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Estimating the marginal productivity of the English National Health Service from 2003/04 to 2012/13

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Estimating the marginal productivity of the English National Health Service from 2003/04 to 2012/13

Abstract

Estimates of the marginal productivity of the health sector are required for a wide range of resource allocation decisions. Founding these estimates on robust empirical analysis can inform these decisions and improve allocative efficiency. This paper estimates the annual marginal productivity of the English NHS over a ten year period (between 2003/04 and 2012/13). Data on expenditure and mortality by programme budget category are used in conjunction with socio-economic and demographic variables from the censuses for 2001 and 2011. This paper applies an econometric strategy that employs an established instrumental variable approach, which is then subjected to a number of sensitivity analyses. The results of the econometric analysis, along with additional data on the burden of disease, are used to generate an estimate of the marginal productivity for each of the study years. We find that an additional unit of health benefit has cost between £5,000 and £15,000 per quality-adjusted life year between 2003/04 and 2012/13. Over this period these estimates (all in current prices) have increased at a faster rate than NHS price inflation suggesting an increase in real terms. These results are discussed in the context of the existing literature, and the potential policy implications for decisions about resource allocation are explored.

Keywords: productivity; econometric modelling; programme budgeting; health opportunity costs; allocative efficiency

1. Introduction

Although useful for resource allocation decisions, reliable estimates of the size of the causal link between healthcare expenditure and health outcomes are difficult to obtain. This is partly because of several empirical challenges including the heterogeneity of observational units and that mortality might be influenced by expenditure and also influence it (reverse causality).[1] For these and other reasons, several studies have failed to identify a strong and consistent relationship between healthcare expenditure and health outcomes (after controlling for other factors).[2]

In a bid to overcome these econometric challenges and to provide policy-relevant estimates of marginal productivity for national decision making, recent studies have started to employ instrumental variable-based (IV) regression approaches using sub-national rather than cross-country data.[3–8] A sub-national approach has considerable advantages over the use of aggregate country level data e.g., it permits the inclusion of a broader range of variables since numerous sources of data can be linked and available data are not constrained by the need for international comparability.

Several sub-national studies use English data that reflects local-level information on expenditure, outcomes and other factors.[3–7] Although these studies use similar datasets, they differ in how the effect of expenditure on outcomes is identified using IVs.[i] One approach directly estimates the elasticity of all-cause mortality with respect to health expenditure.[6] Here, the IVs are chosen on the basis that the per capita budget assigned to each health authority is the product of the national per capita budget and four adjustments reflecting local circumstances, three of which are plausibly unrelated to mortality and are therefore suitable as instruments.[ii]

The other approach[3–5] uses data on expenditure and outcomes in different disease areas (programme budget categories, PBCs) reported at a local level (for English primary care trusts, PCTs). An expenditure equation is estimated to quantify how the overall budget is allocated across PBCs, and an outcome equation is estimated to quantify the elasticity of PBC-specific mortality with respect to PBC-specific healthcare expenditure. The IVs used in this approach, and also employed in this paper, reflect factors, such as socio-economic deprivation and the availability of informal care in the community, which are believed to influence healthcare expenditure but plausibly only indirectly impact on mortality through their impact on expenditure. This second strategy for finding IVs has also been employed in the analysis of Australian data where an elasticity of all-cause mortality with respect to health expenditure of -2.2 is reported.[7,8]

The disease-specific elasticities of mortality with respect to expenditure are interesting results in themselves, but they do not fully express the marginal productivity of the NHS in the most useful way possible. This is because the NHS is not only concerned with extending life, but with improving the quality of life. Therefore, a measure of marginal productivity should ideally reflect the effect of NHS expenditures on extending survival (resulting from reduced mortality) as well as improving

[i] A third approach has recently been explored.[28] It is essentially a hybrid of the two approaches described in the text. This third approach employs IVs for total expenditure in order to estimate elasticities for PBC-specific mortalities instead of all-cause mortality. This approach is a promising avenue for future research as one benefit is that it is no longer assumed that mortality in a PBC is unaffected by spending in other PBCs.

[ii] These four adjustments are the local age index, local additional needs index, local input price index and local distance from target Index. The authors argue that all are potentially exogenous with the exception of the local additional needs index.

health-related quality of life. Such a measure can be obtained by combining health outcome and expenditure elasticities with additional information about disease-specific life expectancy and morbidity burden by age and gender of the patient population.[5] This study[5] reports a cost per life-year of £25 214 for 2008/9; this reflects an estimate of marginal productivity that captures the effect of NHS expenditure on extending survival only. But, by using the effect of expenditure on the mortality as a surrogate for the effect on a measure of health burden that also includes morbidity burden, the study[5] also reports a cost per QALY of £12 936 for 2008/9 and this reflects the likely impact of expenditure at the margin on both mortality and morbidity.

This paper builds on and extends a recent study.[5] That study reported cost per QALY estimates for three years (2006/7, 2007/8 and 2008/9) using PCTs as the unit of analysis and all census-based variables reflected 2001 data. Mortality data ceased to be available for PCTs after 2008/9/10 and hence, to facilitate updates, the unit of analysis used here is the 'upper-tier' local government geography. Moreover, the 2011 census is used to update the (2001) census-based variables. This paper reports estimates of the marginal productivity of the English NHS, annually, for the ten year period between 2003/04 and 2012/13. It applies the methodology used in previous work[5] to new data, constructed for a different unit of analysis, and undertakes a range of additional sensitivity analyses.

The plan of the paper is as follows. The datasets are described in section 2, along with an overview of the empirical approach to estimation. In section 3, annual marginal productivity results for the ten-year period (both point estimates and key percentiles of the distribution) are expressed in terms of the amount of resource used to produce a unit of health benefit (cost per QALY) and the volume of health benefits produced using a unit of resource (QALYs per unit of expenditure). These results are discussed in section 4, before a conclusion is presented in section 5. Additional information about the methods, and results from the sensitivity analyses, are presented in the Appendix.

2. Methods

2.1 Data

This paper uses three sources of data to examine the relationship between NHS expenditure and mortality. **NHS expenditure** (adjusted for unavoidable cost-factors) by geographically defined local health authorities, PCTs, is available for 23 programme budget categories (PBCs), annually, for 2003/4 to 2012/13, and this includes virtually all NHS expenditure on inpatient care, outpatient and community care, and pharmaceutical prescriptions.[iii] **Mortality rates** (standardised years of life lost rates, SYLLR) are available for ten budget categories at the local authority level averaged over three-year periods from 2003/04/05 to 2012/13/14. Finally, **UK census data** for 2001 and 2011 are used to construct a dozen socio-economic variables that were used by Claxton et al (2015). These variables include measures of: the proportion of residents are born outside the European Union; the proportion of the working-age population are employed in managerial and professional occupations; the proportion of households that are owner occupied; and the proportion of the population that provides unpaid care. Further details about the census-based variables can be found in the appendix (see section A2.1). In the absence of intermediate observations, values for 2003 to 2010 are linearly

[iii] Note that this dataset does not include non-NHS expenditures on health. This makes the resulting estimate useful mainly for decisions that concern the NHS and would not be directly relevant for decision making in the comparably small UK private healthcare sector.

interpolated from those observed for 2001 and 2011, and the value for 2012 is assumed to be the same as that recorded by the census for 2011. These socio-economic variables are available as potential controls in the second-stage equation and as potential instruments for the first-stage.

We adopt English local authorities as a consistent geographical unit of analysis across these different sources and years of data. Mortality and census variables are directly available at LA-level. However, the remaining variables (including the PBC expenditure data) are only available at PCT-level and these data are mapped from PCT to LA-level using a tool developed by the UK Department of Health. The sensitivity of the results to the mapping tool was investigated as part of preliminary work, using data from 2008/09 where both PCT-level and LA-level are available, and the results were largely robust to inaccuracies resulting from the mapping process.[9]

2.2 Econometric strategy

Our modelling framework derives from an underlying conceptual model that assumes that each PCT manager receives a fixed annual budget and allocates it across the 23 programmes of care so as to maximise social welfare subject to a health production function. The optimal level of spending for a given PBC is a function of the total PCT budget, the need for healthcare spending in that disease area, environmental factors that affect health in that PBC, as well as need for healthcare spending and environmental factors that affect health in other PBCs. Health within each PBC is assumed to be a function of healthcare expenditure within that specific PBC only.

This framework suggests the estimation of an expenditure equation (1) for each of the 23 PBCs, and an outcome equation (2) for the 10 PBCs for which mortality data are available.

Accordingly, for the j-th PBC we have:

$$x_i = \beta_0 + \beta_1 n_i + \beta_2 m_i + \beta_3 y_i + \varepsilon_i \quad (1)$$

$$h_i = \gamma_0 + \gamma_1 n_i + \gamma_2 x_i + \omega_i \quad (2)$$

All variables are log-transformed prior to estimation in accordance with standard practice in this literature and consequently all coefficients are interpreted as elasticities. The i subscript denotes the unit of observation, (LA as opposed to PCT given data availability), y is the overall budget, h is mortality in the j-th PBC, x is the expenditure on the j-th PBC, n is the need for healthcare in the j-th PBC, m is the need for care in other PBCs, β and γ arguments are parameters to be estimated (β_3 is referred to as an 'expenditure' elasticity and γ_2 an 'outcome' elasticity), and ε and ω are error terms.

It may be the case that m in equation 1 and x in equation 2 are endogenous, since other programme need is proxied using the mortality rate in these other programmes, and expenditure in a disease area may be related to unobservable factors that influence the level of health outcomes (e.g. a high level of historical mortality). For these reasons, the OLS estimation of equations 1 and 2 would likely result in bias even if the analysis controlled for observable healthcare need (n).[iv] One approach to controlling for this endogeneity is to use suitable instruments for the endogenous variables.[3–7] However, theory provides no guidance as to the specific IVs that should be used. In general, we need IVs that are associated with either PBC-specific expenditure or other-PBC mortality (this requirement is referred to as 'instrument relevance'), but not PBC-specific mortality either directly or through

[iv] Note that we instrument for m even though the coefficient of interest, β_3, is estimated on y.

some unobserved variable (this requirement is referred to as 'instrument validity'). Instrument relevance can be directly tested, typically by requiring an F-test of excluded instruments in the first stage and requiring that the test statistic exceeds 10.[10] Instrument validity cannot be directly tested, and expert judgement is required, but when an equation is over-identified (there are more excluded instruments than endogenous variables) then an over-identification test can be helpful, although it may lack power in rejecting the null hypothesis of joint validity in some circumstances.[11]

Each wave of data is analysed separately. The preferred empirical specification for each PBC and for each year is identified using the following method. We use the preferred empirical specifications reported by others[5] for 2008/9 as the starting point for the estimation of outcome and expenditure equations for 2009/10.[v] If the 2008/9 specification performs satisfactorily when re-estimated with 20009/10 data, then this becomes our preferred specification for 2009/10 too. A specification is deemed satisfactory if it passes a battery of statistical tests (including an endogeneity test, the Hansen-Sargan over-identification test, and the Kleibergen-Paap F test for instrument strength) and meets three priors: that expenditure reduces mortality ($\widehat{\gamma_2} < 0$) and that expenditure on a given PBC increases with overall budget ($\widehat{\beta_3} > 0$) and decreases with other PBC need ($\widehat{\beta_2} < 0$).

If the specification fails a test then it is revised (to make good this failure) and re-estimated. If this approach – of specification revision and re-estimation – fails to reveal an acceptable specification then the entire equation is re-estimated with covariates and instrumental variables using a backwards step-wise procedure. In the rare circumstances where it proves impossible to obtain a satisfactory specification and outlier expenditure values are found, the sample is trimmed in an attempt to find an acceptable specification.[vi] Further details of this estimation process are provided in the Appendix, section A1.1.

2.3 Translating mortality effects into quality-adjusted life-years

The outcome and expenditure elasticities obtained via the estimation of equations 1 and 2 for those 10 PBCs with an outcome indicator, together with information about the number of life years lost in each programme, could be used to estimate the cost of a life year.[3] The problem with such an estimate is that it would implicitly assume that expenditure in those programmes with a mortality indicator has no effect on morbidity, and that NHS expenditure on those programmes without a mortality indicator has no health effect at all. These assumptions appear wholly implausible, especially when almost half of NHS expenditure is on programmes without a mortality indicator and morbidity is a significant aspect of disease burden where a mortality indicator is available.

Complete morbidity and quality of life data by PBC and local area are not available, so direct estimates of a more comprehensive measure of the likely health effects of health expenditure (e.g.,

[v] FY 2010/11 then drew upon the preferred econometric specification from FY 2009/10, and so on, up to 2012/13. The model specification for 2008/09 drew upon that for FY 2009/10, and then that for FY 2007/08 drew upon FY 2008/09 and so on until each an appropriate model was specified for each wave of data as far back as FY 2003/04 and up to FY 2012/13.

[vi] This was undertaken for 7 regression specifications out of a total of 310 reported as part of this paper (see Appendix 1 for more details).

QALY effects) are not possible. However, previous work has linked estimated effects on mortality to the likely QALY effects of changes in NHS healthcare expenditure using plausible assumptions. For example, one study[5] drew on a number of data sources to estimate the QALY burden of disease for each 3 digit ICD10 code within each PBC.[vii] They calculate the QALY burden of disease for each PBC by summing (over all relevant ICD10 codes) the product of the per patient QALY burden and the size of the population with the disease (prevalent and incident) in one year. For each PBC with an outcome elasticity, the estimated change in its QALY burden associated with, say, a 1% change in the overall budget can be calculated by forming the product of the outcome elasticity, the expenditure elasticity, and the QALY burden for the PBC (i.e., effects on the mortality burden of disease are used as a 'surrogate' for effects on the broader QALY burden). For those PBCs without an outcome indicator, this study[5] calculates the average proportionate effect of a change in expenditure on the mortality burden of disease in those PBCs where mortality-based outcome elasticities can be estimated, and this average is used as a proxy for the outcome elasticity for those PBCs without a directly estimated outcome elasticity (the proportionate effects on burden of disease are extrapolated from where they can be observed to where they cannot).

Therefore, using the same approach to estimating the QALY burden of disease, combined with these surrogacy and extrapolation assumptions, we are able to estimate the total QALY change associated with a change in total NHS expenditure for all PBCs and hence we can calculate the 'cost per QALY'. Clearly, linking the estimated effects on mortality to QALYs requires a number of assumptions to be made.[viii] Recently, the plausibility of these assumptions has been examined through structured elicitation from clinical experts[29] and this work suggests that these assumptions are likely to be conservative with respect to the QALY effects of changes in expenditure (i.e., the cost per QALY is likely to be lower than that estimated using these assumptions).

3. Results

Full regression results for the preferred outcome and expenditure specifications by PBC for each year, including specification test results, can be found in the Appendix section A2.2, Tables A2.1 – A2.20. The first stage regressions for the IV specifications can be found in the Appendix section A2.3, Tables A2.21 – A2.40. Of particular interest are (i) the coefficients on the expenditure variables in the outcome equations and (ii) the coefficients on the budget variables in the expenditure equations. These coefficients (elasticities) are presented in Table 1.[ix]

[Table 1 here]

[vii] Data from the WHO global burden of disease (GBD) study[12] was used to estimate the duration and incidence of disease (by age and gender), ONS data provided mortality conditional life expectancies by age and gender, quality of life norms by age and gender were based on data from the Health Survey for England and the impact of disease on these quality of life norms were provided by Health Outcomes Data Repository (HODaR) supplemented with information from the Medical Expenditure Panel Survey (MEPS).

[viii] For a more detailed summary of all assumptions, their justification and a discussion of their likely impact on the central estimate of the cost per QALY see Table 32 on page 83 of this work[5].

[ix] Note that cells containing "n/a" or "0" are not incomplete, but indicate that no elasticity was estimated for that PBC-year (or was estimated to be 0).

Taking cancer in 2012/13 as an illustrative example, the expenditure elasticity is interpreted as saying that a 1% increase in overall NHS expenditure leads to a 1.027% increase in cancer expenditure. The outcome elasticity suggests that cancer mortality is reduced by 0.361% as a result of a 1% increase in cancer expenditure. As outlined in section 2.3, these estimated elasticities can be combined with additional information about age, gender, life expectancy and burden of disease of the patient population to produce estimates of (i) the volume of resources used to produce a unit of health benefit (cost per QALY) and (ii) the volume of health benefits produced using a unit of resource (QALYs per £ of expenditure). For the latter, we report the number of QALYs gained for £10 million, which represents a small amount of money relative to the overall level of NHS expenditure, and we label this the 'health opportunity cost' (HOC) associated with £10m of expenditure. All estimates are expressed in current prices and are shown in Table 2.

[Table 2 here]

The cost per QALY and HOC estimates are generated first deterministically (column 1) and also probabilistically (columns 2 - 4). For the latter, draws are taken from independent Normal distributions for each outcome and expenditure elasticity with mean and variance equal to the estimated coefficient and standard error squared respectively. In total, 20,000 draws are made to generate a probability distribution for the overall result. The mean, 5th and 95th percentiles of the generated distributions are presented in Table 2.[x] This confidence interval reflects sampling uncertainty and is determined entirely by the standard errors of the estimated expenditure and outcome elasticities. The confidence interval does not reflect other sources of uncertainty arising from assumptions relating to the effect of expenditure on morbidity or any bias resulting from IV regressions with IVs that are not perfectly valid.

The numerical results shown in Table 2 are plotted in Figures 1 and 2. Figure 1 presents the deterministic point estimate for the cost per QALY along with its 90% confidence interval, while Figure 2 presents the deterministic point estimate in terms of the number of QALYs per £10 million of expenditure along with its 90% confidence interval.

[Figure 1 here]

[Figure 2 here]

Figure 1 shows that all point estimates of the cost per QALY lie between £5,000 and £15,000, and Figure 2 shows that all point estimates for the HOC lie between 690 and 1,860 QALYs. Although the point estimates are suggestive of an increase in the cost per QALY over the study period, the associated confidence intervals overlap each other considerably so that it is not obvious that there has been a significant change in the cost per QALY. A similar argument can be made about the HOC. In addition, the HOC estimates do not decrease monotonically through time even though the cost figures are in current prices and NHS inflation averaged about 3% per annum during the study period.[13]

[x] The deterministic and probabilistic point estimates differ because of the non-linear function that combines the estimated elasticities and additional information about survival and health-related quality of life. In particular, two features of the model are responsible for the non-linearity: the extrapolation assumption, and the adjustment to expenditure elasticities so that the changes in expenditure in all PBCs sum to the overall change in expenditure simulated (1% of total expenditure).

4. Discussion

Claxton et al report a cost per QALY of between £10,000 and £15,000 for 2006/7, 2007/8 and 2008/9. This paper contributes to the literature by extending the number of years analysed and presents more recent estimates; our results suggest a cost per QALY of between £5,000 and £15,000 for 2003/4 to 2012/13. The extension of the study period is only possible by changing the unit of analysis to LA-level. In addition, this paper uses more appropriate IVs by interpolating values from the 2001 and the 2011 censuses. Finally, this paper describes a process where additional waves of data can be added to the dataset and the preferred specification for the previous year can be used to inform the specification for the additional observation.

The results for 2012/13 (the most recent year) indicate that an additional £10mn of NHS expenditure generates 694 QALYs. Expressing this as a ratio of incremental cost to incremental health effect yields an estimate of the marginal productivity of NHS expenditure (£14,410 per QALY). However, as with most point estimates, there is uncertainty associated with it and we find that the 90% confidence interval for the cost per QALY ranges from £11,182 to £19,862. As only the incremental health effect is estimated with uncertainty and this measure appears in the denominator of the (cost per QALY) ratio, the confidence interval is not symmetric around the point estimate.

While the reported point estimates should be used to calculate expected changes in health resulting from changes in expenditure, the degree of uncertainty in our estimates helps to assess the robustness of claims as to whether implicit or explicit established norms are compatible with this evidence or not. For example, since 2004, the National Institute for Health and Care Excellence (NICE), which issues guidance to the UK NHS, has published an explicit range for the cost-effectiveness 'thresholds' used in its deliberative decision-making process: £20,000 per QALY to £30,000 per QALY.[14] Although NICE makes clear that the 'threshold' ought to represent the health opportunity costs of the additional NHS costs of a new technology, this range was, in fact, founded on the values implied by the decisions it made between 1999 and 2003.[15] The evidence from this paper suggests that the NHS's marginal productivity is significantly higher (the cost per QALY is significantly lower) than that implied by NICE's stated guidance.

An assessment of the marginal productivity of health care expenditure is of general policy interest beyond guidance for health technology appraisal. For example, some judgement about the likely health effects of increasing or reducing public expenditure on health care is at the heart of debates about whether public expenditure should be increased to offer additional funding to the NHS or whether existing overall levels of public expenditure should be reallocated across spending departments. The estimates presented above suggest that marginal increases in health expenditure, whether funded through additional taxation, borrowing or reallocation from other spending departments, appear good value when compared to estimates of the equivalent consumption value of health (with recent reviews suggesting that £30,000 per QALY might represent a reasonable lower bound for this).[16,17] Where resource allocation decisions have been made on the implicit basis that the estimate of marginal productivity of the NHS is £30,000, or even £40,000 per QALY[18], these decisions may have been sub-optimal in terms of population QALYs.[19] QALYs may of course not be the sole objective of healthcare expenditure, and decisions may be made that lead to reductions in health (as measured by QALYs), but are judged worthwhile because of other considerations. A framework for analysis to inform decisions such as these is illustrated elsewhere.[20]

Similar studies from other healthcare systems vary widely in terms of methods used but produce similar results in the sense that the estimated marginal productivity is usually lower than the value implied by healthcare decision-makers.[7,16,21,22] In this way our results are consistent with the existing literature with marginal productivity estimated to be much lower than currently explicitly stated norms[23] or the values implied by actual decisions.[18]

Looking at the results from this paper over time, the cost per QALY in 2012/13 is more than double that of 2003/04, but some of this will reflect input price inflation faced by the NHS, roughly 28% over the same period.[13] Nevertheless, these results suggest that real productivity at the margin has fallen, which is consistent with diminishing marginal returns to health expenditure (expenditure has increased in nominal and real terms over most of the ten year period analysed[24]). Identifying factors that can explain this trend is difficult because there are many possible explanations for these changes, and it is left to future research to unpick the mechanisms underlying them.[25]

At the core of this analysis is the econometric estimation of expenditure and outcome elasticities. A key component is the use of IVs to identify a causal effect. Our theoretical model does not tell us which instrumental variables should be used and the validity of those selected cannot always be tested. Although for some PBCs there may be concern about the role of risk factors such as smoking and their association with socio-economic status, generally speaking the mechanisms of cause and effect underlying the observed associations between socio-economic status and PBC-specific mortalities are largely unknown. Nevertheless, the likely presence of endogeneity suggests that we should attempt to use some econometric approach beyond OLS, such as IV regression, to obtain consistent estimates of the causal effects. As such we rely on an approach where we are guided by statistical tests in addition to a priori plausibility that instruments could be valid. We have used appropriate statistical tests to guide model specification throughout, as part of a clearly specified and documented protocol before the analysis was undertaken (see Appendix A1.1). Nonetheless, the tests for validity can lack power to reject the null that IVs are appropriately excluded from the second stage of the IV regression, particularly when all IVs might be thought to influence the endogenous regressor in the same kind of way.[11]

However, the results of the just-identified sensitivity analysis and the poor performance of an OLS strategy, reported in Appendix 1.2 and Appendix 1.3 respectively, combined with other related work provides greater confidence and insight into how these considerations might influence a reasonable interpretation of the results in this paper. Firstly, in related work[5] a sensitivity analysis[26,27] was undertaken to examine the impact of contaminated IVs (IVs that are not perfectly excluded from the second stage of the IV regression) which showed that contamination introduces additional uncertainty into the elasticity estimates, but not bias. Secondly, the implied all-cause elasticities using the approach taken to identification in this paper (see Appendix A1.2) are comparable with the directly estimated all-cause elasticities in the literature.[6,28] The elasticities for key PBCs are also comparable.[28] The fact that similar results are obtained when a very different approach to identification is taken generates confidence in the census-based instruments, that they are plausibly valid, and that the results are not highly specific local average treatment effects. This is especially important in the more common context where the identification strategy pioneered by Andrews et al (2017) is not possible. Taken together these considerations provide reassurance that our IV strategy is appropriate and that the estimates provided in this paper are not seemingly biased in a particular direction. It also suggests that there is inevitably additional structural uncertainty that is not reflected in the confidence intervals reported in Table 2 and Figures 1 and 2.

5. Conclusion

Given the interest among economists in decision-making at the margin, and the longstanding interest in the productivity of publicly funded institutions like the NHS, it is surprising that so few studies have sought to estimate the marginal productivity of the NHS. Its usefulness is not limited to decisions within the healthcare sector but is essential to inform the allocation of scarce public resources across sectors too. This paper has shown how econometric analysis can be used to provide estimates of the marginal productivity of the NHS, with results expressed as either cost per QALY or QALYs per unit of expenditure. The results show that despite the inflation, the cost per QALY has remained relatively stable over time, with point estimates of the amount of resources, in nominal terms, to produce an additional unit of health benefit ranging from £5,000 to £15,000 per QALY over the period between 2003/04 and 2012/13.

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Tables

Programme Budget Category	2003/04		2004/05		2005/06		2006/07		2007/08		2008/09		2009/10		2010/11		2011/12		2012/13	
	Outcome	Spend	Outcome	Spend	Outcome	Spend	Outcome	Spend	Outcome	Spend	Outcome	Spend	Outcome	Spend	Outcome	Spend	Outcome	Spend	Outcome	Spend
Infectious diseases	-0.205	1.094***	-0.100	0.932***	-0.432	1.205***	-0.608	1.051***	-0.660**	1.387***	-0.549***	1.471***	-0.310*	0.968***	-0.256	1.006***	-0.305***	0.841***	-0.362***	0.749***
Cancer	-0.201**	1.711***	-0.224**	1.259***	-0.159*	1.592***	-0.239***	1.219***	-0.273***	1.626***	-0.287***	0.784**	-0.345***	0.502**	-0.220***	0.438	-0.430***	0.961**	-0.361***	1.027**
Blood	n/a	0.652*	n/a	0.952***	n/a	1.486***	n/a	1.037***	n/a	1.374***	n/a	0.995***	n/a	1.060***	n/a	0.332	n/a	0.876***	n/a	1.119***
Endocrine	0	0.653***	-1.843	0.573***	-1.035	0.663***	-1.464	0.630***	-1.491	0.455***	-1.607**	0.498***	-1.075**	0.708***	-0.174	0.696***	-0.199	1.116***	-0.499	0.951***
Mental health	n/a	1.333***	n/a	0.999***	n/a	0.991***	n/a	1.143***	n/a	1.103***	n/a	0.995***	n/a	0.899***	n/a	0.973***	n/a	1.194***	n/a	1.023***
Learning disability	n/a	0.646*	n/a	0.446*	n/a	0.449*	n/a	0.410	n/a	0.386	n/a	0.329	n/a	0.647**	n/a	1.208**	n/a	0.741*	n/a	0.000
Neurological	-0.751*	1.408***	-0.968**	0.929***	-0.325	1.220***	-0.869*	0.382*	-0.237*	0.733***	-0.304	0.897***	-1.357	0.850***	-0.374	0.557***	-1.415	0.703***	-0.009	0.856***
Vision	n/a	0.833***	n/a	1.350***	n/a	1.127***	n/a	0.931***	n/a	1.106***	n/a	0.701***	n/a	0.934***	n/a	0.997***	n/a	1.279***	n/a	1.411***
Hearing	n/a	0.694*	n/a	0.526	n/a	0.762**	n/a	0.989**	n/a	0.951*	n/a	1.637***	n/a	1.273***	n/a	0.808*	n/a	1.231***	n/a	1.523***
Circulatory	-1.202***	1.873***	-1.375***	1.652***	-1.637***	1.477***	-1.404***	1.578***	-1.315***	1.614***	-1.384***	1.784***	-1.842***	0.494*	-1.692***	1.013***	-1.611***	1.491***	-1.464***	1.285***
Respiratory	-1.666***	1.661***	-2.494***	1.253***	-2.217***	1.225***	-2.281***	1.287***	-1.564***	1.555***	-1.671***	0.752**	-2.103***	0.576***	-2.006**	1.192***	-1.743***	1.360***	-1.704***	0.928***
Dental	n/a	0.717*	n/a	0.848*	n/a	1.224**	n/a	0.835**	n/a	0.420***	n/a	0.428**	n/a	0.765***	n/a	0.229	n/a	0.843***	n/a	0.855***
Gastro-intestinal	-1.493***	1.409***	-1.253***	0.928***	-1.014*	1.076***	-1.255**	1.014***	-0.837**	1.490***	-1.146**	0.520*	-1.989*	0.387*	-1.425**	1.040***	-2.000**	1.033***	-1.904**	0.997***
Skin	n/a	0.700***	n/a	0.595***	n/a	0.840***	n/a	0.701***	n/a	0.787***	n/a	0.907***	n/a	0.890***	n/a	0.422*	n/a	0.681***	n/a	1.158***
Musculo skeletal	n/a	1.014***	n/a	0.567***	n/a	0.935***	n/a	0.628*	n/a	0.733***	n/a	0.738***	n/a	0.295	n/a	0.489**	n/a	0.456**	n/a	0.725***
Trauma and injuries	0	0.556***	0	0.576**	0	0.897***	0	0.705***	-0.638	1.328***	0	1.344***	0	1.090***	-0.064	0.589**	0	1.024***	0	1.058***
Genito-urinary	-0.063	0.934***	-0.931*	0.716***	-0.869*	1.079***	-0.588	0.988***	-1.977	1.015***	-0.024	0.733***	-2.997	0.878***	-2.83	0.631***	-0.494	0.598***	-0.160	0.855***
Maternity and neonates	0	0.757***	-0.121	0.678***	-0.056	0.865***	-0.085	0.614**	-0.057	0.563**	-0.030	0.963***	-0.166*	0.653***	-0.04	0.342	-0.136	0.481***	-0.106	0.833***
Poisoning	n/a	2.327***	n/a	1.674***	n/a	1.735***	n/a	1.107***	n/a	1.674***	n/a	2.102***	n/a	0.658**	n/a	1.078**	n/a	0.631**	n/a	1.124***
Healthy individuals	n/a	1.538**	n/a	0.709*	n/a	0.507	n/a	0.709	n/a	1.296**	n/a	1.049	n/a	1.246**	n/a	1.359**	n/a	1.748***	n/a	1.172*
Social care	n/a	1.581***	n/a	1.313**	n/a	1.069*	n/a	1.702***	n/a	1.669**	n/a	1.192*	n/a	0.844	n/a	1.592**	n/a	1.859***	n/a	1.613***
Other	n/a	0.681***	n/a	0.337***	n/a	0.532***	n/a	0.447***	n/a	0.553***	n/a	0.338***	n/a	0.564***	n/a	0.520***	n/a	0.518***	n/a	0.585***

Note: *** denotes p<0.01, * denotes p<0.05, * denotes p<0.10

Table 1 - Estimated outcome and expenditure elasticities, by PBC, 2003/04 to 2012/13

		Point estimate (deterministic)	Point estimate (probabilistic)	5th percentile	95th percentile
2003/04	Cost per QALY	£6,381	£6,381	£5,048	£8,534
	Health opportunity costs of £10mn (QALYs)	1,567	1,567	1,172	1,981
2004/05	Cost per QALY	£5,389	£5,377	£4,110	£7,517
	Health opportunity costs of £10mn (QALYs)	1,856	1,860	1,330	2,433
2005/06	Cost per QALY	£7,613	£7,635	£5,611	£11,619
	Health opportunity costs of £10mn (QALYs)	1,314	1,310	861	1,782
2006/07	Cost per QALY	£6,844	£6,838	£5,139	£9,878
	Health opportunity costs of £10mn (QALYs)	1,461	1,462	1,012	1,946
2007/08	Cost per QALY	£9,747	£9,765	£7,689	£13,043
	Health opportunity costs of £10mn (QALYs)	1,026	1,024	767	1,301
2008/09	Cost per QALY	£12,960	£13,271	£8,390	£32,881
	Health opportunity costs of £10mn (QALYs)	772	754	304	1,192
2009/10	Cost per QALY	£9,887	£9,920	£6,802	£17,296
	Health opportunity costs of £10mn (QALYs)	1,011	1,008	578	1,470
2010/11	Cost per QALY	£10,225	£10,214	£7,073	£17,153
	Health opportunity costs of £10mn (QALYs)	978	979	583	1,414
2011/12	Cost per QALY	£8,997	£8,985	£6,520	£13,945
	Health opportunity costs of £10mn (QALYs)	1,112	1,113	717	1,534
2012/13	Cost per QALY	£14,410	£14,411	£11,182	£19,861
	Health opportunity costs of £10mn (QALYs)	694	694	504	894

Table 2 - Marginal productivity for 2003/04 to 2012/13

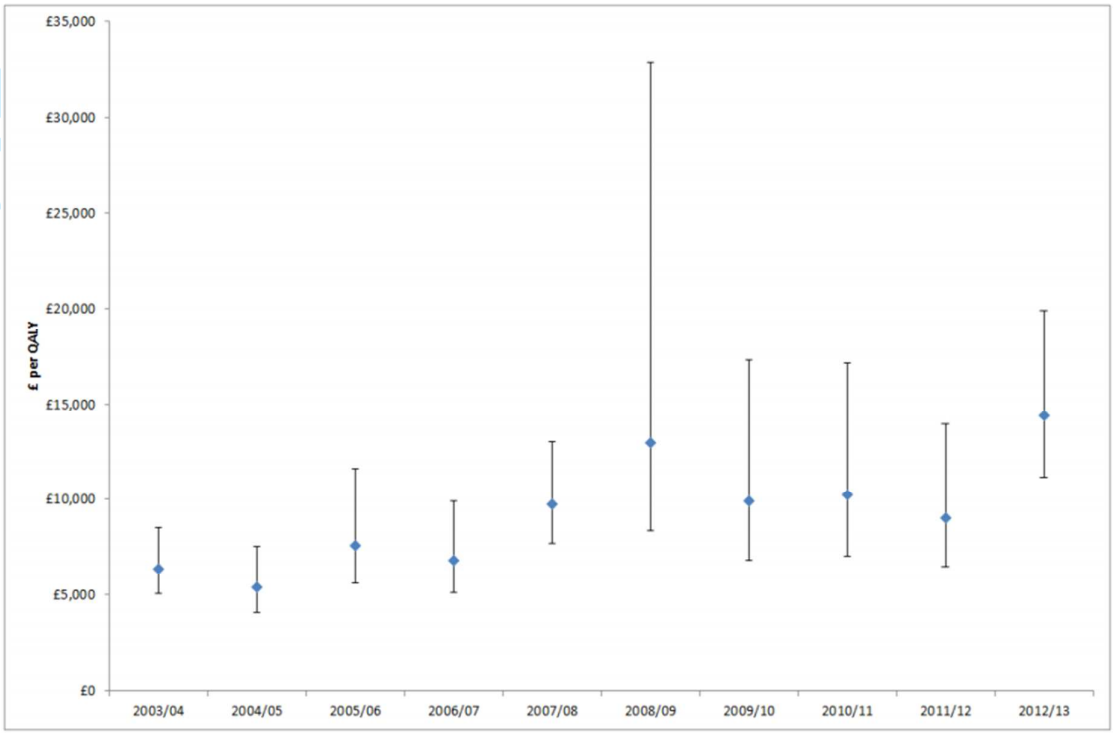

Figure 1 - Marginal productivity for 2003/04 to 2012/13 expressed as cost per QALY with 90% confidence intervals

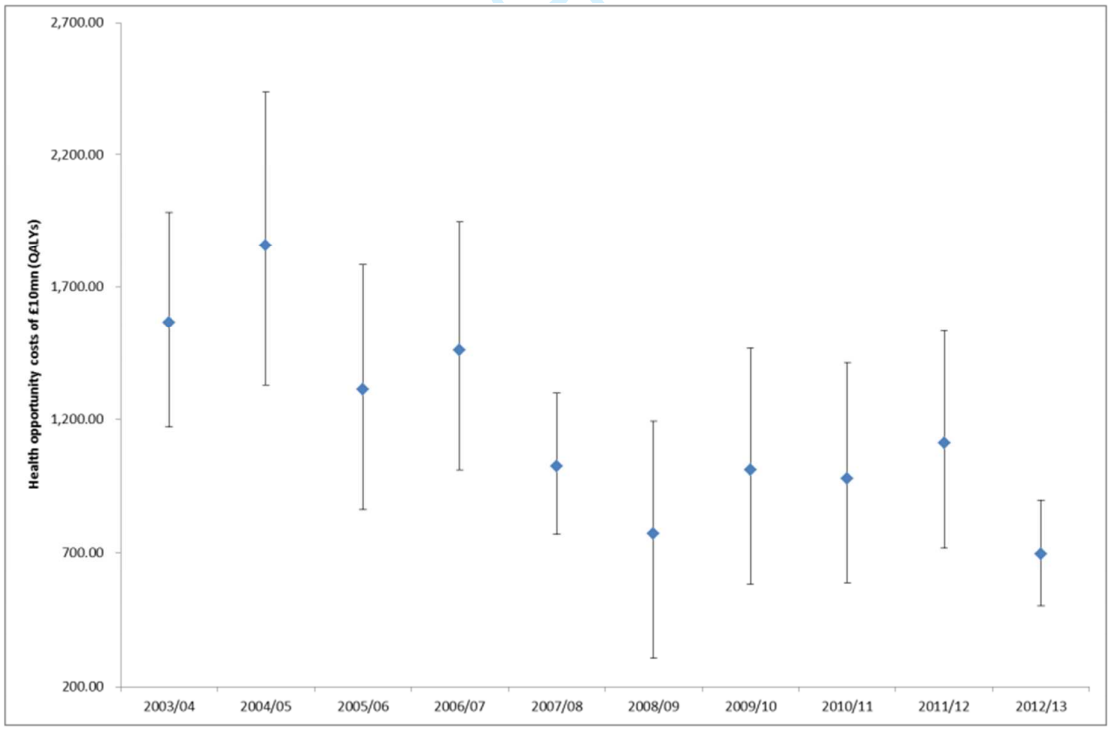

Figure 2 - Marginal productivity for 2003/04 to 2012/13 expressed as QALYs per £10 million with 90% confidence intervals

Appendix

This Appendix is divided into two main sections, A1 and A2.

The first part of the first section (A1.1) provides additional detail on the method used to identify our preferred specification for each outcome and expenditure equation reported in the main paper. The second and third parts of the first section (A1.2 and A1.3 respectively) contain two pieces of sensitivity analysis. In A1.2, all of our preferred specifications are re-estimated using OLS. We use the resulting outcome and expenditure elasticities to re-calculate the implied all-cause outcome elasticity for each of the study years. This (OLS-based) implied elasticity is typically much smaller (in absolute terms) than the implied all-cause outcome elasticity associated with our IV estimates. The third part of the first section (A1.3) explores the impact of re-estimating our preferred outcome and expenditure specifications for the big four PBCs for 2012/13 using only a single instrument. This is motivated by the idea that potential weak instrument bias can be mitigated to some extent by including only a single instrument (Angrist and Pischke, 2009).

The second section of this appendix (section A2) provides the regression results for the preferred outcome and expenditure equations for each wave of data, in addition to the results of all relevant specification tests.

Contents

A1 Additional detail on methods

A1.1 Determining an appropriate econometric specification for each outcome and expenditure equation

The main paper briefly outlined our strategy for determining the appropriate econometric specification for each outcome and expenditure equation. This process is described in greater detail in this section.

Each wave of data is analysed separately. We use the preferred outcome and expenditure specifications for each PBC for 2008/9 as reported by Claxton et al (2015) as the starting point for the estimation of outcome and expenditure equations for 2009/10. If the 2008/9 specification performs satisfactorily when re-estimated with 20009/10 data, then this becomes our preferred specification for 2009/10 too. A specification is deemed satisfactory if it passes a battery of statistical tests (including an endogeneity test, the Hansen-Sargan over-identification test, and the Kleibergen-Paap F test for instrument strength) and meets three priors: that expenditure reduces mortality ($\widehat{\gamma_2} < 0$) and that expenditure on a given PBC increases with overall budget ($\widehat{\beta_3} > 0$) and decreases with other PBC need ($\widehat{\beta_2} < 0$). If the specification fails a test then it is revised (to make good this failure) and re-estimated. If this approach – of specification revision and re-estimation – fails to reveal an acceptable specification then the entire equation is re-estimated with covariates and instrumental variables using a backwards step-wise procedure. In the rare circumstances where it proves impossible to obtain a satisfactory specification and outlier expenditure values are found, the sample is trimmed in an attempt to find an acceptable specification.

This process -- of applying the preferred specification for the 'current' year to the next wave of data and adjusting the specification where necessary – is used to obtain preferred specifications for each PBC for 2009/10, 2010/11, 2011/12 and 21012/13. To get preferred specifications for each year back to 2003/4, we start with the preferred outcome and expenditure specifications for each PBC for 2009/10 and re-estimate them using data for 2008/9. These specifications are adjusted, if necessary, so that they pass the relevant statistical tests and meet our priors. This process -- of applying the preferred specification for the 'current' year to the previous wave of data and adjusting the specification where necessary – is used to obtain preferred specifications for each PBC for 2008/9, 2007/8, and so on back to 2003/4.

For those readers seeking more detail, the following paragraphs describe more precisely how preferred specifications are identified, and Table A1.1 provides a qualitative indicator of the degree of adjustment required when moving from the preferred specification for one year to the preferred specification for the next year.

1. The preferred specification for the preceding year is used to re-estimate each outcome and expenditure equation for the year under consideration (if there is no precedent specification, this is denoted with a '*' in Table A1.1). If this re-estimation produces a result which (a) passes the appropriate statistical tests and (b) generates coefficients in line with theoretical priors, use this result as our preferred result for the year under consideration. This rule is applied to cases where the preferred specification for the preceding year is either IV or OLS. If this re-estimation produces an acceptable result, this is denoted with a '--' in Table A1.1.

2. If the re-estimation produces a result which does not pass tests/have coefficients in line with priors, re-estimate the equation having adjusted the specification as suggested by the initial result. So, for example, if the initial estimation implies the presence of weak instruments and one of the instruments is insignificant in the first-stage regression, try re-estimating the equation without the insignificant instrument. And if, for example, one of the regressors in the second-stage regression is insignificant, try re-estimating without it. If this re-estimation produces an acceptable result, this is denoted with a 'A' in Table A1.1.

3. If a relatively minor adjustment to the preceding year's specification does not generate a statistically and theoretically acceptable result, re-derive the IV equation to be estimated (again, this applies to cases where the preferred specification for the preceding year is either IV or OLS). That is, use OLS with backward stepwise regression to identify relevant covariates to be included in the second-stage regression having forced in the relevant variables throughout. For the outcome equation we force in own programme expenditure, and for the expenditure equation the other programme need variable and the total budget term are forced in throughout the stepwise procedure.

Having identified relevant covariates for the second-stage regression, again use stepwise backward regression to identify relevant instruments for the first-stage conditioning on the covariates for the second-stage identified above. In other words, these second-stage covariates are forced in throughout stepwise procedure to identify relevant instruments.

Having identified covariates for the second-stage and instruments for the first-stage, re-estimate the IV specification equation using these two sets of variables. If the endogeneity test suggests that a variable (eg own programme expenditure in the outcome equation) is clearly not endogenous then re-estimate using OLS. If this re-estimation produces an acceptable result, this is denoted with a 'B' in Table A1.1.

4. If the above re-estimation approach produces a result which does not pass tests/have coefficients in line with priors, re-estimate the equation having adjusted the specification as suggested by the initial result (for example, if the result fails the misspecification test try adding the squared value of one of the regressors to the specification). If this re-estimation produces an acceptable result, this is denoted with a 'C' in Table A1.1.

5. If the above approaches fail to produce an acceptable result, consider excluding LAs with extreme values of expenditure per person. Only explore this option for programmes with small amounts of expenditure and/or mortality (e.g. by excluding the largest and smallest 5% of values or, very occasionally, by excluding obviously incorrect values). If this re-estimation approach produces an acceptable result, this is denoted with a 'D' in Table A1.1.

6. If all of the above fail then either use a value of zero if an outcome elasticity, or, if an expenditure elasticity, adopt the preceding wave's specification and use the estimate irrespective of test results and coefficients not conforming to priors. If this approach is used, it is denoted with a 'E' in Table A1.1.

Table A1.1 Type of specification adjustment undertaken when analysing next wave of data

PBC	PBC description	2003/04		2004/05		2005/06		2006/07		2007/08	
		Outcome equation	Spend equation	Outcome equation	Spend equation	Outcome equation	Spend equation	Outcome equation	Spend equation	Outcome equation	Spend equation
1	Infectious diseases	A	A	A	A	--	--	A	A	A	--
2	Cancers and tumours	--	A	--	--	A	A	A	--	--	A
3	Diseases of the blood	n/a	B	n/a	A	n/a	--	n/a	--	n/a	--
4	Endocrine, nutritional, metabolic	E	A	A	A	A	--	A	A	D	--
5	Mental health disorders	n/a	--	n/a	--	n/a	--	n/a	--	n/a	--
6	Learning disability	n/a	A	n/a	--	n/a	D	n/a	B	n/a	--
7	Neurological problems	A	--	A	--	A	--	D	A	B	A
8	Vision problems	n/a	--	n/a	--	n/a	--	n/a	--	n/a	C
9	Hearing problems	n/a	A	n/a	C	n/a	--	n/a	--	n/a	A
10	Circulatory problems	--	--	A	--	A	--	--	--	A	--
11	Respiratory problems	--	--	A	--	A	A	--	--	A	A
12	Dental problems	n/a	A	n/a	E	n/a	E	n/a	C	n/a	D
13	Gastro-intestinal problems	A	--	--	--	--	--	--	A	--	A
14	Skin problems	n/a	--	n/a	A	n/a	A	n/a	A	n/a	--
15	Musculo-skeletal problems	n/a	--	n/a	--	n/a	--	n/a	A	n/a	--
16	Trauma and injuries	E	A	E	A	E	A	E	--	*	--
17	Genito-urinary problems	B	A	--	A	--	--	D	A	C	A
18&19	Maternity and neonates	E	A	--	A	--	--	C	--	A	--

20	Poisoning and adverse events	n/a	--	n/a	--	n/a	--	n/a	--	n/a	A
21	Healthy individuals	n/a	A	n/a	A	n/a	B	n/a	B	n/a	C
22	Social care needs	n/a	A	n/a	--	n/a	--	n/a	--	n/a	C
23	Other (includes GMS/PMS)	n/a	A	n/a	--	n/a	--	n/a	A	n/a	--

Key: (i) -- denotes the use of the same specification as the previous year; (ii) A – D indicate the severity of the adjustment to the previous specification with A denoting the most minor adjustment and D indicating the most severe (eg need to trim the sample to remove outliers); (iii) E indicates that no plausible specification could be found; and (iv) n/a denotes not applicable (no outcome measure available for this PBC).

Table A1.1 continued Type of specification adjustment undertaken when analysing next wave of data

PBC	PBC description	2008/09		2009/10		2010/11		2011/12		2012/13	
		Outcome equation	Spend equation	Outcome equation	Spend equation	Outcome equation	Spend equation	Outcome equation	Spend equation	Outcome equation	Spend equation
1	Infectious diseases	A	--	A	--	A	--	B	--	--	--
2	Cancers and tumours	--	--	--	A	--	--	A	--	--	--
3	Diseases of the blood	n/a	--	n/a	B	n/a	B	n/a	--	n/a	--
4	Endocrine, nutritional, metabolic	--	A	A	--	B	C	--	A	B	A
5	Mental health disorders	n/a	--	n/a	--	n/a	--	n/a	--	n/a	--
6	Learning disability	n/a	--	n/a	B	n/a	C	n/a	D	n/a	B
7	Neurological problems	C	--	C	--	C	A	C	A	B	--
8	Vision problems	n/a	--	n/a	A	n/a	--	n/a	--	n/a	--
9	Hearing problems	n/a	--	n/a	C	n/a	--	n/a	C	n/a	--
10	Circulatory problems	--	A	--	--	--	B	--	--	--	A
11	Respiratory problems	--	--	B	--	A	A	--	A	A	--
12	Dental problems	n/a	B	n/a	B	n/a	B	n/a	C	n/a	B
13	Gastro-intestinal problems	A	--	A	--	A	A	A	A	A	--
14	Skin problems	n/a	--	n/a	D	n/a	B	n/a	A	n/a	A
15	Musculo-skeletal problems	n/a	C	n/a	B	n/a	C	n/a	C	n/a	--
16	Trauma and injuries	E	--	E	--	*	A	E	A	E	--
17	Genito-urinary problems	C	--	B	--	B	A	A	--	C	--
18&19	Maternity and neonates	A	--	B	--	B	--	A	A	--	--
20	Poisoning and adverse events	n/a	--	n/a	--	n/a	A	n/a	--	n/a	--
21	Healthy individuals	n/a	--	n/a	--	n/a	A	n/a	--	n/a	A
22	Social care needs	n/a	--	n/a	B	n/a	--	n/a	--	n/a	A
23	Other (includes GMS/PMS)	n/a	--	n/a	B	n/a	--	n/a	A	n/a	--

Key: (i) -- denotes the use of the same specification as the previous year; (ii) A – D indicate the severity of the adjustment to the previous specification with A denoting the most minor adjustment and D indicating the most severe (eg need to trim the sample to remove outliers); (iii) E indicates that no plausible specification could be found; and (iv) n/a denotes not applicable (no outcome measure available for this PBC).

A1.2 Sensitivity of the results to the assumption that expenditure is endogenous

The existing literature provides two estimates of the all-cause mortality elasticity for the English NHS: -0.71 (Andrews et al. 2017) and -1.089 (Claxton et al. 2018). Both of these estimates are for 2005/6 and assume that expenditure is endogenous in the outcome equation and employ an IV estimator. Both elasticities also result from the direct estimation of an all-cause outcome equation.

Although we do not directly estimate an all-cause outcome equation, the disease-specific outcome and expenditure elasticities reported in the main paper can be used to calculate an implied all-cause outcome elasticity. This elasticity is presented in Table A1.2 together with the implied elasticity if all preferred specifications for all PBCs are re-estimated using OLS.

Table A1.2 Implied all-cause mortality elasticity estimates: main analysis (IV) and OLS only approaches

	Implied all-cause mortality	
	IV + OLS (main analysis)	ALL OLS
03/04	-1.246	-0.189
04/05	-1.615	-0.293
05/06	-1.372	-0.144
06/07	-1.496	-0.209
07/08	-1.269	-0.167
08/09	-0.795	-0.154
09/10	-0.941	-0.067
10/11	-1.328	-0.066
11/12	-1.386	-0.177
12/13	-1.028	-0.153

Although the implied all-cause outcome elasticity is always negative using OLS, the (absolute) size of the OLS elasticity is always considerably less than the size of the IV-based elasticity. Of course, the much smaller elasticity is to be expected with the use of OLS and the endogenous nature of expenditure.

The implied all-cause elasticity for 2005/6 (=-1.372) is slightly larger (in absolute terms) than that reported for the same year from a directly estimated all-cause outcome equation by Andrews et al. (2017) and by Claxton et al. (2018). This might be because an implied all-cause elasticity, which is based on component disease-specific elasticities, avoids the 'aggregation bias' inherent in a directly estimated all-cause elasticity.

To further illustrate the impact of using OLS rather than an IV estimator, Table A1.3 reports the outcome and expenditure elasticities for all of our preferred specifications for 2012/13 that were estimated using IVs. These specifications were re-estimated using OLS and the relevant elasticities are also shown in A1.3.

Table A1.3 PBC expenditure and outcome elasticities, 2012/13: main analysis and all OLS approaches

PBC	Expenditure equation		Outcome equation	
	IV elasticity	OLS elasticity	IV elasticity	OLS elasticity
Cancer	1.027**	0.220	-0.361***	-0.042
Circulatory	1.285***	0.869***	-1.464***	-0.380***
Respiratory	0.928***	0.602***	-1.704***	-0.121
Gastro-intestinal	0.997***	0.656***	-1.904**	-0.062
Endocrine	0.951***	0.657***	-0.499	-0.409**
Neurological	0.856***	0.474***	N/a (already OLS)	N/a (already OLS)
Vision	1.411***	0.923***	N/a	N/a
Dental	0.855***	0.737***	N/a	N/a
Skin	1.158***	0.704***	N/a	N/a
Poisoning	1.124***	0.588***	N/a	N/a

*** p<0.01, ** p<0.05, * p<0.1

In all ten expenditure equations and all five outcome equations OLS generates smaller point estimates of the coefficient of interest. In addition, when using OLS, there is no evidence of a statistically significant effect of own-PBC healthcare spending on cancer, respiratory and gastro-intestinal mortality.

A1.3 Sensitivity of IV results to just-identified IV approach

Recent theory suggests that potential weak instrument bias can be mitigated to some extent by including only a single instrument (Angrist & Pischke 2009). To examine the impact of this approach on our results, we have re-estimated those specifications that are over-identified, replacing the multiple instruments with only the strongest one. Tables A1.6 and A1.7 report the results of this analysis for the 'big four' programmes using our preferred outcome and expenditure specifications for 2012/13 (note that variable names are described in section A2.1). These results are summarised in Tables A1.4 and A1.5.

The preferred outcome equations for cancer and gastro-intestinal problems are already just identified. Re-estimation of the preferred outcome equations for circulatory disease and respiratory problems using only a single instrument reduces the absolute size of the outcome elasticity by just under 10%.

Table A1.4

Programme budget category		2012/13 outcome elasticity from preferred specification	Single instrument?	2012/13 outcome elasticity from preferred specification with single instrument
Cancer		-0.361**	Yes	n/a
Circulatory disease		-1.464***	No	-1.332***
Respiratory problems		-1.704***	No	-1.538***
Gastro-intestinal		-1.904**	Yes	n/a

The preferred expenditure equation for gastro-intestinal problems is already just identified. Re-estimation of the preferred expenditure equation for the cancer programme increases the expenditure elasticity marginally, but re-estimation has no effect on the elasticity in both the circulatory and respiratory PBCs.

Table A1.5

Programme budget category		2012/13 expenditure elasticity from preferred specification	Single instrument?	2012/13 expenditure elasticity from preferred specification with single instrument
Cancer		1.027**	No	1.052*
Circulatory disease		1.285***	No	1.285***
Respiratory problems		0.928***	No	0.928***
Gastro-intestinal		0.997***	Yes	n/a

That the use of a single instrument has so little impact on our results is to be expected because we have avoided the use of multiple weak instruments in our preferred specifications.

Table A1.6 Re-estimation of preferred multi-instrument outcome specifications using only a single instrument for the big four programmes for 2012/13

	(1)	(2)	(3)	(4)	(5)	(6)
	PBC 2	PBC 10	PBC 10	PBC 11	PBC 11	PBC 13
	cancer	circulatory	circulatory	respiratory	respiratory	gastro-intestinal
	2012/13 spend	2012/13 spend	2012/13 spend	2012/13 spend	2012/13 spend	2012/13 spend
	SYLLR 2012/13/14	SYLLR 2012/13/14	SYLLR 2012/13/14	SYLLR 2012/13/14	SYLLR 2012/13/14	SYLLR 2012/13/14
	outcome model	outcome model	outcome model	outcome model	outcome model	outcome model
	instrument spend	instrument spend	instrument spend	instrument spend	instrument spend	instrument spend
	weighted	weighted	weighted	weighted	weighted	weighted
	IV second stage	IV second stage	IV second stage	IV second stage	IV second stage	IV second stage
	GMM 2S	GMM 2S	GMM 2S	GMM 2S	GMM 2S	GMM 2S
	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level
	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality
	actual census 12	actual census 12	actual census 12	actual census 12	actual census 12	actual census 12
	12/13 version	12/13 specification	12/13 specification	12/13 version	12/13 version	12/13 specification
VARIABLES	preferred:one instrument	preferred:two instruments	one instrument	preferred:two instruments	one instrument	preferred:one instrument
lLAg2_OHP	-0.361**					
	[0.149]					
lLAneedCARAN	1.023***	2.304***	2.226***			3.878***
	[0.134]	[0.234]	[0.237]			[0.832]
lLAg10_OHP		-1.464***	-1.332***			
		[0.268]	[0.292]			
lLAg11_OHP				-1.704***	-1.538***	
				[0.459]	[0.476]	
LPERMSICK				6.265***	6.129***	
				[1.189]	[1.200]	
LPERMSICKSQ				0.742***	0.733***	
				[0.166]	[0.167]	
lLAg13_OHP						-1.904**
						[0.897]
lLAneedCARANSQ						3.735***
						[1.352]
Constant	6.744***	11.541***	10.899***	23.203***	22.107***	11.547***
	[0.691]	[1.302]	[1.419]	[3.903]	[4.001]	[4.024]
Observations	149	149	149	149	149	149
Endogeneity test statistic	8.481	30.621	26.263	20.193	21.300	8.574
Endogeneity p-value	0.004	0.000	0.000	0.000	0.000	0.003
Kleibergen-Paap LM test statistic	10.435	24.067	20.885	19.742	18.916	10.507
Kleibergen-Paap p-value	0.001	0.000	0.000	0.000	0.000	0.001
Kleibergen-Paap F statistic	11.262	19.517	40.357	16.644	33.278	10.363
Pesaran-Taylor reset statistic	0.408	0.086	1.524	0.096	0.301	0.039
Pesaran-Taylor p-value	0.523	0.769	0.217	0.757	0.583	0.843
Hansen-Sargan test statistic		0.810		2.227		
Hansen-Sargan p-value		0.368		0.136		
Robust standard errors in brackets						
*** p<0.01, ** p<0.05, * p<0.1						

Table A1.7 Re-estimation of preferred multi-instrument expenditure specifications using only a single instrument for the big four programmes for 2012/13

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	PBC 2	PBC 2	PBC 10	PBC 10	PBC 11	PBC 11	PBC 13
	cancer	cancer	circulatory	circulatory	respiratory	respiratory	gastro problems
	2012/13 spend	2012/13 spend	2012/13 spend	2012/13 spend	2012/13 spend	2012/13 spend	2012/13 spend
	SYLLR 2012/13/14	SYLLR 2012/13/14	SYLLR 2012/13/14	SYLLR 2012/13/14	SYLLR 2012/13/14	SYLLR 2012/13/14	SYLLR 2012/13/14
	spend model	spend model	spend model	spend model	spend model	spend model	spend model
	instrument o/need	instrument o/need	instrument o/need	instrument o/need	instrument o/need	instrument o/need	instrument o/need
	weighted	weighted	weighted	weighted	weighted	weighted	weighted
	IV second stage	IV second stage	IV second stage	IV second stage	IV second stage	IV second stage	IV second stage
	GMM 2S	GMM 2S	GMM 2S	GMM 2S	GMM 2S	GMM 2S	GMM 2S
	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level
	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality
	actual census 12	actual census 12	actual census 12	actual census 12	actual census 12	actual census 12	actual census 12
	12/13 specification	12/13 specification	12/13 specification	12/13 specification	12/13 specification	12/13 specification	12/13 specification
VARIABLES	preferred:two instruments	one instrument	preferred:two instruments	one instrument	preferred:two instruments	one instrument	preferred:one instrument
lSYLLRacExCancer	-1.565***	-1.569***					
	[0.326]	[0.331]					
lLAgall_OHP	1.027**	1.052*	1.285***	1.285***	0.928***	0.928***	0.997***
	[0.522]	[0.596]	[0.161]	[0.165]	[0.163]	[0.164]	[0.171]
lLAneedCARAN	1.472**	1.447**					
	[0.599]	[0.665]					
lPROFOCCU	-0.472***	-0.477***					
	[0.173]	[0.181]					
lSYLLRacExCirc			-0.908***	-0.929***			
			[0.159]	[0.163]			
lNQUAL174			0.382***	0.376***	0.408***	0.408***	0.357***
			[0.078]	[0.080]	[0.071]	[0.071]	[0.076]
lWHITEEG			0.191***	0.201***			
			[0.050]	[0.051]			
lSYLLRacExResp					-0.370*	-0.370*	
					[0.193]	[0.193]	
lLAneedCARANSQ					1.945***	1.946***	0.622
					[0.395]	[0.400]	[0.475]
lSYLLRacExGast							-0.570***
							[0.218]
Constant	5.169	4.998	1.110	1.231	0.296	0.295	0.942
	[3.768]	[4.240]	[0.993]	[1.014]	[0.744]	[0.746]	[0.872]
Observations	149	149	149	149	149	149	149
Endogeneity test statistic	28.098	26.230	12.964	15.021	6.507	6.481	7.495
Endogeneity p-value	0.000	0.000	0.000	0.000	0.011	0.011	0.006
Hansen-Sargan test statistic	0.008		2.162		0.000		
Hansen-Sargan p-value	0.929		0.141		0.985		
Kleibergen-Paap LM test statistic	18.904	18.899	31.331	27.198	23.711	23.540	29.937
Kleibergen-Paap p-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Kleibergen-Paap F statistic	18.752	37.971	65.251	98.789	23.538	47.153	122.358
Pesaran-Taylor reset statistic	2.365	2.213	0.808	1.271	0.483	0.363	0.024
Pesaran-Taylor p-value	0.124	0.137	0.369	0.260	0.487	0.547	0.878
Robust standard errors in brackets							
*** p<0.01, ** p<0.05, * p<0.1							

A2 Results for specific equations underpinning main results

In this section we provide the regression results for the preferred outcome and expenditure equations for each wave of data, in addition to the results of all relevant specification tests.

A2.1 Description of variables

The census based variables used in this study have the following names:

Short variable name	Long variable name
BORNEXEU	Proportion of residents born outside the European Union
WHITEEG	Proportion of population in white ethnic group
PCWALLTI	Proportion of population of working age (16-74) with a limiting long-term illness
POPPUCAR	Proportion of population providing unpaid care
NQUAL174	Proportion of population aged 16-74 with no qualifications
HHNOCAR	Proportion of households without a car
OWNOCC	Proportion of owner occupied households
LONEPENH	Proportion of lone pensioner households
LONEPARH	Proportion of one parent households
PERMSICK	Proportion of population aged 16-74 that are permanently sick
PC74LTUN	Proportion of population aged 16-74 are long-term unemployed
WORKAGRI	Proportion of 16-74 in employment that are in agriculture
PROFOCCU	Proportion of those aged 16-74 that are in professional occupations

The short variable names are augmented with both a prefix and suffix in the preferred specifications reported below. An 'L' in the prefix denotes that the log value of the variable has been used in the estimation, and the numeric suffix denotes the year to which the variable relates. To obtain values for non-census years we interpolated values between the 2001 and 2011 censuses. We used census values for 2011 when estimating specifications for 2012.

Other (non-census based) indicators used in this study include:

IMD2007	Index of Multiple Deprivation 2007
IMD2010	Index of Multiple Deprivation 2010
needCARAN	Need index (incorporates CARAN or other relevant needs formula)
DIAPREV	Diabetes prevalence rate
EPIPREV	Epilepsy prevalence rate
HIVNEEDPH	HIV need index
CKDPREV	Chronic kidney disease prevalence rate
MATNEEDPP	Maternity need index

As is the case for the census-based variables, the short variable names for these other indicators are augmented with both a prefix and suffix in the preferred specifications reported below. An 'L' in the

prefix denotes that the log value of the variable has been used in the estimation, and the numeric suffix denotes the year to which the variable relates. Thus 'lLAhivneedph' denotes the log of the value of the HIV need index at local authority level. Sometimes, specifications 'fail' the reset test and we add the square of one of the indicators. These variables are denoted either with a '2' as a suffix (for example, 'lLAhivneedph2' is the square of the HIV need index, and 'lLAneedCARAN342' is the square of the need index for 2003/4) or with `SQ' as a suffix (for example, 'LPERMSICK07SQ' is the square of the 'permanently sick' variable for 2007).

The programme specific expenditure variables have names like 'lLAg1_34' where 'l' denotes that the log value has been used, 'LA' denotes that expenditure has been mapped to a local authority geography, 'g1' denotes expenditure in PBC 1, and '34' denotes expenditure in the financial year 2003/4. The variable name 'lLAgall_34' relates to expenditure across all PBCs in 2003/4. Sometimes, we combine expenditure across two PBCs. Thus the variable name 'lLAg1819_78' relates to expenditure across PBC 18 and PBC 19 combined in 2007/8.

The mortality variables have names like 'lSYLLRallcause345' where 'l' denotes that the log value has been used, 'SYLLR' denotes that the standardised years of life lost rate has been used, 'all cause' relates to the disease coverage, and '345' denotes that the data relate to 2003, 2004, and 2005 combined. A further example is 'lSYLLRacExIandP345'; this is a proxy for 'other PBC need' in the expenditure equation for the infectious and parasitic diseases PBC and 'acExIandP' refers to all-cause mortality excluding infectious and parasitic diseases. Another example is 'lSYLLRacExDIA345'; this is a proxy for 'other PBC need' in the expenditure equation for the diabetes PBC, and 'acExDIA' refers to all-cause mortality excluding diabetes.

All regressions are weighted regressions where analytical weights are constructed using the populations of the LAs.

Descriptive statistics for 2012/13 for a selection of variables employed in the analysis are shown in Table A2.0 below. There are 151 observations for each variable and, with the exception of the infant mortality rate, all mortality rates refer to the standardised years of life lost rate per 10,000 of European standard population. Average NHS expenditure per person on healthcare is £1,839. On average, 13% of all residents are born outside the European Union, 31% of the working-age population are employed in managerial and professional occupations, and 62% of households are owner occupied. However, these averages mask considerable variation across local authorities: the proportion of residents born outside the EU varies from under 2% to more than 50%, and the extent of owner occupation ranges between 26% and 81% of all households.

Table A2.0 Descriptive statistics for 2012/13 for a selection of variables employed in the analysis

Variable description	Mean	Standard deviation	Minimum	Maximum
Expenditure per person (£)	1838.84	245.2	1420.48	2656.33
Raw population	350905	265305	11743	1438699
Mortality rates				
Infectious and parasitic disease mortality	6.24	2.7	0	14.45
Cancer mortality	160.86	20.78	93.63	207.91
Diabetes mortality	4.12	1.67	0.25	9.48
Epilepsy mortality	3.71	1.68	0	9.64
Circulatory disease mortality	88.09	19.76	43.2	141.77
Respiratory mortality	25.24	8.88	10.8	57.47
Gastro-intestinal mortality	24.01	9.97	0	61.8
Renal mortality	0.46	0.38	0	2.1
Infant (28 day) mortality rate	2.69	0.83	0	5.5
Socio-economic variables				
Proportion of all residents born outside the European Union	0.129	0.115	0.014	0.506
Proportion of population in white ethnic group	0.835	0.163	0.290	0.985
Proportion of population providing unpaid care	0.101	0.014	0.065	0.129
Proportion of population aged 16-74 with no qualifications	0.247	0.060	0.072	0.387
Proportion of households without a car	0.285	0.124	0.090	0.694
Proportion of households that are owner occupied	0.620	0.114	0.261	0.809
Proportion of households that are one pensioner households	0.120	0.021	0.060	0.167
Proportion of households that are lone parent households with dependent children	0.075	0.018	0.021	0.144
Proportion of population aged 16-74 that are permanently sick	0.043	0.015	0.016	0.088
Proportion of those aged 16-74 that are long-term unemployed	0.018	0.006	0.009	0.037
Proportion of those aged 16-74 in employment that are working agriculture	0.006	0.009	0.000	0.054
Proportion of those aged 16-74 in managerial and professional occupations	0.312	0.077	0.183	0.667
Index of Multiple Deprivation, 2010	23.112	8.62	5.445	43.447

A2.2 Second stage of IV regressions and OLS regressions results tables

Table A2.1 Preferred outcome specifications for 2003/04

Table A2.2 Preferred expenditure specifications for 2003/04

Table A2.3 Preferred outcome specifications for 2004/05

Table A2.4 Preferred expenditure specifications for 2004/05

Table A2.5 Preferred outcome specifications for 2005/06

Table A2.6 Preferred expenditure specifications for 2005/06

Table A2.7 Preferred outcome specifications for 2006/07

Table A2.8 Preferred expenditure specifications for 2006/07

Table A2.9 Preferred outcome specifications for 2007/08

Table A2.10 Preferred expenditure specifications for 2007/08

Table A2.11 Preferred outcome specifications for 2008/09

Table A2.12 Preferred expenditure specifications for 2008/09

Table A2.13 Preferred outcome specifications for 2009/10

Table A2.14 Preferred expenditure specifications for 2009/10

Table A2.15 Preferred outcome specifications for 2010/11

Table A2.16 Preferred expenditure specifications for 2010/11

Table A2.17 Preferred outcome specifications for 2011/12

Table A2.18 Preferred expenditure specifications for 2011/12

Table A2.19 Preferred outcome specifications for 2012/13

Table A2.20 Preferred expenditure specifications for 2012/13

Table A2.1 Preferred outcome specifications for 2003/04

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	PBC 1	PBC 2	PBC 7	PBC 10	PBC 11	PBC 13	PBC 17
	infectious	cancer	neurological	circulatory	respiratory	gastro	genito-urinary
	2003/4 spend	2003/4 spend	2003/4 spend	2003/4 spend	2003/4 spend	2004/5 spend	2003/4 spend
	SYLLR 2003/4/5	SYLLR 2003/4/5	SYLLR 2003/4/5	SYLLR 2003/4/5	SYLLR 2003/4/5	SYLLR 2003/4/5	SYLLR 2003/4/5
	outcome model	outcome model	outcome model	outcome model	outcome model	outcome model	outcome model
	instrument spend	instrument spend	instrument spend	instrument spend	instrument spend	instrument spend	instrument spend
	weighted	weighted	weighted	weighted	weighted	weighted	weighted
	IV second stage	IV second stage	IV second stage	IV second stage	IV second stage	IV second stage	IV second stage
	GMM2S	GMM2S	GMM2S	GMM2S	GMM2S	GMM2S	GMM2S
	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level
	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality
	actual census 03	actual census 03	actual census 03	actual census 03	actual census 03	actual census 03	actual census 03
VARIABLES	04/05 revised	04/05 specification	04/05 revised	04/05 specification	04/05 specification	04/05 revised	re-derived
lLAg1_34	-0.205						
	[0.343]						
lLAhivneedph	0.067						
	[0.072]						
lLAimd_2007exexpobook	0.460***		0.483***				
	[0.138]		[0.142]				
LWHITEEG03	-0.796***						-1.822***
	[0.213]						[0.352]
LPOPPUCAR03	-1.241***						
	[0.421]						
lLAg2_34		-0.201**					
		[0.094]					
lLAneedCARAN34		0.750***		0.716**	3.748***	0.321	
		[0.072]		[0.341]	[0.550]	[0.594]	
lLAg7_34			-0.751*				
			[0.426]				
LWORKAGRI03			0.129**				
			[0.054]				
lLAneedCARAN342			2.472				
			[1.856]				
lLAg10_34				-1.202***			
				[0.182]			
LPERMSICK03				0.637***		1.108***	
				[0.113]		[0.263]	
lLAg11_34					-1.666***		
					[0.446]		
lLAg13_34						-1.493***	
						[0.425]	
lLAg17_34							-0.063
							[0.674]

LNQUAL17403							1.321***
							[0.371]
Constant	-1.843*	5.893***	3.239**	12.254***	9.747***	12.635***	1.263
	[1.082]	[0.393]	[1.296]	[1.023]	[1.777]	[2.414]	[2.895]
Observations	144	151	135	151	151	151	151
Endogeneity test statistic	0.928	4.945	2.165	32.851	28.292	11.906	0.038
Endogeneity p-value	0.336	0.026	0.141	0.000	0.000	0.001	0.846
Kleibergen-Paap LM test statistic	7.931	16.583	12.542	19.283	13.403	14.162	17.836
Kleibergen-Paap p-value	0.005	0.000	0.002	0.000	0.000	0.000	0.000
Kleibergen-Paap F statistic	9.795	10.257	10.043	55.862	28.447	24.260	24.694
Pesaran-Taylor reset statistic	0.641	0.047	0.834	0.009	1.210	0.000	0.177
Pesaran-Taylor p-value	0.423	0.828	0.361	0.924	0.271	0.995	0.674
Hansen-Sargan test statistic		0.971	0.501				
Hansen-Sargan p-value		0.324	0.479				

Robust standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

Table A2.2 Preferred expenditure specifications for 2003/04

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	PBC 1	PBC 2	PBC 3	PBC 4	PBC 5	PBC 6	PBC 7	PBC 8	PBC 9	PBC 10
	infectious	cancer	blood	endocrine	mental health	LDisability	neurological	vision	hearing	circulatory
	2003/4 spend	2003/4 spend	2003/4 spend	2003/4 spend	2003/4 spend	2003/04 spend	2003/04 spend	2003/4 spend	2003/4 spend	2003/4 spend
	SYLLR 2003/4/5	SYLLR 2003/4/5	SYLLR 2003/4/5	SYLLR 2003/4/5	SYLLR 2003/4/5/	SYLLR 2003/04/05	SYLLR 2003/04/05	SYLLR 2003/4/5	SYLLR 2003/4/5	SYLLR 2003/4/5
	spend model	spend model	spend model	spend model	spend model	spend model	spend model	spend model	spend model	spend model
	instrument n/a	instrument o/need	instrument n/a	instrument n/a	instrument n/a	instrument n/a	instrument n/a	instrument o/need	instrument o/need	instrument o/need
	weighted	weighted	weighted	weighted	weighted	weighted	weighted	weighted	weighted	weighted
	OLS	IV second stage GMM2S	OLS	OLS	OLS	OLS	OLS	IV second stage GMM2S	IV second stage GMM2S	IV second stage GMM2S
	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level
	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality
	actual census 03	actual census 03	actual census 03	actual census 04	actual census 03	actual census 03	actual census 03	actual census 03	actual census 03	actual census 03
VARIABLES	04/05 revised	04/05 specification	re-derived OLS	04/05 revised	04/05 specification	04/05 revised	04/05 specification	04/05 specification	04/05 revised	04/05 specification
lLAgall_34	1.094***	1.711***	0.652*	0.653***	1.333***	0.646*	1.408***	0.833***	0.694*	1.873***
	[0.254]	[0.294]	[0.381]	[0.113]	[0.162]	[0.331]	[0.205]	[0.276]	[0.407]	[0.288]
lLAhivneedph	0.274***									
	[0.033]									
lSYLLRacExIandP345	-0.075									
	[0.183]									
lLAhivneedph2	0.138***									
	[0.027]									
lSYLLRacExCancer345		-1.088***								
		[0.237]								
LPROFOCCU03		-0.460***								
		[0.126]								
lSYLLRallcause345			0.321		-0.155	0.204		-0.612**	0.768	
			[0.333]		[0.143]	[0.263]		[0.301]	[0.487]	
LBORNEXEU03			0.110***							
			[0.036]							
lLAneedCARAN34			0.222							
			[0.420]							
LNQUAL17403				0.274***				0.744***		0.907***
				[0.061]				[0.141]		[0.120]
LWHITEEG03				-0.162*						
				[0.090]						
lSYLLRacExDIA345				-0.234**						
				[0.112]						
lLAmhneedindexpp					0.308*					
					[0.157]					
LPOPPUCAR03					-0.597***				0.865***	
					[0.107]				[0.259]	
LHHNOCAR03						-0.426***				
						[0.142]				
lLAneedCARAN342						1.262				
						[1.176]				

lLAepiprev0304							0.319***			
							[0.114]			
lSYLLRacExEPI345							-0.492***			
							[0.139]			
LLONEPENH03									-0.646**	
									[0.271]	
LPC74LTUN03									-0.463***	
									[0.134]	
LLONEPARH03									-0.428	
									[0.269]	
lLAimd_2007exexpobook									0.423**	
									[0.187]	
lSYLLRacExCirc345										-1.759***
										[0.335]
Constant	-4.412***	-2.084	-3.602	0.584	-4.828***	-2.782	-1.831	2.111*	-11.683***	3.212**
	[1.181]	[1.347]	[2.926]	[0.797]	[1.559]	[2.716]	[1.298]	[1.225]	[3.401]	[1.305]
Observations	147	151	150	149	151	137	151	151	151	151
R-squared	0.623		0.244	0.366	0.665	0.098	0.330			
Ramsey reset F statistic	1.280		1.021	2.043	1.403	0.678	0.144			
Probability > F	0.284		0.386	0.111	0.244	0.567	0.934			
Endogeneity test statistic		9.775						3.979	0.261	21.240
Endogeneity p-value		0.002						0.046	0.609	0.000
Kleibergen-Paap LM test statistic		26.685						31.247	20.340	23.015
Kleibergen-Paap p-value		0.000						0.000	0.000	0.000
Kleibergen-Paap F statistic		45.579						35.891	28.335	19.117
Pesaran-Taylor reset statistic		0.185						0.437	0.580	1.931
Pesaran-Taylor p-value		0.667						0.509	0.446	0.165
Hansen-Sargan test statistic								0.101	0.129	0.288
Hansen-Sargan p-value								0.751	0.720	0.592

Robust standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

Table A2.2 continued Preferred expenditure specifications for 2003/04

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	PBC 11 respiratory 2003/4 spend SYLLR 2003/4/5 spend model instrument o/need weighted IV second stage GMM2S LA-level actual mortality actual census 03	PBC 12 dental 2003/4 spend SYLLR 2003/4/5 spend model instrument n/a weighted OLS LA-level actual mortality actual census 03	PBC 13 gastro 2004/5 spend SYLLR 2004/5/6 spend model instrument o/need weighted IV second stage GMM2S LA-level actual mortality actual census 03	PBC 14 skin problems 2003/04 spend SYLLR 2003/4/5 spend model instrument n/a weighted OLS LA-level actual mortality actual census 04	PBC 15 musculo-skeletal 2003/04 spend SYLLR 2003/4/5 spend model instrument n/a weighted OLS LA-level actual mortality actual census 03	PBC 16 trauma 2003/4 spend SYLLR 2003/4/5 spend model instrument n/a weighted OLS LA-level actual mortality actual census 03	PBC 17 genito- 2003/4 spend SYLLR 2003/4/5 spend model instrument n/a weighted OLS LA-level actual mortality actual census 03	PBC 1819 mat/neonates 2003/04 spend infant mort rate 2003/04/05 spend model o/need exogenous weighted OLS LA-level actual mortality actual census 03	PBC 20 poisoning 2003/4 spend SYLLR 2003/4/5 spend model instrument o/need weighted IV second stage GMM2S LA-level actual mortality actual census 03
VARIABLES	04/05 specification	04/05 1/99 specification	04/05 specification	04/05 revised	04/05 specification	04/05 revised	04/05 revised	04/05 revised	04/05 specification
lSYLLRallcause345		0.736		0.131	-0.327**	0.091		0.136	-1.909***
		[0.448]		[0.113]	[0.164]	[0.122]		[0.230]	[0.412]
lLAgall_34	1.661***	0.717*	1.409***	0.700***	1.014***	0.556***	0.934***	0.757***	2.327***
	[0.217]	[0.390]	[0.219]	[0.128]	[0.176]	[0.155]	[0.193]	[0.237]	[0.413]
LPOPPUCAR03		0.823*							
		[0.454]							
LNQUAL17403	0.605***	-0.878***	0.706***	0.178**					0.860***
	[0.103]	[0.293]	[0.100]	[0.072]					[0.168]
LWORKAGRI03		0.092**							
		[0.045]							
lSYLLRacExResp345	-0.857***								
	[0.274]								
lSYLLRacExGast345			-1.132***						
			[0.239]						
LPC74LTUN03					-0.165**				
					[0.072]				
LPROFOCCU03					-0.365***				
					[0.082]				
LLONEPENH03						0.551***			
						[0.117]			
lSYLLRacExrenal345							-0.097		
							[0.165]		
LOWNOCC03							-0.403***		
							[0.124]		
lLAmatneedindexpp								0.468***	
								[0.145]	
Constant	-1.549	-6.011**	2.171*	-2.418***	-2.161	0.783	-2.077**	-1.977	-1.079
	[1.126]	[2.659]	[1.212]	[0.859]	[1.684]	[0.900]	[0.921]	[1.790]	[1.587]
Observations	151	147	151	151	151	151	151	151	151
R-squared		0.133		0.391	0.265	0.346	0.498	0.326	

Endogeneity test statistic	10.155		9.194					9.308
Endogeneity p-value	0.001		0.002					0.002
Kleibergen-Paap LM test statistic	26.355		25.192					30.213
Kleibergen-Paap p-value	0.000		0.000					0.000
Kleibergen-Paap F statistic	48.934		96.403					35.169
Pesaran-Taylor reset statistic	0.177		0.021					0.010
Pesaran-Taylor p-value	0.674		0.886					0.919
Ramsey reset F statistic		1.802		1.640	0.560	1.379	1.993	0.301
Probability > F		0.150		0.183	0.642	0.251	0.118	0.824
Hansen-Sargan test statistic								0.584
Hansen-Sargan p-value								0.445

Robust standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

Table A2.2 continued Preferred expenditure specifications for 2003/04

	(1)	(2)	(3)
	PBC 21	PBC 22	PBC 23
	HI	social care	GMS
	2003/4 spend	2003/04 spend	2003/4 spend
	SYLLR 2003/04/05	SYLLR 2003/04/05	SYLLR 2003/4/5
	spend model	spend model	spend model
	instrument o/need	o/need exogenous	instrument n/a
	weighted	weighted	weighted
	IV second stage	OLS	OLS
	GMM2S		
	LA-level	LA-level	LA-level
	actual mortality	actual mortality	actual mortality
	actual census 03	actual census 03	actual census 03
VARIABLES	04/05 IV revised	04/05 revised	04/05 revised
lSYLLRallcause345	-2.190**	-1.539***	-0.117
	[0.983]	[0.381]	[0.116]
lLAgall_34	1.538**	1.581***	0.681***
	[0.606]	[0.513]	[0.144]
LLONEPARH03	1.088**		
	[0.505]		
LWHITEEG03			-0.423***
			[0.083]
Constant	8.683	1.534	0.831
	[5.661]	[2.555]	[0.876]
Observations	151	148	151
R-squared		0.093	0.297
Endogeneity test statistic	7.348		
Endogeneity p-value	0.007		
Hansen-Sargan test statistic	3.994		
Hansen-Sargan p-value	0.136		
Kleibergen-Paap LM test statistic	32.122		
Kleibergen-Paap p-value	0.000		
Kleibergen-Paap F statistic	19.387		
Pesaran-Taylor reset statistic	0.000		
Pesaran-Taylor p-value	0.985		
Ramsey reset F statistic		2.020	0.584
Probability > F		0.114	0.627

Robust standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

Table A2.3 Preferred outcome specifications for 2004/05

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	PBC 1	PBC 2	PBC 4	PBC 7	PBC 10	PBC 11	PBC 13	PBC 17	PBC 1819
	infectious	cancer	endocrine	neurological	circulatory	respiratory	gastro	genito-	mat/neonates
	2004/5 spend	2004/5 spend	2004/5 spend	2004/5 spend	2004/5 spend	2004/5 spend	2004/5 spend	2004/5 spend	2004/05 spend
	SYLLR 2004/5/6	SYLLR 2004/5/6	SYLLR 2004/5/6	SYLLR 2004/5/6	SYLLR 2004/5/6	SYLLR 2004/5/6	SYLLR 2004/5/6	SYLLR 2004/5/6	inf mort rate 2004/05/06
	outcome model	outcome model	outcome model	outcome model	outcome model	outcome model	outcome model	outcome model	outcome model
	instrument n/a	instrument spend	instrument spend	instrument spend	instrument spend	instrument spend	instrument spend	instrument n/a	spend exogenous
	weighted	weighted	weighted	weighted	weighted	weighted	weighted	weighted	weighted
	OLS	IV second stage GMM2S	IV second stage GMM2S	IV second stage GMM2S	IV second stage GMM2S	IV second stage GMM2S	IV second stage GMM2S	OLS	OLS
	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level
	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality
	actual census 04	actual census 04	actual census 04	actual census 04	actual census 04	actual census 04	actual census 04	actual census 04	actual census 04
VARIABLES	05/06 revised	05/06 specification	05/06 revised	05/06 revised	05/06 revised	05/06 revised	05/06 specification	05/06 revised	05/06 specification
lLAhivneedph	0.112**								
	[0.054]								
lLAimd_2007exexpobook	0.282***		0.667***	0.503***					0.235***
	[0.088]		[0.185]	[0.121]					[0.072]
LOWNOCC04	-0.414*								
	[0.242]								
LWHITEEG04	-0.941***							-1.964***	
	[0.195]							[0.340]	
lLAg1_45	-0.100								
	[0.107]								
lLAg2_45		-0.224**							
		[0.111]							
lLAneedCARAN45		0.778***			1.223***	4.895***	3.466***		
		[0.082]			[0.352]	[1.041]	[0.452]		
lLAg4_45			-1.843						
			[1.126]						
lLAdiaprev0405			0.855***						
			[0.297]						
lLAneedCARAN452			2.426						
			[1.905]						
lLAg7_45				-0.968**					
				[0.484]					
LWORKAGRI04				0.126**					
				[0.057]					
lLAg10_45					-1.375***				
					[0.205]				
LPERMSICK04					0.518***				
					[0.104]				
lLAg11_45						-2.494***			
						[0.832]			
lLAg13_45							-1.253***		
							[0.437]		

lLAg17_45								-0.931*	
								[0.550]	
LNQUAL17404								2.156***	0.638***
								[0.477]	[0.166]
lLAg1819_45									-0.121
									[0.101]
LLONEPENH04									-0.409**
									[0.206]
LBORNEXEU04									0.070*
									[0.040]
Constant	1.106***	6.008***	8.364**	4.082**	12.804***	13.346***	8.469***	5.829**	1.210*
	[0.344]	[0.481]	[3.974]	[1.722]	[1.042]	[3.439]	[1.872]	[2.597]	[0.631]
Observations	145	151	136	137	151	151	151	137	151
R-squared	0.565							0.211	0.457
Ramsey reset F statistic	0.698							0.803	1.023
Probability > F	0.555							0.494	0.384
Endogeneity test statistic		2.886	3.349	2.863	30.641	26.954	6.925		
Endogeneity p-value		0.089	0.067	0.091	0.000	0.000	0.009		
Hansen-Sargan test statistic		0.297		0.880					
Hansen-Sargan p-value		0.586		0.348					
Kleibergen-Paap LM test statistic		14.712	7.045	16.830	21.333	7.554	16.801		
Kleibergen-Paap p-value		0.001	0.008	0.000	0.000	0.006	0.000		
Kleibergen-Paap F statistic		9.441	10.808	14.107	67.065	13.553	33.424		
Pesaran-Taylor reset statistic		2.454	2.713	2.393	0.150	0.551	0.534		
Pesaran-Taylor p-value		0.293	0.100	0.122	0.699	0.458	0.465		

Robust standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

Table A2.4 Preferred expenditure specifications for 2004/05

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	PBC 1 infectious 2004/5 spend SYLLR 2004/5/6 spend model instrument n/a weighted OLS LA-level actual mortality actual census 04 05/06 revised	PBC 2 cancer 2004/5 spend SYLLR 2004/5/6 spend model instrument o/need weighted IV second stage GMM2S LA-level actual mortality actual census 04 05/06 specification	PBC 3 blood 2004/5 spend SYLLR 2004/5/6 spend model instrument n/a weighted OLS LA-level actual mortality actual census 04 05/06 revised	PBC 4 endocrine 2004/5 spend SYLLR 2004/5/6 spend model instrument n/a weighted OLS LA-level actual mortality actual census 04 05/06 revised	PBC 5 mental health 2004/5 spend SYLLR 2004/5/6 spend model instrument n/a weighted OLS LA-level actual mortality actual census 04 05/06 specification	PBC 6 LDisability 2004/05 spend SYLLR 2004/05/06 spend model instrument n/a weighted OLS LA-level actual mortality actual census 04 5/6 specification	PBC 7 neurological 2004/05 spend SYLLR 2004/05/06 spend model instrument n/a weighted OLS LA-level actual mortality actual census 04 5/6 specification	PBC 8 vision 2004/5 spend SYLLR 2004/5/6 spend model instrument o/need weighted IV second stage GMM2S LA-level actual mortality actual census 04 05/06 specification	PBC 9 hearing 2004/5 spend SYLLR 2004/5/6 spend model instrument o/need weighted IV second stage GMM2S LA-level actual mortality actual census 04 re-derived+	PBC 10 circulatory 2004/5 spend SYLLR 2004/5/6 spend model instrument o/need weighted IV second stage GMM2S LA-level actual mortality actual census 04 05/06 specification
VARIABLES										
lLAgall_45	0.932***	1.259***	0.952***	0.573***	0.999***	0.446*	0.929***	1.350***	0.526	1.652***
	[0.210]	[0.278]	[0.355]	[0.111]	[0.170]	[0.260]	[0.212]	[0.319]	[0.412]	[0.247]
lLAhivneedph	0.252***									
	[0.028]									
lSYLLRacExIandP456	-0.125									
	[0.158]									
lLAhivneedph2	0.092***									
	[0.024]									
lSYLLRacExCancer456		-1.622***								
		[0.495]								
LPROFOCCU04		-0.907***								
		[0.275]								
LOWNOCC04		-0.578**	-0.679***							
		[0.281]	[0.180]							
lSYLLRallcause456			-0.027		-0.108	-0.154		-0.825***	0.870	
			[0.203]		[0.154]	[0.211]		[0.293]	[0.540]	
LNQUAL17404				0.172**				0.635***		0.667***
				[0.068]				[0.117]		[0.099]
LWHITEEG04				-0.215***						
				[0.082]						
lSYLLRacExDIA456				-0.103						
				[0.106]						
lLAmhneedindexpp					0.356*					
					[0.182]					
LPOPPUCAR04					-0.743***				1.026***	
					[0.099]				[0.325]	
lLAneedCARAN452						3.141**				
						[1.563]				
lLAepiprev0405							0.196*			
							[0.106]			
lSYLLRacExEPI456							-0.306**			

							[0.136]			
LLONEPENH04									-0.458	
									[0.289]	
LPC74LTUN04									-0.239*	
									[0.142]	
LLONEPARH04									-0.006	
									[0.313]	
lSYLLRacExCirc456										-1.390***
										[0.283]
Constant	-2.947***	3.265*	-4.090**	0.224	-3.165*	1.448	-0.206	-0.380	-6.905*	2.137**
	[1.015]	[1.973]	[1.814]	[0.792]	[1.786]	[1.613]	[1.367]	[1.119]	[3.779]	[1.064]
Observations	145	151	151	151	151	137	151	151	151	151
R-squared	0.584		0.371	0.369	0.667	0.073	0.200			
Ramsey reset F statistic	0.330		0.444	1.478	1.235	0.612	1.654			
Probability > F	0.803		0.722	0.223	0.299	0.609	0.180			
Endogeneity test statistic		13.951						4.380	0.049	18.772
Endogeneity p-value		0.000						0.036	0.825	0.000
Kleibergen-Paap LM test statistic		14.760						35.712	29.992	25.947
Kleibergen-Paap p-value		0.000						0.000	0.000	0.000
Kleibergen-Paap F statistic		14.608						41.912	40.253	23.031
Pesaran-Taylor reset statistic		0.442						0.123	0.044	0.024
Pesaran-Taylor p-value		0.506						0.726	0.835	0.877
Hansen-Sargan test statistic								2.023	1.404	1.474
Hansen-Sargan p-value								0.155	0.236	0.225

Robust standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

Table A2.4 continued Preferred expenditure specifications for 2004/05

	(1) PBC 11 respiratory 2004/5 spend SYLLR 2004/5/6 spend model instrument o/need weighted IV second stage GMM2S LA-level actual mortality actual census 04 05/06 specification	(2) PBC 13 gastro 2004/5 spend SYLLR 2004/5/6 spend model instrument o/need weighted IV second stage GMM2S LA-level actual mortality actual census 04 05/06 specification	(3) PBC 14 skin problems 2004/05 spend SYLLR 2004/5/6 spend model instrument n/a weighted OLS LA-level actual mortality actual census 04 05/06 specification	(4) PBC 15 musculo-skeletal 2004/05 spend SYLLR 2004/5/6 spend model instrument n/a weighted OLS LA-level actual mortality actual census 04 05/06 specification	(5) PBC 16 trauma 2004/5 spend SYLLR 2004/5/6 spend model instrument n/a weighted OLS LA-level actual mortality actual census 04 05/06 revised	(6) PBC 17 genito- 2004/5 spend SYLLR 2004/5/6 spend model instrument n/a weighted OLS LA-level actual mortality actual census 04 05/06 revised	(7) PBC 1819 mat/neonates 2004/05 spend infant mort rate 2004/05/06 spend model o/need exogenous weighted OLS LA-level actual mortality actual census 04 05/06 revised	(8) PBC 20 poisoning 2004/5 spend SYLLR 2004/5/6 spend model instrument o/need weighted IV second stage GMM2S LA-level actual mortality actual census 04 05/06 specification
VARIABLES								
lSYLLRacExResp456	-0.377*							
	[0.205]							
lLAgall_45	1.253***	0.928***	0.595***	0.567***	0.576**	0.716***	0.678***	1.674***
	[0.186]	[0.167]	[0.203]	[0.164]	[0.235]	[0.242]	[0.156]	[0.297]
LNQUAL17404	0.430***	0.467***	0.176*					0.706***
	[0.080]	[0.066]	[0.101]					[0.142]
lSYLLRacExGast456		-0.399**						
		[0.203]						
lSYLLRallcause456			0.114	-0.023	-0.244		-0.025	-1.414***
			[0.175]	[0.158]	[0.150]		[0.127]	[0.295]
LWORKAGRI04			-0.032					
			[0.020]					
LPC74LTUN04				-0.203***		1.522**		
				[0.063]		[0.699]		
LPROFOCCU04				-0.390***				
				[0.097]				
lLAneedCARAN45					0.618**			
					[0.278]			
lSYLLRacExrenal456						-0.160		
						[0.188]		
LPC74LTUN04SQ						0.154*		
						[0.078]		
lLAmatneedindexpp							0.600***	
							[0.134]	
LLONEPENH04							-0.276*	
							[0.144]	
Constant	-1.899**	0.749	-1.639	-1.025	1.679	3.734	-0.983	0.219
	[0.802]	[0.746]	[1.055]	[1.468]	[1.957]	[2.268]	[0.998]	[1.395]
Observations	151	151	151	151	151	151	151	151

Endogeneity test statistic	5.586	1.528						12.795
Endogeneity p-value	0.018	0.216						0.000
Kleibergen-Paap LM test statistic	28.181	33.441						33.481
Kleibergen-Paap p-value	0.000	0.000						0.000
Kleibergen-Paap F statistic	58.442	112.795						40.539
Pesaran-Taylor reset statistic	0.021	0.845						1.118
Pesaran-Taylor p-value	0.885	0.358						0.290
Hansen-Sargan test statistic								1.316
Hansen-Sargan p-value								0.251
R-squared			0.362	0.249	0.363	0.366	0.523	
Ramsey reset F statistic			1.547	1.891	0.676	1.843	1.850	
Probability > F			0.205	0.134	0.568	0.142	0.141	

Robust standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

Table A2.4 continued Preferred expenditure specifications for 2004/05

	(1) PBC 21 HI 2004/05 spend SYLLR 2004/05/06 spend model o/need exogenous weighted OLS LA-level actual mortality actual census 04	(2) PBC 22 social care 2004/05 spend SYLLR 2004/05/06 spend model o/need exogenous weighted OLS LA-level actual mortality actual census 04	(3) PBC 23a GMS 2004/5 spend SYLLR 2004/5/6 spend model instrument n/a weighted OLS LA-level actual mortality actual census 04
VARIABLES	05/06 revised OLS	05/06 OLS	05/06 specification
lLAgall_45	0.709*	1.313**	0.337***
	[0.411]	[0.511]	[0.096]
LWORKAGRI04	-0.047		0.034***
	[0.036]		[0.012]
LWHITEEG04			-0.170***
			[0.046]
lSYLLRallcause456	0.323	-0.940**	0.071
	[0.277]	[0.427]	[0.062]
Constant	-4.176**	-0.206	2.166***
	[1.881]	[3.050]	[0.487]
Observations	151	98	146
R-squared	0.174	0.076	0.259
Ramsey reset F statistic	1.780	1.085	1.314
Probability > F	0.154	0.360	0.272

Robust standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

Table A2.5 Preferred outcome specifications for 2005/06

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	PBC 1	PBC 2	PBC 4	PBC 7	PBC 10	PBC 11	PBC 13	PBC 17	PBC 1819
	infectious	cancer	endocrine	neurological	circulatory	respiratory	gastro	genito-	mat/neonates
	2005/6 spend	2005/6 spend	2005/6 spend	2005/6 spend	2005/6 spend	2005/6 spend	2005/6 spend	2005/6 spend	2005/06 spend
	SYLLR 2005/6/7	SYLLR 2005/6/7	SYLLR 2005/6/7	SYLLR 2005/6/7	SYLLR 2005/6/7	SYLLR 2005/6/7	SYLLR 2005/6/7	SYLLR 2005/6/7	infant mort rate 2005/6/7
	outcome model	outcome model	outcome model	outcome model	outcome model	outcome model	outcome model	outcome model	outcome model
	instrument spend	instrument spend	instrument spend	instrument spend	instrument spend	instrument spend	instrument spend	instrument n/a	spend exogenous
	weighted	weighted	weighted	weighted	weighted	weighted	weighted	weighted	weighted
	IV second stage	IV second stage	IV second stage	IV second stage	IV second stage	IV second stage	IV second stage	OLS	OLS
	GMM2S	GMM2S	GMM2S	GMM2S	GMM2S	GMM2S	GMM2S		
	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level
	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality
	actual census 05	actual census 05	actual census 05	actual census 05	actual census 05	actual census 05	actual census 05	actual census 05	actual census 05
VARIABLES	6/7 specification	06/07 revised	06/07 specification	6/7 revised+	06/07 revised+	06/07 revised	06/07 specification	6/7 revised 5/95%	rederived OLS
lLAg1_56	-0.432								
	[0.377]								
lLAhivneedph	0.478***								
	[0.142]								
lLAhivneedph2	0.085								
	[0.084]								
lLAimd_2007exexpobook	0.372***		0.629***	0.223**					0.158**
	[0.097]		[0.149]	[0.102]					[0.070]
lLAg2_56		-0.159*							
		[0.086]							
lLAneedCARAN56		0.758***			0.901**	4.676***	3.416***		
		[0.078]			[0.381]	[1.026]	[0.587]		
lLAg4_56			-1.035						
			[1.002]						
lLAdiaprev0506			1.023***						
			[0.371]						
lLAg7_56				-0.325					
				[0.434]					
LPOPPUCAR05				10.101				-2.979**	
				[8.381]				[1.486]	
LPOPPUCAR05SQ				1.971					
				[1.781]					
lLAg10_56					-1.637***				
					[0.354]				
LPERMSICK05					0.737***				
					[0.135]				
lLAg11_56						-2.217***			
						[0.827]			
lLAneedCARAN562						1.629			
						[1.293]			
lLAg13_56							-1.014*		
							[0.523]		

lLAg17_56								-0.869*	
								[0.465]	
LNQUAL17405								2.533***	0.719***
								[0.711]	[0.146]
LOWNOCC05								-0.849	
								[0.576]	
LWHITEEG05								-0.822	
								[0.515]	
lLAg1819_56									-0.056
									[0.089]
LLONEPENH05									-0.404*
									[0.233]
LBORNEXEU05									0.078*
									[0.043]
Constant	2.241**	5.730***	6.349	14.837	14.726***	12.403***	7.559***	-0.941	1.289**
	[0.925]	[0.381]	[4.263]	[10.345]	[1.927]	[3.496]	[2.294]	[2.829]	[0.608]
Observations	149	151	136	136	151	151	151	136	151
R-squared								0.228	0.407
Endogeneity test statistic	1.680	3.078	0.937	1.490	28.751	20.370	6.411		
Endogeneity p-value	0.195	0.079	0.333	0.222	0.000	0.000	0.011		
Kleibergen-Paap LM test statistic	12.475	18.668	8.162	20.976	14.371	7.453	16.180		
Kleibergen-Paap p-value	0.000	0.000	0.004	0.000	0.001	0.006	0.000		
Kleibergen-Paap F statistic	19.089	15.860	9.794	15.137	14.185	12.876	29.084		
Pesaran-Taylor reset statistic	0.046	0.912	0.194	0.079	0.330	0.784	0.510		
Pesaran-Taylor p-value	0.830	0.340	0.660	0.779	0.566	0.376	0.475		
Hansen-Sargan test statistic		0.052		0.028	0.292				
Hansen-Sargan p-value		0.820		0.868	0.589				
Ramsey reset F statistic								0.538	0.003
Probability > F								0.657	1.000

Robust standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

Table A2.6 Preferred expenditure specifications for 2005/06

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	PBC 1	PBC 2	PBC 3	PBC 4	PBC 5	PBC 6	PBC 7	PBC 8	PBC 9	PBC 10
	infectious	cancer	blood	endocrine	mental health	LDisability	neurological	vision	hearing	circulatory
	2005/6 spend	2005/6 spend	2005/6 spend	2005/6 spend	2005/6 spend	2005/06 spend	2005/06 spend	2005/6 spend	2005/6 spend	2005/6 spend
	SYLLR 2005/6/7	SYLLR 2005/6/7	SYLLR 2005/6/7	SYLLR 2005/6/7	SYLLR 2005/6/7	SYLLR 2005/06/07	SYLLR 2005/06/07	SYLLR 2005/6/7	SYLLR 2005/6/7	SYLLR 2005/6/7
	spend model	spend model	spend model	spend model	spend model	spend model	spend model	spend model	spend model	spend model
	instrument n/a	instrument o/need	instrument n/a	instrument n/a	instrument n/a	instrument n/a	instrument n/a	instrument o/need	instrument n/a	instrument o/need
	weighted	weighted	weighted	weighted	weighted	weighted	weighted	weighted	weighted	weighted
	OLS	IV second stage GMM2S	OLS	OLS	OLS	OLS	OLS	IV second stage GMM2S	OLS	IV second stage GMM2S
	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level
	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality
	actual census 05	actual census 06	actual census 05	actual census 05	actual census 05	actual census 05	actual census 05	actual census 05	actual census 05	actual census 05
VARIABLES	06/07 specification	06/07 revised	06/07 specification	06/07 specification	06/07 specification	6/7 revised	6/7 specification	06/07 specification	06/07 specification	06/07 specification
lLAgall_56	1.205***	1.592***	1.486***	0.663***	0.991***	0.449*	1.220***	1.127***	0.762**	1.477***
	[0.208]	[0.282]	[0.410]	[0.126]	[0.142]	[0.266]	[0.239]	[0.278]	[0.346]	[0.206]
lLAhivneedph	0.374***									
	[0.025]									
lSYLLRacExIandP567	-0.410***									
	[0.154]									
lLAhivneedph2	0.174***									
	[0.022]									
lSYLLRacExCancer567		-1.358***								
		[0.440]								
LPROFOCCU05		-0.701***							-0.523***	
		[0.242]							[0.181]	
LOWNOCC05		-0.262								
		[0.249]								
lSYLLRallcause567			-0.978**		-0.364***	-0.061		-0.890***	-0.189	
			[0.393]		[0.134]	[0.195]		[0.263]	[0.286]	
LLONEPARH05			0.727***							
			[0.198]							
LNQUAL17405				0.281***				0.643***		0.566***
				[0.069]				[0.104]		[0.113]
lSYLLRacExDIA567				-0.060						
				[0.109]						
lLAmhneedindexpp					0.542***					
					[0.141]					
LPOPPUCAR05					-0.801***					
					[0.100]					
lLAneedCARAN562						1.844				
						[1.223]				
lLAepiprev0506							0.330***			
							[0.089]			
lSYLLRacExEPI567							-0.446***			

							[0.161]			
lSYLLRacExCirc567										-1.190***
										[0.256]
Constant	-3.136***	-0.270	0.095	-0.417	-1.681	0.915	-0.722	1.527	-3.186*	1.952*
	[1.008]	[1.991]	[2.383]	[0.844]	[1.496]	[1.474]	[1.304]	[0.987]	[1.801]	[1.147]
Observations	149	151	151	151	151	137	151	151	151	151
R-squared	0.780		0.282	0.382	0.690	0.058	0.312		0.240	
Ramsey reset F statistic	2.114		0.768	0.813	0.895	1.344	1.913		1.140	
Probability > F	0.101		0.514	0.489	0.445	0.263	0.130		0.335	
Endogeneity test statistic		8.069						4.617		21.249
Endogeneity p-value		0.005						0.032		0.000
Kleibergen-Paap LM test statistic		14.048						38.585		25.420
Kleibergen-Paap p-value		0.000						0.000		0.000
Kleibergen-Paap F statistic		15.505						48.814		22.302
Pesaran-Taylor reset statistic		0.048						0.008		0.084
Pesaran-Taylor p-value		0.826						0.928		0.772
Hansen-Sargan test statistic								0.117		0.060
Hansen-Sargan p-value								0.733		0.806

Robust standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

Table A2.6 continued Preferred expenditure specifications for 2005/06

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	PBC 11 respiratory 2005/6 spend SYLLR 2005/6/7 spend model instrument o/need weighted IV second stage GMM2S LA-level actual mortality actual census 05	PBC 13 gastro 2005/6 spend SYLLR 2005/6/7 spend model instrument o/need weighted IV second stage GMM2S LA-level actual mortality actual census 05	PBC 14 skin problems 2005/06 spend SYLLR 2005/6/7 spend model instrument n/a weighted OLS LA-level actual mortality actual census 05	PBC 15 musculo-skeletal 2005/06 spend SYLLR 2005/6/7 spend model instrument n/a weighted OLS LA-level actual mortality actual census 05	PBC 16 trauma 2005/6 spend SYLLR 2005/6/7 spend model instrument n/a weighted OLS LA-level actual mortality actual census 05	PBC 17 genito- 2005/6 spend SYLLR 2005/6/7 spend model instrument n/a weighted OLS LA-level actual mortality actual census 05	PBC 1819 mat/neonates 2005/06 spend infant mort rate 2005/06/07 spend model o/need exogenous weighted OLS LA-level actual mortality actual census 05	PBC 20 poisoning 2005/6 spend SYLLR 2005/6/7 spend model instrument o/need weighted IV second stage GMM2S LA-level actual mortality actual census 05
VARIABLES	06/07 revised	06/07 specification	06/07 revised	06/07 specification	06/07 revised	06/07 specification	06/07 specification	06/07 specification
lSYLLRacExResp567	-0.381*							
	[0.207]							
lLAgall_56	1.225***	1.076***	0.840***	0.935***	0.897***	1.079***	0.865***	1.735***
	[0.191]	[0.154]	[0.190]	[0.205]	[0.250]	[0.264]	[0.157]	[0.264]
LNQUAL17405	0.414***	0.416***	0.175**					0.449***
	[0.075]	[0.059]	[0.079]					[0.136]
lSYLLRacExGast567		-0.413**						
		[0.199]						
lSYLLRallcause567			0.033	0.038	-0.170		-0.127	-1.235***
			[0.153]	[0.156]	[0.145]		[0.132]	[0.288]
LPC74LTUN05				-0.309***		0.183**		
				[0.069]		[0.081]		
LPROFOCCU05				-0.418***				
				[0.092]				
LWORKAGRI05					0.047***			
					[0.013]			
lLAneedCARAN56					0.376			
					[0.315]			
lSYLLRacExrenal567						-0.326*		
						[0.169]		
lLAmatneedindexpp							0.734***	
							[0.119]	
Constant	-1.704**	-0.274	-2.722***	-4.523***	-0.836	-0.755	-1.145	-1.676
	[0.779]	[0.721]	[0.924]	[1.593]	[2.201]	[2.014]	[0.869]	[1.299]
Observations	151	151	151	151	151	151	151	151
Endogeneity test statistic	4.593	1.596						15.227
Endogeneity p-value	0.032	0.206						0.000
Kleibergen-Paap LM test statistic	27.275	34.219						33.883
Kleibergen-Paap p-value	0.000	0.000						0.000

Kleibergen-Paap F statistic	57.822	107.256						40.297
Pesaran-Taylor reset statistic	0.002	1.800						0.260
Pesaran-Taylor p-value	0.964	0.180						0.610
Hansen-Sargan test statistic								1.785
Hansen-Sargan p-value								0.182
R-squared			0.412	0.395	0.464	0.441	0.497	
Ramsey reset F statistic			1.493	2.060	1.611	1.397	0.840	
Probability > F			0.219	0.108	0.190	0.246	0.474	

Robust standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

Table A2.6 continued Preferred expenditure specifications for 2005/06

	(1)	(2)	(3)
	PBC 21	PBC 22	PBC 23a
	HI	social care	GMS
	2005/6 spend	2005/6 spend	2005/6 spend
	SYLLR 2005/6/7	SYLLR 2005/6/7	SYLLR 2005/6/7
	spend model	spend model	spend model
	instrument o/need	instrument o/need	instrument n/a
	weighted	weighted	weighted
	IV second stage	IV second stage	OLS
	GMM2S	GMM2S	
	LA-level	LA-level	LA-level
	actual mortality	actual mortality	actual mortality
	actual census 05	actual census 05	actual census 05
VARIABLES	re-derived	06/07 specification	06/07 specification
lSYLLRallcause567	0.413	-0.893*	-0.102*
	[0.342]	[0.532]	[0.052]
lLAgall_56	0.507	1.069*	0.532***
	[0.371]	[0.614]	[0.070]
LPOPPUCAR05	-0.864**		
	[0.381]		
LBORNEXEU05	-0.151**		
	[0.067]		
LWORKAGRI05	-0.090*		0.035***
	[0.051]		[0.010]
LWHITEEG05			-0.194***
			[0.045]
Constant	-5.832***	1.173	1.929***
	[2.224]	[2.588]	[0.347]
Observations	151	116	147
R-squared			0.391
Endogeneity test statistic	0.304	0.599	
Endogeneity p-value	0.581	0.439	
Hansen-Sargan test statistic	1.658	3.943	
Hansen-Sargan p-value	0.646	0.268	
Kleibergen-Paap LM test statistic	36.779	33.298	
Kleibergen-Paap p-value	0.000	0.000	
Kleibergen-Paap F statistic	50.792	38.220	
Pesaran-Taylor reset statistic	0.527	0.000	
Pesaran-Taylor p-value	0.468	0.984	
Ramsey reset F statistic			0.691
Probability > F			0.559

Robust standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

Table A2.7 Preferred outcome specifications for 2006/07

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	PBC 1	PBC 2	PBC 4	PBC 7	PBC 10	PBC 11	PBC 13	PBC 17	PBC 1819
	infectious	cancer	endocrine	neurological	circulatory	respiratory	gastro	genito-urinary	mat/neonates
	2006/7 spend	2006/7 spend	2006/7 spend	2006/7 spend	2006/7 spend	2006/7 spend	2006/7 spend	2006/7 spend	2006/7 spend
	SYLLR 2006/7/8	SYLLR 2006/7/8	SYLLR 2006/7/8	SYLLR 2006/7/8	SYLLR 2006/7/8	SYLLR 2006/7/8	SYLLR 2006/7/8	SYLLR 2006/7/8	mortality rate 2006/7/8
	outcome model	outcome model	outcome model	outcome model	outcome model	outcome model	outcome model	outcome model	outcome model
	instrument spend	instrument spend	instrument spend	instrument spend	instrument spend	instrument spend	instrument spend	instrument n/a	instrument spend
	weighted	weighted	weighted	weighted	weighted	weighted	weighted	weighted	weighted
	IV second stage	IV second stage	IV second stage	IV second stage	IV second stage	IV second stage	IV second stage	OLS	IV second stage
	GMM2S	GMM2S	GMM2S	GMM2S	GMM2S	GMM2S	GMM2S		GMM2S
	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level
	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality
	actual census 06	actual census 06	actual census 06	actual census 06	actual census 06	actual census 06	actual census 06	actual census 06 re-derived	actual census 06
VARIABLES	07/08 revised	07/08 revised	07/08 revised+	re-derived++	07/08 specification	07/08 specification	07/08 specification	5%/95% OLS	re-derived+
lLAg1_67	-0.608								
	[0.402]								
lLAhivneedph	0.478***								
	[0.142]								
lLAhivneedph2	0.114								
	[0.076]								
lLAimd_2007exexpobook	0.519***		0.765***	0.307***					0.292
	[0.113]		[0.178]	[0.082]					[0.191]
lLAg2_67		-0.239***							
		[0.083]							
lLAneedCARAN67		0.914***			2.296***	2.781**	4.015***		0.917**
		[0.085]			[0.282]	[1.106]	[0.782]		[0.435]
lLAneedCARAN672		0.955***							
		[0.280]							
lLAg4_67			-1.464						
			[0.976]						
lLAdiaprev0607			1.233***						
			[0.428]						
lLAg7_67				-0.869*					
				[0.494]					
LPOPPUCAR06				1.492***				-2.849**	
				[0.371]				[1.157]	
lLAg10_67					-1.404***				
					[0.218]				
LPROFOCCU06					-0.508***				
					[0.140]				
lLAg11_67						-2.281***			
						[0.801]			
LPERMSICK06						2.745**			
						[1.385]			
LPERMSICK06SQ						0.285			

						[0.203]			
lLAg13_67							-1.255**		
							[0.632]		
lLAg17_67								-0.588	
								[0.428]	
LNQUAL17406								2.140***	
								[0.524]	
LWHITEEG06								-0.973*	
								[0.557]	
lLAg1819_67									-0.085
									[0.205]
LBORNEXEU06									0.120***
									[0.039]
LHHNOCAR06									-0.708***
									[0.140]
LPC74LTUN06									0.489***
									[0.125]
Constant	2.248**	6.052***	8.080*	7.442***	10.621***	18.286***	8.505***	-2.020	2.104
	[0.944]	[0.364]	[4.157]	[2.483]	[1.006]	[5.109]	[2.703]	[2.908]	[1.481]
Observations	148	150	136	117	150	150	149	135	149
Endogeneity test statistic	1.915	8.416	2.828	2.516	35.080	24.628	6.928		0.824
Endogeneity p-value	0.166	0.004	0.093	0.113	0.000	0.000	0.008		0.364
Kleibergen-Paap LM test statistic	9.043	19.866	7.931	16.288	35.077	6.770	10.318		14.757
Kleibergen-Paap p-value	0.003	0.000	0.005	0.001	0.000	0.009	0.001		0.001
Kleibergen-Paap F statistic	15.331	16.380	9.502	7.767	30.494	12.140	15.426		9.216
Pesaran-Taylor reset statistic	0.248	0.358	0.044	0.615	0.039	1.756	0.054		1.239
Pesaran-Taylor p-value	0.618	0.550	0.834	0.433	0.843	0.185	0.817		0.266
Hansen-Sargan test statistic		1.457		0.005	0.624				2.628
Hansen-Sargan p-value		0.227		0.998	0.430				0.105
R-squared								0.222	
Ramsey reset F statistic								0.752	
Probability > F								0.523	

Robust standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

Table A2.8 Preferred expenditure specifications for 2006/07

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	PBC 1 infectious 2006/7 spend SYLLR 2006/7/8 spend model instrument n/a weighted OLS	PBC 2 cancer 2006/7 spend SYLLR 2006/7/8 spend model instrument o/need weighted IV second stage GMM2S	PBC 3 blood 2006/7 spend SYLLR 2006/7/8 spend model instrument n/a weighted OLS	PBC 4 endocrine 2006/7 spend SYLLR 2006/7/8 spend model instrument n/a weighted OLS	PBC 5 mental health 2006/7 spend SYLLR 2006/7/8 spend model instrument n/a weighted OLS	PBC 6 LDisability 2006/07 spend SYLLR 2006/7/8 spend model instrument n/a weighted OLS	PBC 7 neurological 2006/07 spend SYLLR 2006/7/8 spend model instrument n/a weighted OLS	PBC 8 vision 2006/7 spend SYLLR 2006/7/8 spend model instrument o/need weighted IV second stage GMM2S	PBC 9 hearing 2006/7 spend SYLLR 2006/7/8 spend model instrument n/a weighted OLS
VARIABLES	LA-level actual mortality actual census 06 07/08 spec revised	LA-level actual mortality actual census 06 07/08 specification	LA-level actual mortality actual census 06 07/08 specification	LA-level actual mortality actual census 06 07/08 revised	LA-level actual mortality actual census 06 07/08 specification	LA-level actual mortality actual census 06 re-derived OLS	LA-level actual mortality actual census 06 7/8 revised OLS	LA-level actual mortality actual census 06 07/08 specification	LA-level actual mortality actual census 06 07/08 revised
lLAgall_67	1.051***	1.219***	1.037***	0.630***	1.143***	0.410	0.382*	0.931***	0.989**
	[0.258]	[0.263]	[0.330]	[0.168]	[0.204]	[0.488]	[0.220]	[0.329]	[0.458]
lLAhivneedph	0.364***								
	[0.040]								
lSYLLRacExIandP678	-0.043								
	[0.288]								
lLAhivneedph2	0.165***								
	[0.026]								
LPROFOCCU06	0.647*	-0.527***				-0.762***			-0.607**
	[0.346]	[0.102]				[0.243]			[0.254]
LNQUAL17406	0.357			0.185**				0.803***	
	[0.364]			[0.078]				[0.126]	
lSYLLRacExCancer678		-0.751***							
		[0.204]							
lSYLLRallcause678			-0.648**		-0.397***	-0.561*		-0.664**	-0.079
			[0.321]		[0.124]	[0.330]		[0.273]	[0.313]
LLONEPARH06			0.565***						
			[0.194]						
lSYLLRacExDIA678				0.051					
				[0.137]					
lLAmhneedindexpp					0.560***				
					[0.148]				
LPOPPUCAR06					-0.837***				
					[0.118]				
LBORNEXEU06						0.279***			
						[0.083]			
LWHITEEG06						0.838***			
						[0.303]			
lLAepiprev0607							0.417***		
							[0.102]		
lSYLLRacExEPI678							0.119		

							[0.159]		
Constant	-3.116	-0.773	0.769	-1.014	-2.637	4.214*	2.561*	1.677	-5.653**
	[2.237]	[1.188]	[2.461]	[1.017]	[1.850]	[2.513]	[1.334]	[1.537]	[2.581]
Observations	148	150	150	150	150	150	150	150	150
R-squared	0.698		0.162	0.371	0.739	0.111	0.283		0.253
Ramsey reset F statistic	1.801		0.305	0.553	1.380	0.238	0.219		0.601
Probability > F	0.150		0.822	0.647	0.252	0.870	0.883		0.615
Endogeneity test statistic		12.742						1.869	
Endogeneity p-value		0.000						0.172	
Hansen-Sargan test statistic		0.194						0.037	
Hansen-Sargan p-value		0.660						0.848	
Kleibergen-Paap LM test statistic		33.956						34.857	
Kleibergen-Paap p-value		0.000						0.000	
Kleibergen-Paap F statistic		46.177						74.593	
Pesaran-Taylor reset statistic		0.014						0.007	
Pesaran-Taylor p-value		0.906						0.931	

Robust standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

Table A2.8 continued Preferred expenditure specifications for 2006/07

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	PBC 10 circulatory 2006/7 spend SYLLR 2006/7/8 spend model instrument o/need weighted IV second stage GMM2S LA-level actual mortality actual census 06	PBC 11 respiratory 2006/7 spend SYLLR 2006/7/8 spend model instrument o/need weighted IV second stage GMM2S LA-level actual mortality actual census 06	PBC 12 dental 2006/7 spend SYLLR 2006/7/8 spend model instrument n/a weighted OLS LA-level actual mortality actual census 07	PBC 13 gastro 2006/7 spend SYLLR 2006/7/8 spend model instrument o/need weighted IV second stage GMM2S LA-level actual mortality actual census 06	PBC 14 skin problems 2006/7 spend SYLLR 2006/7/8 spend model instrument n/a weighted OLS LA-level actual mortality actual census 06	PBC 15 musculo-skeletal 2006/7 spend SYLLR 2006/7/8 spend model instrument n/a weighted OLS LA-level actual mortality actual census 06	PBC 16 trauma 2006/7 spend SYLLR 2006/7/8 spend model instrument n/a weighted OLS LA-level actual mortality actual census 06	PBC 17 genito- 2006/7 spend SYLLR 2006/7/8 spend model instrument n/a weighted OLS LA-level actual mortality actual census 06	PBC 1819 mat/neonates 2006/07 spend infant mort rate 2006/07/08 spend model spend exogenous weighted OLS LA-level actual mortality actual census 06	PBC 20 poisoning 2006/7 spend SYLLR 2006/7/8 spend model instrument spend weighted IV second stage GMM2S LA-level real mortality actual census 06
VARIABLES	07/08 specification	07/08 specification	re-derived OLS	07/08 revised	07/08 revised	07/08 specification	07/08 specification	07/08 revised	07/08 specification	07/08 revised
lLAgall_67	1.578***	1.287***	0.835**	1.014***	0.701***	0.628**	0.705***	0.988***	0.614**	1.107***
	[0.270]	[0.221]	[0.392]	[0.210]	[0.249]	[0.246]	[0.233]	[0.242]	[0.245]	[0.300]
lSYLLRallcause678			0.628		-0.124	0.341	0.273		0.167	-0.667***
			[0.382]		[0.155]	[0.224]	[0.210]		[0.177]	[0.237]
LPERMSICK06			-0.375							
			[0.284]							
LLONEPARH06			-2.097							
			[1.704]							
LLONEPARH06SQ			-0.480							
			[0.324]							
LWHITEEG06			0.734**							
			[0.302]							
lSYLLRacExCirc678	-1.203***									
	[0.247]									
LNQUAL17406	0.553***	0.273***		0.402***						0.133
	[0.093]	[0.093]		[0.079]						[0.122]
lSYLLRacExResp678		-0.262								
		[0.221]								
lSYLLRacExGast678				-0.363						
				[0.224]						
LPROFOCCU06					-0.287***	-0.504***				
					[0.100]	[0.182]				
LPC74LTUN06						-0.475***		0.147*		
						[0.106]		[0.076]		
LWORKAGRI06							0.080***			
							[0.026]			
lSYLLRacExrenal678								-0.229		
								[0.184]		
lLAmatneedindexpp									0.561***	
									[0.123]	
Constant	1.221	-3.159***	-9.116	-0.291	-1.325	-5.128***	-2.329**	-0.867	-1.203	-1.069
	[1.349]	[1.195]	[5.559]	[1.014]	[1.338]	[1.863]	[1.041]	[1.298]	[1.307]	[1.571]

Observations	150	150	150	150	150	150	150	150	150	150
Endogeneity test statistic	26.058	7.261		4.381						11.024
Endogeneity p-value	0.000	0.007		0.036						0.001
Hansen-Sargan test statistic	0.158	0.478								1.866
Hansen-Sargan p-value	0.691	0.489								0.172
Kleibergen-Paap LM test statistic	27.832	34.096		29.551						35.141
Kleibergen-Paap p-value	0.000	0.000		0.000						0.000
Kleibergen-Paap F statistic	33.179	56.202		85.706						59.640
Pesaran-Taylor reset statistic	0.140	0.314		0.004						0.024
Pesaran-Taylor p-value	0.708	0.575		0.949						0.876
R-squared			0.343		0.286	0.277	0.230	0.358	0.391	
Ramsey reset F statistic			2.275		1.670	0.503	0.759	1.568	1.269	
Probability > F			0.083		0.176	0.681	0.519	0.200	0.287	

Robust standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

Table A2.8 continued Preferred expenditure specifications for 2006/07

	(1)	(2)	(3)
	PBC 21	PBC 22	PBC 23a
	HI	social care	GMS
	2006/7 spend	2006/07 spend	2006/7 spend
	SYLLR 2006/7/8	SYLLR 2006/7/8	SYLLR 2006/7/8
	spend model	spend model	spend model
	spend exogenous	spend exogenous	instrument n/a
	weighted	weighted	weighted
	OLS	OLS	OLS
	LA-level	LA-level	LA-level
	actual mortality	actual mortality	actual mortality
	actual census 07	actual census 06	actual census 06
VARIABLES	re-derived	07/08 specification OLS	07/08 specification
lLAgall_67	0.709	1.702***	0.447***
	[0.432]	[0.489]	[0.112]
lSYLLRallcause678	-0.318	-0.817*	0.056
	[0.471]	[0.429]	[0.082]
LPOPPUCAR06	-2.104***		
	[0.681]		
LBORNEXEU06	-0.190***		
	[0.072]		
LNQUAL17406	0.903**		
	[0.394]		
LWORKAGRI06			0.051***
			[0.010]
LWHITEEG06			-0.225***
			[0.049]
Constant	-4.143	-3.938*	1.621***
	[3.699]	[2.367]	[0.452]
Observations	150	103	145
R-squared	0.134	0.102	0.367
Ramsey reset F statistic	1.695	0.312	0.757
Probability > F	0.171	0.817	0.520

Robust standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

Table A2.9 Preferred outcome specifications for 2007/08

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	PBC 1	PBC 2	PBC 4	PBC 7	PBC 10	PBC 11	PBC 13	PBC 16	PBC 17	PBC 1819
	infectious	cancer	endocrine	Neurological	circulatory	respiratory	gastro	trauma	genito-urinary	mat/neonates
	2007/8 spend	2007/8 spend	2007/8 spend	2007/08 spend	2007/8 spend	2008/9 spend	2007/8 spend	2007/8 spend	2007/8 spend	2007/08 spend
	SYLLR 2007/8/9	SYLLR 2007/8/9	SYLLR 2007/8/9	SYLLR 2007/08/09	SYLLR 2007/8/9	SYLLR 2008/9/10	SYLLR 2007/8/9	SMR 2007/8/9	SMR 2007/8/9	infant mort rate 2007/08/09
	outcome model	outcome model	outcome model	outcome model	outcome model	outcome model	outcome model	outcome model	outcome model	outcome model
	instrument spend	instrument spend	instrument spend	instrument n/a	instrument spend	instrument spend	instrument spend	instrument spend	instrument spend	spend exogenous
	weighted	weighted	weighted	weighted	weighted	weighted	weighted	weighted	weighted	weighted
	IV second stage	IV second stage	IV second stage	OLS	IV second stage	IV second stage	IV second stage	IV second stage	IV second stage	OLS
	GMM2S	GMM2S	GMM2S		GMM2S	GMM2S	GMM2S	GMM2S	GMM2S	
	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level
	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality
	actual census 07	actual census 07	actual census 07	actual census 07	actual census 07	actual census 07	actual census 07	actual census 07	actual census 07	actual census 07
VARIABLES	08/09 revised	08/09 specification	08/09 revised	re-derived, OLS	08/09 revised	08/09 revised	08/09 specification	re-derived	re-derived	08/09 specification+
lLAg1_78	-0.660**									
	[0.290]									
lLAhivneedph	0.515***									
	[0.119]									
lLAhivneedph2	0.157**									
	[0.065]									
lLAimd_2007exexpobook	0.529***		0.487***							
	[0.086]		[0.131]							
lLAg2_78		-0.273***								
		[0.084]								
lLAneedCARAN78		0.958***			2.168***	1.838***	3.565***	3.822***	3.887**	1.494***
		[0.092]			[0.266]	[0.699]	[0.574]	[0.984]	[1.700]	[0.292]
lLAg4_78			-1.491							
			[1.274]							
LPROFOCCU07			-0.830*	-0.701***	-0.598***					
			[0.494]	[0.175]	[0.139]					
lLAg7_78				-0.237*						
				[0.131]						
LPOPPUCAR07				0.542*						
				[0.300]						
lLAg10_78					-1.315***					
					[0.172]					
lLAg11_78						-1.564***				
						[0.448]				
LPERMSICK07						3.244***				
						[1.183]				
LPERMSICK07SQ						0.364**				
						[0.168]				
lLAg13_78							-0.837**			
							[0.425]			
lLAg16_78								-0.638		
								[0.471]		

LPC74LTUN07								-0.605**		0.528***
								[0.249]		[0.114]
lLAg17_78									-1.977	
									[1.728]	
LBORNEXEU07									0.368***	0.178***
									[0.106]	[0.045]
lLAg1819_78										-0.057
										[0.084]
LHHNOCAR07										-0.641***
										[0.125]
Constant	2.369***	6.221***	4.252	2.837***	10.071***	16.150***	6.713***	0.585	8.451	3.206***
	[0.697]	[0.380]	[3.874]	[0.998]	[0.837]	[3.573]	[1.824]	[1.158]	[7.152]	[0.601]
Observations	148	152	133	150	152	152	151	151	152	151
R-squared				0.182						0.404
Endogeneity test statistic	3.991	12.271	1.372		37.856	18.331	6.454	1.100	1.226	
Endogeneity p-value	0.046	0.000	0.241		0.000	0.000	0.011	0.294	0.268	
Hansen-Sargan test statistic	0.898	0.726			0.013			0.604	0.100	
Hansen-Sargan p-value	0.343	0.394			0.908			0.437	0.751	
Kleibergen-Paap LM test statistic	19.326	20.419	8.726		31.136	9.921	12.416	11.511	10.176	
Kleibergen-Paap p-value	0.000	0.000	0.003		0.000	0.002	0.000	0.003	0.006	
Kleibergen-Paap F statistic	9.757	19.300	9.375		43.326	20.194	18.138	8.192	6.291	
Pesaran-Taylor reset statistic	1.118	1.587	0.184		1.828	1.547	0.018	0.049	0.910	
Pesaran-Taylor p-value	0.290	0.208	0.668		0.176	0.214	0.892	0.825	0.340	
Ramsey reset F statistic				1.220						0.766
Probability > F				0.305						0.515

Robust standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

Table A2.10 Preferred expenditure specifications for 2007/08

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	PBC 1	PBC 2	PBC 3	PBC 4	PBC 5	PBC 6	PBC 7	PBC 8	PBC 9	PBC 10	PBC 11
	infectious	cancer	blood	endocrine	mental health	LDisability	neurological	vision	hearing	circulatory	respiratory
	2007/8 spend	2007/8 spend	2007/8 spend	2007/8 spend	2007/8 spend	2007/08 spend	2007/8 spend	2007/8 spend	2007/8 spend	2007/8 spend	2008/9 spend
	SYLLR 2007/8/9	SYLLR 2007/8/9	SYLLR 2007/8/9	SYLLR 2007/8/9	SYLLR 2007/8/9	SYLLR 2007/08/09	SYLLR 2008/9/10	SYLLR 2007/8/9	SYLLR 2007/8/9	SYLLR 2007/8/9	SYLLR 2008/9/10
	spend model	spend model	spend model	spend model	spend model	spend model	spend model	spend model	spend model	spend model	spend model
	instrument n/a	instrument o/need	instrument n/a	instrument n/a	instrument n/a	instrument n/a	instrument o/need	instrument o/need	instrument n/a	instrument o/need	instrument o/need
	weighted	weighted	weighted	weighted	weighted	weighted	weighted	weighted	weighted	weighted	weighted
	OLS	IV second stage GMM2S	OLS	OLS	OLS	OLS	IV second stage GMM2S	IV second stage GMM2S	OLS	IV second stage GMM2S	IV second stage GMM2S
	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level
	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality
	actual census 07	actual census 07	actual census 07	actual census 07	actual census 07	actual census 07	actual census 07	actual census 07	actual census 07	actual census 07	actual census 07
VARIABLES	08/09 specification	08/09 revised	08/09 specification	08/09 specification	08/09 specification	08/09 specification	08/09 revised	re-derived+	08/09 revised	08/09 specification	08/09 revised
lLAgall_78	1.387***	1.626***	1.374***	0.455***	1.103***	0.386	0.733***	1.106***	0.951*	1.614***	1.555***
	[0.252]	[0.314]	[0.386]	[0.129]	[0.123]	[0.393]	[0.243]	[0.277]	[0.572]	[0.294]	[0.245]
lLAhivneedph	0.440***										
	[0.024]										
lSYLLRacExIandP789	-0.536**										
	[0.233]										
lLAhivneedph2	0.181***										
	[0.021]										
lSYLLRacExCancer789		-1.162***									
		[0.216]									
LPROFOCCU07		-0.596***				-0.785***			-0.661***		
		[0.120]				[0.270]			[0.253]		
lSYLLRallcause789			-0.612**		-0.397***	-0.715***		-0.647***	0.029		
			[0.294]		[0.108]	[0.259]		[0.222]	[0.457]		
LLONEPARH07			0.600***								
			[0.162]								
LNQUAL17407				0.721				0.545***		0.721***	0.382***
				[0.527]				[0.097]		[0.110]	[0.091]
LNQUAL17407SQ				0.120							
				[0.183]							
lLAdiaprev0708				0.114							
				[0.116]							
lSYLLRacExDIA789				-0.060							
				[0.096]							
lLAmhneedindexpp					0.598***						
					[0.107]						
LPOPPUCAR07					-0.684***						
					[0.089]						
lLAneedCARAN782						3.601**					

						[1.615]					
lSYLLRacExEPI789							-0.354				
							[0.249]				
lLAepiprev0708							0.512***				
							[0.077]				
LPERMSICK07							0.191				
							[0.120]				
lSYLLRacExCirc789										-1.395***	
										[0.263]	
lSYLLRacExResp789											-0.621***
											[0.202]
Constant	-3.903***	-1.505	-1.767	1.812	-2.007*	4.456*	4.038*	0.021	-5.920*	2.204	-2.864**
	[1.044]	[1.535]	[2.716]	[1.118]	[1.202]	[2.439]	[2.136]	[1.235]	[3.073]	[1.357]	[1.307]
Observations	150	152	152	152	152	152	152	152	152	152	152
R-squared	0.731		0.248	0.504	0.788	0.163			0.267		
Ramsey reset F statistic	0.873		0.552	1.644	0.056	0.901			2.082		
Probability > F	0.457		0.648	0.182	0.982	0.442			0.105		
Endogeneity test statistic		18.550					4.929	6.902		24.020	15.379
Endogeneity p-value		0.000					0.026	0.009		0.000	0.000
Hansen-Sargan test statistic		2.043					1.683	0.296		1.130	0.220
Hansen-Sargan p-value		0.153					0.195	0.587		0.288	0.639
Kleibergen-Paap LM test statistic		32.362					22.137	34.077		27.389	34.114
Kleibergen-Paap p-value		0.000					0.000	0.000		0.000	0.000
Kleibergen-Paap F statistic		49.406					35.000	87.353		29.951	54.028
Pesaran-Taylor reset statistic		0.590					0.342	1.152		0.002	1.060
Pesaran-Taylor p-value		0.442					0.559	0.283		0.967	0.303

Robust standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

Table A2.10 continued Preferred expenditure specifications for 2007/08

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	PBC 12	PBC 13	PBC 14	PBC 15	PBC 16	PBC 17	PBC 1819	PBC 20	PBC 21	PBC 22	PBC 23a
	dental	gastro	skin problems	musculo-skeletal	trauma	genito-	mat/neonates	poisoning	HI	social care	GMS
	2007/8 spend SYLLR 2007/8/9	2007/8 spend SYLLR 2007/8/9	2007/08 spend SYLLR 2007/08/09	2007/08 spend SYLLR 2007/08/09	2007/8 spend SYLLR 2007/8/9	2007/8 spend SYLLR 2007/8/9	2007/08 spend infant mort rate 2007/08/09	2007/8 spend SYLLR 2007/8/9	2007/08 spend SYLLR 2007/08/09	2007/8 spend SYLLR 2007/8/9	2007/8 spend SYLLR 2007/8/9
	spend model	spend model	spend model	spend model	spend model	spend model	spend model	spend model	spend model	spend model	spend model
	instrument n/a	instrument o/need	instrument n/a	instrument n/a	instrument n/a	instrument n/a	instrument o/need	instrument o/need	instrument o/need	instrument o/need	instrument n/a
	weighted	weighted	weighted	weighted	weighted	weighted	weighted	weighted	weighted	weighted	weighted
	OLS	IV second stage GMM2S	OLS	OLS	OLS	OLS	OLS	IV second stage GMM2S	OLS	IV second stage GMM2S	OLS
	LA-level actual mortality actual census 07	LA-level actual mortality actual census 07	LA-level actual mortality actual census 07	LA-level actual mortality actual census 07	LA-level actual mortality actual census 07	LA-level actual mortality actual census 07	LA-level actual mortality actual census 07	LA-level real mortality actual census 07	LA-level actual mortality actual census 07	LA-level real mortality actual census 07	LA-level actual mortality actual census 07
VARIABLES	rederived+ OLS	08/09 revised	08/09 specification	08/09 specification	08/09 specification	08/09 revised	08/09 specification OLS	08/09 revised	re-derived, OLS+	re-derived+	08/09 specification
lLAgall_78	0.420***	1.490***	0.787***	0.733***	1.328***	1.015***	0.563**	1.674***	1.296**	1.669**	0.553***
	[0.150]	[0.296]	[0.203]	[0.198]	[0.293]	[0.218]	[0.242]	[0.382]	[0.544]	[0.804]	[0.110]
LLONEPARH07	0.179**										
	[0.079]										
LNQUAL17407	0.094	0.390***		0.057				0.476***	0.033		
	[0.078]	[0.098]		[0.178]				[0.142]	[0.266]		
lSYLLRallcause789	0.215		-0.062	0.278	0.041		0.230	-1.095***	-0.078	-0.423	-0.062
	[0.146]		[0.134]	[0.186]	[0.225]		[0.164]	[0.323]	[0.348]	[0.615]	[0.081]
lSYLLRacExGast789		-0.786***									
		[0.273]									
lLAimd_2007exexpobook			0.262**								
			[0.107]								
LHHNOCAR07			-0.232***								
			[0.086]								
LPC74LTUN07				-0.357***							
				[0.080]							
LPOPPUCAR07				0.695***							
				[0.252]							
LWORKAGRI07					0.125***						
					[0.018]						
lSYLLRacExrenal789						-0.087					
						[0.153]					
lLAmatneedindexpp							0.597***				
							[0.093]				
LWHITEEG07									0.697**		
									[0.296]		
LLONEPENH07									-0.789*		

Constant	0.328	-1.286	-3.063**	-2.570	-5.264***	-2.654***	-1.238	-2.162	[0.468] -7.075*	-6.170**	1.347***
	[1.039]	[1.375]	[1.174]	[1.597]	[1.084]	[0.916]	[1.382]	[1.918]	[3.584]	[2.758]	[0.453]
Observations	135	152	152	152	152	152	152	152	152	110	151
R-squared	0.485		0.389	0.455	0.418	0.362	0.406		0.121		0.324
Ramsey reset F statistic	1.996		1.692	1.341	1.301	1.846	0.849		0.333		1.210
Probability > F	0.118		0.171	0.264	0.277	0.141	0.469		0.801		0.308
Endogeneity test statistic		6.175						12.926		2.286	
Endogeneity p-value		0.013						0.000		0.131	
Hansen-Sargan test statistic		2.634						1.952		0.598	
Hansen-Sargan p-value		0.105						0.162		0.897	
Kleibergen-Paap LM test statistic		34.752						34.935		25.636	
Kleibergen-Paap p-value		0.000						0.000		0.000	
Kleibergen-Paap F statistic		50.766						54.957		14.920	
Pesaran-Taylor reset statistic		0.130						0.012		0.189	
Pesaran-Taylor p-value		0.719						0.914		0.664	

Robust standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

Table A2.11 Preferred outcome specifications for 2008/09

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	PBC 1	PBC 2	PBC 4	PBC 7	PBC 10	PBC 11	PBC 13	PBC 17	PBC 1819
	infectious	cancer	endocrine	neurological	circulatory	respiratory	gastro	genito-urinary	mat/neonates
	2008/9 spend	2009/10 spend	2008/9 spend	2008/9 spend	2008/9 spend	2008/9 spend	2008/9 spend	2008/9 spend	2008/09 spend
	SYLLR 2008/9/10	SYLLR 2009/10/11	SYLLR 2008/9/10	SYLLR 2008/9/10	SYLLR 2008/9/10	SYLLR 2008/9/10	SYLLR 2008/9/10	SYLLR 2008/9/10	infant mort rate 2008/09/10
	outcome model	outcome model	outcome model	outcome model	outcome model	outcome model	outcome model	spend model	outcome model
	instrument spend	instrument spend	instrument spend	instrument spend	instrument spend	instrument spend	instrument spend	instrument n/a	spend exogenous
	weighted	weighted	weighted	weighted	weighted	weighted	weighted	weighted	weighted
	IV second stage	IV second stage	IV second stage	IV second stage	IV second stage	IV second stage	IV second stage	OLS	OLS
	GMM2S	GMM2S	GMM2S	GMM2S	GMM2S	GMM2S	GMM2S		
	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level
	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality
	actual census 08	actual census08	actual census 08	actual census 08	actual census 08	actual census 08	actual census 08	actual census 08	actual census 08
VARIABLES	09/10 revised	09/10 specification	09/10 specification	PCT specification	09/10 specification	09/10 specification	09/10 revised	PCT specification	09/10 specification+
lLAg1_89	-0.549***								
	[0.201]								
lLAhivneedph	0.472***								
	[0.086]								
lLAhivneedph2	0.168***								
	[0.046]								
lLAimd_2007exexpobook	0.563***		0.690***						
	[0.077]		[0.180]						
lLAg2_89		-0.287***							
		[0.076]							
lLAneedCARAN		0.953***		1.254	2.924***	1.913*	3.774***		1.630***
		[0.092]		[0.763]	[0.274]	[0.990]	[0.601]		[0.294]
lLAg4_89			-1.607**						
			[0.802]						
LPROFOCCU08			-0.851**						
			[0.368]						
lLAg7_89				-0.304					
				[0.641]					
lLAg10_89					-1.384***				
					[0.209]				
lLAg11_89						-1.671***			
						[0.504]			
LPERMSICK08						3.922***			
						[1.287]			
LPERMSICK08SQ						0.457**			
						[0.192]			
lLAg13_89							-1.146**		
							[0.451]		
LLONEPARH08								1.455***	
								[0.359]	
lLAg17_89								-0.024	
								[0.533]	

lLAg1819_89									-0.030
									[0.091]
LBORNEXEU08									0.228***
									[0.043]
LHHNOCAR08									-0.527***
									[0.105]
LPC74LTUN08									0.354***
									[0.114]
Constant	1.873***	6.277***	4.188*	2.757	11.178***	18.058***	8.100***	3.126	2.582***
	[0.488]	[0.349]	[2.205]	[2.697]	[1.018]	[3.907]	[1.957]	[2.877]	[0.633]
Observations	148	152	149	148	152	151	150	143	151
R-squared								0.134	0.442
Endogeneity test statistic	3.777	10.300	4.581	0.931	25.219	15.773	11.326		
Endogeneity p-value	0.052	0.001	0.032	0.334	0.000	0.000	0.001		
Hansen-Sargan test statistic	2.602	0.523		3.587	0.566	2.626			
Hansen-Sargan p-value	0.272	0.470		0.166	0.452	0.105			
Kleibergen-Paap LM test statistic	22.335	25.882	9.327	16.084	24.567	11.562	13.871		
Kleibergen-Paap p-value	0.000	0.000	0.002	0.001	0.000	0.003	0.000		
Kleibergen-Paap F statistic	10.459	32.476	10.515	10.630	43.471	14.269	28.799		
Pesaran-Taylor reset statistic	0.028	0.123	0.911	1.459	0.017	0.154	0.627		
Pesaran-Taylor p-value	0.867	0.726	0.340	0.227	0.897	0.695	0.429		
Ramsey reset F statistic								0.731	0.339
Probability > F								0.535	0.797

Robust standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

Table A2.12 Preferred expenditure specifications for 2008/09

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	PBC 1	PBC 2	PBC 3	PBC 4	PBC 5		PBC 7	PBC 8
	infectious	cancer	blood	endocrine	mental health	PBC 6	neurological	vision
	2008/9 spend	2008/9 spend	2008/9 spend	2008/9 spend	2008/9 spend	LDisability	2008/9 spend	2008/9 spend
	SYLLR 2008/9/10	SYLLR 2008/9/10	SYLLR 2008/9/10	SYLLR 2008/9/10	SYLLR 2008/9/10	2008/09 spend	SYLLR 2008/9/10	SYLLR 2008/9/10
	spend model	spend model	spend model	spend model	spend model	SYLLR 2008/09/10	spend model	spend model
	instrument n/a	instrument o/need	instrument n/a	instrument n/a	instrument n/a	spend model	instrument o/need	instrument o/need
	weighted	weighted	weighted	weighted	weighted	instrument n/a	weighted	weighted
	OLS	IV second stage	OLS	OLS	OLS	weighted	IV second stage	IV second stage
		GMM2S				OLS	GMM2S	GMM2S
	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level
	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality
	actual census 08	actual census 08	actual census 08	actual census 08	actual census 08	actual census 08	actual census 08	actual census 08
VARIABLES	09/10 specification	09/10 specification	09/10 specification	09/10 revised OLS	09/10 specification	09/10 specification	09/10 specification	09/10 specification
lLAgall_89	1.471***	0.784**	0.995***	0.498***	0.995***	0.329	0.897***	0.701***
	[0.261]	[0.335]	[0.272]	[0.147]	[0.192]	[0.351]	[0.204]	[0.223]
lLAhivneedph	0.456***							
	[0.026]							
lSYLLRacExIandP890	-0.429**							
	[0.214]							
lLAhivneedph2	0.181***							
	[0.023]							
lSYLLRacExCancer890		-1.184***						
		[0.168]						
lLAneedCARAN		1.395***						
		[0.468]						
LPROFOCCU08		-0.348***				-0.516**		
		[0.094]				[0.253]		
lSYLLRallcause890			-0.672**		-0.303***	-0.460*		-0.544**
			[0.265]		[0.112]	[0.273]		[0.213]
LLONEPARH08			0.535***					
			[0.152]					
LNQUAL17408				1.217***				0.664***
				[0.398]				[0.079]
LNQUAL17408SQ				0.347***				
				[0.129]				
lLAdiaprevinover17				0.285**				
				[0.116]				
lSYLLRacExDIA890				0.097				
				[0.105]				
lLAmhneedindexpp					0.658***			
					[0.143]			
LPOPPUCAR08					-0.618***			
					[0.104]			
lLAneedCARAN2						3.556**		

						[1.393]		
lSYLLRacExEPI890							-0.132	
							[0.152]	
lLAepilepsyov18prevrate							0.382***	
							[0.068]	
Constant	-5.190***	5.048*	1.139	0.073	-1.644	3.663*	-1.466	2.541**
	[1.130]	[2.695]	[1.594]	[0.976]	[1.724]	[2.101]	[0.992]	[1.057]
Observations	150	152	152	150	152	152	150	152
R-squared	0.783		0.194	0.579	0.789	0.104		
Ramsey reset F statistic	1.513		1.512	1.186	0.465	1.764		
Probability > F	0.214		0.214	0.317	0.707	0.157		
Endogeneity test statistic		19.732					8.533	4.237
Endogeneity p-value		0.000					0.003	0.040
Hansen-Sargan test statistic		1.028					0.081	0.592
Hansen-Sargan p-value		0.311					0.776	0.442
Kleibergen-Paap LM test statistic		36.285					32.990	34.619
Kleibergen-Paap p-value		0.000					0.000	0.000
Kleibergen-Paap F statistic		56.425					82.270	51.873
Pesaran-Taylor reset statistic		0.002					0.809	0.143
Pesaran-Taylor p-value		0.968					0.368	0.705

Robust standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

Table A2.12 continued Preferred expenditure specifications for 2008/09

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	PBC 9 hearing 2008/9 spend SYLLR 2008/9/10 spend model instrument n/a weighted OLS	PBC 10 circulatory 2008/9 spend SYLLR 2008/9/10 spend model instrument o/need weighted IV second stage GMM2S	PBC 11 respiratory 2008/9 spend SYLLR 2008/9/10 spend model instrument o/need weighted IV second stage GMM2S	PBC 12 dental 2008/9 spend SYLLR 2008/9/10 spend model instrument n/a weighted OLS	PBC 13 gastro 2008/9 spend SYLLR 2008/9/10 spend model instrument o/need weighted IV second stage GMM2S	PBC 14 skin problems 2008/09 spend SYLLR 2008/09/11 spend model instrument n/a weighted OLS	PBC 15 musculo-skeletal 2008/09 spend SYLLR 2008/09/10 spend model instrument n/a weighted OLS	PBC 16 trauma 2008/9 spend SYLLR 2008/9/10 spend model instrument n/a weighted OLS
VARIABLES	LA-level actual mortality actual census 08 09/10 specification	LA-level actual mortality actual census 08 09/10 spec revised	LA-level actual mortality actual census 08 09/10 specification	LA-level actual mortality actual census 08 rederived OLS	LA-level actual mortality actual census 08 09/10 specification	LA-level actual mortality actual census 08 09/10 specification	LA-level actual mortality actual census 08 re-derived+ OLS	LA-level actual mortality actual census 08 09/10 specification
lLAgall_89	1.637***	1.784***	0.752**	0.428**	0.520*	0.907***	0.738***	1.344***
	[0.369]	[0.276]	[0.352]	[0.198]	[0.278]	[0.199]	[0.195]	[0.222]
LOWNOCC08	0.377			0.278**				
	[0.255]			[0.110]				
lSYLLRallcause890	0.143			0.279		0.001		-0.271
	[0.320]			[0.193]		[0.123]		[0.170]
lSYLLRacExCirc890		-1.271***						
		[0.236]						
LNQUAL17408		0.515***					0.160	
		[0.087]					[0.152]	
lSYLLRacExResp890			-1.099***					
			[0.285]					
lLAneedCARAN			1.987***		2.117***			
			[0.418]		[0.434]			
lLAneedCARAN2			1.109**					
			[0.530]					
lLAimd_2007exexpobook				0.199*		0.256**		
				[0.111]		[0.108]		
lSYLLRacExGast890					-1.309***			
					[0.323]			
LHHNOCAR08						-0.222***		
						[0.074]		
LPC74LTUN08							-0.305***	
							[0.080]	
LPOPPUCAR08							0.681***	
							[0.224]	
lSYLLRallcause890							0.271	
							[0.170]	
LWORKAGRI08								0.084***
								[0.018]
Constant	-10.672***	-0.118	5.422*	-1.183	8.403***	-4.278***	-2.206	-3.653***
	[1.776]	[1.402]	[2.892]	[1.513]	[2.751]	[1.256]	[1.617]	[0.989]

Observations	152	152	152	152	152	152	152	152
R-squared	0.256			0.501		0.495	0.541	0.348
Ramsey reset F statistic	0.130			3.756		1.203	1.296	0.793
Probability > F	0.942			0.012		0.311	0.278	0.500
Endogeneity test statistic		31.218	17.243		14.052			
Endogeneity p-value		0.000	0.000		0.000			
Hansen-Sargan test statistic		0.278	0.097		0.009			
Hansen-Sargan p-value		0.598	0.756		0.924			
Kleibergen-Paap LM test statistic		28.178	34.175		32.639			
Kleibergen-Paap p-value		0.000	0.000		0.000			
Kleibergen-Paap F statistic		29.651	34.268		22.222			
Pesaran-Taylor reset statistic		0.232	0.092		0.391			
Pesaran-Taylor p-value		0.630	0.761		0.532			

Robust standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

Table A2.12 continued Preferred expenditure specifications for 2008/09

	(1)	(2)	(3)	(4)	(5)	(6)
	PBC 17 genito- 2008/9 spend SYLLR 2008/9/10 spend model instrument n/a weighted OLS LA-level actual mortality actual census 08	PBC 1819 maternity 2008/9 spend SYLLR 2008/9/10 spend model instrument o/need weighted IV second stage GMM2S LA-level actual mortality actual census 08	PBC 20 poisoning 2008/9 spend SYLLR 2008/9/10 spend model instrument o/need weighted IV second stage GMM2S LA-level real mortality actual census 08	PBC 21 HI 2008/9 spend SYLLR 2008/9/10 spend model instrument n/a weighted OLS LA-level actual mortality	PBC 22 social care 2008/9 spend SYLLR 2008/9/10 spend model instrument n/a weighted OLS LA-level actual mortality	PBC 23a GMS 2008/9 spend SYLLR 2008/9/10 spend model instrument n/a weighted OLS LA-level actual mortality actual census 08
VARIABLES	09/10 specification	09/10 specification	09/10 specification	09/10 specification	09/10 specification	09/10 specification
LBORNEXEU08	0.037**					
	[0.016]					
lSYLLRacExrenal890	-0.040					
	[0.130]					
lLAneedCARAN	0.251		2.102***	1.049		
	[0.299]		[0.546]	[0.809]		
lLAgall_89	0.733***	0.963***	0.674*	0.952	1.192*	0.338***
	[0.213]	[0.339]	[0.366]	[0.699]	[0.605]	[0.089]
lSYLLRallcause890		-0.299	-1.433***	0.076	-0.463	-0.028
		[0.341]	[0.356]	[0.326]	[0.410]	[0.071]
lLAmatneedindexpp		0.809***				
		[0.135]				
Constant	-0.747	-0.903	6.637*	-3.945	-2.416	2.672***
	[1.897]	[0.819]	[3.581]	[5.837]	[3.223]	[0.350]
Observations	152	152	152	152	106	150
R-squared	0.491			0.368	0.049	0.228
Ramsey reset F statistic	1.741			0.317	0.331	0.753
Probability > F	0.161			0.813	0.803	0.522
Endogeneity test statistic		1.649	19.393			
Endogeneity p-value		0.199	0.000			
Hansen-Sargan test statistic		2.648	0.006			
Hansen-Sargan p-value		0.266	0.936			
Kleibergen-Paap LM test statistic		15.039	33.275			
Kleibergen-Paap p-value		0.002	0.000			
Kleibergen-Paap F statistic		11.224	33.862			
Pesaran-Taylor reset statistic		0.215	0.029			
Pesaran-Taylor p-value		0.643	0.865			

Robust standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

Table A2.13 Preferred outcome specifications for 2009/10

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	PBC 1	PBC 2	PBC 04	PBC 07	PBC 10	PBC 11	PBC 13	PBC 17	PBC 1819	PBC 16
	infectious diseases 2009/10 spend SYLLR 2009/10/11 outcome model	cancer 2009/10 spend SYLLR 2009/10/11 outcome model	endocrine etc 2009/10 spend SYLLR 2009/10/11 outcome model	neurological 2009/10 spend SYLLR 2009/10/11 outcome model	circulatory 2008/9 spend SYLLR 2008/9/10 outcome model	respiratory 2009/10 spend SYLLR 2009/10/11 outcome model	gastro-intestinal 2009/10 spend SYLLR 2009/10/11 outcome model	genito-urinary 2009/10 spend SYLLR 2009/10/11 outcome model	mat/neonates 2009/10 spend infant mort rate 2009/10/11 outcome model	trauma/injuries 2009/10 spend SMR<75 skull fracture9/10/11 outcome model
	instrument spend weighted IV second stage GMM2S LA-level actual mortality actual census 09	instrument spend weighted IV second stage GMM2S LA-level actual mortality actual census09	instrument spend weighted IV second stage GMM2S LA-level actual mortality actual census 09	instrument spend weighted IV second stage GMM2S LA-level actual mortality actual census 09	instrument spend weighted IV second stage GMM2S LA-level actual mortality actual census 09	instrument spend weighted IV second stage GMM2S LA-level actual mortality actual census 09	instrument spend weighted IV second stage GMM2S LA-level actual mortality actual census 09	instrument spend weighted IV second stage GMM2S LA-level actual mortality actual census 09	o/need exogenous weighted OLS LA-level actual mortality actual census 09	spend exogenous weighted OLS LA-level actual mortality actual census 09
VARIABLES	Re-derived	08/09 version	08/09 revised v2(SI)	Re-derived(SI)+	08/09 version	Re-derived	08/09 revised(SI)	Re-derived	Re-derived, OLS	Re-derived, OLS
lLAg1_0910	-0.310*									
	[0.169]									
lLAhivneedph	0.362***									
	[0.071]									
lLAhivneedphSQ	0.123***									
	[0.037]									
lLAIMD2010	0.478***		0.658***							
	[0.079]		[0.149]							
lLAg2_0910		-0.345***								
		[0.127]								
lLACARANneed910		0.881***		1.191	3.041***	1.433**	4.291***		2.019***	1.163***
		[0.113]		[0.812]	[0.392]	[0.728]	[1.178]		[0.287]	[0.329]
lLAg4_0910			-1.075**							
			[0.462]							
LPROFOCCU09			-0.462***							
			[0.178]							
lLAg7_0910				-1.357						
				[0.845]						
lLAepiprev0910				1.413***						
				[0.384]						
LBORNEXEU09				0.187***					0.319***	
				[0.065]					[0.055]	
lLAg10_0910					-1.842***					
					[0.380]					
lLAg11_0910						-2.103***				
						[0.794]				
LPERMSICK09						4.493***				
						[1.676]				

LPERMSICK09SQ						0.508**				
						[0.239]				
lAg13_0910							-1.989*			
							[1.111]			
lACARANneed910SQ							3.833***			
							[1.473]			
lAg17_0910								-2.997		
								[2.017]		
lACKDprev18								2.662***		
								[0.791]		
LOWNOCC09								-4.052***		
								[1.354]		
LWHITEEG09								-3.945***		
								[1.170]		
LWORKAGRI09								0.522**		
								[0.205]		
lAg1819_0910									-0.166*	
									[0.092]	
LHHNOCAR09									-0.340***	
									[0.099]	
lAg16_0910										0.041
										[0.141]
LPC74LTUN09										-0.259**
										[0.123]
Constant	1.418***	6.559***	2.834**	14.608***	13.415***	21.341***	11.868**	20.235**	2.152***	-0.876
	[0.505]	[0.594]	[1.404]	[5.131]	[1.873]	[6.014]	[4.923]	[9.485]	[0.462]	[0.585]
Observations	147	150	148	140	150	148	148	150	149	143
R-squared									0.413	0.141
Endogeneity test statistic	1.862	5.166	6.368	3.034	34.858	13.820	8.584	2.256		
Endogeneity p-value	0.172	0.023	0.012	0.082	0.000	0.000	0.003	0.133		
Hansen-Sargan test statistic	5.056	0.020			0.877	0.766		2.729		
Hansen-Sargan p-value	0.168	0.888			0.349	0.381		0.099		
Kleibergen-Paap LM test statistic	25.041	23.944	13.637	7.203	14.621	11.432	6.617	26.731		
Kleibergen-Paap p-value	0.000	0.000	0.000	0.007	0.001	0.003	0.010	0.000		
Kleibergen-Paap F statistic	8.698	17.787	17.223	10.204	10.903	9.051	8.446	19.945		
Pesaran-Taylor reset statistic	1.073	0.329	2.068	0.575	0.000	1.083	0.251	1.449		
Pesaran-Taylor p-value	0.300	0.566	0.150	0.448	0.995	0.298	0.616	0.229		
Ramsey reset F statistic									1.439	0.050
Probability > F									0.234	0.985

Robust standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

Table A2.14 Preferred expenditure specifications for 2009/10

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	PBC 1	PBC 2		PBC 4			PBC 7		
	infectious	cancer	PBC 3	diabetes	PBC 5	PBC 6	epilepsy	PBC 8	PBC 9
	2009/10 spend	2009/10 spend	Blood disorders	2009/10 spend	Mental health	LDisability	2009/10 spend	Vision	hearing problems
	SYLLR 2009/10/11	SYLLR 2009/10/11	2009/10 spend	all causeSYLLR 2009/10/11	2009/10 spend	2009/10 spend	all causeSYLLR 2009/10/11	2009/10 spend	2009/10 spend
	spend model	spend model	SYLLR 2009/10/11	spend model	SYLLR 2009/10/11	SYLLR 2009/10/11	spend model	SYLLR 2009/10/11	SYLLR 2009/10/11
	instrument n/a	instrument other needs	spend model	instrument o/need	spend model	spend model	instrument o/need	spend model	spend model
	weighted	weighted	instrument n/a	weighted	instrument n/a	instrument n/a	weighted	instrument o/need	instrument n/a
	OLS	IV second stage	weighted	IV second stage	weighted	weighted	IV second stage	weighted	weighted
		GMM2S	OLS	GMM2S	OLS	OLS	GMM2S	GMM2S	OLS
	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level
	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality
	actual census 09	actual census09	actual census 09	actual census 09	actual census 09	actual census 09	actual census 09	actual census 09	actual census 09
VARIABLES	08/09 version	revised(XR)	Re-derived, OLS	08/09 version	08/09 version	Re-derived, OLS	08/09 version	08/09 revised	Re-derived, OLS
lLAgall_0910	0.968***	0.502**	1.060***	0.708***	0.899***	0.647**	0.850***	0.934***	1.273***
	[0.288]	[0.245]	[0.277]	[0.214]	[0.225]	[0.295]	[0.225]	[0.258]	[0.359]
lLAhivneedph	0.413***								
	[0.022]								
lSYLLRacExIandP901	-0.169								
	[0.229]								
lLAhivneedphSQ	0.147***								
	[0.026]								
lSYLLRacExCancer901		-1.040***							
		[0.173]							
lLACARANneed910		1.446***		0.445					
		[0.288]		[0.335]					
LPROFOCCU09		-0.152				-0.338**			
		[0.098]				[0.139]			
lSYLLRallcause901			-0.850***		-0.107	-0.577**		-0.482*	0.310
			[0.239]		[0.138]	[0.284]		[0.275]	[0.288]
LLONEPARH09			0.703***						
			[0.132]						
lSYLLRacExDIA901				-0.167					
				[0.258]					
lLACARANneed910SQ				1.248**		3.985***			
				[0.522]		[1.155]			
lLAdiaprev0910				0.189*					
				[0.103]					
lLAmhneedindexpp					0.510***				
					[0.170]				
LPOPPUCAR09					-0.465***				
					[0.104]				
lSYLLRacExEPI901							-0.080		
							[0.212]		

lLAepiprev0910							0.394***		
							[0.074]		
LNQUAL17409								0.489***	
								[0.086]	
LOWNOCC09									0.297*
									[0.168]
Constant	-2.991**	6.566***	2.197	0.164	-1.794	2.204	0.406	0.262	-8.969***
	[1.338]	[1.661]	[1.634]	[1.976]	[2.060]	[1.477]	[0.977]	[0.967]	[1.774]
Observations	147	150	150	148	150	150	140	150	150
R-squared	0.752		0.270		0.765	0.139			0.256
Ramsey reset F statistic	0.970		0.592		0.345	1.023			0.479
Probability > F	0.409		0.621		0.793	0.385			0.698
Endogeneity test statistic		17.406		1.531			2.882	3.238	
Endogeneity p-value		0.000		0.216			0.090	0.072	
Hansen-Sargan test statistic		1.235		0.171			0.785	0.736	
Hansen-Sargan p-value		0.267		0.679			0.376	0.391	
Kleibergen-Paap LM test statistic		25.606		27.318			30.560	23.051	
Kleibergen-Paap p-value		0.000		0.000			0.000	0.000	
Kleibergen-Paap F statistic		27.743		23.097			55.103	17.739	
Pesaran-Taylor reset statistic		0.042		0.832			0.073	0.028	
Pesaran-Taylor p-value		0.838		0.362			0.787	0.866	

Robust standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

Table A2.14 continued Preferred expenditure specifications for 2009/10

	(1) PBC 10 circulatory 2009/10 spend SYLLR 2009/10/11 spend model instrument o/need weighted IV second stage GMM2S LA-level actual mortality actual census09	(2) PBC 11 respiratory 2009/10 spend SYLLR 2009/10/11 spend model instrument other needs weighted IV second stage GMM2S LA-level actual mortality actual census09	(3) PBC 12 dental problems 2009/10 spend SYLLR 2009/10/11 spend model instrument n/a weighted OLS LA-level actual mortality actual census 09	(4) PBC 13 gastro 2009/10 spend SYLLR 2009/10/11 spend model instrument other needs weighted IV second stage GMM2S LA-level actual mortality actual census09	(5) PBC 14 skin problems 2009/10 spend SYLLR 2009/10/11 spend model instrument n/a weighted OLS LA-level actual mortality actual census 09	(6) PBC 15 musculo-skeletal 2009/10 spend SYLLR 2009/10/11 spend model instrument n/a weighted OLS LA-level actual mortality actual census 09	(7) PBC 16 trauma/injuries 2009/10 spend SYLLR 2009/10/11 spend model instrument n/a weighted OLS LA-level actual mortality actual census 09	(8) PBC 17 renal 2009/10 spend SYLLR 2009/10/11 spend model instrument n/a weighted OLS LA-level actual mortality actual census 09	(9) PBC 1819 maternity/neonates 2009/10 spend all causeSYLLR 2009/10/11 spend model instrument o/need weighted IV second stage GMM2S LA-level actual mortality actual census 09
VARIABLES	08/09 version	08/09 version	Re-derived, OLS	08/09 version	Re-derived, OLS	Re-derived, OLS	08/09 version	08/09 version	08/09 version
lSYLLRacExResp901		-0.565**							
		[0.273]							
lLAgall_0910	0.494*	0.576***	0.765***	0.387*	0.890***	0.295	1.090***	0.878***	0.653***
	[0.267]	[0.218]	[0.188]	[0.231]	[0.192]	[0.263]	[0.215]	[0.207]	[0.233]
lLACARANneed910	2.458***	1.252***		1.292***		0.965***		0.218	
	[0.502]	[0.309]		[0.319]		[0.340]		[0.265]	
lLACARANneed910SQ		1.323***	-1.905***						
		[0.472]	[0.538]						
lSYLLRacExCirc901	-1.965***								
	[0.460]								
lSYLLRallcause901			0.167		-0.046	0.180	-0.219		-0.405*
			[0.131]		[0.208]	[0.185]	[0.150]		[0.246]
LWORKAGRI09			-0.039**				0.069***		
			[0.018]				[0.016]		
LLONEPENH09			0.190*			0.341***			
			[0.107]			[0.119]			
lSYLLRacExGast901				-0.612***					
				[0.211]					
lLAIMD2010					0.278**				
					[0.133]				
LHHNOCAR09					-0.176**				
					[0.074]				
LPC74LTUN09						-0.317***			
						[0.077]			
LBORNEXEU09								0.051***	
								[0.017]	
lSYLLRacExrenal901								-0.171	
								[0.124]	
lLAmatneedindexpp									0.963***
									[0.088]
Constant	12.640***	3.491	-2.268**	5.218**	-3.817**	0.574	-2.171*	-0.939	2.072***
	[3.154]	[2.136]	[0.977]	[2.254]	[1.517]	[2.551]	[1.157]	[1.794]	[0.704]

Observations	150	148	150	148	148	150	150	150	150
Endogeneity test statistic	23.688	7.777		9.122					1.253
Endogeneity p-value	0.000	0.005		0.003					0.263
Hansen-Sargan test statistic	0.267	0.024		0.389					0.212
Hansen-Sargan p-value	0.606	0.877		0.533					0.899
Kleibergen-Paap LM test statistic	16.668	26.156		32.784					35.340
Kleibergen-Paap p-value	0.000	0.000		0.000					0.000
Kleibergen-Paap F statistic	11.755	22.221		29.989					69.224
Pesaran-Taylor reset statistic	0.022	0.171		2.482					0.050
Pesaran-Taylor p-value	0.883	0.679		0.115					0.822
R-squared			0.482		0.496	0.564	0.236	0.487	
Ramsey reset F statistic			1.405		1.358	1.392	0.948	1.995	
Probability > F			0.244		0.258	0.248	0.419	0.117	

Robust standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

Table A2.14 continued Preferred expenditure specifications for 2009/10

	(1)	(2)	(3)	(4)
	PBC 20	PBC 21	PBC 22	PBC 23a
	poisoning	HI	social care	GMS
	2009/10 spend	2009/10 spend	2009/10 spend	2009/10 spend
	SYLLR 2009/10/11	SYLLR 2009/10/11	SYLLR 2009/10/11	SYLLR 2009/10/11
	spend model	spend model	spend model	spend model
	instrument o/need	instrument n/a	instrument n/a	instrument n/a
	weighted	weighted	weighted	weighted
	GMM2S	OLS	OLS	OLS
	LA-level	LA-level	LA-level	LA-level
	actual mortality	actual mortality	actual mortality	actual mortality
	actual census 09	actual census 09	actual census 09	actual census 09
VARIABLES	08/09 version	08/09 version	Re-derived, OLS	Re-derived, OLS
lSYLLRallcause901	-0.816***	0.232	-0.177	0.010
	[0.302]	[0.323]	[0.432]	[0.071]
lLAgall_0910	0.658**	1.246**	0.844	0.564***
	[0.304]	[0.506]	[0.563]	[0.085]
lLACARANneed910	1.110***	0.939		
	[0.390]	[0.570]		
Constant	3.017	-7.085*	-1.640	0.751**
	[2.692]	[4.068]	[2.855]	[0.369]
Observations	150	150	97	148
R-squared		0.385	0.035	0.463
Endogeneity test statistic	12.352			
Endogeneity p-value	0.000			
Hansen-Sargan test statistic	0.078			
Hansen-Sargan p-value	0.781			
Kleibergen-Paap LM test statistic	25.438			
Kleibergen-Paap p-value	0.000			
Kleibergen-Paap F statistic	21.297			
Pesaran-Taylor reset statistic	0.008			
Pesaran-Taylor p-value	0.928			
Ramsey reset F statistic		0.507	1.066	0.112
Probability > F		0.678	0.368	0.953

Robust standard errors in brackets
*** p<0.01, ** p<0.05, * p<0.1

Table A2.15 Preferred outcome specifications for 2010/11

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	PBC 1 infectious diseases 2010/11 spend SYLLR 2010/11/12 outcome model instrument spend weighted IV second stage GMM2S LA-level actual mortality actual census 10	PBC 2 cancer 2010/11 spend SYLLR 2010/11/12 outcome model instrument spend weighted IV second stage GMM2S LA-level actual mortality actual census10	PBC 04 endocrine etc 2010/11 spend SYLLR 2010/11/12 outcome model instrument spend weighted IV second stage GMM2S LA-level actual mortality actual census 10	PBC 07 neurological etc 2010/11 spend SYLLR 2010/11/12 outcome model instrument spend weighted IV second stage GMM2S LA-level actual mortality actual census 10	PBC 10 circulatory 2010/11 spend SYLLR 20010/11/12 outcome model instrument spend weighted IV second stage GMM2S LA-level actual mortality actual census 10	PBC 11 respiratory 2010/11 spend SYLLR 2010/11/12 outcome model instrument spend weighted IV second stage GMM2S LA-level actual mortality actual census 10	PBC 13 gastro-intestinal 2010/11 spend SYLLR 2010/11/12 outcome model instrument spend weighted IV second stage GMM2S LA-level actual mortality actual census 10	PBC 17 genito-urinary 20010/11 spend SYLLR 2010/11/12 outcome model instrument spend weighted IV second stage GMM2S LA-level actual mortality actual census 10	PBC 1819 maternity/neonates 20010/11 spend SYLLR 2010/11/12 outcome model instrument spend weighted IV second stage GMM2S LA-level actual mortality actual census 10	PBC 16 trauma/injuries 2010/11 spend SMR<75 skull fracture outcome model spend exogenous weighted OLS LA-level actual mortality actual census 10
VARIABLES	Re-derived	09/10 version	Re-derived, OLS	Re-derived plus	09/10 version	09/10 version revised	09/10 version revised	Re-derived	Re-derived	09/10 version & Re-derived, OLS
lLAg1_1011	-0.256									
	[0.285]									
lLAhivneedph	0.305***									
	[0.107]									
lLAIMD2010	0.590***									
	[0.125]									
lLAg2_1011		-0.220***								
		[0.079]								
lLACARANneed1011		0.841***		0.994**	2.170***		3.324***		2.165***	1.003***
		[0.080]		[0.489]	[0.255]		[0.498]		[0.341]	[0.213]
lLAg4_1011			-0.174							
			[0.175]							
LPROFOCCU10			-0.982***							
			[0.136]							
LOWNOCC10			-0.731***							
			[0.125]							
lLAg7_1011				-0.374						
				[0.515]						
lLAg10_1011					-1.692***					
					[0.395]					
lLAg11_1011						-2.006**				
						[0.821]				
LPERMSICK10						7.423***				
						[2.212]				
LPERMSICK10SQ						0.905***				
						[0.300]				
lLAg13_1011							-1.425**			
							[0.631]			
lLACARANneed1011SQ							4.413***			
							[1.579]			

lLAg17_1011								-2.830		
								[2.322]		
LPOPPUCAR10								-2.567*		
								[1.414]		
LWHITEEG10								-1.802**		
								[0.750]		
LNQUAL17410								3.130***		
								[0.841]		
lLAg1819_1011									-0.040	
									[0.240]	
LHHNOCAR10									-0.454***	
									[0.132]	
LBORNEXEU10									0.326***	
									[0.059]	
lLAg16_1011										-0.064
										[0.129]
Constant	0.927	6.119***	0.468	2.968	12.742***	26.332***	9.358***	9.693	1.389	0.618
	[0.638]	[0.369]	[0.611]	[2.232]	[1.931]	[7.442]	[2.781]	[11.907]	[1.212]	[0.548]
Observations	147	150	149	150	150	150	150	152	149	134
R-squared										0.157
Endogeneity test statistic	0.845	6.251		1.359	28.477	21.491	13.803	1.615	0.121	
Endogeneity p-value	0.358	0.012		0.244	0.000	0.000	0.000	0.204	0.728	
Hansen-Sargan test statistic	0.162	0.882			1.843					
Hansen-Sargan p-value	0.688	0.348			0.175					
Kleibergen-Paap LM test statistic	13.677	27.563		11.334	16.195	8.269	6.906	10.628	18.511	
Kleibergen-Paap p-value	0.001	0.000		0.001	0.000	0.004	0.009	0.001	0.000	
Kleibergen-Paap F statistic	9.561	25.020		16.653	12.595	10.897	8.704	11.406	23.729	
Pesaran-Taylor reset statistic	2.067	0.468		0.312	0.117	0.000	0.128	1.600	0.129	
Pesaran-Taylor p-value	0.150	0.494		0.576	0.732	0.994	0.721	0.206	0.719	
Ramsey reset F statistic			0.324							0.049
Probability > F			0.808							0.985

Robust standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

Table A2.16 Preferred expenditure specifications for 2010/11

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	PBC 1 infectious 2010/11 spend SYLLR 2010/11/12 spend model instrument n/a weighted OLS LA-level actual mortality actual census 10 09/10 version	PBC 2 cancer 2010/11 spend SYLLR 2010/11/12 spend model instrument other needs weighted IV second stage GMM2S LA-level actual mortality actual census10 09/10 version	PBC 3 Blood disorders 2010/11 spend SYLLR 2010/11/12 spend model instrument n/a weighted OLS LA-level actual mortality actual census 10 Re-derived, OLS	PBC 4 diabetes 2010/11 spend SYLLR 2010/11/12 spend model instrument o/need weighted IV second stage GMM2S LA-level actual mortality actual census 1- Re-derived +XR	PBC 5 Mental health 2009/10 spend SYLLR 2009/10/11 spend model instrument n/a weighted OLS LA-level actual mortality actual census 09 09/10 version	PBC 6 LDisability 2010/11 spend SYLLR 2010/11/12 spend model instrument o/need weighted GMM2S LA-level actual mortality actual census 10 Re-derived plus	PBC 7 epilepsy 2010/11 spend all cause SYLLR 2010/11/12 spend model instrument o/need weighted IV second stage GMM2S LA-level actual mortality actual census 10 Re-derived	PBC 8 Vision 2010/11 spend SYLLR 2010/11/12 spend model instrument o/need weighted GMM2S LA-level actual mortality actual census 10 09/10 version	PBC 9 hearing problems 2010/11 spend SYLLR 2010/11/12 spend model instrument n/a weighted OLS LA-level actual mortality actual census 10 09/10 version
VARIABLES									
lLAgall_1011	1.006***	0.438	0.332	0.696***	0.973***	1.208**	0.557***	0.997***	0.808*
	[0.294]	[0.380]	[0.302]	[0.175]	[0.285]	[0.500]	[0.193]	[0.234]	[0.417]
lLAhivneedph	0.409***								
	[0.018]								
lSYLLRacExIandP012	0.140								
	[0.210]								
lLAhivneedphSQ	0.051**								
	[0.022]								
lSYLLRacExCancer012		-1.466***							
		[0.262]							
lLACARANneed1011		1.778***							
		[0.480]							
LPROFOCCU10		-0.441***				-1.067***			
		[0.167]				[0.326]			
lSYLLRallcause012			0.286		-0.109	-1.601**		-0.593**	0.599
			[0.216]		[0.172]	[0.693]		[0.248]	[0.375]
LBORNEXEU10			0.175***						
			[0.024]						
lSYLLRacExDIA012				-0.215					
				[0.152]					
LNQUAL17410				0.903*				0.439***	
				[0.485]				[0.078]	
LNQUAL17410SQ				0.204					
				[0.161]					
LWHITEEG10				-0.269***		1.044***			
				[0.047]		[0.294]			
lLAmhneedindexpp					0.530***				
					[0.185]				
LPOPPUCAR10					-0.435***				
					[0.151]				
LLONEPENH10						-0.911**	-0.307*		
						[0.366]	[0.184]		
LWORKAGRI10						-0.181***			
						[0.044]			
LPC74LTUN10						-0.449**	-0.272***		

						[0.185]	[0.078]		
lSYLLRacExEPI012							0.348		
							[0.296]		
lLAepiprev1011							0.537***		
							[0.189]		
LOWNOCC10									0.503***
									[0.165]
Constant	-5.084***	9.093***	-0.747	0.904	-2.280	-1.164	-1.088	0.526	-7.387***
	[1.584]	[2.751]	[1.445]	[1.034]	[2.392]	[3.074]	[1.998]	[0.928]	[2.104]
Observations	148	150	150	150	150	137	150	150	150
R-squared	0.782		0.283		0.606				0.168
Ramsey reset F statistic	1.263		0.226		0.083				0.627
Probability > F	0.290		0.878		0.969				0.599
Endogeneity test statistic		18.766		4.212		3.883	2.038	3.617	
Endogeneity p-value		0.000		0.040		0.049	0.153	0.057	
Hansen-Sargan test statistic		0.229		2.634		0.044	0.310	0.271	
Hansen-Sargan p-value		0.632		0.268		0.833	0.578	0.603	
Kleibergen-Paap LM test statistic		23.548		32.240		20.213	24.854	23.506	
Kleibergen-Paap p-value		0.000		0.000		0.000	0.000	0.000	
Kleibergen-Paap F statistic		30.069		56.655		20.440	22.773	18.701	
Pesaran-Taylor reset statistic		0.009		2.378		0.205	0.551	0.051	
Pesaran-Taylor p-value		0.923		0.123		0.651	0.458	0.821	

Robust standard errors in brackets
*** p<0.01, ** p<0.05, * p<0.1

Table A2.16 continued Preferred expenditure specifications for 2010/11

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	PBC 10 circulatory 2010/11 spend SYLLR 2010/11/12 spend model instrument o/need weighted IV second stage GMM2S LA-level actual mortality actual census10	PBC 11 respiratory 2010/11 spend SYLLR 2010/11/12 spend model instrument o/need weighted IV second stage GMM2S LA-level actual mortality actual census10	PBC 12 dental problems 2010/11 spend SYLLR 2010/11/12 spend model instrument n/a weighted OLS LA-level actual mortality actual census 10	PBC 13 gastro problems 2010/11 spend SYLLR 2010/11/12 spend model instrument o/need weighted GMM2S LA-level actual mortality actual census 10	PBC 14 skin problems 2010/11 spend SYLLR 2010/11/12 spend model instrument o/need weighted GMM2S LA-level actual mortality actual census 10	PBC 15 musculo-skeletal 2010/11 spend SYLLR 2010/11/12 spend model instrument n/a weighted OLS LA-level actual mortality actual census 10	PBC 16 trauma/injuries 2010/11 spend SYLLR 2010/11/12 spend model instrument n/a weighted OLS LA-level actual mortality actual census 10	PBC 17 renal 2010/11 spend SYLLR 2010/11/12 spend model instrument n/a weighted OLS LA-level actual mortality actual census 10	PBC 1819 maternity/neonates 2010/11 spend all causeSYLLR 2010/11/12 spend model instrument o/need weighted IV second stage GMM2S LA-level actual mortality actual census 10
VARIABLES	Re-derived	09/10 version revised	Re-derived, OLS	09/10 revised	Re-derived	09/10 version, OLS plus	09/10 version revised	09/10 version revised	09/10 version
lSYLLRacExCirc012	-0.979***								
	[0.252]								
lLAgall_1011	1.013***	1.192***	0.229	1.040***	0.422*	0.489**	0.589**	0.631***	0.342
	[0.223]	[0.268]	[0.192]	[0.315]	[0.235]	[0.226]	[0.250]	[0.135]	[0.233]
LNQUAL17410	0.458***	0.345***		0.339***		0.412***			
	[0.090]	[0.094]		[0.118]		[0.130]			
lSYLLRacExResp012		-0.547*							
		[0.320]							
lSYLLRallcause012			-0.023		-0.285	0.341	-0.032		-0.253
			[0.154]		[0.249]	[0.216]	[0.182]		[0.211]
lLACARANneed1011			0.660**						
			[0.273]						
LLONEPENH10			-0.209**						
			[0.082]						
lSYLLRacExGast012				-0.691**					
				[0.334]					
LPC74LTUN10					0.385***	-0.359***			
					[0.129]	[0.090]			
LBORNEXEU10					-0.085***				
					[0.030]				
LOWNOCC10						0.258**			
						[0.130]			
LWORKAGRI10							0.069***		
							[0.026]		
LHHNOCAR10							0.083		
							[0.103]		
LWHITEEG10								-0.099*	
								[0.058]	
lSYLLRacExrenal012								0.105	
								[0.119]	
lLAmatneedindexpp									1.049***
									[0.093]
Constant	3.705***	-0.718	2.190	1.298	3.586	-1.983	0.523	-0.928	3.394***
	[0.979]	[1.102]	[1.812]	[1.395]	[2.551]	[1.812]	[1.605]	[0.577]	[0.909]

Observations	150	150	150	150	147	150	150	150	150
Endogeneity test statistic	14.309	8.904		5.635	2.987				0.593
Endogeneity p-value	0.000	0.003		0.018	0.084				0.441
Hansen-Sargan test statistic	0.689	0.101			3.182				3.084
Hansen-Sargan p-value	0.406	0.751			0.204				0.214
Kleibergen-Paap LM test statistic	20.987	22.353		26.652	25.360				32.544
Kleibergen-Paap p-value	0.000	0.000		0.000	0.000				0.000
Kleibergen-Paap F statistic	20.267	17.314		73.904	23.609				75.024
Pesaran-Taylor reset statistic	2.257	1.617		0.342	0.087				0.876
Pesaran-Taylor p-value	0.133	0.204		0.559	0.769				0.349
R-squared			0.431			0.417	0.181	0.388	
Ramsey reset F statistic			2.118			1.833	1.758	0.307	
Probability > F			0.101			0.144	0.158	0.821	

Robust standard errors in brackets
*** p<0.01, ** p<0.05, * p<0.1

Table A2.16 continued Preferred expenditure specifications for 2010/11

	(1)	(2)	(3)	(4)
	PBC 20	PBC 21	PBC 22	PBC 23a
	poisoning	HI	social care	GMS
	2010/11 spend	2010/11 spend	2010/11 spend	2010/11 spend
	SYLLR 2010/11/12	SYLLR 2010/11/12	SYLLR 2010/11/12	SYLLR 2010/11/12
	spend model	spend model	spend model	spend model
	instrument o/need	instrument n/a	instrument n/a	instrument n/a
	weighted	weighted	weighted	weighted
	GMM2S	OLS	OLS	OLS
	LA-level	LA-level	LA-level	LA-level
	actual mortality	actual mortality	actual mortality	actual mortality
	actual census 10	actual census 10	actual census 10	actual census 10
VARIABLES	09/10 version revised	09/10 version revised	09/10 version	09/10 version
lSYLLRallcause012	-1.109**	0.258	-0.260	0.050
	[0.500]	[0.461]	[0.539]	[0.104]
lLAgall_1011	1.078**	1.359**	1.592**	0.520***
	[0.457]	[0.594]	[0.673]	[0.120]
LNQUAL17410	0.420***	0.413		
	[0.156]	[0.336]		
Constant	2.149	-7.612*	-6.686**	0.790
	[1.650]	[4.097]	[2.913]	[0.585]
Observations	150	149	93	150
R-squared		0.200	0.119	0.365
Endogeneity test statistic	6.385			
Endogeneity p-value	0.012			
Hansen-Sargan test statistic	1.613			
Hansen-Sargan p-value	0.204			
Kleibergen-Paap LM test statistic	23.506			
Kleibergen-Paap p-value	0.000			
Kleibergen-Paap F statistic	18.701			
Pesaran-Taylor reset statistic	0.128			
Pesaran-Taylor p-value	0.720			
Ramsey reset F statistic		1.080	0.437	1.133
Probability > F		0.360	0.727	0.338

Robust standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

Table A2.17 Preferred outcome specifications for 2011/12

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	PBC 1	PBC 2	PBC 04	PBC 07	PBC 10	PBC 11	PBC 13	PBC 17	PBC 1819	PBC 16
	infectious	cancer	endocrine etc	neurological etc	circulatory	respiratory	gastro-intestinal	renal	mat/neonates	trauma/injuries
	2011/12 spend	2011/12 spend	2011/12 spend	2011/12 spend	2011/12 spend	2011/12 spend	2011/12 spend	2011/12 spend	2011/12 spend	2011/12 spend
	SYLLR	SYLLR	SYLLR	SYLLR	SYLLR	SYLLR	SYLLR	SYLLR	infant m/rate	
	2011/12/13	2011/12/13	2011/12/13	2011/12/13	2011/12/13	2011/12/13	2011/12/13	2011/12/13	2011/12/13	SMR<75 skull fracture
	spend model	outcome model	outcome model	outcome model	outcome model	outcome model	outcome model	outcome model	outcome model	outcome model
	instrument n/a	instrument spend	instrument n/a	instrument spend	instrument spend	instrument spend	instrument spend	instrument n/a	spend exogenous	spend exogenous
	weighted	weighted	weighted	weighted	weighted	weighted	weighted	weighted	weighted	weighted
	OLS	IV second stage GMM2S	OLS	IV second stage GMM2S	IV second stage GMM2S	IV second stage GMM2S	IV second stage GMM2S	OLS	OLS	OLS
	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level
	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality
	actual census 11	actual census11	actual census 11	actual census 11	actual census 11	actual census 11	actual census 11	actual census 11	actual census 11	actual census 11
VARIABLES	Re-derived, OLS	10/11 version SI	10/11 version	Re-derived+	10/11 version	10/11 version	10/11 version DI	Re-derived, OLS	10/11 version	10/11 version & Re-derived, OLS
lLAg1_1112	-0.305***									
	[0.094]									
lLAhivneedph	0.172***									
	[0.049]									
lLAIMD2010	0.637***			0.402**						
	[0.062]			[0.175]						
LLONEPENH11	-0.666***									
	[0.182]									
lLAg2_1112		-0.430***								
		[0.157]								
lLACARANneed1112		1.055***			2.452***		4.078***		1.989***	1.266***
		[0.135]			[0.295]		[0.949]		[0.377]	[0.265]
lLAg4_1112			-0.199							
			[0.196]							
LPROFOCCU11			-1.041***							
			[0.147]							
LOWNOCC11			-0.555***							
			[0.139]							
lLAg7_1112				-1.415						
				[1.125]						
LWORKAGRI11				0.039						
				[0.051]						
lLAepiprev1112				1.271						
				[0.779]						
lLAg10_1112					-1.611***					
					[0.343]					
lLAg11_1112						-1.743***				
						[0.598]				
LPERMSICK11						6.198***				
						[1.592]				
LPERMSICK11SQ						0.727***				

						[0.220]				
lLAg13_1112							-2.000**			
							[0.984]			
lLACARANneed1112SQ							4.644***			
							[1.513]			
LWHITEEG11								-2.062***		
								[0.484]		
LNQUAL17411								1.246***		
								[0.461]		
lLAg17_1112								-0.494		
								[0.827]		
lLAg1819_1112									-0.136	
									[0.110]	
LBORNEXEU11									0.298***	
									[0.065]	
LHHNOCAR11									-0.357***	
									[0.106]	
lLAg16_1112										0.143
										[0.180]
Constant	-0.523	7.072***	0.581	12.713	12.292***	23.178***	11.964***	2.395	1.830***	-0.140
	[0.454]	[0.727]	[0.735]	[8.281]	[1.675]	[5.233]	[4.389]	[3.962]	[0.579]	[0.773]
Observations	145	148	147	148	148	148	148	148	147	149
R-squared	0.629		0.329					0.113	0.245	0.196
Ramsey reset F statistic	0.313		0.806					0.273	0.835	0.443
Probability > F	0.816		0.492					0.845	0.477	0.723
Endogeneity test statistic		9.404		2.857	25.774	14.703	10.016			
Endogeneity p-value		0.002		0.091	0.000	0.000	0.002			
Kleibergen-Paap LM test statistic		11.267		8.458	17.541	15.098	7.239			
Kleibergen-Paap p-value		0.001		0.004	0.000	0.000	0.007			
Kleibergen-Paap F statistic		14.773		8.746	17.472	18.118	9.678			
Pesaran-Taylor reset statistic		1.934		0.015	0.009	2.624	0.177			
Pesaran-Taylor p-value		0.380		0.902	0.925	0.105	0.674			
Hansen-Sargan test statistic					2.060					
Hansen-Sargan p-value					0.151					

Robust standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

Table A2.18 Preferred expenditure specifications for 2011/12

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	PBC 1	PBC 2	PBC 3	PBC 4	PBC 5	PBC 6	PBC 7	PBC 8	PBC 9
	infectious	cancer	Blood disorders	diabetes	Mental health	LDisability	epilepsy	Vision	hearing problems
	2011/12 spend	2011/12 spend	2011/12 spend	2011/12 spend	2011/12 spend	2011/12 spend	2011/12 spend	2011/12 spend	2011/12 spend
	SYLLR 2011/12/13	SYLLR 2011/12/13	SYLLR 2011/12/13	SYLLR 2011/12/13	SYLLR 2011/12/13	SYLLR 2011/12/13	SYLLR 2011/12/13	SYLLR 2011/12/13	SYLLR 2011/12/13
	spend model	spend model	spend model	spend model	spend model	spend model	spend model	spend model	spend model
	instrument n/a	instrument other needs	instrument n/a	instrument o/need	instrument n/a	instrument n/a	instrument o/need	instrument o/need	instrument n/a
	weighted	weighted	weighted	weighted	weighted	weighted	weighted	weighted	weighted
	OLS	IV second stage GMM2S	OLS	IV second stage GMM2S	OLS	OLS	IV second stage GMM2S	IV second stage GMM2S	OLS
	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level
	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality
	actual census 11	actual census11	actual census 11	actual census 11	actual census 11	actual census 11	actual census 11	actual census 11	actual census 11
VARIABLES	10/11 version	10/11 version	10/11 version	10/11 revised	10/11 version	Re-derived, OLS	10/11 revised	10/11 version	Re-derived,OLS2
lLAgall_1112	0.841***	0.961**	0.876***	1.116***	1.194***	0.741*	0.703***	1.279***	1.231***
	[0.266]	[0.384]	[0.248]	[0.133]	[0.212]	[0.398]	[0.177]	[0.241]	[0.395]
lLAhivneedph	0.409***								
	[0.016]								
lSYLLRacExIandP123	0.115								
	[0.207]								
lLAhivneedphSQ	0.075***								
	[0.023]								
lSYLLRacExCancer123		-1.414***							
		[0.292]							
lLACARANneed1112		1.323***							
		[0.423]							
LPROFOCCU11		-0.394***				-0.691***			-0.280
		[0.146]				[0.251]			[0.281]
lSYLLRallcause123			0.060		-0.078	-0.042		-1.090***	0.376
			[0.175]		[0.121]	[0.502]		[0.246]	[0.345]
LBORNEXEU11			0.178***						
			[0.026]						
lSYLLRacExDIA123				-0.415***					
				[0.122]					
LNQUAL17411				0.275***				0.622***	
				[0.065]				[0.079]	
LWHITEEG11				-0.221***					
				[0.044]					
lLAmhneedindexpp					0.338**				
					[0.147]				
LPOPPUCAR11					-0.496***				
					[0.120]				
LPC74LTUN11						-0.609***			
						[0.187]			
lSYLLRacExEPI123							-0.164		

							[0.146]		
lLAepiprev1112							0.531***		
							[0.081]		
LOWNOCC11									0.665***
									[0.209]
Constant	-3.654***	4.919*	-3.419***	-1.452*	-4.244**	-5.250	2.711**	1.685*	-9.391***
	[1.391]	[2.611]	[1.204]	[0.825]	[1.920]	[3.403]	[1.098]	[0.920]	[2.474]
Observations	146	148	148	148	148	137	148	148	148
R-squared	0.773		0.367		0.732	0.128			0.306
Ramsey reset F statistic	1.018		0.705		0.108	0.371			0.594
Probability > F	0.387		0.551		0.955	0.774			0.620
Endogeneity test statistic		18.153		11.094			8.472	9.649	
Endogeneity p-value		0.000		0.001			0.004	0.002	
Hansen-Sargan test statistic		0.103		2.194			1.223	0.023	
Hansen-Sargan p-value		0.748		0.334			0.269	0.879	
Kleibergen-Paap LM test statistic		19.717		34.180			33.862	22.743	
Kleibergen-Paap p-value		0.000		0.000			0.000	0.000	
Kleibergen-Paap F statistic		18.612		66.387			117.471	19.191	
Pesaran-Taylor reset statistic		0.337		2.356			0.250	0.028	
Pesaran-Taylor p-value		0.562		0.125			0.617	0.866	

Robust standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

Table A2.18 continued Preferred expenditure specifications for 2011/12

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	PBC 10 circulatory 2011/12 spend SYLLR 2011/12/13 spend model instrument o/need weighted IV second stage GMM2S LA-level actual mortality actual census 11	PBC 11 respiratory 2011/12 spend SYLLR 2011/12/13 spend model instrument o/need weighted IV second stage GMM2S LA-level actual mortality actual census 11	PBC 12 dental problems 2011/12 spend SYLLR 2011/12/13 spend model instrument o/need weighted IV second stage GMM2S LA-level actual mortality actual census 11	PBC 13 gastro problems 2011/12 spend SYLLR 2011/12/13 spend model instrument o/need weighted IV second stage GMM2S LA-level actual mortality actual census 11	PBC 14 skin problems 2011/12 spend SYLLR 2011/12/13 spend model instrument o/need weighted IV second stage GMM2S LA-level actual mortality actual census 11	PBC 15 musculo-skeletal 2011/12 spend SYLLR 2011/12/13 spend model instrument n/a weighted OLS LA-level actual mortality actual census 11	PBC 16 trauma/injuries 2011/12 spend SYLLR 2011/12/13 spend model instrument n/a weighted OLS LA-level actual mortality actual census 11	PBC 17 renal 2011/12 spend SYLLR 2011/12/13 spend model instrument n/a weighted OLS LA-level actual mortality actual census 11	PBC 1819 maternity/neonates 2011/12 spend SYLLR 2011/12/13 spend model instrument n/a weighted OLS LA-level actual mortality actual census 11
VARIABLES	10/11 version	10/11 revised	Re-derived+	10/11 version+	10/11 version+	10/11 version+	10/11 version+	10/11 version	10/11 version OLS
lSYLLRacExResp123		-0.722***							
		[0.213]							
lLAgall_1112	1.491***	1.360***	0.843***	1.033***	0.681***	0.456**	1.024***	0.598***	0.481***
	[0.234]	[0.177]	[0.181]	[0.210]	[0.225]	[0.222]	[0.193]	[0.124]	[0.180]
LNQUAL17411	0.414***	0.392***		0.361***		0.151			
	[0.083]	[0.074]		[0.065]		[0.106]			
lLACARANneed1112SQ		2.439***	-1.260	1.173**					
		[0.562]	[0.789]	[0.541]					
lSYLLRacExCirc123	-1.202***								
	[0.236]								
lSYLLRallcause123			0.107		-0.259	0.215	-0.154		-0.217
			[0.300]		[0.263]	[0.132]	[0.135]		[0.143]
lLAIMD2010			-0.080			0.172			
			[0.081]			[0.114]			
LPROFOCCU11			-0.194						
			[0.122]						
lSYLLRacExGast123				-0.593**					
				[0.254]					
LPC74LTUN11					0.248**	-0.226***			
					[0.099]	[0.077]			
LWHITEEG11					0.215***			-0.124***	
					[0.077]			[0.046]	
LOWNOCC11						0.513***			
						[0.113]			
LHHNOCAR11							-0.147***		
							[0.045]		
lSYLLRacExrenal123								0.088	
								[0.096]	
lLAmatneedindexpp									1.108***
									[0.099]

Constant	1.354	-0.873	-2.750*	0.802	1.193	-1.132	-2.656**	-0.550	2.147**
	[1.022]	[0.777]	[1.531]	[0.834]	[1.652]	[1.368]	[1.111]	[0.563]	[0.858]
Observations	148	148	148	148	145	148	148	148	148
R-squared						0.499	0.242	0.434	0.601
Endogeneity test statistic	22.129	15.086	1.201	6.134	1.993				
Endogeneity p-value	0.000	0.000	0.273	0.013	0.158				
Hansen-Sargan test statistic	0.892	0.027	1.361		1.197				
Hansen-Sargan p-value	0.345	0.870	0.243		0.274				
Kleibergen-Paap LM test statistic	20.617	22.588	24.305	29.448	25.703				
Kleibergen-Paap p-value	0.000	0.000	0.000	0.000	0.000				
Kleibergen-Paap F statistic	19.918	19.840	51.658	94.008	35.963				
Pesaran-Taylor reset statistic	0.545	0.836	2.153	0.127	0.000				
Pesaran-Taylor p-value	0.460	0.360	0.142	0.722	0.992				
Ramsey reset F statistic						1.326	0.561	0.514	1.711
Probability > F						0.268	0.642	0.673	0.168

Robust standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

Table A2.18 continued Preferred expenditure specifications for 2011/12

	(1)	(2)	(3)	(4)
	PBC 20	PBC 21	PBC 22	PBC 23a
	poisoning	HI	social care	GMS
	2011/12 spend	2011/12 spend	2011/12 spend	2011/12 spend
	SYLLR 2011/12/13	SYLLR 2011/12/13	SYLLR 2011/12/13	SYLLR 2011/12/13
	spend model	spend model	spend model	spend model
	instrument o/need	instrument n/a	instrument n/a	instrument n/a
	weighted	weighted	weighted	weighted
	IV second stage	OLS	OLS	OLS
	GMM2S			
	LA-level	LA-level	LA-level	LA-level
	actual mortality	actual mortality	actual mortality	actual mortality
	actual census 11	actual census 11	actual census 11	actual census 11
VARIABLES	10/11 version	10/11 version	10/11 version	10/11 version +
lSYLLRallcause123	-0.206	0.570	-0.698*	-0.096
	[0.286]	[0.388]	[0.400]	[0.103]
lLAgall_1112	0.631**	1.748***	1.859***	0.518***
	[0.297]	[0.515]	[0.532]	[0.113]
LNQUAL17411	0.298***	-0.008		
	[0.090]	[0.240]		
LPROFOCCU11				-0.186***
				[0.065]
Constant	-0.147	-12.970***	-5.898**	1.496**
	[1.023]	[3.136]	[2.922]	[0.719]
Observations	148	147	102	148
R-squared		0.319	0.121	0.430
Endogeneity test statistic	1.908			
Endogeneity p-value	0.167			
Hansen-Sargan test statistic	0.020			
Hansen-Sargan p-value	0.887			
Kleibergen-Paap LM test statistic	22.743			
Kleibergen-Paap p-value	0.000			
Kleibergen-Paap F statistic	19.191			
Pesaran-Taylor reset statistic	0.753			
Pesaran-Taylor p-value	0.385			
Ramsey reset F statistic		0.458	0.864	1.273
Probability > F		0.712	0.462	0.286

Robust standard errors in brackets
*** p<0.01, ** p<0.05, * p<0.1

Table A2.19 Preferred outcome specifications for 2012/13

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	PBC 1	PBC 2	PBC 4	PBC 7	PBC 10	PBC 11	PBC 13	PBC 17	PBC 1819
	infectious	cancer	endocrine etc	neurological etc	circulatory	respiratory	gastro-intestinal	renal	mat/neonates
	2012/13 spend	2012/13 spend	2012/13 spend	2012/13 spend	2012/13 spend	2012/13 spend	2012/13 spend	2012/13 spend	2012/13 spend
	SYLLR 2012/13/14	SYLLR 2012/13/14	SYLLR 2012/13/14	SYLLR 2012/13/14	SYLLR 2012/13/14	SYLLR 2012/13/14	SYLLR 2012/13/14	SYLLR 2012/13/14	infant m/rate 2012/13/14
	spend model	outcome model	outcome model	outcome model	outcome model	outcome model	outcome model	outcome model	outcome model
	instrument n/a	instrument spend	instrument spend	instrument n/a	instrument spend	instrument spend	instrument spend	instrument n/a	spend exogenous
	weighted	weighted	weighted	weighted	weighted	weighted	weighted	weighted	weighted
	OLS	IV second stage	IV second stage	OLS	IV second stage	IV second stage	IV second stage	OLS	OLS
		GMM2S	GMM2S		GMM2S	GMM2S	GMM2S		
	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level
	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality
	actual census 11	actual census11	actual census 11	actual census 11	actual census 11	actual census 11	actual census 11	actual census 11	actual census 11
VARIABLES	11/12 version	11/12 version	Re-derived	Re-derived, OLS	11/12 version	11/12 revised	11/12 revised	Re-derived+	11/12 version
lLAg1_1213	-0.362***								
	[0.089]								
lLAhivneedph	0.276***								
	[0.045]								
lLAIMD2010	0.649***		0.579***	0.289***					
	[0.064]		[0.116]	[0.088]					
LLONEPENH11	-0.177								
	[0.183]								
lLAg2_1213		-0.361**							
		[0.149]							
lLACARANneed1213		1.023***			2.304***		3.878***	2.141*	1.926***
		[0.134]			[0.234]		[0.832]	[1.253]	[0.378]
lLAg4_1213			-0.499						
			[0.349]						
LPROFOCCU11			-0.409**					3.875***	
			[0.165]					[1.283]	
lLAg7_1213				-0.009					
				[0.188]					
LBORNEXEU11				-0.169***					0.247***
				[0.050]					[0.064]
lLAg10_1213					-1.464***				
					[0.268]				
lLAg11_1213						-1.704***			
						[0.459]			
LPERMSICK11						6.265***			
						[1.189]			
LPERMSICK11SQ						0.742***			
						[0.166]			
lLAg13_1213							-1.904**		
							[0.897]		
lLACARANneed1213SQ							3.735***		
							[1.352]		

lLAg17_1213								-0.160	
								[0.753]	
LNQUAL17411								3.888***	
								[1.146]	
LWHITEEG11								-3.045***	
								[0.558]	
lLAg1819_1213									-0.106
									[0.129]
LHHNOCAR11									-0.365***
									[0.102]
Constant	0.698	6.744***	1.118	-0.032	11.541***	23.203***	11.547***	9.081*	1.529**
	[0.437]	[0.691]	[1.164]	[0.782]	[1.302]	[3.903]	[4.024]	[4.938]	[0.671]
Observations	147	149	149	149	149	149	149	149	148
R-squared	0.582			0.107				0.233	0.229
Ramsey reset F statistic	1.139			1.414				2.110	1.064
Probability > F	0.336			0.241				0.102	0.366
Endogeneity test statistic		8.481	0.064		30.621	20.193	8.574		
Endogeneity p-value		0.004	0.801		0.000	0.000	0.003		
Kleibergen-Paap LM test statistic		10.435	27.631		24.067	19.742	10.507		
Kleibergen-Paap p-value		0.001	0.000		0.000	0.000	0.001		
Kleibergen-Paap F statistic		11.262	24.515		19.517	16.644	10.363		
Pesaran-Taylor reset statistic		0.408	1.563		0.086	0.096	0.039		
Pesaran-Taylor p-value		0.523	0.211		0.769	0.757	0.843		
Hansen-Sargan test statistic			1.428		0.810	2.227			
Hansen-Sargan p-value			0.490		0.368	0.136			

Robust standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

Table A2.20 Preferred expenditure specifications for 2012/13

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	PBC 1	PBC 2	PBC 3	PBC 4	PBC 5	PBC 6	PBC 7	PBC 8	PBC 9
	infectious	cancer	blood disorders	diabetes	mental health	LDisability	epilepsy	vision	hearing issues
	2011/12 spend	2012/13 spend	2012/13 spend	2012/13 spend	2012/13 spend	2012/13 spend	2012/13 spend	2012/13 spend	2012/13 spend
	SYLLR 2011/12/13	SYLLR 2012/13/14	SYLLR 2012/13/14	SYLLR 2012/13/14	SYLLR 2012/13/14	SYLLR 2012/13/14	all cause SYLLR 2012/13/14	SYLLR 2012/13/14	SYLLR 2012/13/14
	spend model	spend model	spend model	spend model	spend model	spend model	spend model	spend model	spend model
	instrument n/a	instrument o/ need	instrument n/a	instrum o/need	instrument n/a	instrument n/a	instrum o/need	instrum o/need	instrument n/a
	weighted	weighted	weighted	weighted	weighted	weighted	weighted	weighted	weighted
	OLS	IV second stage GMM2S	OLS	IV second stage GMM2S	OLS	OLS	IV second stage GMM2S	IV second stage GMM2S	OLS
	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level
	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality
	actual census 11	actual census11	actual census 11	actual census 11	actual census 11	actual census 11	actual census 11	actual census 11	actual census 11
VARIABLES	11/12 revised	11/12 version	11/12 version	11/12 revised	11/12 version	Re-derived, OLS	11/12 version	11/12 version	11/12 version
lLAgall_1213	0.749***	1.027**	1.119***	0.951***	1.023***	0.000	0.856***	1.411***	1.523***
	[0.252]	[0.522]	[0.253]	[0.128]	[0.221]	[0.451]	[0.168]	[0.234]	[0.357]
lLAhivneedph	0.342***								
	[0.028]								
lSYLLRacExIandP234	0.160								
	[0.193]								
lLAhivneedphSQ	0.087***								
	[0.019]								
LWHITEEG11	-0.303**			-0.243***					
	[0.122]			[0.038]					
lSYLLRacExCancer234		-1.565***							
		[0.326]							
lLACARANneed1213		1.472**							
		[0.599]							
LPROFOCCU11		-0.472***							-0.060
		[0.173]							[0.267]
lSYLLRallcause234			-0.321*		0.043	0.245		-1.047***	0.419
			[0.192]		[0.116]	[0.331]		[0.236]	[0.367]
LBORNEXEU11			0.189***			-0.162***			
			[0.030]			[0.051]			
SYLLRacExDIA234				-0.440***					
				[0.138]					
LNQUAL17411				0.359***				0.607***	
				[0.062]				[0.081]	
lLAmhneedindexpp					0.334**				
					[0.146]				
LPOPPUCAR11					-0.408***				
					[0.116]				
lSYLLRacExEPI234							-0.326**		
							[0.157]		
lLAepiprev1213							0.489***		

							[0.090]		
LOWNOCC11									0.587***
									[0.204]
Constant	-3.303**	5.169	-2.932**	0.056	-3.512*	1.414	2.362**	0.395	-11.656***
	[1.322]	[3.768]	[1.213]	[0.737]	[1.994]	[2.473]	[1.205]	[0.930]	[2.388]
Observations	147	149	149	149	149	135	149	149	149
R-squared	0.788		0.301		0.715	0.081			0.329
Ramsey reset F statistic	2.104		0.196		1.023	0.388			1.093
Probability > F	0.103		0.899		0.384	0.762			0.354
Endogeneity test statistic		28.098		8.114			13.076	9.351	
Endogeneity p-value		0.000		0.004			0.000	0.002	
Hansen-Sargan test statistic		0.008		2.726			0.918	1.707	
Hansen-Sargan p-value		0.929		0.099			0.338	0.191	
Kleibergen-Paap LM test statistic		18.904		28.095			33.802	24.062	
Kleibergen-Paap p-value		0.000		0.000			0.000	0.000	
Kleibergen-Paap F statistic		18.752		43.928			130.353	23.271	
Pesaran-Taylor reset statistic		2.365		1.162			0.643	0.736	
Pesaran-Taylor p-value		0.124		0.281			0.422	0.391	

Robust standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

Table A2.20 continued Preferred expenditure specifications for 2012/13

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	PBC 10	PBC 11	PBC 12	PBC 13	PBC 14	PBC 15	PBC 16	PBC 17	PBC 1819
	circulatory	respiratory	dental problems	gastro problems	skin problems	musculo-skeletal	trauma/injuries	renal	maternity/neonates
	2012/13 spend	2011/12 spend	2012/13 spend	2012/13 spend	2012/13 spend	2012/13 spend	2012/13 spend	2012/13 spend	2012/13 spend
	SYLLR 2012/13/14	SYLLR 2011/12/13	SYLLR 2012/13/14	SYLLR 2012/13/14	SYLLR 2012/13/14	SYLLR 2012/13/14	SYLLR 2012/13/14	SYLLR 2012/13/14	SYLLR 2012/13/14
	spend model	spend model	spend model	spend model	spend model	spend model	spend model	spend model	spend model
	instrument o/need	instrument o/need	instrument o/need	instrument o/need	instrument o/need	instrument n/a	instrument n/a	instrument n/a	instrument n/a
	weighted	weighted	weighted	weighted	weighted	weighted	weighted	weighted	weighted
	IV second stage	IV second stage	IV second stage	IV second stage	IV second stage	OLS	OLS	OLS	OLS
	GMM2S	GMM2S	GMM2S	GMM2S	GMM2S				
	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level	LA-level
	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality	actual mortality
	actual census 11	actual census 11	actual census 11	actual census 11	actual census 11	actual census 11	actual census 11	actual census 11	actual census 11
VARIABLES	11/12 revised	11/12 version	Re-derived	11/12 version	11/12 revised	11/12 version	11/12 version	11/12 version	11/12 version
lSYLLRacExCirc234	-0.908***								
	[0.159]								
lLAgall_1213	1.285***	0.928***	0.855***	0.997***	1.158***	0.725***	1.058***	0.855***	0.833***
	[0.161]	[0.163]	[0.158]	[0.171]	[0.322]	[0.184]	[0.171]	[0.119]	[0.159]
LNQUAL17411	0.382***	0.408***		0.357***		0.173*			
	[0.078]	[0.071]		[0.076]		[0.094]			
LWHITEEG11	0.191***				0.225*			-0.147***	
	[0.050]				[0.115]			[0.038]	
lSYLLRacExResp234		-0.370*							
		[0.193]							
lLACARANneed1213SQ		1.945***		0.622					
		[0.395]		[0.475]					
lSYLLRallcause234			-0.276*		-0.976*	0.210	-0.270**		-0.472***
			[0.158]		[0.559]	[0.137]	[0.117]		[0.126]
LBORNEXEU11			-0.062***						
			[0.017]						
LLONEPARH11			0.344***						
			[0.083]						
lSYLLRacExGast234				-0.570***					
				[0.218]					
LPC74LTUN11					0.277*	-0.378***			
					[0.158]	[0.076]			
LPROFOCCU11					-0.308*				
					[0.175]				
LOWNOCC11						0.384***			
						[0.103]			
lLAIMD2010						0.136			
						[0.107]			
LHHNOCAR11							-0.129***		
							[0.038]		
lSYLLRacExrenal234								-0.093	
								[0.078]	

lLAmatneedindexpp									1.129***
									[0.083]
Constant	1.110	0.296	0.237	0.942	1.704	-3.635**	-2.230**	-1.375**	1.035
	[0.993]	[0.744]	[1.060]	[0.872]	[2.538]	[1.403]	[0.961]	[0.623]	[0.783]
Observations	149	149	149	149	147	149	149	149	149
R-squared						0.594	0.240	0.505	0.676
Endogeneity test statistic	12.964	6.507	2.711	7.495	4.994				
Endogeneity p-value	0.000	0.011	0.100	0.006	0.025				
Hansen-Sargan test statistic	2.162	0.000	2.463						
Hansen-Sargan p-value	0.141	0.985	0.482						
Kleibergen-Paap LM test statistic	31.331	23.711	43.690	29.937	15.054				
Kleibergen-Paap p-value	0.000	0.000	0.000	0.000	0.000				
Kleibergen-Paap F statistic	65.251	23.538	50.773	122.358	20.121				
Pesaran-Taylor reset statistic	0.807	0.484	0.354	0.023	0.002				
Pesaran-Taylor p-value	0.369	0.487	0.552	0.878	0.964				
Ramsey reset F statistic						0.257	1.071	0.879	0.323
Probability > F						0.856	0.363	0.454	0.809

Robust standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

Table A2.20 continued Preferred expenditure specifications for 2012/13

	(1)	(2)	(3)	(4)
	PBC 20	PBC 21	PBC 22	PBC 23a
	poisoning	HI	social care	GMS
	2012/13 spend	2012/13 spend	2012/13 spend	2012/13 spend
	SYLLR 2012/13/14	SYLLR 2012/13/14	SYLLR 2012/13/14	SYLLR 2012/13/14
	spend model	spend model	spend model	spend model
	instrument o/need	instrument n/a	instrument n/a	instrument n/a
	weighted	weighted	weighted	weighted
	IV second stage GMM2S	OLS	OLS	OLS
	LA-level	LA-level	LA-level	LA-level
	actual mortality	actual mortality	actual mortality	actual mortality
	actual census 11	actual census 11	actual census 11	actual census 11
VARIABLES	11/12 version	11/12 revised	11/12 revised	11/12 version
lSYLLRallcause234	-0.601***	-0.455	-0.852**	-0.113
	[0.229]	[0.488]	[0.408]	[0.088]
lLAgall_1213	1.124***	1.172*	1.613***	0.585***
	[0.252]	[0.645]	[0.430]	[0.095]
LNQUAL17411	0.142			
	[0.111]			
LPC74LTUN11		0.902***		
		[0.312]		
LPROFOCCU11			-0.886***	-0.182***
			[0.246]	[0.063]
Constant	-1.673	1.059	-3.927	1.115*
	[1.280]	[5.485]	[2.680]	[0.654]
Observations	149	149	133	149
R-squared		0.234	0.210	0.474
Endogeneity test statistic	8.286			
Endogeneity p-value	0.004			
Hansen-Sargan test statistic	0.008			
Hansen-Sargan p-value	0.930			
Kleibergen-Paap LM test statistic	24.062			
Kleibergen-Paap p-value	0.000			
Kleibergen-Paap F statistic	23.271			
Pesaran-Taylor reset statistic	1.578			
Pesaran-Taylor p-value	0.209			
Ramsey reset F statistic		0.056	2.080	1.333
Probability > F		0.983	0.106	0.266

Robust standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

A2.3 First stage of IV regressions results tables

Table A2.21 First stage of IV regressions, preferred outcome specifications for 2003/04

Table A2.22 First stage of IV regressions, preferred expenditure specifications for 2003/04

Table A2.23 First stage of IV regressions, preferred outcome specifications for 2004/05

Table A2.24 First stage of IV regressions, preferred expenditure specifications for 2004/05

Table A2.25 First stage of IV regressions, preferred outcome specifications for 2005/06

Table A2.26 First stage of IV regressions, preferred expenditure specifications for 2005/06

Table A2.27 First stage of IV regressions, preferred outcome specifications for 2006/07

Table A2.28 First stage of IV regressions, preferred expenditure specifications for 2006/07

Table A2.29 First stage of IV regressions, preferred outcome specifications for 2007/08

Table A2.30 First stage of IV regressions, preferred expenditure specifications for 2007/08

Table A2.31 First stage of IV regressions, preferred outcome specifications for 2008/09

Table A2.32 First stage of IV regressions, preferred expenditure specifications for 2008/09

Table A2.33 First stage of IV regressions, preferred outcome specifications for 2009/10

Table A2.34 First stage of IV regressions, preferred expenditure specifications for 2009/10

Table A2.35 First stage of IV regressions, preferred outcome specifications for 2010/11

Table A2.36 First stage of IV regressions, preferred expenditure specifications for 2010/11

Table A2.37 First stage of IV regressions, preferred outcome specifications for 2011/12

Table A2.38 First stage of IV regressions, preferred expenditure specifications for 2011/12

Table A2.39 First stage of IV regressions, preferred outcome specifications for 2012/13

Table A2.40 First stage of IV regressions, preferred expenditure specifications for 2012/13

Table A2.21 First stage of IV regressions, preferred outcome specifications for 2003/04

VARIABLES	(1) PBC 1 Infectious 2003/04 spend SYLLR 2003/04/05 Outcome first-stage regression	(2) PBC 2 Cancer 2003/04 spend SYLLR 2003/04/05 Outcome first-stage regression	(3) PBC 7 Neurological 2003/04 spend SYLLR 2003/04/05 Outcome first-stage regression	(4) PBC 10 Circulatory 2003/04 spend SYLLR 2003/04/05 Outcome first-stage regression	(5) PBC 11 Respiratory 2003/04 spend SYLLR 2003/04/05 Outcome first-stage regression	(6) PBC 13 Gastro-intestinal 2003/04 spend SYLLR 2003/04/05 Outcome first-stage regression	(7) PBC 17 Genito-urinary 2003/04 spend SYLLR 2003/04/05 Outcome first-stage regression
LPROFOCCU03	**0.770*** **						
	[0.246]						
lLAhivneedph	0.027						
	[0.063]						
lLAimd_2007exexpobook	0.625***		0.231**				
	[0.141]		[0.096]				
LWHITEEG03	-0.164				**0.364*** **		0.190
	[0.270]				**[0.068]**		[0.165]
LPOPPUCAR03	-0.224						
	[0.419]						
LLONEPENH03		**0.511*** **		**0.604*** **		**0.512*** **	
		[0.162]		**[0.081]**		**[0.104]**	
LWORKAGRI03		**0.020**	0.130***				
		[0.022]	[0.022]				
lLAneedCARAN34		0.396**		-0.077	1.185***	-0.640**	**1.402*** **
		[0.175]		[0.229]	[0.120]	[0.295]	**[0.202]**
LHHNOCAR03			**0.498*** **				
			[0.118]				
LPC74LTUN03			**-0.319*** **				
			[0.101]				
lLAneedCARAN342			1.680**				
			[0.772]				
LPERMSICK03				0.276***		0.449***	
				[0.070]		[0.082]	
LBORNEXEU03							**0.090** **
							[0.036]
LNQUAL17403							-0.359**
							[0.138]
Constant	1.321	5.263***	2.509***	6.727***	4.034***	6.516***	3.816***
	[1.156]	[0.274]	[0.685]	[0.267]	[0.015]	[0.302]	[0.225]
Observations	144	151	135	151	151	151	151
K-P F statistic	9.795	10.26	10.04	55.86	28.45	24.26	24.69

Robust standard errors in brackets
*** p<0.01, ** p<0.05, * p<0.1

Table A2.22 First stage of IV regressions, preferred expenditure specifications for 2003/04

VARIABLES	(1) PBC 2 Cancer 2003/04 spend SYLLR 2003/04/05 Expenditure first-stage regression	(2) PBC 8 Vision 2003/04 spend SYLLR 2003/04/05 Expenditure first-stage regression	(3) PBC 9 Hearing 2003/04 spend SYLLR 2003/04/05 Expenditure first-stage regression	(4) PBC 10 Circulatory 2003/04 spend SYLLR 2003/04/05 Expenditure first-stage regression	(5) PBC 11 Respiratory 2003/04 spend SYLLR 2003/04/05 Expenditure first-stage regression	(6) PBC 13 Gastro-intestinal 2003/04 spend SYLLR 2003/04/05 Expenditure first-stage regression	(7) PBC 20 Poisoning 2003/04 spend SYLLR 2003/04/05 Expenditure first-stage regression	(8) PBC 21 Healthy individuals 2003/04 spend SYLLR 2003/04/05 Expenditure first-stage regression
LPERMSICK03		**0.254*** [0.049]**	**0.237*** [0.047]**					
LNQUAL17403		0.169*** [0.063]	**0.224*** [0.054]**	0.487*** [0.050]	0.558*** [0.049]	0.148*** [0.046]	0.547*** [0.049]	**0.123*** [0.044]**
lLAgall_34netpoppheadOHP	0.875*** [0.099]	0.366*** [0.119]	0.162* [0.092]	0.631*** [0.085]	0.624*** [0.082]	0.109 [0.090]	0.711*** [0.085]	0.176** [0.081]
LLONEPENH03	**-0.578*** [0.086]**	**-0.400*** [0.061]**	-0.034 [0.063]	**-0.142* [0.082]**			**-0.248*** [0.080]**	
LPOPPUCAR03			-0.414*** [0.102]	**-0.347*** [0.108]**	**-0.559*** [0.080]**		**-0.388*** [0.109]**	
LPC74LTUN03			-0.036 [0.030]					
LLONEPARH03			0.244*** [0.054]					0.338*** [0.037]
lLAimd_2007exexpobook			-0.019 [0.048]			**0.262*** [0.027]**		
LPROFOCCU03	-0.522*** [0.042]							
lLAneedCARAN34								**0.355*** [0.112]**
LWHITEEG03								**0.014 [0.046]**
Constant	-2.154*** [0.643]	3.812*** [0.909]	5.587*** [0.627]	1.059* [0.569]	1.195** [0.546]	4.757*** [0.589]	0.534 [0.556]	6.022*** [0.548]
Observations	151	151	151	151	151	151	151	151
K-P F statistic	45.58	35.89	28.34	19.12	48.93	96.40	35.17	19.39

Robust standard errors in brackets
*** p<0.01, ** p<0.05, * p<0.1

Table A2.23 First stage of IV regressions, preferred outcome specifications for 2004/05

VARIABLES	(1) PBC 2 Cancer 2004/05 spend SYLLR 2004/05/06 Outcome first-stage regression	(2) PBC 4 Endocrine 2004/05 spend SYLLR 2004/05/06 Outcome first-stage regression	(3) PBC 7 Neurological 2004/05 spend SYLLR 2004/05/06 Outcome first-stage regression	(4) PBC 10 Circulatory 2004/05 spend SYLLR 2004/05/06 Outcome first-stage regression	(5) PBC 11 Respiratory 2004/05 spend SYLLR 2004/05/06 Outcome first-stage regression	(6) PBC 13 Gastro-intestinal 2004/05 spend SYLLR 2004/05/06 Outcome first-stage regression
LLONEPARH04		**-0.250*** [0.076]**				
lLAimd_2007exexpobook		0.261*** [0.045]	0.216** [0.085]			
lLAdiaprev0405		0.118 [0.087]				
lLAneedCARAN452		1.021* [0.527]				
LLONEPENH04	**0.379** [0.151]**			**0.532*** [0.065]**		**0.464*** [0.080]**
LWORKAGRI04	**0.023 [0.016]**		0.104*** [0.020]			
lLAneedCARAN45	0.522*** [0.131]			0.426** [0.184]	1.226*** [0.076]	0.807*** [0.088]
LHHNOCAR04			**0.457*** [0.100]**			
LPC74LTUN04			**-0.400*** [0.094]**			
LPERMSICK04				0.106* [0.062]		
LWHITEEG04					**0.227*** [0.062]**	
Constant	5.183*** [0.260]	2.332*** [0.437]	2.240*** [0.648]	6.187*** [0.225]	4.160*** [0.013]	5.213*** [0.160]
Observations	151	136	137	151	151	151
K-P F statistic	9.441	10.81	14.11	67.07	13.55	33.42

Robust standard errors in brackets
*** p<0.01, ** p<0.05, * p<0.1

Table A2.24 First stage of IV regressions, preferred expenditure specifications for 2004/05

VARIABLES	(1) PBC 2 Cancer 2004/05 spend SYLLR 2004/05/06 Expenditure first-stage regression	(2) PBC 8 Vision 2004/05 spend SYLLR 2004/05/06 Expenditure first-stage regression	(3) PBC 9 Hearing 2004/05 spend SYLLR 2004/05/06 Expenditure first-stage regression	(4) PBC 10 Circulatory 2004/05 spend SYLLR 2004/05/06 Expenditure first-stage regression	(5) PBC 11 Respiratory 2004/05 spend SYLLR 2004/05/06 Expenditure first-stage regression	(6) PBC 13 Gastro-intestinal 2004/05 spend SYLLR 2004/05/06 Expenditure first-stage regression	(7) PBC 20 Poisoning 2004/05 spend SYLLR 2004/05/06 Expenditure first-stage regression
LPERMSICK04		**0.308*** **	**0.254*** **				
		[0.053]	**[0.052]**				
LNQUAL17404		0.139**	**0.227*** **	0.493***	0.561***	0.146***	0.552***
		[0.064]	**[0.059]**	[0.053]	[0.053]	[0.046]	[0.052]
lLAgall_45netpoppheadOHP	0.567***	0.225*	0.127	0.626***	0.624***	0.035	0.692***
	[0.138]	[0.120]	[0.098]	[0.083]	[0.081]	[0.093]	[0.081]
LLONEPENH04	**-0.411*** **	**-0.403*** **	-0.046	**-0.137**			**-0.251*** **
	[0.108]	**[0.061]**	[0.065]	**[0.089]**			**[0.085]**
LPOPPUCAR04			-0.409***	**-0.390*** **	**-0.594*** **		**-0.416*** **
			[0.095]	**[0.118]**	**[0.078]**		**[0.116]**
LPC74LTUN04			-0.062*				
			[0.037]				
LLONEPARH04			0.249***				
			[0.057]				
LPROFOCCU04	-0.570***						
	[0.046]						
LOWNOCC04	-0.227**						
	[0.087]						
lLAimd_2007exexpobook						**0.283*** **	
						[0.027]	
Constant	0.061	4.860***	5.679***	0.920	1.026*	5.175***	0.490
	[1.035]	[0.959]	[0.786]	[0.591]	[0.582]	[0.628]	[0.568]
Observations	151	151	151	151	151	151	151
K-P F statistic	14.61	41.91	40.25	23.03	58.44	112.8	40.54

Robust standard errors in brackets
*** p<0.01, ** p<0.05, * p<0.1

Table A2.25 First stage of IV regressions, preferred outcome specifications for 2005/06

VARIABLES	(1) PBC 1 Infectious 2005/06 spend SYLLR 2005/06/07 Outcome first-stage regression	(2) PBC 2 Cancer 2005/06 spend SYLLR 2005/06/07 Outcome first-stage regression	(3) PBC 4 Endocrine 2005/06 spend SYLLR 2005/06/07 Outcome first-stage regression	(4) PBC 7 Neurological 2005/06 spend SYLLR 2005/06/07 Outcome first-stage regression	(5) PBC 10 Circulatory 2005/06 spend SYLLR 2005/06/07 Outcome first-stage regression	(6) PBC 11 Respiratory 2005/06 spend SYLLR 2005/06/07 Outcome first-stage regression	(7) PBC 13 Gastro-intestinal 2005/06 spend SYLLR 2005/06/07 Outcome first-stage regression
LPROFOCCU05	**0.717***** **[0.164]**						
lLAhivneedph	0.243*** [0.039]						
lLAhivneedph2	0.170*** [0.024]						
lLAimd_2007exexpobook	0.524*** [0.095]		0.243*** [0.043]	0.151 [0.111]			
LLONEPENH05		**0.320**** **[0.158]**			**0.375***** **[0.083]**		**0.419***** **[0.078]**
LWORKAGRI05		**0.049**** **[0.019]**					
lLAneedCARAN56		0.754*** [0.117]			0.344 [0.251]	1.254*** [0.077]	0.934*** [0.096]
LLONEPARH05			**-0.241***** **[0.077]**				
lLAdiaprev0506			0.313*** [0.080]				
LHHNOCAR05				**0.539***** **[0.126]**	**-0.044** **[0.061]**		
LPC74LTUN05				**-0.556***** **[0.114]**			
LPOPPUCAR05				3.083 [3.779]			
LPOPPUCAR05SQ				0.495 [0.801]			
LPERMSICK05					0.198*** [0.061]		
LWHITEEG05						**0.204***** **[0.057]**	
lLAneedCARAN562						0.117 [0.478]	
Constant	2.294*** [0.143]	5.294*** [0.262]	3.176*** [0.426]	6.006 [4.475]	6.120*** [0.312]	4.259*** [0.017]	5.233*** [0.158]
Observations	149	151	136	136	151	151	151
K-P F statistic	19.09	15.86	9.794	15.14	14.19	12.88	29.08

Robust standard errors in brackets
*** p<0.01, ** p<0.05, * p<0.1

Table A2.26 First stage of IV regressions, preferred expenditure specifications for 2005/06

VARIABLES	(1) PBC 2 Cancer 2005/06 spend SYLLR 2005/06/07 Expenditure first-stage regression	(2) PBC 8 Vision 2005/06 spend SYLLR 2005/06/07 Expenditure first-stage regression	(3) PBC 10 Circulatory 2005/06 spend SYLLR 2005/06/07 Expenditure first-stage regression	(4) PBC 11 Respiratory 2005/06 spend SYLLR 2005/06/07 Expenditure first-stage regression	(5) PBC 13 Gastro-intestinal 2005/06 spend SYLLR 2005/06/07 Expenditure first-stage regression	(6) PBC 20 Poisoning 2005/06 spend SYLLR 2005/06/07 Expenditure first-stage regression	(7) PBC 21 Healthy individuals 2005/06 spend SYLLR 2005/06/07 Expenditure first-stage regression	(8) PBC 22 Social care 2005/06 spend SYLLR 2005/06/07 Expenditure first-stage regression
LLONEPENH05	**-0.393*** [0.100]**	**-0.395*** [0.057]**	**-0.145 [0.089]**			**-0.245*** [0.088]**		
lLAgall_56netpoppheadOHP	0.601*** [0.125]	0.191* [0.106]	0.607*** [0.079]	0.604*** [0.075]	0.062 [0.086]	0.659*** [0.076]	0.092 [0.081]	0.116 [0.122]
LPROFOCCU05	-0.541*** [0.045]							
LOWNOCC05	-0.198** [0.085]							
LPERMSICK05		**0.314*** [0.055]**						**0.167*** [0.058]**
LNQUAL17405		0.140** [0.069]	0.475*** [0.055]	0.543*** [0.053]	0.152*** [0.047]	0.535*** [0.053]	**0.216*** [0.055]**	**0.106 [0.065]**
LPOPPUCAR05			**-0.389*** [0.134]**	**-0.616*** [0.081]**		**-0.431*** [0.129]**	-0.300*** [0.105]	
lLAimd_2007exexpobook					**0.274*** [0.026]**			
lLAneedCARAN56							**0.505*** [0.120]**	
LLONEPARH05							**0.288*** [0.050]**	**0.253*** [0.068]**
LWHITEEG05							**0.097 [0.061]**	
LBORNEXEU05							-0.005 [0.022]	
LWORKAGRI05							-0.004 [0.011]	
LHHNOCAR05								**0.049 [0.047]**
Constant	-0.169 [0.952]	5.105*** [0.871]	0.960* [0.548]	1.031* [0.530]	4.992*** [0.593]	0.608 [0.527]	5.810*** [0.677]	6.691*** [0.945]
Observations	151	151	151	151	151	151	151	116
K-P F statistic	15.50	48.81	22.30	57.82	107.3	40.30	50.79	38.22

Robust standard errors in brackets
*** p<0.01, ** p<0.05, * p<0.1

Table A2.27 First stage of IV regressions, preferred outcome specifications for 2006/07

VARIABLES	(1) PBC 1 Infectious 2006/07 spend SYLLR 2006/07/08 Outcome first-stage regression	(2) PBC 2 Cancer 2006/07 spend SYLLR 2006/07/08 Outcome first-stage regression	(3) PBC 4 Endocrine 2006/07 spend SYLLR 2006/07/08 Outcome first-stage regression	(4) PBC 7 Neurological 2006/07 spend SYLLR 2006/07/08 Outcome first-stage regression	(5) PBC 10 Circulatory 2006/07 spend SYLLR 2006/07/08 Outcome first-stage regression	(6) PBC 11 Respiratory 2006/07 spend SYLLR 2006/07/08 Outcome first-stage regression	(7) PBC 13 Gastro-intestinal 2006/07 spend SYLLR 2006/07/08 Outcome first-stage regression	(8) PBC 18 & 19 Maternity 2006/07 spend SYLLR 2006/07/08 Outcome first-stage regression
LPROFOCCU06	**0.816*** **			**-0.372*** **	-0.066			**0.242**
	[0.208]			**[0.101]**	[0.086]			**[0.147]**
lLAhivneedph	0.209***							
	[0.042]							
lLAhivneedph2	0.139***							
	[0.025]							
lLAimd_2007exexpobook	0.586***	**-0.176***	0.286***	-0.131				-0.044
	[0.118]	**[0.091]**	[0.046]	[0.132]				[0.217]
LLONEPENH06		**0.355*** **			**0.372*** **		**0.362*** **	
		[0.128]			**[0.097]**		**[0.092]**	
lLAneedCARAN67		1.355***			1.190***	0.977***	1.093***	0.938*
		[0.297]			[0.179]	[0.304]	[0.108]	[0.542]
lLAneedCARAN672		0.629						
		[0.671]						
LLONEPARH06			**-0.308*** **					
			[0.100]					
lLAdiaprev0607			0.292***					
			[0.080]					
LHHNOCAR06				**0.528*** **	**-0.157*** **			-0.040
				[0.137]	**[0.042]**			[0.135]
LPC74LTUN06				**-0.394*** **				0.146
				[0.126]				[0.143]
LPOPPUCAR06				0.582***				
				[0.145]				
LWHITEEG06						**0.244*** **		
						[0.070]		
LPERMSICK06						0.394		
						[0.421]		
LPERMSICK06SQ						0.035		
						[0.067]		
lLAmatneedindexpp								**0.752*** **
								[0.189]
LBORNEXEU06								-0.066
								[0.045]
Constant	2.122***	5.634***	2.798***	4.276***	5.249***	5.078***	5.018***	5.073***
	[0.200]	[0.220]	[0.435]	[0.913]	[0.264]	[0.686]	[0.188]	[1.091]
Observations	148	150	136	117	150	150	149	149
K-P F statistic	15.33	16.38	9.502	7.767	30.49	12.14	15.43	9.216

Robust standard errors in brackets
*** p<0.01, ** p<0.05, * p<0.1

Table A2.28 First stage of IV regressions, preferred expenditure specifications for 2006/07

VARIABLES	(1) PBC 2 Cancer 2006/07 spend SYLLR 2006/07/08 Expenditure first-stage regression	(2) PBC 8 Vision 2006/07 spend SYLLR 2006/07/08 Expenditure first-stage regression	(3) PBC 10 Circulatory 2006/07 spend SYLLR 2006/07/08 Expenditure first-stage regression	(4) PBC 11 Respiratory 2006/07 spend SYLLR 2006/07/08 Expenditure first-stage regression	(5) PBC 13 Gastro-intestinal 2006/07 spend SYLLR 2006/07/08 Expenditure first-stage regression	(6) PBC 20 Poisoning 2006/07 spend SYLLR 2006/07/08 Expenditure first-stage regression
LPOPPUCAR06	**-0.292*** [0.102]**		**-0.402*** [0.116]**	**-0.429*** [0.108]**		**-0.452*** [0.113]**
LLONEPENH06	**-0.433*** [0.089]**	**-0.441*** [0.051]**	**-0.210*** [0.076]**	**-0.283*** [0.071]**		**-0.300*** [0.073]**
lLAgall_67netpopheadOHP	0.888*** [0.093]	0.327*** [0.114]	0.721*** [0.085]	0.729*** [0.081]	0.148* [0.089]	0.765*** [0.084]
LPROFOCCU06	-0.508*** [0.057]					
LPERMSICK06		**0.276*** [0.056]**				
LNQUAL17406		0.166** [0.064]	0.413*** [0.062]	0.449*** [0.059]	0.156*** [0.053]	0.467*** [0.061]
lLAimd_2007exexpobook					**0.263*** [0.028]**	
Constant	-2.896*** [0.595]	3.930*** [0.963]	-0.127 [0.605]	-0.165 [0.569]	4.395*** [0.615]	-0.438 [0.588]
Observations	150	150	150	150	150	150
K-P F statistic	46.18	74.59	33.18	56.20	85.71	59.64

Robust standard errors in brackets
*** p<0.01, ** p<0.05, * p<0.1

Table A2.29 First stage of IV regressions, preferred outcome specifications for 2007/08

VARIABLES	(1) PBC 1 Infectious 2007/08 spend SYLLR 2007/08/09 Outcome first-stage regression	(2) PBC 2 Cancer 2007/08 spend SYLLR 2007/08/09 Outcome first-stage regression	(3) PBC 4 Endocrine 2007/08 spend SYLLR 2007/08/09 Outcome first-stage regression	(4) PBC 10 Circulatory 2007/08 spend SYLLR 2007/08/09 Outcome first-stage regression	(5) PBC 11 Respiratory 2007/08 spend SYLLR 2007/08/09 Outcome first-stage regression	(6) PBC 13 Gastro-intestinal 2007/08 spend SYLLR 2007/08/09 Outcome first-stage regression	(7) PBC 16 Trauma 2007/08 spend SYLLR 2007/08/09 Outcome first-stage regression	(8) PBC 17 Genito-urinary 2007/08 spend SYLLR 2007/08/09 Outcome first-stage regression
LWHITEEG07	**0.322***				**0.273*****			
	[0.190]				**[0.061]**			
LPROFOCCU07	**0.667*****		-0.233***	-0.147				**0.363*****
	[0.192]		[0.072]	[0.095]				**[0.132]**
lLAhivneedph	0.339***							
	[0.050]							
lLAhivneedph2	0.174***							
	[0.023]							
lLAimd_2007exexpobook	0.539***	**0.024**	-0.053					
	[0.098]	**[0.097]**	[0.057]					
LLONEPENH07		**0.630*****		**0.478*****		**0.467*****		
		[0.134]		**[0.097]**		**[0.110]**		
lLAneedCARAN78		0.670**		1.004***	0.785***	1.142***	1.660***	1.418***
		[0.295]		[0.182]	[0.281]	[0.117]	[0.251]	[0.213]
LPERMSICK07			**0.212*****		1.002**			
			[0.069]		[0.396]			
LHHNOCAR07				**-0.101**			**0.119**	
				[0.062]			**[0.113]**	
LPERMSICK07SQ					0.119**			
					[0.058]			
LWORKAGRI07							**0.108*****	
							[0.027]	
LPC74LTUN07							-0.264*	
							[0.153]	
lLACKDprev0708								**0.155****
								[0.064]
LBORNEXEU07								0.011
								[0.026]
Constant	2.165***	5.705***	4.194***	5.470***	6.204***	5.257***	3.606***	5.201***
	[0.183]	[0.224]	[0.392]	[0.315]	[0.691]	[0.222]	[0.666]	[0.321]
Observations	148	152	133	152	152	151	151	152
K-P F statistic	9.757	19.30	9.375	43.33	20.19	18.14	8.192	6.291

Robust standard errors in brackets
*** p<0.01, ** p<0.05, * p<0.1

Table A2.30 First stage of IV regressions, preferred expenditure specifications for 2007/08

VARIABLES	(1) PBC 2 Cancer 2007/08 spend SYLLR 2007/08/09 Expenditure first-stage regression	(2) PBC 7 Neurological 2007/08 spend SYLLR 2007/08/09 Expenditure first-stage regression	(3) PBC 8 Vision 2007/08 spend SYLLR 2007/08/09 Expenditure first-stage regression	(4) PBC 10 Circulatory 2007/08 spend SYLLR 2007/08/09 Expenditure first-stage regression	(5) PBC 11 Respiratory 2007/08 spend SYLLR 2007/08/09 Expenditure first-stage regression	(6) PBC 13 Gastro-intestinal 2007/08 spend SYLLR 2007/08/09 Expenditure first-stage regression	(7) PBC 20 Poisoning 2007/08 spend SYLLR 2007/08/09 Expenditure first-stage regression	(8) PBC 22 Social care 2007/08 spend SYLLR 2007/08/09 Expenditure first-stage regression
LLONEPENH07	**-0.382*** [0.079]**	**-0.491*** [0.064]**	**-0.401*** [0.042]**	**-0.198*** [0.069]**	**-0.272*** [0.064]**		**-0.284*** [0.067]**	
lLAneedCARAN78		**0.737*** [0.206]**						
lLAgall_78netpoppheadOHP	0.869*** [0.097]	-0.017 [0.120]	0.319** [0.125]	0.714*** [0.090]	0.723*** [0.087]	0.379*** [0.118]	0.757*** [0.090]	0.522*** [0.150]
lLAepiprev0708		0.216*** [0.067]						
LPERMSICK07		0.164*** [0.062]	**0.271*** [0.057]**					**0.124** [0.057]**
LPOPPUCAR07	**-0.213* [0.111]**			**-0.331*** [0.122]**	**-0.367*** [0.115]**	**-0.441*** [0.109]**	**-0.390*** [0.119]**	
LPROFOCCU07	-0.486*** [0.057]							
LNQUAL17407			0.176*** [0.059]	0.387*** [0.063]	0.423*** [0.060]	0.366*** [0.072]	0.440*** [0.062]	**0.076 [0.055]**
lLAimd_2007exexpobook						**0.136*** [0.042]**		
LHHNOCAR07								**0.015 [0.043]**
LLONEPARH07								**0.237*** [0.063]**
Constant	-2.531*** [0.614]	6.763*** [0.891]	4.022*** [1.061]	0.012 [0.629]	-0.065 [0.609]	2.340*** [0.852]	-0.319 [0.629]	3.427*** [1.205]
Observations	152	152	152	152	152	152	152	110
K-P F statistic	49.41	35	87.35	29.95	54.03	50.77	54.96	14.92

Robust standard errors in brackets
*** p<0.01, ** p<0.05, * p<0.1

Table A2.31 First stage of IV regressions, preferred outcome specifications for 2008/09

VARIABLES	(1) PBC 1 Infectious 2008/09 spend SYLLR 2008/09/10 Outcome first-stage regression	(2) PBC 2 Cancer 2008/09 spend SYLLR 2008/09/10 Outcome first-stage regression	(3) PBC 4 Endocrine 2008/09 spend SYLLR 2008/09/10 Outcome first-stage regression	(4) PBC 7 Neurological 2008/09 spend SYLLR 2008/09/10 Outcome first-stage regression	(5) PBC 10 Circulatory 2008/09 spend SYLLR 2008/09/10 Outcome first-stage regression	(6) PBC 11 Respiratory 2008/09 spend SYLLR 2008/09/10 Outcome first-stage regression	(7) PBC 13 Gastro-intestinal 2008/09 spend SYLLR 2008/09/10 Outcome first-stage regression
LPOPPUCAR08	**0.963*** [0.322]**						
LNQUAL17408	-0.589*** [0.191]						
LWHITEEG08	0.608*** [0.172]					**0.195*** [0.075]**	
lLAhivneedph	0.511*** [0.064]						
lLAhivneedph2	0.193*** [0.021]						
lLAimd_2007exexpobook	0.472*** [0.106]	**0.004 [0.076]**	-0.007 [0.074]				
LLONEPENH08		**0.597*** [0.112]**		**0.225** [0.102]**	**0.389*** [0.086]**		**0.423*** [0.079]**
lLAneedCARAN		0.801*** [0.230]		0.559** [0.220]	1.179*** [0.136]	0.938*** [0.294]	1.103*** [0.075]
LPERMSICK08			**0.307*** [0.095]**			1.144** [0.441]	
LPROFOCCU08			-0.198** [0.094]				
lLAepilepsyov18prevrate				**0.393** [0.162]**			
LOWNOCC08				**-0.200 [0.127]**			
LHHNOCAR08					**-0.098* [0.052]**		
LLONEPARH08						**-0.107 [0.082]**	
LPERMSICK08SQ						0.139** [0.067]	
Constant	3.107*** [0.888]	5.760*** [0.166]	4.512*** [0.572]	4.691*** [0.180]	5.525*** [0.238]	6.300*** [0.690]	5.223*** [0.161]
Observations	148	152	149	148	152	151	150
K-P F statistic	10.46	32.48	10.51	10.63	43.47	14.27	28.80

Robust standard errors in brackets
*** p<0.01, ** p<0.05, * p<0.1

Table A2.32 First stage of IV regressions, preferred expenditure specifications for 2008/09

VARIABLES	(1) PBC 2 Cancer 2008/09 spend SYLLR 2008/09/10 Expenditure first-stage regression	(2) PBC 7 Neurological 2008/09 spend SYLLR 2008/09/10 Expenditure first-stage regression	(3) PBC 8 Vision 2008/09 spend SYLLR 2008/09/10 Expenditure first-stage regression	(4) PBC 10 Circulatory 2008/09 spend SYLLR 2008/09/10 Expenditure first-stage regression	(5) PBC 11 Respiratory 2008/09 spend SYLLR 2008/09/10 Expenditure first-stage regression	(6) PBC 13 Gastro-intestinal 2008/09 spend SYLLR 2008/09/10 Expenditure first-stage regression	(7) PBC 18 & 19 Maternity 2008/09 spend SYLLR 2008/09/10 Expenditure first-stage regression	(8) PBC 20 Poisoning 2008/09 spend SYLLR 2008/09/10 Expenditure first-stage regression
LPOPPUCAR08	**-0.296*** [0.110]**		**-0.365*** [0.116]**	**-0.319*** [0.119]**	**-0.149 [0.105]**	**-0.359*** [0.091]**		**-0.160 [0.110]**
LLONEPENH08	**-0.319*** [0.077]**	**-0.534*** [0.058]**	**-0.308*** [0.065]**	**-0.216*** [0.067]**	**-0.251*** [0.074]**		**-0.062 [0.074]**	**-0.262*** [0.077]**
lLAgall_89netpoppheadOHP	0.275* [0.153]	0.220* [0.128]	0.784*** [0.082]	0.745*** [0.081]	-0.005 [0.117]	-0.141 [0.112]	0.439*** [0.134]	0.013 [0.123]
lLAneedCARAN	0.880*** [0.197]	**0.855*** [0.138]**			1.222*** [0.130]	1.227*** [0.214]		1.259*** [0.136]
LPROFOCCU08	-0.329*** [0.058]							
lLAepilepsyov18prevrate		0.256*** [0.053]						
LNQUAL17408			0.420*** [0.057]	0.369*** [0.057]				
lLAneedCARAN2					0.128 [0.292]			
lLAimd_2007exexpobook						**0.045 [0.048]**	**0.213*** [0.048]**	
LWHITEEG08							**0.241*** [0.059]**	
lLAmatneedindexpp							0.297*** [0.088]	
Constant	1.887* [1.133]	3.412*** [0.960]	-0.588 [0.589]	-0.305 [0.588]	5.193*** [0.835]	6.085*** [0.800]	2.109** [0.907]	5.057*** [0.879]
Observations	152	150	152	152	152	152	152	152
K-P F statistic	56.43	82.27	51.87	29.65	34.27	22.22	11.22	33.86

Robust standard errors in brackets
*** p<0.01, ** p<0.05, * p<0.1

Table A2.33 First stage of IV regressions, preferred outcome specifications for 2009/10

VARIABLES	(1) PBC 1 Infectious 2009/10 spend SYLLR 2009/10/11 Outcome first-stage regression	(2) PBC 2 Cancer 2009/10 spend SYLLR 2009/10/11 Outcome first-stage regression	(3) PBC 4 Endocrine 2009/10 spend SYLLR 2009/10/11 Outcome first-stage regression	(4) PBC 7 Neurological 2009/10 spend SYLLR 2009/10/11 Outcome first-stage regression	(5) PBC 10 Circulatory 2009/10 spend SYLLR 2009/10/11 Outcome first-stage regression	(6) PBC 11 Respiratory 2009/10 spend SYLLR 2009/10/11 Outcome first-stage regression	(7) PBC 13 Gastro-intestinal 2009/10 spend SYLLR 2009/10/11 Outcome first-stage regression	(8) PBC 17 Genito-urinary 2009/10 spend SYLLR 2009/10/11 Outcome first-stage regression
LPOPPUCAR09	**1.037*** **							
	[0.301]							
LNQUAL17409	**-0.713*** **							
	[0.201]							
LWHITEEG09	**0.578*** **					**-0.080**		-0.124
	[0.147]					**[0.053]**		[0.089]
LWORKAGRI09	**0.062***							-0.036***
	[0.034]							[0.012]
lLAhivneedph	0.535***							
	[0.062]							
lLAhivneedphSQ	0.141***							
	[0.025]							
lLAIMD2010	0.564***	**-0.042**	-0.020					
	[0.099]	**[0.057]**	[0.081]					
LLONEPENH09		**0.313*** **			**0.373*** **		**0.186*** **	
		[0.088]			**[0.118]**		**[0.064]**	
lLACARANneed910		0.792***		0.389**	0.851***	0.306	0.988***	**1.011*** **
		[0.159]		[0.195]	[0.146]	[0.239]	[0.072]	**[0.188]**
LPERMSICK09			**0.427*** **			1.779***		
			[0.103]			[0.410]		
LPROFOCCU09			0.034					**0.320*** **
			[0.102]					**[0.110]**
LOWNOCC09				**-0.349*** **				-0.063
				[0.109]				[0.105]
lLAepiprev0910				0.545***				
				[0.137]				
LBORNEXEU09				-0.012				
				[0.028]				
LHHNOCAR09					**0.009**			
					[0.059]			
LLONEPARH09						**-0.282*** **		
						[0.069]		
LPERMSICK09SQ						0.204***		
						[0.062]		
lLACARANneed910SQ							0.711*	
							[0.426]	
lLACKDprev18								0.071
								[0.064]
Constant	3.367***	5.445***	5.346***	6.779***	5.705***	7.233***	4.823***	4.796***
	[0.757]	[0.133]	[0.599]	[0.674]	[0.315]	[0.677]	[0.133]	[0.246]
Observations	147	150	148	140	150	148	148	150
K-P F statistic	8.698	17.79	17.22	10.20	10.90	9.051	8.446	19.95

Robust standard errors in brackets
*** p<0.01, ** p<0.05, * p<0.1

Table A2.34 First stage of IV regressions, preferred expenditure specifications for 2009/10

VARIABLES	(1) PBC 2 Cancer 2009/10 spend SYLLR 2009/10/11 Expenditure first-stage regression	(2) PBC 4 Endocrine 2009/10 spend SYLLR 2009/10/11 Expenditure first-stage regression	(3) PBC 7 Neurological 2009/10 spend SYLLR 2009/10/11 Expenditure first-stage regression	(4) PBC 8 Vision 2009/10 spend SYLLR 2009/10/11 Expenditure first-stage regression	(5) PBC 10 Circulatory 2009/10 spend SYLLR 2009/10/11 Expenditure first-stage regression	(6) PBC 11 Respiratory 2009/10 spend SYLLR 2009/10/11 Expenditure first-stage regression	(7) PBC 13 Gastro-intestinal 2009/10 spend SYLLR 2009/10/11 Expenditure first-stage regression	(8) PBC 18 & 19 Maternity 2009/10 spend SYLLR 2009/10/11 Expenditure first-stage regression	(9) PBC 20 Poisoning 2009/10 spend SYLLR 2009/10/11 Expenditure first-stage regression
LLONEPENH09	**-0.159***	**-0.138***	**-0.498*****	**-0.190****	**-0.051**	**-0.123***		**-0.078**	**-0.140***
	[0.082]	**[0.079]**	**[0.059]**	**[0.074]**	**[0.072]**	**[0.068]**		**[0.072]**	**[0.072]**
LPOPPUCAR09	**-0.402*****	**-0.315****		**-0.297****	**-0.303*****	**-0.317*****	**-0.263****		**-0.314*****
	[0.123]	**[0.123]**		**[0.132]**	**[0.109]**	**[0.102]**	**[0.101]**		**[0.105]**
lLAgall_0910pheadOHP	0.009	-0.293**	0.219*	0.711***	-0.192*	-0.280**	-0.338***	0.130	-0.233**
	[0.153]	[0.121]	[0.125]	[0.072]	[0.116]	[0.117]	[0.113]	[0.087]	[0.112]
lLACARANneed910	1.114***	1.468***	**0.678*****		1.279***	1.392***	1.026***		1.396***
	[0.215]	[0.140]	**[0.149]**		[0.135]	[0.131]	[0.197]		[0.130]
lLACARANneed910SQ		0.566*				0.537*			
		[0.302]				[0.275]			
lLAdiaprev0910		-0.027							
		[0.062]							
LPROFOCCU09	-0.263***								
	[0.062]								
lLAepiprev0910			0.326***						
			[0.065]						
LNQUAL17409				0.403***					
				[0.055]					
lLAIMD2010							**0.138*****	**0.341*****	
							[0.044]	**[0.034]**	
LWHITEEG09								**0.357*****	
								[0.042]	
lLAmatneedindexpp								0.194***	
								[0.070]	
Constant	3.944***	7.081***	4.927***	0.213	6.422***	7.052***	7.446***	3.919***	6.730***
	[1.103]	[0.811]	[0.841]	[0.531]	[0.789]	[0.789]	[0.760]	[0.632]	[0.767]
Observations	150	148	140	150	150	148	148	150	150
K-P F statistic	27.74	23.10	55.10	17.74	11.76	22.22	29.99	69.22	21.30

Robust standard errors in brackets
*** p<0.01, ** p<0.05, * p<0.1

Table A2.35 First stage of IV regressions, preferred outcome specifications for 2010/11

VARIABLES	(1) PBC 1 Infectious 2010/11 spend SYLLR 2010/11/12 Outcome first-stage regression	(2) PBC 2 Cancer 2010/11 spend SYLLR 2010/11/12 Outcome first-stage regression	(3) PBC 7 Neurological 2010/11 spend SYLLR 2010/11/12 Outcome first-stage regression	(4) PBC 10 Circulatory 2010/11 spend SYLLR 2010/11/12 Outcome first-stage regression	(5) PBC 11 Respiratory 2010/11 spend SYLLR 2010/11/12 Outcome first-stage regression	(6) PBC 13 Gastro-intestinal 2010/11 spend SYLLR 2010/11/12 Outcome first-stage regression	(7) PBC 17 Genito-urinary 2010/11 spend SYLLR 2010/11/12 Outcome first-stage regression	(8) PBC 18 & 19 Maternity 2010/11 spend SYLLR 2010/11/12 Outcome first-stage regression
LNQUAL17410	**-0.506*** **						0.209**	
	[0.151]						[0.080]	
lLACARANneed1011	**1.453*** **	0.861***	0.822***	0.709***		1.110***		-0.175
	[0.373]	[0.282]	[0.107]	[0.125]		[0.152]		[0.210]
lLAhivneedph	0.368***							
	[0.039]							
lLAIMD2010	0.124	**-0.061**						
	[0.131]	**[0.111]**						
LLONEPENH10		**0.465*** **		**0.146**				
		[0.128]		**[0.095]**				
LWHITEEG10			**0.231*** **				-0.093	
			[0.057]				[0.087]	
LHHNOCAR10				**-0.125** **				0.188***
				[0.056]				[0.063]
LLONEPARH10					**-0.239*** **			
					[0.072]			
LPERMSICK10					2.703***			
					[0.488]			
LPERMSICK10SQ					0.343***			
					[0.076]			
LPC74LTUN10						**-0.205*** **		
						[0.069]		
lLACARANneed1011SQ						1.789***		
						[0.662]		
LWORKAGRI10							**-0.055*** **	
							[0.016]	
LPOPPUCAR10							0.227	
							[0.168]	
lLAmatneedindexpp								**0.796*** **
								[0.163]
LBORNEXEU10								-0.011
								[0.040]
Constant	2.229***	5.799***	4.380***	5.015***	8.864***	3.540***	4.936***	4.640***
	[0.500]	[0.192]	[0.019]	[0.260]	[0.761]	[0.298]	[0.297]	[0.089]
Observations	147	150	150	150	150	150	152	149
K-P F statistic	9.561	25.02	16.65	12.59	10.90	8.704	11.41	23.73

Robust standard errors in brackets
*** p<0.01, ** p<0.05, * p<0.1

Table A2.36 First stage of IV regressions, preferred expenditure specifications for 2010/11

	(1) PBC 2 Cancer 2010/11 spend SYLLR 2010/11/12 Expenditure first-stage regression	(2) PBC 4 Endocrine 2010/11 spend SYLLR 2010/11/12 Expenditure first-stage regression	(3) PBC 6 Learning Disability 2010/11 spend SYLLR 2010/11/12 Expenditure first-stage regression	(4) PBC 7 Neurological 2010/11 spend SYLLR 2010/11/12 Expenditure first-stage regression	(5) PBC 8 Vision 2010/11 spend SYLLR 2010/11/12 Expenditure first-stage regression	(6) PBC 10 Circulatory 2010/11 spend SYLLR 2010/11/12 Expenditure first-stage regression	(7) PBC 11 Respiratory 2010/11 spend SYLLR 2010/11/12 Expenditure first-stage regression	(8) PBC 13 Gastro-intestinal 2010/11 spend SYLLR 2010/11/12 Expenditure first-stage regression	(9) PBC 14 Skin 2010/11 spend SYLLR 2010/11/12 Expenditure first-stage regression	(10) PBC 18 & 19 Maternity 2010/11 spend SYLLR 2010/11/12 Expenditure first-stage regression	(11) PBC 20 Poisoning 2010/11 spend SYLLR 2010/11/12 Expenditure first-stage regression
VARIABLES											
LLONEPENH10	**-0.126**	**-0.265*** **	-0.290***	-0.255***	**-0.165** **		**-0.157** **		**-0.349*** **	**-0.049**	**-0.165** **
	[0.083]	**[0.059]**	[0.058]	[0.064]	**[0.070]**		**[0.068]**		**[0.059]**	**[0.072]**	**[0.070]**
lLAIMD2010		**0.240*** **	**0.227*** **	**0.265*** **		**0.132*** **		**0.251*** **		**0.345*** **	
		[0.038]	**[0.044]**	**[0.041]**		**[0.037]**		**[0.029]**		**[0.033]**	
LPROFOCCU10	-0.261***	**-0.354*** **	-0.212***			**-0.241** **			**-0.388*** **		
	[0.061]	**[0.071]**	[0.049]			**[0.102]**			**[0.048]**		
lLAgall_1011pheadOHP	0.035	0.301***	-0.020	0.197***	0.733***	0.418***	0.688***	0.185**	0.673***	0.124	0.733***
	[0.155]	[0.091]	[0.125]	[0.073]	[0.069]	[0.100]	[0.065]	[0.078]	[0.093]	[0.083]	[0.069]
LNQUAL17410		-0.643**			0.405***	-0.013	0.390***	0.140***			0.405***
		[0.270]			[0.054]	[0.088]	[0.052]	[0.029]			[0.054]
LNQUAL17410SQ		-0.169**									
		[0.083]									
LWHITEEG10		0.319***	0.287***						**0.344*** **	**0.350*** **	
		[0.037]	[0.038]						**[0.062]**	**[0.039]**	
LPOPPUCAR10	**-0.429*** **			**-0.165* **	**-0.345*** **		**-0.315** **				**-0.345*** **
	[0.121]			**[0.087]**	**[0.130]**		**[0.124]**				**[0.130]**
lLACARANneed1011	1.126***		**0.408** **								
	[0.212]		**[0.183]**								
LWORKAGRI10			-0.025***								
			[0.008]								
LPC74LTUN10			-0.079	-0.049					0.058		
			[0.053]	[0.048]					[0.047]		
lLAepiprev1011				0.502***							
				[0.055]							
LBORNEXEU10									0.044**		
									[0.018]		
lLAmatneedindexpp										0.212***	
										[0.072]	
Constant	3.806***	1.632**	4.285***	5.148***	0.046	2.042**	0.396	4.097***	0.279	4.091***	0.046
	[1.148]	[0.804]	[1.008]	[0.569]	[0.508]	[0.791]	[0.489]	[0.531]	[0.922]	[0.593]	[0.508]
Observations	150	150	137	150	150	150	150	150	147	150	150
K-P F statistic	30.07	56.66	20.44	22.77	18.70	20.27	17.31	73.90	23.61	75.02	18.70

Robust standard errors in brackets
*** p<0.01, ** p<0.05, * p<0.1

Table A2.37 First stage of IV regressions, preferred outcome specifications for 2011/12

VARIABLES	(1) PBC 2 Cancer 2011/12 spend SYLLR 2011/12/13 Outcome first-stage regression	(2) PBC 7 Neurological 2011/12 spend SYLLR 2011/12/13 Outcome first-stage regression	(3) PBC 10 Circulatory 2011/12 spend SYLLR 2011/12/13 Outcome first-stage regression	(4) PBC 11 Respiratory 2011/12 spend SYLLR 2011/12/13 Outcome first-stage regression	(5) PBC 13 Gastro-intestinal 2011/12 spend SYLLR 2011/12/13 Outcome first-stage regression
lLACARANneed1112	0.716*** [0.128]	**0.647***** **[0.219]**	0.600*** [0.114]		1.082*** [0.081]
LWORKAGRI11		-0.020 [0.015]			
lLAIMD2010		-0.065 [0.063]			
lLAepiprev1112		0.466*** [0.104]			
LLONEPENH11	**0.328***** **[0.085]**		**0.390***** **[0.088]**		
LHHNOCAR11			**0.025** **[0.044]**		**-0.092***** **[0.030]**
LLONEPARH11				**-0.257***** **[0.060]**	
LPERMSICK11				2.057*** [0.389]	
LPERMSICK11SQ				0.241*** [0.060]	
lLACARANneed1112SQ					0.719 [0.481]
Constant	5.329*** [0.187]	6.729*** [0.461]	5.731*** [0.236]	7.848*** [0.639]	4.321*** [0.049]
Observations	148	148	148	148	148
K-P F statistic	14.77	8.746	17.47	18.12	9.678

Robust standard errors in brackets
*** p<0.01, ** p<0.05, * p<0.1

Table A2.38 First stage of IV regressions, preferred expenditure specifications for 2011/12

VARIABLES	(1) PBC 2 Cancer 2011/12 spend SYLLR 2011/12/13 Expenditure first-stage regression	(2) PBC 4 Endocrine 2011/12 spend SYLLR 2011/12/13 Expenditure first-stage regression	(3) PBC 7 Neurological 2011/12 spend SYLLR 2011/12/13 Expenditure first-stage regression	(4) PBC 8 Vision 2011/12 spend SYLLR 2011/12/13 Expenditure first-stage regression	(5) PBC 10 Circulatory 2011/12 spend SYLLR 2011/12/13 Expenditure first-stage regression	(6) PBC 11 Respiratory 2011/12 spend SYLLR 2011/12/13 Expenditure first-stage regression	(7) PBC 12 Dental 2011/12 spend SYLLR 2011/12/13 Expenditure first-stage regression	(8) PBC 13 Gastro-intestinal 2011/12 spend SYLLR 2011/12/13 Expenditure first-stage regression	(9) PBC 14 Skin 2011/12 spend SYLLR 2011/12/13 Expenditure first-stage regression	(10) PBC 20 Poisoning 2011/12 spend SYLLR 2011/12/13 Expenditure first-stage regression
LLONEPENH11	**-0.086**	**-0.246*** **		**-0.148***		**-0.127***	**-0.244*** **		**-0.385*** **	**-0.148***
	[0.094]	**[0.061]**		**[0.082]**		**[0.075]**	**[0.054]**		**[0.062]**	**[0.082]**
lLAIMD2010		**0.252*** **	**0.275*** **		**0.131*** **		0.276***	**0.264*** **		
		[0.041]	**[0.022]**		**[0.042]**		[0.040]	**[0.027]**		
LPROFOCCU11	-0.351***	**-0.362*** **			**-0.206***		-0.253***		**-0.362*** **	
	[0.058]	**[0.063]**			**[0.107]**		[0.045]		**[0.043]**	
lLAgall_1112pheadOHP	0.085	0.180**	0.082	0.719***	0.400***	0.655***	0.115	0.095	0.592***	0.719***
	[0.185]	[0.087]	[0.077]	[0.072]	[0.122]	[0.066]	[0.083]	[0.083]	[0.076]	[0.072]
LNQUAL17411		-0.114		0.420***	0.044	0.430***		0.187***		0.420***
		[0.075]		[0.055]	[0.092]	[0.054]		[0.032]		[0.055]
LWHITEEG11		0.354***					**0.318*** **		0.288***	
		[0.038]					**[0.032]**		[0.043]	
LPOPPUCAR11	**-0.389*** **		**-0.339*** **	**-0.364*** **		**-0.360*** **				**-0.364*** **
	[0.144]		**[0.076]**	**[0.138]**		**[0.133]**				**[0.138]**
lLACARANneed1112	1.025***									
	[0.242]									
lLAepiprev1112			0.505***							
			[0.052]							
lLACARANneed1112SQ						0.910***	0.820***	1.106***		
						[0.344]	[0.299]	[0.288]		
LPC74LTUN11									0.094**	
									[0.044]	
Constant	3.477***	2.909***	6.299***	0.147	2.282**	0.623	3.610***	4.760***	0.844	0.147
	[1.328]	[0.645]	[0.594]	[0.534]	[0.964]	[0.480]	[0.598]	[0.575]	[0.786]	[0.534]
Observations	148	148	148	148	148	148	148	148	145	148
K-P F statistic	18.61	66.39	117.5	19.19	19.92	19.84	51.66	94.01	35.96	19.19

Robust standard errors in brackets
*** p<0.01, ** p<0.05, * p<0.1

Table A2.39 First stage of IV regressions, preferred outcome specifications for 2012/13

VARIABLES	(1) PBC 2 Cancer 2012/13 spend SYLLR 2012/13/14 Outcome first-stage regression	(2) PBC 4 Endocrine 2012/13 spend SYLLR 2012/13/14 Outcome first-stage regression	(3) PBC 10 Circulatory 2012/13 spend SYLLR 2012/13/14 Outcome first-stage regression	(4) PBC 11 Respiratory 2012/13 spend SYLLR 2012/13/14 Outcome first-stage regression	(5) PBC 13 Gastro-intestinal 2012/13 spend SYLLR 2012/13/14 Outcome first-stage regression
LWHITEEG11		**-0.389***** **[0.060]**			
lLACARANneed1213	0.743*** [0.142]	**0.870***** **[0.190]**	0.847*** [0.119]		0.817*** [0.082]
LNQUAL17411		**0.445***** **[0.104]**			
lLAIMD2010		-0.051 [0.056]			
LPROFOCCU11		0.360*** [0.102]			
LLONEPENH11	**0.342***** **[0.102]**		**0.203**** **[0.100]**		**0.214***** **[0.066]**
LHHNOCAR11			**-0.116**** **[0.045]**		
LPOPPUCAR11				**0.449***** **[0.094]**	
LLONEPARH11				**0.012** **[0.076]**	
LPERMSICK11				1.797*** [0.339]	
LPERMSICK11SQ				0.229*** [0.052]	
lLACARANneed1213SQ					0.310 [0.434]
Constant	5.382*** [0.225]	5.190*** [0.252]	5.122*** [0.260]	8.924*** [0.635]	4.939*** [0.138]
Observations	149	149	149	149	149
K-P F statistic	11.26	24.51	19.52	16.64	10.36

Robust standard errors in brackets
*** p<0.01, ** p<0.05, * p<0.1

Table A2.40 First stage of IV regressions, preferred expenditure specifications for 2012/13

VARIABLES	(1) PBC 2 Cancer 2012/13 spend SYLLR 2012/13/14 Expenditure first-stage regression	(2) PBC 4 Endocrine 2012/13 spend SYLLR 2012/13/14 Expenditure first-stage regression	(3) PBC 7 Neurological 2012/13 spend SYLLR 2012/13/14 Expenditure first-stage regression	(4) PBC 8 Vision 2012/13 spend SYLLR 2012/13/14 Expenditure first-stage regression	(5) PBC 10 Circulatory 2012/13 spend SYLLR 2012/13/14 Expenditure first-stage regression	(6) PBC 11 Respiratory 2012/13 spend SYLLR 2012/13/14 Expenditure first-stage regression	(7) PBC 12 Dental 2012/13 spend SYLLR 2012/13/14 Expenditure first-stage regression	(8) PBC 13 Gastro-intestinal 2012/13 spend SYLLR 2012/13/14 Expenditure first-stage regression	(9) PBC 14 Skin 2012/13 spend SYLLR 2012/13/14 Expenditure first-stage regression	(10) PBC 20 Poisoning 2012/13 spend SYLLR 2012/13/14 Expenditure first-stage regression
LPOPPUCAR11	**-0.404*** [0.128]**		**-0.292*** [0.071]**	**-0.467*** [0.124]**		**-0.451*** [0.117]**				**-0.467*** [0.124]**
LLONEPENH11	**-0.074 [0.090]**	**-0.355*** [0.063]**		**-0.093 [0.082]**		**-0.075 [0.074]**			**-0.286*** [0.064]**	**-0.093 [0.082]**
lLAgall_1213pheadOHP	-0.119 [0.230]	0.650*** [0.055]	0.032 [0.082]	0.693*** [0.073]	0.055 [0.094]	0.636*** [0.065]	-0.005 [0.093]	0.044 [0.078]	0.499*** [0.071]	0.693*** [0.073]
lLACARANneed1213	1.259*** [0.289]									
LPROFOCCU11	-0.366*** [0.063]	**-0.530*** [0.074]**			**-0.277*** [0.067]**		**-0.208*** [0.039]**		-0.362*** [0.042]	
LNQUAL17411		-0.072 [0.079]		0.492*** [0.052]	-0.091 [0.070]	0.495*** [0.050]		0.245*** [0.031]		0.492*** [0.052]
LWHITEEG11		0.241*** [0.066]			0.313*** [0.042]		**0.252*** [0.041]**		0.276*** [0.048]	
lLAIMD2010			**0.300*** [0.025]**		**0.318*** [0.041]**		**0.287*** [0.049]**	**0.274*** [0.025]**		
lLAepiprev1213			0.531*** [0.048]							
lLACARANneed1213SQ						0.802** [0.317]	**0.807*** [0.293]**	1.035*** [0.257]		
LBORNEXEU11							-0.000 [0.015]			
LLONEPARH11							0.140*** [0.053]			
LPC74LTUN11									0.163*** [0.042]	
Constant	4.972*** [1.674]	-0.252 [0.451]	6.825*** [0.634]	0.300 [0.546]	4.068*** [0.687]	0.738 [0.477]	5.393*** [0.574]	5.186*** [0.544]	2.008*** [0.738]	0.300 [0.546]
Observations	149	149	149	149	149	149	149	149	147	149
K-P F statistic	18.75	43.93	130.4	23.27	65.25	23.54	50.77	122.4	20.12	23.27

Robust standard errors in brackets
*** p<0.01, ** p<0.05, * p<0.1

Appendix References

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