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RESEARCH ADVISOR, FINANCIAL RESEARCH  
FEDERAL RESERVE BANK OF SAN FRANCISCO  
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US VISA STATUS:  
PERMANENT RESIDENT

### RESEARCH INTERESTS

CREDIT RISK MODELING, RISK MANAGEMENT, INTEREST RATE TERM STRUCTURE THEORY

### EDUCATION

2007 COPENHAGEN BUSINESS SCHOOL PH.D. FINANCE  
2002 UNIVERSITY OF COPENHAGEN M.SC. ECONOMICS  
1996 UNIVERSITY OF COPENHAGEN B.S. ECONOMICS

### DISSERTATION

TOPIC: "Default and Recovery Risk Modeling and Estimation"

- THE ESTIMATION OF CONFIDENCE SETS FOR RATING TRANSITION PROBABILITIES.
- THE QUADRATIC AND AFFINE-QUADRATIC ASSET PRICING MODELS.
- JOINT ESTIMATION OF DEFAULT AND RECOVERY RISK: A SIMULATION STUDY.
- JOINT ESTIMATION OF DEFAULT AND RECOVERY RISK: AN APPLICATION.

### PUBLISHED PAPERS

"CONFIDENCE SETS FOR CONTINUOUS-TIME RATING TRANSITION PROBABILITIES": WITH DAVID LANDO AND ERNST HANSEN, *JOURNAL OF BANKING AND FINANCE*, VOL. 28, 2004, PP. 2575-2602.

"AN ARBITRAGE-FREE GENERALIZED NELSON-SIEGEL TERM STRUCTURE MODEL": WITH FRANK X. DIEBOLD AND GLENN D. RUDEBUSCH, *ECONOMETRICS JOURNAL*, VOL. 12, NO. 3, 2009, PP. 33-64.

"INFLATION EXPECTATIONS AND RISK PREMIUMS IN AN ARBITRAGE-FREE MODEL OF NOMINAL AND REAL BOND YIELDS": WITH JOSE A. LOPEZ AND GLENN D. RUDEBUSCH, *JOURNAL OF MONEY, CREDIT AND BANKING*, VOL. 42, NO. 6, 2010, PP. 143-178.

"THE AFFINE ARBITRAGE-FREE CLASS OF NELSON-SIEGEL TERM STRUCTURE MODELS": WITH FRANK X. DIEBOLD AND GLENN D. RUDEBUSCH, *JOURNAL OF ECONOMETRICS*. VOL. 164, 2011, PP. 4-20.

"EXTRACTING DEFLATION PROBABILITY FORECASTS FROM TREASURY YIELDS": WITH JOSE A. LOPEZ AND GLENN D. RUDEBUSCH, *INTERNATIONAL JOURNAL OF CENTRAL BANKING*, VOL. 8, NO. 4, 2012, PP. 21-60.

“THE RESPONSE OF INTEREST RATES TO U.S. AND U.K. QUANTITATIVE EASING”: WITH GLENN D. RUDEBUSCH, *ECONOMIC JOURNAL*, VOL. 122, 2012, PP. F385-F414.

“DO CENTRAL BANK LIQUIDITY FACILITIES AFFECT INTERBANK LENDING RATES?": WITH JOSE A. LOPEZ AND GLENN D. RUDEBUSCH, *JOURNAL OF BUSINESS AND ECONOMIC STATISTICS*, VOL. 32, NO. 1, 2014, PP. 136-151.

“ESTIMATING SHADOW-RATE TERM STRUCTURE MODELS WITH NEAR-ZERO YIELDS”: WITH GLENN D. RUDEBUSCH, *JOURNAL OF FINANCIAL ECONOMETRICS*, VOL. 13, NO. 2, 2015, PP. 226-259.

“A PROBABILITY-BASED STRESS TEST OF FEDERAL RESERVE ASSETS AND INCOME”: WITH JOSE A. LOPEZ AND GLENN D. RUDEBUSCH, *JOURNAL OF MONETARY ECONOMICS*, VOL. 73, 2015, PP. 26-43.

“PRICING DEFLATION RISK WITH U.S. TREASURY YIELDS”: WITH JOSE A. LOPEZ AND GLENN D. RUDEBUSCH, *REVIEW OF FINANCE*, VOL. 20, NO. 3, 2016, PP. 1107-1152.

“MODELING YIELDS AT THE ZERO LOWER BOUND: ARE SHADOW RATES THE SOLUTION?": WITH GLENN D. RUDEBUSCH, IN ERIC HILLEBRAND AND SIEM KOOPMAN (ED.) *DYNAMIC FACTOR MODELS (ADVANCES IN ECONOMETRICS, VOL. 35)*, EMERALD PUBLISHING GROUP, 2016.

### WORKING PAPERS

“COULD THE U.S. TREASURY BENEFIT FROM ISSUING MORE TIPS?": WITH JAMES M. GILLAN, JUNE 2012.

“CAN SPANNED TERM STRUCTURE FACTORS DRIVE STOCHASTIC VOLATILITY?": WITH JOSE A. LOPEZ AND GLENN D. RUDEBUSCH, JANUARY 2014.

“A REGIME-SWITCHING MODEL OF THE YIELD CURVE AT THE ZERO BOUND,” JANUARY 2016.

“TRANSMISSION OF QUANTITATIVE EASING: THE ROLE OF CENTRAL BANK RESERVES”: WITH SIGNE KROGSTRUP, JUNE 2016.

“A NEW NORMAL FOR INTEREST RATES? EVIDENCE FROM INFLATION-INDEXED DEBT”: WITH GLENN D. RUDEBUSCH, MAY 2017.

“THE TIPS LIQUIDITY PREMIUM”: WITH MARTIN M. ANDREASEN AND SIMON RIDDELL, JULY 2017.

“A PORTFOLIO MODEL OF QUANTITATIVE EASING”: WITH SIGNE KROGSTRUP, AUGUST 2017.

“DOES QUANTITATIVE EASING AFFECT MARKET LIQUIDITY?": WITH JAMES M. GILLAN, SEPTEMBER 2017.

“TERM STRUCTURE ANALYSIS WITH BIG DATA”: WITH MARTIN M. ANDREASEN AND GLENN D. RUDEBUSCH, SEPTEMBER 2017.

“IS THERE AN ON-THE-RUN PREMIUM IN TIPS?”: WITH JOSE A. LOPEZ AND PATRICK SHULTZ, SEPTEMBER 2017.

### PRESENTATIONS AT PROFESSIONAL MEETINGS

JUN 2017	2017 IBEFA SUMMER MEETING - SAN DIEGO. “THE TIPS LIQUIDITY PREMIUM” AND “A NEW NORMAL FOR INTEREST RATES? EVIDENCE FROM INFLATION-INDEXED DEBT”
JUN 2017	21 <sup>st</sup> ANNUAL GLOBAL INFLATION-LINKED CONFERENCE – BARCLAYS, NEW YORK. “THE TIPS LIQUIDITY PREMIUM”
MAR 2017	THE VIENNA-COPENHAGEN CONFERENCE ON FINANCIAL ECONOMETRICS, VIENNA “THE TIPS LIQUIDITY PREMIUM” AND “DOES QUANTITATIVE EASING AFFECT MARKET LIQUIDITY?”
NOV 2016	THE 2016 BANK OF CANADA ANNUAL CONFERENCE, OTTAWA “A PORTFOLIO MODEL OF QUANTITATIVE EASING”
SEP 2016	THE 12 <sup>TH</sup> ANNUAL CENTRAL BANK WORKSHOP ON THE MICROSTRUCTURE OF FINANCIAL MARKETS – BANQUE DE FRANCE, PARIS “DOES QUANTITATIVE EASING AFFECT MARKET LIQUIDITY?”
JUL 2016	NBER SUMMER INSTITUTE, WORKSHOP ON FORECASTING, EMPIRICAL METHODS IN MACROECONOMICS & FINANCE, BOSTON. “THE TIPS LIQUIDITY PREMIUM”
JUN 2016	THE ANNUAL MEETING OF THE WESTERN FINANCE ASSOCIATION – PARK CITY, UTAH “DOES QUANTITATIVE EASING AFFECT MARKET LIQUIDITY?”
JUN 2016	THE NINTH ANNUAL CONFERENCE OF THE SOCIETY OF FINANCIAL ECONOMETRICS, CITY UNIVERSITY OF HONG KONG. “THE TIPS LIQUIDITY PREMIUM”
JAN 2016	THE ANNUAL MEETING OF THE AMERICAN FINANCE ASSOCIATION – SAN FRANCISCO. “TRANSMISSION OF QUANTITATIVE EASING: THE ROLE OF CENTRAL BANK RESERVES”
JAN 2016	THE ANNUAL MEETING OF THE AMERICAN ECONOMIC ASSOCIATION – SAN FRANCISCO. “DOES QUANTITATIVE EASING AFFECT MARKET LIQUIDITY?”
JAN 2016	THE ANNUAL MEETING OF THE ECONOMETRIC SOCIETY – SAN FRANCISCO. “A REGIME-SWITCHING MODEL OF THE YIELD CURVE AT THE ZERO BOUND”
JUN 2015	NBER EAST ASIAN SEMINAR ON ECONOMICS, FEDERAL RESERVE BANK OF SAN FRANCISCO, CALIFORNIA. “A PROBABILITY-BASED STRESS TEST OF FEDERAL RESERVE ASSETS AND INCOME”
APR 2015	THE EIGHTEENTH CONFERENCE OF THE SWISS SOCIETY FOR FINANCIAL MARKET RESEARCH – ZURICH. “TRANSMISSION OF QUANTITATIVE EASING: THE ROLE OF CENTRAL BANK RESERVES”
MAR 2015	SECOND INTERNATIONAL CONFERENCE ON SOVEREIGN BOND MARKETS, ECB, FRANKFURT. “DOES QUANTITATIVE EASING AFFECT MARKET LIQUIDITY?”

JUN 2014 FIRST ANNUAL CONFERENCE OF THE INTERNATIONAL ASSOCIATION FOR APPLIED ECONOMETRICS, QUEEN MARY UNIVERSITY, LONDON.  
 “A PROBABILITY-BASED STRESS TEST OF FEDERAL RESERVE ASSETS AND INCOME” AND  
 “MODELING YIELDS AT THE ZERO LOWER BOUND: ARE SHADOW RATES THE SOLUTION?”

JUN 2014 20<sup>TH</sup> INTERNATIONAL CONFERENCE ON COMPUTING IN ECONOMICS AND FINANCE, BI NORWEGIAN BUSINESS SCHOOL.  
 “A PROBABILITY-BASED STRESS TEST OF FEDERAL RESERVE ASSETS AND INCOME” AND  
 “MODELING YIELDS AT THE ZERO LOWER BOUND: ARE SHADOW RATES THE SOLUTION?”

JUN 2014 THE SEVENTH ANNUAL CONFERENCE OF THE SOCIETY OF FINANCIAL ECONOMETRICS, ROTMAN SCHOOL OF MANAGEMENT, TORONTO.  
 “A REGIME-SWITCHING MODEL OF THE YIELD CURVE AT THE ZERO BOUND”

JUN 2014 BANCO DE ESPANA – BANK OF CANADA WORKSHOP ON “INTERNATIONAL FINANCIAL MARKETS.”  
 “SWISS UNCONVENTIONAL MONETARY POLICY: LESSONS FOR THE TRANSMISSION OF QUANTITATIVE EASING”

OCT 2013 FRBSF WORKSHOP ON TERM STRUCTURE MODELING AT THE ZERO LOWER BOUND.  
 “MODELING YIELDS AT THE ZERO LOWER BOUND: ARE SHADOW RATES THE SOLUTION?”

SEP 2013 SNB RESEARCH CONFERENCE: ”A NEW NORMAL FOR MONETARY POLICY?” – ZURICH.  
 “A PROBABILITY-BASED STRESS TEST OF FEDERAL RESERVE ASSETS AND INCOME”

JUL 2013 NBER SUMMER INSTITUTE, WORKSHOP ON FORECASTING, EMPIRICAL METHODS IN MACROECONOMICS & FINANCE, BOSTON.  
 “ESTIMATING SHADOW-RATE TERM STRUCTURE MODELS WITH NEAR-ZERO YIELDS”

MAR 2013 23<sup>RD</sup> ANNUAL DERIVATIVE SECURITIES & RISK MEASUREMENT CONFERENCE, FDIC CENTER FOR FINANCIAL RESEARCH AND CORNELL UNIVERSITY.  
 “ESTIMATING SHADOW-RATE TERM STRUCTURE MODELS WITH NEAR-ZERO YIELDS”

JAN 2013 2013 IBEFA ANNUAL MEETING - SAN DIEGO.  
 “COULD THE U.S. TREASURY BENEFIT FROM ISSUING MORE TIPS?”

AUG 2012 ECB WORKSHOP ON ”MARKETS FOR INFLATION PROTECTION” - FRANKFURT,  
 “EXTRACTING DEFLATION PROBABILITY FORECASTS FROM TREASURY YIELDS”

JUL 2012 2012 IBEFA/WEAI SUMMER MEETING - SAN FRANCISCO.  
 “THE RESPONSE OF INTEREST RATES TO U.S. AND U.K. QUANTITATIVE EASING”

MAR 2012 THE FIFTEENTH CONFERENCE OF THE SWISS SOCIETY FOR FINANCIAL MARKET RESEARCH – ZURICH.  
 “PRICING DEFLATION RISK WITH U.S. TREASURY YIELDS”

JAN 2012 THE ANNUAL MEETING OF THE AMERICAN FINANCE ASSOCIATION – CHICAGO.  
 “PRICING DEFLATION RISK WITH U.S. TREASURY YIELDS”

JAN 2012 ’DAY AHEAD’ CONFERENCE ON FINANCIAL MARKETS AND INSTITUTIONS, THE FEDERAL RESERVE BANK OF CHICAGO.  
 “PRICING DEFLATION RISK WITH U.S. TREASURY YIELDS”

JUL 2011 2011 IBEFA/WEAI SUMMER MEETING - SAN DIEGO.  
 “A MODEL-INDEPENDENT MAXIMUM RANGE FOR THE LIQUIDITY CORRECTION OF TIPS YIELDS”

JUN 2011 THE FOURTH ANNUAL CONFERENCE OF THE SOCIETY OF FINANCIAL ECONOMETRICS, UNIVERSITY OF CHICAGO.  
“PRICING DEFLATION RISK WITH U.S. TREASURY YIELDS”

MAY 2011 THE SECOND HUMBOLDT COPENHAGEN CONFERENCE 2011, THE UNIVERSITY OF COPENHAGEN.  
“PRICING DEFLATION RISK WITH U.S. TREASURY YIELDS” AND “HOW EFFICIENT IS THE KALMAN FILTER AT ESTIMATING AFFINE TERM STRUCTURE MODELS?”

MAR 2011 21<sup>ST</sup> ANNUAL DERIVATIVE SECURITIES & RISK MEASUREMENT CONFERENCE, FDIC CENTER FOR FINANCIAL RESEARCH AND CORNELL UNIVERSITY.  
“A MODEL-INDEPENDENT MAXIMUM RANGE FOR THE LIQUIDITY CORRECTION OF TIPS YIELDS”

JUN 2010 THE 2010 ANNUAL CONFERENCE OF THE EUROPEAN FINANCIAL MANAGEMENT ASSOCIATION, THE UNIVERSITY OF AARHUS.  
“DO CENTRAL BANK LIQUIDITY FACILITIES AFFECT INTERBANK LENDING RATES?” AND “CAN SPANNED TERM STRUCTURE FACTORS DRIVE STOCHASTIC VOLATILITY?”

JUN 2009 THE SECOND ANNUAL CONFERENCE OF THE SOCIETY OF FINANCIAL ECONOMETRICS, THE UNIVERSITY OF GENEVA.  
“DO CENTRAL BANK LIQUIDITY FACILITIES AFFECT INTERBANK LENDING RATES?”

APR 2009 19<sup>TH</sup> ANNUAL DERIVATIVE SECURITIES & RISK MEASUREMENT CONFERENCE, FDIC CENTER FOR FINANCIAL RESEARCH AND CORNELL UNIVERSITY.  
“DO CENTRAL BANK LIQUIDITY FACILITIES AFFECT INTERBANK LENDING RATES?” AND “FORECASTING YIELD VOLATILITY WITH ARBITRAGE-FREE NELSON-SIEGEL MODELS”

MAR 2009 THE HUMBOLDT COPENHAGEN CONFERENCE 2009, THE HUMBOLDT UNIVERSITÄT ZU BERLIN.  
“FORECASTING YIELD VOLATILITY WITH ARBITRAGE-FREE NELSON-SIEGEL MODELS”

JAN 2009 ‘DAY AHEAD’ CONFERENCE ON FINANCIAL MARKETS, THE FEDERAL RESERVE BANK OF SAN FRANCISCO.  
“INFLATION EXPECTATIONS AND RISK PREMIUMS IN AN ARBITRAGE-FREE MODEL OF NOMINAL AND REAL YIELDS”

JUN 2008 THE INAUGURAL CONFERENCE OF THE SOCIETY OF FINANCIAL ECONOMETRICS, NYU STERN SCHOOL OF BUSINESS.  
“THE AFFINE ARBITRAGE-FREE CLASS OF NELSON-SIEGEL MODELS”

SEP 2007 SYSTEM COMMITTEE ON FINANCIAL STRUCTURE AND REGULATION, THE FEDERAL RESERVE BANK OF SAN FRANCISCO.  
“COMMON RISK FACTORS IN CORPORATE BOND SPREADS: AN ARBITRAGE-FREE DYNAMIC NELSON-SIEGEL MODELING APPROACH”

APR 2006 16<sup>TH</sup> ANNUAL DERIVATIVE SECURITIES & RISK MEASUREMENT CONFERENCE, FDIC CENTER FOR FINANCIAL RESEARCH AND CORNELL UNIVERSITY.  
“JOINT ESTIMATION OF DEFAULT AND RECOVERY RISK: A SIMULATION STUDY”

SEP 2005 INTERNATIONAL CONFERENCE ON FINANCE, UNIVERSITY OF COPENHAGEN.  
“RECOVERY RISK MODELING: AN APPLICATION OF THE QUADRATIC CLASS”

APR 2004 HEC MONTRÉAL SECOND INTERNATIONAL CONFERENCE ON CREDIT RISK.  
“CONFIDENCE SETS FOR CONTINUOUS-TIME RATING TRANSITION PROBABILITIES”

## REFeree ACTIVITIES

REVIEWED PAPERS FOR: *ECONOMETRICA*, *ECONOMIC JOURNAL*, *JOURNAL OF APPLIED ECONOMETRICS*, *JOURNAL OF BANKING AND FINANCE*, *JOURNAL OF BUSINESS AND ECONOMIC STATISTICS*, *JOURNAL OF CREDIT RISK*, *JOURNAL OF ECONOMETRICS*, *JOURNAL OF THE EUROPEAN ECONOMIC ASSOCIATION*, *JOURNAL OF FINANCE*, *JOURNAL OF FINANCIAL AND QUANTITATIVE ANALYSIS*, *JOURNAL OF FINANCIAL ECONOMETRICS*, *JOURNAL OF FUTURES MARKETS*, *JOURNAL OF MONETARY ECONOMICS*, *JOURNAL OF MONEY, CREDIT AND BANKING*, *REVIEW OF FINANCIAL STUDIES*, AND *RISK MAGAZINE*.

REVIEWED SEVERAL CHAPTERS OF THE BOOK, “*UNDERSTANDING CREDIT DERIVATIVES AND RELATED INSTRUMENTS*” BY ANTULIO BOMFIM, ELSEVIER ACADEMIC PRESS.

## PROFESSIONAL ACTIVITIES

AUG 2015 – PRESENT	RESEARCH ADVISOR, FINANCIAL RESEARCH, FEDERAL RESERVE BANK OF SAN FRANCISCO
JUN 2010 – AUG 2015	SENIOR ECONOMIST, FINANCIAL RESEARCH, FEDERAL RESERVE BANK OF SAN FRANCISCO
JUL 2006 – JUN 2010	ECONOMIST, FINANCIAL RESEARCH, FEDERAL RESERVE BANK OF SAN FRANCISCO
JAN 2005 – JUL 2005	VISITING SCHOLAR, RESEARCH & STATISTICS, FEDERAL RESERVE BOARD, WASHINGTON, DC
FEB 2004 – JUL 2004	VISITING SCHOLAR, RESEARCH & STATISTICS, FEDERAL RESERVE BOARD, WASHINGTON, DC

## TEACHING AND UNIVERSITY EXPERIENCE

APR 2016	CEMS PHD COURSE ON “TERM STRUCTURE MODELS AND THE ZERO LOWER BOUND,” LOUVAIN SCHOOL OF MANAGEMENT RESEARCH, CENTER FOR STUDIES IN ASSET MANAGEMENT, BRUXELLES
SEP 2015	EABCN TRAINING SCHOOL ON “TERM STRUCTURE MODELS AND THE ZERO LOWER BOUND,” EUROPEAN UNIVERSITY INSTITUTE, FLORENCE
FALL 2005	OPTIMIZATION METHODS (GRADUATE), COPENHAGEN BUSINESS SCHOOL
FALL 2004	OPTIMIZATION METHODS (GRADUATE), COPENHAGEN BUSINESS SCHOOL
FALL 2003	OPTIMIZATION METHODS (GRADUATE), COPENHAGEN BUSINESS SCHOOL
NOV 2001 – DEC 2002	RESEARCH ASSISTANT, PROF. D. LANDO, UNIVERSITY OF COPENHAGEN
SEP 1996 – DEC 1999	MICROECONOMICS (UNDERGRADUATE), UNIVERSITY OF COPENHAGEN