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The Diversification of the Maltese Economy

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Policy Note

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Abstract

The Maltese economy has evolved very rapidly in recent years and has had a much better performance than neighbouring economies. This has coincided with a large decline in the share of industrial activity and the emergence of a large number of new services operators. Understanding whether this development could be long lasting is an important policy question. In this light, this note focuses on three issues: (i) Has the structure of the Maltese economy shifted over time? (ii) Has this shift made the Maltese economy less diversified? (iii) What could be the main macroeconomic effects of this shift?

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Executive Summary

The Maltese economy has evolved very rapidly in recent years and has had a much better performance than neighbouring economies. Understanding whether this development could be long lasting is an important policy question. In this light, this note focuses on three issues:

- **Has the structure of the Maltese economy shifted over time?**

Since 1980, the share of agriculture and of industry in the Maltese economy has halved. By contrast, the relative importance of services has surged to over 80%. Since joining the EU in 2004, the share of services has grown by 10 percentage points, the largest increase experienced across the EU. However, the decline in the relative importance of agriculture and industry stems from the emergence of new services operators rather from an actual decline in the value added of these sectors. There are some industrial sub-sectors, like the manufacturing of pharmaceutical products which have increased their economic share.

- **Has this shift made the Maltese economy less diversified?**

In the decade before EU accession, the five sectors that contributed the largest absolute increase in gross value added were construction, real estate, financial services, education and public administration. Together they made up 39% of the increase in value added and 88% of the increase in employment. In the following decade, the five largest sectoral contributions came from financial services, computer programming, legal and accounting services, gambling & betting and education. Together they made up 49% of the growth in value added but just 25% of the rise in employment.

A number of indicators suggest that the Maltese economy has become more diversified. The size of the largest five sectors has gone from 43.2% of gross value added in 1995 to 39.6% in 2014, mainly as the largest sector, wholesale and retail, has seen its share drop to 10.9%, down from 15.3% two decades earlier. The Herfindahl index – a standard measure used to study the concentration of activity – has declined since 1995. The level of the index also suggests that activity is fairly diversified in the Maltese economy and compares well with the situation observed for Germany and Austria, two of Europe's best economic performers. The same indicators suggest that while manufacturing activity remains more concentrated than overall economic activity, there has been some improvement, particularly in regards of employment shares of the different manufacturing sub-sectors.

- **What could be the main macroeconomic effects of this shift?**

The first decade post-EU accession was characterised by job-rich economic growth, with the largest increase in employment in any decade since independence. This appears to reflect differences in the employment multipliers of the sectors that mostly generated value added growth. Moreover this decade saw the expansion of a number of labour-intensive services sectors. This was partly because certain activities that were previously conducted informally by housekeepers are now being serviced in the formal economy. For instance, the number of workers in residential care services doubled in a decade and constituted a tenth of all employment growth. Another cause was the contracting-out of security, office administrative and support services, which explains over a tenth of the overall increase in employment.

The expansion of these labour-intensive services activities has played an important role in the decline in the economy's apparent labour productivity in recent years and the associated growth in unit labour costs, despite a relatively low rise in compensation. More positively, the diversification towards services could help dampen cyclical fluctuations. The services sector exhibits a third of the volatility shown by the value added of industry, and the emergence of the new services sectors has further increased this differential by lowering the volatility of the change in the value added of the overall services sector.

Has the structure of the Maltese economy shifted over time?

Malta has traditionally had a large services sector, as the presence of the British naval base necessitated several ancillary services and resulted in a very good infrastructure particularly for transshipment and trade. Ahead of the closing of the British naval base, there was a sharp expansion in the tourism sector. Since EU accession, there has been a further shift towards export-oriented services (see Table 1).

Table 1
Share of Gross Value Added by Broad Economic Sector

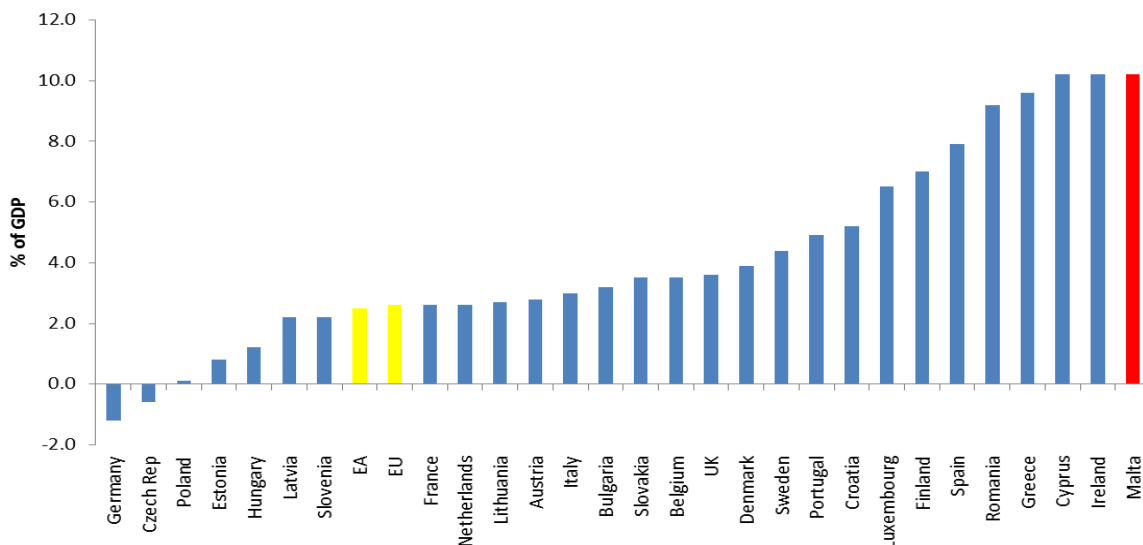
	1980	1990	2000	2004	2014
Agriculture	4%	4%	3%	2%	2%
Industry	38%	31%	27%	28%	17%
Services	59%	65%	70%	70%	81%

Source: Grech (2015), The evolution of the Maltese economy since Independence, Central Bank of Malta Working Paper 5/2015.

In fact, whereas in 2004 Malta had the eighth-highest share of services in its gross value added amongst EU countries, by 2014 it had the third-highest. The rise in the share of services between 2004 and 2014 was the highest across EU countries (see Chart 1).

Chart 1

Change in services' share of total value added (% of GDP)



Source: Author's calculations using Eurostat database as at end August 2015.

Besides tourism, the services sector has expanded to include activities such as specialised forms of tourism such as language schools and dive centres, maritime activity, professional services, back-office administration, information technology and gambling & betting. In fact, computer programming, professional services and administrative support accounted for over a quarter of the increase in value-added since EU accession. This is quite an achievement given that in 2004 these sectors amounted to just 9% of value added. In ten years, the value added of computer programming rose to more than six times its initial value. Moreover, during the same time, the arts, entertainment and recreation sector, which includes gambling & betting, saw its share of value added increase from 2.1% to 8.5%.

The decline in the share of industry does not mean that in absolute terms its output fell. Industry's value added, in fact, rose between 2004 and 2014 by 17% in nominal terms. The transformation of the Maltese economy is the result of the appearance of a large swathe of new services operators rather than the disappearance of existing industrial operators.² Even agriculture and fisheries witnessed considerable growth in value added, up by 47%, despite that their share in the national economy halved in the last two decades.

Table 2
Share of Full-Time Employment by Broad Economic Sector

	1980	1990	2000	2004	2014
Agriculture and fisheries	6%	2%	2%	2%	1%
Industry	39%	36%	32%	28%	15%
Services	55%	62%	66%	70%	84%

Source: Grech (2015), The evolution of the Maltese economy since Independence, Central Bank of Malta Working Paper 5/2015.

The trend over time of sectoral distribution of employment broadly mirrors that in gross value added (see Table 2). The declines in relative employment shares for industry and agriculture are noticeably more pronounced than those in relative value added shares. This suggests that over time, firms in these sectors have become more capital intensive and increased productivity. The intra-sectoral composition of activity also changed substantially. For instance, whereas in the 1980s those employed in the manufacture of clothing and footwear constituted 17% of all industrial workers, in 2014 their share had fallen to 4%. In absolute terms, by 2014 employment in clothing and footwear manufacturing fell to one-tenth its level three decades earlier. Similarly, the share of tourism workers out of total services employment has declined from 11.5% in the 1980s to around 7.5% in 2014, despite the fact that in absolute numbers, employment in tourism rose by half during the last thirty years.

² See Grech & Zerafa (2015).

Has this shift made the Maltese economy less diversified?

The previous section may be taken to imply that the Maltese economy is becoming over-dependent on services.

However, a more detailed look at sectoral data reveals that the Maltese economy is becoming ever more diversified. Recent developments have led to the expansion and/or creation of a number of fairly independent niches of economic activity. This is a major cause of the resilience of the Maltese economy in the face of the protracted subdued economic conditions of its European trading partners.

Before quantifying the degree of diversification of the Maltese economy, it is useful to give an overview of the growth in value-added and employment in a number of sectors. A fuller set of tables setting out growth rates using a 10-sector, 38-sector and 64-sector breakdown of the economy is presented in Appendix 1. Between 1995 and 2004, total gross value added in the Maltese economy grew by €1.7 billion or 69%. In the following decade, gross value added expanded by €2.6 billion or 62%. The trend in employment growth was quite different, with the expansion in the first period being of just 3% (or 4,500 jobs) as against 26% (or 38,100 jobs) in the following decade. This partly reflected the variation in the sectors generating the increase in value added and employment.³

In the decade before EU accession, the five sectors that contributed the largest absolute increase in gross value added were construction, real estate, financial services, education and public administration. Together they made up 39% of the increase in value added and 88% of the increase in employment. In the following decade, the five largest sectoral contributions came from financial services, computer programming, legal and accounting services, gambling & betting and education. Together they made up 49% of the growth in value added but just 25% of the rise in employment. Sectors which until 2004 were quite small, like computer programming, and gambling & betting, saw their value added grow by five to six times by 2014, but increased their employment by less than 80%. Thus for instance, computer programming's employment share rose from 0.9% to 1.9% between 1995 and 2014, while its gross value added share increased from 1.1% to 3.9%.

The rapid emergence of these new sectors has overshadowed the fact that most other sectors also experienced a very good expansion in the first decade following EU accession. Moreover this decade saw a relative weakening of some sectors which had previously

³ To understand sectoral variations in multipliers, see Cassar (2015), Estimates of output, income, value added and employment multipliers for the Maltese economy, Central Bank of Malta Quarterly Review, 2015:1.

carried a large weight in the national economy, such as public administration, construction, the textiles and food processing industry, wholesale and retail, and electronics manufacturing. This resulted in the Maltese economy becoming more diversified.

Table 3
a) Breakdown of gross value added by 38 economic sectors

	1995	2004	2014
Agriculture, forestry and fishing	2.80%	2.32%	1.32%
Mining and quarrying	0.31%	0.50%	0.09%
Manufacture of food products; beverages & tobacco	3.03%	2.47%	1.81%
Manufacture of textiles, wearing apparel, leather	2.75%	1.13%	0.21%
Manufacture of wood and paper, printing	1.50%	1.31%	0.85%
Manufacture of coke and refined petroleum products	0.06%	0.05%	0.03%
Manufacture of chemicals and chemical products	0.64%	0.27%	0.11%
Manufacture of pharmaceuticals	0.43%	0.65%	1.06%
Manufacture of rubber, plastic products, non-metals	2.07%	1.64%	1.12%
Manufacture of basic metals and fabricated metal	0.85%	0.54%	0.39%
Manufacture of computer, electronics and optical	3.81%	2.87%	1.42%
Manufacture of electrical equipment	0.39%	0.57%	0.30%
Manufacture of machinery and equipment	0.17%	0.19%	0.12%
Manufacture of transport equipment	1.12%	0.52%	0.73%
Other manufacturing, and repair of machinery	3.93%	2.93%	2.06%
Electricity, gas, steam and air-conditioning systems	0.70%	0.51%	0.65%
Water supply, sewerage and waste management	1.32%	1.04%	0.91%
Construction	6.14%	7.76%	4.03%
Wholesale and retail trade, repair of motor vehicles	15.27%	13.13%	10.88%
Transportation and storage	8.04%	6.81%	5.92%
Accommodation and food service activities	6.59%	5.60%	5.08%
Publishing, audio-visual and broadcasting activities	0.56%	0.79%	0.42%
Telecommunications	2.02%	3.18%	2.18%
IT and other information services	1.08%	1.13%	3.92%
Financial and insurance activities	2.88%	5.33%	7.54%
Real estate activities	5.68%	6.64%	5.59%
Legal, accounting, management, engineering	2.32%	3.19%	5.60%
Scientific research and development	0.57%	0.59%	1.24%
Other professional, scientific and technical activities	0.11%	0.18%	0.34%
Administrative and support services	3.43%	3.68%	4.56%
Public administration, defence, social security	7.18%	6.87%	6.41%
Education	5.06%	6.10%	6.21%
Human health services	3.20%	4.20%	4.83%
Residential care and social work activities	0.99%	1.60%	2.15%
Arts, entertainment and recreation	1.53%	2.08%	8.56%
Other services	1.31%	1.37%	1.04%
Activities of household as employers	0.19%	0.24%	0.31%

Source: Author's calculations using Eurostat database as at end August 2015.

Table 3
b) Breakdown of employment by 38 economic sectors

	1995	2004	2014
Agriculture, forestry and fishing	2.27%	2.28%	1.69%
Mining and quarrying	0.29%	0.21%	0.14%
Manufacture of food products; beverages & tobacco	3.18%	2.68%	1.99%
Manufacture of textiles, wearing apparel, leather	4.18%	2.15%	0.36%
Manufacture of wood and paper, printing	1.26%	1.36%	1.21%
Manufacture of coke and refined petroleum products	0.07%	0.05%	0.04%
Manufacture of chemicals and chemical products	0.36%	0.25%	0.17%
Manufacture of pharmaceuticals	0.44%	0.35%	0.64%
Manufacture of rubber, plastic products, non-metals	2.55%	2.18%	1.67%
Manufacture of basic metals and fabricated metal	1.22%	0.96%	0.79%
Manufacture of computer, electronics and optical	4.30%	3.23%	1.80%
Manufacture of electrical equipment	0.39%	0.42%	0.30%
Manufacture of machinery and equipment	0.26%	0.22%	0.25%
Manufacture of transport equipment	1.42%	0.41%	0.60%
Other manufacturing, and repair of machinery	4.87%	3.56%	2.10%
Electricity, gas, steam and air-conditioning systems	1.51%	1.12%	0.82%
Water supply, sewerage and waste management	1.75%	1.36%	0.86%
Construction	4.71%	6.37%	5.66%
Wholesale and retail trade, repair of motor vehicles	14.76%	16.82%	14.82%
Transportation and storage	6.12%	6.16%	5.77%
Accommodation and food service activities	6.38%	6.37%	6.37%
Publishing, audio-visual and broadcasting activities	0.43%	0.54%	0.72%
Telecommunications	1.62%	1.25%	0.97%
IT and other information services	0.89%	0.58%	1.94%
Financial and insurance activities	3.95%	4.16%	5.33%
Real estate activities	0.28%	0.31%	0.32%
Legal, accounting, management, engineering	1.48%	2.39%	4.09%
Scientific research and development	0.17%	0.28%	0.82%
Other professional, scientific and technical activities	0.19%	0.43%	0.28%
Administrative and support services	4.06%	3.90%	6.43%
Public administration, defence, social security	10.13%	8.88%	8.42%
Education	6.72%	8.58%	9.01%
Human health services	3.71%	4.73%	4.64%
Residential care and social work activities	1.23%	2.18%	3.57%
Arts, entertainment and recreation	0.86%	1.17%	2.90%
Other services	1.82%	1.84%	2.14%
Activities of household as employers	0.16%	0.25%	0.35%

Source: Author's calculations using Eurostat database as at end August 2015.

Table 3 presents a breakdown of gross value added and employment by 38 economic sectors as specified in the NACE classification adopted by Eurostat. The trends are broadly similar. Sectors which in the mid-1990s were quite significant, especially in manufacturing,

steadily declined in their relative strength. For instance, food processing and beverages and tobacco fell from 3% of overall gross value added in 1995 to 1.8% in 2014, while construction fell from 6.1% to 4% during the same period. However, these detailed sectoral data show that even in manufacturing there have been sectors that bucked the overall trend. For instance, the manufacture of pharmaceuticals increased its share of gross value added and employment, while printing kept its share of total employment. The decline in the share of certain sectors needs to be interpreted with caution, as it could also reflect the rise of outsourcing of certain services, such as security and cleaning activities.

In order to quantify better the degree of diversification of the Maltese economy, a number of indicators are presented in Table 4. Thus, the standard deviation of these 38 shares has declined slightly over these two decades. The median share in gross value added has fallen from 1.5% to 1.3%, while the size of the largest five sectors has gone from 43.2% in 1995 to 39.6% in 2014. The largest sector, wholesale and retail, has seen its share drop to 10.9%, down from 15.3% two decades earlier. Finally, Table 4 shows that the Herfindahl index – a standard indicator used to study the concentration of activity⁴ – has declined over time. The level of the index suggests that activity is not that concentrated in the Maltese economy. The 38 sectors also have a low and declining normalised Herfindahl index⁵, implying that gross value added is fairly equally distributed amongst sectors.

Table 4 includes estimates for Germany, the EU's largest economy and exporter, and Austria, a small open economy which has also performed very well since the crisis. These indicators show that the German and Austrian economies are only slightly more diversified than the Maltese economy. The trend of the diversification indicators for Malta is, however, more pronounced, resulting in increased convergence in the degree of diversification especially with Austria. When one focuses on the manufacturing sector in Malta, the indicators indicate that activity has become much less concentrated (see Appendix 2). The largest five manufacturing sectors constitute 62% of industrial jobs, down from 71% in 1995.

Since employment is relatively more stable than gross value added, the diversification measures were also calculated using employment shares. Table 4 indicates that employment shares are slightly more concentrated, but their distribution is significantly diversified and similar in Malta, Germany and Austria. The largest five sectors constitute a

⁴ The Herfindahl index is calculated as the summation of the squared market shares. For instance if there are three firms with equal share, the index gives a value of 0.33 ($0.33^2 + 0.33^2 + 0.33^2$), while if two of these firms each control 45% and the third just 10%, the index gives a value of 0.42. A higher value implies more concentration.

⁵ While the Herfindahl index ranges from $1/(\text{Number of shares})$ to 1, the normalised index ranges from 0 to 1 and is used to study how equally distributed are market shares.

larger share of total employment than they do in gross value added. The main difference for Malta is that whereas the diversification indicators computed using gross value added show a consistent downward trend, the employment-based indicators show that between 1995 and 2004 the employment distribution had become slightly more concentrated. By 2014, the indicators had returned to similar levels to those in 1995.

Table 4
a) Diversification measures based on value added breakdown by 38 sectors

Malta				
	1995	2004	2012	2014
Standard deviation	0.0302	0.0287	0.0286	0.0281
Largest sectoral share	15.3%	13.1%	11.2%	10.9%
Gap between largest 5 shares and smallest 5 shares	42.4%	40.0%	39.6%	38.9%
Size of largest five sectors	43.2%	41.2%	40.3%	39.6%
Size of smallest five sectors	0.8%	1.2%	0.7%	0.7%
Median share	1.5%	1.5%	1.4%	1.3%
Herfindahl index	0.060	0.057	0.056	0.056
Normalised Herfindhal index	0.035	0.031	0.031	0.030

Germany			
	1995	2004	2012
Standard deviation	0.0256	0.0253	0.0250
Largest sectoral share	10.9%	11.1%	11.2%
Gap between largest 5 shares and smallest 5 shares	34.1%	31.4%	35.5%
Size of largest five sectors	36.2%	34.4%	36.9%
Size of smallest five sectors	2.1%	3.0%	1.4%
Median share	1.7%	1.7%	1.6%
Herfindahl index	0.050	0.049	0.049
Normalised Herfindhal index	0.024	0.024	0.023

Austria				
	1995	2004	2012	2014
Standard deviation	0.0271	0.0268	0.0272	0.0272
Largest sectoral share	13.0%	12.6%	12.8%	12.1%
Gap between largest 5 shares and smallest 5 shares	38.9%	37.8%	37.7%	37.9%
Size of largest five sectors	40.5%	39.7%	39.3%	39.0%
Size of smallest five sectors	1.5%	1.9%	1.7%	1.1%
Median share	1.7%	1.6%	1.7%	1.6%
Herfindahl index	0.053	0.052	0.053	0.053
Normalised Herfindhal index	0.027	0.027	0.028	0.028

Source: Author's calculations using Eurostat database as at end August 2015. Eurostat data for Germany were only available till 2012.

Table 4**b) Diversification measures based on employment breakdown by 38 sectors****Malta**

	1995	2004	2012	2014
Standard deviation	0.0309	0.0335	0.0320	0.0319
Largest sectoral share	14.8%	16.8%	15.1%	14.8%
Gap between largest 5 shares and smallest 5 shares	43.1%	46.0%	44.2%	44.2%
Size of largest five sectors	44.1%	47.0%	45.0%	45.1%
Size of smallest five sectors	1.0%	1.0%	0.8%	0.9%
Median share	1.5%	1.4%	1.5%	1.4%
Herfindahl index	0.062	0.068	0.064	0.064
Normalised Herfindhal index	0.036	0.043	0.039	0.039

Germany

	1995	2004	2012
Standard deviation	0.0288	0.0281	0.0279
Largest sectoral share	14.9%	14.8%	14.1%
Gap between largest 5 shares and smallest 5 shares	29.5%	31.1%	31.5%
Size of largest five sectors	35.0%	37.0%	35.6%
Size of smallest five sectors	5.5%	5.8%	4.1%
Median share	1.9%	1.6%	1.6%
Herfindahl index	0.056	0.055	0.054
Normalised Herfindhal index	0.031	0.029	0.029

Austria

	1995	2004	2012	2014
Standard deviation	0.0306	0.0305	0.0305	0.0304
Largest sectoral share	15.5%	16.1%	15.7%	15.6%
Gap between largest 5 shares and smallest 5 shares	39.8%	40.1%	40.1%	40.1%
Size of largest five sectors	41.4%	41.6%	41.6%	41.5%
Size of smallest five sectors	1.6%	1.5%	1.5%	1.5%
Median share	1.6%	1.5%	1.5%	1.5%
Herfindahl index	0.060	0.060	0.060	0.060
Normalised Herfindhal index	0.035	0.035	0.035	0.035

Source: Author's calculations using Eurostat database as at end August 2015. Eurostat data for Germany were only available till 2012.

What could be the main macroeconomic effects of this shift?

The first decade post-EU accession for Malta was characterised by job-rich economic growth. The increase in employment was the largest in any decade since independence. By contrast, the overall percentage growth in gross value added was below that in previous decades. This was the result of a combination of a number of factors.

The operating surplus of certain sectors, like manufacturing and construction in 2014 was much below the 2004 level; down by a combined 40%. By contrast in the previous decade, industry's operating surplus had more than doubled. During the pre-accession decade, industrial employment had fallen by more than 15%, whereas in the post-accession decade the decline was a more muted 9%. In particular, the decline in manufacturing's operating surplus in the latter decade mainly reflects developments in the electronics sector. Cassar (2015) indicates that electronics has relatively low employment and value added multipliers. By contrast, pharmaceutical manufacturing, which has expanded during this decade, displays much higher multiplier effects.

Table 5
Value Added and Employment Multipliers: Selected Sectors*

	Value Added	Employment
Construction	0.8	32
Real estate	1.0	7
Public administration	1.3	39
Education	1.5	56
Financial Services	1.2	32
Computer programming	0.9	18
Gambling & betting	0.6	7
Legal & accounting services	1.1	24
Manufacture of electronics	0.3	7
Manufacture of pharmaceuticals	0.8	12

*The multipliers show the impact on value added and employment of a €1 million increase in exogenous final demand for that sector. For instance a €1 million increase in the demand for electronics would generate a €0.3 million increase in gross value added in the economy and generate 7 additional jobs.

Source: Cassar (2015).

Table 5 shows the value added and employment multipliers of the five sectors which generated the largest contribution to growth in value added during the decade preceding and that following EU accession. Excluding financial services and education, which were common to both decades, one can note that while the value added multipliers of the sectors generating growth in the two decades are quite similar, the employment multipliers of the sectors that generated most of value added growth pre-2004 are much higher.

Another factor to consider is that to a certain extent the increase in certain service activities during the last decade was the result of social changes. The increased participation of women in the labour market has meant that certain activities that were previously conducted informally by housekeepers are now being serviced in the formal economy. For instance, whereas in 2004 there were about 3,300 workers in residential care services by 2014 they had more than doubled to 6,700. This constituted a tenth of all employment growth, and was slightly higher than the increase observed in the gambling & betting sector.

Another service sector that has seen a spike in employment, generating over a tenth of the overall increase in employment, is security, office administrative and support services. In part, this could explain some of the declines in manufacturing employment as these services are contracted out, whereas in the past they would have been carried out in-house.

The expansion of these very labour-intensive services activities has played an important role in the decline in the economy's apparent labour productivity in recent years and the associated growth in unit labour costs, despite a relatively low rise in average compensation. These labour-intensive sectors, in fact, tend to be characterised by low wages. At the same time, the high value added services sectors, such as legal and accounting, tend to be mostly reliant on human rather than physical capital, explaining why the economy has continued to grow rapidly despite a decline in the investment ratio compared to the mid-1990s.

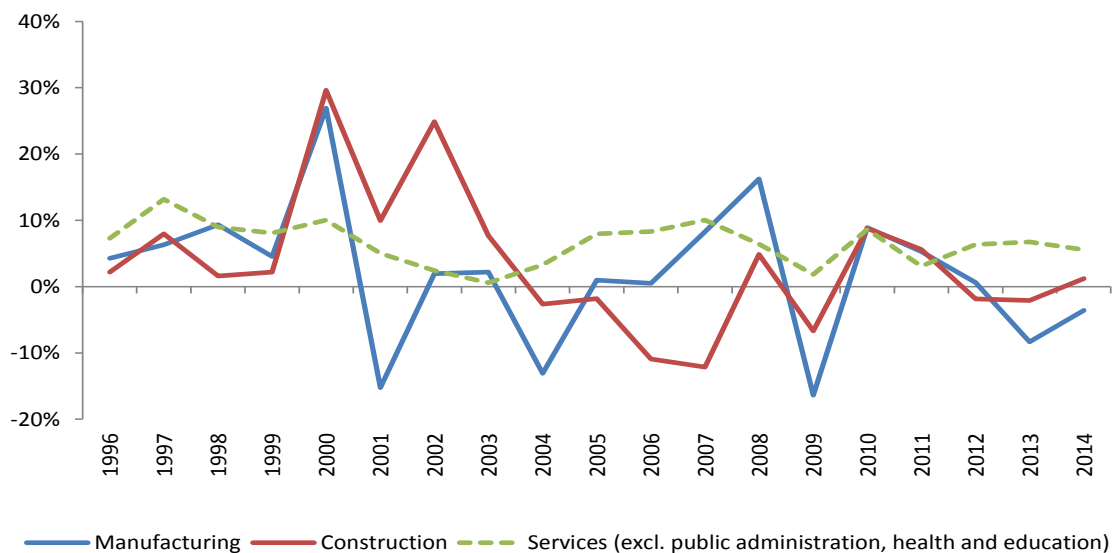
These trends may complicate economic analysis. For example, it becomes much harder to use unit labour costs to assess competitiveness. It is also much more difficult to determine potential output by focusing just on physical investment and employment.

Having mentioned potential output, it is worthwhile to note that the diversification of the Maltese economy and the shift towards services could have significant implications on cyclical fluctuations. Chart 2 shows the year-on-year change in gross value added in manufacturing, construction and in services. Figures for the latter exclude public administration, health and education, as these tend to be relatively stable as they are mostly financed by the government.

As can be seen, the emergence of the new services sectors has done little to affect the volatility of the change in the value added of the overall services sector. If anything, the standard deviation of services' value added changes has moderated since 2005. By contrast, manufacturing and construction continued to exhibit quite volatile value added changes. Over the whole period, the standard deviation of changes in industrial value added was more than three times higher than that exhibited by services. This could suggest that the increased diversification of the Maltese economy, thanks to the expansion of certain services activities, could result in less cyclical economic behaviour.

Chart 2

Annual change in value added



Source: Author's calculations using Eurostat database as at end August 2015.

References

Grech, A. G. (2015), The evolution of the Maltese economy since Independence, Central Bank of Malta Working Paper 05/15.

Grech, A.G. & Zerafa, S. (2015), Structural changes in the Maltese economy, Central Bank of Malta Annual Report 2014.

Cassar, I. (2015), Estimates of output, income, value added and employment multipliers for the Maltese economy, Central Bank of Malta Quarterly Review 2015:1.

Appendix 1: Growth in value added and employment by sectors

Table A.1a: Growth in value added: NACE Rev 2. A64 sector breakdown (% growth and growth in € millions)

	2004 over 1995	2014 over 2004	2004 over 1995	2014 over 2004
Total economy	69%	62%	1,741	2,623
Crop and animal production	16%	-3%	10	-2
Fishing and aquaculture	321%	-25%	18	-6
Mining and quarrying	167%	-72%	13	-15
Manufacture of food products; beverages and tobacco	37%	19%	29	20
Manufacture of textiles, wearing apparel, leather	-30%	-70%	-21	-34
Manufacture of wood and of products of wood and cork	131%	-14%	2	-1
Manufacture of paper and paper products	11%	-17%	1	-1
Printing and reproduction of recorded media	52%	10%	15	4
Manufacture of coke and refined petroleum products	23%	9%	0	0
Manufacture of chemicals and chemical products	-29%	-32%	-5	-4
Manufacture of basic pharmaceutical products	157%	162%	17	45
Manufacture of rubber and plastic products	45%	9%	14	4
Manufacture of other non-metallic mineral products	21%	11%	5	3
Manufacture of basic metals	-80%	1100%	0	1
Manufacture of fabricated metal products	8%	14%	2	3
Manufacture of computer, electronic & optical products	27%	-20%	26	-25
Manufacture of electrical equipment	149%	-15%	15	-4
Manufacture of machinery and equipment	88%	4%	4	0
Manufacture of motor vehicles, trailers and semi-trailers	-21%	126%	-1	7
Manufacture of other transport equipment	-21%	126%	-4	21
Manufacture of furniture; other manufacturing	26%	14%	23	15
Repair and installation of machinery and equipment	23%	9%	3	1
Electricity, gas, steam and air conditioning supply	24%	105%	4	23
Water supply; sewerage, waste management	34%	40%	11	18
Construction	114%	-16%	176	-53
Wholesale and retail trade and repair of motor vehicles	75%	-10%	29	-7
Wholesale trade except of motor vehicles & motorcycles	36%	35%	70	92
Retail trade, except of motor vehicles & motorcycles	50%	45%	76	104
Land transport & postal services	23%	-23%	10	-12
Water transport	187%	51%	10	8
Air transport	11%	2%	7	2
Warehousing and support activities for transportation	67%	78%	62	120
Accommodation and food service activities	44%	47%	73	111
Publishing activities	180%	-25%	15	-6
Motion picture, video, television & broadcasting	80%	12%	4	1
Telecommunications	167%	11%	85	15
Computer programming, consultancy, information	77%	462%	21	222
Financial service activities, except insurance	290%	129%	118	205
Insurance, reinsurance	882%	171%	29	55

Table A.1a: Growth in value added: NACE Rev 2. A64 sector breakdown (% growth and growth in € millions).. continued from previous page

	<i>2004 over 1995</i>	<i>2014 over 2004</i>	<i>2004 over 1995</i>	<i>2014 over 2004</i>
Activities auxiliary to financial services and insurance	26%	88%	7	31
Real estate activities	98%	36%	140	102
Legal, accounting; management consultancy	168%	174%	72	198
Architectural, engineering; scientific research	36%	236%	6	51
Advertising and market research	77%	236%	11	60
Other professional, scientific and technical activities	171%	207%	5	16
Rental and leasing activities	92%	36%	22	16
Employment activities	154%	135%	15	32
Travel agency, tour operator reservation service	84%	9%	23	4
Security, office administrative and support	43%	274%	11	104
Public administration and defence; social security	62%	51%	112	148
Education	104%	65%	132	168
Human health activities	122%	86%	98	154
Residential care activities and social work	175%	117%	44	80
Creative, arts & entertainment; gambling & betting	145%	643%	45	486
Sports activities and amusement and recreation	71%	113%	5	15
Activities of membership organisations	37%	25%	5	4
Repair of computers and household goods	133%	-2%	3	0
Other personal service activities	98%	26%	18	9
Activities of households as employers;	121%	104%	6	11

Table A.1b: Growth in value added: NACE Rev 2. A10 sector breakdown (% growth and growth in € millions)

	<i>2004 over 1995</i>	<i>2014 over 2004</i>	<i>2004 over 1995</i>	<i>2014 over 2004</i>
Total economy	69%	62%	1,741	2,623
Agriculture, forestry and fishing	40%	-8%	28	-8
Other industry	49%	29%	29	26
Manufacturing	23%	9%	122	58
Construction	114%	-16%	176	-53
Wholesale & retail, transport, accommodation	45%	38%	336	417
Information and communication	136%	107%	125	232
Financial and insurance activities	214%	128%	155	292
Real estate activities	98%	36%	140	102
Professional; administrative & support service	101%	149%	164	484
Public admin, education, health & social work	93%	69%	386	549
Arts, entertainment and recreation; other	107%	333%	81	525

Table A.1c: Growth in value added: NACE Rev 2. A38 sector breakdown (% growth and growth in € millions)

	<i>2004 over 1995</i>	<i>2014 over 2004</i>	<i>2004 over 1995</i>	<i>2014 over 2004</i>
Total economy	69%	62%	1,741	2,623
Agriculture, forestry and fishing	40%	-8%	28	-8
Mining and quarrying	167%	-72%	13	-15
Manufacture of food products; beverages and tobacco	37%	19%	29	20
Manufacture of textiles, wearing apparel, leather	-30%	-70%	-21	-34
Manufacture of wood and paper products and printing	48%	5%	18	3
Manufacture of coke and refined petroleum products	23%	9%	0	0
Manufacture of chemicals and chemical products	-29%	-32%	-5	-4
Manufacture of pharmaceuticals	157%	162%	17	45
Manufacture of rubber and plastic products, non-metals	35%	10%	18	7
Manufacture of basic metals and fabricated meta	6%	18%	1	4
Manufacture of computer, electronics and optical	27%	-20%	26	-25
Manufacture of electrical equipment	149%	-15%	15	-4
Manufacture of machinery and equipment	88%	4%	4	0
Manufacture of transport equipment	-21%	126%	-6	28
Other manufacturing, and repair of machinery	26%	13%	26	17
Electricity, gas, steam and air-conditioning systems	24%	105%	4	23
Water supply, sewerage and waste management	34%	40%	11	18
Construction	114%	-16%	176	-53
Wholesale and retail trade, repair of motor vehicles	46%	34%	175	189
Transportation and storage	43%	40%	88	117
Accommodation and food service activities	44%	47%	73	111
Publishing, audio-visual and broadcasting activities	141%	-14%	20	-5
Telecommunications	167%	11%	85	15
IT and other information services	77%	462%	21	222
Financial and insurance activities	214%	128%	155	292
Real estate activities	98%	36%	140	102
Legal, accounting, management, engineering	132%	183%	77	249
Scientific research and development	77%	236%	11	60
Other professional, scientific and technical activities	171%	207%	5	16
Administrative and support services	81%	100%	70	157
Public administration, defence, social security	62%	51%	112	148
Education	104%	65%	132	168
Human health services	122%	86%	98	154
Residential care and social work activities	175%	117%	44	80
Arts, entertainment and recreation	130%	565%	50	501
Other services	76%	23%	25	14
Activities of household as employers	121%	104%	6	11

Table A.2a: Growth in employment: NACE Rev 2. A64 sector breakdown (% growth and growth in thousands of employed)

	<i>2004 over 1995</i>	<i>2014 over 2004</i>	<i>2004 over 1995</i>	<i>2014 over 2004</i>
Total economy	3%	26%	4.5	38.1
Crop and animal production	1%	-17%	0.0	-0.5
Fishing and aquaculture	19%	47%	0.1	0.2
Mining and quarrying	-24%	-16%	-0.1	-0.1
Manufacture of food products; beverages and tobacco	-13%	-6%	-0.6	-0.3
Manufacture of textiles, wearing apparel, leather	-47%	-79%	-2.9	-2.5
Manufacture of wood and of products of wood and cork	89%	56%	0.2	0.2
Manufacture of paper and paper products	-24%	-32%	-0.1	-0.1
Printing and reproduction of recorded media	12%	11%	0.1	0.2
Manufacture of coke and refined petroleum products	-25%	-16%	0.0	0.0
Manufacture of chemicals and chemical products	-29%	-16%	-0.2	-0.1
Manufacture of basic pharmaceutical products	-17%	126%	-0.1	0.7
Manufacture of rubber and plastic products	-6%	3%	-0.1	0.1
Manufacture of other non-metallic mineral products	-19%	-14%	-0.3	-0.2
Manufacture of basic metals	-88%	400%	-0.1	0.0
Manufacture of fabricated metal products	-16%	1%	-0.3	0.0
Manufacture of computer, electronic & optical products	-23%	-30%	-1.4	-1.4
Manufacture of electrical equipment	9%	-8%	0.1	-0.1
Manufacture of machinery and equipment	-13%	42%	-0.1	0.1
Manufacture of motor vehicles, trailers and semi-trailers	-70%	84%	-0.4	0.1
Manufacture of other transport equipment	-70%	84%	-1.1	0.4
Manufacture of furniture; other manufacturing	-25%	-27%	-1.5	-1.3
Repair and installation of machinery and equipment	-25%	-16%	-0.2	-0.1
Electricity, gas, steam and air conditioning supply	-23%	-9%	-0.5	-0.2
Water supply; sewerage, waste management	-20%	-20%	-0.5	-0.4
Construction	39%	12%	2.7	1.1
Wholesale and retail trade and repair of motor vehicles	9%	-10%	0.3	-0.3
Wholesale trade except of motor vehicles & motorcycles	20%	14%	1.5	1.3
Retail trade, except of motor vehicles & motorcycles	18%	13%	2.0	1.7
Land transport & postal services	-11%	49%	-0.3	1.2
Water transport	36%	-19%	0.2	-0.1
Air transport	-10%	-10%	-0.3	-0.3
Warehousing and support activities for transportation	31%	26%	0.8	0.9
Accommodation and food service activities	3%	26%	0.3	2.4
Publishing activities	50%	47%	0.2	0.2
Motion picture, video, television & broadcasting	13%	92%	0.0	0.3
Telecommunications	-20%	-3%	-0.5	-0.1
Computer programming, consultancy, information	-33%	317%	-0.4	2.8
Financial service activities, except insurance	1%	66%	0.1	3.2
Insurance, reinsurance	350%	84%	0.4	0.4

Table A.2a: Growth in employment: NACE Rev 2. A64 sector breakdown (% growth and growth in thousands of employed).. continued from previous page

	<i>2004 over 1995</i>	<i>2014 over 2004</i>	<i>2004 over 1995</i>	<i>2014 over 2004</i>
Activities auxiliary to financial services and insurance	10%	19%	0.1	0.2
Real estate activities	12%	30%	0.1	0.1
Legal, accounting; management consultancy	77%	108%	1.2	2.9
Architectural, engineering; scientific research	42%	136%	0.3	1.2
Advertising and market research	68%	267%	0.2	1.1
Other professional, scientific and technical activities	129%	-17%	0.4	-0.1
Rental and leasing activities	-15%	70%	-0.1	0.6
Employment activities	49%	92%	0.4	1.2
Travel agency, tour operator reservation service	-25%	4%	-0.5	0.1
Security, office administrative and support	7%	197%	0.2	4.4
Public administration and defence; social security	-10%	19%	-1.4	2.5
Education	32%	32%	3.1	4.1
Human health activities	31%	23%	1.7	1.6
Residential care activities and social work	83%	105%	1.5	3.4
Creative, arts & entertainment; gambling & betting	54%	258%	0.5	3.3
Sports activities and amusement and recreation	15%	78%	0.1	0.4
Activities of membership organisations	-10%	13%	-0.1	0.2
Repair of computers and household goods	-16%	0%	0.0	0.0
Other personal service activities	29%	84%	0.3	1.1
Activities of households as employers;	61%	78%	0.1	0.3

Table A.2b: Growth in employment: NACE Rev 2. A10 sector breakdown (% growth and growth in thousands of employed)

	<i>2004 over 1995</i>	<i>2014 over 2004</i>	<i>2004 over 1995</i>	<i>2014 over 2004</i>
Total economy	3%	26%	4.5	38.1
Agriculture, forestry and fishing	4%	-7%	0.1	-0.2
Other industry	-22%	-15%	-1.1	-0.6
Manufacturing	-25%	-16%	-8.9	-4.3
Construction	39%	12%	2.7	1.1
Wholesale & retail, transport, accommodation	11%	15%	4.4	6.7
Information and communication	-17%	92%	-0.7	3.3
Financial and insurance activities	9%	61%	0.5	3.8
Real estate activities	12%	30%	0.1	0.1
Professional; administrative & support service	22%	108%	1.9	11.3
Public admin, education, health & social work	15%	32%	4.9	11.7
Arts, entertainment and recreation; other	19%	107%	0.8	5.2

Table A.2c: Growth in employment: NACE Rev 2. A38 sector breakdown (% growth and growth in thousands of employed)

	2004 over 1995	2014 over 2004	2004 over 1995	2014 over 2004
Total economy	3%	26%	4.5	38.1
Agriculture, forestry and fishing	4%	-7%	0.1	-0.2
Mining and quarrying	-24%	-16%	-0.1	-0.1
Manufacture of food products; beverages and tobacco	-13%	-6%	-0.6	-0.3
Manufacture of textiles, wearing apparel, leather	-47%	-79%	-2.9	-2.5
Manufacture of wood and paper products and printing	11%	12%	0.2	0.2
Manufacture of coke and refined petroleum products	-25%	-16%	0.0	0.0
Manufacture of chemicals and chemical products	-29%	-16%	-0.2	-0.1
Manufacture of pharmaceuticals	-17%	126%	-0.1	0.7
Manufacture of rubber and plastic products, non-metals	-12%	-4%	-0.4	-0.1
Manufacture of basic metals and fabricated meta	-19%	4%	-0.3	0.1
Manufacture of computer, electronics and optical	-23%	-30%	-1.4	-1.4
Manufacture of electrical equipment	9%	-8%	0.1	-0.1
Manufacture of machinery and equipment	-13%	42%	-0.1	0.1
Manufacture of transport equipment	-70%	84%	-1.5	0.5
Other manufacturing, and repair of machinery	-25%	-26%	-1.7	-1.4
Electricity, gas, steam and air-conditioning systems	-23%	-9%	-0.5	-0.2
Water supply, sewerage and waste management	-20%	-20%	-0.5	-0.4
Construction	39%	12%	2.7	1.1
Wholesale and retail trade, repair of motor vehicles	18%	11%	3.8	2.7
Transportation and storage	4%	18%	0.3	1.6
Accommodation and food service activities	3%	26%	0.3	2.4
Publishing, audio-visual and broadcasting activities	31%	67%	0.2	0.5
Telecommunications	-20%	-3%	-0.5	-0.1
IT and other information services	-33%	317%	-0.4	2.8
Financial and insurance activities	9%	61%	0.5	3.8
Real estate activities	12%	30%	0.1	0.1
Legal, accounting, management, engineering	67%	115%	1.4	4.1
Scientific research and development	68%	267%	0.2	1.1
Other professional, scientific and technical activities	129%	-17%	0.4	-0.1
Administrative and support services	-1%	107%	-0.1	6.2
Public administration, defence, social security	-10%	19%	-1.4	2.5
Education	32%	32%	3.1	4.1
Human health services	31%	23%	1.7	1.6
Residential care and social work activities	83%	105%	1.5	3.4
Arts, entertainment and recreation	41%	211%	0.5	3.7
Other services	5%	46%	0.1	1.3
Activities of household as employers	61%	78%	0.1	0.3

Source: Author's calculations using Eurostat database as at end August 2015.

Appendix 2: Diversification indicators for the manufacturing sector

Activity in the Maltese manufacturing sector has become less concentrated, particularly in terms of employment distribution. Gross value added remains less equally distributed. Overall, activity in manufacturing remains much more concentrated than activity in the whole economy. Compared to other countries, manufacturing in Malta remains less diversified.

Table A.3a: Diversification indicators – manufacturing sector – based on value added, NACE Rev 2. A64 sector breakdown

Malta			
	1995	2004	2014
Standard deviation	0.058	0.059	0.057
Largest sectoral share	18%	19%	18%
Gap between largest 5 shares and smallest 5 shares	66%	64%	64%
Size of largest five sectors	68.5%	66.7%	66.7%
Size of smallest five sectors	3.0%	3.1%	3.1%
Median share	3.1%	3.5%	2.9%
Herfindahl index	0.11	0.11	0.11
Normalised Herfindahl index	0.06	0.07	0.06

Germany			
	1995	2004	2012
Standard deviation	0.037	0.042	0.047
Largest sectoral share	13%	15%	17%
Gap between largest 5 shares and smallest 5 shares	44%	46%	49%
Size of largest five sectors	51.8%	54.0%	56.6%
Size of smallest five sectors	8.2%	8.1%	7.2%
Median share	4.3%	3.8%	4.0%
Herfindahl index	0.08	0.08	0.09
Normalised Herfindahl index	0.03	0.03	0.04

Austria			
	1995	2004	2014
Standard deviation	0.029	0.030	0.035
Largest sectoral share	12%	12%	14%
Gap between largest 5 shares and smallest 5 shares	35%	36%	41%
Size of largest five sectors	45.0%	46.7%	49.7%
Size of smallest five sectors	10.1%	10.4%	8.7%
Median share	5.0%	4.5%	4.3%
Herfindahl index	0.07	0.07	0.07
Normalised Herfindahl index	0.02	0.02	0.02

Table A.3b: Diversification indicators – manufacturing sector – based on employment, NACE Rev 2. A64 sector breakdown

Malta			
	1995	2004	2014
Standard deviation	0.061	0.059	0.052
Largest sectoral share	18%	18%	17%
Gap between largest 5 shares and smallest 5 shares	67%	66%	58%
Size of largest five sectors	70.6%	69.8%	62.3%
Size of smallest five sectors	3.4%	3.4%	4.2%
Median share	2.5%	2.3%	3.0%
Herfindahl index	0.12	0.12	0.10
Normalised Herfindhal index	0.07	0.07	0.05

Germany			
	1995	2004	2012
Standard deviation	0.036	0.041	0.043
Largest sectoral share	13%	14%	15%
Gap between largest 5 shares and smallest 5 shares	43%	48%	49%
Size of largest five sectors	51.4%	56.3%	57.6%
Size of smallest five sectors	8.0%	8.2%	8.8%
Median share	4.4%	3.7%	3.6%
Herfindahl index	0.08	0.08	0.09
Normalised Herfindhal index	0.02	0.03	0.04

Austria			
	1995	2004	2014
Standard deviation	0.036	0.036	0.037
Largest sectoral share	14%	14%	13%
Gap between largest 5 shares and smallest 5 shares	43%	42%	43%
Size of largest five sectors	51.2%	50.0%	51.7%
Size of smallest five sectors	7.8%	7.9%	8.3%
Median share	5.0%	5.0%	4.8%
Herfindahl index	0.08	0.08	0.08
Normalised Herfindhal index	0.02	0.02	0.03

Source: Author's calculations using Eurostat database as at end August 2015. Eurostat data for Germany were only available till 2012.