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Working Paper
2009-25

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LESSONS FROM PROFESSIONALS' VIEW

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December 2008

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Abstract - Semi-annual surveys carried out by J. Livingston on a panel of experts have enabled us to compute the expected returns over the time span 1-semester and 2-semesters ahead on a portfolio made up of US industrial stocks. We calculated about 3000 individual ex-ante equity risk premia over the period 1952 to 1993 (82 semesters) defined as the difference between these expected stock returns and the risk-free forward rate given by zero coupon bonds. Unlike any other study, our contribution is to analyse premia deduced from surveys data, at the micro level, per date and over a long period. Three main conclusions may be drawn from our analysis of these ex-ante premia. First, the mean values of these premia are closer to the predictions derived from the consumption-based asset pricing theory than the ones obtained for the ex-post premia. Second, the experts' professional affiliation appears to be a significant criterion in discriminating premia. Third, in accordance with the Arbitrage Pricing Theory, individual ex-ante premia depend both on macroeconomic and idiosyncratic common factors: the former are represented by a set of macroeconomic variables observable by all agents, and the latter by experts' personal forecasts about the future state of the economy, as defined by expected inflation and industrial production growth rate.

***JEL classification* : D81 ; D84 ; E44 ; G12 ; G14**

***Key words:* stock price expectations, equity risk premium, survey micro data**

THE DYNAMICS OF U.S. EQUITY RISK PREMIA:

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1 - Introduction

The equity risk premium is a critical input planning decision, in particular for pension funds and retirees. From a practical point of view, due to the fact that the key input in asset allocation models (e.g. the CAPM) is the value for the equity risk premium, the mainstream theories are rather inoperative without a good estimate of the equity premium. As portfolio decisions are based on the expected (or ex-ante) risk premium, and because the investment implication of the premium may depend on why it gets its expected value, a thorough understanding of this magnitude and of its factors are key points for financial economists. Moreover, as underlined by Graham and Harvey (2003), the equity premium has a large quantitative impact on the equities level: a one percent shift in the equity risk premium could add or subtract \$ 1 trillion (i.e. \$ 10^{12} millions) to the US stock market value.

In the literature, the stock market risk premium is traditionally estimated using long-term historical average of excess stock returns (i.e. the mean of the ex-post equity premia) with respect to the risk-free rate. However, as illustrated with the famous "*equity premium puzzle*" debate initiated by Mehra and Prescott (1985), these historical averages (about 6-7% per year in the US market) are much too large compared to the predictions from Lucas' consumption-based asset pricing model (about 1-2% per year). Interestingly, Fama and French (2002) suggest an explanation: because actual returns include "*large unexpected gains",* the observed equity returns over the past half-century are higher on average than expected returns. If it is true, this implies that using historical averages of excess stock returns is misleading to estimate the ex-ante premium. This is a key point: contrary to the ex-post premium, the ex-ante premium is conditional on the information available at time *t* when agents choose the structure of their portfolios. It may be viewed as the premium that necessarily arises out from the actual decision-making process. Fama and French provide empirical evidences using fundamentals based on the Gordon-Shapiro stock valuation formula. This last one defines the ex-ante risk premium as the sum of the dividends yield (S&P 500) and the historical rate of growth in dividends (as a proxy of the expected long term growth rate) minus the risk-free bonds yield. For the 1951-2000 period, they found that the annual ex-ante equity premia range between 2.5% and 4.3%. These values are significantly lower than the historical average of excess stock returns: as estimated in particular by Ibbotson and Chen (2001), averages range between 4 and 6% over the second half of the 20^{th} century. Other debates in the literature concern the time varying character and term structure equity risk premia. As we will show later, authors strongly suggest that risk premia are both time varying and horizon dependant.

Overall, for a given value of the equity risk premium, four main questions arise: is it an ex-post or an ex-ante magnitude? If it is an ex-ante one, how to measure it? At what date it is observed? What is the time-horizon of the underlying investment decision? Moreover, a last but not least point relates to the fact that, since the market premium is based on the forecasts made by market participants, it is worth considering the characteristics and the factors of ex-ante premia at the individual level. This paper analyses individual and time varying ex-ante risk premia worked out for an industrial portfolio in the US stock market over the time span horizon 1-semester to 2-semesters ahead. These premia are defined by the difference between the expected returns of this portfolio issued from surveys and the risk-free rate over the same horizon. As shown later, using expected stock returns revealed from surveys is not new in the literature. However, no other study analyses per date over a long period and at the microeconomic level the premia deduced from the Livingston surveys. By generating about 3000 individual ex-ante risk premia over the 41-year period between 1952 and 1993, this paper analyses straightforwardly the factors that drive their dynamics.

The structure of the paper is as follows. Part 2 provides a review of the literature that investigates the concept of ex-ante risk premium and its empirical analysis. Part 3 deals with measuring and describing the statistical properties of ex-ante premia as inferred from stock price forecasts provided by the Livingston surveys. Based on the conditional APT framework, Part 4 aims to identify which factors determine the dynamics of these ex-ante premia. Concluding remarks follow in the final section (Part 5).

2 – Ex-ante equity risk premia in the literature: concepts and empirical results

The first heading deals with the link between the basic concept considered in this paper, namely the individual equity risk premium, and the relevant concept in stock valuation models, namely the market risk premium. The second heading relates to whether risk premia should be viewed as ex-ante or ex-post magnitudes. The third heading shows that equity risk premia may be viewed as either long-term or short-term phenomena. The fourth heading describes the main empirical approaches and results found in the literature related to ex-ante equity risk premia.

2.1 – From individual risk premia to the market risk premium

To clarify the link between individual risk premia and the market risk premium, let us consider the market of a given equity. At time t, an agent whose required ex-ante premium[1] is greater than the market excess return will sell stocks in order to buy the risk-free asset, whereas another agent whose required premium is lower than the market excess return will sell the risk-free asset and buy stocks. If stocks sellers and risk-free asset purchasers are more numerous than agents having opposite positions, then the price of the stock will drop whereas the price of the risk-free asset will rise. This implies both an increasing stock return and a decreasing risk-free rate, resulting in a higher market excess return. Consequently, the number of stocks sellers goes down whereas the number of risk-free asset purchasers increases. Market equilibrium will be reached when supply matches demand for both kinds of assets. This occurs when the weight of agents having required premium greater than the market excess return offsets the weight of the agents whose required premium is lower than the market excess return. At this point, there is no arbitrage opportunity between stocks and the risk-free asset, and prices are such that the average of the individual required ex-ante risk premia equals the market excess return, which then represents the ex-ante market risk premium.[2] If the market is efficient, the adjustment described above is instantaneous. This shows that, if at any time a survey asked all market participants to disclose their expected stock return, we would be able to measure the ex-ante market premium using the average of the ex-ante individual premia, and this suggests that our approach makes sense, although our sample does not obviously represent all market participants.

2.2 – Ex-ante versus ex-post risk premia

Ex-ante market risk premia differ from ex-post risk premia mainly analysed in the literature. Unlike ex-ante premia, ex-post premia are deduced from the return observed between t and t+1 and not from the return expected between *t* and *t+1*. The ex-post representation implies both theoretical and empirical limitations. On the theoretical ground, investors being unable to use ex-post premia to make their financial choices at time t, this magnitude cannot be regarded as a decision-making concept, unless the perfect foresight hypothesis holds, in which case the returns expected at time *t* for *t+1* do exactly match the returns observed ex-post between time t and t+1. However, it is clear that there is no risk premia in such a set-up, so that the ex-post excess return cannot be viewed as a risk premium. Considering now the rational expectation hypothesis (REH), the ex-post premium appears to be the rational ex-ante premium plus a white noise representing the ex-post forecasting error. In this instance, because the rational return expectation is unknown, trying to measure ex-ante premia is subject to ad-hoc assumptions about how rational expectations are formed. Empirical evidences shows that because of excessively large error terms, the values of ex-post premia are almost often as negative as positive and this is somewhat disconcerting and likely to generate severe econometric biases, in particular when errors are not white noises (among others, see Mpacko-Priso (2001)). Moreover, experts' expected returns derived from Livingston's surveys convey systematic forecast errors (Abou and Prat (1997)), suggesting to model ex-ante premia without assuming the REH.

2.3 – Equity risk premium: long-term view versus short-term view

Should equity risk premium be viewed as a long-term or a short-term phenomenon? Two points must be distinguished. The first one relates to the relevant time-horizon for the expected premium. Interestingly, Barberis (2000) builds optimal portfolios made up of stocks and bonds quoted on the US market. He shows that, taking into account predictable features of stock returns, the optimum is reached by 40% of stocks for a one-month time horizon and by 100% of stocks for a 10-year time horizon. This result helps to understand why risk premia may be viewed both within a long-term time horizon and within a short-term horizon. In fact, when returns are partially predictable on the basis of their past values and/or macroeconomic variables, agents do not require a unique risk premium but a set of premia scaled by the time horizon.[3] So, as shown below, it is likely to find a term structure for ex-ante equity premia based on survey data about stock price expectations (see Welch (2000), Prat (2001)).

Bounded although distinct from the former, the second point concerns the frequency to which it is relevant to observe the equity premium. The long-term view refers to the well-known debate about the "*equity premium puzzle*": with reasonable preference parameters values, that are the risk aversion coefficient and the subjective discount factor, theoretical risk premia inferred from the consumption asset-based general equilibrium model are far too low (about 1-2% a year) as against observed market premia, which stand about 6% a year on average (Mehra and Prescott (1985)). According to this calibration approach, the risk premium is viewed as a long-term phenomenon since historical averages over many years are considered. It is worth noting that, after many unsuccessful attempts published in the literature[4], Benartzi and Thaler (1995) suggest solving the *premium puzzle* by assuming that long-term investors typically adopt myopic behaviour when measuring the returns of their portfolios. They found that long-term investors measure returns over a period of less than one year: this "*mental accounting hypothesis"* is shown to be a valuable explanation in solving the *puzzle*. It suggests that analysing short-term dynamics of premia makes sense even when long-term investors are involved, which further clarifies the numerous studies found in the literature that analyse risk premia' short-term movements. For instance, French et al. (1987) showed that monthly risk premia fluctuations on the US stock market are partly driven by ARCH effects. Again, De Santis and Gerard (1997) analysed the factors explaining the short-term dynamics of premia by using a conditional multivariate Capital Asset

Pricing Model. Moreover, as regards passive and active mutual funds portfolios, Kryzanowski et al. (1997) pointed out how relevant the Conditional Arbitrage Pricing Theory is to account for monthly premia fluctuations on the Canadian stock market.

As a matter of fact, the literature strongly suggests that it is relevant studying premia dynamics both as a long-term and a short-term phenomenon. In this paper, these two aspects are taken into account. Using the Livingston survey's semi-annual data to compute individual forward ex-ante premia over the time span 1-semester and 2-semesters ahead, we examine over 41 years altogether the long-term historical averages and variances, the discrepancy between agents and the factors of the dynamics of the premia.

2.4 – Ex-ante market risk premium as measured in the literature: backward versus forward approaches

Generally speaking, an ex-ante premium is defined by a given representation of the expected return at time *t* for a future time horizon. Two ways of measuring ex-ante premia follow from the literature. Whether assuming a simple or a complex expectational process, the first approach is backward looking since the expected return depends on the historical values of returns and/or other observable variables.[5] The second approach is forward looking since it relies on stock prices forecast survey data and does not require any hypothesis on the underlying expectational process.

Many studies in the literature use lagged predictors to forecast the excess equity returns: dividend yield, earnings price ratio, short-term interest rate, payout ratio, term and default spread, inflation rate, book-to-market ratio, consumption and wealth, etc. As a result, no robust predictors are found. In particular, Goyal and Welch (2003, 2006) used most of afore mentioned predictors and could not identify one that would have been robust enough for forecasting the equity premium. This is probably the main reason explaining why the usual method to estimate the ex-ante equity risk premium is to extrapolate historical averages of the difference between returns of the stock market portfolio and a risk-free debt rate. For example, Ibbotson Associates (2006) consider that the relevant historical premium is 7.1% during the period 1926-2005. Siegel (2005) shows that the premium was substantially lower during the periods 1802-1870 (3.17%) and 1871-1925 (3.99%). Dimson, Marsh and Staunton (2003) put into evidence that premia were generally higher during the second half of the 20th century. These estimations seem to be particularly widespread according to the averaged period, underlying the weak power of historical averages to inform about future values. Booth (1999) shows that the magnitude of the error implied by using the historical equity premium as an estimate of the expected equity premium is rather substantial, while Shiller (2000) points out that *"the future will not necessarily be like the past".* These empirical evidences lead Fernandez (2006, p.12) to conclude that "*the historical equity premium change over time and it is not clear why capital market data from the 19th century or from the first half of the 20th century may be useful in estimating expected returns in the 21st century …the historical equity premium is not a good indicator of the expected equity premium".*

These difficulties led Fama and French (2002) to suggest another approach to measure the ex-ante equity premium. These authors inferred ex-ante premia on the US stock market (S&P index) from the present value model. They assume that at any time *t*, both the risk-free rate and the expected growth rate of dividends (or earnings) per share would remain unchanged no matter the future time span; these restrictive hypotheses led them to use the well-known dividends discount model (DDM) formula proposed by Gordon where the expected rates of growth in dividends (earnings) and the riskless rate are inferred from historical mean values of dividends (earnings) and interest rate, respectively. For the period extending from 1951 to 2000, Fama and French found a mean premium around 2.5% a year, a value which is close to the one predicted by the consumption-based asset-pricing model. Study by Harris and Marston (2001) is particularly original since the authors introduce in the DDM model the expected earnings issued from surveys to estimate an ex-ante long term market risk premium for US stocks (S&P 500) over the period 1982-98 (annual averages of monthly data). The authors considered the five years ahead expected growth in earnings per share issued from financial analysts as a proxy of the long run expected growth rate in dividends. The average market risk premium is found to be 7.14% above yields on long-term US government bonds. This value seems to be too high since it joins the *equity premium puzzle.* However, the period is not large enough to allow a reliable conclusion on this point. Interestingly, the authors show strong evidence that the risk premium change over time. A significant part of these dynamics may be explained either by the level of interest rates or by readily available forward-looking proxies for risk as the spread of interest rates, the consumer confidence index reported by the Conference Board, the degree of discrepancy between financial analysts' forecasts, or the implicit volatility issued from options prices. However, a well-known limitation of approaches based on the DDM is that it relies on the restrictive hypothesis that both the risk-free rate and the expected growth rate in dividends (or earnings) remain unchanged over an infinite time horizon.

The second way of measuring ex-ante premia avoids this restriction since it is based on a forward looking approach using experts' forecast survey data for stock prices to measure expected stock returns.[6] Within a finite time horizon framework, this approach is not based on historical excess stock returns, but on excess returns expected for a given horizon. Although ex-ante premia may be viewed as a decisional concept, one can always question how representative surveys-based expected risk premia are of market views; in particular, these premia probably tell us hoped-for excess returns as much as required returns. However, with respect of the backward looking approach, the forward looking one is less restrictive since it consists in getting rid of the arbitrary hypothesis concerning how expectations are formed. Moreover, in comparison with the DDM approach reviewed above, it does not assume a constant long-term growth for future dividends.

In this perspective, the paper by Welch (2000) intends to measure the consensus (average) of the expected equity risk premium in the academic profession (finance professors) at October 1997, for time horizons of 1, 5, 10 and 30 years. This measurement is given by the difference between the mean of 226 academic financial economists' forecasts in stock returns (S&P 500) and the equivalent horizon bonds yields. The author found that, for the one-year horizon, the consensus is 5.8% per year with a 2.4% standard deviation but that, in average, short-term premia are lower than long-term premia. The academic profession appears not to have a consistent opinion concerning whether the risk factors as size, book-market, price-earnings or momentum are likely to be useful for portfolio selection in the future. Another interesting result comes from the question asked whether economists believe or not in arbitrage opportunities – i.e. the ability to make money without risk. Apparently, the respondents did pay attention and marked a strong view in favor of the absence of arbitrage opportunities. Our approach to identify risk premia factors will keep in mind this result. Welch (2001) extends these results to a survey (dated August 2001) of 510 finance and economics professors. He found that the consensus forecast for the one-year equity premium ranges from 3% to 3.5%, that is considerably lower than the results exhibited by Welch (2000) for the October 1997 survey, suggesting that equity risk premium is a time varying phenomenon.

Graham and Harvey (2001, 2003, 2005, 2007) present a set of studies about the expected equity premia defined as the difference between the experts' mean expected stock returns and an equivalent horizon bonds yields. These studies are based on quarterly surveys conducted since June 2000 by Duke University and CFO Magazine. It concerns stock market returns expected by about 270 anonymous Chief Financial Officers (CFOs) of U.S. corporations. In their paper dated 2001 (resp. 2003), authors consider the values of premia from the second quarter 2000 (resp. second quarter 2003) through the third quarter of 2001 (resp. third quarter 2004). They found that, in contrast with the 10-year expected risk premium, the one-year risk premium is highly erratic through time (averages between 1.3 and 6.6% depending on the quarter surveyed). This confirms the results obtained by Welch. In the context of the capital asset pricing model, the market risk premium should reflect the price of risk (the market risk aversion) and the amount of risk (the stock market volatility). Accordingly, the surveys ask questions designed to determine CFO's assessment of market volatility. It finally appears to be much lower than usual alternative measures.

In a cross-section of individual data, the authors also check if, as predicted by the asset pricing theory, there is a positive trade-off between expected returns and ex-ante volatility. They found no significant relation between expected returns and the variance at the one-year horizon, but a strong positive relation at the ten-year horizon that is consistent with asset pricing theory. To check if there are systematic differences in expectations based on firms' characteristics, they use information on each respondent's industry, size, number of employees, headquarters location, ownership and percentage of foreign sales. They conclude that the null that firms' characteristics have no impact on market-wide expectations may not be rejected.

In their paper dated 2005 (resp. 2007), Graham and Harvey examine over the period June 2000 to June 2005 (resp. November 2006) the ex-ante US equity risk premium measured over a 10-year horizon relative to a 10-year treasury bond. While the survey asks for both the one-year and ten-year expected returns, authors focus on the ten-year premium. The average risk premia ranges between a minimum of 2.88% and a maximum of 4.65 % per year (mean 4.68% and standard deviation 0.52%). These outcomes conform to the study by O'Neil, Wilson and Masih (2002) who used a survey conducted in July 2002 by Goldman Sachs for its global clients: they found that the average long-run expected risk premium was 3.9%, most values ranging from 3.5% to 4.5%. Graham and Harvey also examined the discrepancies between individual premia measured by the standard deviation across experts for each quarter: over the study period they found a mean of 2.35% with a standard deviation of 0.25%. Finally, the authors examine the determinants of the long-run risk premium. They found that, although premia are not influenced by one-year ago stock returns and past price-earning ratios (S&P 500), there are positive correlations between the ex-ante risk premium in one hand, and both the real interest rates (as reflected in Treasury Inflation Indexed Notes) and the implied volatility on the S&P 100 index options, on the other hand. However, as underlined by these authors, with only 20 observations, it is difficult to consider these results to be robust.

Ilmanen (2003) makes his own survey in April 2002 to explore several issues concerning the long-run expected return of stocks over government bonds. The experts are global bond investors asked on future long-term equity market returns. For the United States the author found a mean forecast of 7.6% over the next decade. Compared with the bond yields (5.2% in average), this implies a mean risk premium of 2.4 % per year. This result is in line with Graham and Harvey who found a 10-year ahead risk premium of 2.7 % at the second quarter 2002, and this convergence between risk premia exhibited by different surveys at the same date is reassuring concerning the significance of the surveys approach.

Park (2006) used stock price forecasts issued from surveys conducted by J. Livingston to construct experts' ex-ante equity risk premia on the US market. As far as we know, no other study in the literature uses these data to analyze equity premia. By comparison with the above-mentioned studies, the main advantage of these survey data stands in that they have been conducted on a semi-annual frequency basis since 1952. The author refers to the previous contribution by Cechetti et al. (2000), which relate to the debate about the "*equity premium puzzle*". What Cechetti et al. (2000) demonstrated was that, in contrast with what ensues from REH, introducing distorted expectations in the consumption-based asset pricing model (Lucas (1978)) helps to solve not only this puzzle, but also the “volatility puzzle” and other well known stylised facts on stock returns or risk premia. Cechetti et al. (2000) justify the distorted expectations hypothesis due to the cost involved in processing information, leading rational agents to sidestep the relevant method for making forecasts, as « *individuals find it too costly to acquire the skills to do maximum-likelihood* ». Accordingly, agents tend to use a less accurate but cheaper predicting method: « *instead, they respond by using rules of thumb* ». Assuming a CRRA utility function with reasonable values for the risk aversion coefficient (<10) and for the discount rate, and using expectations from the Livingston panel, the authors showed that agents are pessimistic during periods of prosperity (i.e. expected stock returns are lower than their values under REH), and optimistic during periods of recession (i.e. expected stock returns are greater than their values under REH). Using expected stock returns calculated from the Livingston survey, which show biases similar to those exhibited by Cechetti et al. (2000), Park (2006) confirmed that distorted expectations solve the *equity premium puzzle.* He showed that the theoretical values of Sharpe's ratios based on the Cechetti et al. (2000) model have the same statistical properties as those worked out from the Livingston panel.[7] Note that it is not the case with the Campbell and Cochrane (1999) model, which integrates habits in the Lucas consumption-based framework. Obviously, these results led us to pay special attention to ex-ante premia as inferred from Livingston’s surveys.

While Park’s approach is based on the analysis of the first moment of the distribution of equity premium, Prat (1996, 2001) focused on how to explain time series of aggregate ex-ante premia derived from Livingston’s consensus relating to stock price expectations. Prat’ study showed that aggregate premia are influenced by macroeconomic variables such as inflation, production growth and consumer sentiment. In the present study, we aim to broaden this last approach by evaluating the relative impact on risk premia for various levels of explanation, i.e. the macro and micro levels, as well as the group-level defined by experts' professional affiliation, and this approach is groundbreaking as regards the literature.

3 – Ex-ante individual equity risk premia in the US stock market using Livingston' surveys

3.1 - Measuring individual ex-ante risk premia

We consider individual stock market premia for a panel of experts who have answered the surveys managed by Joseph Livingston since 1952 with the support of the Philadelphia Federal Bank.[8] Premia are those associated with the US Standard and Poor's 400 Industrial stock price index. For a given agent, the expected return of this equity portfolio is inferred from semi-annual surveys processed in June and December. From June 1952 to December 1989, these surveys gave the 1-semester and 2-semesters ahead forecasts for the S&P 400 industrial index.[9] Beginning with the survey dated June 1990, the questions refer to the S&P 500 composite index that includes the 400 industrial securities. As these two indexes are highly correlated with a stable regression coefficient over the years 1987-89, it is possible to link up the 500 index values over the period from June 1990 to December 1993 to the 400 index values by using a stable coefficient of proportionality for both observed and expected indexes.

Each sample reports the answers given by 50 to 70 economic and financial experts belonging to various professional affiliations that are divided into five groups: universities (identified by the letter "U"), commercial banks ("C"), investment banks ("I") and non-financial firms ("N"). A last group ("A") stands for experts belonging to various administrations (US government, Unions, etc.).

Assuming that experts' opinions reflect without bias investors' opinions is presumably a rather strong hypothesis. However, various reasons suggest that it is safe to say that their answers provide a proxy for investor's opinions. First, we must only assume that for a given expert, the expected stock returns constructed from the "disclosed opinion"- i.e. the expert's answer - equals the "true opinion", namely the one that would prevail without agency or conflict of interest problems, plus a white noise. This hypothesis is less restrictive than the equality between both magnitudes and, using pooled data, the biases between individuals for each survey may be offset. Second, the Livingston panel represents leading institutions that influence other major operating agents significantly intervening in the volume of transactions in the US stock market (see Lakonishok (1980), p.922). This lessens the problems that may arise from an agency bias. Third, a specific bias may arise from conflicts of interest since any expert should give strategic answers that do not disclose his own opinions. However, interestingly, each individual answer remains confidential and does not significantly affect the consensus, as the average weight of each expert in the whole sample is less than 2%. Fourth, Abou and Prat (2000) have specified a model combining the traditional extrapolative, regressive and adaptive processes that may represent individual stock price expectations as revealed by Livingston's surveys. Although these expectations do not conform to the rational expectation hypothesis (see Abou and Prat (1997)), they nevertheless appear to be generated by an identifiable process. This result points to consistent behaviour at work behind the experts' opinions. On the whole, these arguments will probably attenuate the question of measurement biases.

Using Livingston's data, we consider the *forward* ex-ante risk premium $z_{i,t}^{f}$ defined as the premium relating to an industrial portfolio required by expert *i* at time *t* for the future time span [*t+1*, *t+2*].[10] This forward specification - noted by exponent *f* - precludes measurement errors that might occur if premia for the time span [*t*, *t+1*] were considered. As a matter of fact, this last specification would involve knowing the precise value of the S&P 400 index (i.e. the base index) involved by forecasters at the time they make their forecasts. Unfortunately, because the June and December survey questionnaires are sent in early May and November, individual answers come in dribs and drabs between May-June and November-December. As a result, we cannot know for sure when each answer were given, so that individual base indexes remain unidentified. Those loose ends explain why we will consider a forward specification.

Over the 83 semesters during the 41-year period from December 1952 to December 1993, we have computed 2981 individual forward premia held by 262 different experts, using the following formulae:

$$z_{i,t}^{f} = E_{i,t}^{f}(R) - r_t^{f} \qquad [1]$$

with:

$$E_{i,t}^{f}(R) = E_{i,t}^{f}(\pi) + 100\frac{E_{i,t}^{f}(D)}{E_{i,t}^{1}(P)} \qquad [2]$$

where $E_{i,t}^{f}(R)$ is the forward expected stock return, r_t^{f} the implicit forward risk-free market interest rate, $E_{i,t}^{f}(\pi)$ the forward expected rate of change π of the price of the industrial portfolio, $E_{i,t}^{f}(D)$ the forward expected dividends given by this portfolio, and $E_{i,t}^{1}(P)$, the price of the portfolio expected at time *t* for *t+1*. All rates prevail at time *t*, relate to the future semester time-span [*t+1*, *t+2*] and are expressed in percentage per year.

The variables involved in risk premia measurement are calculated on the basis of the following assumptions:

(i) Concerning $E_{i,t}^{f}(R)$, the Livingston surveys give, for expert *i*, forecasts one and two semesters ahead for the S&P 400 industrial index P, noted $E_{i,t}^{1}(P)$ and $E_{i,t}^{2}(P)$, respectively. The forward expected rate of change in the price of the industrial portfolio at semester *t* for period [*t+1*, *t+2*] is then defined as:

$$E_{i,t}^{f}(\pi) = 200\ln\frac{E_{i,t}^{2}(P)}{E_{i,t}^{1}(P)} \qquad [3]$$

Note that the logarithm of the ratio between the two expected stock price indexes ($\ln\frac{E_{i,t}^{2}(P)}{E_{i,t}^{1}(P)}$) does not equal the forward expected logarithmic ratio between the two future indices ($E_{i,t}^{f}(\ln\frac{P_2}{P_1})$), whereas only this last magnitude theoretically represents the forward expected rate of change $E_{i,t}^{f}(\pi)$. However, both from a theoretical and an empirical point of view, it seems reasonable to assume that the relevant magnitude for stockholders is the return rather than the price of equities. Consequently, supposing than experts forecast the stock return and not the price, the relevant variables are not $E_{i,t}^{2}(P)$

and $E^1_{i,t}(P)$ but $E^2_{i,t}(\pi)$ and $E^1_{i,t}(\pi)$, respectively for 2 semesters and 1 semester ahead time spans. In this context, when experts were asked to disclose their forecasts concerning stock prices in *level* (i.e. $E^2_{i,t}(P)$ and $E^1_{i,t}(P)$), their answers may be viewed as deriving from the following relations for the two time horizons:

$$E^2_{i,t}(P) = P_t \exp(E^2_{i,t}(\pi)) \quad => \quad \ln E^2_{i,t}(P) = \ln P_t + E^2_{i,t}(\pi)$$

$$E^1_{i,t}(P) = P_t \exp(E^1_{i,t}(\pi)) \quad => \quad \ln E^1_{i,t}(P) = \ln P_t + E^1_{i,t}(\pi)$$

which result in the following equalities:

$$\ln \frac{E^2_{i,t}(P)}{E^1_{i,t}(P)} = \ln E^2_{i,t}(P) - \ln E^1_{i,t}(P) = E^2_{i,t}(\pi) - E^1_{i,t}(\pi) = E^f_{i,t}$$

As a result, the logarithm of the ratio between the two expected stock price indexes ($\ln \frac{E^2_{i,t}(P)}{E^1_{i,t}(P)}$) accurately measures the forward expected rate of change ($E^f_{i,t}(\pi)$).

(ii) As regards the expected dividends, we assume that any expert builds his forecast for the following semester by extrapolating the rate of change observed during the previous semester:

$$E^f_{i,t}(D) = D_t \exp(d_t) \qquad \text{with} \quad d_t = 1n(D_t / D_{t-1}) \ \forall \, \boldsymbol{i} \qquad [4]$$

where D_t are the dividends per share distributed over the previous year by the 400 industrial firms included in the S&P 400 industrial stock price index. This *ad-hoc* hypothesis is not crucial since the subsequent impact on the ratio $\frac{E^f_{i,t}(D)}{E^1_{i,t}(P)}$ is largely dominated by $E^1_{i,t}(P)$.

(iii) As regards the risk-free interest rate r_t^f, we apply the implicit forward rate inferred from the zero coupon treasury bonds reaching maturity after 1 and 2 semesters, which is in keeping with the stock returns expectations time horizon:

$$r_t^f = \left[\frac{(1+r_t^2)}{(1+r_t^1)} - 1 \right] \cong 2\, r_t^2 - r_t^1 \quad \forall\, i \qquad [5]$$

Any agent is bound to secure this rate at time *t* for the future time-span [*t+1*, *t+2*] by simultaneously lending over two semesters and borrowing over one semester.

3.2 - Main empirical features of ex-ante premia

Table 1 provides the definitions for all the variables used in this paper. For every survey covering the period from December 1952 to December 1993, **figure 1** depicts the central values and the standard deviation across experts, which represents the discrepancy between individual premia for a given date. During that period, the median of individual premia is about 4 % a year and the mean about 2.2%; the central values per date range from +15% to –8% a year, with about 20% of negative premia. These values clearly differ from those obtained for ex-post market premia that range from -63% to +64% (48% of values are negative) with a 5.3% mean (median: 7.1%), and confirm for a long period, the outcomes of the literature using survey data. Moreover, the 2.2% mean observed during the period from 1952 to 1993 within the finite horizon approach using survey data compares significantly with the average of 2.5% obtained by Fama and French (2002) during the period from 1951 to 2000 (still with the S&P index) within the Gordon model. Within the famous *equity premium puzzle* debate, compared to the ex-post premia values, both the ex-ante premia central values and their variances seem to accord more with the predictions derived from the consumption-based asset pricing model.

Note that the magnitude of the ex-ante premia cross-section standard deviations, ranging from 5 to 15 % a year over the period, warrants a micro data approach to explain the degree of heterogeneity which is time varying. Another difference with ex-post premia is that, as can be seen on **figure 2**, none of the three ex-ante premia components, namely, the expected stock prices rate of change, the expected dividends yield and the risk-free rate, [11] are insignificant one compared to others.

[Insert table 1 p. 34]

[Insert figure 1 p.30]

[Insert figure 2 p.31]

Figure 3 and **table 2** show that agents' professional affiliation is a weak but discriminating criterion for premia. For instance, **table 2** shows that over the 42 years covered by the whole sample period, the median value for experts belonging to the "Non-financial firms " is 3.9 % a year, whereas it is 4.6 % for experts from "Investments banks". The relative discriminative power of experts' professional affiliation is illustrated by **table 3** which provides the R^2 coefficients between the mean premia *per date* according to that criterion: the coefficients range from 0.53 (significant at the 5% level) for the pair "University's experts and Non-financial firm's experts" to 0.25 for the pair "Investments banks experts and Non-financial firm's experts".

These results tend to show that the information used by experts to determine their required premia depends on their skills and concerns according to their professional affiliation. However, these statistics incorporate the resulting effect of two factors that are the professional affiliation and the sample period characteristics. The reason is that the survey participation is free: at semester *t* a given expert may cancel its membership without being substituted by another one pertaining to the same group. Consequently, over a long period, not only the respondent but also the relative weight of each professional group in the sample may vary from date to date.

The overall effect is that besides a specific *group effect*, the discrepancies between medians, means and correlations partly reflect a *time effect.* Unfortunately, because of the short temporal overlapping between sub-samples for each expert, we could not build any consistent full panel in order to control for time and group effects.[12] This is why we worked with pooled individual data for each group of experts. By studying a full panel of experts that answered the survey over a same sub-period, we will examine later this adequacy of this approach (see section 4.2).

[Insert figure 3 p.32]

[Insert table 2 p.35]

[Insert table 3 p.36]

4 – Explaining ex-ante individual risk premia

4.1 - Theoretical framework

Our approach derives from the Arbitrage Pricing Theory (APT, Ross (1976)). Let us recall that the APT is based on two general hypotheses. The first one is that at any time, the condition of absence of arbitrage opportunity prevails on the market: with a null initial wealth, any riskless investment leads to a zero expected return. One remembers that this hypothesis is in accordance with Welch (2000) who put into evidence that experts have a strong view in favor of absence of arbitrage. The second hypothesis is that the return R between *t-1* and *t* of any portfolio includes three elements: (i) the return forecasted at time *t-1* for *t*: $E^1_{t-1}[R]$, (ii) the unexpected returns involved in forecast errors associated to *n* independent common factors ${}_jF_t$: $R_t - E^1_{t-1}(R) = \sum_{j=1}^{n} \beta_j \left[{}_jF_t - E^1_{t-1}(F_j) \right]$, and (iii) the unexpected returns resulting from the unexpected components of specific factors. These hypotheses allow expressing the risk premium relating to the portfolio by a linear combination of the *n* factors, each contributing to explain the ex-ante premium z^1_t, the weight ${}_j\beta$ representing the sensitivity of the portfolio to factor ${}_jF_t$:

$$z^1_t = E^1_t(R) - r^1_t = \sum_{j=1}^{n} {}_j\beta \left(E^1_t({}_jR) - r^1_t\right) \qquad [6]$$

Where ${}_jR$ is the return on factor ${}_jF_t$, and where $(E^1_t({}_jR) - r^1_t)$ represents the *j* component of the risk premium for the following period, namely the ex-ante risk premium of the portfolio if only the common factor ${}_jF_t$ is involved.

According to this approach, the common factors of risk premia will not be identified by the theory, but by empirical analysis. Most studies concerned with APT estimate unconditional risk premia and put into evidence the influence of macroeconomic factors such as industrial production growth rate, spread of interest rates and stock market returns (among others, see Roll and Ross (1980), Chen, Roll and Ross (1986) and Elton, Gruber and Mei (1994)). Using a conditional APT, Kryzanowski, Lalancette and To (1997) confirm that several macro-factors determine the time-varying premia for a set of 130 mutual funds equities on the Canadian market: these factors are a composite index of leading indicators, the exchange rate between the Canadian and US dollars, exports, lagged industrial production, shape of the interest rates term structure and the market factor. Supposing REH, the first step in the estimation procedure consists to estimate the β_j coefficients by regressing the innovations of returns - i.e. their unexpected values - on the innovations of the macroeconomic factors. The second step consists in regressing time varying excess returns on the values of β_j with time-varying parameters representing risk premia related to each factor. According to this approach, the risk premium is *endogenously* determined at any date by summing the effects of the *n*-independent factors.

With respect to this approach, one advantage of survey forecasts is that they provide an *exogenous* measure of the risk premium per date a priori not bounded to an expectational hypothesis, and particularly to the REH. Consequently, it becomes possible to identify directly the common factors and to estimate their relative weight. Supposing each component *j* of the risk premium to be proportional to a given variable ${}_jF_t$ by coefficient ${}_ja$, the risk premium z_t^1 may be written as a linear combination of *n* independent variables, each of them weighted by the composite coefficient ${}_jb = {}_j\beta\, {}_ja$. Moreover, at time *t*, any agent may refer to two types of "*common factors"*. The first ones will be called "*idiosyncratic common factors*" (${}_jY_{i,t}$) and express expert' opinions about the future state of the economy through expected macroeconomic variables. From a more standard perspective, the second type of common factors will be called "*macroeconomic common factors*" (${}_jX_t$) and consists in macroeconomic variables observable by all agents. Finally, the equation of the *n*-factors one period ahead forward ex-ante risk premium required by expert *i* is as follows:

$$z^1_{i,t} = \sum_{j=1}^{m} {}_j b \; {}_j X_t + \sum_{j=m+1}^{n} {}_j b \; {}_j Y_{i,t} \qquad [7]$$

4.2 - Lessons from econometric analysis

With respect to equation [7], the econometric equation used to model forward premia is the following:

$$z^f_{i,t} = \sum_{j=1}^{m} {}_j b \; {}_j X_t + K\, Crash_t + {}_{m+1}b\, \Delta q^1_{i,t} + {}_{m+2}b\, \Delta q^f_{i,t} + {}_{m+3}b\, \Delta I^1_{i,t} + {}_{m+4}b\, \Delta I^f_{i,t} + C + \varepsilon_{i,t} \qquad [8]$$

where *j*-indexed exogenous variables stand for macroeconomic common factors ${}_j X_t$ (see *table 1* for notations of variables), where *i*-indexed exogenous variables represent idiosyncratic common factors ${}_j Y_{i,t}$ consisting in individual forecasts in production growth and inflation, and where C is an intercept which may capture a systematic bias in expectations measurement or/and a constant structural effect. $Crash_t$ is a dummy variable introduced to capture the specific impact of the October 1987 stock market crash, so that K represents the impact of the crash on the premium.

The three-dimensional (agents, variables, dates) matrix that reports the answers given by the 262 experts over the 83 semesters during the sample period has 83% of missing values. This is because that over the 42 years covered, there is a natural attrition phenomenon concerning experts since some enter the panel whereas others leave it. Although recent econometric methods would help deal with incomplete panel data, the number of missing values is here far too high to apply them accurately. That is why we have estimated equation [8] using OLS on pooled individual data for each group of experts. However, the OLS method with pooled data may induce biases due to correlations between individual error terms. To address this question, we have attempted to measure these correlations for a subsample of experts observed during the same time period. To do so we have selected the longest *full* panel data - i.e. with no missing value - we could set up over the whole sample period. We found that 12 experts with various professional affiliations regularly responded to all the surveys over the 32 semesters covering the period from December 1952 to December 1968. For each of the 12 files reporting expert's data, we made an OLS estimation of equation [8] and retrieved the 12 residual vectors. We then computed the correlation between the 66 different pairs of these 12 time series. The mean coefficient of correlation is about 0.19 and only 8% of these coefficients appeared to be significantly different from zero at the 5% level. Therefore, controlling for time and individual effects, the correlations between residuals appears to be rather weak. Consequently, to all intents and purposes, we can infer that there is no serious estimation bias induced by pooling individual data.

For a given group of experts selected according to professional affiliation, **Table 4** shows that the forward risk premia depend both on idiosyncratic and macroeconomic common factors as defined above.[13]

[Insert table 4 p.37]

In keeping with experts' personal forecasts, the following four idiosyncratic common factors concern industrial production and inflation:

(i) *Forecasts about the industrial production growth rate*: the one semester ahead growth rate has an intuitive negative influence on the premia since it generates a transitory increase in corporate profits and households' real income. Conversely, the forward expected rate - i.e. for time-span [*t+1*, *t+2*] - appears to have a positive influence on premia. This result suggests that a high and sustained economic expected growth induces a rising uncertainty about the duration of this trend, so that beyond a certain threshold, a downward turning point is likely.

(ii) *Expectations about the inflation rate*: contrary to what happens with industrial production, the one semester ahead expected rate has no significant impact on risk premia. But the forward expected inflation rate appears to have a significant positive influence. This result may be interpreted according to two mechanisms: a wealth effect and a monetary policy effect. In the first instance, an increasing expected inflation rate increases the likelihood of a smaller future real equity value, ending with a higher required risk premium. For the second effect, long-lasting inflation may increase the likelihood of a restrictive monetary policy, which drives up premia.

Let us turn now to the significant macroeconomic common factors:

(i) Indicators expressing uncertainty make up the first set of variables. Firstly, with the expected negative influence, the Consumer Sentiment Index (devised by the Survey Research Centre at the University of Michigan) put into evidence the significant effect of household's economic and financial confidence. Secondly, the volatility of stock returns has the expected positive sign. Thirdly, the positive influence of the stock price expectations heterogeneity indicator suggests that for a given agent, the more he/she perceives a high dispersion within other agents' forecasts, the more likely he/she will be to consider his/her own expectations to be uncertain, inducing a higher required value for the risk premium. This last result suggests that, at the individual level, experts are influenced by other agents' forecasts, suggesting a mimetic behaviour.

(ii) A second set of variables is made up of indicators describing macroeconomic situation, namely, inflation and production growth rate observed over the previous semester. The negative impact of the industrial production growth rate is in line with the influence of one semester ahead individual expectations: the higher the previous semester growth rate, the lower the required premia. A same but weaker effect is found for inflation: the higher the previous semester inflation rate, the lower the required premia. We also have introduced the squared value of the inflation rate to represent the optimal inflation hypothesis, that is an inflation rate minimizing the risk premium, all other effects being given.[14] At the 10% level, this hypothesis only applies to the whole sample: when inflation exceeds 5.5% a year,[15] the required premia increase, while under that threshold, increasing inflation leads to a decrease in premia. This may be interpreted in the light of the monetary policy: if expected inflation exceeds the target set by the Central Bank, and if its reaction function is known - e.g. the well-known Taylor rule - investors will anticipate a restrictive policy that will lead to higher required premia.

(iii) Finally, a dummy variable, taking the value 1 for the December 1987 survey and 0 otherwise, captures the major stock market Crash that occurred in October 1987. The negative impact of the crash seems rather intuitive: according to the financial press, with experts stating that stock prices were much above their fundamental value, a crash was likely. After it occurred, experts thought that stock prices had gone back to their fundamental value, which made a future decrease of stock price unlikely, and this finally led them to lower their required risk premia.

Since the linear combination involving the macroeconomic common factors plus the intercept implicitly gives the fitted values of mean risk premia per date, we also estimate an equation explaining *group-centred* risk premia by only the idiosyncratic common factors. It appeared that the coefficients of theses factors are not significantly different from those given on table 4. This result indirectly confirms that the macroeconomic common factors taken into account in equation [8] give a valuable representation of the mean premia. **Figure 4** shows that the fitted values of the mean risk premia for the full sample depict satisfactorily the actual values. If the market behaviour were similar to Livingston' experts behaviour, this result would mean that the macroeconomic variables in [8] adequately explain the main part of the dynamics of the ex-ante market risk premia.

[Insert figure 4 p.33]

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Table 4 shows that heterogeneity across experts is captured in equation [8] both through the coefficients $_j b$ that are group-dependent, and through the idiosyncratic common factors that are agent-dependent. We will see later (cf. **table 5**) that the estimated coefficients of the macroeconomic and idiosyncratic common factors notably vary among experts themselves, and these results broaden our understanding of the sources behind ex-ante premia heterogeneity. As mentioned earlier (see 3.2), a question arise: does discrepancies between groups of experts mainly result from the fact that differently affiliated agents might be clustered in different periods of time or are they mainly tied to the heterogeneity across experts? To answer this question, we made estimations of various models explaining the individual risk premia by adding in [8] dummies representing a time effect (date of the survey) and dummies supposed to capture a specific additive group effect. Results obtained on the full sample showed these dummies not to be significant at the standard 5% level. This suggests that discrepancies observed between professional affiliations is not due to a time effect and confirm that the group effect operate through the idiosyncratic common factors.

Overall, the significant differences between estimates according to experts' affiliation appositely show that macroeconomic and idiosyncratic factors join together in accounting for heterogeneity from professional affiliation, as can be seen in **figure 3**. In addition, the influence of the same set of factors over the different groups explains the correlation between groups' mean premia, as shown on **table 3**.

Finally, to investigate more deeply the factors explaining the heterogeneity between experts' premia, we selected the 26 agents (10% of the total) who uninterruptedly replied to the Livingston survey for at least 15 years. After that, we estimated equation [8] on each of the 26 corresponding individual time series data reporting the answers for at least 30 semesters. The results given on **table 5** show large discrepancies between estimates. As has been stated before, heterogeneity (see standard errors on figure 1) may be partly explained by discrepancies between experts' price and production expectations. Another major source of heterogeneity is that agents vary in their responsiveness to the same given information. An extreme case arises when the coefficient related to variables ${}_jX_t$ or variables ${}_jY_{i,t}$ is null for one agent but is highly significant for another one: having various skills, experts use different types of information depending on its respective cost and accessibility. For most of the 26 agents, only a few variables summarise this information, generally two or three indicators selected from the previous set of variables. Among them**,** the prevalent ones are expected production trends - i.e. for semester *t* survey, forward growth rate over the time span [*t+1*, *t+2*] - the Consumer

Sentiment Index, and typically, two indicators measuring market risk: stock returns volatility and stock price expectations heterogeneity.

[Insert table 5 p.38]

Compared with the previous studies using the APT quoted above, our results confirm the influence of inflation and industrial production growth, represented both by "*idiosyncratic common factors*" and "*macroeconomic common factors*". Moreover, the significant influence of the "Consumer Sentiment Index", which is classified as a leading indicator by the NBER, confirms the role of the leading indicators composite index that Kryzanowski et al. (1997) put into evidence.[16]

5 – Concluding remarks

The equity ex-ante risk premium is defined as the spread between the expected return on a portfolio of industrial stocks and the risk-free rate. The expected return on industrial stocks in the US stock market (S&P400 industrial index) is inferred from surveys carried out by J. Livingston on a panel of experts for one and two semester's time-horizon, whereas zero coupon bonds with maturities in step with forecasts' time horizon give the risk-free rate. Using these variables, we computed about 3000 individual ex-ante risk premia over the period from 1952 to 1993. In respect of ex-post market premia analysed in the literature, these ex-ante premia offer three main advantages: (i) they are based on forecasts that use information available at the time of the actual financial decisions; (ii) they do not require any assumption about the expectations' formation process; and (iii) they enable to analyse experts' behaviours at the individual level.

Three main conclusions may be drawn from our study. First, these ex-ante premia values are closer to the predictions derived from the consumption-based asset pricing theory than the ones obtained for the ex-post premia. Second, professional affiliation, which is linked to experts' skills and concerns, appears to be a significant variable in sorting out the information used by forecasters to assess the required risk premia. Third, individual ex-ante premia depend both on macroeconomic and idiosyncratic common factors: the former are represented by a set of macroeconomic variables observable by all agents, and the latter by experts’ personal forecasts about the future state of the economy, as defined by expected inflation and industrial production growth rate. Each of these factors partly explains heterogeneity due to experts' professional affiliation, and more generally, heterogeneity among agents.

These results shed light on the relevant sources of heterogeneity that must be taken into account to model the interdependence between investors operating on the stock market. Finally, our conclusions call for further investigations, especially in order to identify the dynamic relationship between ex-ante and ex-post risk premia. This topic will be dealt with at length in a forthcoming study.

Figure 1 - Mean, median, and standard-error of individual ex-ante risk premia

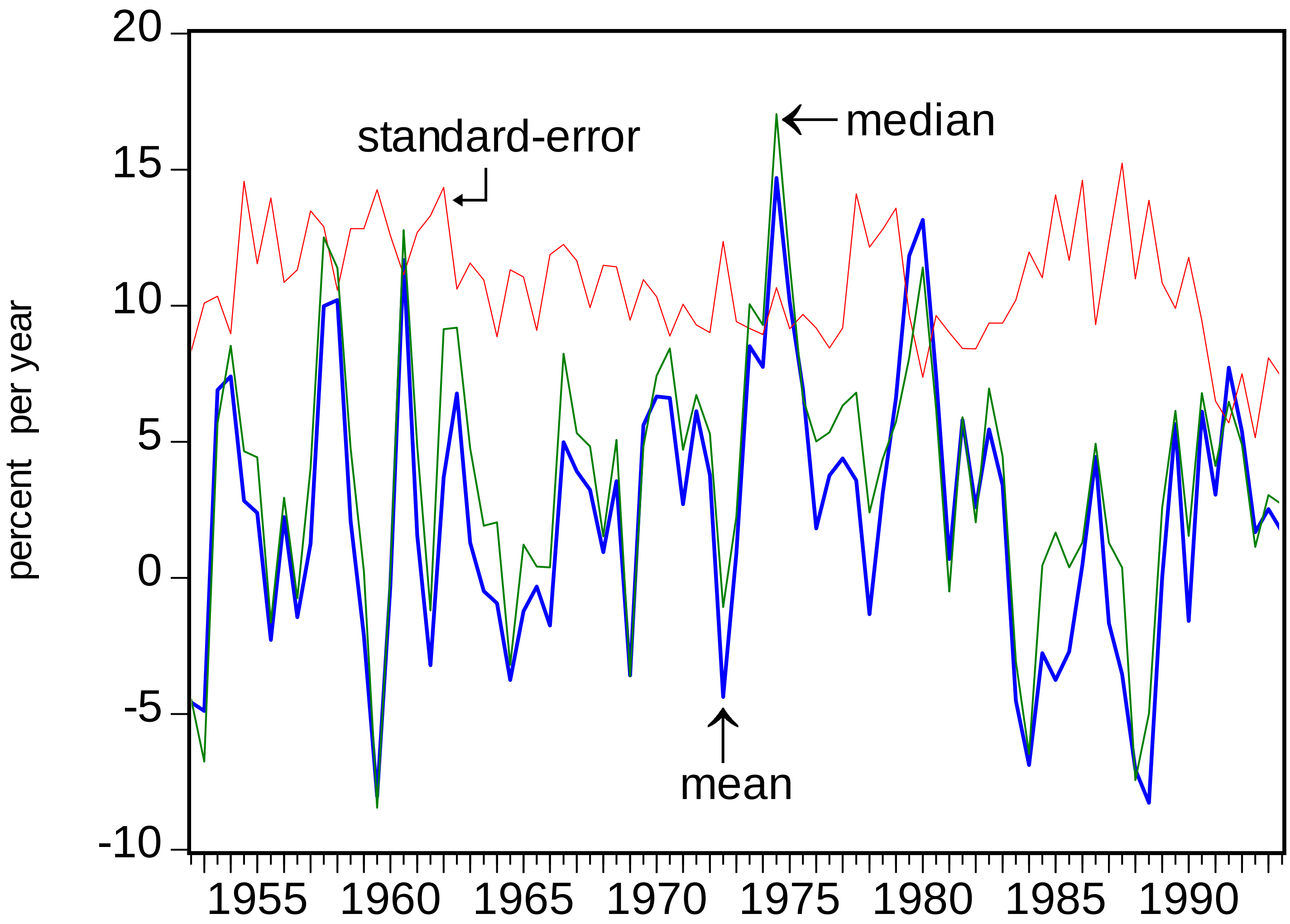

Figure 2 - The three components of individual risk premia mean values

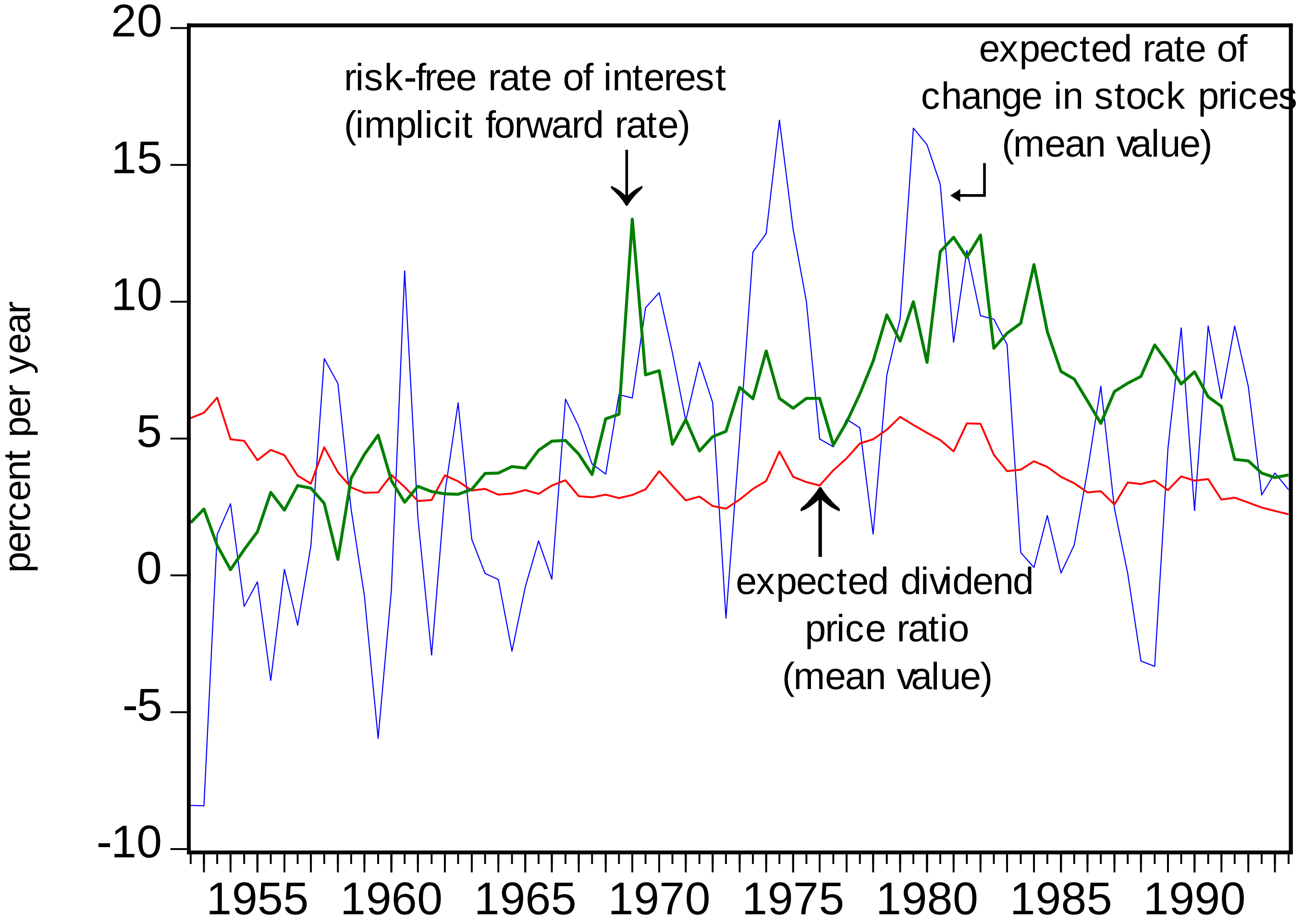

Figure 3 - Individual ex-ante risk premia mean values according to professional affiliation

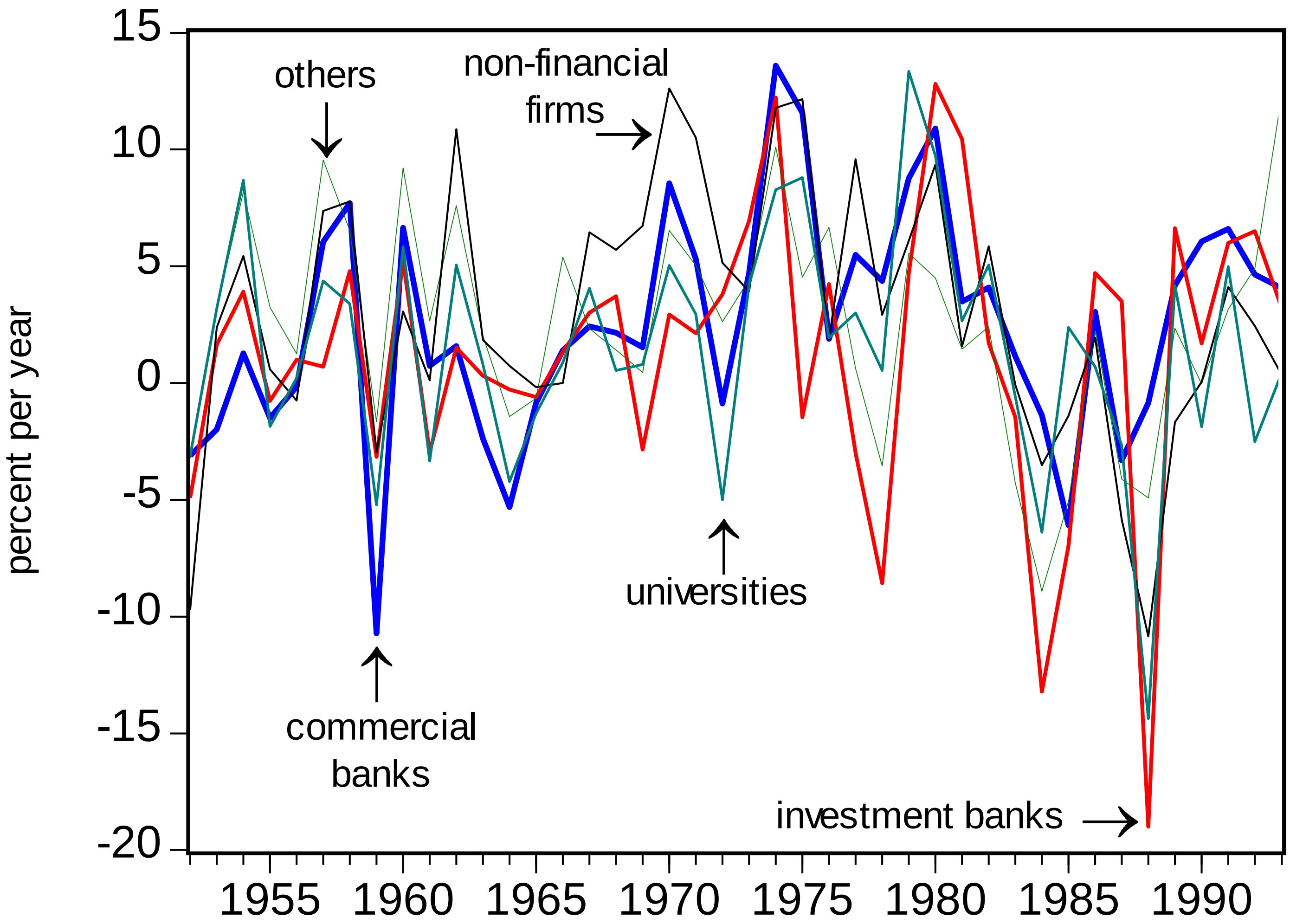

Figure 4 - Actual and fitted values of ex-ante risk premia mean values

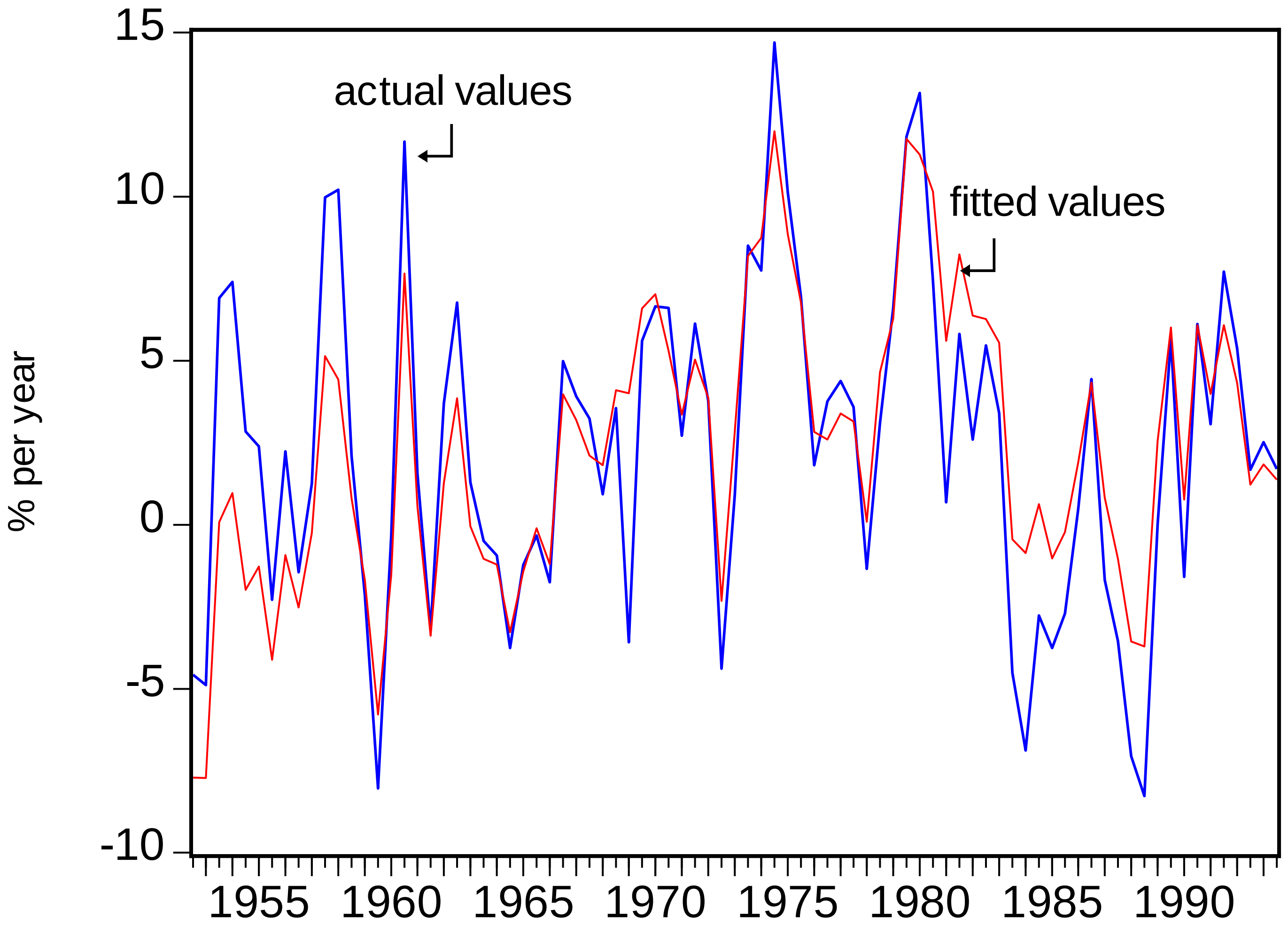

TABLE 1

Notations

Dependant variable

$z_{i,t}^{f}(G)$: Forward *ex-ante* risk premium at time t for the semester time span [$t+1$, $t+2$], related to expert i pertaining to group G.

Exogenous variables

1 - Macroeconomic common factors $_{j}X_{t}$

S_t : Consumer Sentiment Index at time t (in log).

σ_t : Stock returns volatility: standard error over the four semester period [t, $t-4$].

$\Sigma_{t,1}$: Stock prices expectations heterogeneity indicator: at time t, ratio between the cross standard deviation and the consensus (mean) of stock price expectations one semester ahead.

q_t : Industrial production's growth rate observed during the previous semester [t, $t-1$].

I_t : Inflation Rate observed during the previous semester [t, $t-1$].

$Crash_t$: Impact of the October 1987 stock market crash: dummy variable with value 1 for the December 1987 survey, and 0 otherwise.

2 – Idiosyncratic common factors $_{j}Y_{i,t}$

$\Delta q_{i,t}^{1} = E_{i,t}^{1}(q) - E_{G,t}^{1}(q)$: Industrial production's growth rate expected at time t for the time span [t, $t+1$] : spread between individual expectation and group G mean rate.

$\Delta q_{i,t}^{f} = E_{i,t}^{f}(q) - E_{G,t}^{f}(q)$: Forward industrial production's growth rate, expected at time t for the time span [$t+1$, $t+2$]: spread between individual expectation and group G mean rate.

$\Delta I_{i,t}^{1} = E_{i,t}^{1}(I) - E_{G,t}^{1}(I)$: Inflation rate expected at time t for the time span [t, $t+1$]: spread between individual expectation and group G mean rate.

$\Delta I_{i,t}^{f} = E_{i,t}^{f}(I) - E_{G,t}^{f}(I)$: Forward inflation rate expected at time t for the time span [$t+1$, $t+2$]: spread between individual expectation and group G mean rate.

TABLE 2

Individual ex-ante risk premia $z_{i,t}^{f}$: mean, median and standard deviation according to expert's professional affiliation

December 1952 - December 1993

(% per year)

Group	*N*	Frequency (%)	Mean (m)	Median (μ)	Standard-deviation (σ)
Universities	709	23.8	2.03	4.01	12.26
Commercial Banks	772	25.9	2.34	4.03	12.08
Non Financial Firms	598	20.0	2.50	3.88	10.82
Investment Banks	419	14.1	1.55	4.60	13.66
Others	483	16.2	2.85	3.89	10.40
Total	2981	100	2.27	4.04	11.86

TABLE 3

Coefficients of determination R^2 between mean values of ex-ante risk premia according to expert's professional affiliation

December 1952 - December 1993

	$\bar{z}_t^f(U)$	$\bar{z}_t^f(C)$	$\bar{z}_t^f(N)$	$\bar{z}_t^f(I)$	$\bar{z}_t^f(A)$
$\bar{z}_t^f(U)$	1	0.441	0.529	0.415	0.381
$\bar{z}_t^f(C)$		1	0.464	0.254	0.343
$\bar{z}_t^f(N)$			1	0.253	0.380
$\bar{z}_t^f(I)$				1	0.432
$\bar{z}_t^f(A)$					1

$\bar{z}_t^f(G)$: Vector of risk premia mean values at time *t* for experts affiliated to group *G*, namely:

U: Universities, *C*: Commercial Banks, *N*: Non-financial firms, *I*: Investment Banks, *A*: Others.

TABLE 4

Macroeconomic and idiosyncratic common factors of ex-ante risk premia for each group

OLS estimation of equation [8] over the period December 1953 – December 1993

$$z^{f}_{i,t} = \sum_{j=1}^{m} {}_{j}b \; {}_{j}X_{t} + K\,Crash_{t} + {}_{m+1}b\,\Delta q^{1}_{i,t} + {}_{m+2}b\,\Delta q^{f}_{i,t} + {}_{m+3}b\,\Delta I^{1}_{i,t} + {}_{m+4}b\,\Delta I^{f}_{i,t} + C + \varepsilon_{i,t}$$

I – MACROECONOMIC COMMON FACTORS $_{j}X_{t}$

	S_t	σ_t	$\Sigma_{t,1}$	q_t	I_t	I_t^2	$Crash_t$	*constant term C*
U	-11.65	0.05	0.44	-0.21	-0.40	0.04	-12.73	49.11
	(1.9)	(1.3)	(3.1)	(3.8)	(1.2)	(1.4)	(4.0)	(1.8)
C	-14.53	0.06	0.16	-0.21	0.22	0.004	-4.15	64.24
	(2.7)	(1.5)	(1.0)	(3.6)	(0.7)	(0.1)	(1.9)	(2.6)
N	-10.81	0.12	0.38	-0.19	-0.45	0.03	-14.29	46.57
	(2.2)	(3.3)	(2.6)	(3.5)	(1.5)	(1.1)	(6.5)	(2.1)
I	-9.52	0.09	-0.17	-0.10	-0.22	0.06	-13.7	45.46
	(1.1)	(1.4)	(0.8)	(1.1)	(0.5)	(1.3)	(3.0)	(1.1)
A	-14.04	0.05	0.62	-0.11	-0.18	-0.04	-9.80	59.14
	(2.5)	(1.3)	(4.0)	(2.0)	(0.6)	(1.1)	(3.5)	(2.3)
Full sample	-12.58	0.07	0.31	-0.17	-0.22	0.02	-9.56	54.8
	(4.7)	(3.7)	(4.3)	(6.4)	(1.6)	(1.7)	(7.8)	(4.5)

II – IDIOSYNCRATIC COMMON FACTORS $_{j}Y_{i,t}$

GROUP	$\Delta q^{1}_{i,t}$	$\Delta q^{f}_{i,t}$	$\Delta I^{1}_{i,t}$	$\Delta I^{f}_{i,t}$	$\bar{R}^2$	*RMSE %*	***N***
U	-0.01	0.98	0.03	0.53			
	(0.1)	(9.8)	(0.2)	(2.4)	0.239	10.70	708
C	-0.03	0.57	0.01	0.34			
	(0.3)	(4.7)	(0.0)	(1.0)	0.134	11.25	771
N	-0.02	0.91	0.36	0.43			
	(0.3)	(8.3)	(1.4)	(1.3)	0.230	9.49	597
I	-0.07	0.72	-0.70	1.02			
	(0.5)	(4.7)	(1.9)	(2.7)	0.119	12.84	418
A	-0.31	0.73	-0.08	0.46		9.31	482
	(3.9)	(7.7)	(0.4)	(2.1)	0.199		
Full sample	-0.09	0.79	-0.03	0.31			
	(2.5)	(17.3)	(0.3)	(2.7)	0.101	10.24	2976

Notes: *Student* values are reported in brackets under estimates. The estimation based on the full sample of individual risk premia including dummy variables capturing a specific additive group effect was non significant at the 5% level.

TABLE 5

Factors of individual ex-ante risk premia
OLS estimation of equation [8] for each expert in a 26 agents sub-sample

ECON	GROUP	FIRST	NOBS	LCS	VOL4	DISP1	OIP1	OINF1	OINF**2	CRASH	EIP1	EIPF	EINF1	EINFF	CST	RSQ	RMSE
14	A	52.2	59	20.73	0.18	-0.03	-0.09	-0.35	0.10	.	-0.02	0.46	-0.45	-0.41	-92.71	0.52	4.53
			.	2.17	3.65	.	.	.	2.59	.	.	4.52	.	.	2.11	.	.
27	A	52.2	49	-14.28	0.01	0.15	-0.07	-0.34	-0.01	.	-0.25	0.04	0.09	0.21	69.67	0.07	5.85
			.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
94	A	54.2	35	-49.18	0.08	1.96	0.15	-2.34	0.06	.	-0.35	2.16	-0.71	-0.23	208.23	0.54	12.50
			.	.	.	2.47	.	.	.	.	.	2.90	.	.	.	.	.
187	A	71.2	40	-4.98	0.07	0.11	0.05	-0.73	0.04	-3.56	-0.79	0.42	0.16	0.14	24.25	0.36	4.37
			.	.	.	.	.	.	.	.	2.92	1.66	.	.	.	.	.
22	C	52.2	34	-1.52	-0.43	1.81	-0.10	-2.10	0.68	.	0.10	-1.36	2.03	-2.47	-15.87	0.33	12.95
			.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
64	C	52.2	36	-53.69	0.04	-0.01	-0.18	0.81	-0.17	.	0.25	0.74	-0.41	0.65	246.95	0.45	7.56
			.	1.84	.	.	.	.	.	.	.	1.93	.	.	1.83	.	.
72	C	52.2	40	14.61	-0.06	-0.57	-0.46	-0.59	0.17	.	-0.15	0.78	0.72	0.98	-57.96	0.19	15.61
			.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
87	C	53.2	38	-57.74	0.20	0.62	0.26	-1.69	0.00	.	-0.50	0.15	0.28	0.01	259.04	0.28	10.76
			.	1.65	.	.	.	.	.	.	.	.	.	.	.	.	.
116	C	59.1	45	-14.07	0.11	0.53	-0.27	1.15	-0.08	.	-1.08	1.20	0.47	-1.28	57.93	0.61	6.46
			.	.	.	.	1.90	.	.	.	2.67	2.45	.	.	.	.	.
136	C	62.2	54	-8.80	0.25	0.19	-0.30	-1.04	0.04	-5.32	0.36	1.30	0.32	1.50	40.95	0.46	6.67
			.	.	2.79	.	.	.	.	.	.	1.94	.	.	.	.	.
57	I	52.2	31	-25.38	0.55	-1.06	0.33	1.19	-0.32	.	-0.36	1.14	0.82	0.45	121.43	0.48	11.04
			.	.	2.12	.	.	.	.	.	.	1.90	.	.	.	.	.
97	I	55.2	34	-28.38	0.22	-0.20	-0.16	-0.62	-0.11	.	-0.17	1.61	-1.89	2.94	134.51	0.58	6.93
			.	.	.	.	.	.	.	.	.	3.02	.	2.21	.	.	.
134	I	62.2	34	-6.29	0.09	0.35	0.09	-2.55	0.23	.	0.74	0.06	0.40	0.01	33.66	0.36	6.96
			.	.	.	.	.	.	1.87	.	1.81	.	.	.	.	.	.
28	N	52.2	73	-30.22	0.17	0.31	-0.07	-0.76	0.05	-20.38	0.06	1.65	-0.49	0.38	135.51	0.59	8.81
			.	1.91	1.83	.	.	.	.	3.39	.	6.29	.	.	1.86	.	.
58	N	52.2	30	-54.87	-0.38	0.30	0.21	-0.07	-0.18	.	0.11	-1.27	-4.17	0.13	244.14	0.30	10.39
			.	.	.	.	.	.	.	.	.	1.73	.	.	.	.	.
104	N	57.1	46	-41.74	0.11	-0.75	-0.10	-1.48	0.10	-17.84	0.48	0.25	0.42	-0.57	203.35	0.60	7.78
			.	2.34	.	.	.	.	.	2.27	.	.	.	.	2.41	.	.
51	U	52.2	34	-37.22	0.13	-0.88	-0.07	0.43	-0.13	.	0.04	0.47	-1.33	1.87	181.41	0.31	7.90
			.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
53	U	52.2	34	-81.80	-0.93	2.21	0.17	-1.37	-0.10	.	-1.07	1.59	2.30	2.03	344.00	0.62	15.95
			.	.	2.09	.	.	.	.	.	2.04	2.41	.	.	.	.	.
75	U	52.2	58	4.12	0.09	1.55	-0.24	-1.59	0.14	.	-0.60	0.31	-0.31	1.30	-33.86	0.51	8.69
			.	.	.	3.64	.	2.06	.	.	2.15	.	.	.	.	.	.
101	U	55.2	42	-23.22	-0.01	0.28	-0.21	1.49	-0.18	.	-0.24	-0.28	-1.24	-0.39	105.27	0.21	11.03
			.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
106	U	57.1	41	3.00	0.01	-0.49	-0.47	-3.61	0.09	.	-0.43	0.02	0.08	-1.44	13.43	0.46	8.91
			.	.	.	.	2.58	1.91	.	.	.	.	.	.	.	.	.
118	U	59.1	49	5.06	-0.14	0.43	-0.27	0.75	-0.06	.	-0.10	0.20	0.00	-0.58	-24.85	0.09	8.99
			.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
126	U	61.1	53	23.65	0.03	0.79	-0.26	0.62	0.02	-6.21	-0.45	0.05	-0.54	1.00	-109.09	0.29	7.80
			.	.	.	1.90	.	.	.	.	1.69	.	.	.	.	.	.
156	U	67.1	33	1.83	0.04	-1.11	-0.23	-1.49	0.21	.	0.15	0.93	-0.54	0.82	10.00	0.45	7.57
			.	.	.	.	.	.	1.66	.	.	1.91	.	.	.	.	.
171	U	70.1	44	-28.92	-0.10	0.11	-0.10	0.48	-0.04	-12.48	0.27	0.86	0.56	0.59	125.86	0.42	8.43
			.	1.73	.	.	.	.	.	1.98	.	2.01	.	.	.	.	.
173	U	70.1	41	-43.96	0.19	0.75	0.18	-3.48	0.26	-12.46	-0.83	0.00	-1.26	-1.73	192.42	0.56	10.67
			.	1.70	.	.	.	.	.	.	1.88	.	.	.	.	.	.

Note: Student values are reported in brackets only under estimates significant at the 10% level.

Legend: ECON: Expert's number; GROUP: Expert's professional group; FIRST: first observation ("year - semester") for expert's survey participation; NOBS: number of observations; LCS = S_t ; VOL4 = σ_t ; DISP1 = $\sum_{t,1}$; OIP1 = q_t ; OINF1 = I_t ; OINF1**2 = I_t^2 ; CRASH = $Crash_t$; EIP1 = $\Delta q_{i,t}^1$; EIPF = $\Delta q_{i,t}^f$; EINF1 = $\Delta I_{i,t}^1$; EINFF = $\Delta I_{i,t}^f$; C : constant term ; RSQ =R**2 ; RMSE : root of mean square error.

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NOTES

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[1] For any stockholder, the risk premium required to hold stocks rather than a risk-free asset classically depends both on the agent's risk aversion and on his/her appreciation of how uncertain the state of the nature is.

[2] For investor i, let $Q_i\ (s)$ be his/her demand for stocks and $Q_i\ (r)$ his/her demand for the risk-free asset. These magnitudes depend on the spread between his/her required *ex-ante* premium z_i and the market excess return z_m. At any time, $Q_i\ (s)$ and $Q_i\ (r)$ are such that $\frac{dQ_i(s)}{dt} = -\frac{dQ_i(r)}{dt} = \lambda_i\,(z_m - z_i)$, where $\lambda_i > 0$ represents the weight of agent i: the larger λ_i is, the greater the amount is for the transactions for a given value of $z_m - z_i$. When $z_m > z_i$, agent i sells the risk-free asset and buys stocks ($\frac{dQ_i(s)}{dt} > 0$; $\frac{dQ_i(r)}{dt} < 0$) whereas when $z_m < z_i$, agent i sells stocks and buys the risk-free asset ($\frac{dQ_i(s)}{dt} < 0$; $\frac{dQ_i(r)}{dt} > 0$). If N investors having the same weight intervene on the market, the equilibrium, reached when for the two assets, supply matches demand at the aggregate level, is defined by the condition $\sum_{i=1}^{N} \frac{dQ_i(s)}{dt} = 0$ or, equivalently, $\sum_{i=1}^{N} \lambda_i\,(z_m - z_i) = 0$. This last equation leads to the equality between the market excess return and the weighted average of *ex-ante* individual premia, that is $z_m = \sum_{i=1}^{N} \lambda_i z_i \Big/ \sum_{i=1}^{N} \lambda_i$, which implies that, when the equilibrium is reached, the market excess return equals the ex-ante market premium. Note that when all agents have the same weight ($\lambda_i = \lambda\ \forall\, i$), we obtain $z_m = \frac{1}{N}\sum_{i=1}^{N} z_i$: the market ex-ante premium is a simple arithmetic average of individual ex-ante premia.

[3] See Cochrane (1999).

[4] See papers by Kocherlakota (1996), Cochrane (1997) and Siegel and Thaler (1997), which provide comprehensive surveys of the macroeconomics and finance literature about the equity premium puzzle.

[5] For instance, according to the naive process hypothesis, the expected return equals the return observed during the last period. However, as suggested by Abou and Prat (2000), the three traditional expectation processes: extrapolative, adaptive or regressive, may also be assumed in a more general model mixing them.

[6] In the book on the equity risk premium edited by Mehra (2006), historical excess returns remain largely the dominant approach, but some rare studies using survey data are mentioned and are reviewed in the present paper.

[7] The Sharpe ratio is defined as the ratio between the mean risk premium over the period and the standard deviation of the expected return of stocks. To check the distorted expectation hypothesis for the Livingston panel data, the observed Sharpe ratio has to be greater than the corresponding theoretical value.

[8] After the death of J. Livingston in 1989, the Philadelphia Federal Bank managed the survey. Croushore (1997) provides a survey of studies using the Livingston panel.

[9] Cf. the online documentation from the Bank of Philadelphia Bank website, August 1992, page 5, and July 1997, p.2, (variable SPIF). For the 1989-02 and the 1990-01 surveys, observed and expected indexes both relate to the S&P400 index.

[10] This premium may be viewed as the 1-semester ahead *expected* premium corresponding to a portfolio of industrial stocks held for one semester. The existence of a forward market for such a portfolio increases the relevance of the forward premium since the difference between the expected portfolio price and its forward price also defines the forward risk premium.

[11] For the *ex-post* premium, the variance of the stock prices rates of change is quite high compared to the dispersion of the two other components.

[12] As a consequence, we cannot test if discrepancies between groups (moments, correlations, parameters…) are statistically significant.

[13] We checked that, at the 10% level, the exogenous variables are not significantly correlated, which is a condition for applying the APT.

[14] See Lintner (1973).

[15] We have: 0.22 / (2* 0.02) = 5.5 (% a year).

[16] Among the "*macroeconomic common factors*", we found that the interest rates term structure is not significant at the 5% level. Concerning the stock market returns, our results show that the volatility of returns, rather than the returns themselves, is a relevant factor explaining *ex-ante* premia.