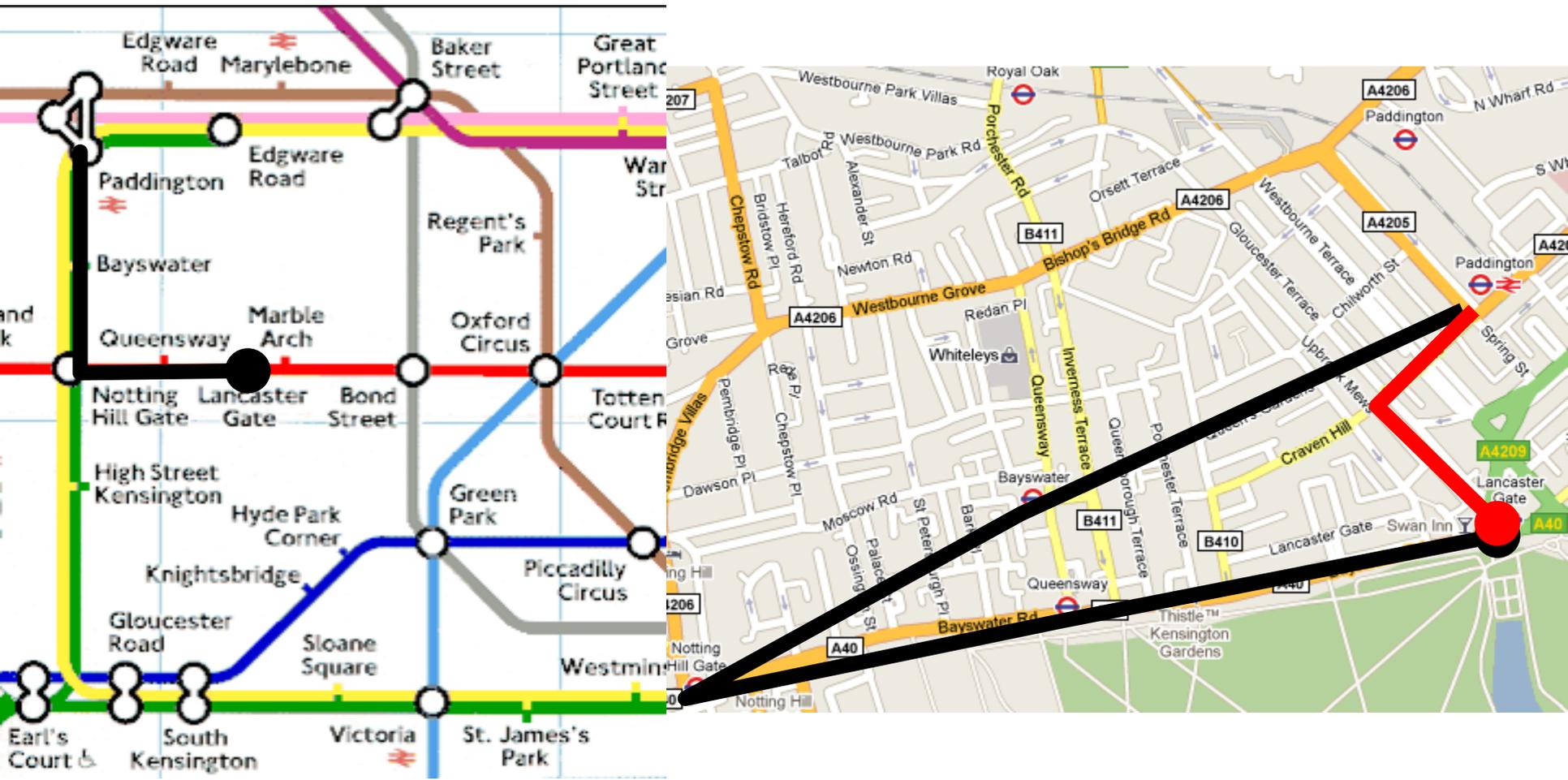


# Knowing when we don't know

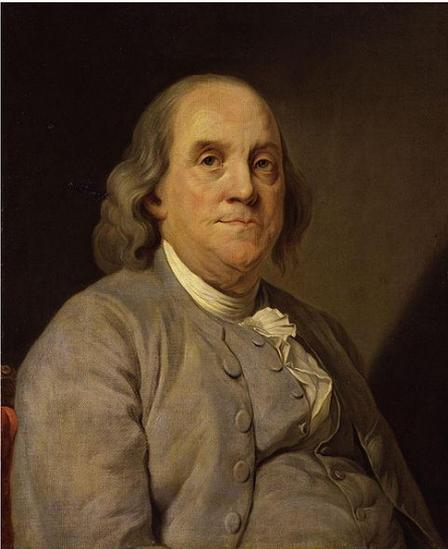
**John Kay**

**Institute for Fiscal Studies 6<sup>th</sup> February 2012**



“Divide half a sheet of paper by a line into two columns, writing over the one **Pro** and over the other **Con**.... When I have got them all together in one view, I endeavour to estimate the respective weights.... I have found great advantage for this kind of equation, in what may be called **moral** or **prudential** algebra.”

Benjamin Franklin to Joseph Priestley, 1772



## Franklin's Gambit

“So convenient a thing is it to be a reasonable creature, since it enables one to find or make a reason for everything one had in mind to do.”

Benjamin Franklin, 1791

## Bogus Models

WebTAG (or STAG, the Scottish equivalent), used for the appraisal of transport projects in the UK

Public sector comparator models for PFI projects

VAR (value at risk) modelling for risk management in banks



"I HAD MY ACCOUNTING DEPARTMENT RUN A COST-BENEFIT ANALYSIS ON YOU AND I HAVE SOME BAD NEWS."

## The result in the world out there

Bank risk management led to comprehensive failures in the UK banking sector of a kind not seen since the nineteenth century

PFI projects are set to cost taxpayers billions in excess funding costs



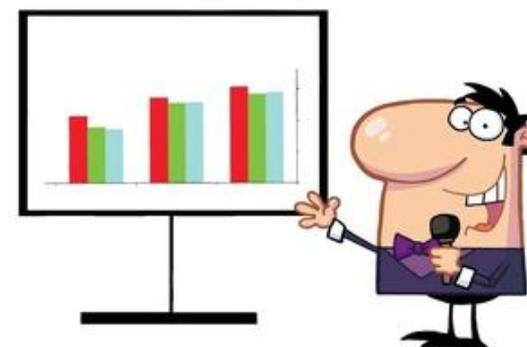
And has policy for the UK transport infrastructure been a success?



## The result in the world of the modellers

All these models are still routinely in use.

In fact their use is effectively compulsory



- WebTAG(STAG) is required for any project receiving central government funding and recommended for all
- public sector comparator studies are obligatory for PFI schemes
- the Basel rules relax capital requirements for banks with appropriate risk management systems (which in practice means VAR)

## The common structure of these models

They ask the question “suppose we had complete and perfect knowledge of the world, what would be”

- the cost/benefit ratio (or other extended length) of a transport project, based on a DCF calculation over a 30 year time horizon
- the relative costs of a PFI project and a public sector comparator over the planned life of the PFI contract?
- the loss we would make on a bad day with 0.1% (or other very low) probability?

**All these calculations are hugely data intensive. Since few of the numbers required are actually known they are most of the figures are estimated or prescribed.**

**WebTAG : Values of Working Time per person £ per hour, 2002 prices and values)**

<b>Vehicle Occupant</b>	<b>Resource Cost</b>	<b>Perceived Cost</b>	<b>Market Price</b>
Car driver	21.86	21.86	26.43
Car passenger	15.66	15.66	18.94
LGV (driver or passenger)	8.42	8.42	10.18
OGV (driver or passenger)	8.42	8.42	10.18
PSV driver	8.42	8.42	10.18
PSV passenger	16.72	16.72	20.22
Taxi driver	8.08	8.08	9.77
Taxi/Minicab passenger	36.97	36.97	44.69
Rail passenger	30.57	30.57	36.96
Underground passenger	29.74	29.74	35.95
Walker	24.51	24.51	29.64
Cyclist	14.06	14.06	17.00
Motorcyclist	19.78	19.78	23.91
<b>Average of all working persons</b>	<b>22.11</b>	<b>22.11</b>	<b>26.73</b>

*Source:  
Department of  
Transport*

**WebTAG: Forecast Growth in the Working and Non-Working Values of Time**

<b>Year</b>	<b>Work VOT Growth (% pa)</b>	<b>Non-Work VOT Growth (% pa)</b>
2003	2.44	1.95
2004	2.55	2.04
2005	1.67	1.34
2006	2.18	1.74
2007	1.97	1.57
2008	-0.09	-0.07
2009	-5.53	-4.43
2010	0.57	0.45
2011	0.96	0.77
2012	1.78	1.42
2013	2.18	1.75
2014	2.19	1.76
2015	2.10	1.68
2016	2.05	1.64
2017-2021	1.67	1.34
2022-2031	1.67	1.34
2032-2051	1.97	1.58
2052 onwards	1.91	1.53

*Source:  
Department of  
Transport*

## WebTAG: Annual Percentage Change in Car Occupancy (% pa) up to 2036

Journey Purpose	Weekday					Weekend	All Week
	7am-10am	10am-4pm	4pm-7pm	7pm-7am	Weekday Average		
Work	-0.48	-0.4	-0.62	-0.5	-0.44	-0.48	-0.45
Non - Work (commuting and other)	-0.67	-0.65	-0.53	-0.47	-0.59	-0.52	-0.56

## What is wrong with these approaches?

All the problems arise (obviously) from our inability to have, or obtain, the knowledge these models assume

- since most numbers are invented, they can usually be selected to deliver the desired result
- **the future is assumed to be essentially similar to the present, except for mechanical projects of demand/incomes etc.**
- the critical question of the terminal value of the project is largely ignored, and an arbitrary cut off selected
- **uncertainties within the model are either ignored or dealt with in an unsatisfactory way.**
- because certainty is implied, little or no value is attached to flexibility or embedded options
- **the prescription of a universal template blocks the route to the proper exercise of judgment and experience**
- the costs of these exercises make serious public debate impossible, and aggravates a bias to mega projects

But the term 'theory' is used in so many different ways, even within economics, that if I do not clarify what I mean by it early on, the gap between what I think I am saying and what you think you are hearing will grow too wide for us to have a serious discussion. I prefer to use the term 'theory' in a very narrow sense, to refer to an explicit dynamic system, something that can be put on a computer and *run*. This is what I mean by the 'mechanics' of economic development - the construction of a mechanical, artificial world, populated by the interacting robots that economics typically studies, that is capable of exhibiting behavior the gross features of which resemble those of the actual world that I have just described.

Robert Lucas, 'On the Mechanics of Economic Development'  
*Journal of Monetary Economics*, (22) 1988

‘It is perhaps natural to think there is a unique way of describing things which gets at their essential nature, ‘an interpretation of the world which gets it right’, and, a description of “Reality As It Is In Itself”

Donald Davidson, (2000) *Rorty and His Critics (Philosophers and their Critics)*

## Why do we engage in these exercises?

- a misconceived search for objectivity in assessment
- **a confusion between rationality and quantification**
- the construction of entry barriers to debate and employment on the part of professionals, consultants, civil servants, risk managers
- **the use of a common, but elaborate, model template allows consultants to build a scaleable business model, using junior analysts for routine tasks.**

## What should we do instead?

- deploy much simpler models to identify key factors influencing assessment
- **these may require further detailed research, political judgment, or experience of similar projects**
- on many issues, quantification will serve as a reality check, but more precise quantification is spurious
- **use the greater flexibility this confers to make much more piecemeal assessment of individual components of large projects, rather than black box analysis**
- give much more attention to the valuation of flexibility, embedded options, and terminal values
- **abandon completely the search for standard templates and universal models the belief that this is possible is a fundamental methodological misconception.**

## A final word

This is not an argument against quantification, modelling or evidence based policy, but against bogus modelling that discredits all these things.

Quantification, models, and the piecemeal accumulation of evidence are essential to good policy making.

**But the map is not the territory.**

