## Table 1 Review of Published Studies (2000-2014) Comparing Ex Ante and Ex Post Estimates of Costs of Regulation to Business

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| Study | Jurisdiction | Sample and Time Period | Sampling Method | Findings |
| Harrington, W., et al. (2000) "On the accuracy of regulatory cost estimates." Journal of Policy Analysis and Management 19(2): 297-322. | US (Federal and California), Singapore, Norway, Ontario | 28 Environmental (20) and Occupational Health and Safety Regulations (8); 1972-1996 | Convenience (existence of an ex ante cost estimate developed by a regulatory agency with substantial expertise in cost analysis, and a relatively detailed ex post estimate, typically (but not always) prepared by an academic or independent analyst. | Ex ante estimates of total costs exceeded (>25%) actuals in 14 cases and were too low (<25%) in 3 cases. Overestimates occurred more frequently is larger regulations. |
| Hammitt, J.K. (2000) “Are The Costs of Proposed Environmental Regulations Overestimated? Evidence from the CFC Phaseout', *Reference Environmental and Resource Economics* 16: 3, 218-301. | US | Environmental regulation (tradeable permits for CFCs-11,-12 and -113) (3); 1985-1987 | Convenience | One ex ante estimate substantially overestimated the control costs for CFCs-11 (x3) and -12 (x2) and slightly underestimated them for CFC-113. A second ex ante estimate underestimated costs. |
| Morgenstern, R., Pizer, W. and Shih, J.S. (2001) The Cost Of Environmental Protection. The Review of Economics and Statistics, 83(4), 732-738. | US | Environmental Regulation (unspecified, large n, relating to pulp and paper, plastics, petroleum and steel industries) 1979-1991 | Representative (of shipments or payroll within each industry) | Industry reported data (used by the Environmental Protection Agency to estimate cost projections for regulatory impact analyses for proposed pollution regulations) indicates over-estimate of abatement costs for pulp and paper industry (by a factor of >2), but no statistically significant difference for plastics, petroleum, and steel |
| Anderson, J. F., & Sherwood, T. (2002) Comparison of EPA and Other Estimates of Mobile Source Rule Costs to Actual Price Changes. Paper presented at the SAE Government Industry Meeting, Washington, DC, May 14, 2002. | US | Environmental Regulations (6); 1990-2001. | Unclear | Full paper not accessible. Ex ante estimates of price increases induced by regulation were greater than actual price changes observed. |
| Thompson, K.M., Sequi-Gomez, M. and Graham, J.D. (2002) Validating Benefit and cost estimates: The case of airbag regulation. Risk Analysis, 22(4), 803–811. | US | Consumer safety regulation (1) | Purposive | Ex ante estimates marginally exceeded realised costs (<5%). |
| Watkiss, P., *et al* (2004), An Evaluation of the Air Quality Strategy: Final Report to Defra. London: HMSO. | UK (including EU-derived regulations) | Environmental regulation: air quality policies in the road transport and electricity generation sectors (unspecified, but relatively large n) | Entire sample (all policies relevant to air quality in the two sectors) | Ex ante estimates overstated costs by factors of 5(low)/7(high) (transport) and 2 (low)/14 (high) (electricity generation) |
| Office of Management and Budget (2005) Validating Regulatory Analysis: Report to Congress on the Costs and Benefits of Federal Regulations and Unfunded Mandates on State, Local, and Tribal Entities. Washington, DC, Office of Information and Regulatory Affairs. | US | Federal Regulations (47): occupational health and safety (13); traffic safety (8); environmental protection (18); energy (6); nuclear power (2); 1975-1996 | Convenience | Ex ante estimates tended to overestimate both benefits and costs (but they have a significantly greater tendency to overestimate benefits than costs): 18 rules accurate benefit estimates, 19 rules with overestimates and 2 rules with underestimates; 12 rules with accurate cost estimates, 16 with overestimates, and 12 with underestimates; 11 cases of accurate benefit to cost ratios, 22 overestimates, and 14 underestimates. |
| Grosse, S.D., Waitzman, N.J., Romano, P.S. and Mulinare, J. (2005) Re-evaluating the benefits of folic acid fortification in the United States: Economic analysis, regulation, and public health. American Journal of Public Health, 95(11),  1917–1922. | US | Health regulation (1): Federal regulation to fortify cereal grains with folic acid | Purposive | Ex ante estimates exceeded realised costs by a factor of between 3.5 and 9. |
| Oosterhuis, F., des Abbayes, C., Görlach, B., Huybrechts, D., Jarvis, A., Kuik, O., Medhursi, J., Meynaerts, E., Monier, V., Ekins, P., Jantzen, J., Vanner, R., Vercaemst, P.,and van der Woerd, H. (2006) Ex-post estimates of costs to business of EU environmental legislation. Amsterdam, Institute for Environmental Studies. | EU | Environmental regulation (5) | Purposive | Ex ante estimates exceeded realised costs by at least a factor of 2 in 4 cases. |
| MacLeod, M., Moran, D., Aresti, M. Harrington, W. and Morgenstern, R. (2006) Comparing the ex ante and ex post costs of complying with regulatory change. Final Report to DEFRA. London: Department for Environment, Farms, and Rural Affairs. | UK | Environmental regulation (8): | Purposive | Ex ante estimates significantly overestimated in 5 cases (>25%), marginally overestimated in 1 (<25%), underestimated in 2 (>25%). |
| Dale, Larry, Antinori, Camille, McNeil, Michael, McMahon, James E., & Fujita, K. Sydny. (2009). Retrospective evaluation of appliance price trends. Energy Policy, 37(2), 597–605. | US | Environmental regulation ( 4): efficiency standards for home appliances (refrigerators, clothes washers, room and central air conditioners); 1982-1990 | Purposive | Ex ante cost estimates generally exceed those  developed ex post. |
| Chan, G., Stavins, R., Stowe, R., and Sweeney, R. (2012) The SO2 allowance trading system and the Clean Air Act amendments of 1990: Reflections on twenty years of policy innovation. Kennedy School of Government, Harvard University. | US | Environmental regulation (1); 1990 | Purposive | Ex ante cost estimates significantly exceed realised costs. |
| Wolverton, A. (2014). Retrospective evaluation of costs associated with methyl bromide critical use exemptions for open field strawberries in California. *Journal of Benefit-Cost Analysis*, 5(2): 225-257. | US | Environmental Regulation; 2005-2010 | Purposive | Ex ante costs for most categories overestimated. |
| Morgan, C. & Simon, N. (2014). National primary drinking water regulation for arsenic: A retrospective assessment of costs. Journal of Benefit-Cost Analysis, 5(2): 259-284. | US | Environmental Regulation; 2001 | Purposive | Ex ante costs overestimated ex post capital costs by  30-100%. |

## Table 2 Description of UK Regulations outlined in Open Europe’s 100 Most Costly EU-Derived Regulations

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| Regulation (originating EU Directive or Regulation) (“cost burden” ranking in OE’s analysis) | Purpose |
| The Agency Workers Regulations  2010 (2008/104/EC) (5) | The regulations aim to protect temporary agency workers (who, at the time, comprised 5% of the workforce) by ensuring that their basic working and employment conditions (duration of working time, overtime, breaks, rest periods, night work, holidays, public holidays and pay) were broadly comparable to those recruited directly to occupy the same job. The regulations set a 12 week qualifying period before equal treatment is applicable and do not apply to redundancy pay, benefits in kind, financial participation schemes (e.g. profit sharing), and occupational social security schemes (e.g. occupational sick pay) [(Department of Business Innovation and Skills, 2010](#_ENREF_4)). |
| The Road Transport (Working Time) Regulations 2005 and The Road Transport (Working Time) (Amendment) Regulations 2012 (2002/15/EC) (12) | The 2005 Regulations aim to establish minimum requirements for the organisation of working time for transport workers to improve both road safety and the health and safety of affected workers. They apply to: “mobile workers” covered by a miscellany of EU drivers’ hours rules; drivers, vehicle crew and travelling staff of heavy goods vehicles over 3.5 tonnes; drivers of most vehicles with more than 8 passenger seats. The 2012 Regulations cover a sub-class of self-employed drivers who were initially excluded from the scope of the Directive under a sunrise clause [(Department for Transport, 2011](#_ENREF_3)). Both sets of regulations seek to limit working to an average 48-hour working week (typically calculated over a four-month reference period). Workers are able to work up to 60 hours in a single week, provided their average working week does not exceed 48 hours over a 4-month period. They also impose a 10-hour limit for night workers over a 24-hour period. Where there is a collective agreement or a workforce agreement at company level between the employer and employees, companies are able to extend the reference period for calculating the average 48-hour week to six months and exceed the 10-hour limit (over a 24-hour period) for night workers. However, the 60-hour weekly limit still applies [(Department for Transport, 2002](#_ENREF_2)). |
| The Control of Vibration at Work Regulations 2005 (2002/44/EC) (14) | The regulations aim to protect workers from risks to their health resulting from exposure to vibration transmitted to the hand-arm (HAV) and whole body (WBV). They place several duties on employers, including a requirement to: assess employee risks from vibration; reduce their exposure to vibration; provide them with information and training. A wide range of industries and occupations were affected by the regulations (e.g. agriculture, construction, mines and quarries, engineering, forestry, public utilities, shipbuilding, aircraft, vehicle manufacture and repair). Prior to their introduction there were no regulations in the UK dealing specifically with the risks from vibration, which were covered by general health and safety legislation and informal guidance.  The link between exposure to HAV and WBV and problems such as vibration white finger (VWF), vibration-related carpal tunnel syndrome, disorders of bones, muscle, joints and sensory nerves, damage to back and back pain were well established when the regulations were introduced. Research at the time suggested that around 2 million people in Britain were exposed to potentially harmful levels of HAV. The Health and Safety Executive (HSE) estimated that exposure at its then existing recommended action level for HAV might cause finger blanching in about 10% of the vibration-exposed population after 8 years. The regulations set a more stringent action level together with an exposure limit value above which exposure is not permitted. A Medical Research Council research report estimated that 9 million workers were exposed to WBV in Great Britain in the late 1990s [(Palmer *et al.*, 1999](#_ENREF_17)), although the contribution of this to back pain in the population was unclear [(Health and Safety Executive, 2005a](#_ENREF_10)). |
| The Working Time (Amendment) Regulations 2002 (94/33/EC and 2003/88/EC) (19) | The 2002 Regulations ended the UK’s opt-outs for young workers in relation to the working time and night work provisions of the EU Council Directive on the protection of young people at work and changed the way that night working hours were calculated. The opt outs covered 16 and 17 year-olds who, under the Directive, would otherwise have been restricted to working a maximum of 40 hours per week (with a maximum working day of 8 hours) and would not normally be allowed to work at night between 10pm and 6am (or 11pm to 7am). Prior to the regulations, calculations for average night working hours excluded overtime (unless it was guaranteed). Subsequently, all overtime was included when calculating night workers’ normal hours (not to exceed an average of eight hours for each 24-hour period over a 17-week period or longer if agreed by a collective or workforce agreement). Among other things, the regulations aimed to ensure a better balance for workers between work and family life, improvements in occupational health and safety, and improve young people’s access to education and opportunities for personal development [(Department of Trade and Industry, 2002](#_ENREF_5)). |
| The Control of Noise at Work Regulations 2005 (2003/10/EC) (33) | The regulations aim to protect workers from risks to their health arising from exposure to noise at work. They lowered existing exposure action values by 5dB(A) (from 90 dB(A) to 85 dB(A)) and introduced a new exposure limit value. They were anticipated to affect firms in agriculture, construction, quarrying, mining, transport, forestry, drinks and packaging, textiles, potteries, glass, rubber, printing, metalworking, woodworking, steel, entertainment, and the armed forces (and potentially education, teachers, and call centre workers). At the time, there was good evidence of some hazard to hearing from prolonged exposure to noise at levels down to 85 dB(A) with research suggesting that about 1.1m people were exposed to noise at this level and above (with an estimated 170,000 suffering deadness, tinnitus or other ear conditions as a result). There is generally a long latency before the effects of damage due to noise exposure are noticed (continuous occupational exposure to noise at 90 dB(A), for example, results in about 5% of the population sustaining a 30 dB hearing loss (moderate disability) within 10 years. This rises to approximately 50% over a working lifetime of exposure [(Health and Safety Executive, 2005b](#_ENREF_11)). |
| The Work at Height Regulations 2005 (2001/45/EC) (37) | The regulations aim to minimise the risk of falls from working at height (one of the most common causes of fatalities and injuries at work) by addressing how work at height is planned, organised, and managed and by outlining training requirements [(Health and Safety Executive, 2005c](#_ENREF_12)). They cover the self-employed and businesses whose employees use ladders, scaffolding and rope access equipment (mainly those involved in construction and steeple jacking, window cleaning, arboriculture, agriculture, utilities, retail, ship building, manufacturing and the occupational group of maintenance/ industrial cleaners) [(Health and Safety Executive, 2005c](#_ENREF_12)). |
| The Control of Asbestos Regulations 2012 (2009/148/EC) (57) | The regulations updated previous asbestos regulations to ensure full implementation of the EU Directive on exposure to asbestos. They aim to provide further protection for building maintenance workers and tradespeople who routinely disturb the fabric of buildings and are most at risk of exposure to asbestos due to the legacy of asbestos-containing materials in the UK’s building stock. They also created additional requirements for some types of non-licensed (lower risk) work with asbestos (specifically, notification of work to the relevant enforcing authority, arrangement of medical examinations for workers, and maintenance of a register for individual workers covering the type and duration of work with asbestos) [(Health and Safety Executive, 2011](#_ENREF_13)). |
| The Control of Substances Hazardous to Health (Amendment) Regulations 2004 (2003/53/EC) (64) | The regulations aim to reduce allergic contact dermatitis, which can lead to permanent sensitivity and disability (conservatively estimated at 200 to 400 cases per year in Great Britain) associated with exposure to cement and cement preparations containing chromium VI. Construction workers exposed to wet cement on a regular basis were most at risk. The regulations prohibited marketing and use of these products (where there was the possibility of risk of contact with the skin) if chromium VI concentration exceeded a specified level; in effect, requiring manufacturers to lower the concentration by adding a reducing agent (ferrous sulphate) to the cement or cement preparation. Studies in EU member states where cement had been chromate-reduced for several years indicated that allergic contact dermatitis would be reduced by between 66% and 100% in the construction industry. The prohibition does not apply where material is supplied for use in circumstances where there is mechanical handling with no possibility of skin contact [(Health and Safety Executive, 2003](#_ENREF_9)). |
| Construction (Design and Management) (CDM) Regulations 2015 (92/57/EEC) (66) | The regulations replaced existing regulations introduced in 2007, which defined management roles and processes and prescribed practical health and safety precautions and welfare requirements for construction projects. They were introduced following a post-implementation review (PIR) [(Frontline Consultants, 2012](#_ENREF_8)), which found that, in many cases, a key position under the previous regulations (the construction, design, management (CDM) co-ordinator) added costs to building projects with few measurable benefits. One responsibility of the CDM co-ordinator was to provide project clients with advice on the management of health and safety risks in construction. More generally, it was intended to assist clients in the selection of competent contractors and the adequacy of management arrangements, to ensure proper co-ordination of the design process, facilitate good communication and co-operation between project team members and prepare a health and safety file. The co-ordinator should have had a pivotal role in the preconstruction phase of a construction project. However, the PIR found that co-ordinators were often appointed late in the project, which meant that they were not well integrated into the project team (designer, client and principal contractor) and, consequently, had few real responsibilities. The new regulations removed the pre-construction co-ordination role of the CDM co-ordinator and passed responsibility to a principal designer. They also shortened, simplified, and increased the accessibility of the regulations, withdrew an existing Approved Code of Practice (which was replaced with guidance aimed at specific industry sub-sectors), removed the detailed framework for the assessment of individual and corporate competence, tightened the conditions used to trigger notification of a construction project to the competent authority, altered the conditions used to trigger a raft of additional duties, and removed the exemption from client duties for domestic clients (now implemented using a “deeming” approach) [(Health and Safety Executive, 2014](#_ENREF_14)). |
| The Transnational Information and Consultation of Employees (Amendment) Regulations 2010 (2009/38/EC) (86) | The Regulations aim to strengthen rights of employees to be informed and consulted on significant changes to businesses (where an employer operates in two or more EU states) [(Department of Trade and Industry, 2006](#_ENREF_6)). |

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## Table 3 Selected Cost and Benefit-Related Data from Sample of Labour-Related Final Impact Assessments

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| Regulation (originating EU Directive or Regulation) (Government Department responsible for impact assessment) | Reported uncertainties and key assumptions concerning cost estimates in final impact assessment | Business data relied on in respect of costs | Assessment and monetisation of estimated benefits |
| The Agency Workers Regulations 2010 (2008/104/EC) (Department of Business, Enterprise, and Regulatory Reform, BERR) [(Department of Business Innovation and Skills, 2010](#_ENREF_4)) | **Material cost-relevant assumptions (based on weak or conflicting evidence):** Major difficulties in estimating the number of workers covered by the proposed regulations were reported. The impact assessment reported that there were “no official statistics or studies that quantify in a robust and comprehensive way the degree of agency working in the UK.” Three sources (the Labour Force Survey (LFS), a survey by the Recruitment and Employment Confederation (REC) Census, and a BIS Survey of Recruitment Agencies (SORA)) produced varying estimates (a quarter of a million, 1.1 million, 1.5 million). The impact assessment took the mean of the latter two surveys as its best estimate, noting that the LFS underestimated the number of agency workers (partly, for example, because it self-reported methodology meant that respondents did not always perceive themselves to be “agency workers”, describing themselves, for example, as “casual workers” or “seasonal workers”). Both REC and SORA may, however, have included an element of double counting. Although, the impact assessment noted that it was difficult to determine how much, it was assumed that the probability of workers being double counted by SORA was likely to be low as only 12% of establishments were included in the survey sample [(Department for Business Enterprise and Regulatory Reform, 2008](#_ENREF_1)).  Major difficulties in reliably quantifying the costs associated with changes to behaviour following implementation were reported (dynamic effects). The incentive for employers to switch assignments lasting less than 12 weeks to minimise costs was noted (the precise the extent of the change depending on the degree of extra cost, employer sensitivity to cost changes, the overall labour market situation, and the feasibility of switching to shorter-term placements). The impact assessment assumed that 25% of assignments lasting between 3 and 6 months would become assignments lasting less than 3 months (to calculate that 40% of the total number of agency workers would be affected by the 12-week qualifying period), but that more work would need to be undertaken in the future to assess the extent of switching to shorter-term assignments.  Data relating to the length of agency workers’ assignments (material to calculating the number of workers that would be affected by the 12-week qualifying period) were inconsistent. Data from SORA and the Confederation of British Industry’s (CBI) Employment Trends Survey indicated that between 40% and 45% of assignments lasted more than 3 months, while the LFS indicated around 70%. The SORA estimates were used (45%).  Data relevant to the characteristics of agency workers were also inconsistent. SORA found 57% of temporary assignments were full-time, whereas the Annual Population (APS) and LFS suggested 75%. The impact assessment assumed the latter.  Cost estimates for training were based on uncertain projections. LFS data were used to estimate the number of affected agency workers (41% of permanent employees had reported to have received job training in the 3 months prior to the survey, compared with 23% of agency workers). The impact assessment then assumed that the affected agency workers would on average receive an additional 2½ days’ training per year at an average cost of £200 per day.  Difficulties in accurately quantifying the financial effects of increased administration associated with the regulations (e.g. calculating equal treatment for pay and holiday entitlements) were reported. A number of assumptions about the time taken to perform these administrative tasks were taken in the absence of any clear evidence (other than for the hourly wages of personnel performing these tasks which were taken from the Annual Survey of Hours and Earnings, ASHE). In addition, the impact assessment noted that official data of the total number of agency assignments likely to be covered by the regulations (and necessary to calculate these costs) did not exist and, consequently, made assumptions on the back of SORA data for the total number of assignments.  The impact assessment provided a conservative estimate based on no apparent evidence for the one-off transition costs that would be incurred (as a result of changes associated with IT systems, staff training, legal advice).  **Dynamic effects:** some dynamic effects (see above and adjacent cell under *summary of business views*) were considered and integrated into estimates (however, the impact assessment noted that it was “very difficult” to quantify these “with any reliability”).  **Assumptions relevant to the rate of compliance:** full compliance assumed. | **Summary of sources:** Official data sources (the LFS, the Annual Population Survey, the ASHE). Government sponsored surveys of business (i.e. SORA) and reviews of the evidence [(Employment Markets Analysis and Research, 2008](#_ENREF_7)). Business data (e.g. REC, CBI Employment Trends Survey).  **Summary of business views:** The consultation aimed to collate data from industry on potential dynamic effects (so that they could be quantified), although the impact assessment reported few detailed responses (and, consequently, noted that it was “very difficult to try and quantify with any reliability what the various responses might add up to”).  The REC survey and a CBI Employment Trends Survey (2007) were cited (in the context of calculating dynamic effects) to highlight how the regulations may reduce the use of temporary workers, trigger an increase in workload and reduction in benefits for permanent staff, lead to an increase in recruitment of permanent staff.  See also adjacent cell under *material cost****-****relevant assumptions*.  **Effect on estimates:** See adjacent cell under *material cost-relevant assumptions* concerning the use of business survey data.  It was reported that no evidence emerged though the consultation to radically change the key assumptions used within the pre-consultation analysis of costs and benefits (feedback in relation to dynamic effects were noted to be of a qualitative, rather than quantitative nature).  Business survey data on potential dynamic effects (see above) were considered too broad/vague to support estimates. | **Reported benefits (workers):** wage increases for agency workers; increased security for agency workers transitioning to permanent contracts (a predicted effect of the regulations); improved working conditions for all agency workers (improvements in breaks and rest periods, access to child care facilities, provision of transport services, right to be informed of vacancies, paid holiday, improved access to training, payment for overtime, shift allowances, unsocial hours premiums/bonuses, bonuses related to personal and individual performance); improved conditions for pregnant workers (such as the right to be offered alternative work or hours if there is a health and safety risk, the right to be suspended on full pay if alternative arrangements cannot be put in place, and paid time off for ante-natal appointments).  **Reported benefits (employers):** increased worker productivity resulting from greater access to training for workers; greater ease in filling vacancies (assuming the regulations increased the attractiveness of agency working and, therefore, supply of agency workers).  **Reported benefits (governments):** increased government revenue as a result of increased tax and national insurance contributions.  **Non-reported benefits (workers):** potential health benefits associated with increased pay, a shift in employment patterns from temporary to permanent, improved conditions for pregnant workers, working time provisions such as breaks and rest periods, access to child care facilities, the provision of transport services, the right to be informed of vacancies, paid holiday, improved access to training, payment for overtime, shift allowances, unsocial hours premiums/bonuses, bonuses related to personal and individual performance, liability and dispute resolution.  **Non-reported benefits (employers):** potential improved worker productivity as a consequence of non-reported health benefits to workers above (except training, where productivity benefits were reported).  **Non-reported benefits (government):** potential cost savings to health service as a consequence of health benefits reported under *non-reported* *benefits (worker)* above.  **Monetised Benefits (workers):** wage and paid holiday increases for agency workers.  **Monetised Benefits (employers):** none quantified.  **Monetised Benefits (government):** increased government revenue as a result increased tax and national insurance contributions.  **Non-monetised benefits (workers):** increased security for agency workers transitioning to permanent contracts (a predicted effect of the regulations); improved working conditions for all agency workers (improvements in breaks and rest periods, access to child care facilities, provision of transport services, right to be informed of vacancies, paid holiday, improved access to training, payment for overtime, shift allowances, unsocial hours premiums/bonuses, bonuses related to personal and individual performance); improved conditions for pregnant workers (such as the right to be offered alternative work or hours if there is a health and safety risk, the right to be suspended on full pay if alternative arrangements cannot be put in place, and paid time off for ante-natal appointments); see also non-reported benefits above.  **Non-monetised benefits (employers):** productivity benefits of increased worker access to training; greater ease in filling vacancies; see also non-reported benefits above.  **Non-monetised benefits (governments):** see non-reported benefits above. |
| The Road Transport (Working Time) Regulations 2005 (2002/15/EC) (Department for Transport, DfT) (Department for Transport, 2002) | **Material cost-relevant assumptions (based on weak or conflicting evidence):** Difficulties were reported in estimating the number of workers that would be covered by the regulations (partly because their activities take place in different sectors of the economy). For drivers of vehicles over 3.5 tonnes,two sources of data were available: a survey by the Industry Training Council (ITC) and the Labour Force Survey (LFS). The ITC survey had estimated that around 550,000 heavy good vehicle (HGV) licence holders used their licences vocationally. However, neither its coverage nor the degree to which it represented all activities covered by the proposed regulations were clear. Equally, although the LFS identified employment by industry and occupation, these did not match exactly the definitions in the regulations (it recorded drivers of HGVs, over 7.5 tonnes, 319,000, and those of smaller goods vehicles, 192,000, but not those of goods vehicles between 3.5 and 7.5 tonnes). The DfT, therefore, estimated a figure of 470,000 employee drivers likely to be covered by the regulations (using the ITC survey and data on the number of vehicles to justify the reasonableness of its assumption). Likewise, LFS data indicated that there were 121,000 bus and coach drivers, but there was no data indicating how many of them would be affected by the regulations. Taking into account that local bus services are not subject to EU drivers’ hours rules, the impact assessment simply assumed that half (60,000) would be affected.  The LFS had also identified about 20,000 drivers who either had second jobs in another occupation or were drivers in their second occupations. The extra hours concerned may, under certain circumstances, have counted against the hours limits in the regulations. The DfT reported that it did not know how many hours were being performed in these second jobs, nor whether they were relevant to the regulations.  The impact assessment simply assumed that 50% of excess hours would be covered by drivers working longer, or by employers reallocating non-driving duties to other staff, leaving the remaining 50% to come from new recruits.  Estimates relating to the degree to which wage rates would have to be increased to attract the extra hours created by the regulations (either from existing workers or from new workers) were undermined by weak data. A large US study had failed to find a definitive answer, concluding that the labour market was elastic (so the financial burden of restricting hours would fall mainly on drivers, as employers would only have to increase wages at the margins to cover the extra hours). The impact assessment noted that the US data would not necessarily apply to the UK, but concluded that in the absence of any other relevant labour market evidence, it at least suggested that both drivers and employers would share the burden. A survey of employers (see adjacent cell) suggested that employers would absorb most (but not all) of the burden. On the back of the US data, however, the impact assessment split the costs 50:50 between employers and drivers.  The impact assessment noted that it was “not clear” whether the additional drivers employed in the wake of the regulations would use existing or new vehicles (see adjacent cell for how this was resolved). The basis of its assumptions for the level of demand for additional vehicles following the introduction of the regulations (see adjacent cell) is unclear.  **Dynamic effects:** dynamic effects reported and integrated into estimates of costs.  **Assumptions relevant to the rate of compliance:** full compliance assumed. | **Summary of sources:** Official data sources (the LFS and New Earnings Survey). Business data included: findings of a survey circulated to members of The Freight Transport Association, Road Haulage Association and the British Association of Removers by a group of key stakeholders (Impact Group) who had been invited by the DfT to provide their views on the assumptions, methodology, costs, and benefits of an earlier impact assessment (designed to “plug some gaps in their knowledge”); a survey by the Industry Training Council (see adjacent cell); estimates (via the public consultation) by several hauliers on how much the regulation would cost their firms; detailed figures (supplied via the public consultation) by the Quarry Products Association about the impact on their members; detailed commentary (via the public consultation) on the figures in the pre-consultation impact assessment by the Freight Transport Association consultation impact assessment; “anecdotal evidence” and estimates from “the road haulage industry” concerning the labour market for drivers.  **Summary of business views:** responses to Impact Group survey indicated DfT cost estimates were conservative; Freight Transport Association’s analysis suggested that DfT had under-estimated the cost on industry by between 15 and 65%.  **Effect on estimates:** Limited weight was attached to the Impact Group survey where it appeared to contradict other evidence and estimates were adjusted downwards accordingly. For instance, the survey suggested that costs could be shared between employers and drivers 60:40, but the impact assessment assumed at 50:50 split (see adjacent cell for further commentary). Similarly, the survey reported that 45% of operators felt they would require more equipment or vehicles following the introduction of the regulations. This was described as “a little pessimistic” as most companies had a financial incentive to ensure additional drivers used existing vehicles wherever possible. Nonetheless, it accepted that there may be occasions when additional vehicles were necessary and included an “illustrative” cost of between £0-35m for additional equipment (which assumed an extra 12,600 vehicles would be required, each leased for 6 months (for the busiest periods) at £500 per month.  In other cases, the impact assessment preferred the LFS (despite its weaknesses) to industry data (see the discussion of the Industry Training Council survey in the adjacent cell).  Both the anecdotal evidence and evidence from the road haulage industry on the labour market indicated a shortage of drivers, which was potentially relevant to the effect of the regulation on wages. The road haulage industry estimated that there was a shortage of drivers of around 50,000 (about 10% of the existing workforce). However, the impact assessment noted that was “not clear how this shortage manifests itself” (e.g. whether freight is not moved, or is delayed or moved less efficiently), or “how the 50,000 figure is derived”. By assuming the observed wage rate to be the equilibrium wage rate (i.e. the wage rate equates supply and demand) the Department appears to have discounted this evidence. | **Reported benefits (workers):** fewer accidents in the workplace and on the highway; less sick leave and improved driver longevity; improved driver recruitment and retention; improved work-life balance.  **Reported benefits (employers):** improved productivity as a result of better relationship in the workplace (leading to improvements in workforce commitment, morale and performance); increased productivity due to less fatigue; efficiency gains resulting from reorganisation of work practices (e.g. a reduction in non-driving activities for drivers, warehouse staff at a lower rate of pay performing duties, such as cleaning vehicles, previously undertaken by drivers); improved (firm and economy wide) productivity as a result of fewer accidents in the workplace and on the highway; improved productivity as a result of less sick leave and improved driver longevity; improved driver recruitment and retention.  **Reported benefits (government):** reduced health service costs (see reported benefits to workers and employers above); reduced emergency service costs as a result of fewer accidents on the highway (implied, but not made explicit).  **Non-reported benefits (workers):** benefits of potential reduction of accidents not disaggregated; see also disputed benefits below.  **Non-reported benefits (employer):** benefits of potential reduction of accidents not disaggregated; increased turnover for vehicle leasing businesses; see also disputed benefits below.  **Non-reported benefits (government):** benefits of potential reduction of accidents not disaggregated; reduced health service costs caused by improvements in health (but see disputed benefits below)  **Disputed benefits (in impact assessment):** The existence of “some evidence” of working and driving long hours being detrimental to health and driver longevity was noted. It was also noted that a higher incidence of sick leave, back problems and cardiovascular diseases amongst drivers, was associated with long working hours in the cab of a vehicle and that the DfT had received “anecdotal evidence from older drivers, who believe their health is being affected by poor working conditions and the long hours they are forced to work.” However, the impact assessment noted that “the extent to which these health problems can be attributed to the stresses of driving and current working conditions [was] a moot point” and that, “other factors, such smoking, lack of exercise, poor diet, etc. may also contribute to poor health.”  **Disputed benefits (by employers):** The Impact Group survey (see adjacent cell) found that most employers thought “there were would no benefits for them at all”, although a minority that it might lead to a modest improvement in long term recruitment and retention of drivers.  **Monetised benefits (combined):** reduction in road accidents (not disaggregated).  **Non-monetised benefits (general):** difficulties in quantifying the benefits of the regulations reported.  **Non-monetised benefits (workers):** earnings related benefits associated with fewer accidents in the workplace, reduced sick leave, changing jobs (as a consequence of improved driver longevity), higher pay in the sector; lower retraining costs; reduced pain and suffering associated with improvements in health; reduced health costs associated with improvements in health; improved work-life balance.  **Non-monetised benefits (employers):** increased productivity of workers due to improvements in health (but see disputed benefits), reduced accidents in the workplace, reduced fatigue, reduced sick leave, improved driver longevity improved driver recruitment; reduced administration costs relating to reduced retraining (as a result of reduced sick leave, improved driver retention, and improved driver longevity); efficiency gains resulting from reorganisation of work practices; increased turnover for vehicle leasing businesses.  **Non-monetised benefits (government):** reduced health service costs due to improvements in health; increased revenue as a result of increased productivity (see *non-monetised benefits (employers)*). |
| The Road Transport (Working Time) (Amendment) Regulations 2012 (2002/15/EC) (Department for Transport, DfT) [(Department for Transport, 2011](#_ENREF_3)) | **Material cost-relevant assumptions (based on weak or conflicting evidence):** Difficulties were noted in determining the number of self-employed workers covered (as the definition of self-employed in the regulations differed from the definition used in the Labour Force Survey (LFS)), earnings data for self-employed drivers (earnings data for employed drivers were used).  **Dynamic effects:** some dynamic effects were considered and integrated into estimates  **Assumptions relevant to the rate of compliance:** full compliance assumed. | **Summary of sources:** Business data (informal discussions). Official data sources (other Member States, LFS, ASHE, previous impact assessments).  **Summary of business views:** Industry trade associations had indicated that the industry was extremely competitive and, therefore, they did not expect significant movement in pay as a result of hours being freed by self-employed drivers then working over 48 hours a week (if the regulations had led to wage increases, this would have increased the estimates for business costs).  **Effect on impact assessment cost estimates:** The DfT provided supporting evidence for the above by citing ONS data showing that nearly 5,500 HGV drivers were claiming Job Seekers Allowance. | **Reported Benefits (workers):** increases in road safety due to limits on working time; improved balance between home and work life due to required limits on working time; increased uptake of work and increased earnings for drivers working under 48 hours per week on average; increase in employment opportunities (as a consequence of existing workers having to work fewer hours).  **Reported benefits (employers):** improved productivity and driver health; reduced less sick leave; improved industry image, recruitment and retention due to more attractive working conditions; increase in revenue for firms employing drivers (who may see more business); reduced workplace accidents.  **Reported benefits (government):** reduced health and emergency service costs associated with increases in road safety  **Non-reported benefits (workers):** none.  **Non-reported benefits (employers):** none.  **Non-reported benefits (government):** increase in revenue as a result of reduction in lost output.  **Disputed benefits (in impact assessment):** On the issue of quantifying benefits associated with reduced fatigue, the impact assessment referred to a Department of Transport sponsored review of the research [(Jackson *et al.*, 2011](#_ENREF_16)), which did “not provide any significant information on which to base a calculation of the benefits that may arise as a result of the reduction of working hours for some drivers.” [(Department for Transport, 2011](#_ENREF_3)) The impact assessment noted that this was because existing research had been unable to disaggregate the various causes of fatigue (such as age, individual susceptibility to sleep loss, lifestyle factors such as new parenthood, personality and mood can all influence fatigue).  **Disputed benefits (by employers):** The impact assessment also relied heavily on the main trade associations to calculate potential road safety benefits. It reported that, “industry [had] clearly indicated that the inclusion of self-employed drivers [was] unlikely to generate any quantifiable benefits in terms of road safety” [(Department for Transport, 2011](#_ENREF_3)) partly because “other life-style factors”, rather than fatigue caused by working above the proposed limits, were likely to have a greater impact. The impact assessment failed to support this finding with additional evidence (although it referred to “additional analysis of research into fatigue), and, instead, concluded that there would be no safety benefits in both its low and best case scenario.  **Monetised benefits (workers):** see above  **Monetised benefits (employers):** see above  **Monetised benefits (government):** see above  **Non-Monetised benefits (workers):** increases in road safety due to limits on working time; improved productivity and driver health, less sick leave; improved balance between home and work life due to required limits on working time; uptake of work and increased earnings for drivers working under 48 hours per week on average; increase in employment opportunities (as a consequence of existing workers having to work fewer hours); increases in revenue for firms employing drivers (who may see more business).  **Non-Monetised benefits (employers):** productivity (and administrative cost-related) benefits associated with increases in road safety due to limits on working time.  **Non-Monetised benefits (government):** reduced emergency service costs associated with improvements in road safety due to limits on working time; reduced health service costs associated with increases in road safety due to limits on working time. |
| The Control of Vibration at Work Regulations 2005 (2002/44/EC) (Health and Safety Executive, HSE) [(Health and Safety Executive, 2005a](#_ENREF_10)) | **Material cost-relevant assumptions (based on weak or conflicting evidence):** The impact assessment noted a number of uncertainties. For vibration transmitted to the hand-arm (hand-arm vibration syndrome, HAVS), the 1995 Self-Reported Work-Related Illness (SWI) survey gave an estimate of 20,400 workers suffering from Vibration White Finger (VWF) (the most common effect of HAV) which was noted as a “very low estimate”. This contrasted with an estimate in the MRC report outlined in Table 2 [(Palmer *et al.*, 1999](#_ENREF_17)) of 301,400 of cases serious enough to merit government compensation. The impact assessment noted that there were “many more (possibly hundreds of thousands)” with a less severe condition. Using evidence from the SWI, but drawing on the MRC report’s estimate of 301,400, the HSE assumed that: 21.5% of workers took time off at an average of 25 days each; no workers left their job; no workers left the labour force. These assumptions were made because of deficiencies in the SWI data and despite a recognition that some workers suffering from VWF had changed jobs to avoid exposure.  The uncertainties for estimates for HAV related effects other than VWF were greater. The MRC report had noted that the risk of sensorineural symptoms for a particular exposure level was similar to that of VWF, but the HSE was not in a position to determine the extent to which the two groups overlapped, which meant that the total number of people with HAVS was not available. Likewise the SWI reported 243,000 people suffering from work-related musculoskeletal disorders relating to the hand, arm, or shoulder, but provided no evidence on how many of these cases were due to HAV. The HSE, therefore, assumed that the number of sensorineural complaints and musculoskeletal disorders caused by HAV were, respectively, 50% of VWF sufferers and 10% of the SWI figures, to arrive at an extra 175,000 individuals who would potentially benefit from the regulations. [(Health and Safety Executive, 2005a](#_ENREF_10)) These assumptions (described as “highly uncertain” in the impact assessment) were made on the back of other assumptions in the MRC report, which noted missing data in relation to 1,103,800 employees exposed to vibration. For these employees the level of exposure was unknown, primarily due to the complexity of exposures. The impact assessment split these cases equally between workers exposed at the two higher levels of exposure.  On the issue of the costs involved in carrying out additional assessments to workers at risk of HAV related problems, the HSE needed to adjust its figures to take account of the fact that an assessment was only required: if employers were unsure about the risks from exposure to vibration after reading the guidance; that employers would undertake collective rather than individual assessments in many cases; that workers exposed to higher levels of vibration were already receiving assessments under existing HSE guidance. On the back of these observations, the HSE simply assumed a series of percentages for at risk workers exposed to different levels of vibration who would receive an assessment (to arrive at an overall number of workers who would receive assessments).  Employers would be required by the regulations to limit the length of time for which tools were used where vibration control had not reduced worker exposure below a certain threshold. It was noted that this would require new ways of working to be developed, “at unquantifiable cost”, that the impact of the provision would depend on how far machinery makers could reduce vibration or whether new ways of working could be developed, and that achieving sufficient reduction through improved machinery design would take several years for many types of machines. The impact assessment then assumed that exposure time would be reduced for 10-15% of employees exposed above a specific limit (5 m/s2 A(8)),  For vibration transmitted to the whole body (WBV) the uncertainties of assumptions made were arguably greater, not least because the relative importance of WBV (which primarily occurs in drivers and some static industrial machines) as a cause of back pain was unclear (“it is difficult to estimate the number of cases of back pain attributable to WBV). The impact assessment drew on the same MRC report outlined above which reported missing data in relation to 1,865,300 employees exposed to vibration. The impact assessment assumed that that 10% of these fell into the highest vibration category, with a further 90% in the category below this. It also drew on HSE estimates of back pain potentially caused (range 9,000 to 21,000) and made worse (range 13,500 to 31,500) by WBV. The method used to arrive at these estimates was unclear in the impact assessment but used (in conjunction with evidence from SWI data) to calculate the number of sufferers who took time off, left their jobs, and left the labour force together.  A considerable number of other assumptions were made. On a case-by-case basis, these are likely to have a less significant effect on overall estimates. Cumulatively, however, they may be more significant (to keep the volume of the supplementary materials manageable, they have not been reproduced here).  **Dynamic effects:** not relevant  **Assumptions relevant to the rate of compliance:** full compliance assumed. | **Summary of sources:** Official data sources included the SWI survey (to estimate workers suffering from VWF and its effect on work, see adjacent cell). Independent research (an MRC report, used to estimate workers suffering from VWF and its effect on work, see adjacent cell). Business consultation responses (unspecified, but see *effect on estimates* below).  **Summary of business views:** Not specified.  **Effect on estimates:** Industry responses to the consultation appear to have informed estimates of the percentage of assessments carried out by consultants (as opposed to employers), the length of time for assessments for workers with low exposures, the percentage of workers with high exposures who would move directly to control action. It is not clear whether they were verified. | **Reported benefits (workers):** reduction in ill health (including pain, grief and suffering); reduction in lost/reduced earnings from time-off work arising from ill health; reduction in lost/earnings from leaving job arising from ill health.  **Reported benefits (business)** employers developing alternative methods for particular tasks (which avoid the use of hand-held vibrating tools and may increase productivity); employers replacing high vibration tools with those that reduce exposure (which may increase productivity, stimulate technological innovation, and increase sales for new tools); reductions in time lost and other work and administrative related inefficiencies due to ill health and impaired performance (which may increase productivity); reduction in compensation claims.  **Reported benefits (government)**: “wider costs to society” (such as extra administration, medical costs, and loss of future output)  **Non-reported benefits (workers):** none.  **Non-reported benefits (business):** several costs to affected businesses, which, in effect, produce benefits to other businesses and the broader economy, such as an increase in the use of specialist consultants, and improvements in and increases in sales of vehicles with seats with built in suspension, were noted as costs, but not reported as benefits to affected businesses.  **Non-reported benefits (government):** increased revenue (arising from salaries of consultants, increased turnover of replacement for tools and vehicles); reduced social security costs.  **Disputed benefits:** The total potential saving to society from eradicating HAVS and WBV-related illness (a large part of which was an estimate of the monetary value of the pain and suffering to affected individuals, informed by standard estimates to assess Quality Adjusted Life Years) were also estimated in risk assessment sections. However, the impact assessment noted that it was not possible to reliably estimate the cost of reducing exposure and that most of the costs calculated did not represent expenditure on reducing exposure and would therefore have little direct impact on benefits.  **Monetised Benefits (to workers):** costs to individuals (e.g. for pain and suffering, using figures based on HSE monetary values for different levels of pain, grief and suffering, and taking time off).  **Monetised Benefits (to business):** loss of future output (ill-defined, see below); reduced administration (ill-defined, see below)); see also disputed benefits.  **Monetised Benefits (to government):** (for HAVS) “wider costs to society” (such as extra administration, medical costs, and loss of future output) calculated by applying the ratio of the total costs of work-related ill health to society to that relating to individuals to their estimate of total costs of HAV illness to individuals (and then assuming that at most 10-20% of the potential savings might be realised as a result of the actions costed in the impact assessment) (see also disputed benefits); (for WBV) “wider costs to society” (such as extra administration, medical costs and loss of future output) calculated by applying the ratio of the total costs of work-related ill health to society to that relating to individuals only to the HSE’s estimate of the total costs of WBV illness (and then assuming that 20% of the potential savings might be realised as a result of the actions costed in the impact assessment).  **Non-monetised benefits (general):** (for HAVS)costs associated with the regulations estimated to be between 0.8 and 1.1 times the benefits (in present value terms and over a ten-year period), however, it was noted that this was likely to underestimate total benefits, since the actual number of people affected by work-related sensorineural complaints and musculoskeletal disorders caused by HAVS was not known and that there may be workers who left their job as a result of exposure to HAVS (assumptions and estimates were not made in respect of this) - reported, as a result, that unquantified benefits “may be substantial”.  **Non-monetised benefits (for workers):** reduction in earnings and retraining costs arising from workers having to leave job or take early retirement (it was noted that if further evidence were to come to light, making it possible to estimate the loss of income associated with workers moving to lower-paid jobs, then the “benefits of preventing these cases [would] increase significantly); see also non-reported and disputed benefits.  **Non-monetised benefits (for employers):** employers developing alternative methods for particular tasks (which avoid the use of hand-held vibrating tools and may increase productivity) (for HAVS); employers replacing high vibration tools with those that reduce exposure (which may increase productivity, stimulate technological innovation, and increase sales for new tools) (for HAVS); reductions in time lost and other work and administrative related inefficiencies due to ill health and impaired performance (which may increase productivity); reduction in compensation claims (for HAVS). |
| The Working Time (Amendment) Regulations 2002 (94/33/EC and  2003/88/EC) (Department of Trade and Industry, DTI) [(Department of Trade and Industry, 2002](#_ENREF_5)) | **Material cost-relevant assumptions (based on weak or conflicting evidence):** Although the Labour Force Survey (LFS) provided reasonably robust data for the number of 16 and 17 year-olds working at night and the number of hours they worked, but detailed information on the actual hours they worked at night was not available. An assumption was made that half of these hours were worked at night.  The DTI also reported difficulties in estimating the number of workers affected from the changes to the calculation of night work hours and associated costs due to the novelty of the regulations and deficiencies of LFS data. The impact assessment used the number of usual night workers who reported “usually” working over 48 hours a week in the LFS. Further, it was not possible to estimate the amount of paid overtime guaranteed to workers in their employment contract from the LFS. The DTI assumed that 10% of paid over time was guaranteed overtime. The estimates did not exclude workers in excluded sectors of activity nor the armed forces, police, other civil protection services (likely to overestimate the actual number of workers affected), but based its calculations on employees, rather than workers as per the LFS (likely to underestimate the numbers affected).  **Dynamic effects:** A number of potential dynamic effects (with varying effects on estimates) were noted but not incorporated into estimated costs (some work being absorbed within the existing workforce, the cost of older workers rising as a result of increased demand).  **Assumptions relevant to the rate of compliance:** full compliance assumed. | **Summary of sources:** Official sources included: the LFS (to calculate the number of 16 and 17-year-olds working more than 40 hours a week); the Office of National Statistics Earnings Survey (to calculate the increased wage costs employers would incur by shifting work onto marginally older workers). Businesses were not a major source of data.  **Summary of business views:** not relevant.  **Effect on estimates:** not relevant. | **Reported benefits (workers):** improvement in work-life balance; improvement in their access to education and vocational training; increase in their opportunities for personal development; improvements in their health, safety, and physical development; increase hours of paid work for older workers: increase hours of paid work for older workers.  **Reported benefits (employers):** increase in extent to which young people were alert at work (and, therefore, their productivity); productivity benefits (as a consequence of replacing 16-17 year-old workers with 18-19 year-old workers) greater efficiencies (to business) as a result of freed hours being absorbed within the existing workforce.  **Reported benefits (government):** reduced health service costs; reduced welfare costs (in so far as young workers take advance of vocational training).  **Non-reported benefits (workers):** none.  **Non-reported benefits (employers):** productivity benefits of improved worker health and safety; improvements in productivity that may accrue where young workers take advantage of vocational training and education; improvements in productivity that may accrue where young workers take advantage of vocational training and education.  **Non-reported benefits (government):** none.  **Non-monetised benefits (workers):** improvement in work-life balance of younger workers; improvement in their access to education and vocational training; increase in their opportunities for personal development; improvements in their health, safety, and physical development; increase hours of paid work for older workers: increase hours of paid work for older workers.  **Non-monetised benefits (employers):** increase in extent to which young people were alert at work (and, therefore, their productivity); productivity benefits of improved worker health and safety; improvements in productivity that may accrue where young workers take advantage of vocational training and education; greater efficiencies (to business) as a result of freed hours being absorbed within the existing workforce greater efficiencies (to business) as a result of freed hours being absorbed within the existing workforce.  **Non-monetised benefits (governments):** increased revenue (as result of increase in hours of pay for older workers at a higher rate of pay); reduced health service costs; reduce welfare costs (in so far as young workers take advance of vocational training). |
| The Control of Noise at Work Regulations 2005 (2003/10/EC) (Health and Safety Executive, HSE) [(Health and Safety Executive, 2005b](#_ENREF_11)) | **Material cost-relevant assumptions (based on weak or conflicting evidence):** Information on costs to business, drew partly on HSE contracted research by the Institute of Employment Studies which was based on a postal survey of employers, a series of follow-up interviews and small number of in-depth case studies). The case studies, which were partly designed to validate the data collected in the survey, were largely unsuccessful. In no cases were there data related to absence or turnover that could be linked to noise at work and the researchers struggled to organise discussion groups with employees [(Honey *et al.*, 1996](#_ENREF_15)).  In situations where daily noise exposure varies considerably, the impact assessment recommended that the regulations allowed for exposure to be averaged over a week, as long as the weekly noise exposure did not exceed the exposure limit value and measures were taken to reduce risks to a minimum. It was reported that there was no indication of how many firms might apply for weekly averaging.  Estimating familiarisation costs required an estimate of the number of firms and other organisations that will be affected by the regulations. The HSE only had access to “reliable information” relating to the potential number of affected employees rather than employers. The impact assessment noted that this made estimation of familiarisation costs “very uncertain”. To derive an estimate, the HSE assumed that between 30% and 50% of employees in potentially “noisy” establishments were exposed to noise exceeding 80 dB(A). It used statistics provided by DTI’s Small Business Service, to estimate the average number of businesses in sectors associated with high levels of noise (between 17 and 18 employees) and from this figure estimated that the total number of affected firms was between 240,000 and 430,000. Familiarisation was then assumed to take an hour.  The regulations required an assessment to be made were there was a likely risk to health. The impact assessment assumed that a “rough” assessment would be carried out for 80% of employees, and that outside consultants would be brought in for the remaining 20% of cases.  Existing noise at work regulations already required assessments and record keeping at noise levels about 85 dB(A). However, HSE contracted research (see above) had found that only 50% of employers with “noisy workplaces” did so. It was then assumed that 30% of employers not carrying out assessments would now incur costs and that of this 30%, two fifths of assessments would indicate the need for measurement, which together with data recording would take on average 1 ¼ hours. Assumptions regarding the proportion of assessments carried out by consultants were the same as above.  Existing noise at work regulations already imposed a duty to inform workers exposed above 85 dB(A) about risks to hearing. However, HSE contracted research (see above) had found that 33% of employers with “noisy workplaces” were not carrying out training. It was then assumed that 20% of employers not carrying out training now would now incur costs.  At 85 dB(A) employers would have to establish a programme of control measures and keep a record to show to safety representatives and workers. Where the noise level reaches 90 dB(A), existing regulations already required employers to reduce noise as far as reasonably practicable. The impact assessment took programmes affecting 50 employees as an average and then assumed that it would take three days’ work by a technician to prepare the programme, 2 hours of a manager’s time to approve it, half a day and 1 hour respectively per year thereafter keeping it up to date, an entirely new programme would be developed every 5 years, and that outside specialists would be hired by a third of firms, at £60 per hour for 3 days. In addition, the impact assessment deducted half of the initial and continuing costs for the estimated 438,000 workers above 90 dB(A) to take account of existing requirements and to reflect the fact that HSE contracted research (see above) ad reported that, overall, despite having noisy environments, relatively few respondents had taken preventive actions (between 37 and 48% of the weighted respondents had indicated that they had not carried out any changes to reduce noise in noisy establishments).  The new regulations required noise reduction programmes to reduce level to 85 dB(A) rather than the current 90dB(A). The impact reported that costs were “uncertain as noise would be reduced to an undefined minimum.” HSE contracted research (see above) had found that although most “good practice” organisations had a purchasing policy which included noise levels in specifications, there was “some evidence” that these policies were “flexible and that noisier plant was purchased.” The impact estimates then assumed that: employers would reduce noise level for 15% of employees in the first year, 30% after 10 years, and 75% after 40 years; that the average cost to reduce noise per worker would be between £200 and £800 (which were lower estimates than in a cost benefit assessment carried out in 1995 to reflect lower figures found in HSE contracted research, which, in turn, might be “indicative of incomplete compliance”); that recurring costs (e.g. maintenance) would be 20% of initial costs.  The regulations required hearing protection to be made available to workers when exposed to noise level between 80 and 85 dB(A). Above 85 dB(A) all workers would have to wear protection. Under the existing regulations, employers were required to provide hearing protection to all employees exposed to noise levels of 90 dB(A). HSE contracted research (see above) reported that 86% of establishments with employees exposed above 85 dB(A) already provided hearing protection. The impact assessment assumed that: 30% of workers exposed between80 dB(A) and 90 dB(a) would be provided with hearing protection; that 25% of workers exposed to noise levels between 85 dB(A) and 90 dB(A) would be provided with hearing protection (and that the rest were already wearing them); wear rates above 90 dB(A) were 90% and that the remaining 10% would be supplied with equipment; that employees exposed to noise levels above 110 dB(A) would be provided with better quality protection.  The regulations required employers to delimit areas where workers are likely to be expose to noise levels exceeding 85 dB(A) (as opposed to 90 dB(A) under the existing regulations) by marking them with signs and restricting access. The impact assessment assumed that every company where these conditions were met would spend an average of £200, one-off costs, to delimit noisy areas and that there were on average 50 employees per firm.  The regulation required employers to provide audiometric (hearing) tests if a worker is at risk of hearing loss following a noise assessment. HSE contracted research (see above) found that just under 30% of firms provided audiometry in establishments with noise levels over 85dB(A), although the level of provision varied substantially between firms of different sizes. The impact assessment weighted the existing profile of audiometry provision according to the proportion of workers in small, medium or large firms in each of the top five industries for noise exposure. This indicated that about 45% of exposed workers received audiometric testing. It then used the prior assumption (see above) that 70% of employers were carrying out noise exposure assessments now, and then further assumed that, of workers receiving noise exposure assessments, about two-thirds would go on to receive hearing tests. In addition, it assumed that assessments would take place once every 5 years, and that hearing tests would take place around twice as often – once every 3 years.  **Dynamic effects:** some potential dynamic effects (purchasing policies) were incorporated into estimated costs.  **Assumptions relevant to the rate of compliance:** evidence-based assumptions on the rate of compliance integrated into cost estimates. | **Summary of sources:** Official sources included: HSE cost benefit assessments of previous European Commission proposals; HSE contracted research on occupational hearing loss from low-level noise; HSE contracted work on the costs and benefits of noise at work regulations undertaken by the Institute of Employment Studies; the International Organisation for Standardisation; the New Earnings Survey; the Small Business Service statistics. Businesses were the primary source of data for HSE contracted research (see above and adjacent cell).  **Summary of business views:** See summary in the adjacent cell relating to HSE contracted research by the Institute of Employment Studies. The impact assessment did not report general business responses to the public consultation (although some responses from small business were reported).  **Effect on estimates:** Business responses to HSE contracted research were used as a basis for several material cost-relevant assumptions (see adjacent cell). The data reported by employers do not appear to have been verified [(Honey *et al.*, 1996](#_ENREF_15)). | **Reported Benefits (workers):** reduction in hearing loss; reduction in other problems related to noise exposure (e.g. tinnitus); reduction in loss of earnings associated with health problems related to noise exposure in so far as captured in the Quality of Life Years (QALY) approach to measuring benefits (see *monetised benefits (workers)* below); reduction in pain and suffering; reduction in restrictions to social activities.  **Reported Benefits (employers):** reductions in productivity losses (reductions in discomfort and annoyance and increases in efficiency due to working in a quieter environment).  **Reported Benefits (government):** reduced health service related costs (hearing aids, cost of appointments, etc.); Department of Social Security administration costs (as fewer workers claim disability benefit).  **Non-reported benefits (workers):** reduction in loss of earnings (as a result of having to leave the work force or being restricted to certain work activities) associated with problems related to noise exposure (tinnitus, hearing loss) in so far as not captured in the QALY approach to measuring benefits (see *monetised benefits (workers)* below).  **Non-reported benefits (employers):** reduction in productivity losses associated with noise-related health problems (e.g. loss of hearing, tinnitus); increased administration and training associated with higher employee turnover arising from noise-related health problems.  **Non-reported benefits (government):** reduction in revenue loses as a result of reduced employee earnings and lower productivity.  **Disputed benefits:** none disputed.  **Monetised benefits (workers):** QALY approach (using the road safety estimate of the value of preventing a fatality) taken for different levels of hearing loss (which includes loss of output, an allowance for pain and suffering, various other items under “welfare loss” suggest as whether there is a need for hospital treatment or restrictions to certain social and work activities).  **Monetised benefits (employers):** reductions in productivity losses (reductions in discomfort and annoyance and increases in efficiency due to working in a quieter environment); reduction in productivity losses associated with noise-related health problems (e.g. loss of hearing, tinnitus); increased administration and training associated with higher employee turnover arising from noise-related health problems.  **Monetised benefits (government):** reduction in health service costs.  **Non-monetised benefits (general):** “great uncertainty in quantifying benefits” reported; estimated benefits reported to be an understatement of benefits likely to be realised.  **Non-monetised benefits (workers):** noise related problems (e.g. tinnitus) other than reductions in hearing loss; hearing loss over the longer term (compounded by the fact that the HSE reported having little information on how hearing loss develops before forty years of exposure); benefits also estimated in terms of numbers experiencing more than 50 dB hearing loss (in practice, loss of hearing between 45dB and 50dB would also require NHS treatment, but information was not available on people in this category).  **Non-monetised benefits (employers):**reduction in productivity losses associated with noise-related health problems (e.g. loss of hearing, tinnitus); increased administration and training associated with higher employee turnover arising from noise-related health problems; reduction in productivity losses associated with non-monetised benefits to workers (see above); reduction in productivity losses associated with discomfort and annoyance of working in a noisy working environment.  **Non-monetised benefits (government):** reduction in lost revenue as a result of lost pay; reduction in Department of Social Security administration costs (as fewer workers claim disability benefit); reduction in lost revenue as a result of lower output; some reduction in health costs (see *non-monestised benefits to workers*). |
| The Work at Height Regulations 2005 (2001/45/EC) (Health and Safety Executive, HSE) (Health and Safety Executive, 2005c) | **Material cost-relevant assumptions (based on weak or conflicting evidence):** The impact assessment noted that it was “extremely difficult” to estimate the number of people working at height because of the large number of sectors in which people worked at height. It relied on estimates by the Ladder Stabiliser Manufacturing Association and Industrial Rope Access Trade Association (IRATA) that between 2.5 to 3 million people used ladders as an essential requirement of their work, and approximately 15,000 worked using rope access.  Its costings also relied on estimates of the relative proportion of businesses that would purchase tower scaffolds and mobile elevated working platforms (rather than hiring them), which, whilst not unreasonable, were based on nothing more than the observation that businesses more likely to hire than purchase were likely to be smaller and, therefore, less likely to afford the one-off cost of purchasing.  Speculative assumptions were also made about: the number of workers who would, in future, use mobile elevated working platforms, rather than ladders; the proportion of ladder users switching to alternative means of access, purchasing stabilising devices, and requiring ladder safety training following the regulations. In addition, the impact assessment reported that it was not possible to estimate the effect of the regulations on either the use of nets and airbags or the length of time taken to set up and take down before and after tasks performed at height (because of insufficient data).  **Dynamic effects:** several potential dynamic effects (see above) were incorporated into estimated costs.  **Assumptions relevant to the rate of compliance:** the fact that the ultimate cost of the regulations would depend on the proportion of business already following good practice (which was unknown) was noted; full compliance with the regulations (lower levels of compliance, a high probability, would reduce the costs and benefits associated with the regulations considerably) was assumed. | **Summary of sources:** Official data sources included: the HSE; the Small Business Service’s statistics on small and medium sized enterprises; the New Earnings Survey). Business consultation responses and feedback for: the number of workers likely to be covered by the regulations; time taken for familiarisation; number of workers requiring repeat training; percentage of self-employed workers/businesses that would purchase ladder stabilising devices following the introduction of the regulations; cost of tower scaffold training; the average purchasing cost of scaffold; the average cost of hiring scaffold; the price of installing an airbag; the cost per square metre for netting, industrial sheds, and metal decking; the number of workers who would switch from using ladders to using alternative means of access; the cost of dual training courses for mobile elevated work platforms; the proportion of businesses likely to purchase, rather than hire mobile elevated work platforms and tower scaffolding; the number of existing mobile elevated work platforms, their purchase and hire cost.  **Summary of business views:** See below and adjacent cell.  **Effect on estimates:** The assumption of the number of workers likely to be covered by the regulations were based (without apparent verification) on estimates of Ladder Stabiliser Manufacturing Association and IRATA (see adjacent cell).  Estimates of number of firms/self-employed workers that would purchase ladder stabilising devices following the introduction of the regulations were based on representations (without apparent verification) from the National Federation of Master Window Cleaners and “unnamed industry sources”.  “Industry sources” were used for estimates (without apparent verification) on: the average cost of tower scaffold training; the average purchasing cost of scaffold; the average cost of hiring scaffold; the price of installing an airbag; the cost per square metre for netting, industrial sheds, and metal decking; the number of workers who would switch from using ladders to using alternative means of access; the cost of dual training courses for mobile elevated work platforms; the proportion of businesses likely to purchase, rather than hire mobile elevated work platforms and tower scaffolding.  Data from the International Powered Access Federation were used for estimates (without apparent verification) of the number of existing mobile elevated work platforms, their purchase and hire cost.  Responses by industry actors to the consultation produced several changes (with verification) to cost estimates, relating to: the number of businesses required to familiarise themselves with the proposed regulations (increased from between 3% and 5% to between 75% and 85%); the length of time required for construction businesses to familiarise themselves with the regulations (increased from a quarter of an hour to 2 hoursfor small constructions businesses, 2 hours to 4 hours for large construction businesses, 1.5 hours to 2 hours for micro sized businesses, and 30 minutes to 2 hours for the self-employed); the proportion of workers requiring repeat training (increased from 0.05% to between 2 and 4%). | **Reported benefits (workers):** pain; grief; suffering; loss of income.  **Reported benefits (employers):** lost output; equipment damage; disruption.  **Reported benefits (government):** reduced medical costs; reduced welfare costs (social security and compensation payments).  **Non-reported benefits (workers):** not clear whether reduced medical costs accounted for.  **Non-reported benefits (employers):** benefits to businesses involved in the manufacture and sale of ladders, elevated working platforms, etc.; see also comments under non-monetised benefits.  **Non-reported benefits (government):** loss of revenue as a result of lower output; revenue increases (VAT) arising from increased sale of ladders, elevated working platforms, etc.  **Monetised benefits (workers):** pain, grief, suffering, loss of income.  **Monetised benefits (employers):** lost output, equipment damage, disruption.  **Monetised benefits (government):** reduced medical costs; reduced welfare costs (social security and compensation payments).  **Non-monetised benefits (general):** to calculate the potential benefits, the impact assessment simply assumed that the regulations would produce between a 7% and 10% reduction in the cost of injuries (translating to a benefit of approximately £46 million per year) with the caveat that the size of the benefits were ultimately uncertain.  **Non-monetised benefits (workers):** as reductions in costs to: individuals (pain, grief, suffering, loss of income); compensation payments (excluded from monetisation of potential benefits as transfer costs).  **Non-monetised benefits (employers):** not clear from the impact assessment what considerations were factored into lost output and disruption (the less comprehensive, the lower the estimated benefits); benefits to businesses involved in the manufacture and sale of ladders, elevated working platforms, etc.  **Non-monetised benefits (government):** loss of revenue as a result of lower output; revenue increases (VAT) arising from increased sale of ladders, elevated working platforms, etc.; compensation payments (excluded from monetisation of potential benefits as transfer costs). |
| The Control of Asbestos Regulations 2012 (2009/148/EC) (Health and Safety Executive, HSE) [(Health and Safety Executive, 2011](#_ENREF_13)) | **Material cost-relevant assumptions (based on weak or conflicting evidence):** The impact assessment reported that, “from inception the lack of basic data on this new category of work [had] been a major difficulty and noted that “there were extremely large variations in the ranges suggested [by business stakeholders]” (see para. below) and that “assumptions have had to be made without firm evidence”. This was due to the fact that: the definition of the new category of work was new so there was no existing data source or experience to draw on (“despite the consultation we have poor evidence to indicate how many individual jobs [in the new category of work] workers will conduct per year”); the exact scope of the new category of work was still in development and therefore unclear; the number of workers involved in any particular job was variable; the extent of asbestos in the building stock was unknown.  The impact assessment noted that the National Federation of Demolition Contractors, who had provided one of the “most considered indicative estimates”, estimated “perhaps 50 notifications per  member company per annum”, which would produce about 7600 jobs per year from demolition work alone.  One Local Authority estimated 3000 notified jobs generated by 400 workers, another suggested ‘several hundred’. A large engineering company estimated only 10 notifications from up to 20 employees doing 4 jobs each. Other companies were reported to have estimated 6 jobs per worker. The electricity/utility sector indicated that depending on the final scope of the new work category, “some 500,000 or more sector jobs per year could be encountered by 10,000 – 15,000 workers, with an uncertain estimate of 12 jobs per worker per annum”. One licensed contractor had suggested a total of 40,000 notifications nationally (which assumed negligible compliance by micro business). The HSE noted that “the difficulties were stark” and because “estimates were generally on the lower side” estimated a range of between 5 and 30 notifications per worker, with a best estimate of the midpoint, 18. This is then used to estimate costs of record keeping and notification.  The impact assessment also noted that the short timescale for implementation meant that “a pragmatic approach” had to be adopted “as there [had] been insufficient time or considered research.” It was noted that research undertaken by the Institute of Employment Studies had struggled to obtain information on the existing cost of asbestos-related building maintenance work as duty holders did not separate out asbestos work from general maintenance budgets and did not subdivide it into licensed and unlicensed work [(Sinclair *et al.*, 2011](#_ENREF_18)). Consequently, “existing research on costs [had] not been particularly useful in reducing uncertainty around the costs of the option and baseline.”  **Dynamic effects:** not explored.  **Assumptions relevant to the rate of compliance:** evidence-based and non-evidenced based assumptions on compliance (e.g. with medicals, notification requirements for workers only performing the new category of work, record keeping requirements for workers’ regulated activity) integrated into cost estimates. | **Summary of sources:** Official data sources included: the Labour Force Survey (LFS) (used to estimate the number of workers exposed to asbestos under the new category of work); the Annual Survey of Hours and Earnings (ASHE) (used to calculate the cost of time for medical examinations, complying with notification and recording requirements, familiarisation with regulations); work carried out for previous impact assessments and consolidating regulation. Business consultation responses (for workers covered, jobs in scope, time taken to comply with notification requirements, time taken to comply with record-keeping requirements, time involved in familiarisation, and compliance levels). HSE commissioned research undertaken by the Institute of Employment Studies (based partly on surveys and interviews with relevant businesses).  **Summary of business views:** Consultation responses demonstrated the “difficulties (encountered by businesses (in estimating numbers of workers, jobs in scope, compliance levels and therefore costs”. Only a small proportion provided estimates. Several indicated that “it was impossible” that the HSE’s estimates were reasonable and “that their own estimates were no better than guesswork”. Others suggested that estimates should be adjusted but “usually failed to specify by how much”.  Consultation responses also suggested that a typical medical examination would take more than the 2 hours assumed in the pre-consultation impact assessment and that compliance with the expanded notification requirements would take longer than the pre-consultation estimate.  Some business actors (via the consultation) gave estimates of familiarisation from a zero base and a majority indicated that the pre-consultation estimates for time involved in familiarisation were too conservative.  See also adjacent cell.  **Effect on estimates:** Business estimates (via the public consultation) informed assumptions (without apparent verification) of the number of potential notifications (in so far as these were noted prior to the assumption being cited).  Business feedback (via the public consultation) on the types of occupations where workers likely to encounter asbestos caused (without apparent verification) pre-consultation assumptions to be adjusted on how many workers would be exposed to asbestos under the new category of work.  Business feedback (via the public consultation) caused (without apparent verification) pre-consultation estimates on both the time involved in a medical examination and in complying with notification requirements to be increased.  Business estimates of time taken to comply with record-keeping requirements were accepted without apparent verification.  Business estimates for time involved in familiarisation which assumed a zero base were discounted, but the pre-consultation estimates were nonetheless increased to reflect views expressed in the consultation.  See also adjacent cell under *material cost-relevant assumptions* in relation to research undertaken by the Institute of Employment Studies. | **Reported Benefits (workers):** improvements in health associated with improved health surveillance (individuals advised that they have asbestosis would be excluded from further work with asbestos as a precaution), improved education (in so far as the new category of work requirements further educated workers in the risks involved), more careful working practices (in so far as the additional notification requirements encouraged safer working routines  owing to potential for the work to be inspected and improved HSE intelligence), a small pool of workers exposed to asbestos (in so far as the additional requirements resulted in a smaller group working in the new category of work, making it easier for the HSE to influence them); see *disputed benefits.*  **Reported Benefits (employers):** none reported.  **Reported Benefits (government):** none reported*.*  **Non-reported benefits (workers):** reduced income losses and retraining costs associated with improvements in health; reduced pain and suffering associated with improvements in health; reduced impact on families associated with improvements in health (but see *disputed benefits*).  **Non-reported benefits (employers):** reduced productivity losses (e.g. from higher worker turnover) associated with reduced risk of disease (although see *disputed benefits* for latency of disease associated with asbestos); reduced administration costs (e.g. retraining) associated with reduced risk of disease; see *disputed benefits.*  **Non-reported benefits (government):** reduced welfare and health service costs associated with reduction in asbestos related disease to workers and the general public (in so far as the additional requirements of the new work category leads to be better control and knowledge of workers); see *disputed benefits.*  **Disputed benefits:** the impact assessment reported that, it was the HSE’s view that the proposed changes did “not bring measurably greater health benefits to workers than those already being achieved” (its view was based on the following observations: that the new requirements were mainly administrative; that the pre-notification of work did not imply that it would be performed competently; that the quality of records kept after the event was incidental to prevention of risk to health, that although medical examinations were designed to detect disease early, to allow removal from further harm and stimulate scrutiny of co-workers health, this was of limited practical value in relation to asbestos because of the 20-40 year delay before disease onset; that for the new category of work requirements to further educate workers, they would first have to recognise they were at risk and apply to workers not already training under existing requirements; that for the new notification requirements to encourage safer working routines full compliance would be necessary  **Non-monetised benefits (workers):** reported that, specific benefits derived from the regulation could not be isolated because the amendments “contributed to an existing packaging of mutually reinforcing interventions”; see also *disputed benefits* above.  **Non-monetised benefits (employers):** see *disputed benefits*.  **Non-monetised benefits (government):** reduced welfare and health service costs associated with reduction in asbestos related disease to workers and the general public; see *disputed benefits*. |
| The Control of Substances Hazardous to Health (Amendment) Regulations  2004 (2003/53/EC) (Health and Safety Executive, HSE) [(Health and Safety Executive, 2003](#_ENREF_9)) | **Material cost-relevant assumptions (based on weak or conflicting evidence):** Problems were reported in evaluating estimates of the capital costs of dosing units and the number of dosing units required for a given mass of cement (“It is worth noting that no further cost information was provided by industry to enable HSE to evaluate these cost estimates”).  Problems were also reported in estimating the costs associated with the likely reduced shelf-life of cement preparations dosed with ferrous sulphate. The impact assessment reported that the technical constraints involved in maintaining shelf-life were unknown and that manufacturers who wanted to maintain a 12 month shelf life might have to compromise on product quality. The potential impact of this was not costed because of “the large uncertainties involved.”  A number of assumptions were made in relation to testing requirements (to check for chromate levels in cement). The evidential basis for the assumptions made in relation to a potential certification system were unclear.  **Dynamic effects:** partially explored (cost of ferrous sulphate was assumed to increase given increase in demand).  **Assumptions relevant to the rate of compliance:** full compliance assumed. | **Summary of sources:** Official data sources included: HSE Epidemiology and Medical Statistics Unit survey, the Occupational Physicians Reporting Activity (OPRA) scheme; Self-Reported Work-Related Illness surveys (SWI), EPIDERM (an HSE-sponsored national skin surveillance project); the Danish Technological Institute. Industry information informed estimates of the number of companies that manufacturer cement preparations in Great Britain, the number of dosing units required for a given mass of cement, the capital cost of each dosing unit, estimates of how much cement would be used in controlled closed or automated processes and therefore not covered by the regulations, estimates of the amount of cement delivered to the cement preparations industry each year, the amount of ferrous sulphate required to achieve a sufficient reduction in chromate VI, the price of ferrous sulphate, the amount of cement, bagged cement, ready-mixed cement sold each year;  **Summary of business views:** Business actors (via the public consultation): claimed that “the assessment of costs should be based on the worst-case number of dosing units”.  The British Adhesives and Sealants Associations (BASA) provided uncertain estimates (range 13-18) of the number of companies that manufacture cement preparations (relevant to the estimating the number of dosing units required).  Representatives of preparation manufacturers raised concerns (via the public consultation) about the amount of reducing agent needed for cement preparations and the impact on product performance.  BASA suggested that time-expired cements and cement preparations may need to be disposed of as special waste, but provided no figures to suggest how much this would increase costs for manufacturers, suppliers and end users.  **Effect on estimates:** Estimates of the number of dosing units required for a given mass of cement were adjusted (estimates of the number of companies manufacturing cement preparations were accepted without verification). Estimates of the amount of cement delivered to the cement preparations industry were accepted (without apparent verification). Estimates of the capital cost dosing units was accepted without verification (even though this was understood to conflict with the view from European producers who were already implementing the directives, several of whom indicated that they did not face extra equipment costs and simply incorporated the process using existing equipment).  Estimates of the amount of ferrous sulphate required to achieve a sufficient reduction in chromate VI were accepted without verification (and notwithstanding other evidence suggesting a lower amount would be satisfactory). Estimates of the price of ferrous sulphate were increased (information provided by the industry was not verified). Estimates of the amount of cement sold were accepted (without apparent verification). Estimates of how much cement would be used in controlled closed or automated processes were accepted (without apparent verification).  In response to the claim that assessment costs should be based on the worst-case number of dosing units, it was noted that this neglected the fact that some cement plants had equipment (such as blenders) that could be used in place of dosing units and that some plants would not need to comply with the restriction if they comprise the exempted “controlled closed and totally automated systems” described in the EU Directive.  Concerns expressed over the amount of reducing agent needed for cement preparations and the impact on product performance were noted but not quantified (see also adjacent cell). BASA’s concerns about time-expired cements and cement preparations needing to be disposed of as special waste were noted but not quantified. The HSE rejected one firm’s evidence of “excessive financial cost” as this was based on “extremely high prices for ferrous sulphate”. | **Reported benefits (workers):** reduction of lost income through absence from work, having to change jobs or taking early retirement; reduction of expenditure on medical treatment (e.g. prescription charges); reduction of retraining costs for those leaving the industry; reduced pain and suffering; indirect effects on families.  **Reported benefits (employers):** increases in productivity and decreases in costs associated with reduction in work absences; increases in productivity from reduction in worker turnover associated with workers having to change jobs or take early retirement; reduction in direct costs associated with administration, recruitment and retraining relevant to higher worker turnover and work absences.  **Reported benefits (government):** reduced health service and welfare costs; reduced revenue from lower output.  **Non-reported benefits (workers):** none.  **Non-reported benefits (employers):** none.  **Non-reported benefits (government):** none.  **Disputed benefits:** none.  **Monetised benefits (workers):** reduction of lost income through absence from work, having to change jobs or taking early retirement; reduction of expenditure on medical treatment; reduced pain and suffering;  **Monetised benefits (employers):** some lost “output”; non-monetisation of mitigation of existing cases.  **Monetised benefits (government):** reduced health service costs (e.g. GP visits, costs of hospital outpatient and in-patient services).  **Non-monetised benefits (workers):** retraining costs for those leaving the industry; indirect effects on families; non-monetisation of mitigation of existing cases; the impact assessment also noted limitations in the data used to estimate the number of new cases of allergic contact dermatitis (the EPIDERM Survey is restricted to dermatologists who participate voluntarily in the scheme, dermatologists will only see the most severe cases of allergic contact dermatitis, non-specialist doctors or occupational health physicians who do not report to the scheme will treat many cases, SWI data are produced entirely from voluntary self-reporting) which by under-reporting the problem may lead to underestimation of potential benefits (the impact assessment reported that, the “true number of new cases a year could be substantially greater than the present range, and total benefits from the proposals would multiply accordingly”).  **Non-monetised benefits (employers):** increases in productivity and costs associated with reduction in work absences; increases in productivity from reduction in worker turnover associated with workers having to change jobs or take early retirement; reduction in direct costs associated with administration, recruitment and retraining relevant to higher worker turnover and work absences; non-monetisation of mitigation of existing cases; see also comments immediately above about underreporting.  **Non-monetised benefits (government):** reduced welfare costs; non-monetisation of mitigation of existing cases. |
| Construction (Design and  Management) (CDM) Regulations 2015 (92/57/EEC) (Health and Safety Executive, HSE) [(Health and Safety Executive, 2014](#_ENREF_14)) | **Material cost-relevant assumptions (based on weak or conflicting evidence):** Wide variations in estimates for the time taken for firms to familiarise themselves with the new Regulations (not a recurring cost for existing firms) were noted. These were explored further in interviews with business actors after the formal public consultation. The assumption for the time take for familiarisation was subsequently increased from 1 hour to 3 hours. This was an industry average covering small contractors (who were assume to only read through the guidance and spend significantly less than 3 hours) and the “more professional end of the market”, where individuals would attend a 2 to 3-hour course.  The EU Directive imposed a number of additional duties where a construction site has more than one contractor present. The CDM 2007 transposed the additional duties but used a measure of the duration of the project (more than 30 days or more than 500 person-days) instead of plurality of contractors. The CDM 2015 changed the additional duties threshold from project duration to contractor plurality for most duties. This was designed to simplify the structure of the Regulations, but it had the effect of increasing the number of projects attracting additional duties (particularly small projects). Projects over 30 days or 500 person days were already likely to involve more than one contractor and so would not be affected by the change in threshold, although a number of shorter-duration projects would. The impact assessment noted that it was “not straightforward to obtain an estimate for the total number of nondomestic construction projects undertaken each year”. Office of National Statistics (ONS) Construction Statistics estimated approximately 37,000 projects of value greater than £100,000 a year and 120,000 projects of value below £100,000 (160,000). However, the number conflicted with HSE data and views of HSE sector experts. 115,000 projects of more than 30 days or 500 person-days were already notified to the HSE annually, which would imply that there would be only 45,000 projects of under 30 days or 500 person-days (or lower if the rate of compliance for HSE notifications was less than 100%). The impact assessment, therefore, assumed that there was an equal split of non-commercial projects above and below the then existing threshold and estimated of a total of 250,000 non-domestic  projects a year. This was then used in conjunction with ONS data on the proportion of new orders by value range (which did not include the smallest projects) and the HSE’s “own assumptions about the distribution at the lowest end of the market” and knowledge of which value projects were meeting the notification criteria under CDM 2007 to estimate that 60,000 additional projects would meet the additional duties threshold.  Estimates of the familiarisation cost of the removal of an exemption for domestic clients (calculated by multiplying the number of clients, length of time for familiarisation, the opportunity costs of the client’s time, and expected level of compliance) were derived from relatively weak data concerning the number of multi- and single contractor projects each year (arrived at by combining HSE survey data on domestic construction activity with Census data on the number of owner occupied premises) and rates of compliance (derived from HSE survey data). Estimates of the costs of new duties were made with reference to relatively weak and contested data on the likely rate of compliance (based on estimates made in previous construction-related impact assessment).  **Dynamic effects:** not relevant.  **Assumptions relevant to the rate of compliance:** evidence-based assumptions on compliance integrated into cost estimates. | **Summary of sources:** Official data sources included: the ONS Construction statistics; ONS Annual Survey of Hours and Earnings; HSE survey data; HSE data arising from legal duties on constructions firms, Census data. Business sources of data included: interviews with business actors; public consultation responses for the present and previous impact assessments; business responses to the post-implementation review.  **Summary of business views:** Business interview data and consultation responses claimed that: the time taken for familiarisation had been underestimated; some of the costs of time used were too low; transitional costs had not been adequately addressed; assumed savings from the replacement of the CDM co-ordinator role with that of the principal designer were overestimated (many respondents suggested that clients would continue to contract out the role to an external party); rates of compliance were underestimated; assumptions relating to estimates arising from the change in the threshold for additional duties (see adjacent cell) were too low.  **Effect on estimates:**  Consultation responses from businesses (formal public consultation, extensive additional informal engagement, post-implementation review) were used to finalise: a) the assumptions for costs associated with wage costs; b) the projected savings from the replacement of the CDM co-ordinator role with that of the principal designer; c) rates of compliance; d) assumptions on the impact of changes in the threshold for additional duties; e) assumptions on the impact of the removal of a previous exemption for domestic clients.  In relation to the first, the HSE concluded that its original estimates of the cost of time involved in certain activities were too low. In the consultation-stage impact assessment the HSE assumed an average full economic cost per hour of approximately £15 per contractor, and of £25 per design professional on the basis of data from the ONS Annual Survey of Hours and Earnings. It altered these assumptions following feedback from stakeholders, which suggested these figures were too low, especially for designers, who, when employed by a company, would have their services charged out at a rate higher than their wages.  In relation to the second, the HSE concluded that it had overestimated the savings to business (estimated savings from identifying, collecting and passing on pre-construction information were reduced from a third to a fifth; estimated savings of co-ordinating the health and safety aspects of the design work were reduced from a half to a third; estimated savings from closer liaison between the principal contractor and designer regarding ongoing design, however, were highlighted in the consultation by business actors and not originally identified by the HSE).  In relation to the third, consultation responses to the revocation of other construction specific regulations were used to justify low estimates for the rate of compliance for familiarisation were used for self-employed contractors (5%) and employers (25%). On the basis of feedback received from the consultation for the present impact assessment the rate of compliance for familiarisation used for design professionals was reduced from 100% to 75%.  In relation to the fourth, estimates of time taken to discharge additional duties were increased.  In relation to the fifth, the HSE do not appear to have adjusted their assumptions. | **Reported Benefits (workers):** improvements in health and safety (textual simplification, combined with the production of sector-specific guidance aimed at small contractors, was expected to lead to improved health and safety in the sector as small construction projects are disproportionately represented in serious and fatal accident statistics and non-compliance with regulatory requirements by small contractors, through ignorance of responsibilities, is commonplace).  **Reported Benefits (employers):** efficiencies and savings resulting from removal of the CDM co-ordinator role (regulations would encourage those responsible for the design role under existing Regulations to assume the CDM co-ordinating role, leading to reduction in costs associated with demonstrating competency and the adequacy of resources as part of the pre-qualification and bidding process, collecting and passing on pre-construction information would be reduced, co-ordinating the health and safety aspects of the design work; liaising with the principal contractor); not having to notify projects to HSE due to a change in the trigger for notification; savings to new businesses entering the market from having to familiarise themselves with shorter, more accessible and targeted regulations (reduced time and removal of need for commercial pre-qualification schemes).  **Reported Benefits (government):** none reported  **Monetised Benefits (workers, excluding self-employed):** none (the impact assessment reported that the effect of the proposed measures on health and safety were difficult to quantify.  **Monetised Benefits (employers, including self-employed):** efficiencies generated by the removal of the CDM co-ordinator role (see break-down above); savings from not having to notify projects to HSE due to a change in the trigger for notification; savings for new businesses entering the market from having to familiarise themselves with shorter, simpler, more accessible and targeted regulations.  **Monetised Benefits (government):** none  **Non-reported benefits (government):** reduced health service costs (associated with potential improvements in health and safety); reduced costs involved in processing fewer notifications of projects.  **Non-monetised benefits (workers):** improvements in health and safety.  **Non-monetised benefits (employers):** salient reported benefits monetised.  **Non-monetised benefits (government):** see non-reported benefits (government). |
| The Transnational Information and Consultation of Employees (Amendment) Regulations 2010 (2009/38/EC) (Department of Trade and Industry, DTI) [(Department of Trade and Industry, 2006](#_ENREF_6)) | **Material cost-relevant assumptions (based on weak or conflicting evidence):**  A study commissioned by the DTI (see adjacent cell) to gather data on costs involved interviews with a small, but representative sample of (primarily) human resource managers from companies with employee information and consultation arrangements [(Weber *et al.*, 2000](#_ENREF_19)).None of the companies interviewed had carried out a cost-benefit analysis of their consultation arrangements. The authors of the study reported “some difficulty in gathering information on costs” and noted that “several [business] respondents were not able to provide detailed estimates of costs” (on issues such as management time, all paid time off for employee representatives, administrative costs, dissemination costs) [(Weber *et al.*, 2000](#_ENREF_19)). Where companies could not provide detailed estimates of costs, the authors constructed their own estimates using figures derived from those companies able to provide such information. Impact assessment estimates of annual running costs (meetings, etc.) and on-recurring costs (e.g. the administration of ballots) were based on this data.  **Dynamic effects:** not explored  **Assumptions relevant to the rate of compliance:** full compliance assumed. | **Summary of sources:** Official sources included an earlier impact assessment, much of the analysis of which was based on a study commissioned by the Department of Trade and Industry (DTI), which was based on business data (see adjacent cell). Data provided by the TUC (for the estimate of number of undertakings affected).  **Summary of business views:** Most responses to the consultation were reported to be supportive of the proposal.  **Effect on estimates:** See adjacent cell. There was no information in either the impact assessment or DTI study to indicate that information provided by business stakeholders were verified. | **Reported Benefits (workers):** increased staff well-being.  **Reported Benefits (employers):** more effective information and consultation of employees might increase productivity and reduce staff turnover by demonstrating a positive commitment to employees, increasing co-operation (or competition) between workplaces, increasing trust between employees and management, promoting better employee understanding of the business, enhancing management understanding of the impact of restructuring on employees (collectively enabling organisations to introduce change and respond more flexibly to changes in economic circumstances.  **Reported Benefits (government):** increased revenue (from higher output) and lower unemployment in so far as effective functioning of European Work Councils lead to less resistance to change that would facilitate more rapid adjustment in the economy.  **Non-reported benefits:** none.  **Non-monetised benefits (workers, employers, government):** no reported benefits were monetised, the impact assessment reported that it would “not be possible to separate out and quantify the specific effects of European Work Councils”. |

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