





# Comparing Public and Private Sector Pay in Ireland: Size Matters

---

**Elish Kelly, Seamus McGuinness and Philip O’Connell (UCD Geary Institute)**

The issue of public sector pay levels has been to the fore since the current economic downturn began in 2008, in the context of efforts aimed at reducing the public sector pay bill as a means of reducing Ireland’s fiscal deficit. The issue is topical again given the current negotiations between the trade unions and the government on a possible extension of the Croke Park agreement. In negotiating this extended agreement, the government is seeking to reduce its public service pay and pensions bill by a further €1 billion between 2013 and 2015. The options available to achieve this saving are relatively limited and, consequently, discussions are likely to centre on changes to existing work practices, public service numbers and levels of public sector pay.

In relation to the earnings of public sector workers, a number of empirical studies have been carried out over the past decade (Boyle *et al.*, 2004; Ernst & Young and Murphy, 2007; Kelly *et al.*, 2009a and 2009b; Foley and O’Callaghan, 2010), all of which have reported a pay premium to public sector workers. However, there has been much debate regarding the magnitude of the gap. The most recent analysis was published by the Central Statistics Office (CSO) in October 2012<sup>1</sup>, using data for 2009 from the National Employment Survey (NES) and data for 2010 from combining the 2009 NES with administrative records from Revenue. This analysis suggested that the public-private sector pay gap ranged between 6.1 per cent and 18.9 per cent in 2010. The report also showed that the premium fell between 2009 and 2010, which is to be expected given the substantial public sector wage cuts implemented in 2010. The CSO report showed that, on average, public sector workers earned over 26 per cent more per week, and 40 per cent more per hour, than employees in the private sector in 2010. However, as the CSO report notes, much of this differential is due to differences between public and private sector workers in terms of education, experience and other factors that influence pay. Thus, while the average hourly pay of public sector workers might be 40 per cent higher, if half of this were attributable to superior experience and education levels of public sector workers, then the estimated public sector pay premium (i.e. the part that cannot be explained by differences in the characteristics of the workers) would be 20 per cent. Given this, it is crucial when attempting to

---

<sup>1</sup> Central Statistics Office, 2012. *National Employment Survey 2009 and 2010 Supplementary Analysis*. Cork: Central Statistics Office.

estimate the unexplained gap between public and private sector workers' wages to ensure that the analysis is underpinned by assumptions that reflect the way pay is determined in each sector. If the component of the pay gap related to characteristics is over/under-estimated, this will result in an under/over-estimate of the public-private pay gap by a similar amount.

The recent extensive analysis of the public sector pay gap for 2010 by the CSO is important and welcome.<sup>2</sup> In CSO (2012), the statisticians took an approach to estimating the wage gap that encompassed a very wide range of possible variables that might be included to explain the gap, thereby generating a wide range of estimates of the gap. They did this on the basis that '*any attempt to present a single, definitive, public-private pay differential would be subject and prone to over simplification*' (CSO, 2012, 3-4).<sup>3</sup>

As labour market researchers, we take a different view to the CSO on this issue. We hold that, on the basis of the theoretical and empirical literature in this area, it is possible to choose between the different variables that might be included and the specifications that should be adopted. From our perspective, we believe firstly that the preferred specification is one where the only variable that should be used to measure organisation size is one that captures size at the establishment (plant) level. We believe that using the size variable measured at enterprise level, as is captured within the NES, is not appropriate and that including it has the impact of understating the wage gap. Secondly, we believe that weighted regressions should be used to generate the estimates. The alternatives of using enterprise size and un-weighted regressions have a major impact on the size of the gap estimated. While presenting a very wide range of estimates, the CSO indicates that its preference is for a specification that includes enterprise as a wage determining characteristic, while acknowledging in the Report that there is no international agreement on this issue.

To illustrate the impact of both enterprise size and the use of weights, Table 1 replicates the Ordinary Least Square (OLS) estimates from the 2012 CSO publication based on a sample of full-time permanent employees aged between 25 and 59 years.<sup>4</sup> It shows clearly the sensitivity of the measured gap to the assumptions made – including enterprise size leads to a halving of the estimated

---

<sup>2</sup> Issues in relation to the choice of variables arise in the case of all the CSO estimation techniques, e.g., i.e., the quantile regressions and the Blinder-Oaxaca decomposition.

<sup>3</sup> The methodology applied in the current report is similar to that in an earlier paper by CSO statisticians using NES 2007 data.

<sup>4</sup> The issues involved in the estimation strategy used by the CSO were extensively debated previously at a meeting of the *Statistical and Social Inquiry Society of Ireland* in November 2009. For more details, see Foley and O'Callaghan (2010).

differential and the used of un-weighted regressions has a smaller but significant impact on the gap .

**TABLE 1** Estimates of the Public-Private Pay Differential Taken from the CSO *Supplementary Analysis*<sup>5</sup>

Model Specification	Estimated Differential	
	Weighted	Un-weighted
Including Organisational Size	8.5	6.3
Excluding Organisational Size	17.0	12.6

Note: The organisational size variable used here is at enterprise level.

In the remainder of this note, we set out our reasons for holding that the organisational size at enterprise level should be omitted and that weighted regressions should be estimated.

### Organisational Size as an Explanatory Variable

From the perspective of the labour market economics literature, there are a number of central arguments that seek to explain why larger firms pay more than smaller firms and, thus, form a basis for including organisational size in any models attempting to either explain or measure pay. First, larger firms tend to hire relatively more qualified and skilled workers as complements to their more capital intensive operations (Hamermesh, 1980). However, such differences in human capital attributes (e.g. educational attainment, experience, etc.) are fully captured in the models estimated in the CSO *Supplementary Analysis*, as the estimates control for differences in both levels of educational attainment and labour market experience of employees between establishments<sup>6</sup>. Consequently, as such effects are explicitly measured within the estimated specifications it is not necessary to include an organisational size variable to proxy for such impacts<sup>7</sup>.

A second prominent explanation for higher wages in larger firms relates to the efficiency wage theory, which argues that monitoring costs are higher in larger organisations and consequently large firms pay more in order to discourage shirking (Eaton and White, 1983; Shapiro and Stiglitz, 1984). If the efficiency wage argument is to provide a theoretical basis for including an organisational size control, then the variable should reflect each organisation's monitoring costs. However, the measurement of organisational size in the NES does not permit this

<sup>5</sup> These estimates relate to all permanent full-time employees aged between 25 and 59, and are taken from Table C.3 in the 2012 *Supplementary Analysis*.

<sup>6</sup> See page 24 of the *Supplementary Analysis*.

<sup>7</sup> We cannot deal with unobserved heterogeneity i.e., unobserved differences between public and private sector workers (e.g. motivation). However, sensitivity checks in Kelly *et al.* (2009b) suggests that unobserved heterogeneity is unlikely to be an important factor with regard to estimates of the public-private sector pay gap in Ireland.

to be done as it measures the number of employees at the enterprise rather than the establishment level. For example, in the NES 2006 data, the organisational size measure for each employee in the primary school sector was 34,084 because all employees in primary schools were recorded as having a single employer. Similarly, organisation size was measured as 17,168 in the secondary school sector; and 12,954 in the Garda. A similar issue arises in the case of some large private sector entities, e.g., banks and supermarkets.<sup>8</sup>

However, the scale of these organisational size differences is not similar across the two sectors. In fact, in the 2006 NES almost 95 per cent of public sector workers were measured as being employed in organisations of at least 500 employees<sup>9</sup>, compared with just 24 per cent in the private sector. The importance of size as a factor is illustrated very clearly in the CSO estimates of the pay gap based on the 2007 NES (Foley and O’Callaghan, 2010), where employees in very large organisations were estimated to earn a premium of about 24 per cent compared to workers in small organisations. Therefore, by including enterprise size, a substantial proportion of public sector pay is attributed to working in much larger organisations relative to the bulk of private sector employees. The application of this organisational size premium in such a universal fashion gives rise to difficulties given that most schools, Garda stations, etc., do not in fact employ very large numbers of people. Moreover, while wage bargaining is undertaken at enterprise level, that variable is captured by the inclusion of the trade union membership. In the latest CSO report, we can see that the inclusion of the enterprise measure of organisational size leads to a reduction in the estimated pay gap by half, i.e., between 6.3 and 8.5 percentage points (Table 1).

Furthermore, the theoretical literature has authoritatively argued that only variables that can be treated as broadly fixed characteristics, such as, for example, educational qualifications, should be included in models attempting to measure the public-private pay differential (Gregory and Borland, 1999). However, the measurement approach used in the NES is such that the organisational size variable cannot be treated as a fixed characteristic that will remain unchanged should workers switch between sectors.

Finally, the theoretical literature also suggests that pay may be higher in larger firms, reflecting higher profits generated by monopoly rents (Oswald, 1993;

---

<sup>8</sup> We are grateful to the CSO for drawing this to our attention.

<sup>9</sup> This arises because, within the NES the organisational size variable is collected at the level of the enterprise as opposed to the establishment. The CSO make reference to the study of Boyle *et al.*, (2004) with regards to an Irish study that incorporates a control for organisational size. However, as demonstrated in the vote of thanks to Foley and O’Callaghan (2010) it is clear that the data used within the Boyle *et al.*, (2004) were collected at the level of the establishment.

Hildreth and Oswald, 1997; Blanchflower *et al.*, 1996). However, given that public sector organisations do not operate in a competitive products/services market, this rationale would seem to have little relevance to studies of the public-private sector pay differential.

CSO (2012) presents estimates both with and without the enterprise size variable included. This demonstrates the important difference that including a size variable makes in the context of the analysis of the NES data. On the basis of the theoretical arguments above, we favour those estimates that exclude the enterprise size measure.

### **The Weighting Decision**

It is also obvious from Table 1 that the size of the estimated public-private pay differential is heavily influenced by whether or not the data are weighted. Un-weighted estimates lie between 4.4 and 2.2 percentage points below the comparable weighted estimates. In relation to its approach, the CSO states that there are numerous problems associated with the use of weights in regression models, while at the same time stating that “...greater emphasis is placed on weighted data” in reporting the pay gap results (CSO, 2012, p. 4). Nevertheless, in support of the decision to present un-weighted estimates, the CSO refers to three papers (Fazio *et al.*, 2006; Gelman, 2007; and Winship and Radbill, 1994). These papers argue that it is sufficient to estimate un-weighted regressions provided that models include variables relevant to the weighting strategy as additional independent variables. We agree that this is a perfectly legitimate argument under normal circumstances where the impact to be estimated relates specifically to the population that the sampling strategy attempts to replicate.

However, with respect to the NES, the sampling stratification is designed to generate a data representation of the distribution of firms within the economy and not the distribution of employees. Therefore, an un-weighted regression that includes key weighting variables (such as sector and organisational size) as additional controls will generate an acceptable estimate of the difference in pay between a worker in a representative private sector firm and his/her counterpart in a representative public sector organisation. However, as workers are not randomly distributed across firms and sectors, the un-weighted estimate will not relate to the difference in pay between representative private and public sector workers. This suggests that the literature cited in the *Supplementary Analysis* is not relevant in this context. The key conversion from a representative sample of firms to a representative sample of workers requires the data to be transformed in a manner not consistent with the initial survey design, which implies that the use of un-weighted data is not an appropriate option in such circumstances.

CSO (2012) contains estimates using both weighted and un-weighted data. This demonstrates clearly the difference that weighting makes to the estimates. Again, on the basis of the arguments above, our preference is for those estimates that are based on weighted data.

### Summary

Given the importance of the current debate on public sector pay, we believe it is important to recognise the significance of the issues discussed in this Note. We suggest that, among the many estimates published in CSO (2012), greater emphasis should be placed on the results generated from equations containing the weighted estimates and excluding organisational size, since it cannot be measured at establishment level.<sup>10</sup> On the basis of the above arguments, we hold the view that pay-gap estimates that are based on organisational size measured at enterprise level, or un-weighted data, are understating the extent of the wage gap. We believe that the data at hand require that estimates should be based on a specification that excludes organisational size as a control and that the data should be weighted to ensure that it is representative of the population of employees in employment. We note that the IMF has taken a similar view on this issue in its recent discussion of public sector pay levels in Ireland in the December 2012 country report<sup>11</sup>. Consequently, we are of the view that the average public-private pay gap in Ireland in 2010 was likely to have been close to 17 per cent.

### References

- Blanchflower, D.G., A.J. Oswald and P. Sanfey, 1996. Wages, Profits and Rent-Sharing. *The Quarterly Journal of Economics*, Vol. 111, No. 1, pp. 227-251.
- Boyle, G., R. McElligott and J. O’Leary, 2004. “Public-Private Wage Differentials in Ireland, 1994-2001”. *ESRI Quarterly Economic Commentary*, Special Article. Summer 2004. Dublin: The Economic and Social Research Institute.
- Central Statistics Office, 2012. *National Employment Survey 2009 and 2010 Supplementary Analysis*. Cork: Central Statistics Office.
- Eaton, B.C. and W.D. White, 1983. “The Economy of High Wages: An Agency Problem”, *Economica*, Vol. 50, No. 198, pp. 175-81.
- Ernst & Young and Murphy, 2007. “An Econometric Study of Earnings Based on National Employment Survey 2003 Data”. *Public Sector Benchmarking Body*, Dublin.
- Fazio, G., K.H. Lam and F. Ritchie, 2006. “Sample Bias in Microeconomic Analyses of Official Microdata.” Office for National Statistics, UK, URN 06/737. <http://www.berr.gov.uk/files/file21911.pdf>.

<sup>10</sup> In this regard, we differ from CSO (2012) which indicates a preference, among its many specifications, for those that include the enterprise size variable, while stressing that there is not universal agreement on this point. .

<sup>11</sup> <http://www.imf.org/external/pubs/ft/scr/2012/cr12336.pdf>



- Foley, P. and F. O’Callaghan, 2010. “Investigating the Public-Private Wage Gap in Ireland using Data from the National Employment Survey”, *Journal of the Statistical and Social Inquiry Society of Ireland*, Vol. XXXIX, 2009/2010, pp. 23-52.
- Gelman, A., 2007. “Struggles with Survey Weighting and Regression Modeling”, *Statistical Science*, Vol. 22, No. 2, pp. 153-164.
- Gregory, R.G. and J. Borland, 1999. “Recent Developments in Public Sector Labour Markets” in O. Ashenfelter and D. Card (eds.), *Handbook of Labor Economics*, Volume 3C. North Holland: Elsevier.
- Hamermesh, D.S., 1980. “Commentary” in J.J. Siegfried (ed.), *The Economics of Firm Size, Market Structure, and Social Performance*. Washington: Federal Trade Commission.
- Hildreth, A.K.G. and A.J. Oswald, 1997. “Rent-Sharing and Wages: Evidence from Company and Establishment Panels”. *Journal of Labor Economics*, Vol. 15, No. 2, pp. 318-337.
- Kelly, E., S. McGuinness and P.J. O’Connell, 2009a. “Benchmarking, Social Partnership and Higher Remuneration: Wage Settling Institutions and the Public-Private Sector Wage Gap in Ireland”. *The Economic and Social Review*, Vol. 40, No. 3, pp. 339-370.
- Kelly, E., S. McGuinness and P.J. O’Connell, 2009b. “The Public-Private Sector Pay Gap in Ireland: What Lies Beneath?” ESRI Working Paper No. 321. Dublin: The Economic and Social Research Institute.
- Oswald, A.J., 1993. “Efficient Contracts are on the Labour Demand Curve: Theory and Facts”. *Labour Economics*, Vol. 1, No. 1, pp. 85-113.
- Shapiro, C. and J.E. Stiglitz, 1984. “Equilibrium Unemployment as a Worker Discipline Device”, *American Economic Review*, Vol. 74, No. 3, pp. 433-444.
- Winship, C. and L. Radbill, 1994. “Sampling Weights and Regression Analysis”, *Sociological Methods and Research*, Vol. 23, No. 2, pp. 230-257.