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The Dynamics of Expectations: A Sequential Perspective on Macroeconomic Forecasting[1]

Abstract: The chapter claims forecasting is a *process* during which forecasts are regularly updates and revised. Paying attention to the dynamics of expectations provides the opportunity to study changes in expectations formed by professionals, and thus give insights into how their labor unfolds. Drawing upon data from a purposely-built database of forecasts running from September 2006 to September 2017, linear and logistic regression models investigate the informational and organizational grounds of forecasts revisions. It suggests that similar forecasts form a consistent sequence, so that revisions mostly consist in the adjustments of 'old' forecasts with respect to newly available information. By and large, forecasting means updating former forecasts. Besides, data shows the core activity of forecasting organizations, and in turn their audience, matter to understand the extent to which they revise their forecasts: despite what forecasters claim in interviews, public institutions, among which the IMF or the OECD, tend to revise their forecasts on a wider scale than private banks or insurance companies. Eventually, scrutinizing how forecasts revisions distribute according to the years during which they are produced, stress that during major economic crises, such as the Great Recession, forecasters not only revise their former expectations downward but also upward. This hints at a Durkheim-inspired interpretation of economic crises as re-opening the future.

Keywords: Macroeconomic forecasting, forecasters, sequence, temporalities, organizations, regression analysis

1. Introduction

While neoclassical economic theories often assume certainty to be a key feature of economies, other social sciences, along with some subfields of economics, have long emphasized the importance of uncertainty in the 'real', or

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'empirical', economic world. Uncertainty has been scrutinized from at least three points of view, respectively referring to the properties of commodities, to individual behaviors, and to the ontology of economies. First, uncertainty arises from unobservable qualities of goods and products. (Akerlof 1970) famously shows that asymmetric information implies releasing the theoretical hypotheses of perfect information and homogeneity and, empirically, may lead to sub-optimality and, eventually, to the collapse of markets. Studying a similar topic, namely uncertainty over quality, sociologists highlight it renders obsolete price-based choices and requires turning to judgment devices (Karpik 2010). Secondly, 'boundedly rational' actors face difficulties to analyze complex situations and, as a result, to discern 'optimal' solutions – all the more so as the ultimate consequences of action remain unknown (Simon 1959). Uncertainty here arises from actors' limited computational abilities: Unable to reach the 'best' solution, economic actors pursue 'satisficing', rather than 'optimizing', solutions. Thirdly, uncertainty is a common property of 'real world' situations: The classic distinction between risk and uncertainty (Keynes 1921; Knight 1921) sheds light on the ontological differences between situations where outcomes can be associated to a defined set of probabilities, and those where "there is no scientific basis on which to form any calculable probability whatever. We simply do not know." (Keynes 1937, 214) Whether its sources lie in individuals, objects, or the economic system, uncertainty prevents from attaining the conditions of general equilibrium and therefore makes it impossible to reach optimality, or efficiency (Beckert 2002). In extreme cases, uncertainty prohibits any economic activity.

In a functionalist perspective, forecasting aims at providing economic actors with depictions of the future to enable action. When uncertainty prevails, actors' decisions are necessarily anchored in 'fictions', requiring actors *a priori* to 'suspend disbelief' and adopt an 'as if' convention. When the future has yet to be created and cannot be known at present (Shackle 1972), economic actors can base their action only on 'fictional expectations' – that is, "pretended representations of a future state of affairs" (Beckert 2013, 226). In this perspective, 'instruments of imagination', among which forecasts, fuel actors' imagination – they eventually build the fictional expectations upon which economic action and coordination are based (Beckert 2016).

2. Shifting the Focus from Outcomes to Processes

Most literature on macroeconomic forecasting deals with 'errors', through the comparison between forecasts and actual economic performance. Indeed, assessing such errors relies on the *ex post* comparison between 'what actually happened' and 'what had been predicted' – a reality test forecasters often discard as 'irrelevant' or 'ineffective' (Pilmis 2018). Following for example the outburst of the Great Recession, explanations of collective forecasting failures often focus on econometric models: in particular, economists advocate for new forms of macroeconometric modelling that would include financial cycles (Borio 2014) or reduce the discrepancies between the 'real' world and the one models create (Taleb 2007; Caballero 2010). Other hypotheses stress the importance of cognition and beliefs in the economic world. While behavioral economists emphasize the importance of 'animal spirits' in finance and in the economy (Akerlof and Shiller 2009), it is worth noting that the notion applies to forecasters as well as to 'ordinary' economic actors. Combining Durkheimian and Bourdieusian traditions, sociologists underline that economists' adherence to a dominant vision of the economic order form the common ground upon which similar interpretations of economic situations are built (Lebaron 2010).

Although inspiring, these sets of explanations remain partly unsatisfactory. Approaches dealing with econometric models often share an optimistic, and somehow positivist, belief that improved future models will be robust enough to provide an accurate approximation of economic mechanisms. It claims a continuous 'march towards progress' will eventually put an end to most forecasting mistakes since they result from mere technical problems. Such explanations nonetheless make no reference to the social dynamics within the world of forecasting and concentrate on the sole statistical puzzles econometricians are bound to solve: It thus offers little insight into the actual process of forecasting. Whether they originate from economics or sociology, a major drawback of 'cognitive' explanations lie in their almost tautological nature. One may provocatively summarize them as follows: 'Forecasters make the same predictions because they agree on how the economy works', or even 'They see the same things because they think the same way.' Consensus then becomes self-explanatory, resulting from either socio-historical configurations of the profession of economist (Fourcade 2010), the interwoven theoretical, political and ideological grounds of economic thinking (Lebaron 2000), or herd behavior. Keynes's famous analysis of a 'beauty contest' (Keynes 1936) shows that herding can be a rational strategy for actors facing uncertainty: In a game-theoretical perspective, mutual observation grants access to formerly private information, allowing individual behaviors to adapt accordingly (Chamley 2003). Obviously, forecasters are no exception: among them, consensus partly emerges from the observation of peers and especially from the observations of organizations that are deemed to hold information before earlier than others (major statistical agencies, for instance). However, in addition to reducing social processes to the sole spreading of information, the analysis of rational herds often leaves the issues its production raises in the shade.

Indeed, focusing on 'errors' rules out whole areas of the activity and process of forecasting. It pays attention to the *opus operatum* but provides little information about the *modus operandi*. Shedding light on forecasting as an on-going process rather than on its outcomes departs from how it is usually understood. Moving backstage, sociologists emphasize the collective dimension of forecasting and stress the importance of social networks in its making (Evans 2007) as well as the role of the 'epistemic participation' of the object of forecasters' inquiry, namely the economy, to the very process of forecasting (Reichmann 2013). However, these scholarly works usually pay attention to one singular institution (e.g., one academic research center, or one central bank) rather than to the broader world of forecasting. More, they often implicitly assume forecasts from a same institution are widely unrelated, so that forecasting exercises could be studied independently from each other.

This chapter advocates for a different approach to the forecasting process, which emphasizes forecasting *sequences* made of successive forecasts of a similar object. Indeed, forecasters issue several forecasts for a same horizon, a same country, and a same variable – usually at the end of each quarter. To take an extreme example, the United States Congressional Budget Office (CBO) produced more than twenty different projections of the US GDP (Gross Domestic Product) growth at the end of year 2017 – forecasts being produced twice a year (usually in January and August) up to ten years in advance. For the same variable, country, and horizon, the

International Monetary Fund (IMF) produced ten different projections – at the end of the first and third quarters of year *y-5* (here, 2012), and at the end of each quarter of both years *y-1* (2016) and *y* (2017). Each new forecast revises the preceding one to reflect the incorporation of newly available economic information – the implied changes being sometimes dramatic (see Fig. 1 for an illustration).

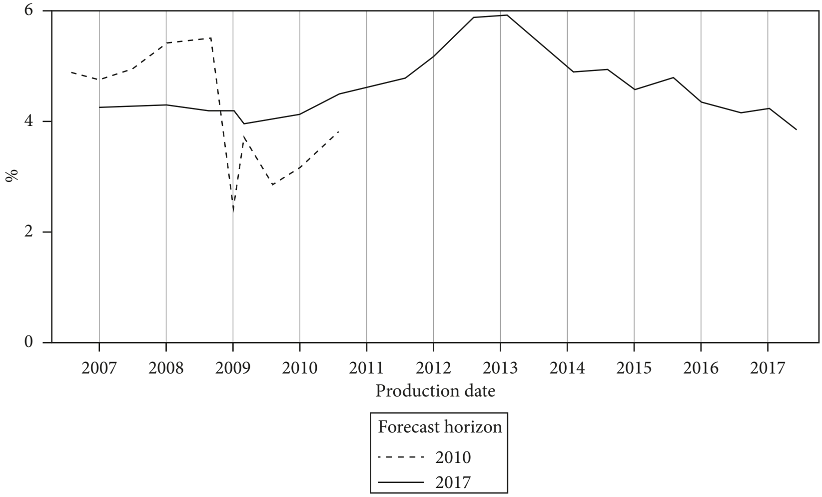

Fig. 1: CBO Forecasts of US Real GDP Growth at the End of 2010 and 2017.
Source: Congressional Budget Office, Budget and Economic Outlook (https://www.cbo.gov/about/products/major-recurring-reports#1).

Understanding the process and nature of forecasting requires paying special attention to forecasts revisions. From a theoretical perspective, revisions provide the opportunity to study changes in expectations formed by professionals, and give insights into how their labor unfolds. It allows investigating the weight of various factors, related either to the properties of the forecasted object, to the identity of forecasters, or to the historical and institutional environment of forecasting. This approach differs from Nordhaus's (1987) which, through the analogy with financial markets (Fama 1970), concentrates on forecasts 'efficiency' and makes little, if any, difference between revisions and 'errors'. It obviously conveys normative statements as to the process it evaluates and, because it focuses on the use of information rather than on its availability, misses a key aspect of forecasting. For example, the deepening of economic crises, which the successive releases from statistical bureaus trace, prevents forecast revision at date *t* to be independent from that at date *t*-1 – contrarily to what the efficiency hypothesis implies.

3. Data and Material

The text exposes early results from ongoing research on macroeconomic governance. It draws upon data from a purposely-built database of forecasts running from September 2006 to September 2017 (designated below as 'Forecasts Database'). Firstly, data first drawn from 'Consensus Forecasts',[2] a series of monthly economic forecasts from professional forecasters. In order to match the quarterly pace of actual forecasting, collected forecasts were produced at the end of each quarter (March, June, September and December[3]). In other words, the database contains a sample of all 'Consensus Forecasts' issues over an eleven-year period (size = ⅓), and almost exhaustively represents all the end-of-quarter releases. Secondly, institutional forecasters usually grant access to their publications online, and enable retrieving the IMF *World Economic Outlook*, the Organization for Economic Co-operation and Development (OECD) *Economic Outlook*, the European Commission (EC) *Economic Outlook* or the CBO *Budget and Economic Outlook*.[4] The 'Forecasts database' eventually gathers more than 32,000 forecasts about two macroeconomic variables (GDP growth and inflation, using 'consumer prices' as a proxy in the latter case) and eight countries or group of countries (China, France, Germany, Greece, Japan, United Kingdom, United States, and the Eurozone). Each forecast is further characterized by its point value, its date *t*, its (more or less distant) horizon and, when appropriate, the date and magnitude of its revision between *t*-1 and *t*. The approach taken here

2 Consensus Forecasts™ are publications from Consensus Economics™, a London-based organization established in 1989 which claims to be "the world's leading macroeconomic survey firm" (Consensus Economics website, http://www.consensuseconomics.com, accessed June 25, 2019).

3 This rule suffered only one exception: "Consensus Forecasts" for December 2011 were missing and thus replaced by data from January 2012.

4 Appendix A displays these institutional sources with greater details.

seemingly reduces forecasting to mere calculation, while forecasts encapsulate not only figures but also scenarios. It is assumed here that both go together: Figures may on occasion mitigate scenarios, but they mostly express them in a numerical fashion.

This chapter more specifically relies on a subset of the 'Forecasts database'. In order to keep a balanced panel, analyses exclude forecasts about China and Greece, as well as those whose horizon exceeds 24 months.[5] Besides, forecast organizations are distinguished according to their main activity:

- *Public institutions* gather institutional forecasters, that is organizations such as IMF, OECD, EC, and CBO. They produce closely scrutinized figures and scenarios about a large number of countries.
- *Major banks* are multinational banks whose subsidiaries or national offices produce macroeconomic forecasts for various countries. Here, such banks comprise Bank of America (including Merrill Lynch), Citigroup, Crédit Suisse, Goldman Sachs, HSBC, JP Morgan, Morgan Stanley, UBS and Unicredit.
- *Other banks* designates the remaining organizations of the banking sector.
- *Other organizations* mostly regroup insurance companies (e.g. AIG, Allianz, Axa, Dai-Ichi Life, etc.), business firms with a department devoted to macroeconomic forecasting (among others, DuPont, FedEx, Ford, General Motors, Total or Toyota), research centers, consulting firms, rating companies, etc.

4. Are Predictions Predictable? Forecasting as a Sequence

At some point, the purpose of forecasting is to compute the economic future by means of macroeconomic information, the largest part of which is made available to the community of forecasters by data providers and statistical bureaus. Scheduled press releases and embargos enable a simultaneous access to recent data for all forecasters and economists.

> We forecast continuously: We are equipped with databases to feed Excel spreadsheets. Supply comes straight from databases once the GDP is out – a quarter an hour later,

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5 Appendix B provides a more precise account of the panel structure.

> and even sometimes at the same minute. When the US figures are released, they are under embargo but they are already delivered to the press and data providers and, say, the embargo is lifted at 8 or 8:30 NY time, hop!, all the data becomes public at once through press agencies and data providers, and I get them on Excel, like, five or ten minutes later… that depends on the data provider, sometimes it needs maybe an hour. Then, they pour out… I don't know, about one country, you get 20 or 30 entries. I don't use them all but I do get them that way, automatically.
>
> Chief economist, Insurance company, French citizen, born early 1960's, December 2015.[6]

In this regard, the world of macroeconomic forecasting displays some features of quasi-perfect information. Most, if not all, macroeconomic information is available and, what is more, purposely-designed devices implement symmetry and ensure economists and forecasters all get the same information at the same time. Since forecasting often consists in extrapolating recent data to spot economic trends, the nature, amount and accuracy of information is critical to produce forecasts. Even though forecasters willingly compare their activity to some kind of 'art' which would require experience-based intuition to 'feel' the coming tendencies and identify key figures within a large-sized dataset, forecasts values may decisively depend on the information available and their basic properties (e.g. the forecasted variable or country). Provided information is symmetric, the date on which forecasts are produced and previous forecasts values may serve as proxies for new and past information, respectively. Testing such hypotheses requires linear regression modelling of the relationship between forecast value at time t (v_t) and a varying set of independent variables. Tab. 1 displays four different models, which share the same ordinary least square (OLS) method. Model 1 tests the autoregressive vector $v_t = \alpha_0 + \alpha_0\ v_{t\text{-}1} + \varepsilon$. For models 2–4, dummies enable including qualitative independent variables, such as forecasters' activity, country, or forecasted variable. When continuous independent variables are significant, using dummies also allows breaking them into discreet modalities to scrutinize their impact: Especially, in the case of production years, it enables paying attention to specific economic conjuncture, rather than considering 'time' as a mere duration.

6 All excerpts are part of a larger qualitative study, made of 48 in-depth interviews. The author has conducted them since June 2014 (average duration: 80 minutes) with economists and forecasters from public (either national or international) and private (banks, insurance companies, and so on) institutions.

Tab. 1: Linear Regression Modelling of Forecast Values[a]

			Model 1	Model 2	Model 3	Model 4
Forecasts	Country	Eurozone		0.036**	-0.734***	-0.741***
		France		n.s.	-0.861***	-0.853***
		Germany		0.062***	-0.581***	-0.582***
		Japan		n.s.	-1.247***	-1.241***
		United Kingdom		0.062***	-0.186***	-0.191***
		United States		*ref*	*ref*	*ref*
	Variable	GDP		*ref*	*ref*	*ref*
		Inflation		0.088***	0.113***	0.114***
	Distance to horizon				0.023***	-0.004***
Forecasters	Bank	Major bank			n.s.	n.s.
		Other bank			*ref*	*ref*
	Public institution				n.s.	n.s.
	Other organization				n.s.	n.s.
Context	Year	2006		0.005***	-0.014***	0.573***
		2007				0.368***
		2008				0.060*
		2009				-2.050***
		2010				n.s.
		2011				0.279***
		2012				-0.291***
		2013				-0.245***
		2014				n.s.
		2015				-0.299***
		2016				-0.379***
		2017				*ref*
	Previous forecast value		0.999***	0.999***		
Intercept			-0.073***	-9.438***	29.594***	1.938***
Adjusted R-squared			0.8199	0.8217	0.1286	0.3794
df			24,737	24,729	29,701	29,691
N			27,739	24,739	29,713	29,713

*Method: OLS. Signif. codes : ***: Pr. < 0.001. **: Pr. < 0.01. *: Pr. < 0.05*

[a]Source: Forecasts Database Subset

Tab. 1 exhibits that simple linear regression modelling, including a small set of independent variables, accurately ‘predicts’ macroeconomic forecast values. It is noticeable that the identity of forecasting organizations holds little, if any, role: There is no significant difference between banks, public institutions and other organizations. In contrast, the very object of forecasting matters. Regarding countries, the modelled coefficients unsurprisingly reflect the hierarchy of macroeconomic performances, since forecasts are often continuation of past trends into the future. Although not always in a strictly linear manner, the horizon also weighs in forecasts value: All other things kept equal, and the impact of conjuncture being controlled for, longer-term forecasts look more optimistic than shorter-term. In addition, the forecasts are sensitive to their context of production. Here again, the outburst of the Great Recession (especially year 2009) is easy to spot through spectacularly negative coefficients. These results support the claim according to which data providers are decisive actors who disseminate the economic and statistical raw information necessary to produce forecasts. All organizations being granted access to the same information at the same time, their precise nature, singularities and peculiarities make little difference, all the more so as cooperation is a key feature of the social world of forecasting (Evans 2007; Reichmann 2013). Shared economic information lead to fairly similar forecasts. To say it bluntly, forecasters seemingly lack ‘imagination’, and forecasting appears data-driven to a large extent.

Yet, the most remarkable result lies in the decisive role of previous values to understand newly produced ones. Removing the previous forecast from regression models dramatically diminishes their goodness of fit, as shown by the R^2 dropping from around 0.82 (model 2) to 0.13 (model 3). The finding stresses that forecasting is a process which continuously incorporates new economic information, rather than a series of unrelated operations. Forecasting widely draw upon preceding forecasts which supposedly embrace recent economic trends. That forecasts are actually self-referential is well-known in economics. “Forecasters,” Nordhaus (1987, 668) writes, “tend to have a certain consistency (stickiness?) in their views of the world, so that recent forecasts will go far in explaining current forecasts.” A broader explanation for such self-reference argues previous forecasts encapsulate, not only forecasters’ own views about the future,[7] but also the amount of economic information available at time *t*-1 – the persistence of some information from one period to the next then contributes to the stickiness of forecasts. Indeed, *revising* forecasts by definition implies forecasting exercises seldom start from scratch. The importance of 'post-mortem' in the world of macroeconomic forecasting – that is, the examination of former forecasts at the beginning of a new exercise – demonstrates the connection between past and present forecasts: Improving future forecasts requires spotting flaws in previous similar forecasts. In line with the near-perfect correlation between two successive forecasts,[8] it suggests that similar forecasts form a consistent sequence, so that revisions mostly consist in the adjustments of previous forecasts with respect to newly available information. By and large, forecasting means nothing but updating former forecasts.

5. What Is Updating? The Informational Grounds of Forecasts Revisions

Studying updates sheds light on the practice of forecasting as well as on economic expertise as a whole. It especially suggests expertise not only originates from a defined set of knowledge and techniques, but is also anchored in a particular institutional setting. Indeed, interviewees sometimes relate forecast revisions to the properties of organizations, such as their main activity or the contours of their audience.

- There is a major difference as to how work is done here [a major French bank] and in the public sector – especially the OECD but the Planning Bureau [Dutch Centraal Planbureau] too. People in those places are very cautious.

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7 Nordhaus (1987) often regards forecasters' views in a behavioral perspective, drawing from Kahneman and Tversky's depiction of the 'anchoring effect' (Tversky and Kahneman 1981). As most works in psychology-inspired behavioral economics, such under-socialized perspective cannot truly account for social phenomena (Bergeron et al. 2018): Forecasters' views are not just their own personal views, they are also grounded in the epistemology of economics as a whole, in the econometric tools they use, in the categories according to which the economy is described…

8 Autogression Model properties (adjusted $R^2 = 0.8199$, coefficient close to 1 – 0.999) stress the almost perfect correlation between v_t and v_{t-1}. Autocorrelation coefficient for v_t (all *t*) is 0.91.

> When the figures are bad… well, next ones may be good. You don't know if this is the beginning of a new trend. You keep very cautious. And if you look at the forecasts from the Planning Bureau, there is little difference between one forecast and the other. Things are very different here because, here, it is of great importance to get the new trends – and yet, like the others, we missed the [2008] crisis in the US. […]
>
> – When you said "you keep very cautious", what does it mean? Does it mean saying, when the figures look bad, that they might not be "that bad" and, likewise, when the figures look good, saying they might not be "that good"? Or does…
>
> – [Interrupting] Yes. Well, most importantly, in the case of the OECD and the Planning Bureau, because these institutions are carefully watched. And, when they release something about the US, they fear it will trigger a stock market crash. They want to avoid that. Their goal is not to spread panic. Things are different here because we are not a public institution – we don't bear responsibility to the general public. We assume liability to our investors. And we are under an obligation to warn them that things may turn very bad. Well, if that's our impression, we don't want to spread panic either, but we state "the risks are high". […] And our forecasts can change far more dramatically. Also, one reason for this is that our clients do not really look backwards. I do. I take a look at what I had forecasted three months earlier. But our clients don't give a damn: they get our forecasts once every three months and that's it. At the OECD, people are far more cautious when it comes to changing forecasts dramatically.
>
> Forecaster, French Bank, Dutch Citizen, born mid-1950s.

In addition to stating a testable hypothesis, the interviewee highlights the role of revisions as a means for forecasters to check their own work. As a practical category, forecast 'revisions' encompass a variety of situations, so that several proxies may capture their intensity. As numerical re-assessments of coming economic evolutions, their measure is three-fold:

1. A revision can first equate to the *deviation*, i.e. to the arithmetic difference, between the values v of forecast at time t and at time t-1: $(v_t - v_{t-1})$ – called below 'revisions' without any further specification.
2. The *squared deviation* allows studying the magnitude of revisions, whatever their sign: $(v_t - v_{t-1}/v_{t-1})^2$– designated below as 'squared revisions'.
3. Finally, *squared relative deviation* provide a same scale for all revisions and, accordingly, enables comparing them despite widely different face values:

Tab. 2: Distribution of Forecasts Revisions (Overview)[a]

	Mean	Median	Std Dev	Skewness	Kurtosis
Deviation	-0.08	0.00	0.55	-2.29	20.84
Squared Deviation	0.30	0.04	1.38	16.52	410.49

[a]Source: Forecasts Database subset

$(v_t - v_{t-1}/v_{t-1})^2$. However, as forecasters often anticipate unchanged macroeconomic situations (meaning $v_{t-1}=0$), using such an index poses difficulties.

Tabs. 2 and 3 expose the statistical distribution of forecasts revisions and squared revisions. Whatever the measure considered, forecasts revisions are not normally distributed. First, forecasters more often revise downward than upward (mean and skewness are both negative) and revisions concentrate around the mean (kurtosis is over 20 in the case of revisions, and over 400 in the case of squared revisions). The distribution of squared revisions is especially spectacular, whose median (0.04) almost equals the minimal value (0 per definition) – meaning half revisions belong to the interval [–0.2; 0.2]. However, more than one fifth of all revisions exceed 0.5 point in absolute value, and more than 1 in 15 exceed 1.0 point. The implementation of linear regression models deepens the understanding of the impact of forecasts properties on the magnitude of their revisions. Tab. 4 exposes the results of three models, which share the same dependent variable (above-defined forecasts revisions). Models 5–7 implement the

Tab. 3: Forecast Revisions by Type and Magnitude[a]

Type	Negative		Positive		Null		Total	
Magnitude	N	%	N	%	N	%	N	%
[0–0.5[	8,449	*34.15*	7,454	*30.13*	3,552	*14.36*	19,455	*78.64*
[0.5–1[	2,065	*8.35*	1,685	*6.81*			3,750	*15.16*
[1-max]	1,100	*4.44*	434	*1.75*			1,534	*6.20*
Total	11,614	*46.95*	9,573	*38.70*	3,552	*14.36*	24,739	*100*

[a]Source: Forecasts Database subset. With null revisions excluded, $\chi^2 = 195.11$, df = 2, p<2.2e-16

same method (OLS) as models 1–4, and dummies intervene in the same way. Tab. 5 displays the results from another series of linear regressions (models 8–10), which are identical to models 5–7 except for the dependent variable –then, squared revisions.

In a seemingly unsurprising manner, Tabs. 4 and 5 show that the higher the value of preceding forecasts, the larger their downward revisions. As to the distance to horizon, dummies hint at a partly non-linear effect, suggesting lower revisions occur on the shortest- (less than six months) and the longest-term (more than 18 months). Both tables stress the impact of macroeconomic conjuncture, as years 2008 and 2009 are associated to increased downward revisions (Tab. 4) and higher squared revisions (Tab. 5). Last but not least, all models show a close positive association between (either squared or not) revisions at time t and at time t-1. As mentioned earlier, this hints at a (more or less) deliberate forecast smoothing, but it also relates to the informational structure of forecasting and to the well-known difficulties to assess economic turns, during which actors encounter difficulties to reach diagnosis of either economic crisis or recovery. The relationship between forecasts revisions in t and t-1 partly reflects the release of new information which gradually confirms what previously appeared only as a possibility: In the end, data corroborates forecasters' previous judgments and interpretations.

More interestingly, Tabs. 4 and 5 provide little support to the aforementioned claim that 'public organizations' would be especially cautious as compared to the private banking system. Considering either revisions or squared revisions, public institutions differ from the other forecasting organizations by a tendency to revise their own forecasts more strongly. Conversely, professional forecasters more easily smooth their forecasts than institutional forecasters. This obviously contradicts the above-quoted forecaster. On the other hand, it reminds of what other forecasters state: "One forecaster told me that he smoothed his forecasts because a more accurate but jumpy forecast would 'drive his customers crazy.' President Carter indeed complained about the 'inconsistency' of his economic advisers, stating he was tempted to prefer the fortune teller at the Georgia State Fair. Another reader commented that too-quick forecast revisions would entail reversing decisions about investment plans too often." (Nordhaus 1987, 673) Besides supporting this claim, such results raise two additional

Tab. 4: Linear Regression Modelling of Forecast Revisions[a]

			Model 5	Model 6	Model 7
Forecasts	Country	Eurozone			0.030*
		France			n.s.
		Germany			0.052***
		Japan			n.s.
		United Kingdom			0.045***
		United States			*ref*
	Distance to horizon	0 to 5 months		-0.008***	*ref*
		6 to 12 months			-0.097***
		13 to 18 months			-0.079***
		19 to 24 months			n.s.
Forecasters	Bank	Major Bank			n.s.
		Other bank			*ref*
	Public institution				-0.071***
	Other organization				n.s.
Context	Year	2007		0.005***	-0.044*
		2008			-0.326***
		2009			-0.242***
		2010			n.s.
		2011			-0.101***
		2012			-0.131***
		2013			-0.073***
		2014			-0.195***
		2015			-0.173***
		2016			-0.156***
		2017			*ref*
	Previous forecast value	Q1		-0.039***	*ref*
		Q2			-0.166***
		Q3			-0.272***
		Q4			-0.455***
	Previous forecast revision		0.178***	0.217***	0.183***
Intercept			-0.069***	-0.105***	0.314***
Adjusted R-squared			0.0329	0.0467	0.1524
df			19,659	19,656	16,635
N			19,661	19,661	19,661

*Method: OLS. Signif. codes : ***: Pr. < 0.001. **: Pr. < 0.01. *: Pr. < 0.05.*
Note: The inclusion of the previous revision requires taking into account three successive forecasts, therefore excluding forecasts produced during Year 2006.

[a]Source: Forecasts Database Subset

Tab. 5: Linear Regression Modelling of Squared Forecast Revisions[a]

			Model 8	Model 9	Model 10
Forecasts	Country	Eurozone			-0.131***
		France			-0.163***
		Germany			n.s.
		Japan			0.156***
		United Kingdom			n.s.
		United States			*ref*
	Distance to horizon	0 to 5 months		0.021***	*ref*
		6 to 12 months			0.379***
		13 to 18 months			0.085**
		19 to 24 months			n.s.
Forecasters	Bank	Major Bank			n.s.
		Other bank			*ref*
	Public institution				0.263***
	Other organization				n.s.
Context	Year	2007		-0.057***	n.s.
		2008			0.720***
		2009			1.156***
		2010			0.155**
		2011			0.370***
		2012			0.129**
		2013			n.s.
		2014			n.s.
		2015			n.s.
		2016			n.s.
		2017			*ref*
	Previous forecast value	Q1		-0.085***	*ref*
		Q2			n.s.
		Q3			n.s.
		Q4			0.181***
	Squared previous forecast revision		0.139***	0.101***	0.061***
Intercept			0.284***	115.01***	-0.150**
Adjusted R-squared			0.0205	0.0422	0.0926
df			19,659	19,656	19,635
N			19,661	19,661	19,661

*Method: OLS. Signif. codes : ***: Pr. < 0.001. **: Pr. < 0.01. *: Pr. < 0.05.*
Note: The inclusion of the previous revision requires taking into account three successive forecasts, therefore excluding forecasts produced during Year 2006 (see Appendix A).

[a]Source: Forecasts Database Subset

issues for future research. It first requires explaining the discrepancies between forecasters' discourses: How come professionals from a same field hold so widely contrasting views of its functioning? Secondly, both discourses stress the importance of audiences to understand the process of forecasting. It challenges the usually admitted idea that forecasting is *solely* data-driven and instead suggests studying forecasts and forecasters in their broader social environment, taking into account the specific needs and demands of their own audience.

A further investigation of the institutional setting of forecasting implies defining revisions as 'events' rather than 'calculations'. Indeed, each forecast revision holds a singular meaning, with respect to its sign ('negative' or 'positive') and magnitude ('more or less than 0.5 point'). Some of these events are frequent enough to be modelled using logistic regression modelling (see Tab. 3). Each model then studies a specific binary dependent variable (coded 0/1): negative revisions (model 11), positive revisions (model 12), and revisions over 0.5 point (model 13). All models rely on Maximum Likelihood Estimation (MLE) and propose the same set of independent variables:

- Country (6 modalities: Eurozone, France, Germany, Japan, UK and US)
- Forecasted variable (2 modalities: GDP and Inflation)
- Distance to horizon (4 modalities: 0–5, 6–12, 13–18, and 19–24 months)
- Forecasting organization (4 modalities: major banks, other banks, public institutions, other organizations)
- Production year (12 modalities: 2006 to 2017)
- Forecast value in *t*-1 (4 modalities: quartiles by year)

Results from Tab. 6 are consistent with the preceding linear regression models. They do not support the hypothesis that banks would more likely overreact to new information in order to warn their clients of coming downturns, while public institutions would be more cautious to avoid spreading panic. Indeed, public institutions are more prone to revise their forecasts downward (model 11) and to revise them strongly (model 13) than any other organization in the panel. On the contrary, major banks lean toward rising successive forecasts, which further weakens the claim according to which they would mainly (or at least, more than other forecasting institutions) commit to alerting their clients

Tab. 6: Logistic Regression Modelling of Forecast Revisions (odds ratio)[a]

			Model 11 Dependent variable: Negative Revision	**Model 12 Dependent variable: Positive Revision**	**Model 13 Dependent variable: Abs. Revision ≥ 0.5 pt**
Forecasts	Country	Eurozone	0.745***	n.s.	0.531***
		France	0.851***	0.722***	0.544***
		Germany	0.599***	0.902*	0.784***
		Japan	0.823***	n.s.	n.s.
		United Kingdom	0.670***	n.s.	n.s.
		United States	*ref*	*ref*	*ref*
	Variable	GDP	*ref*	*ref*	*ref*
		Inflation	0.895***	n.s.	0.689***
	Distance to horizon	0 to 5 months	*ref*	*ref*	*ref*
		6 to 12 months	1.115**	1.086*	2.992***
		13 to 18 months	n.s.	0.847***	1.276***
		19 to 24 months	n.s.	0.739**	n.s.
Forecasters	Bank	Major Bank	n.s.	1.149***	n.s.
		Other bank	*ref*	*ref*	*ref*
	Public institution		1.523***	0.778***	2.051***
	Other organization		n.s.	n.s.	n.s.
Context	Year	2006	1.685***	0.560***	0.575***
		2007	0.619***	1.394***	0.606***
		2008	1.573***	n.s.	3.945***
		2009	n.s.	1.200**	3.367***
		2010	0.490***	2.021***	n.s.
		2011	0.781***	1.791***	2.696***
		2012	*ref*	*ref*	*ref*
		2013	n.s.	n.s.	0.601***
		2014	1.738***	0.639***	0.618***
		2015	1.541***	0.684***	0.664***
		2016	1.351***	0.720***	0.730***
		2017	0.563***	1.834***	0.264***
	Previous forecast value	Q1	*ref*	*ref*	*ref*
		Q2	1.815***	0.529***	0.668***
		Q3	2.764***	0.346***	0.665***
		Q4	5.686***	0.169***	1.194***

Tab. 6: Continued

	Model 11 Dependent variable: Negative Revision	Model 12 Dependent variable: Positive Revision	Model 13 Dependent variable: Abs. Revision ≥ 0.5 pt
Intercept	0.272***	2.449***	0.214***
Pseudo R^2 (MacFadden/ Nagelkerke)	0.0927/ 0.1605	0.0889/ 0.1518	0.1445/ 0.2156
Confusion Matrix Accuracy	64.84 %	66.70 %	79.87 %
df	24,712	24,712	24,712
N	24,739	24,739	24,739

*Method: MLE. Signif. codes : ***: Pr. < 0.001. **: Pr. < 0.01. *: Pr. < 0.05*

[a]Source: Forecasts Database Subset

of coming economic bursts (model 10). Distance to horizon as well as production year also bear salient outcomes. First, the distance to horizon once again hints at a non-linear temporality in forecasting. Indeed, the 6 to 12-month-ahead period is the most closely associated with forecast revision, whatever its sign, as well as, by far, with stronger revisions. Secondly, considering odds ratio, 2008 and 2009 appear as years during which forecasts underwent massive revisions. Yet, while many negative revisions occurred in 2008, the following year 2009 is associated to positive revisions. Interestingly, odds ratio for positive revisions are not significant in the case of 2008, neither are those for negative revisions in the case of 2009. This contrasts with all other years included in the analysis, for which a negative association (odds ratio <1) with one particular type of revisions (either positive or negative) comes along a positive association (odds ratio >1) with the other. That more upward (respectively, downward) forecast revisions than expected occurred in 2009 (respectively, 2008) does not mean that, the same year, fewer downward (respectively, upward) revisions were observed. It reminds that moments of economic crises jeopardize former conventions and habits, thus opening the field of possibilities: Both deep recession and dazzling recovery seem possible, if not likely.

6. Discussion and Conclusion

These early results shall be considered with caution. They require consolidation through further analyses. In particular, testing hypotheses on smaller subsets would allow restraining the analysis to one country at a time, excluding some years, and would therefore prevent an overdetermination of statistical results by some singular socio-historical configurations. Besides, factor analyses would enable studying forecast revisions with a different stance, emphasizing a '*mutatis mutandis*' rather than a '*ceteris paribus*' perspective to shed light on the congruence and correlation between variables.

The inquiry however highlights some features of forecasters' work. First, and unsurprisingly, forecasting is partly data-driven. Indeed, forecasting organizations do not hold an instrumental role *per se*. The homogeneity of models and methods amongst organizations demonstrates the similarities of economic reasoning across the world of forecasting. Economic information is treated in such similar ways that little differences arise between forecasting organizations. Forecast revisions trace shifts in expectations and representations of the future, whether major or minor. Mostly are they nothing but adjustments, which marks the incorporation of new, though sometimes significant, data. Studying the kind of data leading to such changes is a promising lead for further research, as it may enable investigating the categories of thought according to which forecasters apprehend the economy. Forecasters have to identify what is supposedly relevant within a plethoric and ever-growing economic information, so that not all data can serve as input to econometric models. The analysis of how forecasters select information, and how their selection principles evolve across time, would give the opportunity to understand macroeconomic thinking in the making and, eventually, to study together both the narrative and calculative dimensions of forecasting. How expectations form and change arises from the dynamics of forecasting, i.e. from forecasters' working practices, which involve the tasks of selecting, questioning, interpreting and incorporating newly available economic information to produce forecasts for a certain type of clientele or audience. In the end, expecting means revising, adjusting, or updating former expectations.

Paying attention to forecast revisions also emphasizes a two-fold non-linearity of economic forecasting. Obviously, it first reflects the non-linearity of economic evolutions, especially in the case of crises and downturns, by definition disruptive. The Lehman Brothers collapse and its aftermath led to huge forecast revisions, especially during years 2008 and 2009. Secondly, it has to do with the very nature of forecasting and economic expertise. One would expect the distance to horizon to be inversely related to the amount of available economic information, so that most forecast revisions would happen in the final months, when it accumulates and grows more precise. The collected data highlights on the contrary that forecasts revisions are more likely to occur earlier during the sequence of forecasting. Everything goes as if the main features of macroeconomic forecasts were fixed between six and twelve months prior to the horizon, leaving just some details to set. In line with an informational perspective on forecasting, it raises questions as to the nature of the economic data that is made available at that precise moment. Altogether, these results remind that the time is not a continuous but a discreet variable, whether in the economy or within economics.

A Durkheimian perspective on economic evolutions provides a theoretical frame to understand how fictions about the economy change. "Crises," Durkheim writes in his seminal study on *Suicide*, "[are] disturbances of the collective order" (Durkheim 2005, 206). Such 'anomy,' as he names it, has widespread consequences.

> The [social] scale is upset; but a new scale cannot be immediately improvised. Time is required for the public conscience to reclassify men and things. So long as the social forces thus freed have not regained equilibrium, their respective values are unknown and so all regulation is lacking for a time. The limits are unknown between the possible and the impossible, what is just and what is unjust, legitimate claims and hopes and those which are immoderate. Consequently, there is no restraint upon aspirations.
>
> (Durkheim 2005, 213)

That forecast revisions, in times of crisis, go both upwards and downwards seem to confirm the Durkheimian intuition of a widening range of possibilities. Major crises contribute to (re-)open the future, by making possible or thinkable what was not. Fictions, i.e. representations of the future, change. Again, switching narratives eventually alter point forecasts.

Yet, another complimentary way to draw on such an argument instead considers the combination of downward and upward revisions of forecasts as a way to keep the future unchanged. Forecasters indeed distribute and, through the notion of 'horizon', categorize a continuous time into discreet temporalities (short-, medium- and long-term), and assign each of them to differing explanatory models. Investigating forecasters' practices shows that each horizon involves a singular bundle of concepts and techniques. The analysis of economic conditions in the last few months of an on-going year makes use of economic data about the first quarter or semester of the same year, which have then been made public by national statistical agencies. Conversely, economic conjuncture cannot take part in longer-term forecasting, which provides statements about economic structures – Non-Accelerating Inflation Rate of Unemployment (NAIRU), potential GDP, or potential growth are then crucial notions. Revising long-term forecasts therefore means re-investigating how economic structures translate into numbers. Provided that, in times of crisis, downward revisions are more closely associated to short-term forecasts and upward revisions to medium-term forecasts, their combination brings about a same depiction of the long-term economic future as prior to the crisis. In this perspective, crises are nothing but temporary perturbations. Medium term would then matches what Durkheim defines as the "required time to regain equilibrium." In times of crisis, fictions about the economic future, for the shaping of which forecasting is instrumental, change dramatically. Yet, forecasters still share a same belief: that, in the long run, equilibrium will prevail, and that the potential output will only slightly change. In this respect, economic theories would operate less as "instruments of imagination" fueling actors' imagination (Beckert 2016, 245–68) than as constraints restraining forecasters'.

Appendix A: Forecasts Publication Date

Tab. 7: Source: 'Forecasts Database'

	Consensus Forecasts	CBO Budget and Economic Outlook	EC Economic Forecasts	IMF World Economic Outlook	OECD Economic Outlook
2006	Sept./ Dec.	Aug.	Nov.	Sept.	Jun./ Dec.
2007	Mar./ Jun./ Sept./ Dec.	Jan./ Aug.	Feb./ May/ Sept./ Nov.	Mar./ Sept.	Jun./ Dec.
2008	Mar./ Jun./ Sept./ Dec.	Jan./ Sept.	Feb./ May/ Sept./ Nov.	Mar./ Sept.	Jun./ Sept./ Dec.
2009	Mar./ Jun./ Sept./ Dec.	Jan./ Mar./ Aug.	May/ Sept./ Nov.	Mar./ Sept.	Mar./ Jun./ Sept./ Nov.
2010	Mar./ Jun./ Sept./ Dec.	Jan./ Aug.	Feb./ May/ Sept./ Nov.	Mar./ Sept.	May/ Nov.
2011	Mar./ Jun/ Sept.	Jan./ Aug.	Feb./ May/ Nov.	Mar./ Sept.	May/ Nov.
2012	Jan./ Mar./ Jun/ Sept./ Dec.	Jan./ Aug.	May/ Nov.	Mar./ Sept.	May/ Sept./ Nov.
2013	Mar./ Jun./ Sept./ Dec.	Feb.	Feb./ May/ Nov.	Mar./ Sept.	May/ Sept./ Nov.
2014	Mar./ Jun./ Sept./ Dec.	Feb./ Aug.	Feb./ May/ Nov.	Mar./ Sept.	Sept./ Nov.
2015	Mar./ Jun./ Sept./ Dec.	Jan./ Aug.	Feb./ May/ Nov.	Mar./ Sept.	Mar./ Jun./ Sept./ Nov.
2016	Mar./ Jun./ Sept./ Dec.	Jan./ Aug.	Feb./ May/ Nov.	Mar./ Sept.	Feb./ Jun./ Sept./ Nov.
2017	Mar./ Jun./ Sept./ Dec.	Jan./ Jun.	Feb./ May/ Nov.	Mar./ Sept.	Mar./ Jun./ Sept.

Appendix B: Panel Overview

Tab. 8: Source: 'Forecasts Database' Subset

Variable and Modalities	N	%
Country	**29,713**	**100**
Eurozone	5,538	18.6
France	4,109	13.8
Germany	5,570	18.7
Japan	4,153	14.0
United Kingdom	4,876	16.4
United States	5,467	18.4
Macroeconomic Aggregate	**29,713**	**100**
GDP	14,988	50.4
Inflation	14,725	49.6
Distance to Horizon	**29,713**	**100**
0 to 5 months	7,313	24.6
6 to 12 months	10,692	36.0
13 to 18 months	7,621	25.6
19 to 24 months	4,087	13.8
Forecasters	**29,713**	**100**
Major Banks	7,137	24.0
Bank of America – Merrill Lynch	1,026	3.5
Citigroup	910	3.1
Crédit Suisse	530	1.8
Goldman Sachs	1,004	3.4
HSBC	899	3.0
JP Morgan	726	2.4
Morgan Stanley	654	2.2
UBS	868	2.9
Unicredit	520	1.8
Other banks	8,997	30.3
Public institutions	2,096	7.1
Congressional Budget Office	92	0.3
European Commission	736	2.5
IMF	550	1.9
OECD	718	2.4
Other organizations	11,483	38.6

Tab. 8: Continued

Variable and Modalities	N	%
Production year	**29,713**	**100**
2006	1,342	4.5
2007	2,647	8.9
2008	2,643	8.9
2009	2,514	8.5
2010	2,506	8.4
2011	1,896	6.4
2012	3,107	10.5
2013	2,658	8.9
2014	2,684	9.0
2015	2,779	9.4
2016	2,792	9.4
2017	2,145	7.2

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