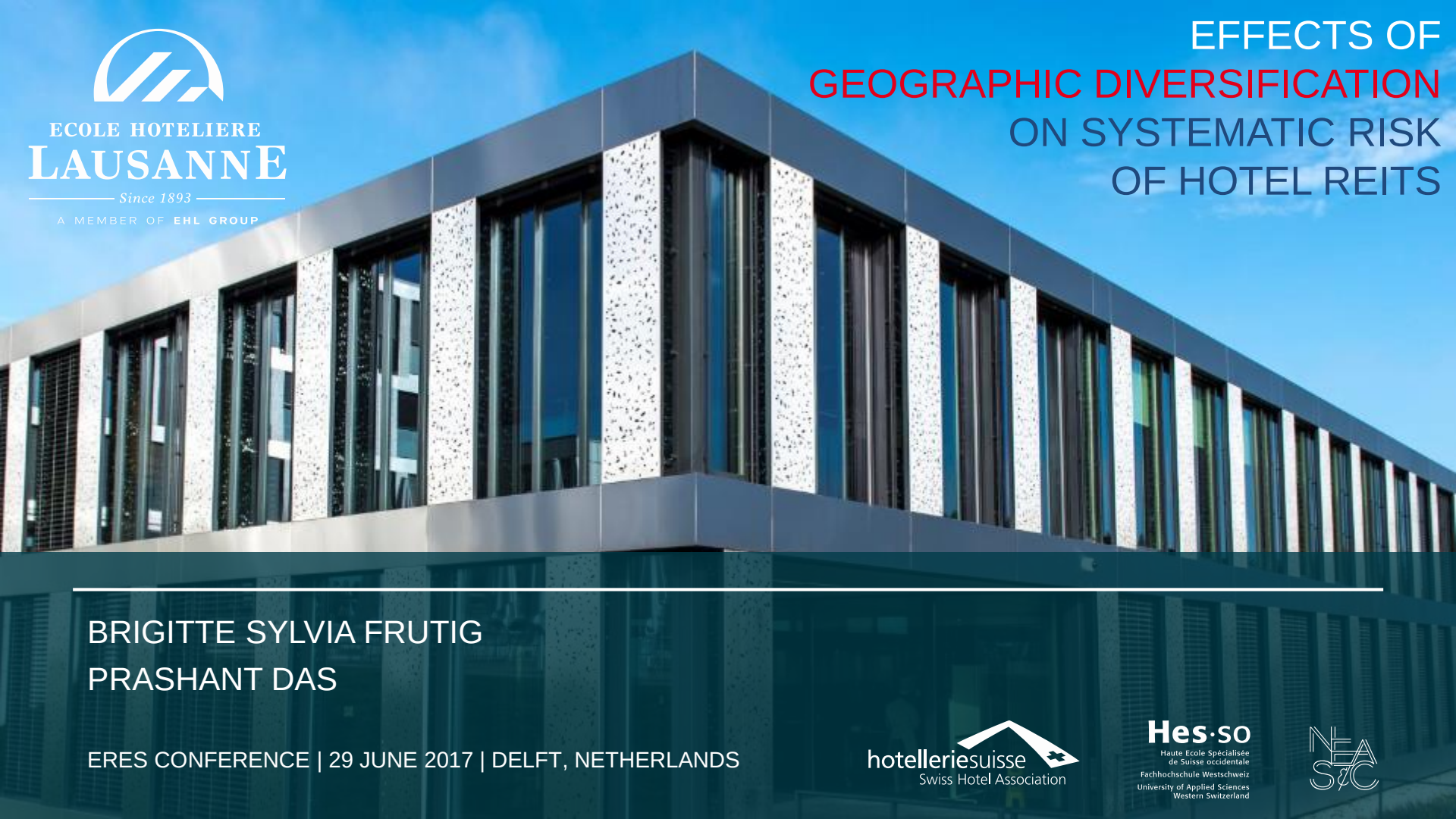

ECOLE HOTELIERE LAUSANNE
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EFFECTS OF GEOGRAPHIC DIVERSIFICATION ON SYSTEMATIC RISK OF HOTEL REITS

BRIGITTE SYLVIA FRUTIG
PRASHANT DAS

ERES CONFERENCE | 29 JUNE 2017 | DELFT, NETHERLANDS

hotellerie suisse
Swiss Hotel Association

Hes·so
Haute Ecole Spécialisée de Suisse occidentale
Fachhochschule Westschweiz
University of Applied Sciences Western Switzerland

NEA S&C

MOTIVATION

Dual Role of REIT Managers

Fixity of asses	←→	Fungible equity units
Need for local knowledge	←→	Need for diversification

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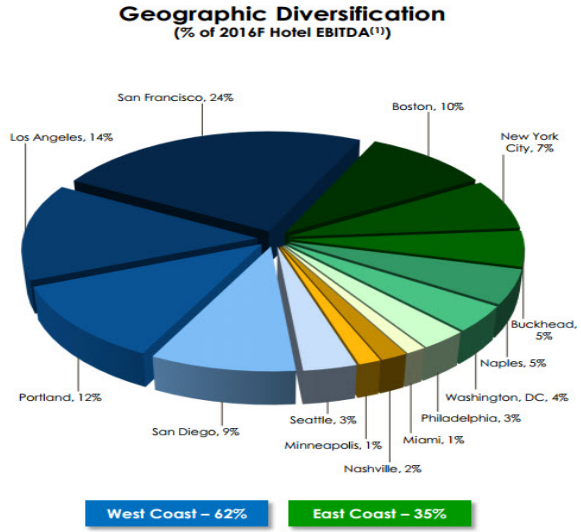
GEOGRAPHIC DIVERSIFICATION IN LODGING BUSINESS

Therefore, sales expansion in overseas markets is normally a driving force for developing hotels in other countries. Geographic diversification is another major motivation for international hotel companies to develop hotels in other countries.

... geographic diversification can reduce the risk of many unforeseeable events on hotel operations in certain geographic locations. Brand development is a driving factor

The SAGE Handbook of Hospitality Management

[Hospitality Properties Trust]
Each combination of hotels is geographically diversified.



LaSalle Hotel Properties

- **LaSalle Hotel Properties seeks to lower risk through:**
  - - Geographic diversification of hotels;

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OBJECTIVE

- Validating the hypothesis whether the geographic diversification reduces the sensitivity to the stock market
- Use multiple measures of geographic diversification
- Focussing on Lodging REITs
  - Lodging REITs are the most volatile (Jackson, 2009; Worsley, 2015)
  - The market cap of lodging REITs is nearly $50 Bi
  - Lodging REITs are ignored in literature (Manning, O'Neill, Singh, Hood, Liu & Bloom, 2015; Worsley, 2015)

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BACKGROUND

Determinants of Equity Beta

- Eichholtz, Hoesli, MacGregor & Nanthakumaran, 1995
- Gyourko & Nelling, 1996
- Lee & Byrne, 1998
- Sing & Patel, 2001
- Ling, Naranjo & Scheick, 2016

Geographic Diversification

- " a popular diversification strategy"
  - Eichholtz, Hoesli, MacGregor & Nanthakumaran, 1995
  - Nelson & Nelson, 2003
  - Lee, 2008
  - Hartzell, Sun and Titman, 2014
  - Adams, Füss & Schindler, 2015
  - Cotter, Gabriel & Roll, 2015
- "Under-researched"
  - Ling, Naranjo & Scheick, 2016

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BACKGROUND | GEOGRAPHIC DIVERSIFICATION

Advantages

- Mostly anecdotal
- Ro and Ziobrowski (2011)

Disadvantages

- Oversight & agency problems
  - John, Knyazeva and Knyazeva (2011)
  - Landier, Nair & Wulf, 2009
  - John et al, 2011
  - Cashman & Seiler, 2014
  - Das & Thomas, 2016

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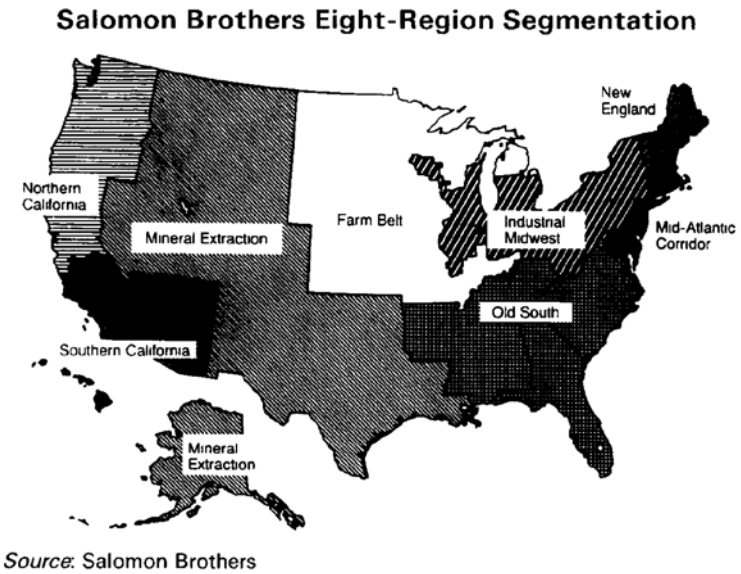
GEOGRAPHIC DIVERSIFICATION

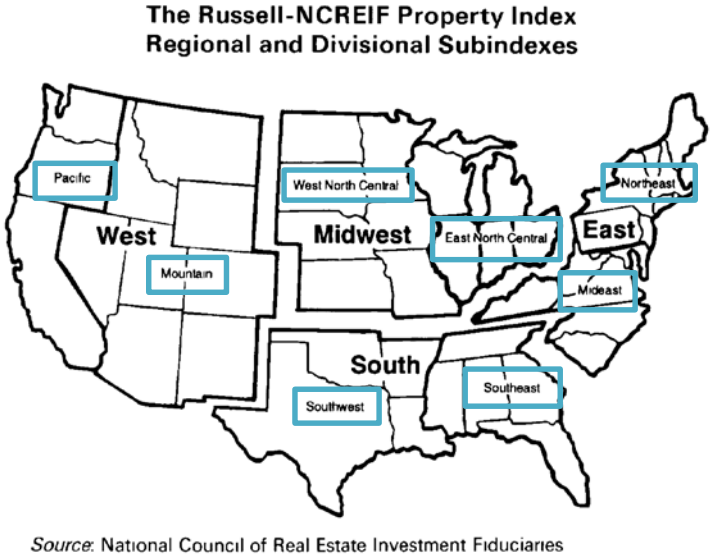
Economic regions



Source: Salomon Brothers

based on counties

NCREIF regions



Source: National Council of Real Estate Investment Fiduciaries

based on states

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MEASURES OF DIVERSIFICATION

- $Herfindahl\ index$

  $\sum_{i=1}^{N} P_i^2$

  (P_i =%of total assets in region I (by # rooms or # properties)

- $Entropy$

$$-\sum_{i=1}^{N} s_i log_{N+1} s_i + \left(1 - \sum_{i=1}^{N} s_i\right) log_{N+1}\left(1 - \sum_{i=1}^{N} s_i\right)$$

(s_i is the proportion of the assets located in region i which is one of the top N regions)

Based on An, Deng & Gabriel (2011)

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METHODOLOGY | FIXED EFFECTS PANEL DATA

- $\beta_{it} = f(X_{it}, geographic\ diversification_{it})$

- Dependent variable (Estimated with 30 month rolling window regression):
  - CAPM market beta
  - Fama French three factor model market beta
  - Four factor model market beta
- Independent variable:
  - Geographic diversification variable
- Control variables (X):
  - Debt leverage, Growth, Size, Profitability, Liquidity, Operating efficiency , Dividend pay-out

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DATA

Institution name	Ticker	Exchange	Earliest transaction data	REIT status	Earliest return data	Included in sample since (quarter)	N
Ashford Hospitality Prime, Inc.	AHP	NYSE	11/04/2007	4/2013	19/11/2013	3/2016	1
Ashford Hospitality Trust, Inc.	AHT	NYSE	28/08/2003	8/2003	25/08/2003	2/2006	42
Apple Hospitality REIT, Inc.	APLE	NYSE	31/07/2008	1/2008	18/05/2015	not included	0
Condor Hospitality Trust, Inc.	CDOR	NASDAQ	30/06/1978	8/1994	29/11/1994	3/1997	77
Chesapeake Lodging Trust	CHSP	NYSE	18/03/2010	6/2009	21/01/2010	4/2012	16
Chatham Lodging Trust	CLDT	NYSE	23/04/2010	12/2010	15/04/2010	3/2013	13
DiamondRock Hospitality Company	DRH	NYSE	31/10/2004	1/2005	25/05/2005	1/2008	35
FelCor Lodging Trust Incorporated	FCH	NYSE	28/07/1994	1/1994	21/07/1994	2/1997	78
Hospitality Properties Trust	HPT	NASDAQ	24/03/1995	1/1995	16/08/1995	2/1998	74
Host Hotels & Resorts, Inc.	HST	NYSE	31/12/1970	1/1999	02/05/1986	4/2001	60
Hersha Hospitality Trust	HT	NYSE	15/06/1984	1/1998	21/01/1999	4/2001	60
InnSuites Hospitality Trust	IHT	NYSE MKT	01/07/1992	2/2004	02/05/1986	4/2006	40
Summit Hotel Properties, Inc.	INN	NYSE	15/04/2011	1/2011	08/02/2011	4/2013	12
LaSalle Hotel Properties	LHO	NYSE	01/12/1995	1/1998	23/04/1998	1/2001	63
Pebblebrook Hotel Trust	PEB	NYSE	04/06/2010	1/2009	08/12/2009	3/2012	17
Ryman Hospitality Properties, Inc.	RHP	NYSE	31/12/1994	1/2013	25/10/1991	4/2015	4
RLJ Lodging Trust	RLJ	NYSE	31/12/2006	5/2011	10/05/2011	1/2014	11
Sunstone Hotel Investors, Inc.	SHO	NYSE	16/08/1995	1/2004	20/10/2004	3/2007	37
Sotherly Hotels Inc.	SOHO	NASDAQ	21/12/2004	1/2004	16/12/2004	3/2007	37
Xenia Hotels & Resorts, Inc.	XHR	NYSE	01/07/2007	1/2014	03/02/2015	not included	0

DATA SUMMARY

Variable	Obs	Mean	Std. Dev.	Min	Max	IPS	Fisher
BETACAPM	677	1.27	0.86	-0.38	4.27	-3.92***	6.90***
HIRF_NR	677	0.27	0.16	0.13	0.69	NA	0.78
ENTROPY2_NR	636	0.01	0.02	-0.05	0.08	NA	1.93**
ENTROPY3_NR	613	0.44	0.06	0.35	0.64	1.35	-1.56
ENTROPY4_NR	558	0.55	0.06	0.39	0.75	-0.90	-0.86
ENTROPY5_NR	494	0.64	0.05	0.53	0.77	-0.32	0.65
HIRF_ER	676	0.27	0.15	0.15	0.68	NA	1.65**
ENTROPY2_ER	635	0.01	0.02	-0.03	0.08	NA	0.94
ENTROPY3_ER	599	0.46	0.05	0.35	0.62	-0.18	-0.13
ENTROPY4_ER	561	0.56	0.05	0.46	0.69	0.04	-0.40
ENTROPY5_ER	531	0.64	0.04	0.56	0.80	0.40	0.34
GROWTH	675	0.02	0.10	-0.26	1.35	-18.4***	56.4***
PROFITABILITY	675	0.00	0.07	-0.43	0.41	-17.2***	51.0***
ILLIQUIDITY	677	3.56E-06	1.57E-05	5.54E-11	1.56E-04	NA	18.51***
LN_MARKETCAP	676	20.14	1.95	15.45	23.61	0.78	-0.55
DPO_PC	668	0.72	1.11	0.00	9.00	NA	51.82***
OPEFF	670	0.09	0.13	0.01	2.23	-8.27***	17.8***

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CONTROL VARIABLES

Variables	Measure
Leverage	debt ratio= total debt/ total assets
Growth	percentage change in total assets
Size	LN of market capitalization
Profitability	ROE =net income / total equity
Liquidity	1-Amihud's illiquidity measure
Operating efficiency	Recurring revenue / real estate value
Dividend pay-out	dividend pay-out ratio=dividends declared / EPS
Ticker	
Year	
Quarter	

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MODEL SELECTION | REIT FIXED EFFECTS

Breusch and Pagan Lagrangian multiplier test for random effects

- Null: OLS is suitable →Rejected for all models

Hausman test.

- Null: Random effects are good →Rejected for all but one model
- FE models may be inefficient (type-II error) when random effects are more suitable, but provide consistent coefficient estimates.
- Therefore, we apply FE estimation to all the models.
- Control for Trend using quarterly dummies

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CAPM BETA & REGIONAL FOCUS

	Baseline	Regional Footprint	Regional Hirfindahl	Economic Regions
INT_VS_US				-0.651
				(0.539)
ER_FARM				-5.834***
				(0.981)
ER_MIDWEST				-5.571***
				(0.952)
ER_MIDATL				-2.514**
				(1.149)
ER_MINERAL				-6.578***
				(0.966)
ER_NEWENG				-5.659***
				(1.055)
ER_NEWSOUTH				-7.383***
				(0.925)
ER_NORTHCALIF				-6.296***
				(1.474)
ER_COUNT		0.0762**		
		(0.0327)		
HIRF_ER			-1.520***	
			(0.535)	
R-squared	0.712	0.715	0.716	0.748

CAPM BETA & REGIONAL ENTROPY

VARIABLES	Entropy- Top 2 Regions	Entropy- Top 3 Regions	Entropy- Top 4 Regions	Entropy- Top 5 Regions
ENTROPY2_ER	-8.225***			
	(1.114)			
ENTROPY3_ER		-5.301***		
		(0.634)		
ENTROPY4_ER			-0.293	
			(0.653)	
ENTROPY5_ER				-0.130
				(0.561)
R-squared	0.763	0.767	0.746	0.795

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CONCLUSIONS

- Increased geographic footprint is associated with significantly higher beta.
- Staying focused on one or two regions has the strongest association with reduced systematic risk.
- When this focus is expanded based on a larger number of preferred regions, the association becomes statistically insignificant.

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Thank You

Questions / Suggestions?