Calibrating the world and the world of calibration*

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Abstract

We develop and calibrate a comprehensive model of the world and the calibrators calibrating it. The model is general in the sense that it takes into account not only the relevant, but also the irrelevant features of the economic environment. One of the byproducts of the analysis is the World Formula which (among other things) is capable of explaining everything.

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Life, as we know it, does not exist.
Swami Mhakhaphi

Whether or not the world, as we know it, exists, I can match its data.
MKP

1 Introduction

For almost two decades, calibrations have been on the center stage of economic progress. Calibration techniques have been fruitfully applied to such diverse questions as the growth of cities, the optimal rate of inflation, the pension system preferred by the median voter or the transition from Malthusian to modern growth. In all these questions, calibrators have usually been able to match the relevant data with their models, leaving apparently few things unexplained.

Indeed, today it is difficult to imagine what economists did in the dark ages before the calibration method gained widespread acceptance. A theory put forward by White and Noise (1999) is that some economists were *estimating* certain economic relationships using matrix algebra and other voodoo rituals instead of simply making them up. Econometricians, as White and Noise call this ancient tribe, also practiced a bizarre virility ritual of exposing their theories to the risk of "falsification". According to their belief system, econometricians could only avoid falsification by attaching a number of "stars" indicating "significance" to their dearest numbers, and by using 10 point fonts in overhead presentation slides; the latter technique was thought to effectively shield the numbers against the "evil eye" of fellow tribesmen.

Clearly, econometrics was an inferior and inefficient technology, even though, in practical life, some of these pre-economists seem to have found some work-arounds for the theoretical limitations of their approach. Whether econometricians were ancestors of calibrators, or just another unsuccessful subspecies of modern homo oeconomicus which eventually became extinct without significantly interbreeding with calibrators (like for example the infamous homo Keynesius), is still an open question. DNA evidence seems to support the latter, the so called Out-of-Minnesota theory (see, e.g. Pääbö (2001)). The alternative school, the so-called Eco-Darwinian school (see, e.g., Dust (1997)) focuses on certain artefacts and rituals (in general, the obsession of both groups with multiple figure digits). Moreover, they point out the close religious and philosophical links between the meaurement–without–theory branch of econometricians and modern calibrators. Both groups do not believe in falsification, albeit their consequences are different[1] and individual members would not admit any relationship between the groups.

Even though papers using calibrations have resulted in tremendous progress for the economic science and mankind in general, they have not yet incorporated the whole known world into one single model. Also, strangely, all calibration models neglect the

[1]The first group stopped to build models, while the second group builds unfalsifiable models.

logical step to model the world's most important scientific industry: To my knowledge, the present paper is the first one to model and calibrate the development of the calibration industry as part of a model of the world as we know it (WAWKI).[2] Since the model is completely general, it is possible to match arbitrary data with it, for example real GDP time series starting 1000 BC, the stock market development or the length of the winter in London, Ontario (for the latter, the model can be used to simulate a ground hog, its shaddow and its visual power).

2 The model

We consider an OLG model with a continuum of agents in each period. Agents live for 70 periods and have to decide whether to work as workers, scientists, or calibrators. Workers produce a consumption good w ("widgets") with a constant returns to scale technology that employs labor, capital, human capital and 11 other factors. Scientists produce knowledge, resulting in technical progress in the next period. Calibrators produce calibrations; calibrations are intrinsically worthless for workers or scientists, but serve as input for other calibrators (every calibration leeds to new feasible parameter values for new calibrations and therefore makes it easier for the next generation of calibrators to produce more models), as a consumption good for calibrators ("entertainment") and as a commonly accepted medium of exchange as long as sufficiently many people believe in the value of calibrations.

We model calibration as a technology with extremely increasing returns to scale. Indeed, there is always an equilibrium in which no one starts to calibrate (this feature of the model seems to describe most of humanity's history reasonably well). In order to model the start of calibration, we assume that every period, there is a small probability for a new agent to be a *mutant*. Mutants have no choice but to calibrate. As long as their number is small, the calibration industry is unsustainable and mutants are thrown in an insane asylum after one period. However, if the calibration industry manages to take off, the increasing returns have the effect that the calibration juggernaut becomes unstoppable and will roll on until eventually the whole economy is working as calibrators. Since the growth of the industry is even more than exponential, one can show that there is a finite time T such that, starting from T, completely arbitrary parameter values are acceptable in calibrations.

The other parts of the economic side of the model is a union of all calibration models around; whenever there were conflicts between some of these models, they were resolved in favor of utmost generality. Unfortunately, space constraints prevent a full description here; see the working paper version, pp. 25-2965. Finally, we embed this model of the economic world into a physical world described in a unified framework by

[2] I assume that the WAWKI exists. At first sight, this seems to be at odds with a theory put forward by Swami Mhakhaphi as quoted in McAfee (1982). However, in the actual calibration, we are handling the data very flexibly and are therefore not very much constrained by the WAWKI existence assumption.

a synthesis of Einstein's general theory of relativity and Planck's theory of quantum mechanics. We spare the reader further details here; they can be found in the working paper version of this paper.[3]

One of the interesting theoretical results that can be derived is the World Formula which (among other things) is capable of explaining outright everything in the WAWKI. The World Formula is actually a corollary to a more general proposition which can explain outright everything in a continuum of worlds which we could know if they existed. Since the World Formula can also be used to compute future stock market prices, it can unfortunately not be revealed before I receive tenure at a US university and therefore have no positive marginal utility of income any more.

3 Parametrization and calibration results

Most parameters are standard and were taken from Calibrator (2001). Since the model is more general than previous calibration models, we also need some additional parameters. Our idiosyncratic parameter estimates are summarized in Table 1.

c	p_w	H	β
299792.458	130.69	$6 * 10^{-11}$	2.0163

Table 1: Parameters

We take c, the speed of light, to be 299 792.458 km/s; we estimated p_W, the price of a widget, to be around \$ 130.69 in constant 1990 dollars, throughout human history. Finally, we assume the Hubble constant (the inverse of the age of the universe in years) to be about 50 km/s/Mpc $\approx 6 \cdot 10^{-11} year^{-1}$.

In order to match the data, we have to take the discount factor to be $\beta = 2.0163$ per year. This is slightly off today's consensus estimates of $\beta \in [0.95; 1.05]$, but we have good reasons for this choice. First, it is the β which is implied by the data.[4] Second, if β were not 2.0163, the WAWKI would not work as predicted by our model. Finally, our calibration of the calibration industry itself shows that $\beta \geq 2$ will become an acceptable parameter choice in calibration models by early April 2023. We can then apply the generalized Filbinger rule to argue that what then is right cannot be wrong today.[5]

For the theoretically inclined reader, it might be interesting that this discount factor results as the product of the gravitational constant G, Planck's constant h, the weight

[3] No one is ever going to check this and my calibration results anyway. After all, my model shows that people's most productive occupation is not checking other people's results but producing new, exciting numbers.

[4] The less knowledgeable referee complained whether this meant that the "model would not work without this absurd and crazy value". The man has clearly no knowledge whatsoever of the meaning of key sentences in this branch of economics. See Ratzinger (1998).

[5] This rule is inspired by the former German politician Filbinger who used this line to comment on his activities during the second world war.

of a hydrogen nucleus, and the Polborn constant.[6]

4 Calibration results

As expected, the model can match arbitrary time series and coefficients of GDP, prices, fertility behavior, wealth concentration indices, unemployment data, city size distributions, yearly rainfall in Timbuktu and the like, as well as the start of the calibration movement and its development so far. Since it is already well known that a sufficiently complex model can match arbitrary data, even those in the WAWKI, I spare the reader any pictures of roughly parallel lines representing "data" and "calibration results" and turn immediately to a description of the prognosis for the future development of the world.

Even though we have the impression that the calibration industry is flourishing right now already, the calibration shows that this is only the beginning; of course, this should not be too surprising considering the incredibly increasing returns to calibration. The employment share of people working in calibration, right now less than 0.1% of the population, will increase to 4% by 2008, 20% by 2012, and reach 100% of the working age population by 2015.

The fountain of youth is discovered in 2032, but as experiments show that immortal guinea pigs' β does not fall below 1, the project is abandoned for fear that people's optimization problem could become undefined. The world formula will (most probably) be discovered through accidental calibration in 2037.[7] Calibrations are increasingly used in areas outside the traditional area of economics. After a decade of unsuccessful physical tests for the National Missile Defense, it is found that it is much more effective and, above all, cheaper to just pretend that the enemy missile was hit. In 2015, the US complete the National Missile Defense calibration. There is a slight upset in 2016 when the first (uncalibrated) missile goes through the shield and wipes out Chicago, but by that time, this is insufficient to derail the calibration juggernaut. In 2019, a Mars landing is simulated in celebration of the 50th anniversary of the Moon landing.

A referee, apparently an experienced calibrator himself, has suggested to analyze the sensitivity of the calibration results to the value of the Hubble constant. Specifically, he suggested a value of $H = 1/6000$ year^{-1}, in case that creationism rather than big bang is the correct theory on the origin of the world (apparently, this referee is either from the state of Kansas, or from Bob Jones University). Evidently, this changes the age of the universe quite drastically, but leaves the economic results basically unchanged. However, it is interesting to note that in a world where the world age were really only

[6] The Polborn constant constitutes a link between the physical world and the preferences of representative agents. Its numerical value is the one implied by the data to get the desired β.

[7] A referee felt that this is slightly inconsistent with the claim that I discovered the World Formula already (see above). However, in the world of quantum economics, it is only possible to ascribe a probabilities to certain events. After what happened with Schroedinger's cat, there should be no conceptual difficulty associated with the fact that the World Formula can be known and unknown at the same time.

6000 years, Christian fundamentalists would stress creationism less than they do today, and rather focus on the flatness of Earth.

5 Extensions and conclusion

As a general model, the model cannot only be applied to the history of the planet Earth, but also to the development of the universe. According to recent estimates of the Drake equation,[8] there are about 1000 stars in our galaxy capable of supporting "intelligent life"; this number includes the planets that are inhabited only by calibrators. Applying our model to estimate the most likely state of the universe yields the following results: About 10.7932% of all planets with intelligent life have not yet reached the industrial revolution, 0.2721% are in the transition from regular science to calibration only and 88.9347% have reached Nirwana (the "calibration only" state). Of those, 29.6872% have discovered the fountain of youth and 4.4535% have the world formula.[9]

This paper provided an operational theory and calibration of everything. As such, it basically solves all questions one could have. Further research will have to focus on the state of the world if WAWKI did not exist.

6 References

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[8] The Drake equation is $N_c = N_* f_p * n_{lz} * f_l * f_i * f_s$, where N_c is the number of intelligent civilizations in the galaxy, N_* is the number of stars in the galaxy, f_p is the fraction of stars with planets, n_{lz} in the planets per star in the life zone for 4 billion years, f_l is the fraction of suitable planets on which life begins, f_i is the fraction of planets on which life forms evolve to intelligence, and f_s is the fraction of a star's lifetime for which a technological civilization survives. Reliable estimates for all these parameter values can be found in Lucas (2001).

[9] The destructive referee mentioned above had some problems with the accurateness implied by 4 digits, mentioning that the "1000" stars looks like a rough estimate, and that with only 1000 stars with intelligent life, only one digit after the comma would make sense anyway. This referee evidently had too much physics in his life, and not enough calibration.