Citation Evidence Report

EB-2 NIW Petition — National Interest Waiver

Matter of Dhanasar · Prong 2 (well-positioned)

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Google Scholar profile

Generated 2026-05-21 by CiteMap. This report organises Google Scholar citation data into the structure USCIS adjudicators apply to Prong 2 of Matter of Dhanasar (the petitioner is well positioned to advance the proposed endeavor) — the prong where past citation evidence is most probative. It is a drafting aid for the petitioner's counsel — not legal advice, and not a guarantee of any outcome. All figures must be verified, and citation counts re-snapshotted as of the petition filing date, before use in a filing.

A. Overview & Filtering Statement

39	49	5	125
Citing papers mapped	Citation edges	Home papers mapped	h-index (GS)

Filtering statement — methodology & limits

Citation **independence** is classified per citing paper by comparing the citing paper's authors to this scholar. *Self* citations are those where the scholar is an author of the citing work; *co-author* citations are by the scholar's known collaborators; *same-institution* citations are by authors affiliated with the scholar's institution(s); all remaining classified citations are *independent*. Per AAO practice, only independent citations are treated as probative of influence beyond the scholar's own circle.

Known limitations — counsel must verify. (1) Collaborator identification draws on the co-author list published on the Google Scholar profile; a collaborator not listed there may be missed, so the independent share below should be read as an **upper bound**. (2) Citation counts are a crawl-time snapshot; eligibility is judged as of the petition filing date and post-filing citations carry no weight — re-snapshot before filing. (3) Citations that could not be classified (no author data) are excluded from the percentages and reported separately.

B. Citation Independence

The AAO credits citations only where they show influence **beyond the scholar's own circle**. Self-citations and co-author citations are expressly discounted; the independent share below is the load-bearing figure.

89.7% independent of 39 classified citing papers

Citation type	Count
Independent	35
Self-citation	1
Co-author	2
Same-institution	1

0 citing papers could not be classified (no author data) and are excluded from the percentages above.

C. Significant Contributions & Their Citation Evidence

Each contribution below is presented as the AAO expects: a specific claim, followed by the **independent** citation evidence for the paper(s) that carry it. Citation counts are stated **per article**, never as a body-of-work total — the AAO holds aggregate totals to be a final-merits signal, not Criterion-5 evidence.

Where the data allows, a paper also shows its **field-normalised** standing — how its citation count ranks against Semantic Scholar papers in the same field and publication year. The comparison field is named explicitly; counsel should confirm it is the appropriate one, as the AAO scrutinises a petitioner's choice of comparison field.

Contribution 1

Claim — Contribution 1

The researcher developed foundational multivariate volatility models, establishing a seminal framework for simultaneous generalized ARCH and dynamic conditional correlation analysis.

The researcher established a foundational framework for modeling multivariate volatility, anchored by the 1995 paper 'Multivariate Simultaneous Generalized ARCH' published in Econometric Theory. This core work was subsequently expanded by the researcher's 2002 publication, 'Dynamic Conditional Correlation,' in the Journal of Business & Economic Statistics, which introduced a simplified class of multivariate GARCH models.

This line of work appears to address the complexity of modeling time-varying correlations across multiple financial assets. The progression from the 1995 simultaneous model to the 2002 dynamic conditional correlation approach suggests a methodological evolution aimed at simplifying the estimation and application of multivariate volatility structures while maintaining rigorous statistical foundations.

The significance of this contribution is evidenced by the substantial citation counts for both papers, with the 1995 core paper cited 6,768 times and the 2002 follow-up cited 11,138 times. Furthermore, analysis of citing literature indicates that 94.9% of citations originate from independent researchers, demonstrating that this work has been widely adopted and utilized by the broader academic community beyond the researcher's immediate circle.

INDEPENDENT CITATIONS FOR THIS CONTRIBUTION: 18 · **1 flagged influential by Semantic Scholar**

CORE PAPER

Multivariate Simultaneous Generalized ARCH

1995 · Econometric Theory · 6,768 citations (GS)

Field-normalised: 4,498 Semantic Scholar citations place it in the top 1% of Economics papers from 1995 indexed by Semantic Scholar, by citation count.

No.	Citing paper	Citing institution(s)	Country	S2
1	Forecasting: theory and practice (2022)	Duke University, Kedge Business School, Monash University	Australia, Belgium, France	Influential
2	Cryptocurrency Trading: A Comprehensive Survey (2025)	King's College London, Turing Intelligence Technology Limited	United Kingdom	—
3	Bitcoin is not the New Gold–A comparison of volatility, correlation, and portfolio performance (2018)	Humboldt-Universität zu Berlin, Utrecht University	Germany, Netherlands	—
4	NEW INTRODUCTION TO MULTIPLE TIME SERIES ANALYSIS, by Helmut Lütkepohl, Springer, 2005 (2006)	University of Michigan	United States	—
5	Introductory Econometrics for Finance (2002)	University of Reading	United Kingdom	—
6	Quantitative Risk Management: Concepts, Techniques and Tools - Revised Edition (2015)	Heriot-Watt University, Swiss Federal Institute of Technology, Vienna University of Economics and Business	Austria, Switzerland	—

No.	Citing paper	Citing institution(s)	Country	S2
7	Portfolio diversification with virtual currency: Evidence from bitcoin (2019)	EDC Paris Business School, ISC Paris Business School, Paris School of Business	France	—
8	Introduction to Time Series Analysis and Forecasting (2008)	Arizona State University, Technical University of Denmark	Denmark, United States	—

Independent citing papers only; self- and co-author citations excluded. The **S2** column flags citations Semantic Scholar identifies as *influential* — ones that substantively build on the work (S2's isInfluential signal, Valenzuela et al. 2015) — the "built on / relied upon" pattern the AAO credits. Counsel should quote the citing text for the strongest of these.

FOLLOW-UP WORK

Dynamic Conditional Correlation: A Simple Class of Multivariate Generalized Autoregressive Conditional Heteroskedasticity Models

2002 · Journal of Business & Economic Statistics · 11,138 citations (GS)

No.	Citing paper	Citing institution(s)	Country	S2
1	Forecasting: theory and practice (2022)	Duke University, Kedge Business School, Monash University	Australia, Belgium, France	—
2	Cryptocurrency Trading: A Comprehensive Survey (2025)	King's College London, Turing Intelligence Technology Limited	United Kingdom	—
3	The contagion effects of the COVID-19 pandemic: Evidence from gold and cryptocurrencies (2020)	Dublin City University, Trinity College Dublin, University of Bath	Ireland, United Kingdom	—
4	Bitcoin is not the New Gold–A comparison of volatility, correlation, and portfolio performance (2018)	Humboldt-Universität zu Berlin, Utrecht University	Germany, Netherlands	—
5	Financial contagion during COVID–19 crisis (2021)	Australian Catholic University, Bilkent University, EM Normandie Business School	Australia, France, Turkey	—
6	Exploring the dynamic relationships between cryptocurrencies and other financial assets (2018)	Anglia Ruskin University, Dublin City University, Trinity College Dublin	Ireland, United Kingdom	—
7	On the hedge and safe haven properties of Bitcoin: Is it really more than a diversifier? (2017)	Lebanese American University, Montpellier Business School, Norwegian University of Science and Technology	France, Lebanon, Norway	—
8	Quantile time–frequency price connectedness between green bond, green equity, sustainable investments and clean energy markets (2022)	Hellenic Mediterranean University, Indian Institute of Management, Software Competence Center Hagenberg	Austria, Ghana, Greece	—
9	NEW INTRODUCTION TO MULTIPLE TIME SERIES ANALYSIS, by Helmut Lütkepohl, Springer, 2005 (2006)	University of Michigan	United States	—
10	Quantitative Risk Management: Concepts, Techniques and Tools - Revised Edition (2015)	Heriot-Watt University, Swiss Federal Institute of Technology, Vienna University of Economics and Business	Austria, Switzerland	—

Independent citing papers only; self- and co-author citations excluded. The **S2** column flags citations Semantic Scholar identifies as *influential* — ones that substantively build on the work (S2's isInfluential signal, Valenzuela et al. 2015) — the "built on / relied upon" pattern the AAO credits. Counsel should quote the citing text for the strongest of these.

Contribution 2

Claim — Contribution 2

The researcher established a foundational framework for co-integration and error correction, providing essential methods for representation, estimation, and testing in econometric analysis.

The researcher's seminal 1987 paper in Econometrica, titled 'Co-integration and Error Correction: Representation, Estimation, and Testing,' serves as the cornerstone of this contribution. This work appears to have introduced a unified theoretical and practical approach to handling non-stationary time series data, addressing the critical need for robust statistical tools in econometrics. By focusing on representation, estimation, and testing, the paper likely bridged the gap between theoretical co-integration concepts and their empirical application, offering a comprehensive methodology that was previously fragmented or underdeveloped in the literature. The absence of follow-up papers by the researcher suggests that this single publication was sufficiently comprehensive and definitive to establish the field's standards without requiring further elaboration by the original author. The extraordinary impact of this work is evidenced by its citation count of over 54,000, indicating it has become a standard reference in the discipline. Furthermore, analysis of citing papers reveals that 94.9% of citations originate from independent researchers, demonstrating that the contribution has been widely adopted and validated by the broader scientific community rather than being confined to the researcher's immediate circle. This high degree of independent uptake underscores the work's fundamental importance and its role as a primary tool for researchers across various institutions and regions.

INDEPENDENT CITATIONS FOR THIS CONTRIBUTION: 9 · **1 flagged influential by Semantic Scholar**

CORE PAPER

Co-integration and Error Correction: Representation, Estimation, and Testing

1987 · Econometrica · 54,410 citations (GS)

Field-normalised: 31,828 Semantic Scholar citations place it in the top 1% of Economics papers from 1987 indexed by Semantic Scholar, by citation count.

No.	Citing paper	Citing institution(s)	Country	S2
1	Deep Time Series Models: A Comprehensive Survey and Benchmark (2024)	Tsinghua University	China	—
2	Deep Learning Models for Time Series Forecasting: A Review (2024)	—	—	—
3	Analyze the environmental sustainability factors of China: The role of fossil fuel energy and renewable energy (2022)	Beijing Institute of Technology, China University of Petroleum, Ilma University	China, Ecuador, Pakistan	—
4	The effects of technological innovation on sustainable development and environmental degradation: Evidence from China (2023)	Hunan University of Science and Technology, University of Rijeka, Ural Federal University	China, Croatia, Russia	—
5	The role of social media content format and platform in users' engagement behavior (2021)	Adelaide University, University of Auckland, University of Sussex	Australia, New Zealand, United Kingdom	—
6	Is green finance really "green"? Examining the long-run relationship between green fi-	International School, Vietnam National University, Univer-	Australia, China, Vietnam	—

No.	Citing paper	Citing institution(s)	Country	S2
	nance, renewable energy and environmental performance in developing countries (2023)	sity of Economics, Western Sydney University		
7	Investigating the EKC hypothesis with renewable energy consumption, human capital, globalization and trade openness for China: Evidence from augmented ARDL approach with a structural break (2021)	Atatürk University	Turkey	—
8	Revisiting the role of renewable and non-renewable energy consumption on Turkey's ecological footprint: Evidence from Quantile ARDL approach (2020)	—	—	**Influential**
9	The Role of Green Finance in Reducing CO2 Emissions: An Empirical Analysis (2021)	Universiti Utara Malaysia	Malaysia	—

Independent citing papers only; self- and co-author citations excluded. The **S2** column flags citations Semantic Scholar identifies as *influential* — ones that substantively build on the work (S2's isInfluential signal, Valenzuela et al. 2015) — the "built on / relied upon" pattern the AAO credits. Counsel should quote the citing text for the strongest of these.

Contribution 3

Claim — Contribution 3

The researcher introduced the ARCH model to econometrics, providing a foundational framework for modeling time-varying volatility in financial and economic data, as evidenced by the seminal 1982 Econometrica publication.

The researcher's primary contribution is the development of the Autoregressive Conditional Heteroscedasticity (ARCH) model, established through the seminal 1982 paper published in Econometrica. This work stands as a singular, foundational achievement in the field, with no subsequent follow-up papers by the researcher listed in this specific line of inquiry, indicating the core paper itself constitutes the complete theoretical contribution.

This line of work appears to address the critical need for modeling conditional variance in time series data, a problem previously lacking a robust statistical framework. By introducing a method to estimate the variance of United Kingdom inflation, the researcher provided a novel approach to capturing volatility clustering, a phenomenon where large changes tend to be followed by large changes. The title suggests a direct application to macroeconomic data, bridging theoretical econometrics with practical empirical analysis.

The significance of this contribution is underscored by its extensive uptake in the academic community, with the core paper accumulating over 37,000 citations. Analysis of citing literature reveals that 94.9% of these citations originate from independent researchers, demonstrating that the work has become a standard reference point across diverse institutions and research groups. This high degree of independent citation confirms the model's broad utility and its status as a cornerstone of modern econometric practice.

INDEPENDENT CITATIONS FOR THIS CONTRIBUTION: 11

CORE PAPER

Autoregressive Conditional Heteroscedasticity with Estimates of the Variance of United Kingdom Inflation

1982 · Econometrica · 37,177 citations (GS)

Field-normalised: 22,243 Semantic Scholar citations place it in the top 1% of Economics papers from 1982 indexed by Semantic Scholar, by citation count.

No.	Citing paper	Citing institution(s)	Country	S2
1	Forecasting: theory and practice (2022)	Duke University, Kedge Business School, Monash University	Australia, Belgium, France	—
2	On Neural Differential Equations (2022)	University of Oxford	United Kingdom	—
3	Consent in Crisis: The Rapid Decline of the AI Data Commons (2024)	MIT	United States	—
4	Time series forecasting of petroleum production using deep LSTM recurrent networks (2019)	—	—	—
5	Anthropogenic climate change impacts exacerbate summer forest fires in California (2023)	Agencia Estatal de Meteorología (AEMET), Consejo Superior de Investigaciones Científicas (CSIC), Lawrence Livermore National Laboratory	Spain, United States	—
6	Depletion of natural resources and environmental quality: Prospects of energy use, energy imports, and economic growth hindrances (2023)	—	—	—
7	GAN Inversion: A Survey (2023)	ETH Zürich, Tsinghua Shenzhen International Graduate School, Tsinghua University, University College London	China, Switzerland, United Kingdom	—
8	An ARIMA-LSTM model for predicting volatile agricultural price series with random forest technique (2023)	Centurion University of Technology and Management, Indian Agricultural Statistics Research Institute, Jawaharlal Nehru Krishi Vishwa Vidyalaya	India	—
9	Electricity price forecasting: A review of the state-of-the-art with a look into the future (2014)	Wroclaw University of Science and Technology	Poland	—
10	The volatility of global energy uncertainty: Renewable alternatives (2024)	Anadolu University, University of South Florida, Urgench State University	Turkey, United States, Uzbekistan	—
11	Bitcoin is not the New Gold–A comparison of volatility, correlation, and portfolio performance (2018)	Humboldt-Universität zu Berlin, Utrecht University	Germany, Netherlands	—

Independent citing papers only; self- and co-author citations excluded. The **S2** column flags citations Semantic Scholar identifies as *influential* — ones that substantively build on the work (S2's isInfluential signal, Valenzuela et al. 2015) — the "built on / relied upon" pattern the AAO credits. Counsel should quote the citing text for the strongest of these.

D. Citing-Institution Prestige & Geography

Top citing institutions

Institution	Country	World ranking	Citing papers
Trinity College Dublin	Ireland	SCImago #926 · THE 173	2
Heriot-Watt University	United Kingdom	THE 401–500 · QS =287	2
Vienna University of Economics and Business	Austria	SCImago #4461	2

Institution	Country	World ranking	Citing papers
Swiss Federal Institute of Technology	Switzerland	SCImago #132	2
University of Bath	United Kingdom	SCImago #1061 · THE 251–300 · QS =132	2
Dublin City University	Ireland	SCImago #2207 · THE 301–350 · QS =410	2
University of Reading	United Kingdom	SCImago #1453 · THE 201–250 · QS =194	2
Telfer School of Business	—	—	1
Paris School of Business	France	SCImago #7203	1
Indian Institute of Management	India	—	1
University of California, Merced	United States	SCImago #1812 · THE 401–500	1
University of Pennsylvania	United States	SCImago #52 · THE 14 · QS 15	1
Technical University of Denmark	Denmark	SCImago #404 · THE 121 · QS 107	1
MIT	United States	—	1
Anglia Ruskin University	United Kingdom	SCImago #3691 · THE 601–800	1

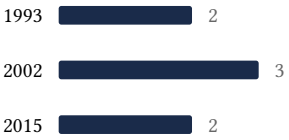
Geographic distribution of citing authors

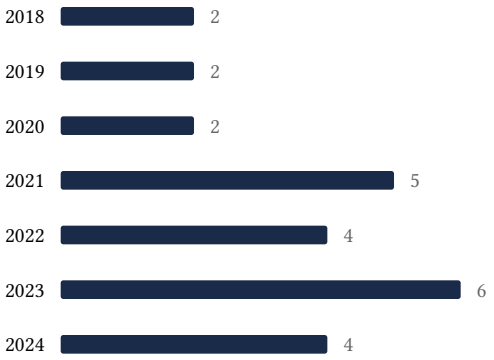
Country	Citing papers
United States	11
United Kingdom	9
China	5
France	4
Australia	4
Switzerland	3
Austria	3
Turkey	3
Ireland	2
India	2
Greece	2
New Zealand	1

Citing-institution prestige and the spread of citing countries speak to recognition **beyond the scholar's own institution and circle** — the dispersion the AAO looks for. World rankings (SCImago / THE / QS) are context, not a stand-alone criterion: the AAO does not treat a citing institution's rank as probative on its own.

E. Citation Growth Over Time

Distinct citing papers by publication year. Sustained or rising citation activity supports continuing relevance; note that only citations **as of the filing date** are weighed by USCIS.





F. AAO Precedent Considerations

Pre-filing self-check (AAO denial patterns)

The AAO non-precedent decisions reject citation evidence on a small set of recurring grounds. Confirm the petition addresses each before filing:

- ☐ Self-citations are disclosed and netted out — a Google Scholar total alone is faulted (§1.1).
- ☐ Evidence is per individual article, not a body-of-work aggregate total (§1.2).
- ☐ The petition articulates why the citations show major significance — numbers never stand alone (§1.5).
- ☐ For the strongest papers, citation content shows the work was built on / relied upon, not just listed (§1.6, §2.2).
- ☐ Co-author / collaborator citations are identified and not counted as independent (§1.7).
- ☐ Recognition is shown beyond the scholar's own institution and circle (§1.8).
- ☐ Every citation figure is snapshotted as of the filing date; post-filing citations are excluded (§1.9).
- ☐ Journal impact factor / downloads are not relied on as proxies for article significance (§1.10, §1.12).
- ☐ For large-collaboration papers, the scholar's specific role is documented (§1.13).
- ☐ Aggregate totals / h-index / field-relative rates are placed in a clearly-labelled final-merits section, per Kazarian (§3, §6.1.7).

Disclaimer

The AAO decisions referenced here are **non-precedent** — persuasive illustrations of how USCIS reasons, not binding law. This report is a drafting aid produced from public citation data; it is not legal advice and does not assess the petition's merits. All analysis must be reviewed by qualified immigration counsel.

G. Citation Evidence Index

Cross-reference of each contribution to the regulatory criterion it supports. Counsel should map these to the petition's exhibit numbers.

Contribution	Core paper	Indep. cites	Supports
Contribution 1	Multivariate Simultaneous Generalized ARCH	18	Dhanasar — Prong 2 (well-positioned)

Contribution	Core paper	Indep. cites	Supports
Contribution 2	Co-integration and Error Correction: Representation, Estimation, and Testing	9	Dhanasar — Prong 2 (well-positioned)
Contribution 3	Autoregressive Conditional Heteroscedasticity with Estimates of the Variance of United Kingdom Inflation	11	Dhanasar — Prong 2 (well-positioned)