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**LABOUR MARKET DYNAMICS: NEW STATISTICAL AND ANALYTICAL APPROACHES**

Submitted by the United Kingdom Central Statistical Office<sup>1</sup>

**1. INTRODUCTION**

1.1 A major shortcoming of the most commonly available labour market statistics is that they give only a 'snapshot' picture of a dynamic system in a constant state of flux. Not surprisingly, labour market analysts - and others interested in demographic and social developments - have long demanded statistics of gross flows to supplement those of stocks to shed light on the factors that determine net changes in stocks. These include data that track the experiences of particular groups of people over lengthy periods of time regarding their transition from one labour market state to another. Yet in spite of this long-standing demand, flow data remain relatively under-developed, unpublicized and, arguably, under-used.

1.2 The main purpose of this paper is to stimulate a debate on this state of affairs. Most of the paper (Sections 3 and 4) is taken up with a brief description of the several methods of compiling these statistics, describing their relative advantages and disadvantages. British statistics are mainly used to illustrate some of the sources, methods and techniques used; brief cross-references are also made to some other papers prepared for the CES Session on Labour Market Dynamics. In Section 5 the paper concludes with some issues for discussion.

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1 Prepared by P.J. Stibbard, Head of Labour Market Statistics Group in the Central Statistical Office until his retirement early in 1996. (Mr. Stibbard will also be the organiser of this session of the substantive discussion at the 1996 plenary session of the Conference.)

## 2. THE NEED FOR FLOW DATA

2.1 The most well-known labour market statistics are those for employment and unemployment; these are expressed as stocks, usually at monthly or quarterly intervals. Disaggregation of these stock data include cross-sectional analyses by sex, industry, occupation; also sub-national breakdowns. These data are often used in political debate and presented by the media as 'performance indicators' of a Government's economic and social policies - sometimes expressed in absolute numbers and sometimes as rates. For these general purposes, flow data are rarely used although, if available, they are sometimes a valuable aid for interpreting changes in stocks.

2.2 There is a stronger and more sustained demand for flow data from those concerned with formulating and monitoring labour market policies. This is because labour market policies are usually designed to stimulate flows in certain groups of the population. An examination of flow data helps to decide whether a policy is appropriate and, if it is implemented, assists in monitoring its effectiveness.

2.3 Policies to create employment generally take the form of trying to move people out of unemployment and into employment. They can sometimes include stimulating or facilitating movements within the employed population, from outdated and declining industries and occupations to those expected to expand in future. Other programmes such as vocational youth training, are aimed at redirecting people into employment when first entering the labour force, rather than unemployment. In Britain Government policy in the early 1980s was to reduce labour supply by changing the benefit rules to increase the flows from the labour force (employed and unemployed) into inactivity. In contrast, since the mid 1980s Government policy has tried to maximise effective labour supply by a variety of means. Throughout the 1980s and 1990s, these policies have attempted to encourage the enterprise culture and in that regard there is interest in transitions into and out of self-employment, and activity in the 'small firm' sector.

2.4 In general the aim is to obtain data for the following transition matrix (1):

**Figure 1**

	Labour force status at current date			
	E(t)	U(t)	N(t)	
Labour force status at <u>previous</u> date	E(t-1)	EE	EU	EN
	U(t-1)	UE	UU	UN
	N(t-1)	NE	NU	NN

E = employment; U= unemployed; N = Not in labour force (i.e. economically inactive).

(The meaning of the entries is as follows: EE represents the number of persons who were employed both at the current and previous dates, EU is the number of persons employed at the previous date who became unemployed, EN is the number of previously employed persons who withdrew from the labour force, etc.)

2.5 The more disaggregated the statistics on flows between the three basic labour market states the better the understanding of the reasons for changes in stocks. As indicated above, there is also interest in movements within the three basic status - eg between occupations and industries within employment; the transition from short-term to longer term unemployment; and movements in and out of the 'margins' of the labour force within the 'economically inactive' category. Not only is disaggregation desirable but also the ability to cross-tabulate with other variables which may have an association with labour market behaviour.

2.6 The main focus of labour market analysis is people. Therefore the most common analytical unit is the individual; however, it is often useful to relate individuals to the household they are part of and - for employed people - their workplace. For data originating from employers, the analytical unit is necessarily the job, reflecting any multiple job-holding by individuals. Data on jobs should ideally be supplemented by information on unfilled vacancies.

2.7 Looking backwards, flow data may be used to analyse labour market dynamics and the forces at work in determining unemployment, labour force participation etc. Looking forward, they can provide information for improving labour market projections.

### 3. SOURCES AND METHODS OF DATA COLLECTION

#### 3.1 Surveys of individuals and households

##### 3.11 Recall questions

Flow data can be derived from retrospective questions in ad hoc or regular surveys, for example by asking about labour market status at some past date, say a year previously. Also, retrospective questions can be asked about how long ago certain events happened (eg when the respondent's present job began).

Advantages:

- Convenient; relatively inexpensive
- Produces quick results

Disadvantages:

- Errors due to respondents' memory lapses, made worse by proxy responses;
- Less scope to employ detailed questions to determine previous status than present status; thus a risk of inconsistent definitions which would affect accuracy of resulting flow data.
- Analyses based on questions about status at some past date exclude additional changes of status since then.

Illustrations:

The **Family and Working Lives Survey**, funded by four British Government Departments, is a one-off survey which collects data retrospectively via personal interview. Fieldwork was conducted from mid 1994 to mid 1995 and respondents were asked to recall past events over their working lives from age 16 to date. The sample size is about 9,000 with an ethnic minority 'booster'

sample of about 2,000. Key areas of interest from a labour market viewpoint include: work histories; internal labour markets; impact of unemployment; training; life histories; work orientations; the influence of family and household circumstances on labour market behaviour and attitudes; groups facing disadvantage in the labour market; the influence of where people live; geographical mobility and retirement. Full results are expected to become available in 1997: some preliminary results will shortly be made available (2).

The British **Labour Force Survey** contains a few retrospective questions, providing data on 'economic activity now and one year ago; the length of time with current employer; duration of unemployment; activity prior to unemployment and, of those unemployed or inactive but had a job sometime in the last five years, the duration of active job search. Respondents are asked if they have been made redundant 3 months prior to interview: the proportion of these people who have some form of employment by the time they are interviewed is another indicator of labour market activity. Retrospective data from the Labour Force Survey has been used in work by Clive and Joan Payne on labour turnover (3); Beatson on labour mobility (4); and Gregg and Wadsworth on job tenure and job security (5).

The paper from Estonia reports on analyses from an extensive activity history supplement to their first Labour Force Survey, held in 1995. The analytical emphasis so far has been on filling gaps in stock data. The paper from the United States includes a comparison of retrospective data on job tenure collected via their Current Population Survey with that collected from a longitudinal survey.

### **3.12 Rotation Sample Designs**

Most Labour Force Surveys include a rotation scheme in their sample design. The sampling units are partially replaced according to a prescribed pattern, so that a reducing proportion of the sample remains in successive survey periods. Although increasing the precision of monthly or quarterly estimates of changes of levels (stocks) is the prime reason for these designs, flow data can be produced as a by-product; by linking the labour force status at these different points in time for individual respondents, statistics of the type shown in Figure 1 in paragraph 2.4 can be compiled.

#### Advantages:

- Absence of recall errors
- Flow data based on same definitions as corresponding stock data.

#### Disadvantages:

- Low response rates and high attrition rates affect quality of data
- Sampling error of flow data greater than corresponding stock data
- Difficulty of establishing links between successive interviews when respondents change their address can cause bias in results;
- Ability to provide data on particular flow periods (month, quarter, year) depends on suitability of sample design;
- Conditioning effect of repeated interviews;
- Generally not suitable for deriving long-term flow data;
- Necessary to wait until after termination of reference period for flow data before results are available;

- Spurious flows maybe generated if people respond differently to face-to-face and follow-up telephone interviews.

Illustrations:

The British **Labour Force Survey** was relaunched in Great Britain in 1992 as a quarterly survey covering 60,000 households and 150,000 people each quarter. The LFS questionnaire covers a very wide range of labour market-related subjects, including employment, self-employment, hours of work, unemployment and vocational training. Each quarter's sample is unclustered and made up of 5 'waves', consisting of 12,000 households. Every sample address is interviewed in 5 successive quarters. Thus there is an 80% overlap between quarters. All first wave interviews are face-to-face and the second to fifth interviews are usually telephone interviews, in both cases using CAI. The household response rate at first interview is 82% or more (with about one-third proxy responses for household members). Responses rates fall by one or two percent in subsequent interviews.

Until about two years ago virtually all resources were concentrated on analysing and disseminating quarterly data sets; and developing an annual data set which, through the five-wave design, covers 96,000 households. However the construction of linked longitudinal data sets then become a top priority and some preliminary findings will be published shortly including a report on the formidable technical problems that are involved(6). Countries with LFS designs have attempted to exploit the sample overlap in order to estimate gross flows but only a few publish gross flow data and, because of the technical difficulties, they usually are not articulated with the stock data published on a routine basis.

### 3.13 Longitudinal Surveys

These are surveys designed to monitor the behaviour and experiences of individuals or households over quite long periods of time. They can take the form of **cohort surveys**, in which a sample of individuals of a particular age is selected at a point in time and then re-surveyed at intervals; or **panel surveys**, in which a nationally representative sample is selected and then re-surveyed at intervals.

Advantages:

- Absence of recall errors;
- Flow data based on same definitions as corresponding stock data

Disadvantages:

- Expensive to operate and require a long-term budget commitment;
- Attrition affects quality of data;
- Rarely suitable for providing regular and timely data for national statistical infrastructure.
- Problems of tracking households over time.

Illustrations:

The Canadian **Survey of Labour and Income Dynamics (SLID)** was introduced to add 'a new dimension to existing survey data....: the changes experienced by individuals through time.' The first panel of 15,000 households started in 1993 and will follow the same respondents for six years; a second panel is

scheduled to begin in 1996. The general objective of the SLID is 'to understand economic well-being' and to answer questions, such as 'What economic shifts do individuals and families live through, and how does it vary with their paid work, family make-up, receipt of government transfers, or other factors?' SLID is designed to provide data for seven major research themes: employment and unemployment dynamics; life cycle labour market transitions, job quality; family economic mobility; dynamics of low income; demographics; education.

The **Youth Cohort Study** is a series of British longitudinal surveys of young people following their completion of compulsory education. The YCS survey tracks the movement of young people in and out of full and part-time education, employment, youth training and unemployment; it collects some information on their schooling and examination attainments pre-16, as well as identifying courses studies and qualifications obtained subsequently; contextual information on socio-economic characteristics is also, collected and the questionnaire includes a monthly diary, so that young peoples' main activities over the whole survey period can be tracked. Each cohort - there have been eight since 1985 - has an initial core sample of about 20,000 16-17 year olds who are contacted three times by post. Until recently these 'sweeps' were conducted annually but under a new design introduced for Cohort 7 they are biennial. The study uses a random 10% sample of the school population taken from a stratified, representative, sample of schools. Response rates are relatively good. For Cohort 3, for instance, 77% responded to the first sweep, which dropped to a cumulative 58% for the second sweep, and to 44% for the third sweep, taken at 18-19.

The **British Household Panel Survey (BHPS)** began in 1991 and has annual 'waves' of data collection; the fieldwork for wave 5 started in 1995 and funding for future waves extends to 1999. The panel consists of a nationally representative sample of 5,500 households, comprising about 10,000 interviewed individuals. Data on employment and income are collected but the questionnaire goes well beyond these topics, covering also consumption expenditure, housing, health and attitudes and beliefs (7). The BHPS provided the first reliable information on how a nationally representative sample of individuals' incomes change from one year to another and should facilitate analysis of people and households whose period of poverty is transitory, and those where it is permanent. Results of waves 2 and 3 provided the first comprehensive - work history sample in Britain (although retrospective data was collected to provide a historical context for a respondent's current and subsequent activities were valuable data in themselves, providing a very long term picture of historical change). It also provides a year-on-year picture of flows of individuals into and out of various employment states, and details of individuals' unemployment periods.

The **New Earnings Survey (NES)** is a postal survey of employees in Great Britain which has been carried out in April of each year since 1970. It obtains information about the levels, distribution and make-up of earnings of employees in all industries and occupations. The survey is based largely on a 1% sample of employees who are members of income tax schemes and is designed to represent all categories of employees. The sample each year comprises all those whose 'National Insurance Numbers' end with a specified pair of digits. The same pair of digits have been used since 1975. Information for employees

in the sample is obtained from their employers. The survey is statutory and the response rate is 98.5% but defects in the sampling frame reduce this to an effective 85%, mainly due to job changing in the period between the sample selection and the reference date of the survey.

A matched sample is generated by identifying employees whose classification characteristics have not changed between two successive surveys. For example in the 1992 NES there were 95,000 employees classified as full-time adults in both surveys and whose pay in each of the relevant pay periods was not affected by absence and therefore could be properly compared between the two surveys. The matched sample made up a little over three-quarters of the complete NES sample of full-time adults. The standard errors of increases of average earnings are much reduced by overlap; with a typical correlation coefficient of 0.8 between earnings in successive years, there is a reduction in sampling errors of the order of 30% compared with independent samples. A longitudinal datafile (the NES Panel Dataset) has also been created, containing information on over 170,000 men for whom earnings information is recorded for two or more years; for 80,000 of them information is available every year from 1984.

### **3.2 Establishment Surveys**

Labour turnover statistics can be derived from regular establishment surveys by asking for information on the number of employees at the end of the reference period who were not employed at the beginning of the period.

Advantages:

- Employment statistics derived from establishment surveys tend to be more accurately coded to industry than those from household surveys
- Analyses by size of establishment or enterprise possible.

Disadvantages:

- Requires special record-keeping by respondent establishments which may affect speed and level of response
- Coverage of employees may be affected by accuracy and up-to- dateness of register used to select sample or panel of enterprises.
- Very limited information available on the socio-economic characteristics of employees joining, leaving or retained in the establishment without increasing compliance burden significantly.

Illustration:

Information of this type was collected in Britain from manufacturing enterprises until 1989. It was discontinued after a review of requirements from establishment surveys. Respondents found it one of the more problematic and time-consuming questions to answer and there was a feeling that the resulting data were unreliable and implausible. They were little used - most enquirers wanting instead data covering the whole economy; or data that could only be collected by seeking data at the level of the individual employee. Given the political pressure to reduce the processing and compliance costs of establishment surveys, the questions were dropped. Nevertheless there is evidence of a steady interest in the topic and it remains one of the main requests which cannot be satisfied from currently available data.

### **3.3 Registers and administrative records: persons**

Flow statistics can be derived from administrative registers, matching records of individual people at different points in time, either using a single register or more than one in combination via a common identifier.

#### Advantages:

- Less subject to measurement errors;
- Register analysis usually less expensive than surveys unless register especially constructed for statistical use only;
- Non response not a problem (although incomplete or out of date records can be a difficulty);
- Comprehensive coverage facilitates analysis of small geographical areas and other sub-populations.

#### Disadvantages:

- Concepts, definitions and accuracy coding usually mainly determined by administrative rather than statistical requirements;
- Vulnerable to changes in administrative rules and practices which could exaggerate true flows;
- Use of registers, especially in combination, raises confidentiality issues.
- Problems of tracking analytical units (i.e. households) over time

#### Illustrations:

Data on gross flows into and out of unemployment are routine analyses in the presentation of **claimant count** every month (i.e. the British measure of unemployment derived from administrative sources). Currently around 300,000 people join or leave the count every month, representing a monthly turnover of about 12%. Other indicators of the turnover of claimant unemployment can be derived showing the likelihood of remaining unemployed after 3 months, 6 months etc. These figures help to counter the common belief that the unemployed are a static group of people.

Similar flow data are presented for the level of **Vacancies notified to British Government 'JobCentres'**. Separate data are compiled on inflows and total outflows, distinguishing those outflows that represent actual job placements by the Job-Centre. Although JobCentres are estimated to broker only about one-third of all vacancies, these data are nevertheless found to be useful in assessing the level of activity in the job market.

The so-called **'JUVOS' Cohort in Britain** is a longitudinal database of the 'claimant unemployed'. It is a 5 per cent sample of claims for unemployment-related benefits. Each time a person with a relevant national insurance number claims for benefit their details are added to the cohort file. It was first established in 1982, is updated monthly and currently contains about 3 million claim records, relating to the approximate 1 million people who have had at least one claim for the relevant benefits since then. Details held on the file enable users to derive: information such as duration of unemployment; number of spells of unemployment and length of time between spells of unemployment; geographical mobility - analysed by age, sex, marital status and recent occupation (8). The analyses show that between 1990 and 1995 about 10 million different people experienced at least one spell of unemployment. Separate estimates from demographic sources show that approaching 40 million people were of working age sometime over that period.

Thus about one quarter of the 'workforce' was affected by a spell of claimant unemployment in this five year period. An important drawback to this source is that it yields no information itself on the activity of people before, between and since their spell(s) of unemployment. However, using National Insurance Numbers as a common identifier, the JUVOS dataset has been linked to the NES Panel Dataset (see Section 3.13) to investigate such matters as the effects of unemployment on future earnings.

The paper from Denmark describes their system whereby information on labour market status is based entirely on administrative records, linking tax and unemployment insurance data; there are also linkages via a business register to the individual's employer and workplace.

### **3.4 Registers and administrative records: establishments**

Register of establishments can generate statistics used to study certain aspects of labour market dynamics. The traditional focus on net change in employment totals derived from establishment surveys hides most of the dynamics of employment. Whether net employment is rising, falling or constant, large numbers of jobs are being created and destroyed. Policies that seek to influence the labour market and the economy generally by influencing business behaviour - eg the degree to which small firm generation should be encouraged by Government - need data which indicate where the jobs are being created (in existing or new establishments?) and where they are being destroyed (in existing or closing establishments?). Survey data on labour turnover can supply a partial answer (see section 3.2) but register analysis, preferably linked with surveys, is potentially a better source for these data, as they provide the 'business demography' data including business openings and closings. Thus it is possible to link data on labour turnover and business turnover.

Advantages:

- as for 'person' registers - see Section 3.3

Disadvantages:

- as for 'person' registers - see Section 3.3
- Problems of tracking analytical units i.e. enterprises over time
- Very limited information on the socio-economic characteristics of employees unless linkage established with person registers.

Illustrations:

The papers from Sweden and Denmark both describe well developed registers of enterprises and establishments, in which the difficulty of tracking the continuity of individual enterprises or establishments over time is overcome by defining them in terms of their people who work there. In this way an exaggeration of the number of business formations and closures is avoided.

In the United Kingdom indicators of new business formations and closures are assembled from Valued Added Tax records. These are currently only analysed annually and issued about eight months in arrears. Quarterly data of company insolvencies and business bankruptcies, based on administrative records, are published only a month in arrears (covering England and Wales only). Although

both sources are useful indicators of the health of the small firms sector, they unfortunately provide no information on the employment effects of business formations and closures. It is hoped that the newly developed Inter-Departmental Business Register will provide some information of this kind.

In 1987, and again in 1994(9), the OECD has done some valuable work describing the potential analytical value of longitudinal data for businesses in understanding the process of job creation and destruction which underlies changes in net employment. The paper from Denmark draws attention to OECD's scheme for conceptualising and measuring job turnover, based on comparisons of the stock of employment in each establishment/enterprise at two points in time. Establishments are classified into one of four categories according to their situation in the reference period: opening; expanding; contracting; closing. Figures of gross job gains and gross job loss are compiled from each category and their sum is termed 'job turnover'. OECD point out that true turnover is underestimated as only net change within each establishment are counted; changes in unfilled vacancies are also excluded.

### **3.5 Combination and other Methods**

Administrative records, supplemented by surveys, provide useful data on the operations and outcomes of British Government Training Programmes. Individual 'starters' and 'leavers' certificates in British schemes such as Youth Training and Training for Work, besides providing overall numbers of flows and stocks, provide demographic details on participants and operational information on actual duration of training, qualifications achieved and immediate destination on leaving (if known). There are then postal **Follow Up Surveys** to all participants six months after leaving to seek information on participants' current activity and other matters. These provide information on the progression of participants into employment and other 'positive' outcomes. The response rate is around 50 per cent. Occasional face-to-face interviews with a sample of those who do not respond have established that those that do are reasonably representative of all participants and the biases are negligible. Besides these routine, regular, surveys there are numerous ad hoc and small scale surveys to assess the effectiveness of aspects of both existing schemes and new schemes which are being tested on a pilot basis.

In the absence of any other source it is sometimes possible to calculate **synthetic or proxy data** that provide some insight into labour market dynamics. For example, given the dearth of data on unemployment flows, especially internationally comparable data, the OECD have calculated 'proxy' flows (10). Proxies for inflows refer to that part of the stock of the unemployed who have been unemployed for one month (an undercount as it ignores those who have moved in and out of unemployment during the month). Proxies for outflows are the difference between the average monthly inflows and the monthly average change in unemployment over one year.

## **4 LABOUR ACCOUNTING SYSTEMS**

4.1 The several sources and methods described in this paper for the United Kingdom generally exist independently and are commissioned by different authorities. Their results are sometimes inconsistent and, even when brought together, give an incomplete and hazy picture of the labour market.

4.2 Comprehensive Labour Accounting Systems (LAS) have been proposed to provide a logical and comprehensive structure into which the 'primary' data collected by various means can be fitted and consistently enforced by uniform definitions, units of measurement, accounting periods etc, and gaps in the system become readily apparent. These only exist as theoretical models at present and are promoted as instruments for the 'description and analysis of the state and dynamics of the labour market and its interaction with the rest of the economy'(11).

4.3 A LAS is sometimes portrayed as playing the same role in labour statistics as a National Accounting System (NAS) in economic statistics. This is a useful analogy but one difference is worth noting. The most commonly used statistics derived from or associated with national accounts are flow data from income and expenditure accounts or calculations of value added. The corresponding balance sheets data of assets and liabilities are comparatively little known and used. This is the reverse of the situation in labour market statistics, where the priority objective of the accounting system appears to be a comprehensive and consistent set of stock data. For the foreseeable future this objective seems sufficiently ambitious. The professional resources needed to compile even stock accounts for general use are currently beyond the means of virtually all national statistical offices.

4.4 Another difference between an LAS and the NAS is that the latter generates a widely used summary statistic of dominant importance in monitoring the economy ie GDP. There is no equivalent output from an LAS.

4.5 A comprehensive set of data on labour market flows at the macro level is a complicated tool; it is difficult to comprehend and requires a large amount of raw data. For illustration, some work on The Netherlands labour market (12) is based on only 3 'relevant' stocks - Unemployment, Employment and Vacancies (non-participants outside the labour force are treated as a residual). Yet there are 18 relevant flows; the number of flows is increased by separate consideration of flows of jobs and flows of persons; also by separate treatment of changes in jobholding where there is an associated vacancy from those where there is none.

## **5. HOW CAN THE PRODUCTION AND USE OF FLOW AND LONGITUDINAL DATA BE FURTHER ENCOURAGED?**

5.1 This paper has provided some indication of the policy interests that give rise to the demand for information on labour market dynamics; it also provides a description of the main statistical techniques available for satisfying that demand - conducting surveys, exploiting administrative records, combining surveys and administrative records, employing synthetic methods and combining all these in an accounting system.

5.2 If British experience is any guide, there is a general perception among potential users that there are insufficient longitudinal and flow data available. But when one begins to probe, more information is available than one had expected. The problems seem to be more about under-exploitation rather than non-existence. To remedy this, a publicity guide to longitudinal data sources is being produced (13) and a more integrated and strategic approach to future Government funding in this area is being developed.

5.3 Participants in the discussion are invited to describe how far the demand for data and labour market dynamics in their countries is unmet; how much of this is due to the available data being under-used and to what extent is there a genuine absence of data of any kind.

5.4 The following reasons have been advanced for the relatively limited development of data on dynamics. To what extent do they apply in each country and, if they do, what is being done to overcome them?

- Lack of funds for these expensive programmes, especially bearing in mind the long-term budget commitment they require
- Competition for computer power (surely a fast diminishing problem) or for software expertise
- Sources of flow data are insufficiently related to each other
- Difficulties of reconciling the flow data with the familiar and well-established stock data of employment and unemployment, which leads to a lack of confidence in the information - among producers as well as users of the data.
- Results of long-term studies, where the past experiences which individuals have undergone (which have influenced their current characteristics) may form a poor basis for current policy formation, since the context of those past experiences may now have changed out of all recognition
- Even when available, data on dynamics has in practice been little used in formulating and monitoring labour market policy.
- Presentational problems; the tabular and diagrammatic portrayal of flows and longitudinal data in a user-friendly way is quite a challenge.

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(\*) Copies will be available at the CES Conference in June 1996.