Assessing employment in Malta

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ASSESSING EMPLOYMENT IN MALTA

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Abstract

In this paper, the total number of employed and the full-time equivalent employment in Malta are estimated for the last three decades. These series give a new picture of the historical development of employment and productivity in Malta. The estimated full-time equivalent time series, in spite of its limitations, is a first step on the way towards a comprehensive statistical measure of labour input in Malta.

The author is a Research Officer in the Economic Analysis Office of the Economic Research Department of the Central Bank of Malta. The views expressed in this paper are the author's and do not necessarily reflect those of the Central Bank. *The author would like to thank Mr. John Caruana, Mr. Aleksander Markowski and Mr. Paul Pace for their comments and suggestions on an earlier draft of this paper and assumes full responsibility for any remaining errors.*

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1.0 Introduction

In the context of economic analysis, employment data are used in two ways. The number of employed is used to highlight the distribution of the labour force between those in employment and the unemployed. The same series is also used to assess the input of labour into the productive process. However, the latter should optimally be gauged by the total number of hours worked by those in employment, including full-timers, part-timers and the self-employed. In the absence of data on hours worked, labour input could be approximated by means of a measure of full-time equivalent employment, whereby part-timers are added to the employment aggregate in the form of the number of full-timers that would be needed to replace them.

The purpose of this paper is to compile the time series for the total number of employed and full-time equivalent employment for Malta[1]. The series are to include part-time employment[2] for which no consistent time series is readily available. The paper starts by describing the presently available official labour market statistics, focusing particularly on recent developments in this area. Data from administrative sources can, in fact, now be supplemented by those derived from surveys. The paper proceeds to show how the historical full-time employment series can be brought in line with that derived from recent surveys. A time series for part-time employment is then constructed on the basis of available administrative data and the latest survey results. The full-time and part-time series are then aggregated, the latter having been adjusted to its full-time equivalent. Time series data are compiled on an annual basis for the period 1970-2001 and on a quarterly basis for the period March 1990-September 2002. The paper concludes by showing how the new series impacts on the employment rate, productivity and per capita employment income.

1.1 Employment Data in Malta

Up to March 2001, the only official and regularly released statistics on the Maltese labour market were produced monthly by the Employment and Training Corporation (ETC). The full-time gainfully occupied population data were, and still are, compiled on the basis of engagement and termination of employment forms sent by employers, while the unemployment figure is derived from the unemployment register at the end of the month. The labour supply is then computed as the sum of full-timers and unemployed. Between 1995 and 2000, the ETC also used to compile data on part-time employment, which included both those who only held a part-time job and those who worked part-time over and above their full-time job.

The National Statistics Office (NSO) conducted its first pilot Labour Force Survey (LFS) in 2000. This survey is based on a random sample of 2,500 households chosen from the Electoral Register. According to the NSO, the main aim of the LFS is to divide *'the 15+ year old population into three mutually exclusive groups – employed, unemployed and inactive – and provide descriptive information on each of these groups'*[3]. The survey has been conducted on a quarterly basis since March 2001.

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[1] The National Accounts section of the National Statistics Office is working on the full-time equivalent employment, but to our knowledge, no date has been set for the release of the series.
[2] Defined as those who work less than 40 hours per week.
[3] See National Statistics Office (Malta), '*Presenting the Results for the Maltese Islands (May and December 2000) of the Labour Force Survey*', 2001.

The two methods, the ETC's administrative register and the LFS, are fundamentally different in both concept and methodology[4]. The LFS' concepts and definitions are in line with those used by international statistical agencies, and thus the results can be easily compared across countries[5]. At the same time, though data based on administrative records do not suffer from sampling errors, policy changes that lead to changes in operational and administrative procedures usually lead to frequent discontinuities in the series[6]. Furthermore, a possible error source in the administrative series is that registering at the ETC can affect a person's income.

Following the release of the LFS, the ETC revised its data covering the period 1983 to 2001 extensively[7]. Amongst other things, the ETC reduced significantly the 'temporarily employed' category. This modification decreased the gainfully occupied population and, in turn, the labour supply, by 3,500 to 4,000 persons (nearly 4.5% of the total on average). The ETC also added to its unemployment figure those persons who registered under Part 2 of the unemployment register[8]. The latter revision increased the number of unemployed and, in turn, the labour supply by 400 to 800 persons (around 0.7% of the total on average).

Table 1: Common data points of the ETC and LFS full-time employment data series

	May-00	**Dec-00**	**Mar-01**	**Jun-01**	**Sep-01**	**Dec-01**	**Mar-02**	**Jun-02**	**Sep-02**
ETC	135,604	136,828	137,567	138,552	138,448	137,496	136,775	137,306	136,940
LFS	133,906	134,388	134,342	136,144	135,979	134,979	134,486	135,947	135,779
ETC/ LFS	***101.3%***	***101.8%***	***102.4%***	***101.8%***	***101.8%***	***101.9%***	***101.7%***	***101.0%***	***101.0%***

[4] For a more detailed treatment of these differences, refer to Box 1, pg.17-19, Central Bank of Malta Quarterly Review, September 2001. For an example of the possibilities of combining administrative registers with survey data see '*The effects of using administrative registers in economic short term statistics: the Norwegian Labour Force Survey as a case study*', Discussion Paper No.273, Statistics Norway, June 2000.

[5] See *'Providing comparable international labour statistics'*, US Bureau of Labour Statistics, June 2002.

[6] For a more detailed discussion on the strengths and limitations of using administrative records, see '*Guide to Labour Market Statistics Releases*', Office for National Statistics (UK), April 2000.

[7] Subsequently, the ETC introduced a policy whereby it periodically revises its administrative register in order to ensure a continuous and transparent update of its data. For more details on this policy see ETC Proposal 1/2001, October 2001.

[8] Registrants under Part 2 include persons who have either been dismissed from work due to disciplinary action, left employment of their own free will, or were struck off Part 1 after having refused work or training opportunities.

2.0 Composition of Total Employment

Total employment covers employees and the self-employed. In both categories, part-timers should be included with those working full-time.

Both the ETC and LFS employment series include employees and the self-employed. In order to arrive at the total number of employed in Malta the numbers of full-time employed and part-time employed were added. In this case, part-timers were defined as those having a part-time job only, since those having both a full-time and a part-time job were already counted as full-time employed.

To measure the labour input in Malta, part-timers were included in terms of their full-time equivalent (i.e. the number of full-timers needed to replace them). In this case, part-timers were defined as those having either a part-time job only or both a full-time and a part-time job. In this way, the labour input of those working more than 40 hours a week as a result of having a part-time job was fully accounted for. Thus, the two variables, total employment (i.e. the number of gainfully occupied) and full-time equivalent employment (i.e. the labour input) involve different definitions of part-time employment.

Full-time employment is published in time series form while part-time employment had to be constructed. The series for the full-time employed was also adjusted for changes in definition as well as possible measurement errors.

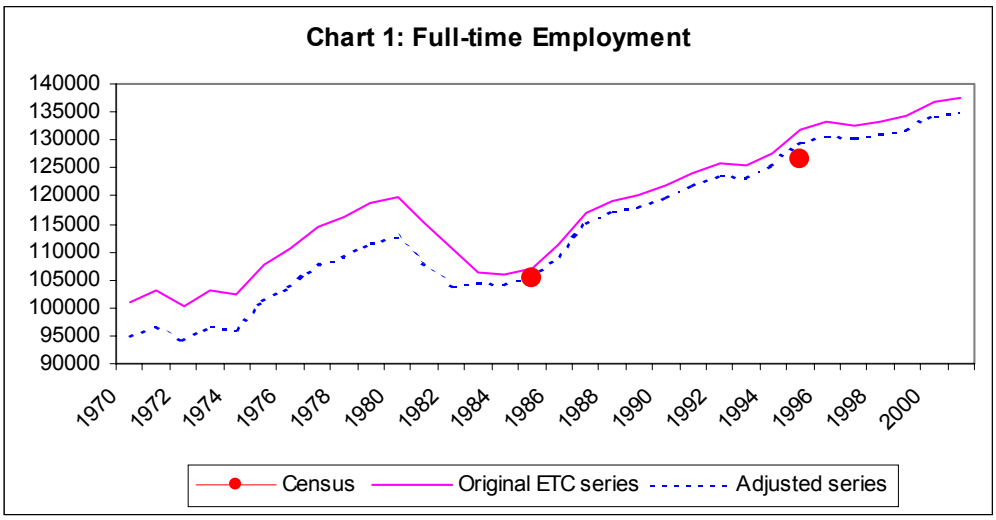
2.1 Full-time Employment

As can be seen from Table 1, the ETC's full-time gainfully occupied population was, on average, 1.7% higher than that produced by the LFS. This is somewhat surprising at first glance[9], as the LFS considers all persons aged between 15 and 64, while the ETC data set is restricted to the 16 to 61 age bracket. The persistent gap between the two measures might reflect the lack of efficient checks on whether persons who quit a job are reported to the ETC. Another possible cause might be differences in definitions of employment. The ETC retains in its gainfully occupied data all those who are registered as contractually bound by their employers, while the LFS's definition is more restricted. For example, in the case of persons who are on leave for more than six months, the LFS only includes those who are still receiving payment. It is thus more representative of the actual labour input.

The LFS data were deemed to be more reliable and were therefore adopted as the measure of full-time employment. Given the absence of LFS data prior to May 2000, however, the existing ETC data were adjusted downwards by a factor of 0.017 in order to create a consistent full-time employment series throughout. Furthermore, in order to account for the break in ETC data in 1983, a revision factor of 0.956 was applied to the pre-1983 non-revised ETC data. This revision factor was based on the average of the revision carried out for the period 1983-1992. The full-time employment series derived as a result of these adjustments is presented in Appendix 2. To assess the reliability of this series, it was compared with periodic assessments

[9] For a discussion on the comparison of different kinds of employment data see *'People and jobs: comparing sources of employment data'*, Office for National Statistics (UK), January 2002 and '*How exactly is employment measured?*', Office for National Statistics (UK), October 2001.

of full-time employment made by the NSO in the past. Thus, for example, whereas the estimated series indicates that there were 129,617 full-timers in December 1995, the 1995 Census showed an estimate of just over 126,500. Similarly, while the 1985 Census indicated the number of employed at 105,293, the adjusted series shows 105,285. In both cases, the adjusted full-time employment series is closer to the Census estimate than the original ETC data, as can be seen from Chart 1.



2.2 Part-time Employment on an Annual Basis

In contrast with full-time employment, the ETC's part-time employment series is only available for the period 1995 to 2000. The series (which included all part-time workers, i.e. persons that worked only part-time and also those who worked part-time over and above their full-time jobs) was discontinued following the publication of the LFS. According to the latter, the number of persons who only work part-time[10] was, in fact, substantially lower than the ETC data. The 1995 Census had also indicated that the ETC's part-time employment data were substantially over-estimated. According to the Census, at end 1995 there were 14,959 persons in part-time employment[11], that is, around 31% less than the relative ETC figure.

Table 2: Published Part-time Employment Data (number of persons)

	All part-timers (ETC)	***Part-time as only job (ETC)***	***Part-time as only job (LFS)***
1995	21,778	10,638	
1996	24,941	11,730	
1997	27,786	12,841	
1998	30,157	14,191	
1999	33,098	16,975	
2000	36,522	18,689	10,815
2001			10,608

[10] The LFS results do not include data on those who work part-time over and above their full-time job.
[11] See Census of Population and Housing, Vol.4, pg. 494.

To arrive at a measure of part-time employment, the existing ETC series on those who worked only part-time was adjusted in line with the LFS's results. The adjustment factor (of approximately 0.58) reflects the ratio between the ETC and the LFS figures for 2000. Furthermore, the ETC data indicated that the number of persons who held only a part-time job amounted to approximately half of all part-timers. This ratio was hence applied on the adjusted ETC data to derive an all part-timers series[12]. As can be seen from Table 3, the estimate for 1995 is relatively close to the Census figure.

Table 3: All Part-timers (number of persons)

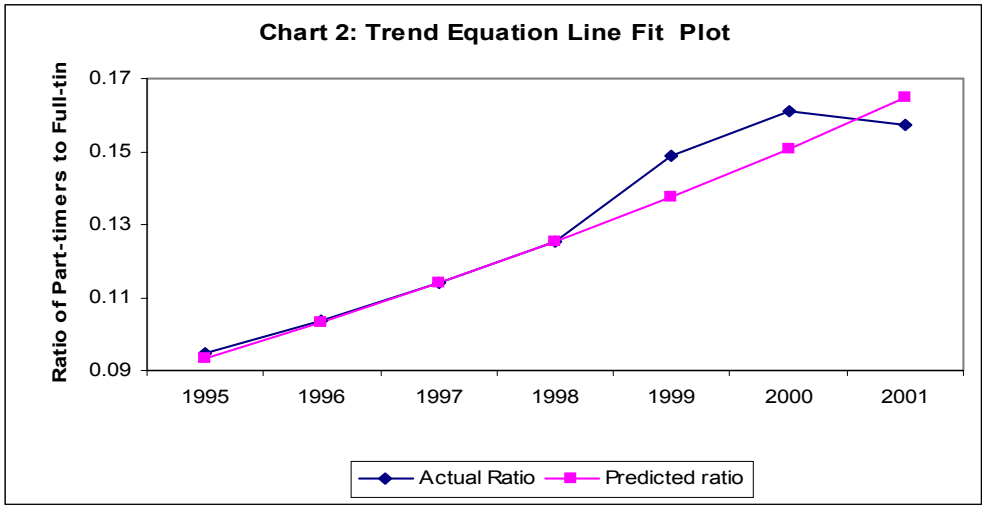
	Original all part-timers (ETC)	***Adjusted all part-timers***	***1995 Census***
1995	21,778	12,312	14,959
1996	24,941	13,576	
1997	27,786	14,862	
1998	30,157	16,424	
1999	33,098	19,646	
2000	36,522	21,630	
2001		21,216	

This adjusted series was then extended backwards, prior to 1995, using a double-logarithmic trend[13] for the ratio of the number of part-timers to that of full-time employees. The trend equation is presented below:

$$\text{Ln(Part-time to Full-time ratio)} = -15.1868 + 3.6088\ \text{Ln(Time trend)}$$
$$(-12.5) \qquad (10.8)$$

$R^2 = 0.96$ Sample period: 1995 - 2001

Values in parenthesis are t-statistics



Although the trend line in Chart 2 does not fit the actual data after 1998, it appears that the estimated trend is appropriate for the earlier years[14]. The results of this

[12] A more detailed explanation of the line of reasoning underlying the determination of these adjustment factors can be found in Appendix 1.

[13] The time trend was set to start at 35 in 1995.

[14] It should, however, be kept in mind that the statistical robustness of these results is conditioned by the very limited data set on which they are based.

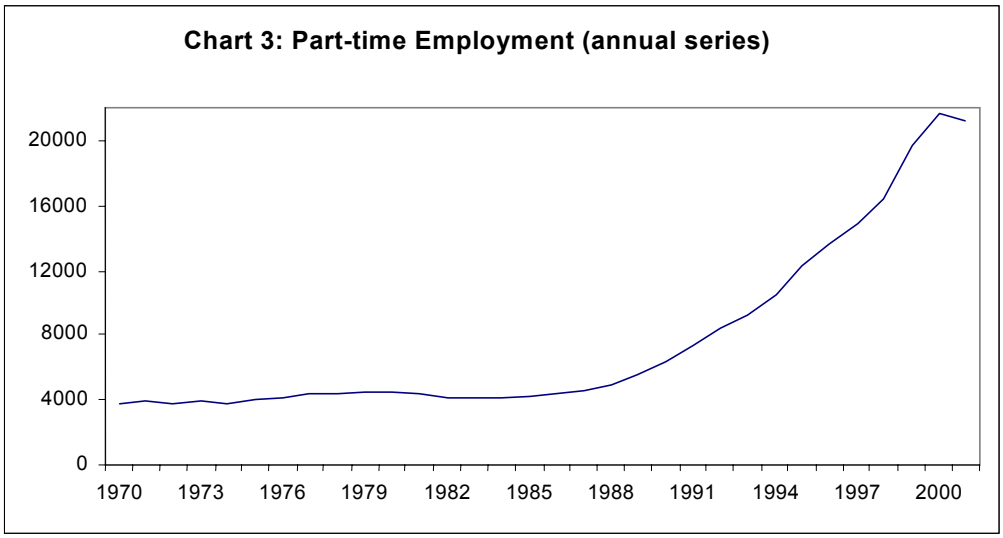
regression were thus utilised to compute values for the part-time to full-time ratio for the period preceding 1995. The equation gives very low numbers of part-timers prior to 1987. The ratio of part-timers to full-time employees, according to the equation, was below 1% until 1979 and below 2% in the following five years. Table 4 shows selected estimated values of part-time employment for the period 1970 to 1990, together with the previously derived data for 1995 to 2001.

Table 4: All Part-timers Data for Selected Years

	Adjusted all part-timers (no of persons)	***Estimated all part-timers (no of persons)***	***Ratio of part-timers to full-timers (%)***
1970		97	0.0
1975		447	0.4
1980		1,398	1.2
1985		2,923	2.8
1990		6,417	5.4
1995	12,312		9.5
1996	13,576		10.4
1997	14,862		11.4
1998	16,424		12.6
1999	19,646		14.9
2000	21,630		16.1
2001	21,216		15.7

Note: The ratio for the period 1970-1995 was derived using the double logarithmic time trend.

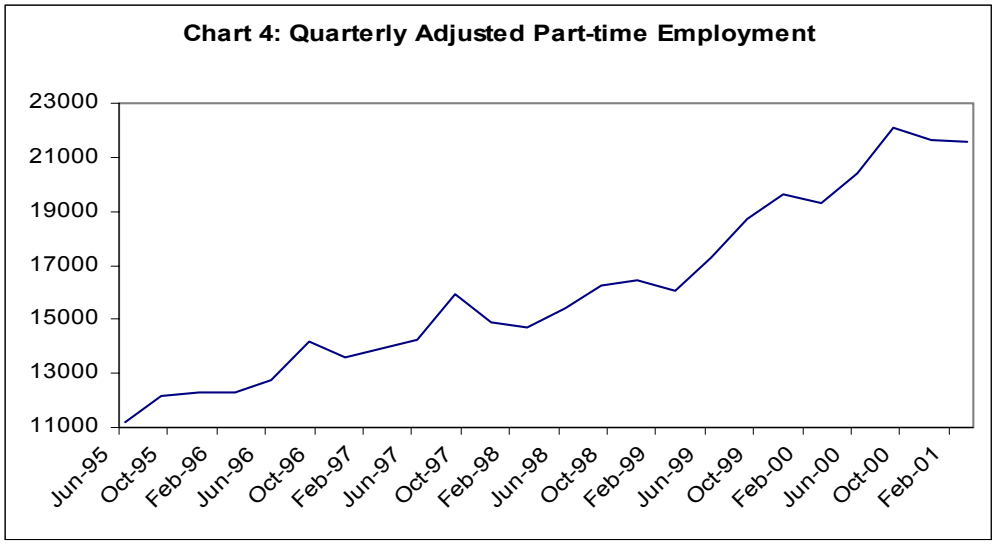
Since we believe these numbers underestimate the actual development, a 4% ratio was assumed for the period prior to 1987. The resultant series for part-timers (which includes estimated data up to 1994, adjusted ETC data between 1995 and 1999 and LFS data for 2000 and 2001) are shown in Chart 3[15].



[15] The results of the estimation process were benchmarked with the 1994 Household Budgetary Survey (HBS). Our estimate of the ratio of part-timers to full-timers for 1994, 4.2%, was fairly close to the HBS' 4.7%.

2.3 Part-time Employment on a Quarterly Basis

A quarterly part-time employment series was computed in line with the methodology adopted with respect to annual data. A constant 0.58 adjustment factor was applied to the ETC's part-time as primary job quarterly data series. This figure was then doubled to arrive at an adjusted series of all part-time employees. The results of this process can be seen in Chart 4.



The next step was to extend the series backwards. A simple trend could not, however, be employed since, as can be seen from the Chart, part-time employment follows a seasonal pattern. This can also be seen from Table 5, which presents each quarter's reading as a percentage of the December quarter reading.

Table 5: Each Quarter as a Percentage of the December Quarter

	1996 (ETC)	**1997 (ETC)**	**1998 (ETC)**	**1999 (ETC)**	**2000 (ETC)**	**2001 (LFS)**
March Quarter	91%	94%	90%	82%	89%	102%
June Quarter	94%	96%	94%	88%	94%	107%
September Quarter	105%	107%	99%	95%	102%	99%
December Quarter	100%	100%	100%	100%	100%	100%

During most of the years under review, part-time employment rose sharply during the June and September quarters. In 1996, 1997 and 2000 it also declined during the December quarter, while in 1998 part-time employment remained stable. In 1999 the pattern is unclear, but this year was exceptional in terms of labour market statistics. During that year all the main labour market data aggregates moved quite strongly upwards, while unemployment was reported to have declined dramatically in a matter of months, even though there was no commensurate acceleration in economic activity. In 2001, part-time employment dropped sharply during the September and December

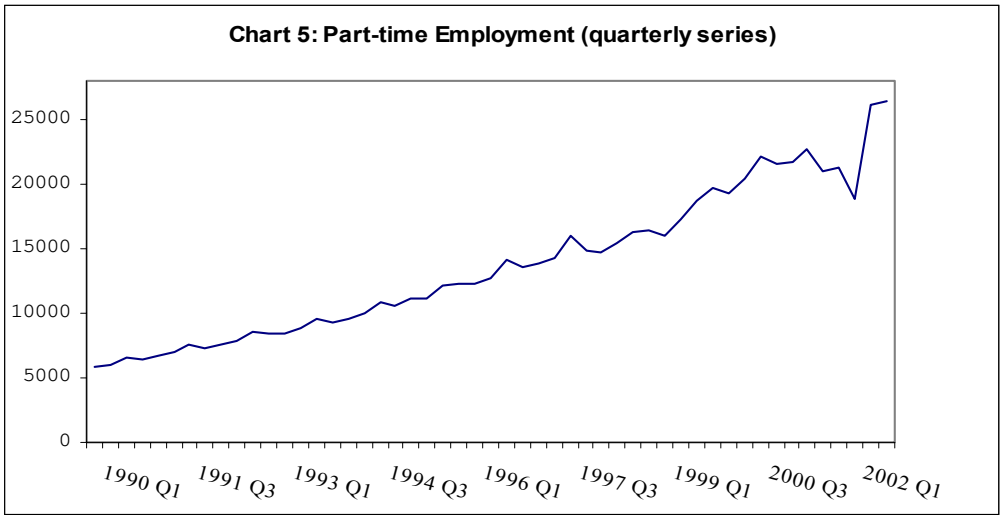
quarters. This reflected the slump in tourism and manufacturing activity that followed the deepening of the international recession and the September 11 events. The years 1999 and 2001 were thus excluded from the analysis of the quarterly pattern.

An average seasonal pattern was imposed on the pre-1996 data, using the annual figures as values for the December quarter. The seasonal pattern was calculated as the average of the patterns that prevailed during 1996-98 and 2000.

Table 6: Seasonal Pattern imposed on Quarterly Part-time Employment (1990-1995)

	% of December Quarter
March Quarter	91%
June Quarter	95%
September Quarter	103%
December Quarter	100%

The resultant number of part-timers (which includes estimated data up to March 1995, adjusted ETC data up to September 2000 and actual LFS data thereafter) is shown in Chart 5.



2.4. Conversion into Full-time Equivalent

For the purposes of assessing the labour input rather than employment, the number of part-timers has to be weighted by the length of their average working week. The estimated number of part-time employees was converted into full-time equivalent by multiplying it by a factor of 0.49. This factor was chosen in the light of the findings of the 1995 Census, which gave a breakdown of the hours worked by part-timers (see Table 7). The Census reports the number of part-timers for three intervals regarding weekly work time: 1-10, 11-20 and 21-30 hours per week. Taking the mid-point of

each interval as the actual number of hours worked, the weighted average working week amounted to 19.6 hours, or 49% of the full-time week[16].

Table 7: Conversion to Full-time Equivalent

Hours worked per week	***Share of total part-timers***	***Hours worked (mid-point) as % of full-time hours***
1-10	13.9%	13.7%
11-20	28.8%	38.7%
21-30	57.3%	63.7%
Overall	100%	49.0%*

** Weighted average of the numbers in column 3 using the weights in column 2.*

Due to lack of data, it was not possible to allow for variations in the number of overtime hours worked. The latter phenomenon may be quite significant in certain segments of the Maltese economy, such as manufacturing and tourism.

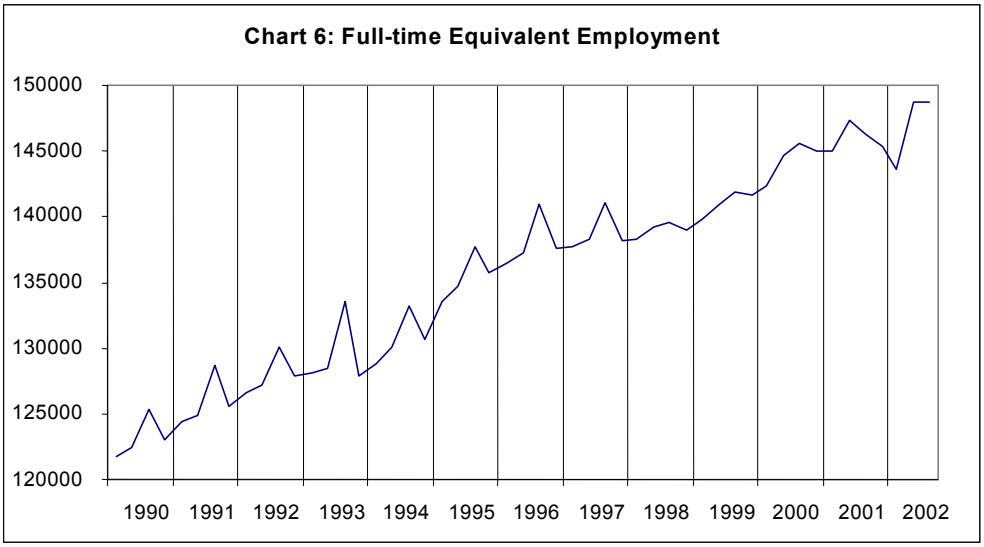


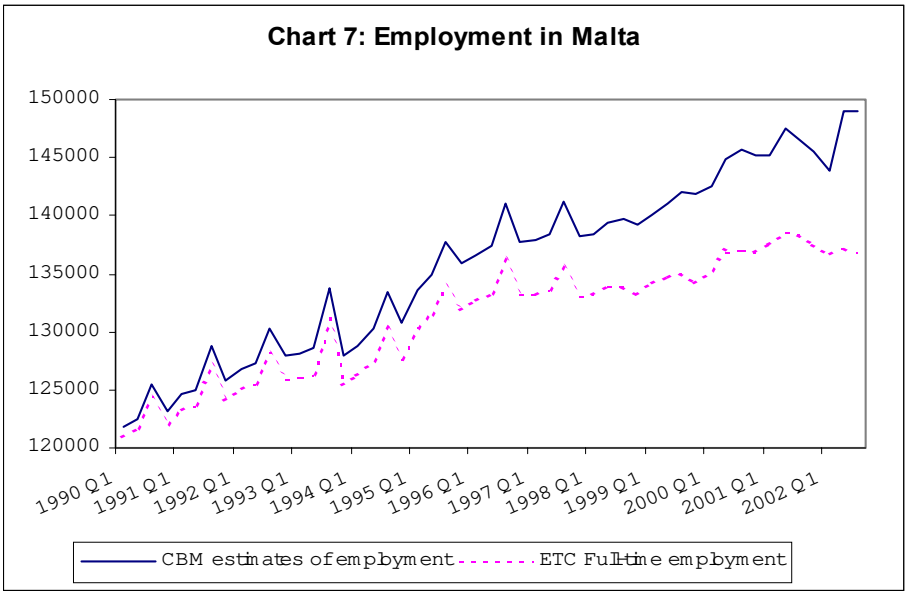
Chart 6 above shows the resultant full-time equivalent employment series. It appears that the series follows a pronounced seasonal pattern up to 1997. The series rises significantly in the third quarter, but most of the increase is reversed in the final quarter. This, in essence, reflects the pattern of the demand for labour of industries such as tourism and agricultural processing. The influence of seasonal fluctuations seems to have decreased since 1998. This may, in part, reflect restrained tourist activity since that year[17].

[16] The latter was taken to be 40 hours, even though the Census defined the full-time working week as between 31 and 40 hours. The breakdown shown in Table 7 includes both part-timers who only hold a part-time job and those who work also full-time. If one includes only those who only hold a part-time job, the average working week amounts to 0.47.

[17] Tourist arrivals have, in fact, declined for three consecutive years, and at end 2002 were significantly below their 1998 level.

3.0 Implications of the New Employment Series

At present, the only long time series on employment available is the full-time employment data series compiled by the ETC. However, this series does not capture part-time employment. The CBM estimate of employment presented in this Working Paper includes those employed full-time and those only having a part-time job. Those having both a full-time and a part-time occupation are included under full-time employment.



The inclusion of part-time employment in the employment series gives a different picture of the historical development of employment in Malta than the ETC series. Chart 7 shows the ETC full-time employment series and our estimates of total employment including part-timers. As can be seen, the two series increasingly diverge, reflecting the growing importance of the part-time element in Malta's workforce. The latter is estimated to have grown from 2.5% of total employment in 1990 to 8.8% in 2002. Whereas the ETC's measure of full-time employment grew by 10.2% between the third quarter of 1990 and the same quarter of 2002, the estimated total employment data series shows an increase of 18.7%. In absolute terms, the ETC's full-time employment series implies a rise of approximately 12,700 workers, while our estimates show an increase of nearly 23,500.

Full-time and part-time employment have followed different paths. For example, in 2002 whereas full-time employment declined by 0.7%, there was a substantial increase in part-time employment according to the LFS. Anecdotal evidence indicates that the factors underlying the increase in part-time employment have changed in recent years. Traditionally, part-time employment was dominated by housewives. However, it appears that in recent years both male and female part-timers are increasingly being employed by firms providing auxiliary services to industry. This could be a response to more favourable tax treatment of income from part-time work. While full-time employment grew by just 0.5% between 1996 and 2002, the part-time workforce in full-time equivalent terms is estimated to have risen by 86%, to stand at nearly 13,000 in September 2002.

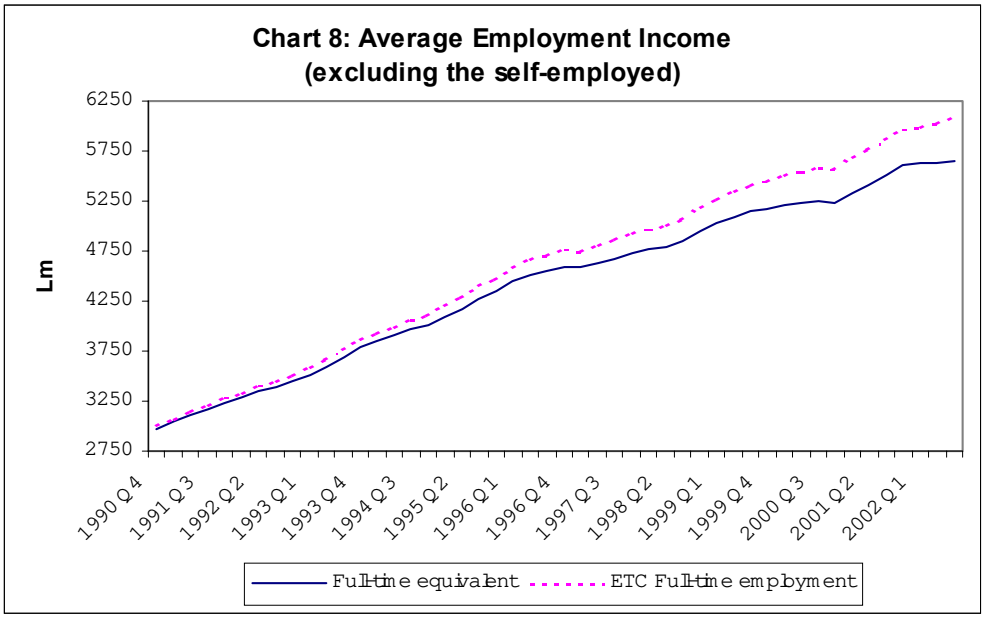
The new data also give another picture of trends in the employment rate[18]. As can be seen from Table 8, in 2001 the latter, calculated in terms of full-time employees, was up by nearly 1 percentage point from its 1990 level. On the other hand, including the part-time element, the employment rate increased from 56% in 1990 to nearly 60% in 2001.

Table 8: Employment Rates (%)

	Full-time and Part-time	**Full-time only**
1990	56.2	55.7
1991	56.7	56.0
1992	56.9	56.1
1993	56.9	55.9
1994	56.8	55.5
1995	58.1	56.6
1996	59.6	57.7
1997	59.3	57.2
1998	58.9	56.5
1999	59.2	56.4
2000	60.0	56.6
2001	59.9	56.6

3.1 Some Implications of the Full-time Equivalent Series

When measuring average labour income and average labour productivity, labour input in terms of working hours should be used rather than the number of employed. The estimated full-time equivalent employment data series presented in this paper, in spite of its limitations, is a first step on the way towards a comprehensive statistical measure of labour input in Malta.

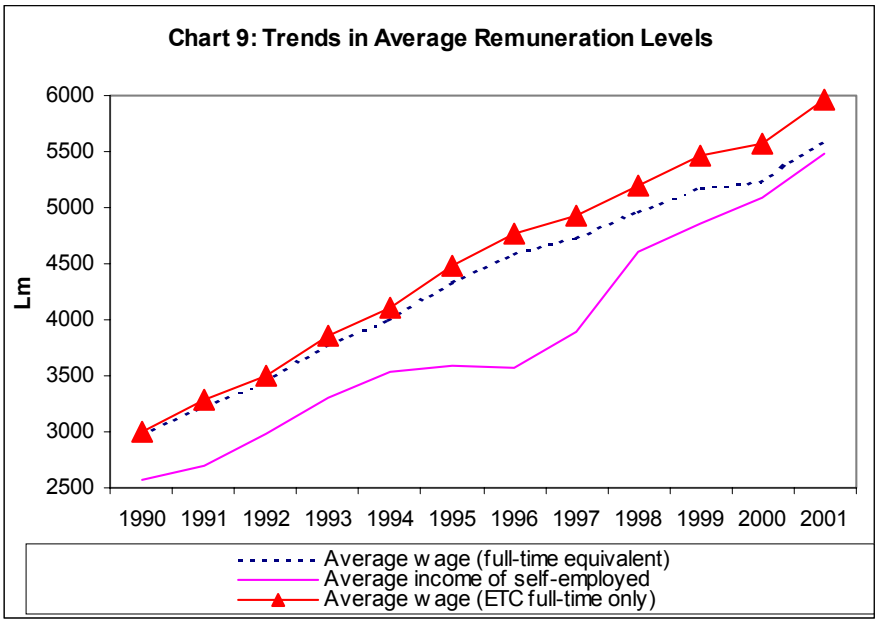


[18] The latter is defined as the ratio of the total number of employed to the working-age population (i.e. the 16 to 61 age bracket).

The full-time equivalent employment gives a significantly lower level of average employment income than that implied by the full-time employment series. In both cases, the self-employed are excluded from the employment aggregate, as employment income accrues exclusively to employees[19]. This is evident from Chart 8, which graphs the ratio between the four-quarter moving-sum of employment income and the two employment measures (computed as a four-quarter moving-average). The full-time equivalent series implies a slower average annual increase in employment income, 5.9% compared to 6.4%, over the period under review.

The level of employment income per person employed calculated using the full-time equivalent series averaged around Lm5,600 in 2002, whereas using the full-time employment series alone it yielded an average salary of more than Lm6,000. This income per capita measure includes contributions to social security made by employers in respect of their employees, which statutorily amount to 10% of the basic gross salary, up to a certain ceiling. In 2002, it is estimated that these contributions corresponded to around 8.5% of aggregate employment income.

When this amount was excluded, the actual gross income received by workers computed on the basis of the full-time equivalent series was estimated at Lm5,160. This is practically identical to the average gross annual income shown by the LFSs in 2002. By contrast the Economic Survey (January-September 2002), which includes an estimate of average earnings computed on the basis of the number of full-timers, implies an annual income of Lm5,700 for the same year.

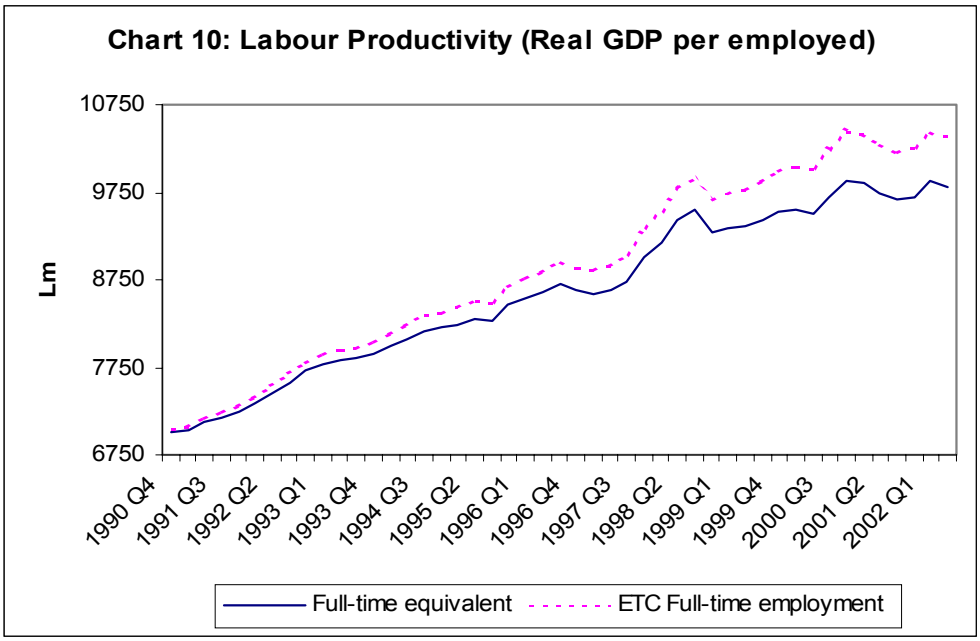


The full-time equivalent series also refines our knowledge of the gap between the average remuneration of employees and the self-employed. As can be seen from Chart 9, the average income earned by the self-employed[20] has historically been lower

[19] See '*National Accounts of the Maltese Islands: Sources and Methods*', National Statistics Office (Malta), 1999. Details on the number of self-employed are given in Appendix 4.
[20] Computed on the basis of income from self-employment data from the National Accounts and data on the number of self-employed compiled by the ETC.

than the average wage paid to employees. However, the new series indicates that the gap between average remuneration levels has become much smaller in recent years.

Chart 10 compares real GDP[21] per worker computed on the basis of the ETC full-time employment series with that derived from the estimated full-time equivalent series. The use of the ETC series implies an average labour productivity increase of 3.5% per annum between 1990 and 2001. The use of the estimated full-time equivalent series gives an average annual growth of labour productivity of 3%.



4.0 Conclusion

Accurate, timely and comprehensive labour market statistics are an essential requirement for the analysis of any economy. In recent years, there has been a shift internationally in labour market compilation methods away from a wholesale reliance on administrative sources towards a comprehensive use of survey methods.

The labour force survey has only recently been introduced in Malta. As has been shown, its results shed new light on a number of areas of the Maltese labour market. Failing to account for part-time employment has led to an overestimation of both average labour costs and productivity of labour in the Maltese economy. However, it must be stressed that the series described in this paper is just a step towards the definitive measurement of the labour input in Malta. The latter objective can only be achieved by compiling the number of hours worked.

[21] The real GDP series used in this calculation was taken from the Central Bank's quarterly model. These data differ somewhat from the official GDP series.

Appendix 1: The Adjustment Factors Applied to ETC Data

ETC data on part-time employment was compiled on a monthly basis from June 1995. Its compilation was discontinued after March 2001, when three successive LFSs had shown a large difference between the results of the two methods.

Table A: Overlapping LFS and ETC data on Part-time Employment

	Part-time as only job (ETC)	***Part-time as only job (LFS)***	***Ratio LFS:ETC***
May 2000	17,317	9,551	0.55
Dec 2000	18,689	10,815	0.58
Mar 2001	18,629	10,840	0.58

As can be seen from Table A, the ratio between LFS and ETC data was constant during the last two surveys. The first survey had shown a somewhat larger divergence, but the results of this survey must be treated with caution as the exercise was still untested and was considered as a pilot try. Furthermore, there is no reason to believe that the ETC's over-estimation should have followed a particular seasonal pattern. The ETC's method appears to have led to over-estimation right from the start. In fact, while the Census had indicated that in November 1995 there were 14,959 persons in part-time employment, the ETC reading for the same month stood at 21,623[22]. In this light, in adjusting the ETC figures an adjustment factor of 0.58 was used across the monthly readings of the ETC.

The LFS does not produce data on the number of those who work part-time over and above their full-time job. However, both the ETC and Census show that in 1995 the total number of part-timers was nearly equally divided between those having part-time as the only job and those working part-time beside their full-time employment. Furthermore, according to the ETC data this relationship remained constant, on average, during the 1995 to 2000 period. Thus, the number of those who held part-time employment as a secondary job was assumed to be equal to those having only a part-time occupation.

Table B: ETC Sub-division of Part-time Employment

	Part-time as secondary job	***Part-time as only job***
1995	11,140	10,638
1996	13,211	11,730
1997	14,945	12,841
1998	15,966	14,191
1999	16,123	16,975
2000	17,833	18,689

[22] This would imply an adjustment factor of 0.69. The Census' enumeration however included a number of part-timers on which no detailed information was given. If these are excluded the adjustment factor would stand at 0.58, i.e. identical to the ratio adopted in this estimation exercise.

Table C: Census Estimate of Part-time Employment (as at November 1995)

	No of persons	***Sub-Total***
Working for an employer part-time only	4,448	
Working part-time and looking after the home or family	1,997	
In full-time education and working part-time	1,033	
Total Part-time as an only job		7,478
Working for an employer on a part-time and full-time basis	3,433	
Was self-employed on full-time basis and working part-time	226	
Non-otherwise specified	3,822	
Total Part-time as a secondary job		7,481
Total Part-time employment		14,959

Therefore the adjusted ETC series was doubled to arrive at a figure for total part-time employment.

Appendix 2: Estimated Annual Series (1970-2001)

	Adjusted full-time employment	Part-time in full-time equivalent	Full-time equivalent employment	Total employment
1970	95,095	1,864	96,959	96,997
1971	96,900	1,899	98,799	98,838
1972	94,388	1,850	96,238	96,276
1973	96,807	1,897	98,704	98,743
1974	96,176	1,885	98,061	98,100
1975	101,350	1,986	103,337	103,377
1976	103,892	2,036	105,928	105,970
1977	107,555	2,108	109,663	109,707
1978	109,202	2,140	111,343	111,386
1979	111,490	2,185	113,676	113,720
1980	112,557	2,206	114,764	114,809
1981	108,257	2,122	110,379	110,422
1982	103,863	2,036	105,899	105,940
1983	104,373	2,046	106,419	106,460
1984	104,071	2,040	106,111	106,153
1985	105,358	2,065	107,423	107,607
1986	109,212	2,141	111,353	111,397
1987	115,061	2,255	117,316	117,362
1988	117,181	2,396	119,577	119,626
1989	118,188	2,742	120,930	120,986
1990	119,949	3,144	123,093	123,157
1991	122,068	3,601	125,669	125,742
1992	123,840	4,096	127,936	128,019
1993	123,330	4,557	127,887	127,980
1994	125,498	5,163	130,661	130,766
1995	129,707	6,033	135,740	135,863
1996	130,931	6,652	137,583	137,719
1997	130,327	7,282	137,609	137,758
1998	131,010	8,048	139,058	139,222
1999	132,019	9,627	141,646	141,842
2000	134,388	10,599	144,987	145,203
2001	134,979	10,396	145,375	145,587

Adjusted full-time employment: Prior to the 1983 break in series, ETC data were modified by a revision factor and an adjustment factor, based on the relationship between ETC and LFS results. Then up to 2000, revised ETC data were only modified by the adjustment factor. Thereafter the series was taken from the LFS.
Part-time in full-time equivalent: Up to 1987, the part-time series was set at 4% of full-time employment. Between 1987 and 1995, data was estimated using a double-logarithmic time trend for the ratio between part-timers and full-timers. Up to 2000, the ETC series was modified by an adjustment factor, based on the relationship between ETC and LFS results in 2000. Thereafter the series was taken from the LFS. Since the latter only provides the number of those who work part-time only, the reading was doubled in order to capture those who work part-time over and above their full-time job. A full-time equivalent conversion factor of 0.49 was applied.
Full-time equivalent employment: sum of full-timers and equivalent part-timers.
Total employment: sum of full-timers and those who work part-time only.

Appendix 3: Estimated Quarterly Series (March 1990 – September 2002)

	Adjusted full-time employment	Part-time in full-time equivalent	Full-time equivalent employment	Total employment
1990 Q1	118,938	2,856	121,794	121,852
1990 Q2	119,525	2,973	122,498	122,558
1990 Q3	122,150	3,247	125,396	125,463
1990 Q4	119,949	3,144	123,093	123,157
1991 Q1	121,228	3,271	124,499	124,566
1991 Q2	121,558	3,404	124,962	125,032
1991 Q3	124,910	3,718	128,628	128,704
1991 Q4	122,068	3,601	125,669	125,742
1992 Q1	122,963	3,720	126,683	126,759
1992 Q2	123,333	3,872	127,205	127,284
1992 Q3	125,922	4,229	130,152	130,238
1992 Q4	123,840	4,096	127,936	128,019
1993 Q1	123,964	4,139	128,103	128,187
1993 Q2	124,208	4,308	128,516	128,604
1993 Q3	128,875	4,706	133,581	133,677
1993 Q4	123,330	4,557	127,887	127,980
1994 Q1	124,081	4,689	128,771	128,866
1994 Q2	125,259	4,881	130,140	130,240
1994 Q3	128,009	5,332	133,341	133,450
1994 Q4	125,498	5,163	130,661	130,766
1995 Q1	128,011	5,480	133,491	133,603
1995 Q2	129,269	5,474	134,743	134,855
1995 Q3	131,705	5,966	137,671	137793
1995 Q4	129,707	6,033	135,740	135,863
1996 Q1	130,434	6,035	136,469	136,592
1996 Q2	131,031	6,255	137,286	137,414
1996 Q3	133,988	6,953	140,941	141,082
1996 Q4	130,931	6,652	137,583	137,719
1997 Q1	130,924	6,813	137,736	137,876
1997 Q2	131,329	6,987	138,316	138,458
1997 Q3	133,221	7,809	141,030	141,189
1997 Q4	130,878	7,282	138,160	138,308
1998 Q1	131,070	7,216	138,287	138,434
1998 Q2	131,631	7,557	139,188	139,342
1998 Q3	131,663	7,976	139,639	139,802
1998 Q4	131,010	8,048	139,058	139,222
1999 Q1	131,962	7,865	139,827	139,987
1999 Q2	132,495	8,461	140,956	141,129
1999 Q3	132,728	9,173	141,901	142,088
1999 Q4	132,019	9,627	141,646	141,842
2000 Q1	132,948	9,473	142,421	142,614
2000 Q2	134,608	9,995	144,603	144,807
2000 Q3	134,664	10,835	145,499	145,720
2000 Q4	134,388	10,599	144,987	145,203
2001 Q1	134,342	10,623	144,965	145,182
2001 Q2	136,144	11,111	147,255	147,482
2001 Q3	135,979	10,263	146,242	146,451
2001 Q4	134,979	10,396	145,375	145,587
2002 Q1	134,486	9,211	143,697	143,885
2002 Q2	135,947	12,824	148,771	149,033
2002 Q3	135,779	12,919	148,698	148,962

Adjusted full-time employment: Up to 2000, ETC data were modified by an adjustment factor, based on the relationship between ETC and LFS results. Thereafter the series was taken from the LFS.

Part-time in full-time equivalent: Between 1990 and 1995, data was estimated using a double-logarithmic time trend for the ratio between part-timers and full-timers. A seasonal pattern, based on 1996-1998 and 2000, was imposed on the estimated annual series. Then up to 2000, the ETC series was modified by a constant adjustment factor based on the relationship between ETC and LFS results in 2000. Thereafter the series was taken directly from the LFS. Since the latter only provides the number of those who work part-time only, the LFS reading was doubled in order to capture those who work part-time over and above their full-time job. A full-time equivalent conversion factor of 0.49 was applied throughout.

Full-time equivalent employment: sum of full-timers and equivalent part-timers.

Total employment: sum of full-timers and those who work part-time only.

Appendix 4: The Self-employed Category

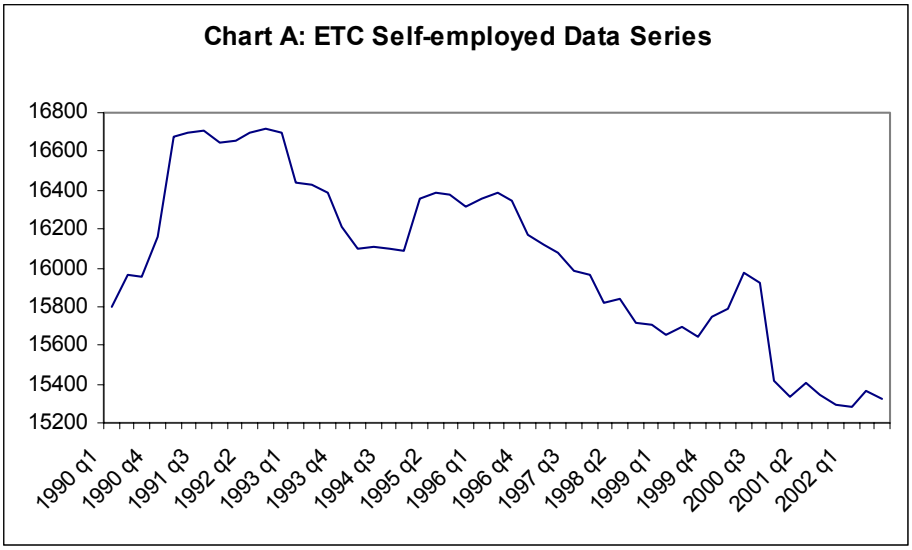
In order to arrive at a correct measure of the average gross salary, one needs to subtract the self-employed category from the gainfully occupied population because earnings from self-employment are not included within the employment income component in the National Accounts.

A time series of the number of self-employed registered with the ETC is readily available. However, as can be seen from Table A, the number of self-employed is significantly lower than that presented in successive LFSs.

Table A: Self-employed (ETC and LFS Common Data Points)

	2000 Q2	**2000 Q4**	**2001 Q1**	**2001 Q2**	**2001 Q3**	**2001 Q4**	**2002 Q1**	**2002 Q2**	**2002 Q3**
ETC	15,973	15,421	15,335	15,406	15,342	15,291	15,282	15,368	15,322
(% of full-timers)	11.7	11.3	11.1	11.1	11.1	11.1	11.2	11.2	11.2
LFS	17,212	18,813	18,944	17,675	19,976	20,788	19,313	21,539	20,069
(% of employment)	12.0	13.0	13.0	12.0	13.7	14.3	13.4	14.5	13.5

Nevertheless, it was considered appropriate to utilise the ETC self-employed time series to arrive at an estimate of the number of wage earners. As can be seen from Table A, the LFS series exhibits quite substantial variations in the number of self-employed, a phenomenon which might be more the result of changes in the sample composition, rather than actual developments in the labour market.



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