Investment in a Smaller World

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Motivation

- Air travel has made the world smaller by reducing the time required to travel large distances.

  "Mobility of population is death to localism"

  Frederick Jackson Turner,
  The Significance of the Frontier in American History (1873)

- Research Question: Does air travel facilitate portfolio investment and improve risk-sharing?
  - Is personal contact relevant to investment decisions?

- Literature suggests that geographical proximity improves monitoring by fund managers, venture capitalists, banks, and corporate managers.

Home Bias versus Local Bias

- Original home bias literature documents the tendency of investors to overweight assets in their own country.
- Several explanations for the home bias:
  - Currency risk and capital controls
  - Taxes
  - Institutions (legal protections, corporate governance)
  - Asymmetric information
- Later literature documents the tendency of US investors to overweight "local" firms and its impact on corporate policies (senior citizens demand dividends).

Contribution

- Although technology (i.e. trains, planes, internet) has improved long-distance communication, its impact on investment and risk-sharing has not been examined.
- Investment in distant firms implies a weaker local bias.
- In contrast to the local bias literature, our study examines portfolio investment in **multiple** destinations.
- The local bias literature conditions on distance, which is constant.
- Air traffic and portfolio flows are both time-varying.

Main Findings

- Air traffic facilitates portfolio investment in distant firms.
- Distance is less relevant to portfolio investment than air traffic over long distances.
- More air traffic to a destination is associated with nearby firms having a more diverse investor base and a lower cost of equity.
- Robustness tests involving the opening of air hubs confirm our conclusions.

Data

- Research and Innovative Technology Administration (RITA) within the US Department of Transportation (DOT) publishes monthly air passenger data starting from January 1990.
- Data on airports and the number of passengers are available.
  - The zip code of each airport is hand collected.
- All airports within 30 miles of an investor's zip code (origin) and a firm's headquarters (destination) are examined.
- Institutional investor holdings data are from 13F statements.
  - The zip code of each investor is from Nelson's Directory.

Air Traffic

- Air traffic (AT) is defined from an origin (zip code i) to a destination (zip code j):

$$\text{AT}_{i,j,t} = \log\left(\text{Passengers flying from zip code } i \text{ to zip code } j \text{ in quarter } t\right).$$

- Air passenger volume (APV) is determined by all passengers arriving at a destination (zip code j):

$$\text{APV}_{j,t} = \log\left(\text{Passengers flying into zip code } j \text{ in quarter } t\right).$$

- Ticket prices and flight times are not examined.
  - Observed passenger volume accounts for the monetary cost and the opportunity cost of time.

Data Summary

Year	Pairs of zip code	Investor zip codes	Firm zip codes	Average DIST	Positive AT	Average AT
1991	94,134	446	2,057	1,006	59.9%	830,297
1992	103,667	476	2,061	995	60.9%	782,287
1993	105,935	475	2,078	995	62.1%	790,412
1994	117,327	509	2,282	1,003	61.5%	819,645
1995	131,033	539	2,468	1,012	60.9%	866,202
1996	131,875	539	2,543	1,003	61.6%	878,089
1997	146,504	580	2,601	1,002	61.7%	891,410
1998	160,013	627	2,553	998	62.6%	925,126
1999	166,107	634	2,503	1,013	62.7%	957,595
2000	179,276	695	2,455	1,025	62.2%	994,265
2001	177,905	695	2,407	1,039	63.1%	971,171
2002	186,064	709	2,366	1,046	63.1%	853,735
2003	195,987	716	2,295	1,050	64.6%	856,472
2004	212,724	748	2,229	1,049	64.1%	883,770
2005	210,950	790	2,143	1,046	63.5%	934,483
2006	212,851	814	2,090	1,043	63.7%	955,093
2007	217,506	852	2,031	1,045	63.9%	981,799
2008	209,708	879	1,983	1,047	63.4%	966,236
2009	202,378	863	1,953	1,042	63.0%	914,215
All	166,418	662	2,268	1,024	62.5%	897,490

Investment Opportunities at the Destination

- Is higher air traffic to a destination induced by greater investment opportunities?
- Unlikely to affect our study provided the securities issued by firms at the destination is fixed.
  - Study whether the *reshuffling* of portfolio holdings among investors located at different origins is related to variation in air traffic?
- Control for investment opportunities using the equity issuance, debt issuance, and CAPEX of firms at the destination.
- Also control for the population and per capita income growth at the destination.

Main Empirical Test for Investors

- Test whether $\beta_1 > 0$ in the following panel regression

$$\begin{aligned}\log\left(\text{Portfolio Investment}\right)_{i,j,t} &= \beta_0 + \beta_1\,\text{AT}_{i,j,t} + \beta_2\log(\text{DIST})_{i,j} \\ &\quad +\alpha\,\text{FC}_{j,t} + \gamma\,\text{DEST}_{j,t} + \epsilon_{i,j,t}\,.\end{aligned}$$

- FC denotes firm characteristics at the destination:
  - book-to-market, size, past returns, return on assets, idiosyncratic volatility, as well as equity issuance, debt issuance, and CAPEX
- DEST denotes destination characteristics:
  - Population and per capita Income growth

Panel Regression Details

- Data is quarterly (t denotes a specific quarter).
- Fixed effects for origin and destination are included separately along with year fixed effects to examine cross-sectional variation in portfolio investment.
- Fixed effects for each pairwise origin-destination combination are included without year fixed effects (or distance) to examine time series variation in portfolio investment.
- Standard errors are clustered by year.

Main Finding for Investors

- $\beta_1 > 0$: Air traffic facilitates portfolio investment (over distances greater than 500 miles).

	All	$\leq$ 500	$\geq$ 500	$\geq$ 500	$\geq$ 500
AT	0.024***	0.005	0.029***	0.022***	0.061***
	(2.95)	(0.59)	(3.27)	(28.39)	(14.69)
DIST				0.054***	0.244***
				(12.19)	(27.60)
BM	-0.139***	-0.107***	-0.151***	-0.078***	-0.090***
	(-7.73)	(-4.55)	(-8.96)	(-7.83)	(-6.40)
SIZE	0.497***	0.545***	0.482***	0.469***	0.228***
	(50.22)	(78.87)	(41.95)	(75.10)	(37.86)
CAPEX	-0.007***	0.760**	-0.008***	-0.009***	-0.006***
	(-5.86)	(2.72)	(-5.57)	(-4.45)	(-3.58)
Equity Issuance	0.199***	0.132**	0.216***	0.294***	0.167***
	(5.90)	(2.75)	(5.61)	(6.41)	(3.61)
Debt Issuance	0.034***	0.016*	0.042***	0.048***	0.022**
	(4.03)	(1.82)	(3.42)	(3.44)	(2.70)
Fixed Effects	Origin	Origin	Origin	Origin	Destination
	Destination	Destination	Destination	Year	Year
Observations	5,857,909	1,524,934	4,332,975	4,332,975	4,332,975
Adj. R-squared	0.684	0.702	0.678	0.398	0.121

Number of Investors

- Repeat panel regression with number of institutional investors rather than the dollar-denominated amount of portfolio investment as the dependent variable.

$$\begin{aligned}\text{Number of Investors}_{i,j,t} &= \beta_0 + \beta_1 \,\text{AT}_{i,j,t} + \beta_2 \log(\text{DIST})_{i,j} \\ &\quad + \alpha \,\text{FC}_{j,t} + \gamma \,\text{DEST}_{j,t} + \epsilon_{i,j,t} \,.\end{aligned}$$

- Only consider investors positions greater than \$500,000 since reporting threshold is \$200,000.

Number of Investors

	All	$\leq$ 500	$\geq$ 500	$\geq$ 500	$\geq$ 500
AT	0.007***	0.006***	0.007***	0.008***	0.044***
	(5.19)	(3.47)	(3.74)	(26.46)	(41.75)
DIST				0.011***	0.052***
				(9.49)	(16.57)
BM	0.008	0.011**	0.007	0.001	0.001
	(1.57)	(2.36)	(1.31)	(0.35)	(0.40)
SIZE	0.072***	0.078***	0.070***	0.086***	0.023***
	(22.72)	(27.80)	(21.14)	(80.87)	(26.53)
CAPEX	0.000	-0.023	-0.000	-0.002**	-0.001**
	(0.40)	(-0.31)	(-0.13)	(-2.45)	(-2.70)
Equity Issuance	-0.010	-0.032**	-0.003	0.044**	0.007
	(-0.77)	(-2.25)	(-0.23)	(2.58)	(0.77)
Debt Issuance	0.004	0.003	0.004	-0.001	-0.001
	(1.55)	(1.20)	(1.41)	(-0.63)	(-0.66)
Fixed Effects	Origin	Origin	Origin	Origin	Destination
	Destination	Destination	Destination	Year	Year
Observations	5,857,909	1,524,934	4,332,975	4,332,975	4,332,975
Adj. R-squared	0.739	0.747	0.736	0.548	0.050

- Greater air traffic between the origin and destination is associated with firms headquartered near the destination attracting more investors located at the origin.

Air Hub Openings

- Giroud (2013) compiles the dates and locations of 28 air hub openings.
  - Air hub opening is exogenous with respect to investment opportunities at various destinations.
- Four filters identify flights initiated and cancelled by an air hub opening.
- Either the distance between the origin and hub (first segment), the distance between the hub and destination (second segment), or both flight segments are required to be shorter than the distance between the origin and destination.
- For example, the United Airlines hub that opened at Washington D.C.'s Dulles airport in 1986 does not a suitable connection for flights between Los Angeles and Seattle.

Hub Opening

- HUB equals zero in the 3 years before and the year during the opening of an air hub.
- In the 3 years following an air hub's opening:
- $\text{HUB}_{i,j,t}$ equals 1 if an air route is initiated between zip code i and zip code j.
- $\text{HUB}_{i,j,t}$ equals -1 if an air route is canceled between zip code i and zip code j.

Hub Results

- The following specification replaces AT with HUB

$$\log\left(\text{Portfolio Investment}\right)_{i,j,t} \quad = \quad \beta_0 + \beta_1 \, \text{HUB}_{i,j,t} + \alpha \, \text{FC}_{j,t} + \epsilon_{i,j,t} \, .$$

- The β_1 coefficient continues to be positive.
- Destinations (zip code j) are NOT the location of the air hub opening but air traffic to these destinations is affected by its opening.

Corporate Acquisitions

- Also examine whether air traffic influences real investment decisions by firms.
- Controlling for investment opportunities is more important in this context.
- As with portfolio investment, air traffic explains the frequency of corporate acquisitions.

Acquisition Frequencies

AT Quartiles	Distance between Acquiring and Target Firm				Total
	≤ 100	[100, 500)	[500, 1000)	≥ 1000	
Lowest	6,167	2,222	1,941	2,373	12,703
2	6,454	1,240	1,446	3,466	12,606
3	967	3,475	3,269	4,968	12,679
Highest	16	3,633	3,875	5,096	12,620
Total	13,604	10,570	10,531	15,903	50,608

- Air traffic facilitates corporate acquisitions over long distances.

Logistic Regression

- The following specification examines the impact of air traffic on the likelihood of an acquisition

$$\begin{aligned} \text{DEAL}_{i,j,t} &= \beta_0 + \beta_1 \,\text{AT}_{i,j,t} + \beta_2 \log(\text{DIST})_{i,j} \\ &\quad + \alpha \,\text{DC}_{j,t} + \gamma \,\text{DEST}_{j,t} + \epsilon_{i,j,t} \,. \end{aligned}$$

- Indicator DEAL distinguishes the actual acquiring firm from other *pseudo-acquiring* firms that bought another target firm.

- Logistic regression controls for the acquiring firm's
  - size
  - leverage
  - free cash flow

  and deal characteristics
  - cash offer
  - private target
  - diversifying acquisition

Logistic Regression Results

	All	DIST $>$ 500	All	DIST $>$ 500
AT	0.007	0.025**	0.011*	0.024**
	(1.15)	(2.14)	(1.79)	(1.99)
DIST	-0.159***	-0.148**	-0.158***	-0.155**
	(-9.14)	(-2.29)	(-10.45)	(-2.55)
SIZE (A)	0.007	0.037***	0.017**	0.051***
	(1.03)	(3.09)	(2.31)	(3.52)
Leverage (A)	0.161	0.056	0.195*	0.013
	(1.47)	(0.29)	(1.90)	(0.07)
Free Cash Flow (A)	0.088	0.198	-0.022	0.148
	(0.99)	(1.25)	(-0.26)	(0.79)
Cash	0.087***	0.025	0.054	-0.007
	(3.08)	(0.60)	(1.59)	(-0.16)
Industry Fixed Effects	Acquirer	Acquirer	Target	Target
Year Fixed Effects	Yes	Yes	Yes	Yes
Observations	10,581	7,067	10,575	7,048
Pseudo R-squared	0.084	0.086	0.083	0.084

- The positive β_1 coefficient is confirmed using HUB variable.

Firm Implications

- Regardless of each flight's origin, we next examine the impact of passenger volume on the investor base of nearby firms and their cost of equity.

$$\begin{aligned} \text{Number of Investors}_{j,t} &= \beta_0 + \beta_1 \,\text{APV}_{j,t} \\ &\quad + \alpha \,\text{FC}_{j,t} + \gamma \,\text{DEST}_{j,t} + \epsilon_{j,t} \end{aligned}$$

$$\begin{aligned} \text{Return}_{j,t} &= \beta_0 + \beta_1 \,\text{APV}_{j,t} \\ &\quad + \alpha \,\text{FC}_{j,t} + \gamma \,\text{DEST}_{j,t} + \epsilon_{j,t} \end{aligned}$$

- Returns in the next one to three years are evaluated.

Investor Base and Cost of Equity Results

	Number of Investors	Annual Return
APV	0.1926***	-0.0002**
	(3.41)	(-2.04)
BM	2.1878**	0.0125**
	(2.30)	(2.16)
Size	47.3049***	-0.0061***
	(45.58)	(-3.47)
CAPEX	1.3464***	0.0141***
	(7.10)	(5.72)
Equity Issuance	-35.0004***	-0.3813***
	(-6.90)	(-5.77)
Debt Issuance	-6.3256***	-0.0185*
	(-3.98)	(-1.80)
IVOL	418.4096	1.8286***
	(1.57)	(4.13)
PRET	-19.3024***	-0.0082
	(-12.92)	(-0.36)
Quarter Fixed Effects	Yes	Yes
Destination Fixed Effects	Yes	No
Observations	159,727	159,727
Adj. R^2	0.877	0.008

Air Hub Openings and Passenger Volume

- NET_j equals the difference between the number of route initiations minus the number of route cancellations into the destination following the opening of an air hub.

- First stage of the instrumental variables procedure determines the air passenger volume into every destination attributable to the opening of an air hub

$$\text{APV}_{j,t} \quad = \quad \beta_0 + \beta_1 \, \text{NET}_{j,t} + \alpha \, \text{FC}_{j,t} + \gamma \, \text{DEST}_{j,t} + \epsilon_{j,t} \, .$$

- Positive β_1 coefficient of 0.192 (t-statistic of 7.22) indicates that more net flights into a destination as a result of a hub opening increases air passenger volume.

- Air passenger volume attributable to the opening of an air hub from the first stage is denoted $\hat{\text{APV}}_{j,t}$.

Results from Air Hub Openings

	First Stage Predicted APV	Second Stage Number of Investors	Second Stage Annual Return
NET	0.192***		
	(7.22)		
Predicted APV		28.931***	-0.228**
		(3.62)	(-2.51)
BM	0.012	0.590	0.010
	(1.05)	(0.37)	(1.56)
SIZE	0.273***	27.911***	0.053**
	(24.71)	(14.22)	(2.23)
CAPEX	0.233	6.890	-0.824***
	(0.51)	(0.65)	(-3.43)
Equity Issuance	-0.079	-22.736***	-0.554***
	(-0.41)	(-4.09)	(-6.69)
Debt Issuance	0.051	-11.684***	0.055
	(0.41)	(-2.84)	(1.00)
Destination Fixed Effects	Yes	Yes	No
Observations	15,673	15,673	15,673
Adj. R^2	0.948	0.929	0.010

Conclusion

- Air travel mitigates local bias by facilitating portfolio and real investment in distant firms.
- By broadening the investor base of firms to include more distant investors, air traffic lowers their cost of equity through improved risk sharing.
- Therefore, air travel has important implications for investors and firms.