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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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Ex parte SIMON WANNASIN BELL and
FRANK PAK-HO SIU

_____

Appeal 2017-001019
Application 14/203,807
Technology Center 3600

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Before JOSEPH L. DIXON, CATHERINE SHIANG, and
JASON M. REPKO, *Administrative Patent Judges.*

DIXON, *Administrative Patent Judge.*

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellants appeal under 35 U.S.C. § 134(a) from a rejection of claims 1–9. We note that this application is a divisional application of serial number 13/503,698. We have jurisdiction under 35 U.S.C. § 6(b).

We affirm.

The claims are directed to methods and apparatus for improving factor risk model responsiveness. Claim 1, reproduced below, is illustrative of the claimed subject matter:

    1.   A computer-based method of estimating a variance of a factor in a factor risk model comprising the steps of:

        storing data for the factor in a memory, wherein said memory is a non-transitory computer readable medium;

        determining a time series history of factor returns for the factor over a set of historical times by a programmed processor cooperating with the memory and with software;

        calculating a set of exponentially decaying weights with a fixed half life corresponding to the time series history of factor returns by the programmed processor cooperating with the memory and with software;

        computing a metric of volatility for each historical time by the programmed processor cooperating with memory and with software;

        calculating a set of volatility adjustment multipliers by the programmed processor cooperating with the memory and with software as the ratios of most recent volatility metric to the computed volatility metric;

determining when at least one volatility adjustment multiplier is outside a predetermined range;

adjusting the at least one volatility adjustment multiplier to a value in the predetermined range;

computing the factor-factor covariance for the time series of factor returns using the volatility adjustment multipliers within the range and any adjusted volatility adjustment multipliers for any volatility adjustment multipliers determined to be outside the range by the programmed processor cooperating with the memory and with software; and

outputting the factor variance as part of a factor risk model as a user perceived output by an output device.

REFERENCES

No prior art has been relied upon by the Examiner in rejecting the claims on appeal.

REJECTION

The Examiner made the following rejection:

Claims 1–9 stand rejected under 35 U.S.C. § 101 as being directed to non-statutory matter because the claim(s) as a whole, considering all claim elements both individually and in combination, do not amount to significantly more than an abstract idea.

ANALYSIS

We note that the Examiner has withdrawn the obviousness-type double patenting rejection due to the filing of a Terminal Disclaimer. (Final

Act. 3). The Examiner has also withdrawn the prior art rejection in the Final
Office Action. (*Id.*).

35 U.S.C. § 101 REJECTION

Appellants set forth the same arguments for independent claims 1, 5,
and 9. As a result, we select independent claim 1 as the representative claim
for the group and address Appellants' arguments thereto. With respect to
representative independent claim 1, we will sustain the rejection of claim 1
under 35 U.S.C. § 101, and claims 2–9, which have not been separately
argued. 37 C.F.R. § 41.37(c)(1)(iv).

> The Supreme Court:

> [S]et forth a framework for distinguishing patents that claim laws
> of nature, natural phenomena, and abstract ideas from those that
> claim patent-eligible applications of those concepts. First, . . .
> determine whether the claims at issue are directed to one of those
> patent-ineligible concepts. If so, we then ask, "[w]hat else is
> there in the claims before us?" To answer that question, . . .
> consider the elements of each claim both individually and "as an
> ordered combination" to determine whether the additional
> elements "transform the nature of the claim" into a patent-
> eligible application. [The Court] described step two of this
> analysis as a search for an "'inventive concept'"—*i.e.*, an
> element or combination of elements that is "sufficient to ensure
> that the patent in practice amounts to significantly more than a
> patent upon the [ineligible concept] itself."

Alice Corp. Pty. Ltd. v CLS Bank Int'l, 134 S. Ct. 2347, 2355 (2014) (citing
Mayo Collaborative Servs. v. Prometheus Labs., Inc., 566 U.S. 66, 72–73
(2012)).

To perform this test, we must first determine whether the claims at
issue are directed to a patent-ineligible concept.

Although the Court in *Alice* made a direct finding as to what the claims were directed to, we find that this case's claims themselves and the Specification provide enough information to inform one as to what they are directed to.

The steps in claim 1 result in: outputting the factor variance as part of a factor risk model as a user perceived output by an output device. The Specification further states:

> The present invention relates generally to the estimation of the risk, or active risk, of an investment portfolio using factor risk models. More particularly, it relates to improved computer based systems, methods and software for more accurate estimation of the risk or active risk of an investment portfolio. The invention addresses techniques allowing a factor risk model's risk estimates to be more accurate, more stable, and more responsive.

Spec. 1:9–13. The Specification describes:

> Suppose that there are N assets in an investment portfolio and the weight or fraction of the available wealth invested in each asset is given by the N-dimensional column vector w. These weights may be the actual fraction of wealth invested or, in the case of active risk, they may represent the difference in weights between a managed portfolio and a benchmark portfolio as described by Litterman[R. Litterman, Modem Investment Management: An Equilibrium Approach, John Wiley and Sons, Inc., Hoboken, New Jersey, 2003 (Litterman)]. The risk of this portfolio is calculated, using standard matrix notation, as

$$V = w^T Q w \qquad (1)$$

> where V is the portfolio variance, a scalar quantity, and Q is an $N \times N$ positive semi-definite matrix whose elements are the variance or covariance of the asset returns. Risk or volatility is given by the square root of V.

Spec. 5:4–13 (emphasis added). The Specification further states:

Factor risk models represent the expected variances and covariances of security returns using a set of M factors, where M is much less than N, that are derived using statistical, fundamental, or macro-economic information or a combination of any of such types of information. Given exposures of the securities to the factors and the covariances of factor returns, the covariances of security returns can be expressed as a function of the factor exposures, the covariances of factor returns, and a remainder, called the specific risk of each security. Factor risk models typically have between 20 and 80 factors. Even with 80 factors and 1000 securities, the total number of values that must be estimated is just over 85,000, as opposed to over 500,000.

In a factor risk model, the covariance matrix Q is modelled as

$$Q = B^T \sum B + \Delta^2 \qquad\qquad (2)$$

where B is an N x M matrix of factor exposures, $\sum$ is an M x M matrix of factor-factor covariances, and Δ^2 is a matrix of specific variances. Normally, Δ^2 is assumed to be diagonal.

The factor-factor covariance matrix $\sum$, is typically estimated from a time series of historical factor returns, f_t, for each of the M factors, while the specific variances are estimated from a time series of historical specific returns.

Spec. 6:8–23. The Specification further discusses the numerous calculations and algorithms involved in the Dynamic Volatility Adjustment (DVA) which results in an output. (Spec. 13–22).

Thus, all this evidence shows that claim 1 is directed to a methodology for improving risk model responsiveness with minimal negative impact on both the risk model accuracy and stability.

It follows from prior Supreme Court cases, and *Gottschalk v. Benson*, 409 U.S. 63 (1972) in particular, that the claims at issue here are directed to an abstract idea. Here, the Specification states the present invention relates to the estimation of the risk, or active risk, of an investment portfolio using

factor risk models. (Spec. 1:9–13). We determine the claims to be directed to improving risk model responsiveness with minimal negative impact on both the risk model accuracy and stability–which are at the patent-ineligible end of the 35 U.S.C. § 101 spectrum. *See Alice Corp. Pty. Ltd.*, 134 S. Ct. at 2356. That is, we find the claimed steps of, storing, determining, calculating, computing, adjusting and outputting, constitute physical acts by a human and/or "analyzing information by steps people go through in their minds, or by mathematical algorithms, without more, as essentially mental processes within the abstract-idea category." *Electric Power Grp., LLC v. Alstom S.A.*, 830 F.3d 1350, 1354 (Fed. Cir. 2016). *See also buySAFE, Inc. v. Google, Inc.*, 765 F.3d 1350 (Fed. Cir. 2014) (claims directed to certain arrangements involving contractual relations are directed to abstract ideas). Thus, outputting the factor variance as part of a factor risk model as a user perceived output by an output device is the result of an "abstract idea" beyond the scope of § 101.

As in *Alice Corp. Pty. Ltd.*, we need not labor to delimit the precise contours of the "abstract ideas" category in this case. It is enough to recognize that there is no meaningful distinction in the level of abstraction between the concept of mitigating settlement risk in *Alice* and the concept of estimating risk, at issue here. Both are squarely within the realm of "abstract ideas" as the Court has used that term. The claims do not preempt all forms of the abstraction or may be limited to asset management, does not make them any less abstract. *See OIP Techs., Inc. v. Amazon.com, Inc.*, 788 F.3d 1359, 1360–61 (Fed. Cir. 2015).

The introduction of a computer (or computer based method) into the claims does not alter the analysis at *Mayo* step two.

> [T]he mere recitation of a generic computer cannot transform a patent-ineligible abstract idea into a patent-eligible invention. Stating an abstract idea "while adding the words 'apply it'" is not enough for patent eligibility. Nor is limiting the use of an abstract idea "'to a particular technological environment.'" Stating an abstract idea while adding the words "apply it with a computer" simply combines those two steps, with the same deficient result. Thus, if a patent's recitation of a computer amounts to a mere instruction to "implement[t]" an abstract idea "on ... a computer," that addition cannot impart patent eligibility. This conclusion accords with the preemption concern that undergirds our § 101 jurisprudence. Given the ubiquity of computers, wholly generic computer implementation is not generally the sort of "additional feature[e]" that provides any "practical assurance that the process is more than a drafting effort designed to monopolize the [abstract idea] itself."

Alice Corp. Pty. Ltd., 134 S. Ct. at 2358 (alterations in original) (citations omitted).

"[T]he relevant question is whether the claims here do more than simply instruct the practitioner to implement the abstract idea . . . on a generic computer." *Alice Corp. Pty. Ltd.*, 134 S. Ct. at 2359. They do not.

Taking the claim elements separately, the function performed by the computer at each step of the process is purely conventional. Using a computer to take in data, compute a result, and return the result to a user amounts to electronic data query and retrieval–some of the most basic functions of a computer. All of these computer functions are well-understood, routine, conventional activities previously known to the industry. In short, each step does no more than require a generic computer to perform generic computer functions.

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Considered as an ordered combination, the computer components of Appellants' method add nothing that is not already present when the steps are considered separately. Viewed as a whole, Appellants' claims simply recite the concept of estimating a mathematical variance of a factor in a factor risk model and computation of the volatility of a portfolio of assets. The claims do not, for example, purport to improve the functioning of the computer itself. Nor do they effect an improvement in any other technology or technical field. Instead, the claims at issue amount to nothing significantly more than instructions for estimating a mathematical variance of a factor in a factor risk model and computation of the volatility of a portfolio of assets. Under our precedents, that is not enough to transform an abstract idea into a patent-eligible invention. *See Alice Corp. Pty. Ltd.*, 134 S. Ct. at 2360.

> As to the structural claims, they
>
>> are no different from the method claims in substance. The method claims recite the abstract idea implemented on a generic computer; the system claims recite a handful of generic computer components configured to implement the same idea. This Court has long "warn[ed] ... against" interpreting § 101 "in ways that make patent eligibility 'depend simply on the draftsman's art.'"

Alice Corp. Pty. Ltd., 134 S. Ct. at 2360 (alterations in original).

We have reviewed all the arguments which Appellants have submitted concerning the patent eligibility of the claims before us which stand rejected under 35 U.S.C. § 101. (App. Br. 7–11; Reply Br. 1–3). We find that our analysis above substantially covers the substance of all the arguments that

have been made. But, for purposes of completeness, we will address various arguments in order to make individual rebuttals of same.

Appellants argue "[t]he present invention addresses improved methods for estimating variance of a factor in a factor risk model as further defined by the claims which do not preempt other and different optimization strategies." (App. Br. 8). Appellants further present arguments to "*an N-dimensional new factor vector*" and "the programming of a computer to do the steps of claim 1, the *computer-based apparatus of claim 8*, and the computer software stored on *a non-transitory medium of claim 15*" address language not present in independent claim 1 and claims not before the Board. (App. Br. 8–9) (emphasis added). Appellants' arguments are not persuasive because such arguments are not commensurate in scope with the language of independent claims 1, 5, and 9. *See In re Self*, 671 F.2d 1344, 1348 (CCPA 1982) (limitations not appearing in the claims cannot be relied upon for patentability).

We disagree with Appellants, because the Examiner finds, as do we above, that the limitations in independent claim 1 set forth or describe the abstract idea are [e.g.]: storing, determining, calculating, computing, adjusting and outputting. (Ans. 6). The Examiner goes on to find that, "[t]his is a risk problem and is not directed to attempting to solve a computer technology problem. There is no improvement to any computer technology. The computers, processors, servers, and networks used for updating or modifying data or information is old and well known and routine in the art of risk management." *Id.* (emphasis omitted).

Appellants argue "[t]he present claims are clearly analogous to those in *DDR Holdings, LLC v. Hotels.com et al.*, 113 USPQ2d 1097 (Fed. Cir.

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2014) where it was held that solving an Internet-centric problem with a claimed solution that is necessarily rooted in computer technology." (App. Br. 9). Appellants further argue "the present invention is necessarily rooted in computer technology and clearly is identified as addressing problems in balancing prediction accuracy, stability, and responsiveness in risk model predictions, as addressed at length in the Background of the Invention." (App. Br. 9)

We disagree with Appellants. As found *supra*, the Specification makes it clear claim 1 is directed to a methodology for improving risk model responsiveness with minimal negative impact on both the risk model accuracy and stability. Moreover, the Specification is explicit in stating "[o]ne likely scenario is that the system of the invention will be implemented as a personal computer or workstation which connects to a server 28 or other computer through an Internet or other network connection 26" (Spec. 11:19–22), and "algorithms may be suitably implemented as software stored in memory and executed by a processor or processors in computer 12. Data may be input by a user or retrieved from a database or other storage" (Spec. 13:15–17) with no further details of the computer or software.

We disagree with Appellants because in *DDR*, the claims at issue involved, *inter alia*, "web pages displays [with] at least one active link associated with a commerce object associated with a buying opportunity of a selected one of a plurality of merchants" (claim 1 of US 7,818,399). There is no such claim element with this degree of detail here before us in the present patent application disclosure. All that is required by the claims are generically recited "computer-based" method or apparatus.

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Finally, Appellants argue, "that further adjustment carries throughout the claimed process to solve specific problems with risk models in a manner similar to the way in which Internet-centric problems were solved in DDR Holdings. Unconventional steps and elements confine the invention to a particular useful application." (App. Br. 10–11).

We disagree with Appellants. This is an effect, and not a specific means or method that improves the relevant technology. The question is whether the claims as a whole "focus on a specific means or method that improves the relevant technology" or are "directed to a result or effect that itself is the abstract idea and merely invoke generic processes and machinery." *McRO, Inc. v. Bandai Namco Games Am. Inc.*, 837 F.3d 1299, 1314 (Fed. Cir. 2016). In this case, claim 1, as a whole, is focused on the idea of estimating a mathematical variance of a factor in a factor risk model for computation of the volatility of a portfolio of assets which is not directed to patent eligible subject matter.

<div align="center">Reply Brief</div>

Appellants argue that the words of the claims taken as a whole contradict the analysis of the Answer establishing it as a gross oversimplification of the claims and a critical failing of that analysis. (Reply Br. 2). We disagree with Appellants and find Appellants' arguments in the Appeal Brief, discussed above, merely identified the problems with the risk models, and identify the present invention as an improvement thereto.

Appellants further contend that

> [a]t pages 9 and 10, the Appellant's Brief addresses at length technological problems addressed by the present invention. The Answer turns the analysis required by McRo and the precedents cited thereby on their head concluding because a computer is

employed the technological improvement is somehow irrelevant.
Such a conclusion is contrary to <u>McRo</u>.

(Reply Br. 2). For the reasons discussed above, we disagree with
Appellants' argument and Appellants have not shown error in the
Examiner's conclusion of a lack of patent eligible subject matter of
independent claim 1.

CONCLUSION

The Examiner did not err in rejecting claims 1–9 based upon a lack of
patent eligible subject matter.

DECISION

For the above reasons, we sustain the Examiner's rejection of claims 1
–9 based upon a lack of patent eligible subject matter.

No time period for taking any subsequent action in connection with
this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

<u>AFFIRMED</u>