

**United States Court of Appeals
for the Federal Circuit**

IN RE: SAMIR VARMA,
Appellant

2015-1502

Appeal from the United States Patent and Trademark
Office, Patent Trial and Appeal Board in No. 90/012,366.

INVESTPIC LLC,
Appellant

v.

**INTERNATIONAL BUSINESS MACHINES
CORPORATION, SAS INSTITUTE INC.,**
Appellees

2015-1667

Appeal from the United States Patent and Trademark
Office, Patent Trial and Appeal Board in No. 95/001,939.

Decided: March 10, 2016

JAY P. KESAN, DiMuroGinsberg PC, McLean, VA, argued for appellants. Also represented by CECIL E. KEY, DGKeyIP Group, Tysons Corner, VA; TERESA MARIE SUMMERS, DiMuroGinsberg PC – DGKeyIP Group, Tysons Corner, VA.

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JOHN MARLOTT, Jones Day, Chicago, IL, argued for both appellees in 2015-1667. SAS Institute Inc. also represented by DAVID B. COCHRAN, Cleveland, OH.

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Before WALLACH, CLEVINGER, and TARANTO, *Circuit Judges*.

TARANTO, *Circuit Judge*.

These two appeals involve U.S. Patent No. 6,349,291, which names Samir Varma as the inventor and is owned by InvestPic LLC (collectively, Varma). The patent describes and claims methods and systems for performing statistical analyses of investment data. The Patent Trial and Appeal Board of the Patent and Trademark Office cancelled certain claims of the '291 patent in two related reexamination proceedings—one initiated by International Business Machines Corp. and SAS Institute Inc., the other by SAS alone. *IBM v. InvestPic LLC*, No. 2015-1450, 2015 WL 1456097, at *6 (PTAB Mar. 27, 2015); *Ex parte Varma*, No. 2014-7760, 2014 WL 7186800, at *7

(PTAB Dec. 16, 2014). Varma's appeals center on two claim phrases: (1) a "bias parameter" that "determines a degree of randomness in sample selection in a resampling process"; and (2) "a statistical analysis request corresponding to two or more selected investments." We agree with Varma that the Board erred regarding both claim phrases. Correcting the first error, we reverse the cancellation of claims 1–5, 8–16, 19–21, and 24. Correcting the second error, we vacate the cancellation of claims 22, 23, 25, and 29–31 and remand for further proceedings on those claims.

BACKGROUND

A

The '291 patent states that many "conventional financial information sites" on the World Wide Web furnish information derived from "rudimentary statistical functions [that] are not useful to investors in forecasting the behavior of financial markets because they rely upon assumptions that the underlying probability distribution function ('PDF') for the financial data follows a normal or Gaussian distribution, which is generally false." '291 patent, col. 1, lines 24–37. It adds that "the PDF for financial market data is heavy tailed (i.e., the histograms of financial market data typically involve many outliers containing important information)" and that "statistical measures such as the standard deviation provide no meaningful insight into the distribution of financial data." *Id.*, col. 1, lines 41–47. Conventional "analyses understate the true risk and overstate potential rewards for an investment or trading strategy." *Id.*, col. 1, line 53–54.

After those descriptions of deficiencies of conventional methods, the '291 patent's Summary of the Invention states that "[t]he present invention utilizes resampled statistical methods for the analysis of financial data," which does not necessarily follow a normal probability distribution. *Id.*, col. 1, line 65, through col. 2, line 3. One

particular resampling method described in the '291 patent is the bootstrap method, which estimates the distribution of data in a pool (sample space) by repeated sampling from the pool. *Id.*, col. 10, lines 20–38. In a bootstrap analysis, one way to define a sample space, *id.*, col. 11, lines 16–17, is by identifying a specific investment or particular time period, *id.*, col. 12, lines 62–66. The “bootstrap” samples of data are then drawn “with replacement”: samples are repeatedly drawn from that sample space, and after each drawing, the drawn data returns to the pool for the drawing of the next sample. *Id.*, col. 10, lines 60–62; *id.*, col. 11, lines 18–20. Although samples may be drawn at random, *id.*, col. 10, lines 60–62, the '291 patent also describes using a “‘bias’ parameter” that “specifies the degree of randomness in the resampling process,” *id.*, col. 11, lines 55–58. *See id.*, col. 15, lines 52–62; *id.*, col. 16, lines 9–21. The '291 patent states that, “[i]n order to perform a resampled statistical analysis, a query is received from a client,” who “may specify a number of parameters including an investment or investments (e.g., a portfolio) to be analyzed, a financial function, a sample size, a period, a type of plot and a bias parameter, which controls the randomness of the resampling process.” *Id.*, col. 2, lines 50–56 (emphasis added).

Claim 1, amended during reexamination, is representative, for present purposes, of the claims that include the “bias parameter” limitation:

1. A method for calculating, analyzing and displaying investment data comprising the steps of:
 - (a) selecting a sample space, wherein the sample space includes at least one investment data sample;
 - (b) generating a distribution function using a re-sampled statistical method and a bias parameter, wherein the bias parameter deter-

mines a degree of randomness in sample selection in a resampling process; and,

(c) generating a plot of the distribution function.

InvestPic J.A. 735 (amendment underlined).

Claim 22, also amended during reexamination, involves a request concerning two or more investments:

22. A system for providing statistical analysis of investment information over an information network comprising:

a financial data database for storing investment data;

a client database;

a plurality of processors collectively arranged to perform a parallel processing computation, wherein the plurality of processors is adapted to:

receive a statistical analysis request corresponding to [a] two or more selected investments;

based upon investment data pertaining to the two or more selected investments, perform a resampled statistical analysis to generate a resampled distribution; and,

provide a report of the resampled distribution.

Varma J.A. 331 (amended version: additions underlined; bracketed word deleted).

Claim 29, also amended during reexamination, is another claim involving two or more investments:

29. A system for providing statistical analysis of investment information over an information network comprising:

a financial data database for storing investment data pertaining to two or more investments;

a front end subsystem for receiving a statistical analysis request corresponding to two or more selected investments;

a parallel processor, wherein the parallel processor includes:

at least one processor for performing resampled statistical analysis based upon the statistical analysis request.

InvestPic J.A. 742 (amendments underlined).

B

In March 2012, IBM and SAS filed a request for inter partes reexamination of claims 1–31 of the '291 patent—claims lacking the language underlined in the quotations just above.¹ IBM and SAS argued in the reexamination request that the claims are anticipated by each of two prior-art references, Sortino and Barraquand, and in any event rendered invalid for obviousness by those references, with or without additional references.

Sortino, the reference of primary importance in these proceedings, discloses using a bootstrap method to gain better information about the expected returns on an asset, including the uncertainty associated with the expected returns, than is given by the mean and standard devia-

¹ IBM and SAS were joined by Algorithmics Inc. in requesting the inter partes reexamination, but Algorithmics is not an appellee in this court.

tion of historical data. Sortino speaks of nine asset categories, one being the Standard & Poor's 500 index (S&P 500), and describes performing bootstrap analyses on historical data. As an example, Sortino describes sorting the data for the S&P 500 into seven economic scenarios (*e.g.*, deep recession, mild inflation, chaos) and performing a separate bootstrap analysis on the data from each of the scenarios. After the separate bootstrap analyses, Sortino indicates, the user may inject a subjective judgment into a final set of figures by weighting the results from the seven scenarios to arrive at a combined distribution for the asset. For example, if the investor believes there to be “a 2% chance of a deep recession, a 10% chance of a moderate recession, an 8% chance of a stagnant period, a 60% chance of growth and a 20% chance of moderate inflation,” *InvestPic* J.A. 216; *Varma* J.A. 288, the results of the separate bootstrap analyses for those five data sets may be weighted according to the investor's beliefs to give the combined distribution. As for Barraquand, that reference discloses an error-reduction technique (which it calls “quadratic resampling”), applied to pricing a class of financial assets and implemented on a parallel processor.

The examiner granted the request for inter partes reexamination as to claims 1–5, 8–16, 19–21, and 29–31 in May 2012. The examiner then rejected all of those claims: claims 1–5, 10–16, 19, and 21 for anticipation by Sortino; claims 8, 9, 20, and 29–31 for obviousness over Sortino in view of other references. The examiner found that “Sortino's teaching of identification and use of different scenarios for analyses” meets the “bias parameter” limitation (in the unamended claims). *InvestPic* J.A. 723. The examiner cited the assertion by IBM and SAS that InvestPic effectively “want[ed] to ‘rewrite’ the claim language as ‘wherein the bias parameter determines a degree of randomness **in the selection of samples** in a resampling process’ reading in limitations regarding how and when the ‘bias parameter’ must operate.” *InvestPic*

J.A. 721 (emphasis in original). In response, InvestPic amended the claims. Claims 1 and 11 were amended to clarify that “the bias parameter determines a degree of randomness *in sample selection* in a resampling process.” *InvestPic* J.A. 735, 738 (emphasis added). InvestPic also amended claim 29, on which claims 30 and 31 depend, to include the language underlined in the block quote above, including the requirement that the system “receiv[e] a statistical analysis request corresponding to two or more selected investments.” *InvestPic* J.A. 724.

After entering the claim amendments, the examiner again rejected claims 1–5, 10–16, 19, and 21 for anticipation by Sortino and claims 8, 9, 20, and 29–31 for obviousness over Sortino and other prior art. The examiner separately rejected claim 29 for anticipation by Barraquand and claims 30–31 for obviousness over Barraquand and other prior art.

InvestPic appealed to the Board, arguing that Sortino does not teach a bias parameter that is applied in sample selection in a resampling process, as required by claims 1–5, 8–16, and 19–21; Sortino does not disclose two or more investments, as required by claims 29–31; and Barraquand does not teach a resampling method at all. The Board affirmed the examiner’s rejection of the claims for anticipation and obviousness over Sortino. It did not reach the alternative, Barraquand-based grounds of rejection of claims 29–31.

For the requirement of using a bias parameter in sample selection, the Board found “that Sortino teaches the application of bias after an initial selection by application of the various enumerated scenarios.” *InvestPic*, 2015 WL 1456097, at *3. For the requirements involving two or more investments, the Board gave several reasons for finding that Sortino suggests the ability to analyze two or more investments. The Board relied on Sortino’s ability to conduct distinct analyses of different invest-

ments seriatim, which it thought sufficed because of “[t]he absence of a temporal limitation from Owner’s claims indicating that ‘two or more investments’ are analyzed at the same time.” *Id.* The Board also cited the transitional term “comprising” in claim 29, which indicates that the claim is open-ended, and the claim’s use of the indefinite article “a” when introducing “a statistical analysis request,” which has been construed to mean “one or more.” Therefore, the Board found that although two requests would be necessary in the Sortino system to analyze two or more investments, using “multiple ‘requests’ to analyze ‘two or more investments[.]’ shows or suggests the claimed feature.” *Id.* at *4.

C

In June 2012, after the examiner had granted the request for inter partes reexamination of claims 1–5, 8–16, 19–21, and 29–31, SAS requested an ex parte reexamination of claims 22–31 of the ’291 patent. Claims 22–28 claim systems for performing a statistical analysis of financial data over a network. Claim 22, on which claims 23–28 originally depended, is quoted above. Claim 24, before amendment, required that the claim 22 statistical analysis request include a bias parameter. The amended version of claim 24, now independent, does not involve a requirement of “two or more” selected investments, but it does require (as relevant here) that the bias parameter “determine[] a degree of randomness in sample selection in a resampling process.”

The examiner granted the request for reexamination of claims 22–28, then confirmed the validity of claims 26–28 but rejected claims 22–25 (when lacking the underlined language) for obviousness over the combination of Sortino, Barraquand, and the prior-art patent Maggioncalda (U.S. Patent No. 6,012,044). Maggioncalda describes a user interface for a financial advisory system that operates over a computer network. The examiner

determined that “[i]t would have been obvious . . . to use an interactive computer based financial advisory system, as taught by Maggioncalda, to perform statistical analysis of investment options, as taught by Sortino.” *Varma* J.A. 305–06. Further, the examiner determined that it would have been obvious to use the parallel-processing computer system “taught by Barranquand [sic] in order to be able to perform the calculations more quickly.” *Varma* J.A. 306.

Varma then amended claims 22, 24, and 25 by rewriting claims 24 and 25 in independent form, adding the above-underlined language regarding “two or more selected investments” to claims 22 and 25, and specifying that the bias parameter of claim 24 (applicable even to a single investment) “determines a degree of randomness in sample selection in a resampling process.” *Varma* J.A. 331–33. The examiner entered the amendments and again rejected claims 22–25 for obviousness over Sortino, Maggioncalda, and Barraquand.

Varma appealed to the Board, arguing that because the bias parameter of claim 24 “cannot be construed as merely biasing in general, or biasing the randomness of something else outside of sample selection in the resampling process itself,” *Varma* J.A. 1005, Sortino does not disclose the requisite bias parameter. Varma also argued that Sortino does not teach a resampled analysis of two or more investments as required by claims 22, 23, and 25. The Board agreed with the examiner on both points.

For claim 24 and its bias-parameter limitation, the Board found “that claim 24 does not mandate that the bias parameter be utilized during initial sample selection” and Sortino suggests a bias parameter by “teach[ing] the application of bias after an initial selection by application of the various enumerated scenarios.” *Varma*, 2014 WL 7186800, at *4. For the other claims and their two-or-more-investments limitations, the Board found that

Sortino suggests the ability to analyze two or more investments. As in the inter partes reexamination, the Board noted that the claims use the transitional term “comprising” and the indefinite article “a” in the claim term “a statistical analysis request,” and on that basis it found “that a system such as that disclosed by Sortino, that may utilize multiple ‘requests’ to analyze ‘two or more investments,’ shows or suggests the claimed feature.” *Id.* at *3. The Board also observed that the examiner “note[d] that Sortino discloses analysis of the S&P 500 index, which comprises 500 underlying stocks (or investments).” *Id.* at *2.

Varma appeals under 35 U.S.C. § 141(b), challenging the Board’s rejection of claims 1–5, 8–16, 19–25, and 29–31. We have jurisdiction under 28 U.S.C. § 1295(a)(4)(A).

DISCUSSION

Where there is no dispute about findings or evidence of facts extrinsic to the patent, we review de novo the Board’s determination of the broadest reasonable interpretation of the claim language. *Straight Path IP Grp., Inc. v. Sipnet EU S.R.O.*, 806 F.3d 1356, 1360 (Fed. Cir. 2015). We review the Board’s anticipation determination for substantial evidence. *In re Rambus, Inc.*, 753 F.3d 1253, 1256 (Fed. Cir. 2014). We review the Board’s ultimate obviousness determination de novo and underlying factual findings for substantial evidence. *Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1073 (Fed. Cir. 2015).

A

Varma’s first challenge is to the Board’s understanding of the bias parameter required by claims 1–5, 8–16, 19–21, and 24. For the inter partes reexamination, as it comes to us, dependent claims 2–5, 8–10, 12–16, and 19–21 rise or fall with independent claims 1 and 11. For the ex parte reexamination, claim 24 is the sole claim before us presenting this issue.

As a threshold matter, we reject the suggestion that Varma’s claim-construction position on the key point involving the bias-parameter limitations is new on appeal and therefore should be disregarded. Varma consistently asserted to the examiner and the Board the meaning of the bias parameter limitation asserted here—that the bias parameter must be applied to the selection of samples from a sample space, as distinguished from the creation of a sample space or the post-sampling combination of results calculated separately from the separate sampling analyses of distinct sample spaces. *See, e.g., InvestPic* J.A. 759–60, 1245–47, 1372–75; *Varma* J.A. 355–60, 1035–36.

On the merits, we agree with Varma that there is only one reasonable meaning of the claim language, considered alone and in light of the specification: the bias parameter is used in selecting samples from the sample space, not in creating a sample space, and not in making arithmetic combinations of statistical measures previously calculated from separate, resampled analyses. The claim language makes this clear. It explicitly states that the bias parameter “determines a degree of randomness in sample selection in a resampling process.” *InvestPic* J.A. 735–42; *Varma* J.A. 331–32. Claim 1 clearly differentiates between “selecting a sample space,” which occurs in step (a), and “sample selection,” which occurs in step (b). The bias parameter is applied in sample selection in step (b), not in step (a)’s creation of a sample space. And “sample selection” is complete before any process of taking calculated statistical results of several distinct sampling processes and combining those measures in a preferred way.

The specification reinforces the distinctions that are clear in the claim language. The specification first describes the bootstrap process generally: “In step 920, a sample space x is selected. In step 925, a statistical function based on the sample space data is computed In step 930, bootstrap samples . . . are generated from the

sample space using a resampling process.” ’291 patent, col. 11, lines 16–20 (emphases in original). The sample space, therefore, is created before the resampling process, and bootstrap samples are generated *from the sample space*. The specification then describes a bootstrap process using the bias parameter. The sample space is created in step 1115. *See id.*, col. 12, lines 60–66 (“In particular, in step 1115, *a* sample space is determined using the *sample_size* parameter received in step 1105. Because financial database 150*d* may store samples for investments for many different time periods, in step 1115, *a* set of relevant samples for the resampled statistical analysis requested by the client 105 is determined.”) (emphases in original). The bias parameter is applied in step 1135, *after* the creation of the sample space. *Id.*, col. 14, lines 5–10 (“In step 1135, the bias parameter received in step 1105 is analyzed. If no bias is selected (i.e., $\text{bias} = -1$ and data is to be selected randomly), control passes to step 1045 (‘no’ branch of step 1035). If $\text{bias} \neq 0$, in step 1040, a bias initialization algorithm is performed as described in detail below.”).

The particular descriptions of use of a bias parameter confirm the point: the samples that produce a single resampling analysis are all drawn from a given sample space, with the bias parameter determining selection of each particular sample. “The ‘bias’ parameter is a decimal value that is either -1 or between 0 and 1 ” *Id.*, col. 11, lines 55–56. “A value of -1 indicates that the resampling process should be conducted purely randomly.” *Id.*, col. 11, lines 58–59. When “the ‘bias’ parameter is between 0 and 1 , sampling is performed so that $b\%$ of the samples are ‘up’ days and $1-b\%$ of the samples are ‘down’ days, where $b = \text{bias}$. Thus, if $b = 1$, only ‘up’ days will be selected and if $b = 0$ only ‘down’ days are selected.” *Id.*, col. 11, lines 59–64. In the described algorithm for the process, “the sample space is separated into two sets, a first set including only ‘up’ days and a second set includ-

ing only ‘down’ days.” *Id.*, col. 16, lines 10–15. Each sample is drawn from either one set or the other based on whether a randomly generated number between 0 and 1 is or is not less than the bias parameter (between 0 and 1); the distribution of samples, therefore, depends on where between 0 and 1 the bias parameter is set. *Id.*, col. 16, lines 15–22. In this process, the bias parameter controls how samples are selected from the sample space to produce a resampling result for that sample space; it does not change the definition of the sample space itself.

The process leading to the amendments of claims 1, 11, and 24 further supports this reading of the bias parameter. In the inter partes reexamination, when the examiner initially rejected the claims, he stated that Varma’s arguments about the bias parameter were effectively “rewrit[ing]” the claim language as ‘wherein the bias parameter determines a degree of randomness **in the selection of samples** in a resampling process’ reading in limitations regarding how and when the ‘bias parameter’ must operate.” *InvestPic* J.A. 721 (emphasis in original). Varma then proposed amendments to add “in sample selection,” amendments “essentially and helpfully suggested by the Examiner.” *InvestPic* J.A. 749. Based on the amended claim language, Varma specifically argued the distinction between “bias in the selection of sample space to do resampling from” and “selection of samples from that sample space, for example, once that space had been selected.” *InvestPic* J.A. 749–50 (emphases omitted). In the ex parte reexamination, Varma amended claim 24 in the same manner and for the same reasons.

Given the proper understanding of the bias-parameter limitation, the Board’s rejection of claims 1–5, 8–16, 19–21, and 24 must be reversed. The Board’s rulings in both reexamination proceedings rely solely on Sortino for this limitation, “find[ing] that Sortino teaches the application of bias after an initial selection by application of the various enumerated scenarios.” *InvestPic*, 2015 WL

1456097, at *3; *Varma*, 2014 WL 7186800, at *4. But Sortino does not teach or suggest biasing how samples are selected from a defined sample space to arrive at a resampling-based measure for that sample space.

Sortino allows for the introduction of bias in two ways: (1) by sorting the data into seven economic scenarios to perform separate bootstrap analyses of each scenario; and (2) weighting the individual results of the separate bootstrap analyses for the seven scenarios to produce a combined distribution. Neither option biases the selection of samples in the resampling process as required by the claims. First, Sortino is clear that once a scenario is created, all selection of samples from that scenario is random, not biased. *InvestPic* J.A. 214 n.4 (“All of the monthly returns for a given asset in a given scenario were entered into a file. Twelve monthly returns were randomly selected from this file and combined to make a single annual return. This procedure was repeated 200 times with replacement to generate the underlying distribution for a given asset in a given scenario.”); *Varma* J.A. 286 n.4. Second, the post-bootstrap weighting of scenarios similarly does not change the selection of samples from a sample space, and therefore is not the result of the application of a bias parameter within the meaning of the ’291 patent. And none of the expert declarations, all of which were submitted before the clarifying claim amendments, supports finding that Sortino biases the selection of samples from the sample space when performing a resampling process.

Finally, we note that the Board did not find, and we have not been shown, that Sortino’s process—which sorts data into seven economic scenarios, performs a random bootstrap analysis on each individual scenario, and then allows for arithmetic combination of measures separately derived for each of the scenarios—is mathematically equal to applying a bias in choosing samples from a sample space to create bootstrap samples. We therefore need not

decide whether such a showing, if made, would matter to the analysis. *Cf. Zenith Labs., Inc. v. Bristol-Myers Squibb Co.*, 19 F.3d 1418, 1423 (Fed. Cir. 1994) (all claim elements must be proved to be met, even if the required evidence is scientifically redundant). Therefore, we conclude that Sortino does not disclose a bias parameter that operates on the selection of samples from a sample space in a resampling process.

B

Varma also challenges the Board's understanding of "a statistical analysis request corresponding to two or more selected investments," as required by claim 22 (and claims 23 and 25) and claim 29 (and claims 30–31). *InvestPic* J.A. 742–43; *Varma* J.A. 331–33. As with the bias-parameter limitation, we reject the suggestion that Varma's claim-construction position on the key point involving this claim limitation is new in this appeal. On this point, the interpretation of the claims that Varma asserts here is consistent with the meaning it asserted to the examiner and the Board in the reexamination proceedings—that the statistical analysis requested is one that covers two or more investments. *See, e.g., InvestPic* J.A. 761–64, 1262–63, 1390–92; *Varma* J.A. 336–40, 1006–13.

In finding this claim limitation met by Sortino, the Board rejected Varma's position. The Board implicitly relied on two related but different interpretations. In Interpretation 1, the claim phrase embraces a request that calls for a statistical analysis of a single investment. Thus, the Board reasoned that Sortino is covered by the claim even if "two requests would be necessary in the Sortino system to accomplish an analysis of 'two or more investments.'" *InvestPic*, 2015 WL 1456097, at *3; *Varma*, 2014 WL 7186800, at *2. In Interpretation 2, the claim phrase embraces a request that calls for statistical analyses of at least two investments, but each analysis

may be an analysis of a single investment, and the single-investment analyses may take place seriatim. Thus, the Board agreed with the examiner that there is no “temporal limitation from [the] claims indicating that ‘two or more investments’ are analyzed at the same time.” *InvestPic*, 2015 WL 1456097, at *3; *Varma*, 2014 WL 7186800, at *2. We conclude that both interpretations are unreasonable.

The error of Interpretation 1 is plain from the claim phrase at issue. The phrase requires “a statistical analysis request corresponding to two or more selected investments.” *InvestPic* J.A. 742–43; *Varma* J.A. 331–33. That language on its face excludes Interpretation 1. A single request must correspond to at least two investments.

The Board relied on the claims’ use of “comprising” as the transitional term, but that term does not support Interpretation 1. Although the transitional term “comprising” indicates that the claim is open-ended, the term does not render each limitation or phrase within the claim open-ended. *See Dippin’ Dots, Inc. v. Mosey*, 476 F.3d 1337, 1343 (Fed. Cir. 2007); *Spectrum Int’l, Inc. v. Sterilite Corp.*, 164 F.3d 1372, 1380 (Fed. Cir. 1998). “Comprising” means that the claim can be met by a system that contains features over and above those specifically required by the claim element, but only if the system still satisfies the specific claim-element requirements: the claim does not cover systems whose unclaimed features make the claim elements no longer satisfied. Thus, here, a claim-covered system may receive more than one request, but it must in particular be adapted to receive “a request” that itself corresponds to two or more selected investments.

The Board also cited the indefinite article “a” before “statistical analysis request” to support Interpretation 1. But while “a” sometimes is non-restrictive as to number, permitting the presence of more than one of the objects

following that indefinite article, context matters even as to whether the word has that meaning. *See Harari v. Lee*, 656 F.3d 1331, 1341 (Fed. Cir. 2011). And here the question is not whether there can be more than one request in a claim-covered system: there can. Rather, the question is whether “a” can serve to negate what is required by the language following “a”: a “request” (a singular term) that “correspond[s]” to “two or more selected investments.” It cannot. For a dog owner to have “a dog that rolls over and fetches sticks,” it does not suffice that he have two dogs, each able to perform just one of the tasks. In the present case, no matter how many requests there may be, no matter the variety of the requests the system may receive, the system must be adapted to receive a request that itself corresponds to at least two investments.²

² The language here is non-technical, and nothing in the words after “request,” based on ordinary usage or context or other intrinsic evidence, implies or even tends to suggest a plurality of requests. In this respect, the phrase is different from “a contact hole for source wiring and gate wiring connection terminals” in *Eidos Display, LLC v. AU Optronics Corp.*, 779 F.3d 1360, 1365–68 (Fed. Cir. 2015), where both the technical context and intrinsic evidence made clear that there could not be a single hole for all the connection terminals. The phrase at issue here also differs from an example used in *Eidos*: “I am going to create an electric car for the United States and United Kingdom.” *Id.* at 1365. That phrase itself suggests that the “car” referred to is a design that would naturally embrace the necessary country-specific variations in implementation. In the present case, there is no contextual or intrinsic-evidence basis for inferring from the words that come after “request” that the singular term embraces a plurality in some sense.

While the language of the “a statistical analysis request” phrase itself makes clear the unreasonableness of Interpretation 1, it is other claim language—specifically, language in claim 22 (found also in claim 25)—that makes Interpretation 2 unreasonable as an understanding of the “a statistical analysis request” phrase. Claim 22 requires that the plurality of processors be adapted not only to “receive a statistical analysis request corresponding to two or more selected investments,” but also to do these additional things: “based upon investment data pertaining to the two or more selected investments, perform *a* resampled statistical analysis to generate *a* resampled distribution; and provide a report of *the* resampled distribution.” *Varma* J.A. 331 (emphases added). The reference to “the two or more selected investments” is to the immediately preceding “a statistical analysis request” language. A single resampled statistical analysis must be performed based on data pertaining to those two or more investments. A single resampled distribution must be generated by that analysis, and the single distribution must be reported. The interlocking of singulars in that language makes it unmistakable that at least two investments must be the subject of each statistical analysis that is the subject of the request in the claim phrase at issue. For those reasons, the language of claims 22 and 25 precludes Interpretation 2 for those claims.

Similar language is not found in claim 29, the lone claim in the inter partes reexamination that raises the “two or more selected investments” issue. But the principle that the same phrase in different claims of the same patent should have the same meaning is a strong one, overcome only if “it is clear” that the same phrase has different meanings in different claims. *Fin Control Sys. Pty, Ltd. v. OAM, Inc.*, 265 F.3d 1311, 1318 (Fed. Cir. 2001); see *Digital-Vending Servs. Int’l, LLC v. Univ. of Phoenix, Inc.*, 672 F.3d 1270, 1275 (Fed. Cir. 2012); *American Piledriving Equip., Inc. v. Geoquip, Inc.*, 637 F.3d

1324, 1333 (Fed. Cir. 2011); *PODS, Inc. v. Porta Stor, Inc.*, 484 F.3d 1359, 1366 (Fed. Cir. 2007). IBM and SAS have not pointed to, and we do not see, anything in the language of claim 29, or the specification or prosecution history, that provides the required basis for giving the phrase in claim 29 a meaning different from the meaning of the same phrase in claims 22 and 25. And we do not see why the same-meaning principle is inapplicable here just because the amended versions of the claims were introduced in two different reexamination proceedings (about three weeks apart): claim 29 in the inter partes reexamination on March 15, 2013; claims 22 and 25 in the ex parte reexamination on April 5, 2013. If allowed, the claims would be claims within a single patent.

The amendment history of the claims reinforces the conclusion that Interpretation 2 is unreasonable: Varma specifically argued against that interpretation in both proceedings based on the language at issue. After the unamended claims 29–31 were rejected in the inter partes reexamination, Varma amended claim 29 to add “corresponding to two or more selected investments.” *InvestPic* J.A. 742. In doing so, Varma invoked that language to distinguish Sortino, arguing that “all of [Sortino’s] analyses were based upon a single asset at a time.” *InvestPic* J.A. 766. Similarly, Varma amended claims 22 and 25 in the ex parte reexamination in response to the examiner’s rejections based on the examiner’s implicit adoption of Interpretation 2: the examiner found that a request step in Sortino was “implicit, or at least obvious, because various analyses on S&P 500 were actually performed.” *Varma* J.A. 305. Varma added the two-or-more-investments limitation and argued that “Sortino disclosed a statistical analysis request corresponding only to a *single* investment or asset category.” *Varma* J.A. 337 (emphasis in original).

We conclude that the Board relied on unreasonable interpretations of claim language in claims 22, 23, 25, and

29–31. The proper remedy, we also hold, is to vacate the Board’s rejections of those claims for reconsideration of anticipation and obviousness under the correct claim construction.

In the appeal from the ex parte reexamination, the Director of the PTO argues that we may affirm even under the correct claim construction based on the observation by the Board and examiner that Sortino performs an analysis of the S&P 500 index and the S&P 500 index corresponds to 500 underlying securities. IBM and SAS do not make this argument (as to claim 29) in the inter partes reexamination appeal. We reject the Director’s position. There is no basis for treating the single index investment (bought by investors as a single investment) as two or more investments in the assets whose values define the value of the index investment.

Sortino treats the S&P 500 index as a single asset, and it nowhere provides an analysis of the securities underlying the S&P 500 index. IBM and SAS themselves note that Sortino “describes the S&P 500 index as merely one exemplary investment.” Brief for Appellees IBM Corp. and SAS Institute Inc. at 52, *InvestPic LLC v. IBM* (No. 2015-1667). In his expert declaration, Dr. Sortino stated that the analysis shown in his paper “bootstrapped the whole S&P portfolio, not the lowest level underlying individual securities (e.g., specific stocks, bonds, futures, etc.) within the portfolio,” further noting that “this distinction may seem subtle or even trivial, but it in fact has important practical implications.” *Varma* J.A. 781 ¶ 21. Dr. Savage made a similar point, describing “an asset category such as an S&P Index Fund [a]s itself an asset.” *Varma* J.A. 730 ¶ 17. There is no identified record basis for a contrary understanding. Because the S&P 500 index is consistently treated as a single asset, Sortino’s analysis of the S&P 500 index alone cannot meet the two-or-more-investments claim limitation.

On the other hand, we do not reverse the cancellation of the claims that involve this claim limitation. One reason is that paragraphs 20 and 22 of Dr. Sortino's declaration raise a question—which we do not answer—about whether the prior-art Sortino article might teach or suggest a single resampling analysis of at least two assets. To be sure, in the Sortino article itself, the figures relate only to a single asset category, the S&P 500 index; and the article states that the “statistics support our earlier claims about the shape of uncertainty for the S&P 500 and these results held for all nine asset categories studied,” with no statement as to carrying out any single bootstrap analysis of at least two asset categories together. *InvestPic* J.A. 216; *Varma* J.A. 288. But in his declaration, Dr. Sortino said the following, seemingly about the work supporting his article:

The asset allocation model we developed at this time and which was marketed to a number of firms used stocks and bonds from different countries. In both cases it is important to estimate the correlations between the *asset categories* and create a variance-covariance matrix. While we estimated covariance and correlation between the asset categories (e.g., stocks, bonds) we did not want to, need to, and did not, estimate the much more complex correlation and covariance relationships between all the underlying individual securities (individual stocks, bonds or other financial instruments within the portfolios).

InvestPic J.A. 294–95 ¶ 20; *Varma* J.A. 780–81 ¶ 20 (emphasis in original). Dr. Sortino added that “for asset allocation we only needed to measure the covariance between the overall *asset categories* (e.g., the entire S&P, Japan, etc.)” *InvestPic* J.A. 295 ¶ 22; *Varma* J.A. 781 ¶ 22 (emphasis in original).

The Board did not rely on those paragraphs of the Sortino declaration. *InvestPic*, 2015 WL 1456097, at *3–4; *Varma*, 2014 WL 7186800, at *2–3. We will not address in the first instance the meaning and legal significance of those passages, or whether reliance on them at this stage is procedurally appropriate. We leave such questions to the Board on remand. *See Ariosa Diagnostics v. Verinata Health, Inc.*, 805 F.3d 1359, 1366–67 (Fed. Cir. 2015).

Varma also challenges the adequacy of the Board’s analysis regarding the obviousness rejections of claims 22, 23, 25, and 29–31. We do not address that challenge, because we are independently vacating and remanding for the Board to reconsider those claims in light of the proper claim construction. We also do not address the examiner’s alternative grounds of rejection of claims 29–31 based on Barraquand. The Board stated that it was not reaching those grounds. *InvestPic*, 2015 WL 1456097, at *6. Whether to reach to those grounds, and, if so, whether they are sound, are determinations to be made in the first instance by the Board on remand.

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Varma challenges the Board’s understanding of “resampled statistical analysis,” a term that appears in all claims at issue.³ Varma suggests that the term refers to “a statistical analysis using resampling of data involving multiple investments for multiple time periods, wherein the interrelationships in the financial data are preserved.” Brief for Appellant, *InvestPic LLC* at 35, *InvestPic LLC v. IBM* (No. 2015-1667); Brief for Appel-

³ Claims 1–5 and 8–10 use the term “re-sampled statistical method,” but Varma treats the terms as equivalent. Brief for Appellant, *InvestPic LLC* at 35, *InvestPic LLC v. IBM* (No. 2015-1667).

lant, Samir Varma at 37, *In re Varma* (No. 2015-1502). That proposed construction goes far beyond the language supposedly being construed, which refers to a statistical technique that indisputably may be used for analysis outside the financial context altogether and, indeed, may be used for single-investment analysis, as many of the patent claims at issue here make clear. We reject Varma's narrowing construction of "resampled statistical analysis."

CONCLUSION

We reverse the Board's rejection of claims 1–5, 8–16, 19–21, and 24. We vacate the Board's rejection of claims 22, 23, 25, and 29–31 and remand for further proceedings regarding those claims.

Costs awarded to InvestPic in No. 2015-1667.

**REVERSED IN PART, VACATED IN PART, AND
REMANDED**