Chapter 2

A research programme for improving forecasts of patent filings

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1 Introduction

This chapter describes the starting point of the research efforts described in the subsequent chapters. It draws to a certain extent on an earlier internal EPO report by a group of experts on forecasting.

Filing estimates are of crucial importance for the capacity planning decisions faced by the Office. EPO search and examination capacities are a major determinant of pendencies. Any improvement in the precision of filing predictions will therefore mean a better tradeoff between office efficiency and decision-making lags. In 1999, the EPO asked the external expert group (referred to below as the advisory group) to review its methods and procedures used for predicting the numbers of filings.

The advisory group came to a positive general assessment of the methods and procedures used at EPO to estimate and predict patent filings. The group also made a number of suggestions which were summarized in a report to the Office. In addition to making detailed suggestions as to how the current practice of estimating filings could be improved, the advisory group suggested to set up a continuous research programme. Subsequently, the Office concluded that such a research programme should involve outside experts contributing to an improvement of existing methods. The EPO then asked this author to submit a report in which the structure of a research programme would be outlined.

The report was concluded at the beginning of 2000 and presented suggestions – made on the basis of information available at that time – as to how such a research programme could be set up and which research packages could be specified. The report described five research modules which

were to be either delegated to external researchers or undertaken (at least in parts) by EPO experts.

The following sections summarize the suggestions made prior to the inception of the research projects described in subsequent chapters of this book. In Sect. 2, the main motivation for the research projects is described. In Sect. 3, potential approaches towards estimating patent filings are summarized. Sect. 4 describes the proposed research modules, and Sect. 5 discusses the need for coordination among the different modules. Sect. 6 concludes with additional suggestions.

2 Motivation and task description

The basic structure underlying the inflow of filings at the EPO is described in Fig. 2.1. Stages with EPO involvement are highlighted.

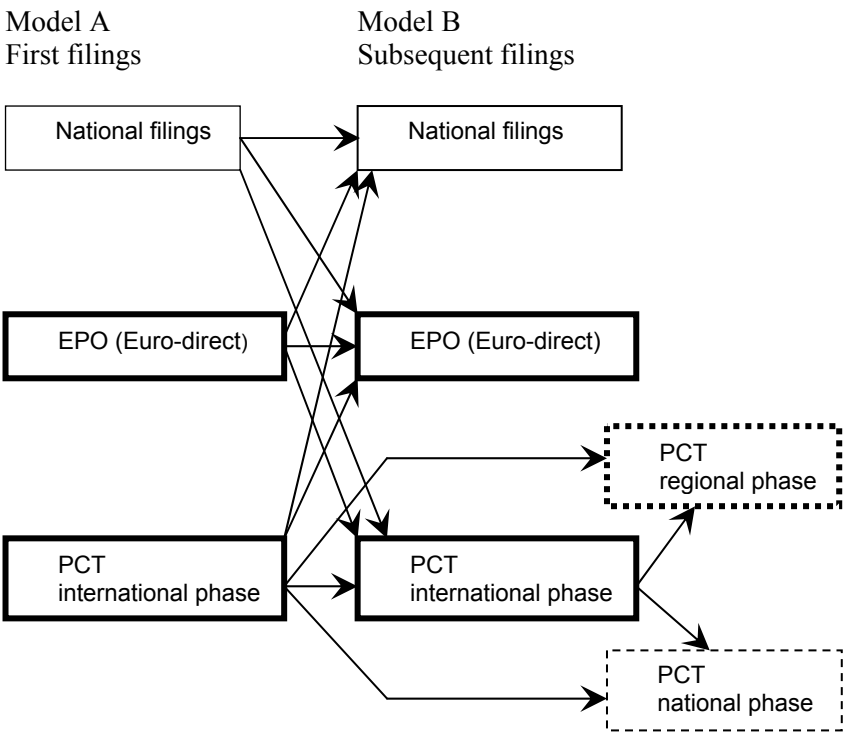

Fig. 2.1. Sources and destinations of filings. The stages where EPO can be involved are highlighted

Existing models for predicting the numbers of filings fall into two categories. The first type (Model A) focuses on first filings that are directly filed at the EPO (euro-direct), at national offices (national filings or PCT-IP filings) or at other supranational offices. The second type (Model B) focuses on subsequent filings, that quote the priority of an earlier first filing and that can also be made at the EPO, national offices or at other supranational offices. Subsequent filings may either enter (or remain in) the euro-direct group, or they may be euro-PCT-IP filings. It is important to realize that (as of 2004), about 86% of all applications reaching the EPO refer back to a national priority, and that the lion's share of these priorities (about 89%) are from Japan, the US and EPC countries.

3 Approaches to forecasting patent filings

3.1 Approaches pursued by EPO and discussed in the report of the advisory group of experts

3.1.1 Survey approaches

The most direct way of eliciting information about future filings is to ask potential applicants about their intentions to file applications at the EPO. The Office has conducted such a survey annually since 1996 and the approach is generally thought to generate highly valuable information. The advisory group views this method as the most promising candidate for short-term predictions, since it does not incorporate past trends into future predictions.[1] The Office surveys two groups of applicants – firstly, applicants that typically file a large number of patent applications per year, and secondly, a random sample of applicants with a relatively small number of filings per applicant.[2]

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[1] Strictly speaking, this may not be correct if the applicants themselves use methods for predicting future filings which depend on long-run trends. In any case, the respondents of the survey can safely be assumed to have better information on such trends at the firm level than the Office.

[2] Another group of interest are firms which have not been actively patenting in the past, but may be willing to initiate their first patent filings in the future. In principle, the existing data at the Office would permit an analysis of how large this group is in relation to the two other ones.

Patent filings are heavily concentrated – the largest applicants account for a very large portion of total filings.[3] Surveying a very small number of applicants can therefore generate information on the development of a large share of total future filings. The Office has also asked the panel firms for more differentiated information on the number of Euro-direct, PCT and total filings. This information may be of increasing importance, since the growth rates for these types of applications differ considerably. Yet, the more complex questionnaire may also lead to a reduction in the number of applicants responding to the survey.

The advisory group has supported the survey approach, and it has recommended to undertake the following steps towards improvements:

- Increase the sample size.
- Simplify and/or redesign the questionnaire in some parts, e.g., in order to obtain explanations from the respondents for the anticipated changes in filings.
- Broaden the information base via an inclusion of an "EPO filing question" in other surveys, such as the Community Innovation Survey.
- Improving the estimation techniques used to predict filings based on the survey results.
- Working towards an increased exchange of information and cooperation between the EPO, the JPO and the USPTO.[4]

Some of these comments will be addressed below, as the improvement of the survey method will constitute Module A of the proposed research programme.

3.1.2 Extrapolation

The extrapolation models involve – in some way or another – the modelling of the time series behavior of patent filings. This may involve a simple smoothing technique (such as exponential smoothing), a regression of filings against time, a univariate time series model (such as an Auto Regressive Integrated Moving Average, or ARIMA model), or a multivariate time series model of filings. The univariate models typically consider the total number of filings at the level of the Office. In other research efforts, EPO

[3] Given that patent filings are highly correlated with firm size (which is roughly distributed according to a log-normal distribution), this result is not surprising.

[4] The Office is already engaged in an extensive exchange of information on a number of forecasting techniques. A trilateral global applicant panel survey would also be a good idea.

statisticians have used national R&D data to model domestic filings as a function of past R&D expenditures. In current versions of the applicant panel survey, the Office asks firms about their R&D activities. Again, this provides valuable data for forecasting future filings.

The advisory group encourages the EPO to consider ARIMA models as a valuable complement to the theoretically less complex regressions of filings on time trends. In particular, the external experts recommend to employ extended ARIMA approaches which allow other variables, such as R&D, to be included in the estimation. In principle, it is also possible to shift to monthly or quarterly time series if these contain interesting information on the future development of filings. Such an approach is helpful in that it enables the office to recognize relatively early if the predicted filings differ substantially from the actual ones. These issues will again be addressed below, since this report suggests to dedicate one research module (Module E) to ARIMA, Vector AutoRegression (VAR) and other time series approaches, using aggregate data on filings.

3.1.3 Transfer methods

The third generic type of approaches pursued by the Office uses data on first filings in the national offices and on past subsequent filings at the EPO for the computation of transfer coefficients. This approach is attractive, since the national offices can in principle deliver detailed data on their current filings which - with some probability given by the transfer coefficient - may reach the EPO later, typically at the end of the priority year. The transfer method also lends itself nicely to the modelling of the application path, since separate transfer coefficients can be computed for euro-direct and euro-PCT-IP applications which reach the Office via the national offices and WIPO. Therefore, this report suggests to intensify research towards the improvement of the transfer method as currently pursued by the Office. This work will constitute module D (see Sects. 3.2.2. and 4.5 for more details).

3.2 Additional approaches suggested by the advisory group

3.2.1 Econometric modelling

The advisory group recommends to embark on a number of additional research efforts. These are not meant to introduce drastically new methods, but to refine the existing ones based on new empirical evidence regarding the predictive power of the models. One of these approaches recommended by the advisory group is the modelling of the relationship between patent

filings and a broader set of economic and behavioral determinants. The patent literature contains a large number of contributions in which patenting activity (either filings or grants) are modeled as a function of broad sets of variables. These models have been specified at the level of enterprises, industries, and countries. This report suggests in the following section to design two research modules (Modules B and C) that deal explicitly with these types of models. One module is supposed to study these relationships at the firm level, another module is suggested for work on the determinants of filings at the industry or national level.

It is noteworthy that there is a direct relationship between models of this kind at the firm level and the survey information considered in Sect. 3.1.1. R&D expenditures play a particularly important role in this context, since the relationship between the two variables is very strong. Given the time lag between R&D spending and the filing of patent applications, information on future R&D could effectively lengthen the time horizon for which predictions can be made with reasonable precision. The Office has already developed plans to ask respondents in the applicant panel for information about their R&D activities. These data may be an effective complement for the research projects sketched out in this report. R&D data may also be or become available from additional sources, such as the Community Innovation Surveys.

3.2.2 Econometric modelling of filings flows between patent offices[5]

Another recommendation of the advisory group concerns more econometric approaches which distinguish between different types of filings or application paths. These approaches can be seen as natural extensions of the transfer method already practiced by the office. The particular appeal of this recommendation is that it would enable a more refined prediction to emerge from the estimation – in particular one that takes heterogeneity across filings into account. Given that the workloads resulting from various types of filings differ, the microstructure in such predictions would be of particular relevance to the Office. More details on this approach and its implications for the research to be undertaken follow in Sect. 4.5.

[5] The report of the advisory group uses the term *structural models*, since these approaches consider the structure of the various patent offices and the flows of filings between them in greater detail than time-series or other approaches. This terminology is avoided here, since the term may be misunderstood. In econometrics, the term structural model is typically reserved for a model in which the regression parameters directly reflect corresponding parameters in a theoretical model. See Chap. 3.

3.2.3 Global models and cooperation with other offices

The advisory group also recommends stronger cooperation with the JPO and USPTO in the development of models which focus on flows of filings between the three offices. In terms of the classification developed by the advisory group, this would involve a more structured approach to transfer models – executed in a cooperative effort between the offices.

Taking this suggestion into account in the design of a research project initiated by the EPO alone would obviously run into a number of problems. The degree to which cooperation between large national and supranational institutions can be realized cannot be affected by the EPO alone, nor can it be planned in the context of this report. This particular suggestion of the advisory group is therefore not taken into account here. However, some of the projects described below may very well profit from cooperation with the USPTO and the JPO. As they are described here, they can also be initiated on a stand-alone basis.

3.2.4 Other recommendations

The advisory group is skeptical about additional approaches such as neural networks or applications of chaos theory. That skepticism is shared in this report. These drastically different approaches will therefore not be considered here. But research work based on these concepts can possibly constitute an entry in the research competition outlined below. In that regard, the research competition offers a degree of openness with respect to drastically new approaches that could not be replicated in a contract research setting.

4 Proposed research projects

4.1 Structure of the research programme

An overview of the projects to be undertaken is presented in Fig. 2 which lists some of the most important tasks within the modules, and (in the bottom field of each rectangle) the party or parties to be engaged in the particular project.

This section lists details of the research to be undertaken in each of the five modules A, B, C, D, and E. Furthermore, it briefly summarizes the research questions to be tackled, the statistical and econometric methods that may be applicable, and the types of data needed for a completion of the analysis. The segmentation of the overall research work in five modules follows a number of simple design principles. Firstly, the modules should

be reasonably balanced, i.e., of roughly equal weight. Secondly, while some coordination across modules is required and potentially very productive, the modules can be delegated to teams which work separately on their respective task. This is not to say that the tasks are completely independent – each of the modules can profit from some coordination and coupling with the other modules. As will become clear, some of them have particularly strong links, either because they will have to employ the same or very similar data sources, or because they are likely to employ very similar econometric methods.

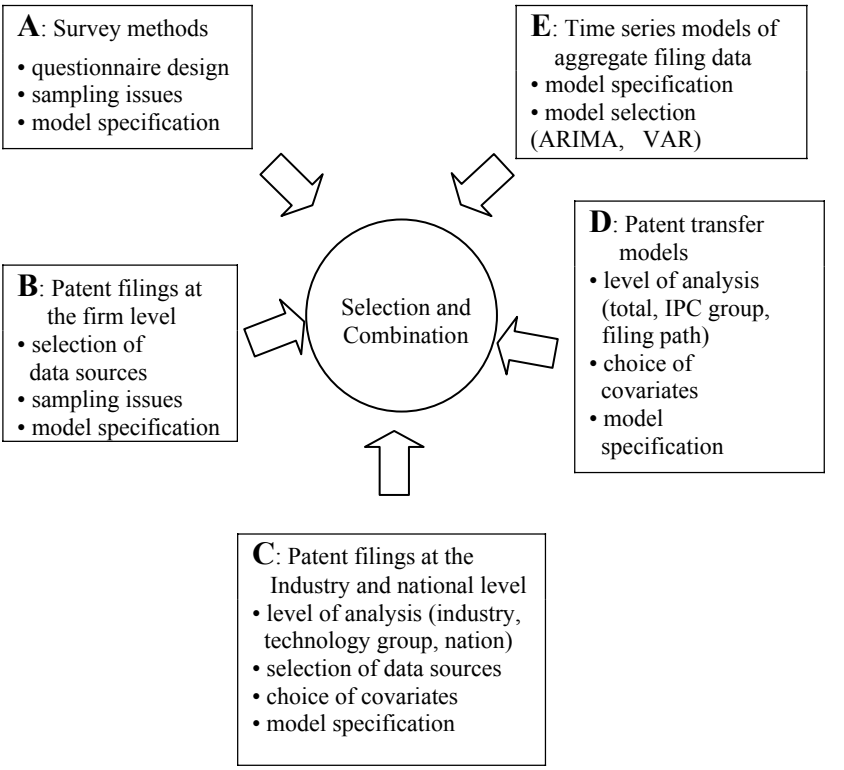

Fig. 2.2. Research modules

The coexistence of various methods which generate different predictions regarding the number of filings in future years also requires a systematic method of selecting or combining these estimates. In principle, this task

could be delegated to an additional research module. Given that the coordination requirements for this module would be exceedingly high, this task should either be tackled once the research results have been generated; even better, this task should be considered an activity that is directed and undertaken internally by EPO experts who are in contact with the research groups.

In three out of the five modules (B, C and E), this report recommends that the research work be delegated to external teams which are then monitored by EPO experts. In one case (Module A), the research is likely to be conducted by Office experts with some limited help from outside sources. Finally, in one other case (Module D), the research undertaken will have to be shared about equally between the external and internal researchers. In any case, monitoring and coordination by EPO experts will prove to be critical, in particular when the teams are supposed to take trilateral inputs into account. This is most likely to be needed for Modules A, C, and D.

4.2 Module A – Survey methods

The most direct method of obtaining an estimate of future patent filings is to survey applicants. This method is particularly appealing in the light of the strong concentration of filings within a group of relatively large corporations. Therefore, it is paramount to have precise estimates of the number of applications coming from large applicants. Moreover, by surveying a representative sample of applicants with relatively small numbers of filings, it becomes possible to generate predictions for that group as well. Survey data are particularly valuable when the structural relationships that have guided patenting behavior in the past are subject to major change. While much of the efficacy of the survey approach relies on an efficient execution of the respective survey, a number of interesting scientific research questions remain, e.g.:

- How should survey questionnaires be designed in order to elicit a maximum of information and – at the same time – a high response rate.
- Which firms should be included in the samples, and how large should the samples be given the resource cost of increasing the sample size.
- How should the estimates obtained in the survey be combined to generate an estimate of the overall number of filings expected in some future year.

Leaving aside the third question, which is a classical statistical problem, the first two questions require in-depth knowledge of the previous surveys undertaken by the office. This report therefore suggests to conduct the re-

search tasks of this module within the EPO. External support is feasible and possibly constructive in the following areas:

1. The optimal design of the questionnaire should match the typical information structure of the respondents. Data that are not easily available to the respondents are unlikely to be generated through search and analysis. Hence, to the extent that this step has not been undertaken already, it would be productive to interview a number of survey participants with respect to the data questions they can answer easily and with great precision. This information could guide the EPO in its difficult trade-off between comprehensiveness of the questionnaire and frequency of missing items or even reduced response rates.
2. The form in which the survey is administered could conceivably be subject of research. Internet-based questionnaires have been shown to be quite effective and popular among some respondents. They also offer cost advantages and allow online error tracking.
3. It may also be interesting to consider which incentives can be provided to the respondents of the survey in order to encourage participation. These could involve, for example, extensive reports about future trends in patenting, or free issues of products (e.g., CD-ROM data) that the Office makes available for a fee to the public at large.

The advisory group has recommended that research and work leading to improvement in the survey method should be conducted mainly in-house. This report concurs, given that the coordination of this particular task is relatively burdensome. However, for questions and support in the area of survey design, the Office may want to enlist support in the form of thesis work to be undertaken by graduate or undergraduate students with prior training in empirical methods.

As was mentioned before, the task of generating predictions and measures of dispersion for the expected number of filings is a classical statistical problem. However, the problem may not be trivial, depending on the particular structure of the survey. Again, this report recommends to set some resources aside in order to enlist help from statistical and econometric experts, or – given financial constraints – from graduate and undergraduate students undertaking supervised thesis work in this area. For example, the use of bounded influence estimators as recommended by the advisory group can become the topic of a thesis in statistics or econometrics. A particular expertise of the patent system is not required in these applications, hence, the group of possibly interested researchers is considerably larger than it is for the following modules.

Steps towards a survey conducted jointly or cooperatively by the EPO, the USPTO, and the JPO are currently not included in the concept for this

research module as they may depend on factors that cannot be assessed in detail in this report.

4.3 Module B – Patent filings at the firm level

This module is intended to generate research results on the impact of economic and behavioral determinants on patent filings at the firm level. The motivation underlying this research is the same as for Module A. Given that a small number of applicants at the EPO (and at other patent offices) account for a large fraction of total filings, a model describing the behavior of these firms might be a powerful instrument in predicting future patent filings. Moreover, for these large applicants it is typically possible to obtain accounting and other data that may be used in the specification of micro-econometric models of patent filings. A necessary condition for such models to be helpful is to find a robust and statistically well-founded model. In other words, research in this module needs to identify

- The set of covariates to be included in the econometric models.
- Data sources containing the covariates determining filing at the firm level.
- Means of updating these data sources such as to allow EPO to use the methods developed here in regular intervals.
- The econometric estimation procedures best suited for predicting filings at the firm level.

Data collection is the most critical issue for research within this module. It requires researchers to make difficult tradeoffs between data availability and maintenance on the one hand, and methodological and theoretical considerations on the other. Ideally, the data used here should come from standard sources which will reliably produce updates of the data. A restriction to applicants with headquarters in Japan, Germany, France, UK and the US would conceivably lower the complexity of the data collection process without introducing large biases.

The data to be collected for these firms should ideally include information on R&D expenditures, value-added, sales, the number of employees, and other standard accounting information. The most crucial variable is clearly R&D. While R&D expenditures have to be reported by publicly traded US corporations to the Stock Exchange Commission (SEC), they are not part of standard reporting in the UK, France and Germany. However, various researchers have put together relatively large panel datasets that do include information on R&D expenditures which could in principle be useful for the projects described here.

The business press also compiles data on the R&D activities of the largest international corporations. For example, Business Week publishes an annual report on R&D undertaken by U.S. firms. It will be an important task in this module to identify such data, to arrange for access to them, and to conduct the econometric analyses. This work is obviously related to some of the issues tackled in Module A. If it turns out that the EPO survey will regularly collect data on R&D expenditures and expected changes in R&D spending levels, then modules A and B should be closely coordinated.

4.4 Module C – Patent filings at the industry and national level

The research questions relevant for module C are similar to those of module B. At first glance, it may seem puzzling that such an analysis at the industry or national level should be undertaken. However, it is not necessarily the case that predictions based on a firm-level model will outperform a corresponding model estimated at the level of industries or nations. One argument that may lead to a preference for the more aggregated level is the existence of externalities at the firm level. If the patenting behavior of firms is not only a function of own R&D, but also of the R&D of competitors, then a model at the industry level could conceivably be a more precise instrument than estimates at the firm level are. Moreover, more aggregated estimates also circumvent the need for aggregation of the firm level results.

Models at the industry and national level face a number of challenges, though. Firstly, there is the problem of associating patent applications with industries. The natural classification of patents via their IPC codes does not translate easily into some industry classification. Transition matrices to accomplish this transformation have been developed for some nations (e.g., Canada) but not for a large number of European countries. Thus, mapping IPC classes into industries (e.g., classified by NACE codes) is largely terra incognita at this point. The advisory group discusses the possibility of aggregating various industries to a relatively small number of five or six major groups. This report concurs, since this procedure is likely to reduce complexity and allow for a better concordance between patent and industrial classification. The proper group classifications will have to be determined by the researchers, if possible in accordance to the results from other patent offices in the trilateral group. Industry-specific data, e.g. on R&D, value-added, investment etc. are available, for example from the OECD in its MSTI ANBERD database. Once the industry-IPC classifica-

tion is determined, the aggregation of these variables should not constitute a problem.

A structurally similar problem emerges for models of filings at the national level. This problem arises in particular if one wishes to model first filings at the national offices, since applicants in smaller EPC countries may prefer to send their first application to one of the large national offices in Europe. The advisory group has recommended to circumvent some of these problems by aggregating a number of relatively small countries to one bloc, and by interpreting this bloc as one observation together with other observations reflecting the larger countries.

Given that the purpose of this research is to model cross-sectional and longitudinal variations of filings, a relatively large set of determinants can conceivably be of value in estimating the models. Typically, the data used in this module will consist of panel data which may – at least for some variables – be considerably "shorter" than the data used in the ARIMA and time series estimates at the national level. It is therefore believed that the approach to be studied here has more similarity with the research work conducted in module B, than with typical time series approaches as they will be discussed in Sect. 4.6 which describes a module (module E) which can be dedicated to "pure" time series estimates.

The research questions to be tackled in module C can be summarized as follows:

- Determine covariates to be included in the econometric models at the industry or national level.
- Identify data sources containing the covariates determining filing at the firm level.
- Study means of updating these data sources in order to allow EPO to use the methods developed here in regular intervals.
- Find a procedure to aggregate patent filings to industry-related groups of patents, e.g. concordance matrices between IPC and NACE codings.
- Identify the model specifications and econometric estimation procedures best suited for predicting filings at the industry and national level.

4.5 Module D – Patent transfer models

Models which explicitly consider the flows of filings between patent offices have been described and recommended by the advisory group. These models can be seen as the natural extension of the transfer models already used in the office, and they are therefore referred to as "patent transfer models" in this report. The existing transfer models used by the Office

typically try to use simple, but effective extrapolation techniques which are applied to the transfer coefficients, i.e., measures of the likelihood that a patent first filed in some national office will reach the EPO within the priority year either as a Euro-direct filing or as a PCT filing.

In essence, the patent transfer approach amounts to taking the complexity and heterogeneity much more seriously than is done in the other approaches. Modelling various types of filings explicitly increases the value of information coming from precise predictions, but arguably, obtaining precise predictions becomes a more complex job as well. But since PCT applications are becoming increasingly popular (though not equally quickly for the large applicant nations), the approach takes one important source of variation for workload accumulating in the Office into account. Hence, the challenges to be addressed in this module are to

- Identify a sufficiently detailed, but not too complex abstraction of real workflows at the EPO.
- Explore the tradeoffs involved in modelling euro-direct filings and euro-PCT-IP filings either separately or together.
- Obtain information on data availability, in particular of national filings which become the input data for this approach.
- Specify models capturing important determinants of the change in transition coefficients.
- Estimate these models and select the most appropriate variant for future use in the EPO.

The research work in this module would also bring together the work in Modules C and E with the transfer coefficients estimated here, at least to the extent that these modules generate predictions of national first filings. An important step in the combination of these results has been pointed out by the advisory group – once stochastic transfer coefficients and stochastic estimates of future filings are combined, computing the confidence intervals for the resulting estimates is no longer trivial. Given the importance of having precise confidence bounds, this question will also be considered in this module.

Finally, it seems appropriate to point out that the contextual knowledge required for the research work in module D is considerable. This is particularly true if the module also encompasses attempts to model the secular shift from national filings towards filings at the EPO. Such a historical analysis would be highly valuable, but requires in-depth knowledge of applicant behavior and institutional details of the patent system. This report therefore recommends to treat this project as one in which EPO experts and external experts cooperate particularly closely. This module cannot be

delegated to an external team that is not in close and immediate contact with EPO experts.

4.6 Module E – Time series models of aggregate filing data

The final proposed module targets the classical time-series estimation techniques which are already being employed in the Office on a regular basis. The advisory group's report suggests enrichment of the methods used so far by employing additional related economic time series that can shed more light on the longitudinal variation of filings. This is obviously appealing if one takes the lessons learned by the USPTO into account: going from a pure univariate approach to one in which other economic variables were used (in particular R&D expenditures) reduced the forecasting error from about 20 percent in univariate models to about 4 percent in the extended models.

Research issues to be addressed in this module E encompass

- Identification of a set of possible regressors to be used in the time series estimates.
- Specification of suitable models (e.g. Vector AutoRegression, ARIMA, error correction).
- Estimation of the models and determination of the most suitable ones.

The data needs for this particular module are considerably less pronounced than for the other models. Moreover, since the focus will be on prediction rather than causal analysis of the determinants of patent filings, the team working on this module will not require prior knowledge of the patent system.

5 Data needs and internal coordination between modules

EPO can substantially facilitate the projects described in the previous section by supporting the prospective researchers with respect to their data needs. This section lists the data necessary for tackling the research modules. It is recommended that the EPO provide most of the data necessary to undertake the research. This support will enable the cooperating researchers to focus fully on their analytical task, rather than lose time in the search for the required data. Given the restricted financial resources available for the overall project, this support will be a crucial element in the overall design. Moreover, by having some control over the data collection process, the Office can ensure that the econometric models to be developed are not

contingent on idiosyncratic datasets which may be hard to replicate in the Office.

In some cases, however, the data collection effort should be delegated to the external researchers. This is particularly relevant for Module B in which the identification and acquisition of reliable sources of firm-level data is a crucial part of the overall module.

The following table summarizes the data needs for each of the modules. In order to facilitate communication between the research groups, it is recommended to produce a database that can be used jointly by all teams. If at all possible, the teams should be allowed to use the data at their home locations.

The table also briefly summarizes which projects need to be coordinated closely in order to avoid duplication of effort. For example, Modules C and D share the same data, but Module D requires transfer data in addition to the data used in Module C. The methods used in Module E have some bearing and relevance for Modules C and D. Modules A and B can gain considerable synergies by working with the same or similar sampling strategies.

Table 2.1. Required data for the research modules

Module	Data required	Module to be closely coordinated with
A	no data required – external team contributes by: i) testing pilot questionnaires ii) exploring data availability in direct consultation with respondents iii) exploring alternative modes of surveying (written, internet, phone)	B
B	patent filings by applicant (same sample as used in Module A) R&D at the firm level	A, C
C	national filings industry level economic data (OECD and statistical offices) R&D spending by industry (ANBERD)	B, D (some links with E)
D	as in module C, plus national first filings and structural data (euro-direct vs. euro-PCT-IP)	C (some links with E)
E	national and EPO filings (monthly or quarterly, annually)	(some links with C and D)

6 Further recommendations

The above modules represent a targeted approach to the improvement of forecasting methods at the Office. They can best be carried out as contract research undertaken by interested and capable scientists. It may be possible to relax some of the financing constraints by explicitly earmarking some of the research work as eligible for supervised graduate thesis work. By specifying the needs of the EPO explicitly in the research contracts, the research work can be focused and highly effective. This is exactly the purpose of the modular approach described above. Necessarily, the research work also becomes very specific in the sense that alternative approaches not foreseen by either the advisory group or by this report may not be pursued. Some remedies should be in place to allow such approaches to emerge. Two possible approaches are listed here – a research competition for young researchers and a regular research conference. Other approaches may be attractive, too, but they would require higher funding levels. For example, the Deutsche Bundesbank has reserved funds for a "researcher in residence." This position is meant to attract eminent researchers in the field of public and corporate finance, and it has apparently proven to be quite successful so far. The EPO could follow this example in order to make research on the economics of the European patent system more attractive.

6.1 Research competition

In order to achieve this objective, an additional suggestion is to introduce a best paper award for research on the determinants of patent filings. This call should be restricted to junior researchers who are – at the time of the call – younger than 35 years of age. This would invoke a kind of tournament structure with prizes to be allotted to the winners of the contest, rather than to all participants who have undertaken the effort. The EPO should provide the basic data for the tournament, e.g., on a CD-ROM, but participants should be free to choose or generate additional data that they think is valuable. This mechanism would set in motion the forces of competition and innovation which may prove to be quite effective from the Office's point of view. The announcement of the winners could take place during a research conference which focuses on issues of patenting.

6.2 Research conference

Probably the least expensive research programme is one in which the scientific community is made aware of research questions relevant to the Office and incorporates some of the questions in the normal course of scientific inquiry. It is clear that scientists will be driven by their own perception of research problems and opportunities. However, it is unlikely that this perception will completely exclude applied problems at the EPO from consideration. In order to allow for such a contribution, researchers need to be alerted to questions of particular relevance. Moreover, the EPO should provide the data necessary to carry out ambitious and path-breaking research in the field of patenting. The EPO should therefore consider the costs and benefits of organizing a conference or regular sequence of conferences in which the participants of the research programme, the participants of the research competition and other scientists play a role.