

# Social Science Statistics II

## Module II Project 2010/2011

This assessed project constitutes 100% of marks for Social Science Statistics II.

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## Submission

- The project is due **Thursday 14<sup>th</sup> April 2010**.
- **Two copies** should be handed in at the Graduate School Office:

College of Social Sciences  
Room 107  
Florentine House  
53 Hillhead Street  
University of Glasgow G12 8QF  
*Opening Hours: Monday to Friday 10am-4pm*

- The main text should be presented in hard copy **and should not exceed 40 pages in total (including tables and appendices)**. Font size should not be less than 12pt text, 10pt in tables. Margins should not be less than 2cm. The main text should be 1.5 spacing, whereas text in tables and figures should be single spaced. Both copies of the assignment should be spiral bound (either wire comb binding or standard plastic comb binding).
- *You must also submit the Word file of your project on CD, with your amended data set, output file and syntax file. These files will **only be consulted if there is doubt over authorship** (i.e. suspected plagiarism) so you should **include in your hard copy anything you want the marker to see**. NB use CD & file names that clearly identify you (e.g. your matriculation number).*
- Late projects may be accepted, but will be penalised accordingly (see the Graduate School Handbook for details).
- Extensions to the deadline will only be considered in cases with genuine extenuating circumstances and supporting evidence (**please consult the Graduate School Handbook** before making enquiries – the handbook explains the procedures and criteria for extensions and contains a copy of the application form).
- Students may co-operate to some extent, but the final submission (particularly the interpretation of results) should be your own work. Tutors can be consulted for advice in principle (e.g. “how do I run a Chow Test?”), but not regarding specific actions on your project (e.g. “What Chow Tests do you think I should run on this data, and can you show me how I do it?”).
- Remember to include a **one page non-technical Executive Summary** (see below).

## Project Brief

You have two options:

Either Using *good modelling practice*, construct a regression model of crime rates in Scotland using the dataset provided ([scotcrime.sav](#)).

### Background to Crime and Inequality Dataset: [scotcrime.sav](#):

All variables are at datazone level. A variable dictionary explaining the meaning of each variable is included below (page 9). Datazones are non-overlapping geographical areas with between 500 and 1000 residents (see the following link for more information: <http://www.scotland.gov.uk/Publications/2005/02/20697/52626> ).

Most of the variables are taken from the Scottish Neighbourhood Statistics Website ([www.sns.gov.uk](http://www.sns.gov.uk)). It is worth taking a look at the site to understand the meaning of variables and also to identify other variables which you might want to add to your model. Other variables (elevation through to distance between dwellings) are from commercial datasets (i.e. not in the public domain) and have had their original values transformed or altered in some way to preserve the confidentiality of the original data (i.e. these are artificial variables included for the purposes of teaching/assessment and not suitable for use in actual research).

There are two particular hypotheses you may want to test. First, whether the physical environment has an impact on crime rates (e.g. see the Wikipedia article on the “[broken windows theory](#)”). The dataset includes lots of variables measuring aspects of the physical environment. Second, whether inequality increases or reduces crime rates.

With regard to the effect of inequality, you might want to test competing theories, such as the “role-model” theory, Vs. the “Wilkinson and Pickett” thesis. The role-model theory says that the location of wealthy households near a poor area can provide role models, help socialise disadvantaged youths and boost aspirations (see Galster 2007), all of which reduce the propensity to commit criminal acts. The Wilkinson and Pickett argument says that inequality makes people unhappy and discontented by increasing stress and the hormones it releases, and this in turn results in a variety of social ills including crime. The corollary of the Wilkinson and Pickett argument might be that people are more aware of inequality (and hence more affected by it) if they are surrounded by inequality within their datazone (as above), postcode sector or local authority. Three items are copied at the end of this project brief from *The Economist* which help summarise the wider debate about the links between inequality and social problems: (1) Unbottled Gini, (2) letter to The Economist from Richard Wilkinson in reply to this article, and (3) The rich and the rest.

You might also be interested in the spatial scale at which inequality affects crime. The Wilkinson and Pickett research, for example, was conducted mainly at the national level, so you would want to test whether the effects are present at a more local level. It is not possible to access income inequality measures for small areas, and, in any case, income measures do not take account of wealth inequality which might also be important. To measure inequality, therefore, your dataset includes variables that measure the inequality of house prices at various spatial scales. Such house-price measures potentially capture both income (more expensive houses require larger mortgages which in turn require larger incomes) and wealth effects (for most households, their home is their single largest asset – see Thomas and Dorling 2004; Levin and Pryce 2011).

To measure house price inequality the dataset includes variables based on the Gini coefficient, which takes on a value between zero and one, and can be represented as a percentage (De Maio 2007). If wealth is perfectly equally distributed, the Gini coefficient will equal zero. In a perfectly unequal society, where all wealth is owned by one person, the coefficient will equal one.

**Note that you are not expected to be an expert on inequality or crime—the above notes are merely intended to give you some background, and to help you think about the topic. Your assignment will primarily be assessed on how well you apply the statistical procedures taught in the SSS2 course.**

## References:

- De Maio, F. (2007) Income Inequality Measures, *Journal of Epidemiology and Community Health* 2007;61:849–852 (Click [here](#) to access).
- Galster, G. (2007) Neighbourhood Social Mix as a Goal of Housing Policy: A Theoretical Analysis, *International Journal of Housing Policy*, 7, 19-43 (click [here](#) to access).
- Levin, E. and Pryce, G. (2011) The Dynamics of Spatial Inequality in UK Housing Wealth, *Housing Policy Debate*, 21, 99-132 (click [here](#) to access).
- Thomas, B. and Dorling, D. (2004) *Know your place*, Shelter (click [here](#) to access).
- Wilkinson, R. and Pickett, K. (2010) *The Spirit Level: Why Equality is Better for Everyone*, Penguin.

As an alternative to Wilkinson and Pickett (2010), you might want to take a look at the following reference which makes similar arguments but is a bit more academic:

- Wilkinson, R. and Pickett, G.(2005) *The Impact of Inequality: How to Make Sick Societies Healthier*, Routledge.

Or Using *good modelling practice*, construct a OLS regression model on a subject that interests you or that is relevant to your work.

If you choose this second option, you must be confident that your chosen data is adequate (e.g. 150 or more observations, at least 10 to 15 explanatory variables, **a continuous and appropriate dependent variable**, sufficient continuous (appropriate) explanatory variables). It would be advisable to check with the SSS2 coordinator (Gwilym Pryce) to ensure that the data is suitable. You can also select from the datasets supplied in SSSI/SSSI provided they meet the above requirements and **provided you did not use the same dataset in the regression section of the SSSI assignment**.

## **Marking**

The project will be marked primarily on model construction: i.e. the extent to which you have followed good modelling practice in using diagnostic testing etc. The recommended “general to specific” strategy outlined in lecture 7 is summarised below. What you must demonstrate is that you know how to use these tests and the meaning of the output, the consequences of the test results, and the appropriate way of dealing with such failures. You must also demonstrate an ability to combine the information from diagnostic testing in a way that results in a robust yet meaningful model.

Marks will be given for the amount of *appropriate* work done (e.g. using a variety of tests with discussions of their pros and cons rather than just one test). You can pass with using only one or two tests for each failure of OLS assumptions provided these are appropriately chosen and applied and understanding is demonstrated (particularly of the meaning of coefficients and other output for the final model).

Very good marks will be given to students who demonstrate that: (i) they have not only an understanding of the available tests and solutions, but also of their limitations; (ii) the tests have been applied and the model constructed in an intelligent, logical way; (iii) they have read widely re statistical analysis and used a range of tests and diagnostic methods for each violation of OLS assumptions; (iv) they appreciate the implications of their model; and (v) they have been innovative in the way they have developed or applied the model (e.g. added relevant data, or used the model to simulate scenarios). Note that you need to convince the marker

that you understand what you are doing – we can only mark what you've written down in the hard copy of the assignment you submit.

## Style of Presentation

The project should be presented as *a technical report to an academic audience* with full explanation of all presented results. Three key questions/themes should run through the report: (i) what is the real-world meaning/implications/usefulness of the model? (ii) how do you know that the model is correctly specified? and (iii) how generalisable is the model to other samples? **The report should also include a one page non-technical Executive Summary, which should be understandable to an intelligent lay person.**

NB: because this project is to be presented as a technical report rather than in the style of a journal article, you should focus on explaining the details of diagnostic tests and the modelling process, and less discussion of the existing literature or theory related to the dependent variable you are trying to explain (**i.e. the markers will not be particularly interested in your knowledge of crime and inequality, but they will be interested in whether you can build a decent regression model**). Note that presentation of test results should be done without including the surplus information that comes with SPSS output. In other words, you should try to present your results in as concise a way as possible – pages and pages of unedited and unexplained SPSS output will not be well-received, and projects that exceed the page limit will be penalised.

## Summary of Good Modelling Practice

### (i) Theory

- Always start with theory where possible.
- Try to consider all possible determinants of the dependent variable
- Try to identify specific hypotheses you want to test

### (ii) Anticipated Regression Model

- identify the regression model that follows from your theory and that will allow you to test the hypotheses you are most interested in.

### (iii) Data Collection & Coding

- make sure the data you collect, the way you collect it (i.e. unbiased sampling, large  $n$ , precise measurement) & the coding will allow you to build your general model and test specific hypotheses.
- if you are using secondary data, be aware of the sampling and coding issues associated with the data.

### (iv) General Model

- attempt your first regression model using the data available:
  - start with all available variables and all available observations
  - make obvious modifications before starting the diagnostic/refinement process

#### (v) Diagnostic Checks and Refinement

- Examine Residual plots
  - scatter plots of residuals on  $y$  &  $x$ s
  - should be “spherical”
  - normal probability plots
  - outliers (use Cook’s distances etc.)
- Heteroscedasticity
  - Test using Koenker B-P etc.
  - If heterosk. exists, use White’s SEs & avoid Chow’s 2<sup>nd</sup> Test
- Wrong signs and Misspecification
  - t-tests & multicollinearity tests
  - RAMSEY reset test.
  - Non-linear Transformations
  - interactions
- Low Adjusted  $R^2$ 
  - Transform variables
  - drop irrelevant variables
  - get data on new variables
- F-Tests
  - structural stability (Chow)
  - linear restrictions
- Multicollinearity
  - check VIF, eigenvalues, Condition indices etc.
  - present joint hypothesis tests.

#### (vi) Specific Model

- should be “well behaved”
  - stable
  - passes general misspecification tests if possible
  - e.g. RESET test
- coefficients should be meaningful
  - do the coefficients make sense?
  - How do they relate to your theory/intuition?
  - Alternative explanations/interpretations

#### (vii) Revise Theory?

- Do your empirical results mean that you need to modify your initial theory, hypotheses and Anticipated Regression Model?

- Often, it is only when you start the empirical process that you really grasp the key aspects or limitations of your theory

(ix) Present the Final model (to an academic audience: e.g. journal article)

- you should present your (revised) theory first
- then the (revised) anticipated regression model
- then discuss the data and measurement of (revised) anticipated variables
- then present a selection of regression models
- present a series of “preferred” regressions which might vary by:
  - selection of regressors
  - measurement of dependent variable
  - and/or sample selection
- present the selection of regressions in columns all in a single table rather than as separate tables -- this will assist comparison
- only present statistics that you explain/discuss in your text
  - always present sample size, Adjusted  $R^2$ , t values on individual coefficients or SEs or Sig.
- then offer a full discussion
  - I.e. of the different regressions and statistics that you have presented and discuss any relevant elements of the refinement process
- this discussion should lead you to select a final “preferred” model(s) (if there is one) on the basis of the diagnostics, intuition and relevance to the theory
  - it is a good idea to present this in a separate table in more detail -- e.g. with confidence intervals for the coefficients
- you should comment on the limitations of your model
  - given the data and the anticipated effect of measurement problems, omitted variables, bias in sample, insufficient sample size etc.
- Then present the results of your specific hypothesis tests
  - these should be run on your final preferred model(s) and include a full discussion of their meaning and the limitations implied by the inadequacies of your model.
- If you are presenting to a non-academic audience, you will have to select which of the above are likely to be most meaningful/important to them.
  - Whether or not you present the results of the diagnostics, you **MUST** construct your model using them otherwise:
    - ❖ how do you know that you have specified it correctly?
    - ❖ How do you know that it can be generalised beyond your little sample!?

## Statistical Reading

There is no set statistical reading for this assignment. To pass, you could probably get away with reading only my overheads and lab notes. However, I would strongly recommend that you read more than these. In particular, I would recommend that you purchase your own copy of *A guide to econometrics* by Peter Kennedy since this will be helpful for the assignment but also serve as a useful reference tool when you read empirical material in future or if you go on to do any of your own statistical analysis.

In addition there are a wide range of texts in the library that you could consult (see the list below for a sample). These are written in varying degrees of technical detail, but most provide useful commentary even if you don't understand the maths. It's probably worth browsing through a few to find a style you feel comfortable with. I list a large number of possibilities below, but the best recent one I've come across is:

### ❑ **Wooldridge, Introductory Econometrics: A Modern Approach**

which is by an eminent statistician, very clear and at a fairly accessible level. Others include:

- ❑ Basic econometrics Damodar N. Gujarati
- ❑ Introduction to econometrics Christopher Dougherty
- ❑ Using econometrics a practical guide A.H. Studenmund
- ❑ Undergraduate econometrics R. Carter Hill, William E. Griffi
- ❑ A companion to theoretical econometrics edited by Badi H. Ba
- ❑ Applied econometrics for health economists a practical guide
- ❑ A guide to econometrics Peter Kennedy
- ❑ Econometric methods Jack Johnston, John DiNardo
- ❑ Econometric analysis William H. Greene
- ❑ Statistics and econometric models Christian Gourieroux
- ❑ Econometric methods and applications G.S. Maddala
- ❑ A dictionary of econometrics Adrian C. Darnell.
- ❑ Essentials of econometrics Damodar Gujarati
- ❑ Undergraduate econometrics R. Carter Hill, William E.
- ❑ Introduction to econometrics G. S. Maddala
- ❑ Using econometrics : a practical guide ; A.H. Studenmund
- ❑ Econometrics Jon Stewart
- ❑ A course in econometrics Arthur S. Goldberger
- ❑ Understanding econometrics Jon Stewart

Gwilym Pryce  
22<sup>nd</sup> February 2011

## Variable Dictionary for the scotcrime.sav Dataset

|                   |   |
|-------------------|---|
| SNS               | = "Scottish Neighbourhood Statistics", see <a href="http://www.sns.gov.uk">www.sns.gov.uk</a> |
| centroid          | = central point of a geographical area  |
| datazone centroid | = centre of the datazone  |
| RoS               | = Registers of Scotland   |

| Variable         | Label   |
|------------------|---|
| datazone         | The data zone is the key small-area statistical geography in Scotland. SNS has introduced, for the first time, a common, stable and consistent, small-area geography called data zones. The data-zone geography covers the whole of Scotland and nests within local authority boundaries. Data zones are groups of 2001 Census output areas and have populations of between 500 and 1,000 household residents. Where possible, they have been made to respect physical boundaries and natural communities. They have a regular shape and, as far as possible, contain households with similar social characteristics. |
| Males10to14      | Total Male Population (10-14) (original SNS variable name: GR-countind3M)   |
| Males15to19      | Total Male Population (15-19) (original SNS variable name: GR-countind4M)   |
| crime_total_04   | Total number of SIMD (Scottish Index of Multiple Deprivation) crimes in 2004 (original SNS variable name: CR-SIMDCRIME_totno) -- higher the value, the higher the number of crimes. SIMD crimes include five categories of crime: 1.crimes of violence; 2. domestic house breaking; 3. drugs offences; 4. minor assault; and 5.vandalisms   |
| crime_rate_04    | Number of SIMD crimes per 10,000 of the population (original SNS variable name: CR-SIMDCRIME_totrat). SIMD crimes include five categories of crime: 1.crimes of violence; 2. domestic house breaking; 3. drugs offences; 4. minor assault; and 5.vandalisms   |
| PopTotal         | Total Population (all ages) (original SNS variable name: GR-denominatorindP)  |
| ServicesDep      | Geographic Access to Services (Drive Times) Deprivation Rank (original SNS variable name: CS-accdtrk) -- hig  |
| EducDep          | Education, Skills and Training Deprivation Rank (original SNS variable name: CS-educrk)-- higher the value,   |
| EmptDep          | Employment Deprivation Rank (original SNS variable name: CS-emprk) -- higher the value, the better the Emplo  |
| HousingDep       | Housing Deprivation Rank (original SNS variable name: CS-housrk)-- higher the value, the better the housing   |
| income           | Current Income Deprivation Rank (original SNS variable name: CS-incrk) -- higher the value, higher the incom  |
| Males10to14_rate | Proportion of datazone population that are males aged 10 to 14  |
| Males15to19_rate | Proportion of datazone population that are males aged 15 to 19  |
| JSA_all          | Number of residents who are JSA (Job Seekers Allowance) claimants   |

|                  |   |
|------------------|---|
| JSA_female       | Number of female residents who are JSA (Job Seekers Allowance) claimants  |
| JSA_male         | Number of male residents who are JSA (Job Seekers Allowance) claimants  |
| house_price_2004 | Registers of Scotland (RoS) house prices in 2004  |
| datazone_i_gini  | Gini Coefficient for datazone house prices (RoS 2004)   |
| pcsect_i_gini    | Gini Coefficient for postcode sector house prices (RoS 2004)  |
| pc1_i_gini       | Gini Coefficient for postcode district house prices (RoS 2004)  |
| la_i_gini        | Gini Coefficient for local authority house prices (RoS 2004)  |
| AirQualityND02   | AirQuality2002-2004L: ND02 concent, Population weighted (original SNS variable name: cs_aqdno2dpopwtd1)   |
| AirQualityPM10   | AirQuality2002-2004: PM10 concent, Population weighted (original SNS variable name: cs_aqdp10dpopwtd1)  |
| Derelict_pre1991 | % of people within 0-500 metres of a Site Derelict pre 1991 (original SNS variable name: cs_derdpctpop1)  |
| Derelict_any     | % of people within 0-500 metres of any Derelict Site (original SNS variable name: cs_derdpctpop2)   |
| Polluted_lt500   | within 500m of a site on the Scot Pollutant Rel Inventory (original SNS variable name: cs_cdspridpctpop2)   |
| Polluted_lt1000  | within 1000m of a site on the Scot Pollutant Rel Inventory (original SNS variable name: cs_cdspridpctpop4)  |
| Polluted_lt2000  | within 2000m of a site on the Scot Pollutant Rel Inventory (original SNS variable name: cs_cdspridpctpop6)  |
| Polluted_gt2000  | over 2000m from a site on the Scot Pollutant Rel Inventory (original SNS variable name: cs_cdspridpctpop8)  |
| flood_pluvial    | % dwellings located in 1/200 fluvial flood risk area (original SNS variable name: cs_fluvialpercent)  |
| flood_pl_coastal | % dwell's located in 1/200 coastal/fluvial floodrisk areas (original SNS variable name: cs_fluvisoastpercent)   |
| elevation        | height above sea level (computed as the average height above sea level of all postcode centroids in the datazone)                                       |
| a_roads          | distance (m) to nearest A roads (computed as the average of distances to nearest A road from all postcode centroids in the datazone)                    |
| b_roads          | distance (m) to nearest B roads (computed as the average of distances to nearest B road from all postcode centroids in the datazone)                    |
| coastline        | distance (m) to nearest coastline (computed as the average of distances to nearest coastline from all postcode centroids in the datazone)               |
| dlua             | distance (m) to nearest edge of urban area (computed as the average of distances to nearest urban boundary from all postcode centroids in the datazone) |
| lakes            | distance (m) to nearest lake (computed as the average of distances to nearest lake from all postcode centroids in the datazone)                         |
| motorways        | distance (m) to nearest motorway (computed as the average of distances to nearest motorway from all postcode centroids in the datazone)                 |

|                        |   |
|------------------------|---|
| rail_stati             | distance (m) to nearest railway station (computed as the average of distances to nearest railway station from all postcode centroids in the datazone) |
| rivers_lar             | distance (m) to nearest large river (computed as the average of distances to nearest large river from all postcode centroids in the datazone)         |
| rivers_med             | distance (m) to nearest medium river (computed as the average of distances to nearest medium sized river from all postcode centroids in the datazone) |
| rivers_sma             | distance (m) to nearest small river (computed as the average of distances to nearest small river from all postcode centroids in the datazone)         |
| woodland               | distance (m) to nearest woodland (computed as the average of distances to nearest woodland from all postcode centroids in the datazone)               |
| avgerage_floorarea     | avgerage floorarea of houses in the datazone  |
| avgerage_footprintarea | avgerage footprint area of houses in the datazone   |
| nearestneighbour       | ave distance (in metres) between dwellings in the datazone  |

## Unbottled Gini: The Economist Jan 20th 2011

*Inequality is rising. Does it matter—and if so why?*



FOR the head of the IMF to quote Adam Smith may seem unremarkable. But here is Dominique Strauss-Kahn citing the great man in November 2010: “The disposition to admire, and almost to worship, the rich and the powerful and...neglect persons of poor and mean condition...is the great and most universal cause of the corruption of our moral sentiments.”

Mr Strauss-Kahn then bemoaned “a large and growing chasm between rich and poor—especially within countries”. He argued that inequitable distribution of wealth could “wear down the social fabric”. He added: “More unequal countries have worse social indicators, a poorer human-development record, and higher degrees of economic insecurity and anxiety.”

That marks a huge shift. Just before the financial crisis America’s Congress was gaily cutting taxes for the highest earners, and Tony Blair, Britain’s prime minister, said he did not care how much soccer players earned so long as he could reduce child poverty. So why has fear of inequality stormed back into fashion? Does it matter in some new way? Does it have previously unknown effects?

The most obvious reason for the renewed attention is inequality’s apparent increase. A common yardstick is the Gini coefficient, which runs from 0 (everyone has the same income) to 1 (one person has all the income). Most countries range between 0.25 and 0.6.

The Gini coefficient has gone up a lot in some rich countries since the 1980s. For American households it climbed from 0.34 in the mid-1980s to 0.38 in the 2000s. In China it went up even more, from under 0.3 to over 0.4. But this was not universal. For decades, Latin America had the world’s worst income inequality. But Brazil’s Gini coefficient has fallen more than five points since 2000, to 0.55. And as poor countries are on average growing faster than rich ones, inequality in the world as a whole is falling.

### *Getting richer quicker*

Greater inequality can happen either because the wealthier are getting wealthier, or the poor are falling behind, or both. In America it has had more to do with the rich. The income of the wealthiest 20% of Americans rose 14% during the 1970s, when the income of the poorest fifth rose 9%. In the 1990s the income of the richest fifth rose 27% while that of the poorest fifth went up only 10%. That is a widening income spread, but not a drastic one. Robert Gordon, an economist at Northwestern University in Illinois, reckons that for the bottom 99% of the population, inequality has not risen since 1993.

The problems at the bottom are reasonably well understood: technology enables the automation of blue-collar trades; globalisation lets unskilled jobs move to poorer, cheaper countries; shrinking trade-union membership erodes workers’ bargaining power. But inequality is rising more sharply at the top,

among what George Bush junior called the “haves and have-mores”. Here the causes are more mysterious.

The economists Emmanuel Saez and Thomas Piketty studied the incomes of the top 0.1% of earners in America, Britain and France in 1913-2008. America’s super-rich, they found, were earning about 8% of the country’s total income at the end of the period—the same share as during the Gilded Era of the 1920s and up from around 2% in the 1960s. A study by the Economic Policy Institute, a think-tank in Washington, DC, looked at the ratio of the average incomes of the rich and the “bottom” 90% of the population between 1980 and 2006. It found that the top 1% earned ten times more than the rest at the start of the period and 20 times as much at the end—ie, its “premium” doubled. But for the top 0.1% the gain rose from 20 times the earnings of the lower 90% to almost 80-fold.

You can understand why people might regard this as unfair: the top 0.1% do not seem to be working 80 times as hard as everyone else, nor are they contributing 80 times more to welfare. But that is a matter of public opinion, and mostly of politics. The question of the economic impact of extreme inequality is separate. Recent evidence suggests it may not be as damaging as many imagine. Our special report casts doubt on the widespread view that inequality causes (or is associated with) a host of social problems. Economics focus finds little evidence that it stoked the financial crisis.

But recent research does suggest two other reasons why the rise in inequality is a problem. One is that rich economies seem to provide disproportionate and growing returns to the already wealthy. The other is that inequality may literally be making people miserable by increasing stress and the hormones it releases.

In a recent series of lectures at the London School of Economics, Adair Turner, the chairman of Britain’s Financial Services Authority, cited several factors that appear to be pushing up the incomes of the rich. First, financial, legal and health services have increased their shares of GDP in most rich economies—especially Anglo-Saxon ones—and these professions contain some of the richest people in the country. Financial services’ share of GDP in America doubled to 8% between 1980 and 2000; over the same period their profits rose from about 10% to 35% of total corporate profits, before collapsing in 2007-09. Bankers are being paid more, too. In America the compensation of workers in financial services was similar to average compensation until 1980. Now it is twice that average. Rich bankers really are all around you.

#### *Turner turns the screw*

Next, argues Lord Turner, as people get wealthier they tend to devote more discretionary income to what are called “positional goods”—items such as limited-edition, celebrity-endorsed sneakers whose main value lies in their desirability in the eyes of others. The willingness of people to buy such stuff, combined with the vast new markets of millions of emerging middle-class consumers in China, India and elsewhere, has boosted the stars’ brands beyond anything that was possible in the past. Bobby Jones, the best golfer of the 1920s, was an amateur. Tiger Woods earned \$90m in 2009, before sex scandals wrecked his image. Writing children’s novels used to keep authors in chintz and twinsets. J.K. Rowling, author of the Harry Potter books, is a billionaire.

Admittedly, truly global celebrities are few in number. But they have a penumbra of agents, lawyers and image-makers. As Lionel Robbins, a British economist, once said, “a substantial proportion of the high incomes of the rich are due to the existence of other rich people.”

The growth of celebrity rents explains more than just why there may be more rich people around. The point about positional goods—and of fashion and brands in general—is their relative attractiveness. Owning the latest gadget or garment is particularly attractive when others don’t have it, rather as buildings are valuable because of their location: ie, how desirable they seem to others. With such goods, a rising tide does not lift all boats. You yearn to be not merely richer, but richer than your neighbours. So the more brands, fashion and houses become important, the more relative income and inequality matter.

This would seem to qualify one of the commonest justifications for being relaxed about inequality: that it is not a big concern if the rich are getting richer so long as the poor are doing well too. That view was shared by Margaret Thatcher and Ronald Reagan and more recently by Mr Blair and Ben Bernanke, the Fed chairman. But if positional goods are taking a larger share of people’s salaries, then relative income does matter and so do income disparities between rich and poor. Positional goods do not affect material welfare, as do poor schools or substandard housing. But they do affect people’s quality of life and well-being. That leads to a second reason for worrying about inequality: its physiological and physical consequences.

In “The Spirit Level”, a bestselling book of 2009, Richard Wilkinson and Kate Pickett argue that inequality “gets under the skin” and makes everyone worse off, not just the poor. They mean “gets under the skin” literally. The argument is that inequality causes chronic stress, and makes people secrete too much of a hormone called cortisol. This normally has benign metabolic and other functions. Produced in large quantities it can harm among other things the brain and the immune system. So cortisol may be a direct link between inequality and bad health.

Another is that inequality impairs the production of a second hormone, oxytocin. Sometimes referred to as the “cuddle hormone”, this is secreted in childbirth and during breastfeeding, and seems to encourage pair-bonding and trust in others. The claim is that people living in unequal societies secrete less oxytocin, hence they have lower levels of trust. These accounts might be dubbed the medical, as opposed to material, explanations for inequality’s bad effects.

The hypothesis is plausible. Humans are social animals and have been refined by evolution to be extremely sensitive to social interactions. Though intuitively attractive, the link is not yet well established. Most studies of hormonal stress markers have focused on particular groups subject to huge, chronic woes, such as carers of patients with Alzheimer’s disease. Little research so far has dealt with the general population. A recent review of the scientific literature found little consistent evidence of a link between bio-markers of stress and social or economic status.

Nor is it certain that income inequality is the right problem to focus on. What seems to affect levels of stress hormones is not income, but competition for status, a broader, fuzzier notion. Evolution has primed humans to seek high status. Losers in competitions for esteem may well suffer. Societies with fierce status competition may well be unhealthier and more violent. But it is the disparities of status, not of income, that matter.

Often the two go together: Nordic countries have low income inequality and not too much status competition. But one can also imagine societies with narrow income disparities that are riddled with status conflict. The old Soviet Union is a vivid example. The inverse is conceivable too: countries with large income disparities but less status conflict, perhaps because competition is smoothed by social mobility. Arguably America fitted that description until recently. Overall though, it is true that in most places growing income disparities are a reasonable proxy for growing status competition.

Economists have long argued that inequality is a much less important problem than poverty. The recent research linking inequality to widespread social ills has not decisively overturned that view: the evidence is still mixed, at best.

The claim that inequality now matters more because of brands and status competition may turn out to be more robust. Such concerns could seem peripheral compared with global woes such as poverty. But inequality is local. As Adam Smith also once wrote, “if he was to lose his little finger tomorrow, he would not sleep tonight; but provided he never saw them, he would snore with the most profound security over the ruin of a hundred million of his brethren.”

## Wilkinson & Pickett Letter to The Economist 3 Feb 2011

### *The elements of inequality*

SIR – You were incorrect in asserting that there is a weak link between inequality and the variety of problems we attribute to it in our book, “The Spirit Level” (“Unbottled Gini”, January 22nd). The relationships between national levels of income inequality and mental illness, children’s well-being, low social mobility, teenage births, prison rates and trust are all extraordinarily close, with correlations of between 0.7 and 0.9.

Although the connections we show of inequality to life expectancy, infant mortality and homicide are slightly weaker (though still statistically significant with correlations of between 0.4 to 0.6), there are an additional 200 independent analyses that chart the link between health and inequality and another 50 between violence and inequality. Your point about homicide and gun ownership was also wide of the mark: control statistically for gun ownership and the relationship between homicide and inequality becomes slightly stronger. The issue of outliers is a red herring. Raised as a criticism of some of our studies, it is irrelevant to these other analyses.

The politically motivated attacks on our work have been rebutted, not only in a new chapter of ours, but also by others.

Richard Wilkinson  
Emeritus professor of social epidemiology  
University of Nottingham medical school  
Kate Pickett  
Professor of epidemiology  
University of York

# The rich and the rest: The Economist, Jan 20th 2011

## *What to do (and not do) about inequality*

APART from being famous and influential, Hu Jintao, David Cameron, Warren Buffett and Dominique Strauss-Kahn do not obviously have a lot in common. So it tells you something about the breadth of global concerns about inequality that China's president, Britain's prime minister, America's second-richest man and the head of the International Monetary Fund have all worried, loudly and publicly, about the dangers of a rising gap between the rich and the rest.

Mr Hu puts the reduction of income disparities, particularly between China's urban elites and its rural poor, at the centre of his pledge to create a "harmonious society". Mr Cameron has said that more unequal societies do worse "according to almost every quality-of-life indicator". Mr Buffett has become a crusader for a higher inheritance tax, arguing that America risks an entrenched plutocracy without it. And Mr Strauss-Kahn argues for a new global growth model, claiming that gaping income gaps threaten social and economic stability. Many others seem to share their concerns. A new survey by the World Economic Forum, whose annual gathering of bigwigs in Davos begins on January 26th, says its members see widening economic disparities as one of the two main global risks over the next decade (alongside failings in global governance).

The debate about inequality is an old one. But in the wake of a financial crisis that is widely blamed on Wall Street fat cats, from which the richest have rebounded fastest, and ahead of public-spending cuts that will hit the poor hardest, its tone has changed. For much of the past two decades the prevailing view among the world's policy elite—call it the Davos consensus—was that inequality itself was less important than ensuring that those at the bottom were becoming better-off. Tony Blair, a Labour predecessor of Mr Cameron's, embodied that attitude. His New Labour party was famously said to be "intensely relaxed" about the millions earned by David Beckham (a footballer) provided that child poverty fell.

Now the focus is on inequality itself, and its supposedly pernicious consequences. One strand of argument, epitomised by "The Spirit Level", a book that caused a stir in Britain, suggests that countries with greater disparities of income fare worse on all manner of social indicators, from higher murder rates to lower life expectancy. A second thread revisits the macroeconomic consequences of income disparities. Several prominent economists now reckon that inequality was a root cause of the financial crisis: politicians tried to counter the growing gap between rich and poor by encouraging poorer folk to take on more credit (see article). A third argument is that inequality perverts politics, with Wall Street's influence in Washington often cited as exhibit A of the unhealthy clout of a plutocratic elite.

If these arguments are right, there might be a case for some fairly radical responses, especially a greater focus on redistribution. In fact, much of the recent hand-wringing about widening inequality is based on sloppy thinking. The old Davos consensus of boosting growth and combating poverty is still a better guide to good policy. Rather than a sweeping assault on inequality itself, policymakers would do better to take on the market distortions that often lie behind the most galling income gaps, and which also impede economic growth.

Begin with the facts about inequality. Globally, the gap between the rich and the poor has actually been narrowing, as poorer countries are growing faster. Nor is there a monolithic trend within countries (see article). In Latin America, long home to the world's most unequal societies, many countries—including the biggest, Brazil—have become a bit more equal, as governments have boosted the incomes of the poor with fast growth and an overhaul of public spending to improve the social safety-net (but not by raising tax rates for the rich).

The gap between rich and poor has risen in other emerging economies (notably China and India) as well as in many rich countries (especially America, but also in places with a reputation for being more egalitarian, such as Germany). But the reasons for this differ. In China inequality has a lot to do with the hukou system of residency permits, which limits internal migration to the towns; by some measures inequality has peaked as rural labour becomes more scarce. In

America income inequality began to widen in the 1980s largely because the poor fell behind those in the middle. More recently, the shift has been overwhelmingly due to a rise in the share of income going to the very top—the highest 1% of earners and above—particularly those working in the financial sector. Many Americans are seeing their living standards stagnate, but the gap between most of them has not changed all that much.

The links between inequality and the ills attributed to it are often weak. For instance, some of the findings in “The Spirit Level” were distorted by outliers: strip out America’s high murder rate (which many would blame on guns, not inequality) or Japan’s longevity (diet, not equality), and flatter societies no longer look so much healthier. As for the mooted link to the financial crisis, the timing is dodgy: America’s poor fell behind in the 1980s, the credit bubble took off two decades later.

### *Message to Davos*

These nuances suggest that rather than fretting about inequality itself, policymakers need to differentiate between its causes and focus on ways to increase social mobility. A global market offers far bigger returns to those at the top of their game, be they authors, lawyers or fund managers. Modern technology favours the skilled. These economic changes are themselves often reinforced by social ones: educated men now tend to marry educated women. The result of all this, as our special report this week shows, is the rise of a global elite.

At heart, this is a meritocratic process; but not always. Rules and institutions are often rigged in ways that limit competition and favour insiders at the expense both of growth and equality. The rules can be blatantly unfair: witness China’s limits to migration, which keep the poor in the countryside. Or they can involve more subtle distortions: look at the way that powerful teachers’ unions have stopped poorer Americans getting a good education, or the implicit “too big to fail” system that encouraged bankers to be reckless and left the rest with the tab. These are very different problems, but they all lead to wider inequality, fewer rungs in the ladder and lower growth.

Viewed from this perspective, the right way to combat inequality and increase mobility is clear. First, governments need to keep their focus on pushing up the bottom and middle rather than dragging down the top: investing in (and removing barriers to) education, abolishing rules that prevent the able from getting ahead and refocusing government spending on those that need it most. Oddly, the urgency of these kinds of reform is greatest in rich countries, where prospects for the less-skilled are stagnant or falling. Second, governments should get rid of rigged rules and subsidies that favour specific industries or insiders. Forcing banks to hold more capital and pay for their implicit government safety-net is the best way to slim Wall Street’s chubbier felines. In the emerging world there should be a far more vigorous assault on monopolies and a renewed commitment to reducing global trade barriers—for nothing boosts competition and loosens social barriers better than freer commerce.

Such reforms would not narrow all income disparities: in a freer world skill and intellect would still be rewarded, in some cases magnificently well. But the reforms would strike at the most pernicious, unfair sorts of income disparity and allow more people to move upwards. They would also boost growth and leave the world economy more stable. If the Davos elites are worried about the gap between the rich and the rest, this is the route they should follow.