South African Journal of Economics Vol. 76:S2 August 2008

QUANTIFYING THE OUTSOURCING OF JOBS FROM MANUFACTURING TO SERVICES

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Abstract
There has been debate internationally and in South Africa about the extent to which a relative decline in manufacturing employment and rise in services employment can be accounted for by intersectoral outsourcing of jobs in the domestic economy. This article develops a new methodology for testing for and quantifying outsourcing at an economy-wide level. This methodology is used to analyse intersectoral shifts in employment in South Africa between 1997 and 2005. Trends in employment in the business services subsector of services are also examined for what they suggest about the extent of outsourcing. Overall, the results suggest that intersectoral outsourcing accounts for some but by no means all of the apparent shift in employment between the manufacturing and services sectors in South Africa.
JEL Classification: J21, L23, L24, L60, L80
Keywords: Outsourcing, employment, manufacturing, services, deindustrialisation, South Africa

1. INTRODUCTION

A stylised fact of economic growth is that at advanced stages of development the rate of growth of the manufacturing sector tends to level off and the manufacturing sector accounts for diminishing shares of aggregate output and employment, while the service sector accounts for increasing shares. Many high-income and some middle-income countries have experienced deindustrialisation – in relative terms a decline in the share of manufacturing employment and in absolute terms a fall in the number of people employed in manufacturing.[1] On the other hand, services has grown as a share of GDP and more so as a share of employment in many countries.[2]

One of the hypotheses advanced in the international literature to explain the relative decline in manufacturing employment and rise in services employment is that this is merely a *statistical illusion* arising from the reallocation of activities from manufacturing firms to service providers. The balance of evidence in developed countries appears to indicate that there has in fact been a real structural shift in the economy from manufacturing to services. While there has been (domestic) outsourcing of activities from

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[1] See Palma (2008) for a discussion and analysis of deindustrialisation internationally.

[2] On some relevant aspects of the services sector, see *e.g.* Bhagwati (1984), Daniels (1993), Dasgupta and Singh (2005), Katouzian (1970) and Kletzer (2005).

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manufacturing to services, this seems to account for a relatively small proportion of the overall decline in manufacturing and rise in services.[3]

In South Africa too, there has been speculation about the extent to which the apparent shift in employment between the services and manufacturing sectors is a reflection of a *real structural change* in the activities of the economy, as opposed to a *shifting around of activities*. For example, cleaning services within a vehicle manufacturing plant that were previously reported as manufacturing jobs (because of being based within the firm) could have been outsourced to a cleaning company and then be reported as service sector jobs. An apparent rise in services employment and concomitant fall in manufacturing employment associated with this outsourcing would not necessarily reflect the rise of the services sector and decline in the manufacturing sector in any meaningful analytical sense.

There has been an ongoing shift in the structure of employment from manufacturing to services in South Africa. Manufacturing employment declined from 19.9% of total (formal sector) employment in 1997 to 16.8% in 2005, although increasing slightly in absolute terms from 1.37 to 1.44 million. The share of the service sector (excluding general government) increased from 50.5% to 57%, from 3.47 to 4.88 million jobs. These figures are based on data from the October Household Surveys (OHS) and Labour Force Surveys (LFS). The trends can also be examined over a longer period using the South African Standardised Industry Database (SASID) data, although this is not directly comparable to the LFS data and the categories used are not identical. The SASID data show the share of manufacturing in total employment peaking in 1981 at 17.7%, thereafter declining gradually to 13.5% in 2004. The share of services in total employment was steady from 1970 until the mid-1990s, within a narrow range of about 39-41%. From the mid-1990s onwards it increased rapidly, standing at 50.5% in 2005.

A view is often expressed, based largely on anecdotal evidence, that there has been considerable outsourcing of activities and especially of jobs to specialised service providers. There has also been significant outsourcing of functions from the public to private sectors, and various other forms of privatisation. For instance, at the local government level activities such as cleaning and refuse removal have frequently been outsourced from the public sector to private companies.

Getting to the bottom of this issue is important analytically as well as from a policy perspective in terms of prospects for future employment creation. If the apparent shift in employment from manufacturing to services reflects a real structural shift, this might suggest that the rise in services employment is "endogenously dynamic" and potentially sustainable. It would also raise questions about whether the decline in manufacturing employment should be allowed to continue or should be addressed through policy interventions. Conversely, if the apparent shift in employment from manufacturing to services is merely a reflection of a shifting around of activities, this would not in itself be a direct indication of the relative dynamism of these sectors. It might also suggest that these

[3] See, for example, Rowthorn and Ramaswamy (1997) for empirical quantification of this. Rowthorn and Coutts (2004) state that ". . . part of the decline in manufacturing employment may be merely a statistical artifact caused by shifting classification. However, it seems implausible that this accounts for more than a modest fraction of the huge recorded fall in the share of manufacturing employment in advanced economies over the past thirty years".

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trends in manufacturing and services employment would be unlikely to continue indefinitely.

Despite the importance of this issue, there is little empirical evidence in South Africa concerning the magnitude of outsourcing, and the extent to which this can account for the apparent shift in employment from manufacturing to services. Outsourcing is very difficult to quantify, especially at the economy-wide level. To the author's knowledge, no such quantifications are currently available for South Africa.

A new method is thus proposed in this article for estimating the extent to which changes in employment can be accounted for by outsourcing. The analysis allows for judgements to be drawn about the prevalence and extent of outsourcing, rather than arriving at exact numbers. The methodology is applied to South African employment data over the period 1997-2005.

2. METHODOLOGY

The methodology developed in this article to investigate the extent to which outsourcing can account for the apparent shift in employment between manufacturing and services is used for the first time here. It is based on a cross-referencing of sectoral and occupational data drawn from the OHS for 1997-1999 and the LFS for 2000-2005, both undertaken and published by Statistics South Africa.[4] The focus is on the formal sector, particularly in the light of the poor quality of informal sector data. The period of analysis of this study is determined by the availability of data that is broadly comparable. Although there is OHS data for 1995 and 1996, these years are generally not considered comparable with each other or with subsequent years. Given the fact that the OHS and LFS data are not entirely comparable and cannot be accurately treated as a single series, the analysis is undertaken separately for the two periods 1997-1999 and 2000-2005.

The 8-year period for which data are available is unfortunately much shorter than would be ideal for this analysis. Further, there is likely to have been considerable outsourcing prior to 1997, which would be missed here. To the extent that this earlier outsourcing was uneven between sectors, those occupations or sectors in which the bulk of outsourcing occurred relatively earlier will appear to have outsourced less in the period of this study.

The analysis is based on an examination of the occupational disaggregation of employed people (at four-digit level) in conjunction with which sector they are reported within (using SIC coding at two-digit level). The intuition behind the method is to examine changes in the share of particular occupations in employment of a sector, as well as changes in the share of sectoral employment within a given occupation.

The methodology can be simply explicated using an example of cleaning workers – an occupation that is often thought of in relation to outsourcing. Analysis of the OHS/LFS data shows how many cleaners[5] were reported within each sector of the economy in each year from 1997 to 2005. Examining the shift in the sectoral distribution of cleaners – in the context of overall changes in employment of cleaners and in overall sectoral employment – can potentially shed light on the extent to which there was an "outsourcing-type" reallocation of cleaning jobs between the manufacturing and services sectors.

[4] The base data for the analysis was extracted from the OHS and LFS by Debbie Lee.

[5] Using occupational code 9132, "phelpers and cleaners in offices, hotels and other establishments".

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Between 1998 and 2005 the total number of cleaners in South Africa rose from 268,351 to 306,923.[6] The number of cleaners reported in the manufacturing sector fell slightly from 24,275 to 23,163, while the number of cleaners employed in services increased significantly from 176,650 to 270,528. To what extent can these different trends in manufacturing and services be accounted for by the outsourcing of cleaning employment from manufacturing to services?

In investigating this we make use of the following data derived from OHS/LFS data for each year (and similarly for each other occupation):

– What was the change in the total number of cleaners?
– What was the change in the number of cleaners employed in manufacturing and in services, respectively?
– What was the change in the share of all cleaners that were employed in the manufacturing and services sectors, respectively?
– What was the change in the share of people employed in manufacturing that were cleaners, and similarly for services?
– What was the change in the share of cleaners employed in the business services subsector and in the share of cleaners employed in the business services subsector as a share of cleaners employed in all private services?

One of the limitations of the methodology developed here is that the data are based on people's self-identification of their occupation and sector. There is bound to be some variation in this regard, for example, in the case of a security guard based in the textiles manufacturing sector. However, it is probable that a guard employed directly by the textiles factory, on the payroll and under the supervision of the textiles factory management, and based there full-time and permanently is more likely to report their sector as being textiles. On the other hand, a guard employed by, on the payroll of, and under management of a security company who happens to be based (probably temporarily) at a textiles factory would be more likely to report in the security sector.

Dynamic decomposition techniques were employed in order to analyse the changes in the employment of particular occupations within each sector. In the first stage of the analysis, changes in employment in a given occupation and sector were decomposed into the change associated with a reallocation of jobs between sectors, and the change in the number of people employed within a particular occupation. For example, to what extent was the growth of almost 100,000 cleaning jobs in the services sector between 1998 and 2005 associated, with on the one hand, a "reallocation" of cleaning jobs from manufacturing, and on the other hand, with the growth of cleaning employment?

In the first part of the empirical analysis, we thus define $L_{jx} \equiv \theta_{jx} L_j$ where L_{jx} is the number of jobs in occupation j in sector x (for example the number of cleaners employed in the manufacturing sector); θ_{jx} is the share of jobs in occupation j that are within sector x (that is, $\theta_{jx} = \frac{L_{jx}}{L_j}$) (for example, the share of all cleaners who are employed in manufacturing); and L_j is the number of jobs in occupation j (for example, the number of cleaners employed in the entire (formal sector) economy).

[6] Note that these years are not strictly comparable as the 1998 data are derived from the OHS and the 2005 data from the LFS; in the empirical results presented in section 3 the results based on these two sources are analysed separately.

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Thus, analysing the change in the number of jobs in occupation j in sector x between time periods 0 and 1,

$$\Delta L_{jx} = L^1_{jx} - L^0_{jx} = \theta^1_{jx} L^1_j - \theta^0_{jx} L^0_j = \underbrace{(\theta^1_{jx} - \theta^0_{jx})\left(\frac{L^1_j + L^0_j}{2}\right)}_{\text{“allocation effect”}} + \underbrace{(L^1_j - L^0_j)\left(\frac{\theta^1_{jx} + \theta^0_{jx}}{2}\right)}_{\text{“occupational change effect”}}$$

This allows for the separation of the changes in employment within a sector and occupation (for example, cleaning jobs in manufacturing) into two components. The “allocation effect” is the change associated with a reallocation of employment across sectors. The “occupational change effect” is associated with a change in the size of that occupation. The results of this analysis would indicate, for instance, whether the growth of cleaning employment within the services sector could be accounted for primarily by the “reallocation” of cleaning jobs to services or by the growth of cleaning employment in general.

Finally, changes can be calculated for the manufacturing, services, and general government sectors as a whole. The overall employment in a sector is $L_x \equiv \sum_{j=1}^{n} \theta_{jx} L_j$ and hence the change in sectoral employment between times 0 and 1 is given by the following:

$$\Delta L_x = \sum_{j=1}^{n} \theta^1_{jx} L^1_j - \sum_{j=1}^{n} \theta^0_{jx} L^0_j = \underbrace{\sum_{j=1}^{n} (\theta^1_{jx} - \theta^0_{jx})\left(\frac{L^1_j + L^0_j}{2}\right)}_{\text{“allocation effect”}} + \underbrace{\sum_{j=1}^{n} (L^1_j - L^0_j)\left(\frac{\theta^1_{jx} + \theta^0_{jx}}{2}\right)}_{\text{“occupational change effect”}}.$$

This part of the analysis does not necessarily conclusively answer our questions around outsourcing. For example, the allocation effect in the case of cleaners could be found to be negative for manufacturing and positive for services. This result alone does not provide a distinction between the outsourcing of cleaning jobs from manufacturing to services on the one hand, and on the other hand the overall shrinkage of the manufacturing sector and growth of the services sector. The result could simply reflect the overall growth of employment in the services sector and the opposite for the manufacturing sector, and not necessarily any outsourcing-type reallocation of jobs per se.

Where the occupations being analysed are clearly “services” or “manufacturing” jobs, the results do convey significant information, but not necessarily about the sectors as measured in SIC codes. For instance, where the occupation being analysed is clearly a “service job” such as clerks, a positive occupational change effect does point to growth in that service occupation (as does a simple examination of the employment data for that occupation). However, this is of course not necessarily correlated to the growth of the service sector, as clerks can be employed in any sector of the economy.

This raises questions around the actual meaning of the “manufacturing” and “services” sectors. Sectors are generally defined in terms of SIC codes (or other similar industrial classifications), not in terms of occupation, and this is for good reasons. However, when focussing on employment trends, and – in the context of a debate around the possibility of deindustrialisation – analysing whether or not there has been a relative decline in manufacturing employment, it may also be relevant to look at employment by occupation. The growth or decline of employment categories that are clearly “service workers” within manufacturing might be interpreted somewhat differently from changes

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in what are clearly "manufacturing occupations" within manufacturing, and similarly for services.

Although the decomposition analysis set out above does not necessarily distinguish between the outsourcing of jobs from manufacturing to services and the overall shrinkage of the manufacturing sector and growth of the services sector, it is nevertheless relevant to analysing changes in specific occupations of interest. For instance, a positive "occupational change effect" in a clearly services occupation would indicate real growth in that occupation, irrespective of the sectors within which those people are employed. This does provide some information concerning the change in the employment of "service occupations".

Nonetheless, intersectoral changes remain of primary interest for this study. This necessitates a further stage of analysis to distinguish more clearly between intersectoral outsourcing and differences in the overall growth of sectors. A secondary decomposition analysis is thus undertaken which focuses on changes in the *share of an occupation within sectors*.

To continue with the example of cleaners, in the first stage of the decomposition analysis the allocation effect could be positive for services and negative for manufacturing. This result would then need to be interpreted in conjunction with an analysis of changes in the share of cleaning jobs within manufacturing and services, respectively.

If the share of cleaning jobs within manufacturing were found to fall, then interpreted in conjunction with a finding of a negative allocation effect from the first decomposition analysis this would point to an outsourcing of cleaning jobs from manufacturing to services. Alternatively, if the share of cleaning jobs in manufacturing were actually to rise, then even a negative allocation effect for manufacturing and positive effect for services would not necessarily constitute evidence of the outsourcing of cleaning jobs from manufacturing to services.

In the secondary decomposition analysis changes in employment of a given occupation within a given sector are therefore separated out into that component associated with changes in the share of that occupation within that sector, and that component associated with changes in the overall employment of that sector.

That is, based on $L_{xj} \equiv \gamma_{xj} L_x$ where L_{xj} is the number of jobs in occupation j in sector x (of course $L_{xj} = L_{jx}$); γ_{xj} is the share of jobs in sector x that are within occupation j (that is, $\gamma_{xj} = \frac{L_{xj}}{L_x}$); and L_x is the number of jobs in sector x.

The change in employment of a given occupation within a given sector between times 0 and 1 would then be decomposed according to the following:

$$\Delta L_{xj} = \gamma^1_{xj} L^1_x - \gamma^0_{xj} L^0_x = \underbrace{(\gamma^1_{xj} - \gamma^0_{xj})\left(\frac{L^1_x + L^0_x}{2}\right)}_{\text{"occupational share effect"}} + \underbrace{(L^1_x - L^0_x)\left(\frac{\gamma^1_{xj} + \gamma^0_{xj}}{2}\right)}_{\text{"sec toral employment effect"}}.$$

The "occupational share effect" refers to the change in the number of people employed in a given occupation and a given sector which can be accounted for by the change in the share of sectoral employment that is in that occupation. For example, that part of the change in the number of cleaners employed in manufacturing which is associated with the change in the share of manufacturing jobs that are cleaners. The "sectoral employment effect" refers to the change in the number of people employed in a given occupation and

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a given sector that can be accounted for by the change in overall employment in the sector. For example, that part of the change in the number of cleaners employed in manufacturing which is associated with the change in the level of manufacturing employment. The sum of these two components is of course the net change in the number of cleaners in manufacturing.

Finally, in the third stage of the empirical analysis, a more detailed investigation of which specific *subsectors* within services experienced the most growth for any given occupation is also helpful in forming a judgement about the extent of any outsourcing. In order to investigate this, the trends in employment of occupations in services at the two-digit SIC level are analysed.

If the growth of a certain occupation in the services sector is disproportionately in the "other business services" subsector of services, this might suggest growth associated with the outsourcing of activities to service providers. The "other business services" subsector is where specialised service providers to other businesses (operating in any sector of the economy) would generally be categorised. For example, it would include companies providing cleaning or security services to client companies.

For each of the occupations analysed, employment of that occupation in the "other business services" subsector is thus analysed both as a percentage of total services employment and as a percentage of total employment, over time. In particular, if employment of that occupation within the "other business services" sector is a rising share of total services employment, this would be strong evidence of outsourcing.

The results of these three parts of the empirical analysis – the two decomposition exercises as well as the analysis of trends in the share of "other business services" employment in total services employment and total employment – need to be interpreted jointly in forming any judgements about outsourcing. The allocation effect is intended as the primary measure of outsourcing. However, this needs to be interpreted in conjunction with other results for that occupation. The most conclusive evidence of jobs foregone through outsourcing (either lost outright or created at a lower rate than would otherwise have been the case) is where a negative "allocation effect" and a non-positive "occupational share effect" are found, as well as "other business services" employment comprising an increasing share of employment of that occupation in services. However, note that even a positive occupational share effect is not necessarily indicative of the absence of outsourcing. A fast-growing occupation may account for an increasing share of employment within a sector, despite the loss of (actual or potential) jobs through intersectoral outsourcing. The purpose of the methodology of this study is to form judgements about the presence and broad extent of intersectoral outsourcing, rather than to fix on a precise number for each occupation.

3. EMPIRICAL RESULTS

In this section the results from the decomposition analyses set out above are presented and discussed. Results are shown firstly for six specific occupational groups that are of particular interest to this study as they are typically associated with outsourcing. These occupations are: cleaners, security guards, business professionals not elsewhere classified, buyers, salespersons and shop demonstrators, and office clerks not elsewhere classified. All are reasonably large categories, to avoid working with unacceptably large confidence intervals. Together these occupations comprise 18.4% of total employment in 2005, so

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do represent a significant section of the labour market. Thereafter, the aggregate results for each of the three sectors (manufacturing, private services and general government) are discussed.

Results are shown separately for two periods: 1997-1999 and 2000-2005. The reason for this is that data up to 1999 is derived from the OHS and data from 2000 onwards from the LFS, and these two data sources are not strictly comparable. The breakdown of results into two periods is also useful in showing changes in the patterns of intersectoral outsourcing during these periods.

The first results presented are those for cleaners (see Table 1), as per the example discussed earlier in this article. The allocation effect is negative for both manufacturing and general government but positive for services, for both periods 1997-1999 and 2000-2005. This suggests the reallocation of cleaning jobs from both manufacturing and government to services. Interestingly, both the occupational change and occupational share effects are positive for all three sectors for the period 1997-1999 – associated with an increase in the share of cleaners in the total employment if each sector – but negative for all three sectors for the period 2000-2005. In the first period, the positive occupational change effect outweighs the negative allocation effect in manufacturing and general government, associated with overall growth in the employment of cleaners in these sectors. In the later period, by contrast, both the allocation and occupational change effects are negative for manufacturing and government, associated with an unambiguously negative change in total employment of cleaners in those sectors. In the case of services, all four effects are positive in the first period. In the second period, the positive allocation effect outweighs the negative occupational change effect, and the positive sectoral employment effect outweighs the negative occupational share effect.

Note also (from Table 1c) that the number of cleaners employed in the business services subsector, as a percentage of both total employment of cleaners in the service sector and of total employment of cleaners, rose steadily and significantly from 1997 to 2005. The increasing concentration of cleaners in the business services subsector in particular suggests that there was a growth of employment in cleaning service providers, as opposed to simply an overall growth of cleaning employment in the services sector as a whole.

Table 1a. Cleaners 1997-1999

	Allocation effect	**Occupational change effect**	**Occupational share effect**	**Sectoral employment effect**	**Total employment change**
Manufacturing	−4,541	19,672	17,321	−2,190	15,131
Services	18,971	102,544	109,843	11,672	121,515
Government	−7,639	18,503	12,029	−1,165	10,864

Table 1b. Cleaners 2000-2005

	Allocation effect	**Occupational change effect**	**Occupational share effect**	**Sectoral employment effect**	**Total employment change**
Manufacturing	−11,145	−279	−14,233	2,809	−11,424
Services	21,832	−2,293	−17,471	37,010	19,539
Government	−3,542	−252	−6,508	2,714	−3,794

Table 1c. Employment of cleaners in business services subsector

	1997	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**
As % total services employment	13.7	16.4	19.7	24.1	29.6	26.3	27.0	27.6	32.4
As % total employment	8.4	10.8	13.9	17.6	21.7	19.3	19.6	21.1	26.0

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The results from each of the other occupations analysed, shown in Tables 2-6, can be interpreted in a similar fashion. Judgements about the prevalence and extent of outsourcing in each case need to be formed on the basis of a joint consideration of the three parts of the methodology, as reflected in the three tables for each occupation.

Table 2a. Security guards 1997-1999

	Allocation effect	Occupational change effect	Occupational share effect	Sectoral employment effect	Total employment change
Manufacturing	–921	2,914	2,674	–681	1,993
Services	4,991	51,980	44,891	12,080	56,971
Government	–6,732	6,236	330	–826	–496

Table 2b. Security guards 2000-2005

	Allocation effect	Occupational change effect	Occupational share effect	Sectoral employment effect	Total employment change
Manufacturing	2,988	1,852	4,064	776	4,840
Services	9,424	57,734	28,371	38,787	67,158
Government	–12,783	3,740	–10,670	1,627	–9,043

Table 2c. Employment of security guards in business services subsector

	1997	1998	1999	2000	2001	2002	2003	2004	2005
As % total services employment	62.8	75.2	80.2	72.8	74.1	82.7	82.1	84.5	85.9
As % total employment	48.1	60.7	63.6	62.1	63.9	72.6	70.8	77.7	76.2

Table 3a. Business professionals n.e.c. 1997-1999

	Allocation effect	Occupational change effect	Occupational share effect	Sectoral employment effect	Total employment change
Manufacturing	–4,132	628	–3,228	–276	–3,504
Services	2,722	2,054	3,805	971	4,776
Government	1,834	222	2,123	–67	2,056

Table 3b. Business professionals n.e.c. 2000-2005

	Allocation effect	Occupational change effect	Occupational share effect	Sectoral employment effect	Total employment change
Manufacturing	858	1,507	2,191	174	2,365
Services	4,960	28,903	28,868	4,995	33,863
Government	–3,491	3,144	–629	282	–347

Table 3c. Employment of business professionals n.e.c. in business services subsector

	1997	1998	1999	2000	2001	2002	2003	2004	2005
As % total services employment	14.2	13.0	21.0	32.8	0.0	10.7	25.7	24.3	22.8
As % total employment	8.5	9.4	15.9	25.2	0.0	10.0	20.1	19.6	20.5

Table 4a. Buyers 1997-1999

	Allocation effect	Occupational change effect	Occupational share effect	Sectoral employment effect	Total employment change
Manufacturing	–4,906	3,904	–84	–918	–1,002
Services	5,296	5,624	9,531	1,389	10,920

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Table 4b. Buyers 2000-2005

	Allocation effect	Occupational change effect	Occupational share effect	Sectoral employment effect	Total employment change
Manufacturing	−1,997	2,468	−295	766	471
Services	5,282	8,089	9,221	4,150	13,371

Table 4c. Employment of buyers in business services subsector

	1997	1998	1999	2000	2001	2002	2003	2004	2005
As % total services employment	2.5	0.0	16.6	3.2	6.4	10.1	n/a	14.8	10.0
As % total employment	1.2	0.0	10.8	2.1	4.1	6.3	0.0	11.5	7.9

Table 5a. Shop salespersons and demonstrators 1997-1999

	Allocation effect	Occupational change effect	Occupational share effect	Sectoral employment effect	Total employment change
Manufacturing	−11,643	3,084	−6,419	−2,140	−8,559
Services	13,588	28,261	21,970	19,879	41,849
Government	−1,172	106	−1,024	−42	−1,066

Table 5b. Shop salespersons and demonstrators 2000-2005

	Allocation effect	Occupational change effect	Occupational share effect	Sectoral employment effect	Total employment change
Manufacturing	4,532	1,967	5,314	1,185	6,499
Services	−2,519	47,873	−1,226	46,580	45,354
Government	0	0	0	0	0

Table 5c. Employment of shop salespersons and demonstrators in business services subsector[7]

	1997	1998	1999	2000	2001	2002	2003	2004	2005
As % total services employment	2.5	0.2	1.2	1.6	0.7	0.3	0.3	0.3	0.3
As % total employment	2.1	0.1	1.0	1.5	0.6	0.3	0.2	0.3	0.3

Table 6a. Other office clerks 1997-1999

	Allocation effect	Occupational change effect	Occupational share effect	Sectoral employment effect	Total employment change
Manufacturing	−5,035	−8,043	−12,518	−560	−13,078
Services	4,777	−52,993	−50,739	2,523	−48,216
Government	−4,495	−15,686	−19,643	−538	−20,181

Table 6b. Other office clerks 2000-2005

	Allocation effect	Occupational change effect	Occupational share effect	Sectoral employment effect	Total employment change
Manufacturing	−381	23,217	21,639	1,197	22,836
Services	−9,240	178,035	154,669	14,126	168,795
Government	11,473	49,768	57,950	3,291	61,241

[7] This is the only occupation for which employment in that occupation and in the business services subsector as a percentage of either total services employment in that occupation or total employment in that occupation decreased over time.

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Table 6c. Employment of other office clerks in business services subsector[8]

	1997	1998	1999	2000	2001	2002	2003	2004	2005
As % total services employment	14.0	40.0	28.2	45.5	30.2	9.5	17.5	13.0	16.6
As % total employment	7.3	21.0	17.3	30.3	15.3	5.5	9.1	6.8	10.0

In summary, the following sectors and occupations can be identified as having clearly undergone employment loss associated with "outsourcing", for the specified time periods:

Cleaners in manufacturing, 2000-2005
Cleaners in general government, 2000-2005
Security guards in general government, 1997-1999
Security guards in general government, 2000-2005
Business professionals *n.e.c.* in manufacturing, 1997-1999
Business professionals *n.e.c.* in government, 2000-2005
Buyers in manufacturing, 1997-1999
Buyers in manufacturing, 2000-2005
Shop salespersons and demonstrators in manufacturing, 1997-1999
Shop salespersons and demonstrators in general government, 1997-1999
Shop salespersons and demonstrators in services, 2000-2005
Other office clerks in manufacturing, 1997-1999
Other office clerks in general government, 1997-1999

The following sectors and occupations cannot unambiguously be said to have experienced employment loss associated with outsourcing, but it is likely that employment would have been higher than it actually was had there not been outsourcing:

Cleaners in manufacturing, 1997-1999
Cleaners in general government, 1997-1999
Security guards in manufacturing, 1997-1999
Other office clerks in manufacturing, 2000-2005
Other office clerks in services, 2000-2005

The following sets of tables show the results of the decomposition analyses for all seven occupations that have been separately investigated as well as for the sectors in aggregate. For each occupation and sector in each period, the tables show the allocation and occupational effects, which sum to the employment change, as well as the occupational share and sectoral employment effects, which also sum to the total employment change. Each set of tables thus shows the results of the first decomposition analysis (into the allocation and occupational change effects), the second decomposition analysis (into the occupational share and sectoral employment effects), as well as (in part c) the analysis of employment within the "other business services" subsector of services. The third table for each occupation shows employment in that occupation in the "other business services" subsector of services as a percentage of the total employment of that occupation in services and as a percentage of the total employment in that occupation. All figures are in actual numbers of jobs.

[8] The high volatility evident in this table does raise questions about the reliability of data for this occupation. This may derive in part from this category being a type of residual for other office clerks not elsewhere classified, and changes in how office clerks are classified into other occupations over time. Results pertaining to this occupation should thus be treated with caution.

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Finally, results are shown in Table 7 for the manufacturing, services and general government sectors as a whole. Only the first decomposition analysis is meaningful for total sectoral employment. The reason for this is that the occupational share effect is always 0 (as $\sum_{j=1}^{n} \gamma_{xj}^{0} = \sum_{j=1}^{n} \gamma_{xj}^{1} = 1$ for any sector x) and hence the sectoral employment effect simply equals the total change in employment for that sector. Only the allocation effect and occupational change effect are thus shown for the sector aggregates in Table 7.

For the 1997-1999 period, the occupational change effect is positive for all three sectors, but in the cases of manufacturing and general government this is outweighed by a negative allocation effect, and the total employment fell. A different picture emerges for the period 2000-2005. Both the allocation and occupational change effects are positive for each of the sectors, and total employment of course grows in each case. The growth in employment is by far the highest in services (1.4 million new jobs over the entire period 1997-2005 if the OHS and LFS data are treated together). Both manufacturing and general government do show small increases in employment over the entire 1997-2005 period, although as a proportion of total employment in these sectors the increases are not very significant.

Fig. 1 below summarises the changes in occupational and sectoral employment in an alternative form. For each of the occupations studied, and for both the manufacturing and services sectors, three employment figures are shown. The first of the three bars (light grey) shows a counterfactual projection of what employment in that sector and occupation would have been in 2005, had the same proportion of that occupation been employed in the sector as was the case in 1997. For example, how many cleaners would have been employed in manufacturing in 2005 had the proportion of all cleaners employed in the manufacturing sector been the same as it was in 1997. This is calculated as $\theta_{jx}^{1997} L_{j}^{2005}$. The second bar (dark grey) in each case shows what employment in the sector and occupation would have been in 2005 if the proportion of people in that sector who work in that occupation had remained at 1997 levels. For instance, how many cleaners would have been employed in manufacturing in 2005 if the proportion of all manufacturing workers who are cleaners had been the same as it was in 1997. This is calculated as $\gamma_{xj}^{1997} L_{x}^{2005}$. The third bar for each sector/occupation (black) shows the actual employment of workers in that sector and occupation in 2005, which is $L_{jx}^{2005} = L_{xj}^{2005}$. This presentation treats the OHS and LFS as a single series despite their discontinuity, and hence should be interpreted with caution.

Table 7a. Sector totals 1997-1999

	Allocation effect	Occupational change effect	Total employment change
Manufacturing	−175,760	64,207	−111,553
Services	129,680	177,253	306,933
Government	−52,994	26,266	−26,728

Table 7b. Sector totals 2000-2005

	Allocation effect	Occupational change effect	Total employment change
Manufacturing	12,541	119,737	132,278
Services	312,596	393,766	706,362
Government	9,082	47,235	56,317

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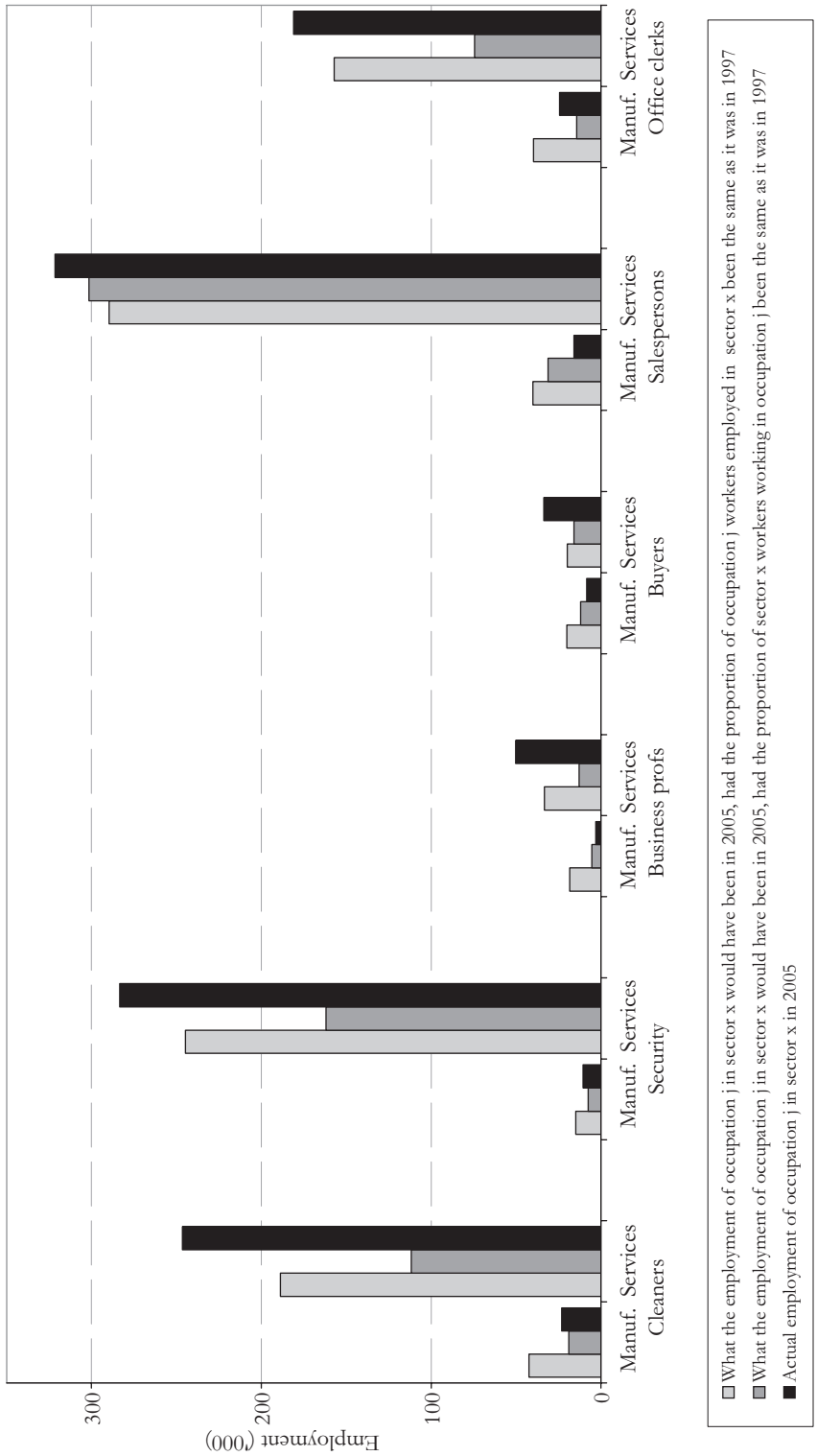

Figure 1. Analysis of sectoral/occupational changes

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For manufacturing, it can be seen that the actual number of workers in 2005 (the third, black bar) is in between the two projections in the cases of cleaners, security guards and office clerks. For these occupations, employment in manufacturing became a smaller share of total employment in that occupation in 2005 than it had been in 1997. However, employment in these occupations actually grew as a proportion of manufacturing employment. Although actual employment in 2005 in these occupations in manufacturing would of course have been higher had manufacturing retained the same share as it had had in 1997, the increasing importance of these occupations within manufacturing does suggest that employment in these occupations in manufacturing was not necessarily "bled away" to services overall.

A different pattern is evident for business professionals *n.e.c.,* buyers, and for the sizeable category of shop salespersons and demonstrators. For these occupations the actual number of people employed in manufacturing in 2005 was smaller than both of the counterfactual projections (the third bar is the smallest). This means that the number of workers in these occupations in manufacturing fell both as a proportion of the total employment in those occupations and as a proportion of total employment in manufacturing. Employment in these occupations in manufacturing would in all probability have been higher had it not been for intersectoral outsourcing. This finding is bolstered when interpreted in conjunction with the results for services.

Looking at the trends in services evident from the chart, for *all occupations* the third bar (black) is the highest. This means that the actual number of people employed in these occupations in services in 2005 exceeds both of the counterfactual projections. Employment in these occupations in services grew *both* as a share of the total employment in those occupations and as a share of total services employment. This strongly suggests that employment in these occupations in services in 2005 was higher than it would have been in the absence of intersectoral outsourcing.

4. CONCLUSIONS

The objectives of this study are twofold. First, to develop a methodology for the measurement of intersectoral outsourcing, which can be used in analysing changes in any country (provided suitable employment data are available). Second, to apply this methodology to the case of South Africa (over the period 1997-2005). The focus of the article is on outsourcing affecting the manufacturing and services sectors as well as general government.

More detailed microeconomic analysis at firm level would be needed in order to definitively put exact numbers on the number of people outsourced from manufacturing to services. Rather, the objective here is to get a sense of the prevalence and scale of outsourcing. Judgements in this regard need to be formed taking into account the results from all three parts of the empirical analysis – the two decomposition exercises and the trends in the composition of occupational employment *within* the services sector.

In a nutshell, the results suggest that there has been significant intersectoral outsourcing, which has led to employment in manufacturing being lower than would otherwise have been the case, and employment in services being higher than would otherwise have been the case. However, this alone cannot account for the much faster rate of growth in services than in manufacturing employment – there has also been a real shift in the structure of the economy, from manufacturing to services.

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Outsourcing is more prevalent in some of the occupations analysed than in others, although the trends do differ between the two time periods being analysed. Occupations that show particularly strong evidence of outsourcing from manufacturing to services include cleaners (particularly in 2000-2005), business professionals *n.e.c.* (particularly in 1997-1999), buyers (in both periods), and shop salespersons and demonstrators and other office clerks (both 1997-1999). For each of the occupations analysed, employment in services increased – both as a share of total occupational employment and as a share of total services sectoral employment. This indicates that the growth in services employment has been inflated by outsourcing from manufacturing and other sectors.

It should also be considered that many of the occupations being analysed have experienced relatively rapid employment growth, and if these occupations are to be regarded in some sense as "service jobs" irrespective of the sector within which they are located, this is also germane to understanding changes in the labour market and in the relative importance of different sectors of the economy.

The changing nature of the public service in recent years is also relevant to explaining the different employment patterns of manufacturing and services. The outsourcing (and various forms of privatisation) of activities previously performed by public servants (including local government) to the private sector would of course show up as growth of private services employment, both in absolute terms and relative to manufacturing.

The results do point to significant outsourcing from general government, particularly in occupations such as cleaners, security guards, business professionals and other office clerks. These jobs are likely to have been outsourced to specialised service providers in the "other business services" subsector of services.

Recognising the outsourcing of jobs from general government to the private services sector has important implications for interpreting relative employment trends between the manufacturing and services sectors. Firstly, the portion of the growth in private services employment that is accounted for by the shifting of general government employment to the private sector is not indicative of any innate dynamism of the services sector relative to manufacturing. Secondly, as outsourcing from the public service flattens out, this trend is not sustainable. Much of the shift may already have taken place and hence this aspect of the better employment performance of services relative to manufacturing is unlikely to continue at the same pace (barring major new outsourcing or privatisation).

The period of this study, 1997-2005, is limited by the availability of comparable data. This period is much shorter than would be preferable for this sort of analysis. It also excludes earlier years, when significant outsourcing probably occurred. It is thus likely that this analysis misses a large part of intersectoral outsourcing that did occur.

Nevertheless, it is worth noting that one of the factors to which outsourcing is commonly attributed by commentators is the new labour legislation regime introduced in the late 1990s, which accorded greater rights to workers. Anecdotal comments suggest that one of the ways in which firms responded was by outsourcing parts of their labour force, particularly in so-called "non-core functions" to outside firms so that adherence to labour legislation would become "someone else's problem". Outsourcing that did occur for these reasons would be included in the period analysed here.

The findings reported here need to be situated within broader debates around the changing sectoral composition of the economy, sector strategies and the potential for

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future job creation in South Africa.[9] Outsourcing explains some but by no means the entire shift in employment between the manufacturing and services sectors. Had it not been for intersectoral outsourcing, the growth of manufacturing employment would have been higher and the growth of services employment lower. Still, there has also been a real structural shift in employment in South Africa, and the private services sector has been the main generator of employment in recent years. This is broadly consistent with the trends in value added in the economy.

The portion of employment growth in services (and lack of higher growth in manufacturing) that is accounted for by outsourcing is unlikely to continue over time in a sustainable fashion. Insofar as it is accounted for by intersectoral outsourcing, increasing employment in services is not directly indicative of any relative dynamism of the services sector, either in terms of its own future employment-generating potential or in terms of its capacity to pull along the growth of other sectors. Further, outsourcing cannot continue indefinitely once most of the "potentially outsourcable" functions have already been hived off.

The nature of jobs being outsourced also has implications for the future growth and employment creation potential of the services sector. Occupations such as cleaners are not particularly dynamic, technologically progressive or productivity-enhancing jobs. To the extent that the growth in services employment is driven by the growth of such occupations, growth in service sector employment does not in itself point to the centrality of the services sector as an engine of economic growth. However, these types of occupations can be important in absorbing surplus labour, and this is of course vital in the context of the unemployment crisis facing South Africa.

Finally, the fact that outsourcing alone cannot account for the poor employment performance of manufacturing also has implications for this sector. Even in the absence of outsourcing, it is likely that manufacturing's share of total employment would have fallen, although by a significantly lower amount than was the case. As discussed in the first section of this article, manufacturing is typically regarded as having "special properties" which accord it a particularly important role in the growth and development process. A relative decline in this sector can thus be cause for concern, especially for a developing country. The finding of this analysis that not all of this relative decline can be accounted for by outsourcing – in other words there is a real structural shift from manufacturing to services – emphasises the need for stronger and more decisive policies addressed to the manufacturing sector if its relative decline is to be addressed.

REFERENCES

BHAGWATI (1984). Splintering and disembodiment of services and developing nations. *World Economy*, l.7(2) (June): 133-143.

DANIELS, P. W. (1993). *Service Industries in the World Economy*. Oxford: Blackwell.

DASGUPTA, S. and SINGH, A. (2005). Will services be the new engine of economic growth in India?. *Working Paper 310*. Centre for Business Research, University of Cambridge.

KATOUZIAN, M. A. (1970). The development of the service sector: A new approach. *Oxford Economic Papers*. New Series, 22(3) (Nov. 1970): 362-382.

KLETZER, L. G. (2005). Globalization and job loss, from manufacturing to services. *Economic Perspectives* 2Q 2005.

PALMA, G. (2008). Deindustrialisation, premature deindustrialisation, and the Dutch Disease. In Blume, L. and Durlauf, S. (eds), *The New Palgrave: A Dictionary of Economics* (2nd edition). Basingstoke: Palgrave Macmillian.

[9] These issues are discussed and investigated more fully in Tregenna (2007).

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ROWTHORN, R. and COUTTS, K. (2004). Commentary: Deindustrialisation and the balance of payments in advanced economies. *Cambridge Journal of Economics*, 28(5).
ROWTHORN, R. and RAMASWAMY, R. (1997). Deindustrialisation: Causes and implications. *IMF Working Paper 97/42*.
TREGENNA, F. (2007). The contribution of manufacturing and services sectors to growth and employment in South Africa. HSRC Working Paper, Pretoria.

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