



City Research Online

City St George's, University of London

Citation: Blake, D. (2014). On the Disclosure of the Cost of Investment Management (PI-1407). London, UK: Pensions Institute.

This is the published version of the paper.

This version of the publication may differ from the final published version. To cite this item please consult the publisher's version.

Permanent repository link: <https://city-ref-test.eprints-hosting.org/id/eprint/17355/>

Copyright and Reuse: Copyright and Moral Rights remain with the author(s) and/or copyright holders. Copies of full items can be used for personal research or study, educational, or not-for-profit purposes without prior permission or charge, unless otherwise indicated, provided that the authors, title and full bibliographic details are credited, a hyperlink and/or URL is given for the original metadata page and the content is not changed in any way. For full details of reuse please refer to [City Research Online policy](#).



DISCUSSION PAPER PI-1407

On the Disclosure of the Costs of Investment Management.

David Blake.

May 2014

ISSN 1367-580X

The Pensions Institute
Cass Business School
City University London
106 Bunhill Row
London EC1Y 8TZ
UNITED KINGDOM

<http://www.pensions-institute.org/>

On the Disclosure of the Costs of Investment Management

David Blake

Pensions Institute
Cass Business School
106 Bunhill Row
London
EC1Y 8TZ
United Kingdom

www.pensions-institute.org

May 2014

Abstract

This paper argues that no good reasons have been put forward for why **all** the costs of investment management, both visible and hidden, should not ultimately be fully disclosed. They are after all genuine costs borne by the investor. Furthermore, recent studies have shown that hidden costs are at least as high as visible costs, if not much higher. Full transparency could be introduced in stages.

1. Introduction

On 13 May 2014, the Financial Conduct Authority criticised the investment management industry for not reporting charges to investors sufficiently clearly. In particular, it criticised the annual management charge (AMC) as failing 'to provide investors with a clear, combined figure for charges'. Instead, it recommended the use of an ongoing charges figure (OCF) which, in addition to the investment manager's fee, includes recurrent operational costs, such as keeping a register of investors, calculating the value of the fund's units or shares, and asset custody costs. In other words, the OCF measures costs that an investment manager would pay in the absence of any purchases or sales of assets and if asset markets remained static during the year. The next day, on 14 May, the Financial Reporting Council accepted the Investment Management Association's (IMA) proposal to report not only the OCF, but also all the dealing costs and stamp duty paid when an investment manager buys and sells assets in the fund's portfolio. IMA chief executive Daniel Godfrey said: 'Our new measure is simple, easy-to-understand and covers every penny spent by a fund...It will give investors confidence that nothing has been hidden.'

Unfortunately, even with the new information reported, there will remain costs that are hidden. These are the indirect transaction costs for which investors pay via lower net returns. The size of these indirect costs depends on the asset classes involved and the extent to which the client's assets are actively managed, but they could be material – even when investments are passively managed – and significantly affect the net return that the investor receives. Most of these costs are currently not disclosed to investors.

I address three important questions in this paper: (1) what are these costs?, (2) to what extent could they be disclosed currently?, and (3) in respect of which costs is further work required to allow disclosure on a cost-effective basis?

2. The Indirect Costs of Investment Management

The indirect costs of investment management can be divided into two types: visible (explicit) costs and hidden (implicit) costs

One of the first studies to enumerate the hidden costs is Keim and Madhavan (1998). One estimate of the size of both sets of indirect costs was provided by the Plexus Group in 2005 and discussed in Madhavan et al. (2007). The information was expressed in the form of an iceberg, with the visible costs shown above the water and the hidden costs are shown below the water (Figure 1).

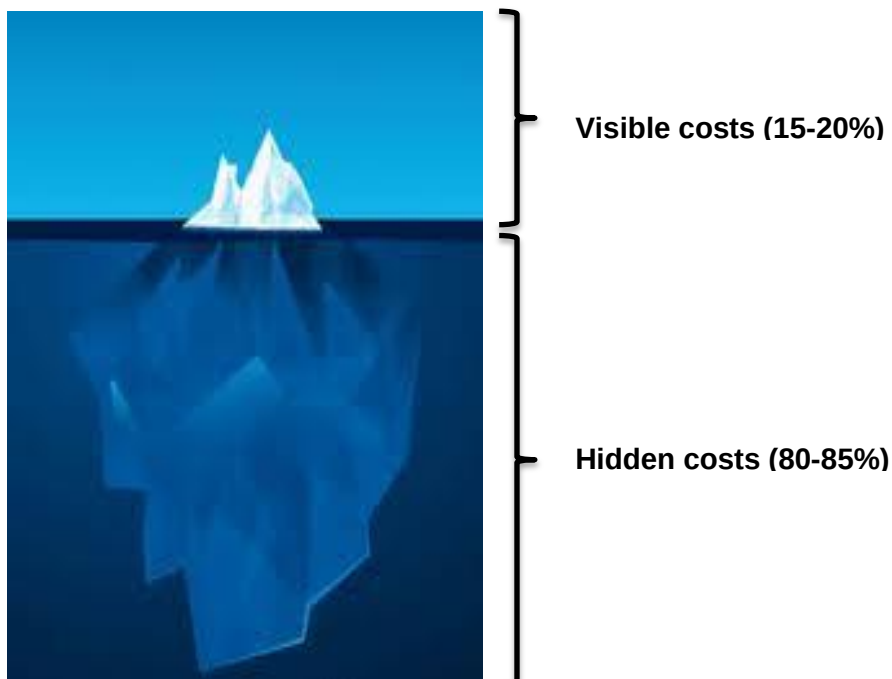
The Plexus iceberg breaks down the indirect costs as follows (with cost estimates derived from the Plexus Group study in 2005):¹

- visible costs (9 basis points of assets under management or 18% of total costs)
 - commissions
 - taxes

¹ In a study of approximately 1,800 US equity mutual funds from 1995-2006, Edelen et al. (2013) report aggregate trading costs of 1.44% of assets under management compared with an expense ratio of 1.19%. So in their study, hidden costs account for 55% of total costs, while visible costs account for 45%. Bogle (2014, Table 1) estimates aggregate trading costs of 1.15% of assets under management for US equity mutual funds compared with an expense ratio of 1.12%, a cost ratio of 51:49. While in both studies the gap is narrower than the Plexus Group study, the hidden costs are still higher than the visible costs.

- fees
- custodial charges
- acquisition costs
- hidden costs (42 basis points of assets under management or 82% of total costs)
 - bid-ask spread
 - transactions costs in underlying funds
 - undisclosed revenue
 - market impact
 - information leakage
 - market exposure
 - missed trade opportunity or market timing costs
 - delay costs

Figure 1: Plexus Iceberg



Even the visible costs are not necessarily as straightforward as might first appear. Take, for example, the commissions charged by brokers when securities are purchased and sold. Investment managers often get ‘free’ services in exchange for this commission, such as broker research, market data or corporate access (to company managers).² But these ‘free’ services are actually paid for by the client. The level of the services received increases with the level of business given to a broker, thereby providing an incentive to churn the client’s portfolio. Further, investment managers frequently aggregate different clients’ trades to get the best price. The aggregated trades will go through a particular broker which means that some of these clients will be indirectly paying for research from

² It has been estimated that £500m of investing clients’ funds was used to pay for corporate access in 2012 (p. 8, *FTfm*, 20 January 2014).

which they get no benefit (for example, because the broker specialises in research about a segment of the market in which the client does not invest). Acquisition costs are transaction costs associated with purchases of assets other than bonds or equities such as the direct ownership of property.

Of the hidden costs, the simplest to understand is the bid-ask spread that a dealer or market maker charges to buy and sell a security or an investment bank charges for, say, a currency hedge. The total spread costs incurred during the year will be related to portfolio turnover³ for that year.

If the investment manager buys funds on behalf of the investor, the transactions costs incurred by these funds (as opposed to the explicit charges) are not currently reported even to the investment manager, but are still paid by the investor in terms of a lower net return.

The investment manager might also benefit from undisclosed revenue, such as retained interest on underlying cash balances or retained profits from stock lending.⁴

The other hidden costs are non-cash costs associated with the active management of an investor's portfolio.

Market impact refers to the reaction of the market price to a large transaction, such as a block sale of securities. The market price will fall in the process of selling the securities and the average execution price will be below the pre-sale price. If the investment manager attempts to execute a large transaction in smaller batches – e.g., by advertising trades to attract buyers or seeking indicators of interest – this will lead to information leakage and will have broadly the same effect as market impact.

Market exposure refers to the fact that an investor is exposed to what is happening in the market during the period that the transaction is taking place. Suppose the investment manager is planning to buy securities for a client. The client is exposed to the risk that the market price rises before the transaction is executed.

Missed trade opportunity or market timing costs are the costs associated with not executing a transaction at the best possible price. Finally, there are delay costs associated with waiting for transactions to complete (e.g., holding the purchase price in a zero-interest account). Some of these non-cash costs can be hedged against – e.g., those relating to adverse market movements – but the cost of the hedge then becomes an explicit measure of the hidden cost.

³ Portfolio turnover is the percentage of the securities in an investment portfolio that are bought and sold during the year. One method to calculate it is to take the smaller of the sum of the values of all securities purchased during the year and the sum of the values of all securities sold during the year and divide the result by the average value of the fund during the year. Another is to take 50% of the sum of the values of all securities purchased during the year plus 50% of the sum of the values of all securities sold during the year and divide the result by the average value of the fund during the year. The IMA is working on a common standard for calculating the portfolio turnover rate.

⁴ It is arguable that undisclosed revenue should be treated as a reduction in return rather than a cost, but for compatibility with the other items, we treat it as a cost.

Figure 1 shows that the visible costs are estimated at 15-20% of the total indirect costs, while the hidden costs are estimated at 80-85%. The hidden costs are therefore of material significance. This has been confirmed by the following studies: Keim and Madhavan (1997), which showed the economic significance of trading costs; Keim and Madhavan (1996), which showed the economic significance of price movements prior to trade dates; and Keim and Madhavan (1995), which showed the economic significance of the opportunity costs associated with the delays in executing large orders. To reiterate, all these costs are in addition to the explicit costs including the AMC.

The extent of the transaction costs incurred will be highly correlated with the number of transactions.⁵ This is why it should be good practice to reveal the portfolio turnover rate. This is required in the United States. It was previously a recommendation of the Investment Management Association (IMA) in the UK, but has been removed from the draft IMA Statement of Recommended Practice (SORP) 'Financial Statements of Authorised Funds'.⁶

3. Which Costs Could Be Disclosed

All the indirect costs listed in the previous section relate to the efficiency of the investment management process and all good investment managers should have an estimate of their size. Nevertheless, some of the costs are easier to estimate than others.

The following indirect costs should be straightforward to collect or estimate from the information collected by the investment manager's own systems:

- visible cash costs (which I denote as **Level 1 costs**)
 - commissions
 - taxes
 - fees
 - custodial charges
 - acquisition costs
- hidden cash costs (which I denote as **Level 2 costs**)
 - the bid-ask spread⁷
 - transactions costs in underlying funds
 - undisclosed revenue

Commissions, taxes, fees, custodial charges and acquisition costs are cash costs that have to be explicitly paid out and undisclosed revenue items will be paid into the investment manager's own account.

⁵ Bryant and Taylor (2012, Chart 1) report an approximately linear relationship between transactions costs and the portfolio turnover rate: a 50% annual portfolio turnover rate costs on average 0.2% of assets under management, while a 250% annual portfolio turnover rate costs on average 0.8% of assets under management.

⁶ <http://www.investmentfunds.org.uk/policy-and-publications/sorp-2013/>

⁷ Gilts and foreign exchange are traded 'commission-free' in the UK, so for these items we need to apportion the spread between commission (and include this in Level 1) and the pure spread.

The item 'bid-ask spread' could be calculated at the same time as portfolio turnover is calculated, so long as the bid-ask spread for each security is collected at the time a security is purchased. Alternatively, the investment manager could use the spreads at the time of disposal (which would still provide a reliable estimate if spreads do not vary much over time – which seems a reasonable assumption to make in normal market conditions).⁸

The item 'transactions costs in underlying funds' is no more than the same information as above, but provided by the investment managers of the underlying funds. Failing to report transaction costs in underlying funds clearly potentially permits the bypass of any regime for the declaration of transaction costs.

The following indirect costs are non-cash costs and would be more challenging to calculate, since they involve the analysis of information that might not be automatically captured by the investment manager's own systems:

- hidden non-cash costs (which I denote as **Level 3 costs**)
 - market impact
 - information leakage
 - market exposure
 - missed trade opportunity or market timing costs
 - delay costs

Nevertheless, there are organisations that specialise in advising investment managers on the efficiency of their investment processes which can obtain this information for a fee. One such organisation is Novarca, a Swiss-based consultancy.

Objections to Full Disclosure

A number of objections have been put forward.

It has been argued that full disclosure is technically impracticable or too expensive

Industry insiders have informed me that one of the problems with disclosure in the UK is that many UK investment managers have not got the software in place to provide the Level 2 costs discussed above. However, other industry insiders say that the costs of putting software in place to make Level 2 costs transparent would not be high.

Dealing with Level 3 is certainly more difficult. Estimates of Level 3 costs can already be made by specialist consultants. The issue is whether fund manager systems could be configured to generate similar information on a cost-efficient basis. This needs to be established in a reasonable timeframe and with involvement of parties beyond those which may face a conflict of interest. An alternative, possibly as an interim measure, might be periodic audits by external consultants.

⁸ In this case, the 'bid-ask spread' item would be equal to the smaller of the sum of the spreads on all securities purchased during the year and the sum of the spreads on all securities sold during the year. It could be expressed as a rate by dividing by the average value of the fund during the year (evaluated using mid-market prices, i.e., the average of the bid and ask prices).

Partial disclosure is all that is needed

The IMA draft SORP,⁹ which was approved by the Financial Reporting Council on 14 May 2014, proposes that fund managers should declare the following transaction costs: transfer taxes, commission (execution), commission (research), and, amounts recovered on units issued and cancelled. However, it does not recommend publication of the following transaction costs: the transaction costs incurred by underlying funds, the profits made by funds when stock-lending is undertaken, and interest retained by fund managers on cash balances. Nor does it suggest explicit publication of the portfolio turnover rate. On bid-ask spread, it says 'An estimate of the average portfolio dealing spread on the balance sheet date should also be given', but it is not clear how this figure can be used to estimate the total spread costs incurred during the year due to portfolio turnover.

There are no standard definitions and measurements of transaction costs

The UK industry has no common and binding approach to standard definitions and measurements of transaction costs. However, this collective action problem is now being tackled by the UK government. In *Better Workplace Pensions: Further Measures for Savers*¹⁰ of March 2014, the UK government set out its intended approach to developing common standards for the declaration of transaction costs incurred by workplace pensions' investments (p.87):

From 2015, trustee boards and Independent Governance Committees will have new duties to consider and report on costs and charges, and pension schemes and providers should start making progress immediately in these areas.

Thereafter, the Government will introduce new requirements to standardise the disclosure of administration charges and transaction costs, making this the first international example of full transparency in pension schemes.

The Government will start work immediately with regulators, providers, trustees and asset managers on the design and implementation of the relevant standards and products to ensure maximum effectiveness of these transparency measures.

A voluntary standard for the disclosure of pension charges and costs was introduced in the Netherlands in 2011.¹¹ The initiative is being led by the Federation of Dutch Pension Funds and has the support of the Dutch Central Bank, the Dutch Accounting Standards Board, the Netherlands Institute of Chartered Accountants (NBA), and the Dutch Asset Management Association. While the initial transaction costs reported did not cover all of the Level 1 to Level 3 costs I identify above, the stated ultimate objective of the Federation of Dutch Pension Funds is full transparency of

⁹ See http://www.investinginfunds.org/assets/20120628_EnhancedChargesDisclosureGuidance.pdf

¹⁰ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/298436/better-workplace-pensions-march-2014.pdf.

¹¹ Federation of Dutch Pension Funds (2011, p.87), *Recommendations on Administrative Costs*, http://www.pensioenfederatie.nl/Document/Publicaties/Service-documenten/Aanbevelingen_uitvoeringskosten_2013_herziene_versie.pdf.

transactions costs. Currently there is discussion in the Dutch parliament about adopting legislation on disclosing transaction costs in early 2015.¹²

Costs cannot be considered in isolation

Some have argued that costs cannot be considered independently of the underlying investment strategy.¹³ This means that costs should only be considered along with risk, expected return and portfolio turnover. However, this does not prevent costs being declared on a backward-looking basis. This would mean they would be directly comparable with the realised returns and portfolio turnover rate.

Investors cannot deal with complexity

Presentation of transaction costs and of the portfolio turnover rate does not have to be complex and can be tailored differently for different audiences. The point of providing the information is that it permits not just those investors who can use the information from undertaking comparisons, but also interested third parties. As Lord Lawson put it in the House of Lords: 'There are sections of the press that give excellent consumer advice on financial matters, and not just the press: there is the excellent Paul Lewis, with his *Money Box* programme on the wireless. All these people need the information. They need to be the beneficiaries of disclosure if they are to be as effective as they might be for the benefit of members of pension schemes.'¹⁴

4. Support for Full Disclosure

I would argue that the principle of full transparency is paramount. Further, there is little point in requiring transparency where the reported measure for 'costs' does not include all of the costs, or in the short term, as many as could currently be reported on a cost-effective basis.

This view is supported by a number of professionals interviewed on an anonymised basis in the recent Pensions Institute report *VfM: Assessing Value for Money in Defined Contribution Default Funds* (see Harrison, Blake and Dowd (2014)):

- 'Schemes and asset managers are boasting that they are so low cost they can't make a profit. This is nonsense – all that low charges tell us is that the real asset management costs are going out of the funds before the member charge is extracted'. *Independent consultant*
- 'A charge cap on an incomplete disclosure measure would not just be pointless, it would actively encourage greater opacity at fund level and drive bad practice in the asset management community'. *Employee benefit consultant*
- 'If all charges earned are not included in the charges cap, it is easy to see fund managers using alternative sources of revenue [e.g. soft commissions], as well as stock-lending, to

¹² <http://www.rijksoverheid.nl/documenten-en-publicaties/kamerstukken/2014/02/26/tweede-nota-van-wijziging-wet-verlaging-maximumopbouw-en-premiepercentages-pensioenen.html>.

¹³ For example, Bryant and Taylor (2012).

¹⁴ Lord Lawson, Hansard at column 958, House of Lords Official Report, Vol. 752, No. 119, Wednesday 26 February 2014.

replace the fees lost from a reducing AMC. It will be hard for fiduciaries to either see this going on or do much about it. We should not underestimate the ingenuity of the financial services industry. Any opportunity for a loophole will be taken, so it is important that a 'cover-all' clause is inserted in legislation that addresses both the spirit as well as the specifics of the legislation'. *Employee benefit consultant*

- 'Most [active] funds over-trade. There should be a fee structure that dissuades fund managers from trading unnecessarily. Where I am really uncertain is in the murky world of broking. We never get involved with that side of the industry. Are they [brokers] any good? Are their fees sensible or reasonable? Is competition effective in that area? Why do fund managers bother taking their research – shouldn't they be doing their own? The failure to manage transactional cost at the fund level ... provides a compelling case for Government intervention'. *Employee benefit consultant*
- 'We need to challenge every basis point in that member charge and ask whether it delivers value to members'. *Asset manager*
- 'There is no technical obstacle to reporting the portfolio turnover rate' *Fund Manager*

Supporters of full disclosure also include:

- The Pensions Regulator in its *Regulatory Guidance for Defined Contribution Schemes* (November 2013) states that (p.12): 'In a quality scheme, trustees will ensure that all costs and charges borne by members are transparent and communicated clearly at point of selection to the employer to enable value for money comparisons to be made and to assess the fairness to members of the costs and charges'.¹⁵
- The Office of Fair Trading in its *Defined Contribution Workplace Pension Market Study* (September 2013, revised February 2014) states (p. 18): 'we are concerned that non-visible charges add to the potential for conflicts of interest to emerge in the supply chain such that charges may not always be managed down in the interests of scheme members. While we have not received specific evidence of inflated transaction charges, a number of industry experts have pointed to the potential for conflicts to exist. Disclosure of transaction costs and independent scheme governance could help to ensure that this potential conflict of interest is managed'.¹⁶
- The Work and Pensions Select Committee of the House of Commons which has re-opened its inquiry into governance and best practice in workplace defined contribution pension schemes and one of the key points that it will focus on is the 'transparency of charges and costs'¹⁷
- A cross-bench group of MPs has sent a letter to the Financial Reporting Council requesting the FRC 'to ensure that the accounting standards employed by fund managers are accurate and fair.....A..regime that claims to disclose transactions costs, but omits major types of transactions costs does not meet these requirements'¹⁸

¹⁵ <http://www.thepensionsregulator.gov.uk/guidance/guidance-dc-schemes.aspx>

¹⁶ http://www.offt.gov.uk/shared_offt/market-studies/oft1505

¹⁷ Reported in *Professional Pensions*, 19 October 2013.

¹⁸ Reported in the *Financial Times*, 10 November 2013.

- Adrian Boulding, pensions strategy director at Legal & General has stated that ‘a cost is a cost and they all drag on members’ funds’¹⁹
- Lord Freud, supporting the Government’s amendment to require the publication of transaction costs in the House of Lords said: ‘...the full range of transaction costs that may be borne by [pension] scheme members should be disclosed.’²⁰
- Lord Turner: ‘Although a price cap on explicit costs is important, it is not sufficient. That is why I strongly support the sentiment of the amendment of the noble Lord, Lord Lawson, which seeks to cover all the other costs which are not covered in explicit fund management charges. The issue of these other costs was also one with which the Pensions Commission was concerned. We were concerned that, beyond what you can see in an annual management charge for a fund, there are lots of other costs involved. These are precisely the sort of costs described in Amendment 28, in the name of the noble Lord, Lord Lawson, which include fees and performance fees paid to investment managers ... commissions and bid-offer spreads paid ... fees, revenue splits and bid-offer spreads paid to custodian banks. These are very significant but are not well understood. On the Pensions Commission, we sought to see whether research had been done on how big these were. Interestingly, there was one piece of research, which was sponsored by the FSA back in 2000 and written, after a lot of research, by a man called Kevin James.²¹ It tried to work out just how large these other costs were in the UK and in the US. We called them implicit costs in addition to explicit costs. There is a box in the first Pensions Commission report which explains that piece of analysis and how big they are. His analysis, which we interpreted, suggested that some of these costs might be as high as 90 basis points, on top of the overt, explicit costs. We ended up, for the purposes of modelling, believing that if we were to try to understand what got lost between the gross return on equities that you see by looking at the FTSE All-Share Index every year and what the saver gets, we had to allow, in addition to the explicit asset management costs, for 65 basis points on average going in these implicit costs – more for actively managed funds, less for index funds. It is possible that those costs have come down since that analysis was done and since we looked at it – there has, for instance, been some compression of bid-offer spreads – but they are sufficiently large that it is incredibly important to focus on them, pay attention to them and, as it were, bring the disinfectant of transparency to bear on this bit of the cost base. Let us suppose that they were 65 basis points. That means that if somebody thought that they were paying 0.85% on an explicit annual management charge, between the gross return on equities in the market and what they actually get, they would be paying 85 basis points plus 65 basis points, which takes us back to the 1.5% per annum, which is 34% of their pot disappearing.’²²

¹⁹ Quoted in the *Financial Times*, 10 November 2013.

²⁰ Lord Freud, Hansard at column 956, House of Lords Official Report, Vol. 752, No. 119, Wednesday 26 February 2014.

²¹ James (2000).

²² Lord Turner, Hansard at column 966, House of Lords Official Report, Vol. 752, No. 119, Wednesday 26 February 2014.

- The European Commission which, in April 2014, announced that it was introducing a new disclosure requirement under the Shareholders' Rights Directive to make institutional investors, such as pension funds, disclose publicly how they pay asset managers.²³

5. Conclusion

I would argue that no good reasons have been put forward for why **all** the costs of investment management, both visible and hidden, should not ultimately be fully disclosed. They are after all genuine costs borne by the investor. Furthermore, recent studies have shown that hidden costs are at least as high as visible costs, if not much higher. Full transparency could be introduced in stages.

First, the following indirect cash costs could be reported in the form of both a 'rate of cost' – which could then be deducted from the gross rate of return to give a net rate of return – and as a monetary amount – which can then be compared with the monetary value of the investor's portfolio:

- visible cash costs (Level 1 costs)
 - commissions
 - taxes
 - fees
 - custodial charges
 - acquisition costs
- hidden cash costs (Level 2 costs)
 - bid-ask spread
 - transactions costs in underlying funds
 - undisclosed revenue

Then, once investment managers' systems can cope, the following indirect non-cash costs could be estimated and reported in the same form:

- hidden non-cash costs (Level 3 costs)
 - market impact
 - information leakage
 - market exposure
 - missed trade opportunity or market timing costs
 - delay costs

Further work is required to allow disclosure of Level 3 costs. The Government should announce that Level 3 costs will be investigated within a set period with proposed solutions to be subject to a cost-benefit analysis at the end of that period.

²³ http://europa.eu/rapid/press-release_IP-14-396_en.htm;
http://ec.europa.eu/internal_market/company/shareholders/indexa_en.htm.

If total investment costs are not ultimately disclosed in full, then this leaves two open questions: (1) how can there ever be an effective and meaningful cap on charges? and (2) how can active investment managers ever assess their true value added?

References

- Bogle, J. (2014) 'The Arithmetic of "All-In" Investment Expenses', *Financial Analysts Journal*, 70(1), 13-21, January/February.
- Bryant, C., and Taylor, G. (2012) *Fund Management Charges, Investment Costs and Performance*, Investment Management Association, Statistics Series Paper 3, May.
- Edelen, R., Evans, R., and Kadlec, G. (2013) 'Shedding Light on "Invisible" Costs: Trading Costs and Mutual Fund Performance', *Financial Analysts Journal*, 69(1), 33-44, January/February.
- Harrison, D., Blake, D., and Dowd, K. (2014) *VfM: Assessing Value for Money in Defined Contribution Default Funds*, Pensions Institute, Cass Business School, London.
- James, K. (2000) *The Price of Retail Investing in the UK*, Financial Services Authority, Occasional Paper Series 6, February.
- Keim, D., and Madhavan, A. (1995) 'Anatomy of the Trading Process: Empirical Evidence on the Behaviour of Institutional Trades', *Journal of Financial Economics*, 37, 371-398.
- Keim, D., and Madhavan, A. (1996) 'The Upstairs Market for Large-Block Transactions: Analysis and Measurement of Price Effects', *Review of Financial Studies*, 9, 1-36.
- Keim, D., and Madhavan, A. (1997) 'Transactions Costs and Investment Style: An Inter-Exchange Analysis of Institutional Equity Trades', *Journal of Financial Economics*, 46, 265-292.
- Keim, D., and Madhavan, A. (1998) 'The Cost of Institutional Equity Trades', *Financial Analysts Journal*, 54(4), 50-69
- Madhavan, A., Treynor, J.L., and Wagner, W.H. (2007) 'Execution of Portfolio Decisions, in *Managing Investment Portfolios: A Dynamic Process*, edited by Maginn, J. L., Tuttle, D.L., McLeavey, D. W., and Pinto, J. E. John Wiley & Sons, Hoboken (Chapter 10, pp.637-681).