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A model of the representative economist

As researcher and policy advisor

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Abstract: Econ is the representative economist who behaves as predicted by economic theory. The paper considers an important parameter, β. It is assumed that economic theory gives a qualitative prediction about β, and that an empirical literature of M papers exists about β. Two cases are considered: (C1) Econ is in the academic career writing a paper with a new estimate of β. (C2) Econ is advising the Minister who is in charge of a policy using β. Basic economic theory gives a clear prediction in both cases: The size of β will be exaggerated in (C1) and even more in (C2).

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1. Introducing Econ, the representative academic economist

A small literature compares economists to others – it concludes that economists are more rational.[2] Economics is a theory about rational behavior, which helps us to predict the behavior of others, so it should help us even more to predict the behavior of *Econ*, the representative academic economist. Below, Econ's behavior is modeled in two well-defined cases that are taken to be independent.[3] Both cases deal with a parameter β that is important for some policy.

(C1) Econ is in the *career* at a university or a research institute, and works on a paper giving a new estimate of β. The paper is written for the scientific 'market'.

(C2) Econ is *advisor* to the Minister in charge of the policy using β. The Minister wants a one-page memo on β.[4] The memo is written for the political 'market'.

Any estimate depends on the conditions under which the data used for the estimation were generated. Thus, the true value of β can only be found under conditions of *ceteris paribus*. These conditions work in the reverse in the two cases: (C1) The researcher has to control his estimate of β for the special conditions, which affect the data used, in order to reach the *ceteris paribus* estimate. (C2) The advisor has to assess β given the special conditions that will prevail when the policy is on. This is one main difference between research and policy advice.

Estimates of β are presented as (b, t), which is referred to as the *size* and the *fit* of the estimate. To simplify, it is assumed that the choices of Econ are based upon (b, t) only. Thus, the choice has two dimensions, precisely as the well-known diagrams illustrating *basic textbook theory*. It is, of course, a heroic simplification, but I try to get as close as possible to this theory, as it is our joint frame of reference. In addition, we know a great deal about its strengths and weaknesses, so they do not need to be discussed at present. I think that most of us believe that it is a useful story about the representative agent. Thus, it must be a more useful story about the representative economist.

Section 2 considers Econ's utility functions in the two cases. It also looks at the β-knowledge that Econ has to acquire in both cases. As a researcher, Econ has to add a *new twist* to the β-knowledge, while he represents the *relevant version* of the knowledge to the political

2. It is done by polls and experiments comparing students of economics and other students (Marwell and Ames 1981, Carter and Iron 1991 and Kirchgässner 2005, who gives a fine survey of the literature). The findings are confirmed by independent psychological research (Vedel and Thomsen 2017).
3. The two cases should allow the reader to model other cases. To simplify, both cases look at the parameter β.
4. It is possible that the advisor also gives more discrete advice, but this is not covered at present.

'market' when he is advisor.

Section 3 looks at case (C1), where Econ is in research. He has to solve two problems of research strategy that both have a basic solution, which is evident from economic theory: (P1) He has to optimize his effort, where the analysis concentrates on the empirical work.[5] It is where Econ's marginal benefits from making estimates equal the marginal costs. It appears to be a great many estimates. (P2) He has to choose the 'best' one for publication. It is the one where Econ's utmost indifference curve touches his production possibility frontier. The solutions to these problems predict that this choice is too good; i.e., Econ will make *publication bias* defined as a systematic difference between the published estimates and the true value – the bias *exaggerates* the result.

Section 4 looks at case (C2), where Econ is policy advisor. He is appointed to give credibility to the policies of the Minister by representing the knowledge of the 'profession'. Econ has to give advice that is both *academically respectable* and *politically possible*, i.e., it is useful to the Minister. This is an Edgeworth box problem where Econ's own preferences come to play a small role in his choice. The model predicts that an able advisor will reach the *same advice* as any other able advisor. It is typically larger than the average research result.

The main finding that rational researchers and advisors tend to exaggerate the results is well known and has been presented by many papers coming to the problem from different angles. I do not try to give a survey of this literature – my aim is to demonstrate that our basic theory provides robust predictions of Econ's decisions.

2. Econ's preferences and the β-knowledge

Section 2.1 looks at the indifference curves of researchers and advisors. Econ's work on β requires that he masters the existing β-knowledge discussed in section 2.2. A key part is that the β-literature has some typical features as surveyed in section 2.3. Section 2.4 deals with the scientific and the political 'markets', where Econ has to sell his product.

2.1 Preferences of researchers and advisors: Interests and tastes

The preferences of Econ that affect his research decisions have the usual two aspects of interests and tastes, but with a twist.

5. My colleagues in pure theory claim that a similar process is at work also for theoretical modeling. However, it is more difficult to formalize.

Interests: Normally Econ is only marginally affected by the policies using β. Also, his research influences the β-knowledge marginally. In the case of policy advice, Econ may influence the policy a bit more, but still not very much. Thus, in both cases Econ's own interests are almost exclusively due to (i) the effect his work has on his career. Sections 3.1 and 4.2 argue that the effect is substantial in both cases.

Tastes: As everybody else Econ is affected by (ii) ideology. He wants to appear 'good' and in accordance with the 'zeitgeist' that is often termed 'political correctness'. This affects his preferences as analyzed in the literature about *expressive behavior*.[6] Also, Econ may support a (iii) political party or a theoretical school. Finally, (iv) Econ is interested in truth. The analysis is concentrated on (i) and (iii), while (iv) is discussed in section 3.5.

The interests (i) of all researchers are clearly rather *similar*, though the strength varies during the career, and (ii) and (iv) are similar as well, while (iii) differs. Thus, in many cases most researchers will have similar preferences. Section 4 argues that when Econ works as an advisor his preferences are dominated by his position.

Econ's preferences are summarized as standard indifference curves giving his preferences for the fit and the size of the estimate of β as shown on Figure 1a. The researcher has the black curves I to I_R, while the advisor has the gray curves from I to I_A.

Figure 1. The indifference curves of Econ for the size and fit of β

Figure 1a. As researcher and advisor

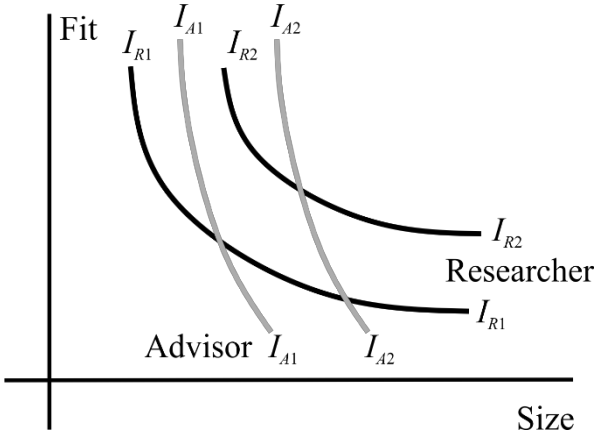
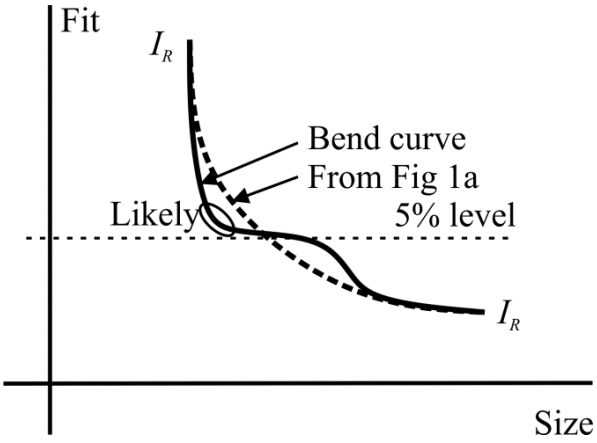


Figure 1b. A 5% bend for researchers



(C1) Researchers: It is sometimes claimed that researchers look at *t*-ratios only, so that their indifference curves are horizontal (Ziliak and McCloskey 2008). However, sponsors are more

6. The theory of expressive behavior generalizes the theory of expressive voting (Fiorina 1976, Brennan and Hamlin 1998, and Hillman 2010).

interested in size, and the political market cares mostly about size, so some indifference curves are vertical. Below I argue that choices are robust to the trade-off between size and fit.

New research reports strong evidence that indifference curves for researchers have bends, with horizontal sections just above the 5% level of significance (Brodeur *et al.* 2016).[7] This case is drawn as the black curve on Figure 1b. Indifference curves with bends may give multiple solutions. However, apart from such rare cases, the indifference curves on Figure 1b have the advantage that they give solutions close to the bend as indicated by the 'likely' part of the curve on the figure, which is precisely why such results are so common. Below I concentrate on the case of Figure 1a, as it applies to policy advisers as well.

(C2) Advisors: Advice is useful for the Minister in the short run if it leads to policies he can sell on the political market. Most ministers have a policy to sell, and they want people to believe that the policy is efficient, so they want the advisor to exaggerate the effects. Thus, they prefer big values of β rather than small. In the same way, the opposition wants small values. Some policies are discussed in terms of a negative variable, such as unemployment and inflation. Here efficiency is measured in terms of a reduction, so that the sign is still positive. If the policies are seen to work, it may enhance the prestige of the Minister in the long run too, making it 'double' useful. However, much research points to the short time horizon on the political market (Nannestad and Paldam 1994).

The usefulness aspect corresponds to the concept of '*politically possible*' that is often used. The classical Tinbergen-Johansen type analysis has a clear division of labor, where the Minister takes care of preferences and the experts describe the choice set (Tinbergen 1960, Johansen 1977/78). Although this is not entirely wrong, the distinction is often blurred in practice, and the advisor's role is at some middle: He is to help the Minister look at the politically relevant part of the choice set.

An important point about political advice is that it has to be sold on the political market, and hence the Minister cares little about the fit. The advisor will hedge his bet by stressing the uncertainty, but at the end of the day, he has to provide a central assessment of β within the political constraints. Thus, the indifference curves for the advisor are steeper than the ones of the researcher, as shown on Figure 1a.

7. These results are reached from a large sample of t-ratios published in top journals. Brodeur *et al.* (2016) also find a bend just above the 1% level, but Figure 1b includes the 5% level only.

2.2 The β-knowledge

The situation where Econ starts from a clean slate is quite rare.[8] There is normally a body of *β*-knowledge which Econ is expected to have mastered. Journals reject papers that do not demonstrate that the author has a good grasp on the existing knowledge, and advisors are selected for their expertise. This knowledge has three elements:

(K1) Some theory exists about *β*. The theory is qualitative, and it typically predicts the sign of *β*, which is taken to be plus. Thus, Econ knows that the 'right' sign is plus and conversely that negative estimates of *β* are 'wrong'. If he disregards the right sign, colleagues, referees and editors will point this out to him.

(K2) A literature of *M* papers already exist reporting estimates of *β*, of which (nearly) all have the right sign. Some of these papers are published in top journals, but once Econ starts to look for papers a good many, like $M = 50$, are normally found. It is not necessary to cite all, but the most important should be mentioned.

(K3) Econ's audience is likely to know some casual observations that are fine to mention in the intro or the conclusion of the paper. Sometimes they contradict (K2) and this may be the 'intuition' used to justify the paper.

When Econ does research, he draws mostly upon (K1) and (K2), and he has to demonstrate that he adds a new twist to the literature improving the *β*-knowledge. When Econ is advisor, the recent policy experience in his country (K3) is important.

2.3 The typical β-literature and meta-studies

Most economic papers claim that they try to find the true value, so presumably they do control for conditions that may distort the result to reach the *ceteris paribus* estimate. This is one important reason why papers should differ, and it suggests the most common type of estimating equation. It is derived (as $\partial y/\partial x$) from a much more elaborate theory.

(1) $y = \beta x + [\alpha_0 + \alpha_1 z_1 + \ldots + \alpha_n a_n]$, where [] contains the controls

All estimating equations in the *β*-literature contain the main term βx and a set of *ceteris paribus* controls. Equation (1) may include interaction or second order terms, lags, and a_0 may be broken into fixed effects. The setup (1) calls for regression analysis – and it is surely the

8. Doucouliagos *et al.* (2017) study what happens when a new literature starts.

dominating empirical technique in economics – and a large effort has been made to develop a range of regression estimators.

Paper j of the M papers contains n_j estimates, b_j of β, so that $N = \sum_{j=1}^{M} n_j$ is larger than M. The number of estimates per paper is rising – at present it seems to be around 10, so $N \approx 10M$. Most of the M papers contain a brief survey of the literature concentrating on the papers considered the most important. The author then explains why his version of the model and his estimates are better.

In the last couple of decades, the technique of meta-analysis has been developed for use in economics.[9] It is used to analyze literatures claiming to estimate the *same* parameter, precisely as the β-literature. The meta-analysis considers the full β-literature and codes all N estimates b_i, their fit t_i, and precision $p_i = t_i/b_i$, and as many characteristics of the way the estimate is reached as the analyst manages.

A key instrument in a meta-study is the funnel that displays the distribution of the results as a (b_i, p_i)-scatter. If estimates deviate only randomly as they should, the size of b is independent of p, so the funnel is symmetric around the mean, $\bar{b}$. Thus, asymmetries point to a non-random influence upon the results. In addition, most published estimates have t-ratios above 2, showing significance of the estimate, therefore the funnel should be lean; i.e., the standard deviation of the b_is should be small.

The study of funnels gives two notable results: They are typically amazingly wide considering the t-ratios, and they are often asymmetrical. In about 2/3 of the studies, the asymmetry is interpreted as a publication bias. That is, most researchers in the literature have the same preferences, and hence the whole literature has a bias.

Economics has seen a wave of meta-studies since 2008 when T.D. Stanley proposed a remarkably simple and robust tool that detects the asymmetry and corrects for it to give a *meta-average*.[10] Through the efforts of Hristos Doucouliagos at the DelMar (Deakin Lab for the Meta-Analysis of Research) a total of 159 meta-studies has be made comparable. They cover 64’074 estimates in more than 6,700 papers within most fields of empirical economic. This has resulted is several papers such as Ioannidis *et al.* (2017) and Doucouliagos *et al.* (2017). They do show that the average published paper has an exaggeration bias. It is quite variable, but in average the bias is about two. That is, the (arithmetic) mean of the published result is twice as

9. An introduction to meta-analysis in economics is found in Paldam (2015a). Readers who want to dig deeper should consult the textbook Stanley and Doucouliagos (2012).

10. The tool is the FAT-PET MRA, where the FAT is the funnel asymmetry test and the PET is the precision estimate test (i.e., the meta average) that corrects the mean for asymmetry. MRA is meta-regression analysis, i.e., regressions on regression coefficients (Stanley 2008, and Stanley and Doucouliagos 2012).

large as the meta-average estimated at the limit where the number of papers, *M*, goes to infinity.

Meta studies often code the impact factor of the journal in which the paper has appeared as a proxy for the quality of the paper. It has proved difficult to obtain significant results to this variable, so the results of scientific papers do not depend upon the quality of the study. This is surely an intriguing result, but its implications are not discussed at present. However, it matters for Econ as it means that he does not need to study the whole of the literature, but only a sample of the main papers.

2.4 The scientific and the political 'markets'

Researchers 'sell' their papers on the scientific 'market', where the publication pressure has generated certain market-like properties: Journals have impact factors that are roughly proportional to rejection rates, and individual authors and papers score citations. Both researchers and advisors 'buy' knowledge (in the form of search time) on the market. Search engines have been developed to make the market efficient.

The researcher (C1) knows that the market has three types of agents that have to be taken into consideration: Editors and referees act as gatekeepers to journals; sponsors finance research and may have interests in the results; and research administrators influence the careers of researchers. Administrators look at the publication record and, especially, at the taxable research grants researchers obtain from sponsors. Thus, they have a clear interest in making their researchers accommodating to sponsors.

Most western countries have national research policies of 'research integrity' as further discussed in section 3.5. The interest of research institutes is at odds with the official policy of research integrity. It is arguable that the policy of research integrity is needed precisely to keep the interests of sponsors and research administrators at bay.[11]

Advisors give their memos to the Minister, who operates on the political 'market', which also has some market-like properties. The advisor (C2) has to consider two types of agents: The Minister, who has to sell his policies at the political market and who may appoint another advisor. Econ's academic colleagues, who may undermine his credibility by signaling to the market that he is 'too' political. Thus, his advice has to be both useful to the Minister and academically acceptable. Here it is important that the advisor has to take into consideration that the memo may be given/leaked to the media.

11. A nonlinear trade-off curve seems to exist. If researchers are 'too' honest, they have little to 'sell' to sponsors, but if they are known to be 'too' malleable, they are not credible and thus the price falls.

3. Econ as researcher

Section 3.1 looks at the optimal research effort seen as the number of estimated regressions, *J*. Section 3.2 considers the *PPF*, production possibility frontier, while section 3.3 combines the PPF and the researcher's indifference curve to find the optimal estimate.

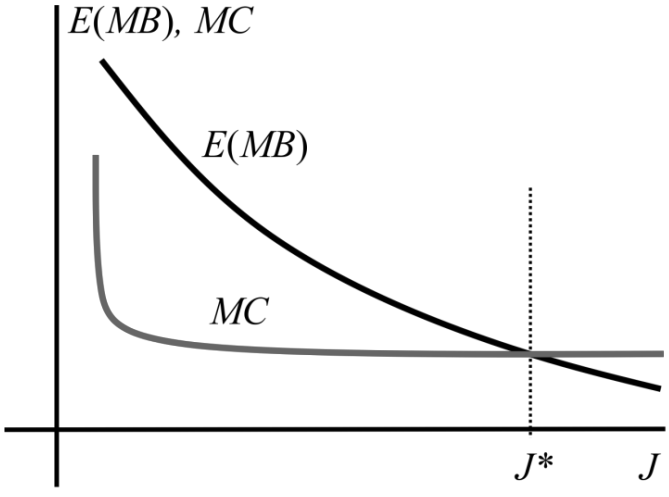
3.1 Running regressions: marginal costs and benefits

The optimal effort is the number of regressions *J**, where *MC*, the marginal costs, equals the *MB*, the marginal benefits, of the regression.

MC. The first regression is expensive, but once the data is in the computer, it takes a couple of minutes to choose the variables, run the regression and look at the result. Thus, *MC*(*J*) quickly becomes horizontal as *J* rises.

E(*MB*). There are often surprises when you run regressions, so the benefits have a random element. Thus, the expectation operator *E*() is used on the benefits. Econ starts with the most promising regressions, so the expected benefits are a falling function of *J*. The fall will cause *E*(*MB*) to converge to zero.

Figure 2. The determination of *J**, the optimal number of regressions



Note: The figure is developed in Paldam (2013), where it is used to analyze the big downward shift of the *MC*-curve over time due to the great improvement in computers and econometric packages. Also, it discusses the effect of new estimators that give a temporary upward shift in the *MC*-curve until the new estimator becomes another command in the next version in the econometric packages.

This gives the results written as equations (1) to (3) that yield one solution J^*, which is the optimal number of regressions, as depicted on Figure 2.

(1) $E(MB(J)) > MC(J)$ for all $J < J^*$ J is too small $\Rightarrow$ keep on regressing

(2) $E(MB(J)) < MC(J)$ for all $J > J^*$ J is too big $\Rightarrow$ stop regressing

(3) $E(MB(J^*)) = MC(J^*)$ the solution

It is easy to go one step further and assess the crude orders of magnitude: Once the MC-curve is horizontal, Econ may run 15 regressions and consider their merits per hour. If his hourly salary is € 30, the marginal cost per regression is € 2.

Econ's academic career depends upon his *publication record*, which is the number of papers weighted with their impact factors. The success of the career may be measured as the present value of his remaining life income, W.[12] Let σ be his time preference, R his expected remaining life, and y_t his future annual earnings. Let y_t be constant except for career steps. One such step is Δy_t:

(4) $W_t = y_t\, C(\sigma, R)$, where $C(\sigma, R) = \sum_{i=0}^{R}(1+\sigma)^{-i} \approx 20$, for $R = 50$ and $\sigma = 0.05$

(5) A career step gives the gain: $\Delta W_t \approx \Delta y_t \cdot 20$

If one step is worth, e.g., Δy_t = € 10,000 per year, then ΔW_t = € 200,000. Let us further imagine that app. 10 papers extra are needed to make the step, then the expected income gain from a paper is $\Delta W_t/10$ = € 20,000. This is surely a crude estimate, but it is robust to polishing. Fine empirical results may add 50% to the publication chance. Thus, the regression search is worth about € 10,000 for Econ.[13]

If he runs J = 5,000 regressions to find a fine result, the average regression has the benefit of € 2. However, $E(MB)$ is higher at the start, and then it falls gradually to zero. Thus, $E(MB)$ will intersect MC well before 5,000, e.g., at 500. There are some stochastics involved; researchers with a strong intuition may find a good result quicker; researchers with a large risk aversion may go on longer, etc. Anyhow, it is likely that J^* is quite large.

Searches with large values of J have a problem known as *overfitting* or *data mining*; see e.g. Leamer (1983). As J goes up, this reduces the degrees of freedom. This should reduce

12. Researchers also derive *pure* utility from the work and the publication of a paper. The money-equivalent value of that utility should be added. If the paper goes nowhere, this utility is small. Thus, the pure utility is roughly proportional to the expected income gain. The key point is that Econ expects a substantial personal gain if he makes a paper that does well on the market.

13. For researchers who are tenured professors, the gain is smaller, but even then, there are incentives.

t-ratios, but the amount of mining done is a private matter for the researcher. To demand that he reveals precisely what he has done invites an unfair burden of moral hazard. Data mining decreases the probability of making Type I errors (rejecting the true model), while it increases the probability of making Type II errors (accepting false models). Thus, data mining causes overfitting (Clark 2004). When J is large, some results are surely too good. If Econ chooses these results, his research is biased.

3.2. PPS, the production possibility set, and the PPF, its frontier

The PPS is an eight-formed object with a positive slope as drawn on Figure 3.[14] In most cases some negative estimates appear too, as shown on Figure 3a, but in some cases, where β is large and large data samples are used, there may be no negative estimates, as on Figure 3b.

Figure 3. The production possibility set of estimates

Figure 3a. Small to moderate data samples

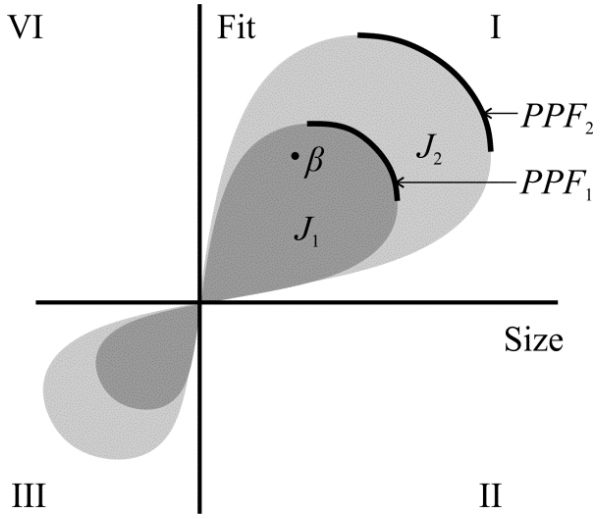
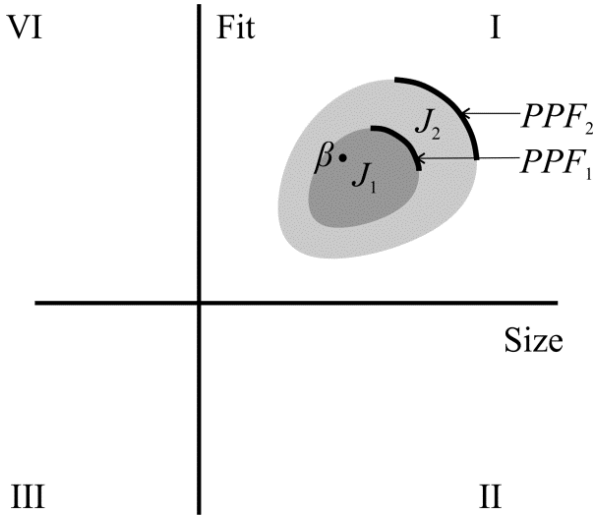


Figure 3b. Large data samples



The *t*-ratio has the same sign as the estimate, so quadrants II and IV are empty by definition. The fit and size are positively correlated – the simulations show that the typical correlation is about 0.85 in the case of Figure 3a, but it may fall to 0.25 in the case of Figure 3b. It is difficult to get close to the axes; i.e., large estimates rarely have a fit that is close to zero, and vice versa. The *PPS* is a function of two factors of production: The *ingenuity* and *effort* of the researcher. The ingenuity causes the width of the *PPS* area, while the effort is the size of *J*. If *J* increases from J_1 to J_2, the object increases as shown.[15]

14. The assessments of the PPS draw upon *simulations* (Paldam 2015b and 2016).
15. As J is finite, the points in the gray area are a point scatter, and the rim consists of straight lines, but for ease of presentation I stick to the continuous presentation as drawn.

The β-theory says that the sign on β is positive, so the estimates in quadrant III are 'wrong'. Only the segment in quadrant I makes sense. Given that the β-theory is sound, it is likely that the true value is within the *PPS* as shown.

The bolded part of the rim of the *PPS* is the efficient part of the object where the size can be increased only if the fit decreases and vice versa. The bold curve is known as the production possibility frontier, *PPF*. The two *PPF*s drawn are for two values of *J* as mentioned, and they are drawn to be roughly homothetic with respect to the origo of the coordinate system. While the eight-shaped production possibility sets look somewhat special, the *PPF*-curves look as the standard textbook case on Figures 3a and 3b, just as the indifference curves did.

3.3 The optimal solution

Figures 2 and 3 are drawn in the same diagram, so they can be merged in the usual way. It is done on Figure 4, which shows two *PPF*-curves – PPF_1 is for a lower *J* and PPF_2 is for a higher *J* – and the two indifference curves C_1 and C_2 that touch the two *PPF*s. Two cases are drawn. Figure 4a is for the typical researcher, while Figure 4b is for the advisor, as discussed in section 4. As C_2 is better for Econ than C_1, it follows once again that it pays to make a good many regressions.

Figure 4. The optimal solution: The solutions S_1 and S_2

Figure 4a. C1: Econ as researcher

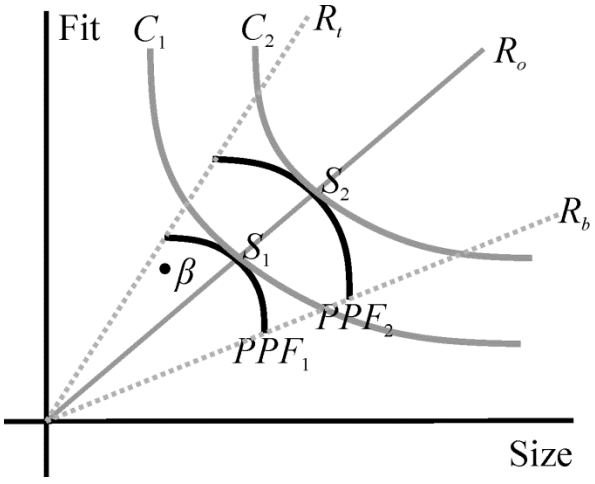
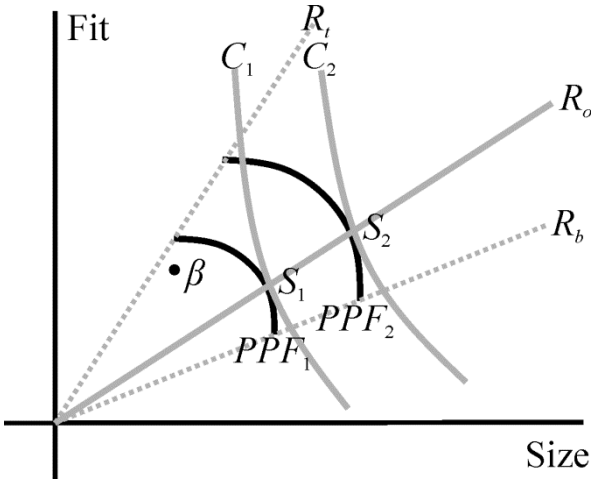


Figure 4b. C2: Econ as advisor



If both the indifference curves and the *PPF*s are homothetic as regards the origo of the coordinate system, the expansion path for the optimal solution as a function of *J* becomes a ray, i.e., a straight line from origo (0,0), as drawn. It is likely that the two sets of curves deviate

a little from the strict homothetic forms so that the expansion path bends a little, but it is not clear if they bend upwards or downwards, hence the middle case is shown.

Econ's optimization can only reach the true value of β if it is on the *PPF*. Section 3.4 will argue that β is an internal point so that two key results follow: Econ produces a bias due to his *rationality*; the rationality bias is in the *direction of his priors*.

As good results are big and significant estimates, Econ chooses estimates that are systematically *too* big and *too* significant. As Econ is the representative economist, it follows that most researchers make much the same choices. Thus, the estimated *b*'s and *t*'s in the whole of the β-literature are too big. In other words, the literature has a publication bias, precisely as found in most meta-studies.

3.4 The robustness of the bias

Figures 4a and 4b show the effect of rather different preferences, and it looks as if the choices they generate are close. Simulations compare the results produced by extreme vertical and horizontal indifference curves (Paldam 2015b and 2016). It is shown that the gap between the results is remarkably small – typically less than 10%. The results for more reasonable indifference curves are always in the interval between the two extreme solutions. Thus, all reasonable indifference curves give much the same result. It is always biased – this follows from two lines of argument:

The true value β is a point in the possibility set of estimates, which is an area that has infinitely more internal points than rim-points. Thus, the probability of hitting the rim by chance is zero. With no strong reason for β to be on the rim, it will not happen.

This formal point also applies for a finite set of estimates when the behavior of researchers is considered. Imagine that:

(6) $y = F(x)$ is the true model. It contains the true controls.

(7) $Z = (z_1, \ldots, z_n)$ is a set of n false controls that sometimes 'work' by chance.

The false controls should not be in the model, but as the *z*s are correlated with *x* in some data samples by chance, some researchers have used one or the other of these controls. From reading up the literature, the *Z*-set becomes part of the *β-knowledge* of the researcher. But he does not know if they are false or true, and he will thus experiment with such variables. Some of the *z*s in the *Z*-set are negatively correlated with *x*, and when they are included in the model *x* obtains an extra effect, so that the estimate of β becomes too large.

An extension follows from *search theory* where a key concept is the reservation outcome that the searcher seeks to reach. This reservation estimate is also known as the 'state-of-the-art' estimate $\beta^R = (b^R, t^R)$. From the argument until now it is likely that $\beta^R > \beta$. We like to believe that the estimates in this literature converge to the true value β. That is, hopefully $\beta^R \rightarrow \beta$. However, at any point in time researchers may consider β^R as the reservation estimate they have to reach.

When Econ sends his paper to a journal, the editor will assign referees. They are likely to be authors of the β-literature. They have helped making the estimates that have made the profession believe that β^R is 'reasonable'. Econ will know that most referees belong to that group. They will surely like that he gets a reasonable result that is close to β^R.

The search process at the labor market has a realistic market price to which the search process will converge. That is, if the searcher sets his reservation wage too high, he will be disappointed and lower his goal. However, in the estimate search discussed it is clear that it is doable to find too high estimates. Thus, the adjustment process of β^R down to β due to disappointment is not strong at all.

3.5 An altruistic researcher and mimicking: The rotten researcher theorem

The official policy of the typical ministry dealing with research and many universities is to demand that researchers have a high level of *research integrity*.[16] This is in accordance with the ethos of research that sees the researcher as a pure seeker of truth.

Imagine a researcher who seeks truth only. Her results will be below β^R in both dimensions. Thus, she will be an underachiever. It is likely that neither referees nor editors will like her paper(s). It will also cause sponsors to disregard her.

The university administrators will soon note that she does not deliver the goods: Neither publications that attract public research funds nor 'nice' results that other sponsors like. Therefore, she will bring in no funds to tax and no politically correct results that give good publicity to the institution.[17] Consequently, this preference will harm her career. Thus, pure truth seeking is altruistic in the sense of giving away personal gain for the greater good of truth.[18]

16. The official Danish report on the Code of Conduct for Research Integrity (2014) is typical of such reports. It was made by a committee of 12 leading administrators of academic institutions citing 24 similar reports and declarations from other countries and international organizations.
17. The home pages of most research institutions highlight some of its research. It is my impression that the chosen projects tends to be good and politically correct.
18. Economists recognize altruism as a fact, and empirical studies regularly find altruism, but it is also a main finding that it plays a limited role. A famous quote by Gordon Tullock is that 'people are 5% altruistic'.

In contrast, Econ is shrewder and finds an estimate that is a little 'better' than β^R. Thus, he will add to the β-knowledge that the 'state-of-the-art' estimate is β^R, or maybe even a bit higher. Consequently, Econ's research gives a small divergence from the truth, not convergence to the truth.

It is nice to believe that truth will prevail in the longer run. If it does, truth may pay in that perspective. From the argument above, it follows that the longer run may be rather long. The career of the economist takes place in the short to medium run. This is the first problem for truth seeking, but it has two more problems. The second is that it is difficult for the researcher herself to know if she has found truth or confirmed her priors and the ones of the market. The third problem follows from the fact that everybody else pretends that they seek truth only and have great 'research integrity' as demanded by official policy.

In relation to the research integrity ideals, Econ is a 'rotten' researcher, but he does not want to appear so as it would harm the publication chances of his paper and his career in general. Thus, Econ will mimic the altruistic as much as he can, and he will be terribly offended if anyone suggests that he accommodates sponsors, referees etc. Thus, for the reader it is difficult to know if the researcher is rational or altruistic. It follows that both rational and altruistic authors do their best to create credibility by the same devices.[19]

One method is to present *robustness* experiments. The average paper publishes about ten estimates in order to show the robustness of the main result. The main problem with robustness experiments is that what matters for the bias is the number of experiments per published one, not the number published (Paldam 2015b). A second method is *out-of-sample projections* (Clark 2004). It is not as common as robustness experiments, but it is not rare either. Obviously, the rational researcher may mine both the sample and the out of sample data. This is likely to be a stepwise process, but it can surely be done.

Some processes are working to help a convergence to the truth: The main characteristic of a true estimate is that it survives *independent replication*.[20] What is needed is another researcher who tries to replicate *exactly* the same model on another data set. If it survives, it increases the probability that it is the true model. After repeated independent replications, it is likely that the true model has been sorted out. However, it is well known that replication studies are difficult to publish.

Finally, it is also possible to get close to the true value by making meta-studies of the

19. This theory is inspired by the 'rotten kid theorem' from Becker (1974); see also Frey (2003).
20. See also Dewald *et al.* (1986), McCullough *et al.* (2008) and Duvendack *et al.* (2015).

literature. Here the distribution of the results may indicate that the published results are systematically skewed and should be corrected by the appropriate methods.

3.6 Jumps, schools and the confirmation bias

The above analysis concentrates on an individual researcher who writes a paper on a market where a reservation estimate exists. However, sometimes jumps occur, and some fields have several schools with different reservation estimates.

Let us for a moment imagine that the twist in the model that Econ makes is so big that it generates a prediction that is substantially different from the going reservation estimate, and that he finds fine estimates to confirm that result. That will make his paper difficult to sell – it is likely to take one or two years longer – but if he succeeds, it is possible that his paper will be cited more than most papers. However, it will take several years for the extra citations to start to be visible. Thus, it is a risky strategy where the costs are quick to materialize and the benefits come after 5-6 years only. If Econ is at a critical step in his career, the risk may be forbidding.

In addition, in some cases two or more schools exist in the market with different reservation estimates. There are even cases where the schools differ as to the signs of the parameter researched. Here Econ has to choose his market, but then there is a choice.

The analysis so far has another consequence. It means that papers testing a theoretical result have a confirmation bias, so that the theory is accepted far too often. In the sample examined by Fanelli (2010), it is found that papers in economics do have a rather large fraction (86%) of confirmations. In the harder sciences, the fraction is much lower.

4. Econ as policy advisor

Econ is appointed political advisor as he is assumed to have the β-knowledge, and one of his jobs is to write a one-page memo with his best assessment, β^A, of β to the Minister, and through him to the political market. The memo is available to the media, and it may be based upon a technical background paper.

Section 4.1 gives some background. Section 4.2 argues that Econ has to consider two types of agents: He has to give advice that is useful to the Minister, who may find another advisor if this is not the case, and his advice has to be academically respectable. The advisor may quit if he has to give advice that is too ‘politicized’. Thus, he functions between the sacking

and the quitting point. Section 4.3 considers some consequences and extensions.

4.1 Some background: Great expectations, their disappointment and myopia

A robust general finding in the political economy of elections is that the average government loses the support of about 2.5% (±5%) of the voters from ruling a normal election period.[21] A simple way to understand this result is to note that to reach the majority at an election, a party (coalition) has to promise too much.[22] When elected, a government comes to reveal that some of the promises were exaggerated. Thus, economic policies have exaggeration cycles.

Another commonly found result in studies of elections and politics in general is that the political process enforces a short time horizon (Nannestad and Paldam 1994). The political myopia is one of the mechanisms allowing exaggeration cycles.

This creates some distrust to the political system, including the Minister. Outside advisors are chosen to give credibility. Thus, the advisor has to give politically useful advice – that is, advice the Minister can 'sell' on the political market – and at the same time he needs to keep his credibility. The credibility is relative to Econ's academic audience. It is a problem for Econ, in the longer run, if many in the academic audience see his political advice as overly politicized.

Part of the cyclical nature of policy-making is that some policies that have been over-sold come to be seen as discredited. This is an important part of (K3) the casual observations in the β-knowledge. That is, if an announced value of β has been used for a policy that did not deliver (fully) on its promises, this reduces the size of β that can be sold on the political market for some time.

4.2 The choice of Econ's best advice: An Edgeworth game

The advisor is engaged in a game that can be explained by two sets of preferences. A key to the academically respectable advice is that the β-knowledge about β contains a 'state-of-the-art' estimate, β^R, which is a bit larger than β. In principle, β^R is the value that Econ should use as his key advice. However, Econ also wants his advice to be useful for the Minister, who has the political preferences drawn on Figure 1a.

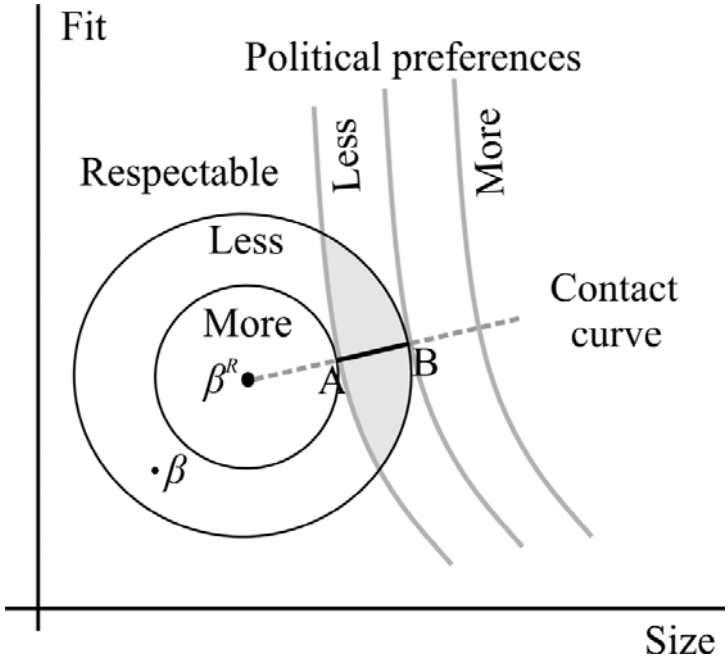
Econ has some leeway: The literature does not fully agree about the state-of-the-art estimate,

21. This result is based upon 283 elections in 19 established 'western' democracies. The result does not depend upon the size of the country or the election law (Nannestad and Paldam 2002).

22. In a set of influential papers, Alesina (1987, 1989) showed how rational political business cycles may occur in the short run when election outcomes are uncertain. However, the evidence may also be interpreted as unsuccessful attempts by new governments to implement electoral promises (Paldam 1991).

β^R, and it is possible for Econ to stress some study that produces a more desirable estimate as a particularly fine study. In addition, β^R is supposedly a ceteris paribus estimate, which it is surely not what is needed. Thus, β^R should be adjusted for the relevant conditions. This is not easy to do. Here a background paper with estimates on recent national data may come in handy, and by a careful search, a range of results will surely appear. Thus, the respectability preferences are a set of circles around β^R that become less respectable the further away from center they are. The political preferences from Figure 1a are, as mentioned, rather steep, indicating that the Minister does not care much about the fit, but wants a big size.

Figure 5. Econ as advisor to the Minister



The political preferences are Econ's assessment of the Minister's preferences, but it is likely that they have talked about the issue and that Econ's assessments are rational. The two sets of preference curves give a typical Edgeworth box as depicted on Figure 5. The tangent points are the (dashed gray) contact curve drawn as a line that starts in β^R and goes to the right. Point A is the sacking point where the Minister choses another advisor. Point B is the point where Econ quits as an advisor. This gives the (gray) lens, which contains the relevant part of the contact curve. It is the black line between A and B.

Economic theory does not predict which point will be chosen. It depends upon the power and negotiation ability of Econ and the Minister. The typical Minister is surely good at such power games; this is precisely why he is minister. Therefore, it is likely that β^A will be

close to point B.

4.3 Consequences and extensions

I take the main case to be that the Minister wants a large value of β. This causes the following sequence:[23]

(8) $\beta < \beta^R < \beta^A$

This is the case if β is a measure of policy efficiency. The Minister wants to increase some good or decrease some bad, y, by a measure x, so that policy efficiency is $\beta = \left| \partial y/\partial x \right|$, where the numerical signs ensure that the efficiency is positive. If Δx is unpopular, such as a tax increase, the best would be if the tax was very efficient, so that only a small increase is necessary.

However, there are cases where the Minister wants a small effect. For example, he wants to abolish a policy made by a former government, so he wants to be able to argue that the policy is inefficient, or he may want ammunition to shoot down policy proposals from the opposition. In such cases, equation (8) breaks down. It may even happen that $\beta > \beta^A$.

The model explains how an able advisor comes to choose the best advice. It shows how the two sets of preferences generate the choice, but neither of these is Econ's own preference. Thus, any other able advisor will choose almost the same choice. Consequently, *able advisors are interchangeable*.

However, it should be said that in spite of the problems of 'exaggerating' advice, it is clear that the exaggeration would be larger without the advisor.

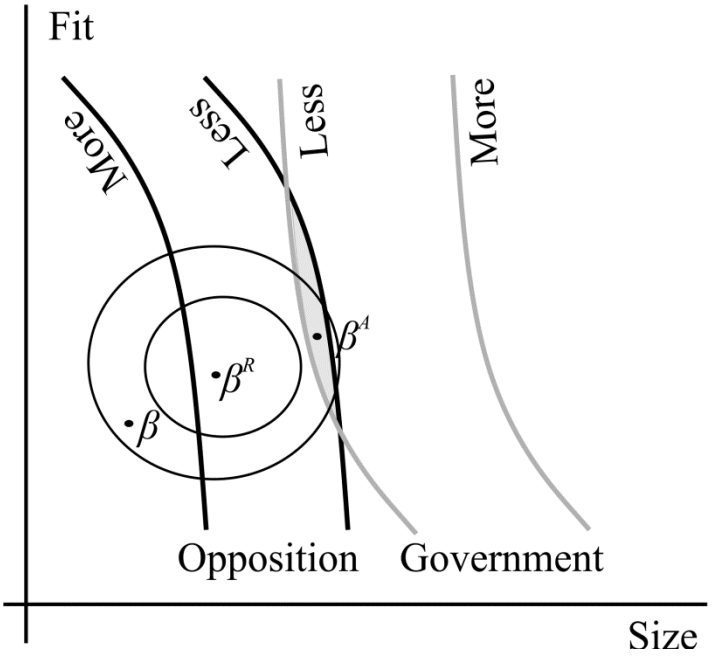
Several extensions are interesting to contemplate: The most important is that advisors are sometimes appointed to give independent advice to both government and opposition. The advisor may be appointed to advise the Parliament or the public at large. The idea may here be that the advisor is to help the government and the opposition to agree more easily by discrediting extreme policies.

On Figure 6, the government and the opposition have reverse preferences. To get to less, as shown by the gray area, that allows a reasonable compromise; both have to go to less preferable preferences. Here Econ cannot allow himself to give advice that is much more

23. Two recent meta-studies compare estimates/assessments in research papers and official reports. They confirm the sequence (8) (Royuela 2016, Fidrmuc and Lind 2017). Other meta-studies compare estimates of independent and dependent (who work in an administration) researchers, they also confirm (8); see e.g., Doucouliagos and Paldam (2008).

preferred by either the government or the opposition than by the other party. Thus, Econ is even more constrained than in the previous case. In order to give useful advice, Econ may get even further away from the true value.

Figure 6. Econ as advisor to the Parliament



Obviously, the case on Figure 6 has much more possibilities than the previous cases. Also, a whole set of additional possibilities occur when Econ advises about more issues. Here he can give advice that is more pro-opposition on one issue if he gives advice that is more pro-government on another issue, so a particular kind of log-rolling results.

5. Conclusion

The analysis considers the representative academic economist, Econ, who behaves as predicted by economic theory. The paper models his choices as regards an important parameter, β, when he works as researcher and as political adviser, and shows that his choices follow straight from basic theory. The key result is that it is rational for Econ to exaggerate his results.

When Econ is researcher, the model predicts that his published results are both too large and too significant. This confirms the results in most meta-studies. However, about one third of meta-studies find no publication bias, and the Econ model allows us to identify cases where

no bias is produced. This may happen, e.g., when economic theory does not predict the sign on β, or when the interests of sponsors differ sufficiently.

When Econ is policy adviser, he enters in a game of some complexity, as he is dealing with two sets of preferences. On one hand, his job is to give useful advice that is politically possible. On the other hand, he wants to give respectable advice that is acceptable by the economic profession. Here the analysis suggests an even greater exaggeration, but some cases have been mentioned where the prediction becomes blurred.

It is easy to criticize the analysis: The reader may look inwards and conclude that his decisions are more complex or less rational than Econ's. However, the theory is not made to describe any particular individual, but the representative economist.

It has been a main effort in writing this paper to use only theory that everybody likely to read this text have learned and most have taught. That is, everything is based upon standard textbook micro, which is known to give results that largely generalize to more advanced theory. Thus, if the reader thinks that the analysis is wrong, it is an important question just how much of our theory is wrong and how it should be revised.

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