraordinarily high inflation in1982-3, coupled with declining real earnings and mismatch between them and the credit terms index.

This situation, as it was expected to endure, gave occasion for widespread revisions of asset and debt positions in relation to income, to which naturally some people were less alert than others. The recent indexation of loans was by many held responsible for financial distress and an increasing number of bankruptcies. The worst cases, however, were associated with the rigid practice of real estate dealers not to index house sellers balances in the short to medium term but to stick to nominal 20 per cent interest rate that proved disastrous to those buying new housing at rapidly rising prices. Thus, the lack of uniform implementation of the system seems rather to be blamed. The latter case occurred when the boom peaked in 1987 and gave way to a serious setback from 1988, thus causing excessive strains in the credit market. Such a situation could possibly have justified intervention into excessive real interest rates which, however, would have entailed the risk of starting a chain of events contrary to the liberalization policy. In both instances, therefore, the solution of these transitory problems was preferred of lengthening loans as required in special cases and of financial reorganization of threatened enterprises.

Initially, in the framework of administered credit terms and against the background of a strong tradition of incomes policy, indexation could be regarded as an economic policy measure. With financial liberalization, and especially with the setting free of interest rates as from 1986, its nature and role changed to a free choice among alternative credit terms, with regard mainly to market perception of inflation risk, while monetary management was being generalized and modernized in terms of market operations. This attitude, however, was slow to dawn upon the public and political parties, causing repeated clamouring for intervention and trade union tendencies to pull interest rate determination into the collective bargaining orbit. Hardly realizing their members overwhelming lifetime interest in financial accumulation, their leadership almost invariably gave precedence to the more marginal interest of debtors and job seekers among their members and pressed for generally low real interest rates. Incidentally, this attitude may have helped indexation pave the way for disinflation that has proceeded successfully over the last few years.

At the outset no promise was given that financial indexation would lead to desired disinflation, which in view of the contrary effects of wage indexation would have been considered a daring commitment. The distinction between these two types of indexation hinges mostly on their respective cost or demand effects. Wage indexation accelerates the rise of costs and thereby, under accommodative demand policies, pushes inflation along, while the argument is far fetched that it can restrict demand. Similar cost-push causation can, in a simple-minded fashion, be brought to bear on financial indexation, while in that case the resulting real interest rates will have a direct demand restraining effect that is liable to be stronger than the cost effect and can be augmented through fiscal and monetary measures. There are several strands of this argument for disinflationary effects, relating to forces brought into play by strong interest rate policy after an extended period of free reins. Firstly, and mainly while the position of trade unions was still strong, the automatic adjustment of debts to the rate of inflation wiped out the gains from it, real and imaginary, that for long had provoked inflationary settlements. Even open complaints were aired that the system left no scope for gains through hard bargaining. Secondly, by the same token, responsible settlements were encouraged by the systematic guarantee that nominal interest rates would be adjusted to yield the targeted real inter-

est rates rather than staying high for reasons of inflation risk. Thirdly, the elimination of inflation gains and the need to foot the real interest bill alongside that of wages and salaries reimposed the discipline so long absent in the business community. Fourth, the demand restraint created the framework for effective competition to keep down prices and secure gains in living standards better than before, with feed-back effects for improved income and price stability. Fifth and finally, by these processes was created a level playing field for demand management policy to fulfil its role. To these real side economic effects can be added the constructive influence of fostering a mature capital and money market by building up the stock of financial capital and multiplying its forms of tradeable objects.

Possible international parallels

Publication of this text on an international forum is bound to raise questions as to its possible wider applicability. Is the experience of Iceland in this respect such a special case that it contains no lessons for other economies, or are there parallels to which it is applicable? It is common knowledge that public attitude in other countries to financial indexation is positively correlated with the changing level of inflation. For the time being the interest for it as a general solution is at a low and will hardly be revived unless inflation creeps into the upper reaches of the one digit range. In Iceland, it was not introduced as such until double digit inflation had been problematic for decades, although by retrospect it would have seemed wise to do so long before. There still remain many countries with inflation in a similar range that might consider the experience of this policy in Iceland. The rationale for resorting to financial indexation in their cases may, however, depend on a host of particular circumstances, such as by which forces their inflation is generated, whether the independence and integrity of administration and quality of index computation allows of a reliable measure of that kind, or how appealing alternative foreign exchange denominations may be, not the least for former dependencies with exchange rates linked to single reserve currencies. Relatively independent and developed countries with, however, inflation maintained by a vicious circle of interactions between wages and interest rates, may be the likeliest candidates for general financial indexation.

Apart from being employed as a comprehensive solution to the depreciation of inflation ridden currencies, indexation is increasingly being applied to the sectors of the capital market most risk averse and sensitive to reliable real interest rates, such as investment by pension funds and such like in public sector bonds. The best known examples, of course, are the Anglo-Saxon countries and some of the Nordic countries. Indexed issues, thereby, have an opportunity of being tested for preference in the market and providing an interesting and increasingly used opportunity for the assessment of market perception of inflation prospects and risk of unindexed papers. Despite present tranquility, some risk of inflation revival always looms on the horizon. An interesting option may, therefore, be to make long term contracts contingent upon a revision clause, whereby indexation would be set in train at a certain and not very high level of inflation.

A similar measure could possibly be devised in the international forum to cope with currency crises such as have shaken world confidence and created havoc in foreign exchange markets. Market determination of exchange rates plays dual roles that are often difficult to re-

concile, the macroeconomic role of balancing current trade in goods and services and establishing a solid basis for the industrial structure, on the one hand, and the financial one of stabilizing for exchange rates consistent with confidence and credibility for holding vast sums of exchange denominated wealth, on the other. Transactions of the latter type can obviously swamp the former. When confidence starts to falter with self-fulfilling consequences, there is no way to revise denominations other than to sell the respective currency to the point of overshooting far beyond realistic current balance purposes. Keynes´ dictum of the by-product of a casino is an apt phrase in this respect. Rather than clamour for an utterly unrealistic single world currency, it may be advisable to establish an arrangement whereby danger signals would activate a clause of revaluation or redenomination of respective financial balances, a procedure of a similar nature as financial indexation.

Conclusions

The main conclusins of this paper are that an almost comprehensive financial indexation, followed up by market determined real interest rates, proved highly successful in restoring the stock of financial savings from the severe depletion wrought by previous inflation and accumulating it to an unprecedented high. Thereby, this policy paved the way for a great variety of financial market objects and forms of organizations as well as for modern instruments and methods of monetary policy and control. With general liberalization of credit terms and opening up of the credit system, indexation needed no longer to be administratively dictated but remains as an option for issuers and negotiating partners in the market.

In the wider context of economic policy, financial indexation has facilitated active demand management for economic discipline on all kinds of agents and helped bring about disinflation and secure a durable fundament for equilibrium policy. With increasing confidence in stability formal indexation has receded, helped by monetary and supervisory authorities in view of possible risk involved in mixing the regimes.

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