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CALENDAR EFFECTS ON QUARTERLY GDP-GROWTH RATES

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Abstract

Since 1986 Statistics Netherlands publishes Quarterly National Accounts. The earliest estimates of quarterly GDP, the so-called flash estimates, are published some seven weeks after the reference quarter. In this paper we examine a new, faster flash estimate, some three to four weeks earlier than its original counterpart. The gain is made by using a simple regression technique and incomplete data. To compensate for the lack of data, information on the number of working-days and shopping-days was added to the regression. It turns out that these calendar-aspects significantly affect GDP-growth: 0.30%-points extra GDP-growth for one extra working-day. One extra shopping-day accounts for about 0.17%-points extra GDP-growth.

The cost of an earlier estimate is a decrease of reliability. The probability of a forecast error of over 0.5%-points will be about 26 percent, compared to 12 percent for the official flash estimate.

Contents

1. Introduction

1.1 Integrated short-term economic indicators in The Netherlands

Since 1986 Statistics Netherlands publishes Quarterly National Accounts. The time series go back to 1977. In addition to Quarterly National GDP-growth, the accounts offer a host of detailed information on the development of the Dutch economy. However, for monitoring purposes the current timeliness of some seventeen weeks of the Quarterly National Accounts is considered less satisfactory. To meet the need for earlier indicators of economic performance Statistics Netherlands started the so-called flash project. This project aimed at an assessment of macro-economic performance of the Dutch economy seven weeks after the reference quarter. The flash estimate contains information on GDP, imports of goods and services, consumption by households, consumption by government, gross fixed capital formation by enterprises, gross fixed capital formation by government, and exports of goods and services.

Prior to the first official release of the flash estimate in 1991, Statistics Netherlands evaluated its reliability over the period 1989/IV-1991/III (Reininga, Zijlmans and Janssen, 1992). After that an evaluation over the period 1989/IV-1993-I was made (Algera and Janssen, 1994). The flash estimates of both GDP and household consumption proved to be reliable estimates of the regular estimates, some ten weeks later. The other flash estimates showed less satisfactory results. Therefore, it was decided to publish flash data on GDP and household consumption only.

As described in Reininga et al. (ibid.) the probability value is a very convenient summary statistic. It reflects the probability that the discrepancy between the flash estimate and the regular estimate exceeds a certain threshold.[1)] The probability values for the period 1989/IV-1994/IV are shown in table 1.

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1. These probabilities are calculated assuming a normal distribution with the estimated standard error and mean of the difference between the flash estimate and the regular estimate as parameters of the distribution.

Table 1. The probability that the discrepancies between the flash estimates and the regular estimates exceed a certain threshold.

Macro-economic variable	Threshold 0.5%	Threshold 1.0%
	Probability value (%)	
Gross domestic product	11.5	0.3
Imports of goods and services	73.2	51.4
Consumption by households	19.6	1.4
Consumption by government	35.4	7.7
Gross fixed capital formation by enterprises	73.2	51.3
Gross fixed capital formation by government	78.4	60.1
Exports of goods and services	73.2	51.3

1.2 The construction of regular and flash estimates

The compilation process of the flash estimate and the regular Quarterly National Accounts is more or less the same. The input-output table of the corresponding reference quarter in the previous year is extrapolated with the use of output, expenditure and income data. The inconsistencies which occur after the "flat" extrapolation are subjected to a (statistical) balancing process. Finally, two fully consistent input-output table results (one in constant prices and one in current prices), with GDP in constant prices as an important result. The timeliness of both, the flash estimate and the Quarterly National Accounts, depends on the amount of statistical data needed, the timeliness of these data, and the time the balancing process takes. In fact, the more up to date flash estimates are obtained by using less statistical information than is used for the regular estimates.

In this paper we examine a new - faster - flash estimate of quarterly GDP-growth. This new estimate is based on even less statistical information than is normally used for the original flash estimate. Moreover, the laborious balancing procedure is replaced by an econometric equation. By and large, this results in a fast estimate three to four weeks earlier than its original counterpart.

1.3 Seasonality and occasional events

In general quarterly statistics are affected by four phenomena: trend, business cycle, seasonality and occasional events. Currently, Statistics Netherlands publishes Quarterly National Accounts figures which are adjusted for seasonality. Research is done to arrive at figures that are also adjusted for occasional events.

Although the impossibility for seasonal adjustment procedures to meet all theoretic requirements at the same time is well documented (see Lovell, 1963), in practice many seasonal adjustment procedures seek to approximate the seasonal component in time series. However, Den Butter and Fase (1987) show that none of the procedures for seasonal adjustment they investigated, could identify the known seasonal pattern of a simulated time series. Consequently, the adjusted time series may still contain seasonal elements. In that case a judgement of the business cycle on the basis of the inadequately adjusted series can be a hazardous task. Here, GDP-growth is calculated as the growth-rate between a certain quarter and the corresponding quarter one year before. In this way the seasonal component is eliminated implicitly. Only shifts in seasonal patterns, e.g. because of technological changes and changing habits, will appear in the figures.

More seriously in analyzing the business cycle by GDP-figures are occasional events. Such events, like changes in the number of working-days, weather conditions, strikes, influenza epidemics and floods, may have a large impact on GDP-growth. Therefore a quantitative assessment of the occasional component would greatly increase the relevance of GDP-growth figures as an indicator of cyclical fluctuations. Removing both seasonal and occasional components from GDP-growth figures enables the construction of so-called "business cycle"-relevant growth figures. Such a series may serve as an optimal reference-series for leading indicators as well as tendency indicators.

In examining the new faster econometric estimate of GDP-growth we found that adding information on the number of working-days and shopping-days to the rather limited amount of statistical information, improved our results in terms of reliability. Apparently, the assessment of the average effect of these so-

called "calendar-effects" can be used for forecasting purposes together with information on the number of working-days and shopping-days in the reference quarter readily at hand. Moreover, the quantification of these calender effects can be used to construct an experimental time series of the "business cycle"-relevant GDP-growth.

1.4 Outline of the Paper

In the next section the econometric method is introduced, that will replace the balancing process. Moreover, the availability and the timeliness of data at Statistics Netherlands are discussed. Furthermore, the results are presented. In particular, the reliability of the econometric estimates vis-a-vis the flash estimates of Statistics Netherlands is evaluated. Next, various attempts to improve our preliminary econometric results by means of information on "calendar effects" are shown. Finally, as an experiment, an experimental time series of "business cycle"-relevant GDP-growth is constructed, using the estimated calendar-effects. The main conclusions are summarized in section 3.

2. A new fast estimate of GDP-growth

2.1 The econometric method

2.1.1 Introduction

As pointed out in the introduction we aim at presenting fast estimates of GDP-growth by means of simple regression techniques. Just like the flash and the regular estimates, our new fast estimate is bound to the same limitations with respect to the choice of underlying data. Therefore the estimate is to be constructed from observations on facts. Expectations and assumed relationships between expectations and realizations should not be used.

Part of the gain of time is due to the use of simple regression techniques, which enables us to skip the laborious statistical compilation process. However, it also prohibits the use of the expert knowledge and intuition of the specialists who compile the flash and regular estimates. Therefore regression techniques are expected to yield less reliable results, compared to those used to compile the flash estimates. Only a substantial increase in the timeliness will warrant the change in technique. The goal is set at the presentation of (econometric) estimates within four weeks after the reference quarter. This implies a fast estimate, three to four weeks earlier than the original flash estimate. Consequently, this standard leads to rather stringent demands on the timeliness of exogenous variables to be used. Our analysis has to be restricted to monthly and quarterly data with a timeliness of four weeks at most.

2.1.2 Three estimation methods

GDP can be estimated by three different methods: the income method, the expenditure method, and the output method. All three methods should yield the same result. In reality persistent problems in the compilation process of statistics cause severe deviations of this theoretic outcome. Consequently, balancing procedures that, at least partly, combine income, expenditure and output information have been developed, and seem to offer the most promising results as to the reliability of the estimates of (real) GDP.

In principle, our econometric equation should reflect this insight from traditional statistical methods. Ideally, this would imply the inclusion of income, expenditure, and output variables. However, the required timeliness of four weeks or less cannot be met by income data in The Netherlands. So, income variables cannot be included in the analysis. Therefore, the econometric equation only contains output and expenditure variables that are (supposed to be) relevant indicators of GDP.

2.1.3 Output and expenditure data in The Netherlands

An econometric estimate of GDP-growth on the basis of the output method ideally would imply the use of separate data on real output growth in every industry. However, the availability of data in The Netherlands precludes such an "ideal" regression. The timeliness of some of the output data does not meet our standards. For other variables (long) time series are not available. An impression of the short-term indicators available in the Netherlands can be found in the monthly "Conjunctuurbericht" (Business Cycle Report).

Fortunately, a monthly output index of manufacturing industry is available. Seven weeks after the reference month the so-called production index (PI) offers information on output in this part of the economy. This means that four weeks after a reference quarter output information on the first two months of a quarter is available. Moreover, long time series going back to the early sixties are available.

Next to the PI of manufacturing we can dispose of a PI of the construction industry. This particular branch of industry accounts for only 5.7 percent (in 1993) of GDP. However, output in the construction industry is affected by bad weather conditions. Consequently, this index might prove to be of particular interest to approximate the overall impact of occasional events like lengthy periods of cold weather on real economic growth. The timeliness of this index resembles the timeliness of the PI of manufacturing industry. So, again, only information on the first two months of the reference quarter can be used. Unfortunately, the PI of the construction industry is available for only a short period: 1988/I-1994/II.

As (timely) output data for other parts of the economy are lacking, both indexes are the only variables reflecting the output method. This might seriously deteriorate the reliability of the results of the econometric method as the contribution of both industries to GDP is only 25 percent (in 1993).

To improve the estimate of GDP-growth by means of output variables we decided to add an overall indicator of economic performance to the equation. Total employment, besides problems because of a possible time-lag between changes in employment and changes in GDP, might be a very suitable indicator in this respect. However, data on total employment are not available in time. On the other hand, data on unemployment are published three weeks after a reference quarter. Therefore, although it is a less suitable indicator of overall economic performance than employment, because of possible disturbances from the supply side of the labor market, it is the only one which can be used.

As far as expenditure data are concerned Statistics Netherlands offers rather timely monthly information on household consumption and exports of goods and services. These two expenditure categories account for over 75 percent of total expenditure in The Netherlands (1993). Eight weeks after a reference month information on consumption and exports[2)] is available. Again, this means that four weeks after a reference quarter only information on the first two months of a quarter can be used.

2.2 Preliminary econometric results

2.2.1 Strategy

The first stage of our investigation was to arrive at a basis specification of the regression equation. The choice of variables was limited by those (partly) available within four weeks after the end of the reference quarter. However, if available, it was assumed that the time-series of a variable could be founded on data on all three months of a quarter. The actual situation, that in general

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2. Due to the liberalisation of the intra-EC trade in 1993, Statistics Netherlands was forced to redesign its observation of imports and exports of goods and services. This change has lead to a significant delay in the publication of trade statistics and a loss of reliability. It is expected that in the next years the foreign trade statistics will regain their accuracy and timeliness.

only data on the first and second month were available, was dealt with in the second stage of our investigation. At this latter stage the choice of variables, which was decided at before, remained unchanged. In a third stage new variables were added to compensate for calendar effects and the impact of bad weather conditions. The results of the third stage are described in section 2.3.

Our assessment of the econometric results is not only based on the traditional indicators of the so-called "fit" of the regression, like adjusted R^2 and t-values. As our goal is to estimate economic growth within four weeks after the reference quarter, the reliability of the estimates in an ex-post simulation process also plays an important role, especially in stage two and three of our investigation. Moreover, in the third stage they are considered even more important than the traditional indicators.

The reliability of the new flash estimate can be evaluated in terms of deviations from the first regular Quarterly National Accounts as well as in terms of variance. A good summary indicator, which takes both into account, is the probability that the "forecast" error exceeds a predetermined reliability standard. In the evaluation of the flash estimate an error of 0.5%-point was considered to be the maximum error to be tolerated. The initial evaluation of our fast econometric estimate is based on this standard. As Statistics Netherlands started the official release of its flash estimate in 1991/II, our ex-post simulation period is from 1991/II to 1994/IV.

2.2.2 Results

In the first stage of our investigation it was assumed that the variables available were founded on data on all three months of a quarter. We could dispose of time-series on industrial output, construction, unemployment, household consumption and exports. No significant relation between construction and GDP was found, probably due to the short length of the time-series. All time-series are expressed in relative changes (percentages) with respect to the corresponding quarter one year before. The result was:

```
gdp       =  0.10 + 0.31 pi + 0.50 cons - 0.12 unempl + 0.09 exp
(t-value)   (0.3)  (5.2)     (4.4)       (-1.2)         (1.8)

R2(adj.) = 0.75
Durbin-Watson Statistic = 2,03
Estimation period: 1982/I - 1994/IV

gdp    = gross domestic product
pi     = production index of industrial output (manufacturing)
cons   = household consumption
unempl = unemployment
exp    = exports
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Despite a strong multicollinearity between the production index, unemployment and consumption, the t-values for their respective coefficients are relatively high. Therefore, it was decided not to drop one of them.

In contrast with the assumption above, full information on the production index, household consumption and exports was not available: data on the last month of the last quarter is lacking. There are three ways to deal with this lack of information. First, one may assume that the data on the two first months of a quarter are representative for the quarter as a whole. This assumption does not allow for a continuous growth or decline during a quarter as the third month will always be an average of the first two. Secondly, one may declare the second month representative. This assumption, however, does not allow for a cyclical change within a quarter. Thirdly, one may introduce a time-lag, assuming a kind of autoregressive trend within a time-series.

The decisions taken were not only based on the t-values and R^2, but also on the performance on the ex-post simulation. It turned out that in general the use of the second month of a quarter lead to more satisfactory results than the use of all information available. Further it was found that for exports a time-lag of two months was to be preferred. However, it is not certain that this latter result will hold for many years. The value of the regression coefficient and its significance very much depends on the length of the time series. We think that, if longer time-series become available, another solution must be found for the lack of information on the third month. The result of the second stage was:

gdp = 1.16 + 0.11 pi2 + 0.26 cons2 - 0.039 unempl + 0.079 exp_{-2}

(t-value) (3.8) (3.3) (2.8) (-4.1) (1.6)

R^2(adj.) = 0,69
Durbin-Watson statistic = 1.94
Estimation period: 1982/I t/m 1994/IV

gdp = gross domestic product
pi2 = production index of industrial output (manufacturing), second month
cons2 = household consumption, second month
unempl = unemployment
exp = exports

The ex-post simulation over the period 1991/II-1994/IV enables us to assess the reliability of the econometric estimates vis-a-vis the regular flash estimates of Statistics Netherlands. The probability that our estimate exceeds the preset reliability standard of 0.5%-point, is approximately 30 percent, whereas this probability for the flash estimate is only some 12 percent. As yet, it may be concluded that the faster estimate is obtained at the cost of a considerable loss of reliability.

2.3 Improving the preliminary results

2.3.1 Adding calendar information

As mentioned before changes in GDP are due to cyclical, seasonal, structural and occasional factors. The occasional factor partly consists of so-called "calendar effects". The number of working-days in the reference quarter may differ from the number of working-days in the same quarter of the previous year. This will affect the output growth of e.g. manufacturing and construction. Similar remarks can be made with respect to the number of shopping-days and household expenditure. Normally, these effects are already implicitly included in the right hand side variables of the regression equation. In our case, however, the exogenous variables do refer to only a part of the reference quarter. Therefore, the included calendar effects may differ from the real calendar effect of the quarter as a whole. Correcting for these differences may improve the result of the previous section.

The time-series to correct for calendar effects were calculated as the difference of the quarterly growth-rate of the number of working-days[3)] respectively shopping-days[4)] and the corresponding growth-rate of the second month of the quarter. The inclusion of calendar effects led to the next result.

```
gdp        =  0.69 + 0.30 pi2 + 0.40 cons2 - 0.028 unempl + 0.028 exp_2 + 0.13 tdays + 0.19 wdays
(t-value)    (2.4)  (5.8)       (4.2)         (-3.3)          (0.67)        (2.8)         (3.8)

R2(adj.) = 0,78
Durbin-Watson statistic = 1.96
Estimation period: 1982/I t/m 1994/IV

gdp    = gross domestic product
pi2    = production index of industrial output (manufacturing), second month
cons2  = household consumption, second month
unempl = unemployment
exp    = exports
tdays  = correction for the number of shopping-days
wdays  = correction for the number of working-days
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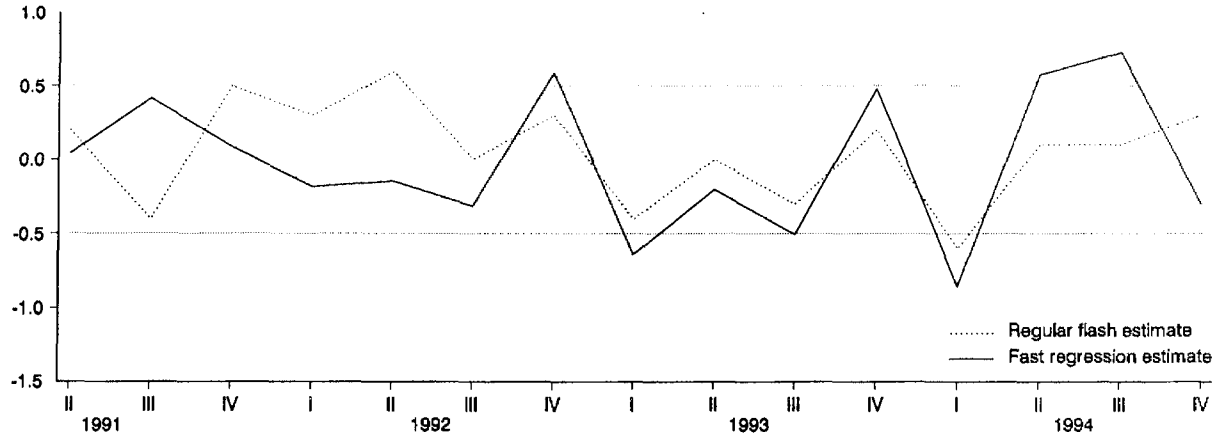
Inclusion of a correction for the number of working- and shopping-days significantly improved the results. The coefficient of exports, however, does not differ from zero anymore. Nevertheless we decided not to drop this variable as keeping this variable in very much improved the results of the ex-post simulation. However, it strengthens our reservations with respect to the specification of this variable. The probability of a forecast error of over 0.5%-point improved to about 26 percent. The forecast errors of this regression are shown in figure 1.

Figure 1. The forecast-errors of the regular flash estimate (dotted line) and the fast regression estimate (solid line) of GDP-growth, 1991/II - 1994/IV



3. The number of working-days is calculated assuming five working-days per week. Church and public holidays are not counted as working-days. The average number of working-days per quarter is 64.
4. The number of shopping-days is the weighted sum of the number of days. The weighting scheme is 0.51 (Mondays), 0.68 (Tuesdays), 0.74 (Wednesdays), 1.14 (Thursdays), 1.55 (Fridays), 1.38 (Saturdays) and 0.00 (Sundays). The weights are based on daily data on household expenditure. The average number of shopping-days per quarter is 77.

An alternative approach to compensate for lack of data is to use calender information to predict the value of the missing observations on the production index, household consumption and exports, thus completing the time series of the exogenous variables. Then the regression specification in section 2.2.2 can be used to arrive at an estimate of GDP-growth. This method should be preferred to the one presented before, as it makes use of all data available. The results in terms of R^2 and t-values were very good. Its performance on the ex-post simulation, however, was very bad, with a probability value of over 40 percent.

2.3.2 The quantitative impact of bad weather conditions

Like calendar effects, the proxies for the quarterly changes in the output of manufacturing and household consumption, also not fully count for the impact of extreme weather conditions. Yet, it is almost sure that such conditions, for example long periods of cold weather or excessive rainfall, affect economic growth. In particular construction and agriculture are susceptible to this adverse influence from the natural environment. Unfortunately we could not satisfactorily include such effects in our analysis, despite a lot of daily, monthly and quarterly data on rain and snow, temperature, sunshine etcetera.

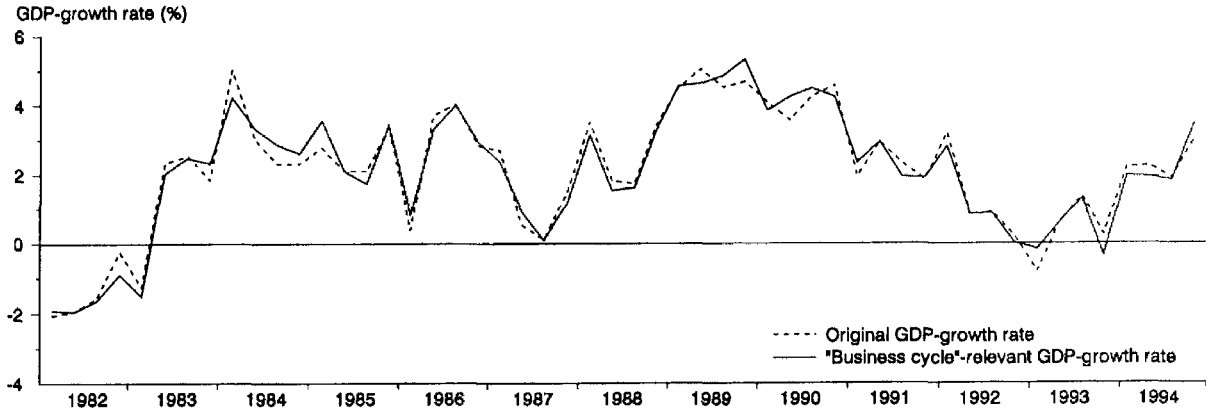
As far as construction is concerned, Statistics Netherlands provides detailed data on the number of working-days lost because of bad weather conditions. This indicator seemed appropriate to evaluate the weather-effect on output in the construction industry, and consequently, on real GDP-growth. Again we did not find any significant contribution of these data to the explanation of changes in economic growth. This result may be caused by the rather short time series available (1986/I-1994/II) but may also reflect the fact that, at least on a macro level, weather conditions do not affect real growth as much as was thought in advance.

2.4 A "business cycle"-relevant time series of GDP-growth

Next to improving forecast results, the explicit introduction of calendar effects enables the quantitative assessment of their impact on real GDP-growth. It can be calculated from the estimated coefficient for the correction for the number of working-days that one extra working-day accounts for an average of

0.30% extra real GDP-growth. One extra shopping-day accounts for an average extra GDP-growth of about 0.17%. This rather low additional effect of an extra shopping-day might be explained by an opposite lower stock building in retail trade as a consequence of an extra shopping-day. Using the results of section 2.3.2 it is possible to construct an experimental "business cycle"-relevant time series of GDP growth. The result is shown in figure 2.

Figure 2. Experimental "business cycle" relevant GDP-growth, 1982-1994



The experimental "business cycle"-relevant time series of quarterly GDP-growth and the original time series show significant differences. The average absolute difference between both series is almost 0.3%-point. One quarter of all observations in the original time series has been changed with over 0.4%-point.

3. Conclusions

In this article it is shown that it is possible to arrive at a first estimate of quarterly economic growth in the Netherlands, three to four weeks before the official first flash estimate, which is published some seven weeks after the reference quarter. This gain is made by using a simple regression technique and incomplete data, at the costs of a decrease of reliability. The probability of a forecast error of over 0.5%-points will be about 26 percent, compared to 12 percent for the official flash estimate.

However, if speed is considered more important than accuracy, and a forecast-error of 0.7%-point is acceptable, the probability that the fast regression estimate exceeds this standard is only 12 percent. Coincidentally, this probability equals the probability that the current official flash estimate exceeds its 0.5%-point standard. As real GDP-growth figures are very important indicators of overall economic performance, Statistics Netherlands considers the cost in terms of loss of reliability too high. More research is needed to improve the reliability of the fast estimate.

Finally, our efforts to a first (econometric) assessment of calendar effects on real GDP-growth: the results indicate a rather important impact of working-day fluctuations. The experimental "business cycle"-relevant time series of GDP-growth, which could be constructed, shows significant differences with the original time series.

References

Algera, S.B., and R.J.A. Janssen, 1994, Relationship between Business Cycle Surveys and National Accounts - theory and practice. In: The Explanatory Power of Business Cycle Surveys (edited by K.H. Oppenländer and G. Poser), papers presented at the 21st CIRET Conference Proceedings, Stellenbosch 1993.

Den Butter F.A.G., and M.M.G. Fase, 1987, Seizoenanalyse en Beleidsdiagnose (Seasonal Analysis and Policy Determination). De Nederlandsche Bank, Monetaire Monografieën, No. 8.

Lovell, M.C., 1963, Seasonal Adjustment of Economic Time Series and Multiple Regression Analysis. Journal of the American Statistical Association, pp. 993-1010.

Reininga, F.K., G.M. Zijlmans, and R.J.A. Jansen, 1992, Preliminary Results of the Dutch Quarterly Accounts Flash Estimate. In: CIRET Studien 43, Contributed Papers Submitted for the 20th CIRET Conference 1991 in Budapest, CIRET/Munich.

Statistics Netherlands
National Accounts Occasional Papers

NA/01 Flexibility in the system of National Accounts, Van Eck, R., C.N. Gorter and H.K. van Tuinen (1983).
This paper sets out some of the main ideas of what gradually developed into the Dutch view on the fourth revision of the SNA. In particular it focuses on the validity and even desirability of the inclusion of a number of carefully chosen alternative definitions in the "Blue Book", and the organization of a flexible system starting from a core that is easier to understand than the 1968 SNA.

NA/02 The unobserved economy and the National Accounts in the Netherlands, a sensitivity analysis, Broesterhuizen, G.A.A.M. (1983).
This paper studies the influence of fraud on macro-economic statistics, especially GDP. The term "fraud" is used as meaning unreporting or underreporting income (e.g. to the tax authorities). The conclusion of the analysis of growth figures is that a bias in the growth of GDP of more than 0.5% is very unlikely.

NA/03 Secondary activities and the National Accounts: Aspects of the Dutch measurement practice and its effects on the unofficial economy, Van Eck, R. (1985).
In the process of estimating national product and other variables in the National Accounts a number of methods is used to obtain initial estimates for each economic activity. These methods are described and for each method various possibilities for distortion are considered.

NA/04 Comparability of input-output tables in time, Al, P.G. and G.A.A.M. Broesterhuizen (1985).
It is argued that the comparability in time of statistics, and input-output tables in particular, can be filled in in various ways. The way in which it is filled depends on the structure and object of the statistics concerned. In this respect it is important to differentiate between coordinated input-output tables, in which groups of units (industries) are divided into rows and columns, and analytical input-output tables, in which the rows and columns refer to homogeneous activities.

NA/05 The use of chain indices for deflating the National Accounts, Al, P.G., B.M. Balk, S. de Boer and G.P. den Bakker (1985).
This paper is devoted to the problem of deflating National Accounts and input-output tables. This problem is approached from the theoretical as well as from the practical side. Although the theoretical argument favors the use of chained Vartia-I indices, the current practice of compilating National Accounts restricts to using chained Paasche and Laspeyres indices. Various possible objections to the use of chained indices are discussed and rejected.

NA/06 Revision of the system of National Accounts: the case for flexibility, Van Bochove, C.A. and H.K. van Tuinen (1985).
It is argued that the structure of the SNA should be made more flexible. This can be achieved by means of a system of a general purpose core supplemented with special modules. This core is a fully fledged, detailed system of National Accounts with a greater institutional content than the present SNA and a more elaborate description of the economy at the meso-level. The modules are more analytic and reflect special purposes and specific theoretical views.

NA/07 Integration of input-output tables and sector accounts; a possible solution, Van den Bos, C. (1985).
The establishment-enterprise problem is tackled by taking the institutional sectors to which the establishments belong into account during the construction of input-output tables. The extra burden on the construction of input-output tables resulting from this approach is examined for the Dutch situation. An adapted sectoring of institutional units is proposed for the construction of input-output tables.

NA/08 A note on Dutch National Accounting data 1900-1984, Van Bochove, C.A. (1985).
This note provides a brief survey of Dutch national accounting data for 1900-1984, concentrating on national income. It indicates where these data can be found and what the major discontinuities are. The note concludes that estimates of the level of national income may contain inaccuracies; that its growth rate is measured accurately for the period since 1948; and that the real income growth rate series for 1900-1984 may contain a systematic bias.

NA/09 The structure of the next SNA: review of the basic options, Van Bochove, C.A. and A.M. Bloem (1985).
There are two basic issues with respect to the structure of the next version of the UN System of National Accounts. The first is its 'size': reviewing this issue, it can be concluded that the next SNA should contain an integrated meso-economic statistical system. It is essential that the next SNA contains an institutional system without the imputations and attributions that pollute the present SNA. This can be achieved by distinguishing, in the central system of the next SNA, a core (the institutional system), a standard module for non-market production and a standard module describing attributed income and consumption of the household sector.

NA/10 Dual sectoring in National Accounts, Al, P.G. (1985).
Following a conceptual explanation of dual sectoring, an outline is given of a statistical system with complete dual sectoring in which the linkages are also defined and worked out. It is shown that the SNA 1968 is incomplete and obscure with respect to the links between the two sub-processes.

NA/11 Backward and forward linkages with an application to the Dutch agro-industrial complex, Harthoorn, R. (1985).
Some industries induce production in other industries. An elegant method is developed for calculating forward and backward linkages avoiding double counting. For 1981 these methods have been applied to determine the influence of Dutch agriculture in the Dutch economy in terms of value added and labour force.

NA/12 Production chains, Harthoorn, R. (1986).
This paper introduces the notion of production chains as a measure of the hierarchy of industries in the production process. Production chains are sequences of transformation of products by successive industries. It is possible to calculate forward transformations as well as backward ones.

NA/13 The simultaneous compilation of current price and deflated input-output tables, De Boer, S. and G.A.A.M. Broesterhuizen (1986).
A few years ago the method of compiling input-output tables underwent in the Netherlands an essential revision. The most significant improvement is that during the entire statistical process, from the processing and analysis of the basic data up to and including the phase of balancing the tables, data in current prices and deflated data are obtained simultaneously and in consistency with each other.

NA/14 A proposal for the synoptic structure of the next SNA, Al, P.G. and C.A. van Bochove (1986).

NA/15 Features of the hidden economy in the Netherlands, Van Eck, R. and B. Kazemier (1986).
This paper presents survey results on the size and structure of the hidden labour market in the Netherlands.

NA/16 Uncovering hidden income distributions: the Dutch approach, Van Bochove, C.A. (1987).

NA/17 Main national accounting series 1900-1986, Van Bochove, C.A. and T.A. Huitker (1987).
The main national accounting series for the Netherlands, 1900-1986, are provided, along with a brief explanation.

NA/18 The Dutch economy, 1921-1939 and 1969-1985. A comparison based on revised macro-economic data for the interwar period, Den Bakker, G.P., T.A. Huitker and C.A. van Bochove (1987).
A set of macro-economic time series for the Netherlands 1921-1939 is presented. The new series differ considerably from the data that had been published before. They are also more comprehensive, more detailed, and conceptually consistent with the modern National Accounts. The macro-economic developments that are shown by the new series are discussed. It turns out that the traditional economic-historical view of the Dutch economy has to be reversed.

NA/19 Constant wealth national income: accounting for war damage with an application to the Netherlands, 1940-1945, Van Bochove, C.A. and W. van Sorge (1987).

NA/20 The micro-meso-macro linkage for business in an SNA-compatible system of economic statistics, Van Bochove, C.A. (1987).

NA/21 Micro-macro link for government, Bloem, A.M. (1987).
This paper describes the way the link between the statistics on government finance and national accounts is provided for in the Dutch government finance statistics.

NA/22 Some extensions of the static open Leontief model, Harthoorn, R.(1987).
The results of input-output analysis are invariant for a transformation of the system of units. Such transformation can be used to derive the Leontief price model, for forecasting input-output tables and for the calculation of cumulative factor costs. Finally the series expansion of the Leontief inverse is used to describe how certain economic processes are spread out over time.

NA/23 Compilation of household sector accounts in the Netherlands National Accounts, Van der Laan, P. (1987).
This paper provides a concise description of the way in which household sector accounts are compiled within the Netherlands National Accounts. Special attention is paid to differences with the recommendations in the United Nations System of National Accounts (SNA).

NA/24 On the adjustment of tables with Lagrange multipliers, Harthoorn, R. and J. van Dalen (1987).
An efficient variant of the Lagrange method is given, which uses no more computer time and central memory then the widely used RAS method. Also some special cases are discussed: the adjustment of row sums and column sums, additional restraints, mutual connections between tables and three dimensional tables.

NA/25 The methodology of the Dutch system of quarterly accounts, Janssen, R.J.A. and S.B. Algera (1988).
In this paper a description is given of the Dutch system of quarterly national accounts. The backbone of the method is the compilation of a quarterly input-output table by integrating short-term economic statistics.

NA/26 Imputations and re-routeings in the National Accounts, Gorter, Cor N. (1988).
Starting out from a definition of 'actual' transactions an inventory of all imputations and re-routeings in the SNA is made. It is discussed which of those should be retained in the core of a flexible system of National Accounts. Conceptual and practical questions of presentation are brought up. Numerical examples are given.

NA/27 Registration of trade in services and market valuation of imports and exports in the National Accounts, Bos, Frits (1988).
The registration of external trade transactions in the main tables of the National Accounts should be based on invoice value; this is not only conceptually very attractive, but also suitable for data collection purposes.

NA/28 The institutional sector classification, Van den Bos, C. (1988).
A background paper on the conceptual side of the grouping of financing units. A limited number of criteria are formulated.

NA/29 The concept of (transactor-)units in the National Accounts and in the basic system of economic statistics, Bloem, Adriaan M. (1989).
Units in legal-administrative reality are often not suitable as statistical units in describing economic processes. Some transformation of legal-administrative units into economic statistical units is needed. This paper examines this transformation and furnishes definitions of economic statistical units. Proper definitions are especially important because of the forthcoming revision of the SNA.

NA/30 Regional income concepts, Bloem, Adriaan M. and Bas De Vet (1989).
In this paper, the conceptual and statistical problems involved in the regionalization of national accounting variables are discussed. Examples are the regionalization of Gross Domestic Product, Gross National Income, Disposable National Income and Total Income of the Population.

NA/31 The use of tendency surveys in extrapolating National Accounts, Oudde-ken, Frank and Gerrit Zijlmans (1989).
This paper discusses the feasibility of the use of tendency survey data in the compilation of very timely Quarterly Accounts. Some preliminary estimates of relations between tendency survey data and regular Quarterly Accounts-indicators are also presented.

NA/32 An economic core system and the socio-economic accounts module for the Netherlands, Gorter, Cor N. and Paul van der Laan (1989).
A discussion of the core and various types of modules in an overall system of economy related statistics. Special attention is paid to the Dutch Socio-economic Accounts. Tables and figures for the Netherlands are added.

NA/33 A systems view on concepts of income in the National Accounts, Bos, Frits (1989).
In this paper, concepts of income are explicitly linked to the purposes of use and to actual circumstances. Main choices in defining income are presented in a general system. The National Accounts is a multi-purpose framework. It should therefore contain several concepts of income, e.g. differing with respect to the production boundary. Furthermore, concepts of national income do not necessarily constitute an aggregation of income at a micro-level.

NA/34 How to treat borrowing and leasing in the next SNA, Keuning, Steven J. (1990).
The use of services related to borrowing money, leasing capital goods, and renting land should not be considered as intermediate inputs into specific production processes. It is argued that the way of recording the use of financial services in the present SNA should remain largely intact.

NA/35 A summary description of sources and methods used in compiling the final estimates of Dutch National Income 1986, Gorter, Cor N. and others (1990).
Translation of the inventory report submitted to the GNP Management Committee of the European Communities.

NA/36 The registration of processing in supply and use tables and input-output tables, Bloem, Adriaan M., Sake De Boer and Pieter Wind (1993).
The registration of processing is discussed primarily with regard to its effects on input-output-type tables and input-output quotes. Links between National Accounts and basic statistics, user demands and international guidelines are examined. Net recording is in general to be preferred. An exception has to be made when processing amounts to a complete production process, e.g. oil refineries in the Netherlands.

NA/37 A proposal for a SAM which fits into the next System of National Accounts, Keuning, Steven J. (1990).
This paper shows that all flow accounts which may become part of the next System of National Accounts can be embedded easily in a Social Accounting Matrix (SAM). In fact, for many purposes a SAM format may be preferred to the traditional T-accounts for the institutional sectors, since it allows for more flexibility in selecting relevant classifications and valuation principles.

NA/38 Net versus gross National Income, Bos, Frits (1990).
In practice, gross figures of Domestic Product, National Product and National Income are most often preferred to net figures. In this paper, this practice is challenged. Conceptual issues and the reliability of capital consumption estimates are discussed.

NA/39 Concealed interest income of households in the Netherlands; 1977, 1979 and 1981, Kazemier, Brugt (1990).
The major problem in estimating the size of hidden income is that total income, reported plus unreported, is unknown. However, this is not the case with total interest income of households in the Netherlands. This makes it possible to estimate at least the order of magnitude of this part of hidden income. In this paper it will be shown that in 1977, 1979 and 1981 almost 50% of total interest received by households was concealed.

NA/40 Who came off worst: Structural change of Dutch value added and employ-- ment during the interwar period, Den Bakker, Gert P. and Jan de Gijt (1990).
In this paper new data for the interwar period are presented. The distribution of value added over industries and a break-down of value added into components is given. Employment by industry is estimated as well. Moreover, structural changes during the interwar years and in the more recent past are juxtaposed.

NA/41 The supply of hidden labour in the Netherlands: a model, Kazemier, Brugt and Rob van Eck (1990).
This paper presents a model of the supply of hidden labour in the Netherlands. Model simulations show that the supply of hidden labour is not very sensitive to cyclical fluctuations. A tax exempt of 1500 guilders for second jobs and a higher probability of detection, however, may substantially decrease the magnitude of the hidden labour market.

NA/42 Benefits from productivity growth and the distribution of income, Keuning, Steven J. (1990).
This paper contains a discussion on the measurement of multifactor productivity and sketches a framework for analyzing the relation between productivity changes and changes in the average factor remuneration rate by industry. Subsequently, the effects on the average wage rate by labour category and the household primary income distribution are studied.

NA/43 Valuation principles in supply and use tables and in the sectoral accounts, Keuning, Steven J. (1991).
In many instances, the valuation of transactions in goods and services in the national accounts poses a problem. The main reason is that the price paid by the purchaser deviates from the price received by the producers. The paper discusses these problems and demonstrates that different valuations should be used in the supply and use tables and in the sectoral accounts.

NA/44 The choice of index number formulae and weights in the National Accounts. A sensitivity analysis based on macro-economic data for the interwar period, Bakker, Gert P. den (1991).
The sensitivity of growth estimates to variations in index number formulae and weighting procedures is discussed. The calculations concern the macro-economic variables for the interwar period in the Netherlands. It appears, that the use of different formulae and weights yields large differences in growth rates. Comparisons of Gross Domestic Product growth rates among countries are presently obscured by the use of different deflation methods. There exists an urgent need for standardization of deflation methods at the international level.

NA/45 Volume measurement of government output in the Netherlands; some alternatives, Kazemier, Brugt (1991).
This paper discusses three alternative methods for the measurement of the production volume of government. All methods yield almost similar results: the average annual increase in the last two decades of government labour productivity is about 0.7 percent per full-time worker equivalent. The implementation of either one of these methods would have led to circa 0.1 percentage points higher estimates of economic growth in the Netherlands.

NA/46 An environmental module and the complete system of national accounts, Boo, Abram J. De, Peter R. Bosch, Cor N. Gorter and Steven J. Keuning (1991).
A linkage between environmental data and the National Accounts is often limited to the production accounts. This paper argues that the consequences of economic actions on ecosystems and vice versa should be considered in terms of the complete System of National Accounts (SNA). One should begin with relating volume flows of environmental matter to the standard economic accounts. For this purpose, a so-called National Accounting Matrix including Environmental Accounts (NAMEA) is proposed. This is illustrated with an example.

NA/47 Deregulation and economic statistics: Europe 1992, Bos, Frits (1992).
The consequences of deregulation for economic statistics are discussed with a view to Europe 1992. In particular, the effects of the introduction of the Intrastat-system for statistics on international trade are investigated. It is argued that if the Statistical Offices of the EC-countries do not respond adequately, Europe 1992 will lead to a deterioration of economic statistics: they will become less reliable, less cost effective and less balanced.

NA/48 The history of national accounting, Bos, Frits (1992).
At present, the national accounts in most countries are compiled on the basis of concepts and classifications recommended in the 1968-United Nations guidelines. In this paper, we trace the historical roots of these guidelines (e.g. the work by King, Petty, Kuznets, Keynes, Leontief, Frisch, Tinbergen and Stone), compare the subsequent guidelines and discuss also alternative accounting systems like extended accounts and SAMs.

NA/49 Quality assessment of macroeconomic figures: The Dutch Quarterly Flash, Reininga, Ted, Gerrit Zijlmans and Ron Janssen (1992).
Since 1989-IV, the Dutch Central Bureau of Statistics has made preliminary estimates of quarterly macroeconomic figures at about 8 weeks after the end of the reference quarter. Since 1991-II, a preliminary or "Flash" estimate of GDP has been published. The decision to do so was based on a study comparing the Flash estimates and the regular Quarterly Accounts figures, which have a 17-week delay. This paper reports on a similar study with figures through 1991-III.

NA/50 Quality improvement of the Dutch Quarterly Flash: A Time Series Analysis of some Service Industries, Reininga, Ted and Gerrit Zijlmans (1992).
The Dutch Quarterly Flash (QF) is, just like the regular Quarterly Accounts (QA), a fully integrated statistic based on a quarterly updated input-output table. Not all short term statistics used to update the QA's IO-table are timely enough to be of use for the QF, so other sources have to be found or forecasts have to be made. In large parts of the service industry the latter is the only possibility. This paper reports on the use of econometric techniques (viz. series decomposition and ARIMA modelling) to improve the quality of the forecasts in five parts of the service industry.

NA/51 A Research and Development Module supplementing the National Accounts, Bos, Frits, Hugo Hollanders and Steven Keuning (1992).
This paper presents a national accounts framework fully tailored to a description of the role of Research and Development (R&D) in the national economy. The framework facilitates to draw macro-economic conclusions from all kinds of data on R&D (also micro-data and qualitative information). Figures presented in this way can serve as a data base for modelling the role of R&D in the national economy.

NA/52 The allocation of time in the Netherlands in the context of the SNA; a module, Kazemier, Brugt and Jeanet Exel (1992).
This paper presents a module on informal production, supplementing the National Accounts. Its purpose is to incorporate informal production into the concepts of the SNA. The relation between formal and informal production is shown in the framework of a Social Accounting Matrix (SAM). To avoid a controversial valuation of informal production, the module constists of two SAMs. One expressed in actual prices with informal labour valued zero, and one which expresses the embedded informal labour input measured in terms of hours worked.

NA/53 National Accounts and the environment: the case for a system's approach, Keuning, Steven J. (1992).
The present set of main economic indicators should be extended with one or a few indicators on the state of the environment. This paper lists various reasons why a so-called Green Domestic Product is not suitable for this purpose. Instead, a system's approach should be followed. A National Accounting Matrix including Environmental Accounts (NAMEA) is presented and the way to derive one or more separate indicators on the environment from this information system is outlined.

NA/54 How to treat multi-regional units and the extra-territorial region in the Regional Accounts?, De Vet, Bas (1992).
This paper discusses the regionalization of production and capital formation by multi-regional kind-of-activity units. It also examines the circumstances in which a unit may be said to have a local kind-of-activity unit in the extra-territorial region and what should be attributed to this "region".

NA/55 A historical Social Accounting Matrix for the Netherlands (1938), Den Bakker, Gert P., Jan de Gijt and Steven J. Keuning (1992).
This paper presents a Social Accounting Matrix (SAM) for the Netherlands in 1938, including related, non-monetary tables on demographic characteristics, employment, etc. The distribution of income and expenditure among household subgroups in the 1938 SAM is compared with concomittant data for 1987.

NA/56 Origin and development of the Dutch National Accounts, Den Bakker, Gert P. (1992).
This paper describes the history of national accounting in the Netherlands. After two early estimates in the beginning of the nineteenth century, modern national accounting started in the 1930s on behalf of the Tinbergen model for the Dutch economy. The development spurred up after World War II to provide data to the government for economic planning purposes. In the 1980s, the development was towards a flexible and institutional approach.

NA/57 Compiling Dutch Gross National Product (GNP); summary report on the final estimates after the revision in 1992, Bos, Frits (1992).
This summary report describes the sources and methods used for compiling the final estimate of Dutch Gross National Product after the revision of the Dutch National Accounts in 1992. Attention is focused on the estimation procedures for 1988. A more extensive report is also available (**NA/57_Ext.**).

NA/57_Ext. Compiling Dutch Gross National Product (GNP); full report on the final estimates after the revision in 1992, Bos, Frits and Cor N. Gorter (1993).
This report describes the compilation of the final estimate of Dutch Gross National Product after the revision of the Dutch National Accounts in 1992. Attention is focused on the estimation procedures for 1988. The description covers i.a. data sources, sampling features of the surveys, grossing up procedures, adjustments for underreporting and the integration process.

NA/58 The 1987 revision of the Netherlands' National Accounts, Van den Bos, C and P.G. Al (1994).
The 1987 revision that was completed in 1992 has improved the Dutch National Accounts in three ways. First, new and other data sources have been used, like Production statistics of service industries, the Budget Survey and Statistics on fixed capital formation. Secondly, the integration process has been improved by the use of detailed make- and use-tables instead of more aggregate input-output tables. Thirdly, several changes in bookkeeping conventions have been introduced, like a net instead of a gross registration of processing to order.

NA/59 A National Accounting Matrix for the Netherlands, Keuning, Steven and Jan de Gijt (1992).
Currently, the national accounts typically use two formats for presentation: matrices for the Input-Output tables and T-accounts for the transactions of institutional sectors. This paper demonstrates that presently available national accounts can easily be transformed into a National Accounting Matrix (NAM). This may improve both the transparency and analytic usefulness of the complete set of accounts.

NA/60 Integrated indicators in a National Accounting Matrix including environmental accounts (NAMEA); an application to the Netherlands, De Haan, Mark, Steven Keuning and Peter Bosch (1993).
In this paper, environmental indicators are integrated into a National Accounting Matrix including Environmental Accounts (NAMEA) and are put on a par with the major aggregates in the national accounts, like National Income. The environmental indicators reflect the goals of the environmental policy of the Dutch government. Concrete figures are presented for 1989. The NAMEA is optimally suited as a data base for modelling the interaction between the national economy and the environment.

NA/61 Standard national accounting concepts, economic theory and data compilation issues; on constancy and change in the United Nations-Manuals on national accounting (1947, 1953, 1968 and 1993), Bos, Frits (1993).
In this paper, the four successive guidelines of the United Nations on national accounting are discussed in view of economic theory (Keynesian analysis, welfare, Hicksian income, input-output analysis, etc.) and data compilation issues (e.g. the link with concepts in administrative data sources). The new guidelines of the EC should complement those of the UN and be simpler and more cost-efficient. It should define a balanced set of operational concepts and tables that is attainable for most EC countries within 5 years.

NA/62 Revision of the 1987 Dutch agricultural accounts, Pauli, Peter and Nico van Stokrom (1994).
During the recent revision of the Dutch national accounts, new agricultural accounts have been compiled for the Netherlands. This paper presents the major methodological and practical improvements and results for 1987, the base year for this revision. In addition, this paper demonstrates that a linkage can be established between the E.C. agricultural accounting system and the agricultural part of the standard national accounts.

NA/63 Implementing the revised SNA in the Dutch National Accounts, Bos, Frits (1993).
This paper discusses the implementation of the new United Nations guidelines on national accounting (SNA) in the Netherlands. The changes in basic concepts and classifications in the SNA will be implemented during the forthcoming revision. The changes in scope will be introduced gradually. Important changes scheduled for the near future are the incorporation of balance sheets, an environmental module and a Social Accounting Matrix.

NA/64 Damage and insurance compensations in the SNA, the business accounts and the Dutch national accounts, Baris, Willem (1993).
This paper describes the recording of damages to inventories and produced fixed assets in general, including damages as a result of legal product liability and of the liability for damage to the environment. In this regard, the 1993 System of National Accounts and the practice of business accounting are compared with the Dutch national accounts.

NA/65 Analyzing economic growth: a description of the basic data available for the Netherlands and an application, Van Leeuwen, George, Hendrie van der Hoeven and Gerrit Zijlmans (1994).
This paper describes the STAN project of the OECD and the Dutch national accounts data supplied to the STAN database, which is designed for a structural analysis of the role of technology in economic performance. Following an OECD analysis for other industrial countries, the importance of international trade for a small open economy such as the Netherlands is investigated. The STAN database is also available on floppy disk at the costs of DFL. 25, an can be ordered by returning the order form below (Please mention: STAN floppy disk).

NA/66 Comparability of the sector General Government in the National Accounts, a case study for the Netherlands and Germany, Streppel, Irene and Dick Van Tongeren (1994).
This paper questions the international comparability of data concerning the sector General Government in the National Accounts. Two differences are distinguished: differences due to lack of compliance with international guidelines and institutional differences. Adjustments to National Accounts data are reflected in a separate module which comparises Germany versus The Netherlands. The module shows that total General Government resources as well as uses are substantially higher in the Netherlands.

NA/67 What would Net Domestic Product have been in an environmentally sustainable economy?, Preliminary views and results, De Boer, Bart, Mark de Haan and Monique Voogt (1994).
Sustainable use of the environment is a pattern of use that can last forever, at least in theory. This pattern is likely to render a lower net domestic product than the present economy. The coherence between reductions in pressure on the environment and changes in net domestic product is investigated with the help of a simple multiplier model. This model is based on a National Accounting Matrix including Environmental Accounts (NAMEA).

NA/68 A Social Accounting Matrix for the Netherlands, concepts and results, Timmerman, Jolanda G. and Peter J.M. van de Ven (1994).
In this paper a Social Accounting Matrix (SAM) for the Netherlands is presented. Two years are covered: 1988 and 1990. The SAM is an integrated data framework based on national accounts extended with information on distribution of income, consumption and wealth among household. Furthermore, labour income and employment are subdivided into several labour categories. The tables of the SAMs of both 1988 and 1990 are available on separate floppy disks at the costs of DFL. 65 each.

NA/69 Analyzing relative factor inputs of Dutch exports: An application of the 1990 Social Accounting Matrix for the Netherlands (forthcoming), Reininga, Ted (1995).
In this paper the validity of neoclassical trade theory for explaining Dutch international trade patterns is studied. The analysis is carried out with the use of a Social Accounting Matrix for The Netherlands. This study corroborates the outcome of other recent analysis in this field: classical trade theory offers a better starting-point to understand Dutch trade patterns than neoclassical trade theory. Moreover, these recent studies point to the increasing relevance of insights derived from modern trade theory. The results presented here seem to support this point of view.

NA/70 SESAME for the evaluation of economic development and social change, Keuning, Steven J. (1994).
This paper elaborates on the concept of a System of Economic and Social Accounting Matrices and Extensions, or SESAME for short. The SESAME-concept serves to meet the criticism that conventional national accounts take a too limited view at social, environmental and economic development. SESAME details the monetary accounts and couples non-monetary information in an integral system approach. SESAME is meant as a synthesis of national accounts and the social indicators approach.

NA/71 New revision policies for the Dutch National Accounts, Den Bakker, Gert P., Jan de Gijt and Robert A.M. van Rooijen (1994).
This paper presents the (new) revision policy for the Dutch National Accounts. In the past, several major revisions of national accounting data have been carried out in the Netherlands. In the course of time, the policy has changed several times. Recently, the aim has become to publish relatively long time-series shortly after the publication of the revised benchmark year data.

NA/72 Labour force data in a National Accounting framework, Den Bakker, Gert P. and Jan de Gijt (1994).
This paper deals with the Dutch interwar labour force data. Starting with census data the estimation of the working and non-working labour force by industry and by occupational type is described and the results are discussed. The data have been estimated within the national accounts framework. It is the first time that labour market figures at a meso-level have been estimated which are linked to other national accounting figures.

NA/73 Integrated estimates of productivity and terms-of-trade changes from a Social Accounting Matrix at constant prices, Keuning, Steven J. 1994).
This paper demonstrates that measures of real income change for the total economy can best be derived from real income changes per subsector. For this purpose a Social Accounting Matrix (SAM) at constant prices has been compiled. By breaking down value added at constant prices into constant price estimates for each primary input category, productivity changes by industry can be estimated as an integral part of the regular national accounts compilation. The national total trading gain or loss from a change in the terms of trade is as well allocated to subsectors, thus embedding the estimation of this macro-measure into a meso-consistency framework. These ideas have been applied in a case-study for Indonesia.

NA/74 Taking the environment into account: The Netherlands NAMEA's for 1989, 1990 and 1991, De Haan, Mark and Steven Keuning (1995).
The National Accounting Matrix including Environmental Accounts (NAMEA) contains figures on environmental burdens in relation to economic developments as reflected in the National accounts. NAMEA's for the Netherlands in 1989, 1990 and 1991 have now been completed. They include a more detailed industrial classification and a series of environment taxes and levies, plus environmental protection expenditures by industry and households. Further, the depletion of two important mineral resources in the Netherlands is now incorporated in the NAMEA's.

NA/75 Economic theory and national accounting, Bos, Frits (1995).
This paper describes the relationship between economic theory and national accounting. This relationship is often misunderstood, by economic theorists and national accountants alike. Attention is drawn to the consistency required in a national accounting system, to national accounts figures as a transformation of primary data and to the fundamentally different valuation principles employed in economic theory and national accounting (forward looking and analytic versus backward looking and descriptive). The gap between economic theory and national accounting can only be bridged by satellite accounts, as in these accounts consistency with the overall system and valuation at current exchange value are not strictly required.

NA/76 An information-system for economic, environmental and social statistics, Keuning, Steven J. and Jolanda G. Timmerman (1995).
The 1993 SNA mentions that a SAM can also be extended to deal with environmental issues. This entails the integration of a SAM and a NAMEA into a SAMEA (Social Accounting Matrix including Environmental Accounts), a further extension into the direction of a so-called SESAME (System of Economic and Social Accounting Matrices and Extensions). This paper shows how environmental data and environmental indicators can be integrated into such a system. A Dutch case-study shows the interrelations between e.g. the employment of various types of workers (by sex/educational level) and the environmental problems caused by the activities in which they are employed. Moreover, this pollution is also allocated to the subsectors that receive value added. This enables a comparison with the consumption-based pollution by subsector. The SAMEA yields a framework for an integrated analysis and modelling of social, economic and environmental issues.

NA/77 Material flows, energy use and the structure of the economy, Konijn, Paul J.A., Sake de Boer and Jan van Dalen (1995).
Many environmental problems are connected to production and use of materials and energy. It would therefore be desirable to have an information system that gives consistent, complete and detailed information on material and energy flows. Such a system would even be more useful if it could be connected directly to economic data. This paper presents such a system. Based on the foundation laid by the national accounts the authors construct a system for the analysis of flows of materials and energy through the economy. In this paper the proposed system is illustrated with an application to the flows of iron/steel and energy. An input-output table is presented that describes the production processes in the ferrous metal branch entirely in physical units. Subsequently, steel contents of final products are calculated, and an analysis is made of the consequences of a new technology in the basic steel industry on total energy use in the economy.

NA/78 Calendar effects on quarterly GDP-growth rates, Reininga, Ted K. and Brugt Kazemier (1996).
Since 1986 Statistics Netherlands publishes Quarterly National Accounts. The earliest estimates of quarterly GDP, the so-called flash estimates, are published some seven weeks after the reference quarter. In this paper we examine a new, faster flash estimate, some three to four weeks earlier than its original counterpart. The gain is made by using a simple regression technique and incomplete data. To compensate for the lack of data, information on the number of working-days and shopping-days was added to the regression. It turns out that these calendar-aspects significantly affect GDP-growth: 0.30%-points extra GDP-growth for one extra working-day. One extra shopping-day accounts for about 0.17%-points extra GDP-growth.

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