

CONTACT INFORMATION

Department of Finance
NYU Stern School of Business
44 West 4th Street, Suite 9-197 F
New York, NY 10012 USA

☎ (832) 364 9793
✉ fsaleh@stern.nyu.edu
[Personal Website](#)
Citizenship: Canada, USA

EDUCATION

NYU Stern School of Business, New York, NY USA

Ph.D., Finance, 2018 *Expected*

M.Phil., Finance, 2017

Columbia University, New York, NY USA

M.Sc., Operations Research Engineering, 2013

Cornell University, Ithaca, NY USA

B.Sc. *Summa Cum Laude*, Operations Research Engineering, 2011

INTERESTS

FinTech, Asset Pricing

WORKING PAPERS

Blockchain Without Waste: Proof-of-Stake

A blockchain constitutes a distributed ledger that records transactions across a network of agents. Blockchain's value proposition requires that agents eventually agree on the ledger's contents since payments possess risk otherwise. Restricted blockchains ensure this consensus by appointing a central authority to dictate payment validity. Permissionless blockchains (e.g. Bitcoin, Ethereum), however, admit no central authority and therefore face a non-trivial issue of inducing consensus endogenously. Nakamoto (2008) provided a temporary solution to the problem by invoking an economic mechanism known as Proof-of-Work (PoW). PoW, however, lacks sustainability, so, in recent years, a variety of alternatives have been proposed. This paper studies the most famous such alternative, Proof-of-Stake (PoS). I provide the first formal economic model of PoS and demonstrate that PoS induces consensus in equilibrium. My result arises because I provide the first endogenous blockchain coin pricing. Propagating disagreement introduces risk and thereby reduces blockchain coin value which implies that stake-holders face an implicit cost from delaying consensus. PoS randomly selects a stake-holder to update the blockchain and provides her an explicit monetary incentive, a "block reward," for her service. In the event of disagreement, block rewards constitute a perverse incentive, but I demonstrate that restricting updating ability to large stake-holders induces an equilibrium in which consensus obtains as soon as possible. I also demonstrate that consensus obtains eventually almost surely in any equilibrium so long as the blockchain employs a modest block reward schedule. My work reveals the economic viability of permissionless blockchains.

A Note on CDS Returns (with *Patrick Augustin*)

We show that commonly used metrics of CDS returns poorly approximate true CDS returns, and that they may erroneously represent the relationship between changes in prices of equity and bonds. Given the complexities involved in computing CDS returns correctly, we provide a simple closed-form approximation that bears a correlation of no less than 99% with the true return series. Our work emphasizes the importance of distinguishing between changes in credit spreads and CDS returns.

The New SME Lendscape (with *Manasa Gopal*)

We provide a formal economic model of the SME online lending world. We demonstrate that relatively small borrowers lend from online lenders and relatively large borrowers lend from banks in equilibrium. We also show that online lenders finance some borrowers that would have been rationed

in the absence of FinTech. These results stem from the fact that technology yields online lenders low underwriting costs while banks maintain lower funding costs. We provide empirical support with a proprietary data set. We also examine whether FinTech SME loans constitute a separate asset class. We find that a traded portfolio of such loans provides risk exposures largely unspanned by traditional assets thereby suggesting that the universe of such loans offer investors novel risk exposures.

An Economic Covariance Model of Stock-Bond Dynamics

The price of equity equals the risk-adjusted present discounted value of cash-flows. Discount factors depend upon the short rate process. As such, a link exists between bond and equity returns. This link implies a relationship between volatilities and the stock-bond correlation. I show that the stock-bond correlation increases in interest rate volatility and decreases in cash-flow volatility. These results qualitatively explain the historical variation in the stock-bond correlation including the mysterious sign change around the turn of the century. I take the aforementioned insights and marry them with the multivariate volatility modeling literature to produce an economic covariance model of stock-bond dynamics. The resulting model possesses the empirical quality of an econometric model and the economic content of an asset pricing model. This empirical model outperforms a GJR-DCC model. I provide both in-sample and out-of-sample results. I also show that the results hold for individual stocks.

RESEARCH IN
PROGRESS

When You Come to a Fork in the Road, Take It! (with [David Yermack](#))

TEACHING
EXPERIENCE

NYU Stern School of Business

Instructor

Foundations of Finance (Teaching Rating: 6.3 out of 7.0) 2016

Teaching Fellow

FinTech Analytics: Data-Driven Credit Modeling (MBA), [Professor Roger Stein](#) 2016

Financial Econometrics (PhD), [Professor Robert Engle](#) 2015

Volatility (MBA), [Professor Robert Engle](#) 2015

HONORS

NYU Stern, Marcus Nadler Fellowship 2017 - 2018

NYU Stern, David M. Graifman Memorial Award 2015

NYU Stern, Stern Doctoral Fellowship 2013 - 2016

Columbia University, Presidential Fellowship 2012 - 2013

Cornell University, Summa Cum Laude 2011

PROFESSIONAL
EXPERIENCE

Harvard Management Company, Boston, MA, USA
Associate Intern, Analytics Desk 2013 - 2014

BNP Paribas, New York, NY, USA
Junior Trader, CDS Flow Desk 2011 - 2012

COMPUTER SKILLS C#, Java, L^AT_EX, MATLAB, R, SQL, Visual Basic

REFERENCES

[Professor Rangarajan Sundaram \(Chair\)](#)
Altman Professor of Credit and Debt Markets
NYU Stern School of Business
44 W 4th Street, Suite 11-53
New York, NY 10012
☎ (212) 998 0918
✉ rsundara@stern.nyu.edu

[Professor Robert Engle](#)
Michael Armellino Professor of Financial Services
NYU Stern School of Business
44 W 4th Street, Suite 9-62
New York, NY 10012
☎ (212) 998 0710
✉ rengle@stern.nyu.edu

[Professor Kose John](#)
Gerstenberg Professor of Banking and Finance
NYU Stern School of Business
44 W 4th Street, Suite 9-50
New York, NY 10012
☎ (212) 998 0337
✉ kjohn@stern.nyu.edu

[Professor David Yermack \(Chair\)](#)
Chair, Finance Department
NYU Stern School of Business
44 W 4th Street, Suite 9-70
New York, NY 10012
☎ (212) 998 0357
✉ dyermack@stern.nyu.edu

[Professor Joel Hasbrouck](#)
Kenneth Langone Professor of Business
NYU School of Business
44 W 4th Street, Suite 9-88
New York, NY 10012
☎ (212) 998 0310
✉ jhasbrou@stern.nyu.edu

[Professor Thomas Philippon](#)
John L. Vogelstein Faculty Fellow
NYU Stern School of Business
44 W 4th Street, Suite 9-90
New York, NY 10012
☎ (212) 998 0490
✉ tphilipp@stern.nyu.edu