



ESRI Research Note

An Alternative Index of Industrial Production for Ireland using Manufacturing Wages

Kevin Timoney

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Introduction

Industrial production in Ireland experienced a sharp decline towards the end of the last decade. The CSO's monthly *Industrial Production and Turnover Index* provides timely indicators of the volume of manufacturing output, and could be expected to follow the path of the economy over time. The index suggests a downturn in manufacturing took place between early 2008 and mid-2010, with a rapid recovery then lasting until the final quarter of 2012. More recently, the pharmaceutical patent cliff (discussed in detail in FitzGerald, this issue) resulted in a large drop-off in industrial production.

While the initial rebound for industrial production volume was encouraging, it was not accompanied by improvements in other indicators for the economy. Indeed, there are some aspects of the index's construction which may limit its utility as an indicator of current economic conditions. The pharmaceuticals sector holds a substantial presence in Irish manufacturing and merchandise trade, contributing two-fifths of total manufacturing Gross Value Added (GVA) and a quarter of total goods exports value for the four years 2008-2011. Consequently, the recovery in the Industrial Production volume index in the immediate aftermath of the crisis could have been masking an on-going weakness in other areas of manufacturing. By contrast, today the effects of the patent cliff on output in the sector could be masking more favourable developments elsewhere in manufacturing. The reason why the index may not be a very useful indicator of what is happening in the economy is that it is weighted using manufacturing GVA, which may overstate the benefits of the output to the Irish economy. This overstatement could arise because much of the value added in foreign-owned firms may flow back out of the economy in profits.

In this note, an alternative Industrial Production index is constructed using sectoral manufacturing wages rather than GVA as the fixed base weights. This approach allows for an assessment of how the volume of output implied by labour earnings in manufacturing has changed over time. The intention here is to

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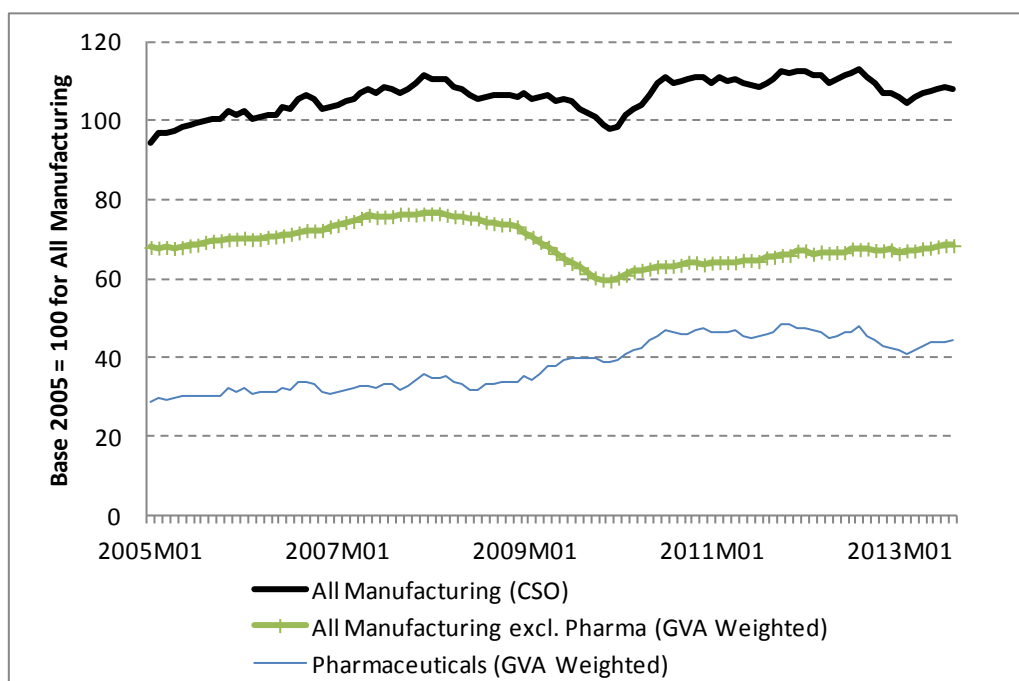
provide a more relevant indicator of industrial production that would possibly reflect other important economic indicators.

The recent performance of the Industrial Production index is discussed below followed by analysis of the alternative measure of output with labour costs base weights. Conclusions are then drawn and an appendix sets out the methodology for the re-weighting of the index.

Industrial Production Weighted by Gross Value Added

Manufacturing output measured with GVA entered a period of recovery in 2010 and 2011, following the initial downturn during the previous two years. In 2006 and 2007, manufacturing grew by 4.5 per cent a year. During the downturn in 2008 and 2009, there was a fall of 3.5 per cent a year, but a rebound of 4.3 per cent a year then took place in 2010 and 2011. Figure 1 below shows the six-month moving average, seasonally-adjusted index for all manufacturing, over the period January 2005 to August 2013. The chart shows also shows the series for pharmaceuticals and non-pharmaceuticals.

FIGURE 1 Industrial Production (Gross Value Added, SA, 6-month MA)



Source: Central Statistics Office

To obtain estimates of the composition of the Industrial Production index by sector, the volumes are reconstructed using GVA weights obtained from the CSO's *Census of Industrial Production* (CIP). The method is described in further

detail in the appendix, and the result closely approximates the CSO's Industrial Production index.

Analysing the index values by sector reveals the contrasting paths for industrial output in pharmaceuticals compared to other manufacturing sectors during the downturn period. Pharmaceuticals output grew by 7 per cent during the downturn years, while all other manufacturing fell by 10 per cent. As the overall index is weighted by GVA, and pharmaceuticals output accounted for a very large GVA in 2008 (31% of manufacturing GVA), the fall of industrial output during the downturn was swiftly recovered due to the expanding volume of pharmaceuticals output. Rather than the result of improving economic conditions, this may have been related to the then-upcoming expiry of pharmaceuticals patents towards the end of 2012 (see FitzGerald, this issue, for details of the impacts of patent expiry on various economic indicators).

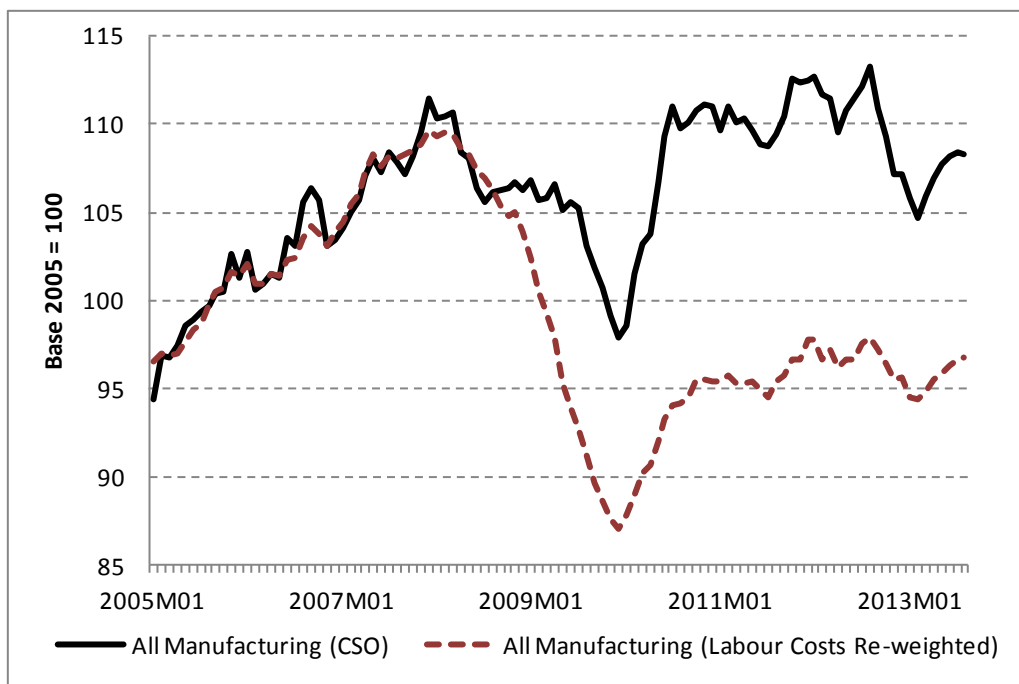
The rebound in industrial production in 2010 and 2011 coincided with a return to positive growth in goods exports, including exports of pharmaceuticals. Unfortunately, there was no corresponding improvement for the labour market over this period, with CIP data showing the number of persons engaged in manufacturing enterprises falling from 174,215 to 167,373. These figures suggest a continued weakness of the economy, in contrast to the industrial production data.

Industrial Production Weighted by Labour Costs

As indicated above, manufacturing output, measured using GVA weights, suggests a benign recovery took place in 2010 and 2011, but this trend was not reflected in other indicators for current economic conditions. This section considers an alternative Industrial Production index using 2008 manufacturing wages as fixed base weights. (See the appendix for details of the methodology.)

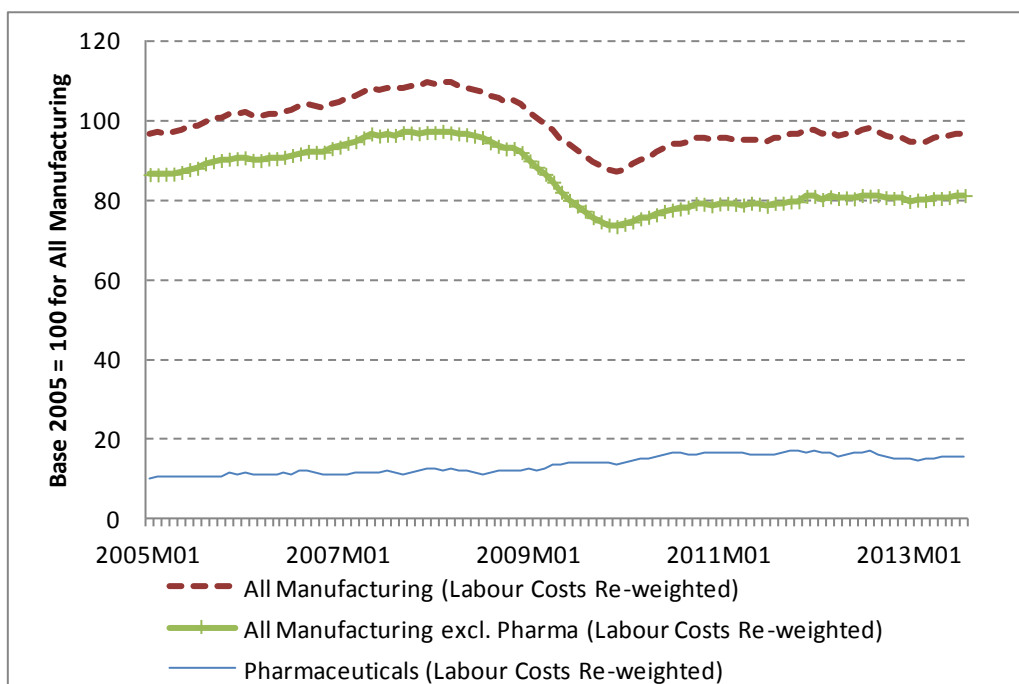
The re-weighted index is compared with the original CSO index in Figure 2 below. Initially, the re-weighted index closely matches the trend in the CSO index for 2005-2008. A larger decrease then occurs in 2009, and the re-weighted index shows a trend consistent with a much more subdued level of economic activity for the past number of years. The downturn was much more severe than that of the CSO index, and the recovery was more modest. Furthermore, the more recent "patent cliff" downturn since the final quarter of 2012 is much less pronounced than for the CSO index. The implied output level has remained 10-15 per cent below the official index since mid-2009, and is also below the 2005 level. The path of the re-weighted index is more consistent with the trend of employment in the manufacturing industries.

FIGURE 2 All Manufacturing Index (CSO and Labour Costs, SA, 6-month MA)



Source: Central Statistics Office and own calculations

FIGURE 3 Industrial Production (Labour Costs, SA, 6-month MA)



Source: Central Statistics Office and own calculations

Figure 1 is replicated for the re-weighted index in Figure 3. The aggregate labour cost in the pharmaceuticals sector relative to all manufacturing sectors (11%) is lower than its relative aggregate GVA (31%). This translates to a smaller index

value in the range of 8 to 19 for labour costs, rather than between 23 and 56 for GVA. Weighted by labour costs, the pharmaceuticals volume index is no longer compensating for the downturn in all other manufacturing, and the overall index is much lower as a result. The re-weighted index for all manufacturing moves closely with manufacturing excluding pharmaceuticals, and it is much less affected by the recent “patent cliff” downturn.

Conclusions

The recovery of measured industrial production in recent years has been primarily driven by the rise of output by the pharmaceuticals sector. However, the GVA weights used in the Industrial Production index mean that the index can be of limited use as an indicator of current economic conditions. Using the wage bill of manufacturing sectors to re-weight the index yields a similar pattern of implied output volume for 2005-2008, with a much larger fall and a more subdued trend emerging for the years since 2009. By contrast, while the official index shows a significant fall in output in recent months, the pattern of change in the re-weighted index excluding pharmaceuticals suggests relatively limited change in industrial output over the last year. The interpretation of the pattern of change in the (original) pharmaceuticals index is discussed in a separate note by FitzGerald. The re-weighted index presented in this note intends to show a more meaningful measure of industrial production in terms of current economic conditions.

Appendix

The re-weighting methodology applied in this note is described here in further detail. Using the CSO's seasonally adjusted manufacturing output series (NACE sectors 10-33), the first task is to reproduce this volume index using a re-weighted series of Gross Value Added (GVA) by individual sectors. Table A1 shows the groups of sectors for which the output index is available and their 2008 GVA and labour costs weights. The data for these sector groups are constructed from the CSO's *Census of Industrial Production* (CIP). These data were available for 2008-2011 at the time of writing, and due to some adjustments to the NACE sector groupings over this period, 2008 is chosen as the base year.

TABLE A1 Manufacturing Output 2008 Weighting by Sector Group

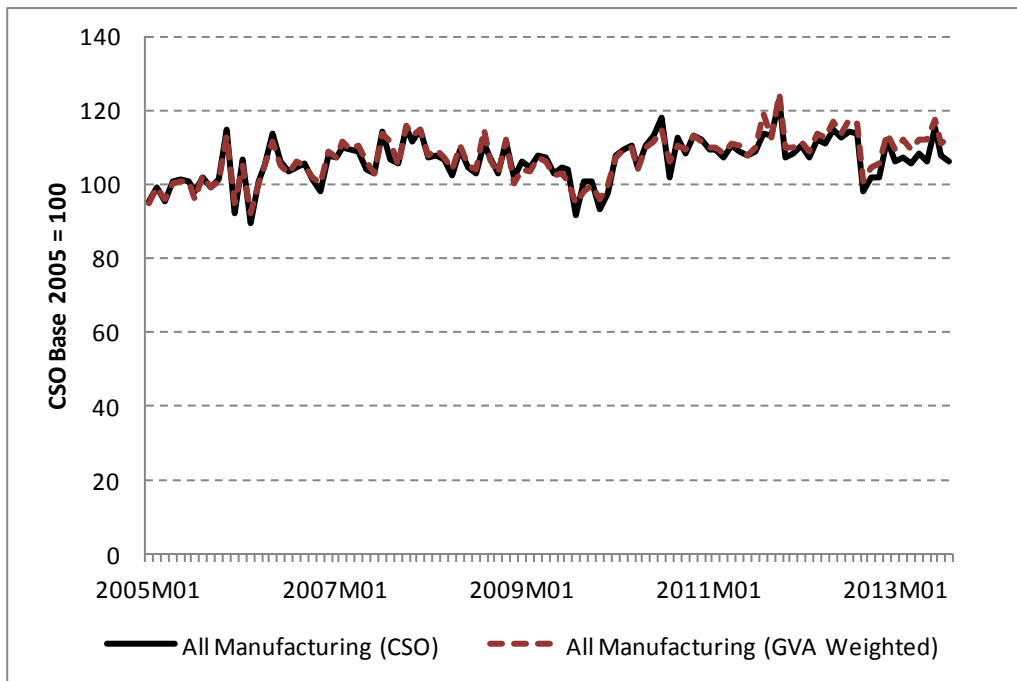
Sector Group	GVA Weighting	Labour Costs Weighting
Food products and beverages (10,11)	0.19	0.20
Tobacco; coke and refined petroleum products; furniture (12,19,31)	0.03	0.03
Textiles and wearing apparel (13,14)	0.00	0.01
Leather and related products (15)	0.00	0.00
Wood and wood products, except furniture (16)	0.01	0.02
Paper and paper products; printing and reproduction of recorded media (17,18)	0.02	0.05
Chemicals and chemical products (20)	0.10	0.06
Basic pharmaceutical products and preparations (21)	0.31	0.11
Rubber and plastic products (22)	0.01	0.04
Other non-metallic mineral products (23)	0.03	0.05
Basic metals and fabricated metal products (24,25)	0.03	0.07
Computer, electronic, optical and electrical equipment (26,27)	0.15	0.15
Machinery and equipment n.e.c. (28)	0.03	0.05
Transport equipment (29,30)	0.01	0.03
Other manufacturing (32)	0.08	0.11
Repair and installation of machinery and equipment (33)	0.01	0.01

Source: Central Statistics Office, *Census of Industrial Production*

Using a fixed weights approach, the weights are constructed from the GVA data and then multiplied by the corresponding sectoral manufacturing output index values. The sum of these values across sectors should well-approximate the CSO's index. Following this procedure, the six-month moving averages of the series are taken to remove the volatility by month. In Figure A1 below, the unadjusted results of this comparison are shown, with the two indices closely matching each other since 2005. To re-weight the index by labour costs, the same procedure is followed as for GVA, but using manufacturing wages from *CIP* data. These data are also presented above in Table A1. As discussed in this note, the re-weighting approach intends to highlight the recent disconnect between the industrial production series measured by GVA, and that measured by labour costs. The unadjusted data for the re-weighted output index are shown below in Figure A2. Re-weighted with labour costs, manufacturing output closely follows the index

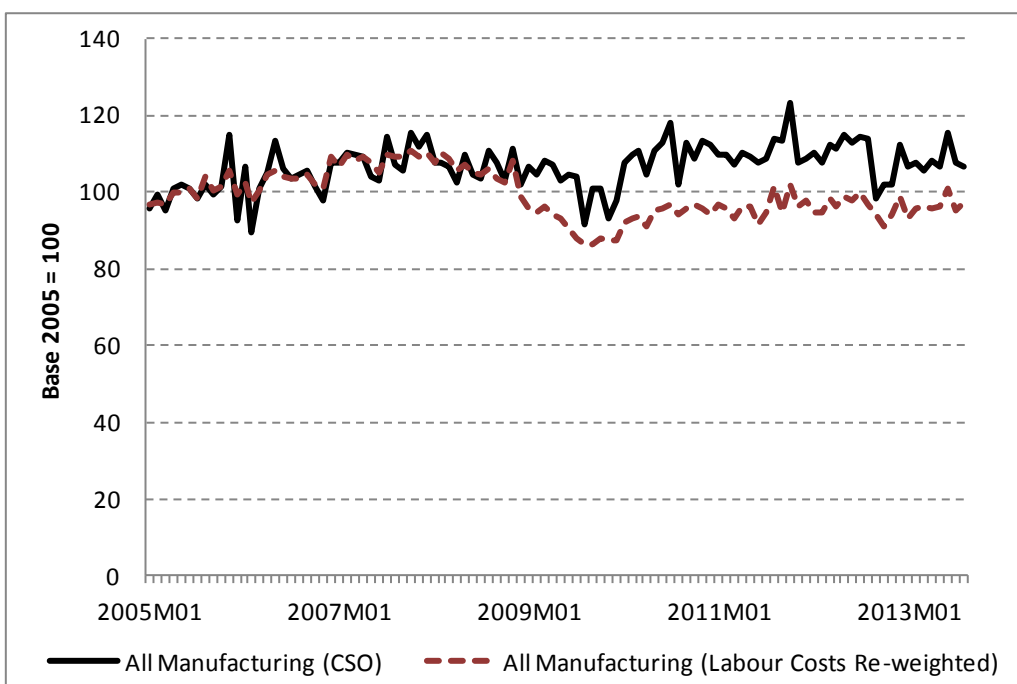
weighted with GVA until early 2009, when a larger fall takes place. This index has remained largely unchanged since shortly after the original downturn in 2008 and 2009.

FIGURE A1 Manufacturing Output index, Reproduced with 2008 Gross Value Added Weights



Source: Central Statistics Office and own calculations

FIGURE A2 Manufacturing Output index, reproduced with 2008 Labour Costs Weights



Source: Central Statistics Office and own calculations