Comparing the Performance of Active and Passive Mutual Funds in Developing and Developed Countries

Nalini Gupta

Professor Connel Fullenkamp, Primary Advisor
Professor Kent Kimbrough, Honors Seminar Instructor

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Abstract

This paper seeks to test the hypothesis that developing countries or informationally inefficient countries should see higher returns for active mutual funds on average than passive funds and the trend should be reversed in developed nations or informationally efficient economies. This analysis is done using a cross section of eight countries, four developed and four developing. Using a fund universe of 20 active and 20 passive funds per country and controls such as volatility, market return, financial market development and Human Development Index among others, we see that there is no clear systematically dominant strategy between active and passive investment universally. While developing countries are associated with lower returns, we do not find a significant difference between active and passive based on development classification. A key finding is that an increase in liquidity, acting as proxy for informational efficiency, leads to a co-movement of active and passive returns in each country. The paper also lends itself to further analysis regarding confounding factor such as noise trading and movement of foreign capital which impact the effect of increased liquidity on mutual fund returns.

I. Introduction

A mutual fund is a type of financial vehicle made up of a pool of money collected from many investors to invest in securities like stocks, bonds, money market instruments, and other assets (Hayes, 2019). In 2018, there were over 118,000 open ended funds worldwide. Almost half of these were concentrated in the United States. There has been a marked increase in the Assets Under Management[1] world over, as seen in Chart 1, below as well as an increase in the number of mutual funds over time. Chart 2 shows the steady increase in the number of mutual

Chart [1]
Global Assets Under Management in selected years from 2007 to 2017
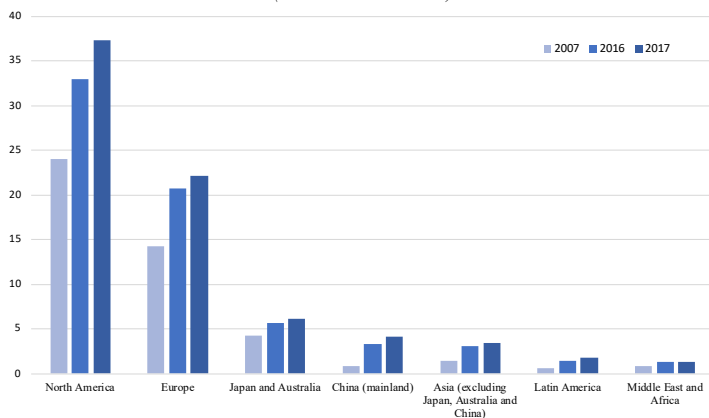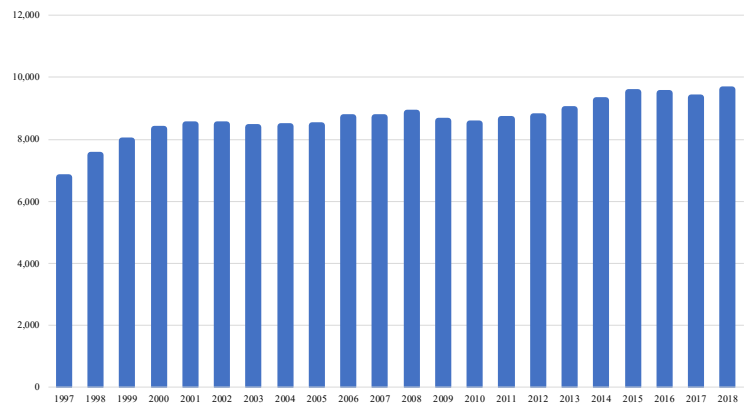by region
(in trillion U.S. dollars)

Chart [2]
Number of mutual funds in the U.S.
1997-2018

funds in the United States.[2] With the advent of passive investing options, futures, and newer investment products, mutual fund houses have increased the number of funds available, each catering to a different investor goal.

There are two different types of management strategies associated with managing mutual funds, namely active and passive management. Active mutual funds refer to mutual funds that

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[1] Assets under management (AUM) is a financial term used to describe the total value of assets managed by an investment company on behalf of their clients. The investment company can be a bank, mutual fund, hedge fund, exchange traded fund, wealth management company or other financial services company investing clients' money in selected financial instruments.

[2] Source: Statista

have fund managers making decisions regarding the allocation of funds to particular securities. The goal is to outperform benchmark indices of choice or achieve the goal specified in the prospectus. The Fidelity Magellan Fund is a good example of an actively managed mutual fund. On the other hand, passive investment funds such as index funds or Exchange Traded Funds (ETFs) replicate a benchmark or index of choice and try to match its performance. Vanguard's S&P 500 Index Fund and the SPY are salient examples of Index Funds and ETFs, respectively. During the last two decades there has been a rise in the popularity of passive investing strategies in the United States (See Chart 3).[3] Even globally, the assets held in ETFs increased from $417 billion in 2005 to $4,685 billon in 2018 (Nace, 2019). On average, it is believed that passive

Chart [3]
Number of ETFs in the United States
2003 - 2019
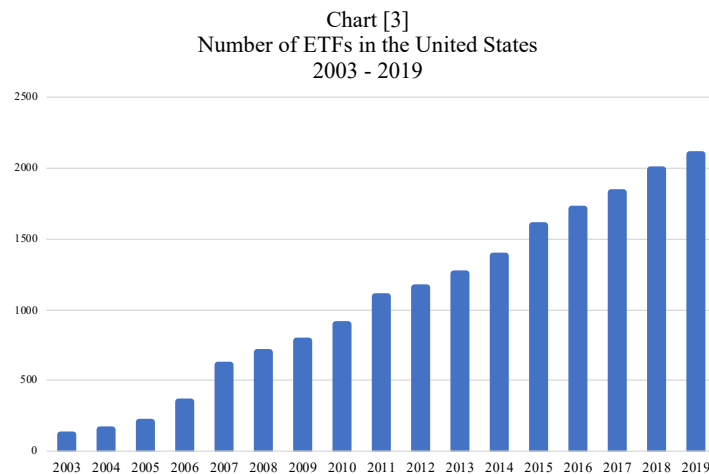
investing gives higher returns due to lower management fees, expense ratios[4] and lower churning or repeated changing of the assets held in the portfolio. Risk also factors in to the consideration between active and passive mutual funds. It is generally believed that there is an inverse relationship between risk and returns. The higher the risk, the higher the return is a rule of thumb which would suggest that active funds would have higher returns than passive funds on average,

[3] Source: Statista

[4] Expense Ratio measures how much of a fund's assets are used for administrative and other operating expenses

due to the ability of fund managers to take on higher risk than a benchmark index of well diversified stocks. However, in the United States, passive funds tend to have higher average returns than active funds net all of the taxes and fees (Petajisto, 2013) suggesting that risk doesn't quite portray the entire picture. The higher returns obtained by passive funds would suggest that all the information about the stocks are represented in the market prices, suggesting that an informationally efficient market would lead to active being no better than passive investing. The converse of that would be interesting to investigate. The primary question this paper seeks to answer is whether there is an advantage to active investing in markets which are not as informationally efficient as the United States. Based on intuition, it would seem that the lower the informational efficiency, the more opportunity there is for fund managers, who ostensibly are informed investors, to achieve higher returns, suggesting that active returns might exceed passive returns.

This original hypothesis is based on the fact that there is a difference in level of informational efficiency and ensuing financial market development in various economies. The Efficient Market Hypothesis suggests that market prices fully reflect all the information available and react instantaneously and in an unbiased fashion to new information (Fama, 1970; Strong, Walker, 1987). However, informational efficiency varies significantly across countries. A study by Cornelius (2020) found empirical evidence that the markets in India, Mexico, Korea and Malaysia were informationally inefficient and suggested that there was a lag between the availability of information and its reflection in the price of the security (Cornelius, 2020). This lag would suggest that there is a possibility of systematic profit in other developing countries as

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well.[5] Given that active mutual funds generally engage in fund selection and believe that they can perform better due to expertise or some niche information, it would naturally follow that there is a chance that active strategies may show higher returns than purely passive indexing in countries with lower levels of informational efficiency. Often times, countries with low levels of information efficiency are also categorized as developing; however, it should be noted that this is not a one to one correlation. The same holds for financial market development as well. For many countries such as France, Germany and the United States, the level of financial market development is correlated to their overall development. However, in economies such as India or Brazil, the financial markets have grown to accommodate the increasing interest in emerging markets but overall development is still lacking. The developmental status of a country will be based on the World Trade Organization's designation and a multitude of other macroeconomic and developmental indicators including but not limited to the Human Development Index (HDI)[6] and GDP per capita among others. Given the discussion above about how informational efficiencies should intuitively lead to higher active returns and the fact that, in general, there is some evidence of a negative correlation between the state of development and informational inefficiencies, I then seek to test whether active investment options yield higher returns than passive investment in developing countries compared to developed countries.

To answer this question, I hypothesize that developing countries or informationally inefficient countries should see higher returns for active mutual funds on average than passive

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[5] It should be noted that this study was done on a sample of 6 developing countries. However, it does not suggest that there is a direct correlation between the "developing" countries and informational efficiency. This is due to the fact that the classification of countries into "developing" and "developed" is based on a number of factors outside the financial markets and hence may not represent the informational efficiency and level of development of the markets.

[6] The components of the HDI are discussed in the Appendix

funds, and the trend would be reversed in developed nations or informationally efficient

economies.[7] To approach this question, I start with an in depth literature review of the existing

studies of this nature in Section II. This is followed by a layout of the theoretical framework

(Section III) for this analysis. This naturally leads into the discussion about the data and the

subsequent empirical findings in Sections IV and V respectively. The conclusions and wider

policy implications are discussed in Section VI.

II. Literature Review

A cross country analysis of mutual fund performance is uncommon and has been

undertaken by very few researchers. This is mostly due to the inherent country- and economy-

specific factors that determine financial returns, which make a cross sectional analysis

complicated due to the multitude of factors to account for. Most mutual fund studies undertaken

are inherently country specific because it allows the researcher to hold certain economic

variables such as interest rates, yield curves and GDP growth constant. However, a few

researchers have tried to study performances of certain types of mutual funds across different

countries. The seminal amongst these papers were the studies done by Ferreira et al. (2012) and a

study conducted by the World Bank (Klapper et al., 2003).

The study done by Ferreira et al. (2012) compares the performance of active, open-ended

mutual funds in 27 countries across the world. Sixteen of these 27 countries are from Europe, the

United States and Canada representing North America, and there are 8 countries from Asia

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[7] Please note that the hypothesis does not necessarily conflate the development level of the country with
informational efficiency. The study is designed to consider both aspects separately because the correlation between
the development level and informational efficiency in financial markets is not extremely strong.

including India, Indonesia and Malaysia. While their objective is to determine which factors determine mutual fund performance in various countries and how these factors differ across countries, their methodology provides a basic framework for the study being conducted here. Their methodology involves two types of factors that impact active mutual fund performance - mutual fund specific and country specific. Using a four factor model (Carhart, 1997), they use financial factors such as market return for a particular country, portfolios of small minus big[8], portfolios of high minus low[9] and momentum controls[10]. Other fund specific characteristics such as total expense ratio[11], total loads[12] and flow[13] are also considered in the model. The paper also takes country specific factors such as economic development[14], level of stock market development and level of development of the mutual fund industry into account. The quarterly returns between 1997 and 2007 were then regressed on the above factors to determine results. The study concluded that, on an average, mutual funds underperformed the market and the benchmarks of choice with only a few exceptions (Ferreira et al, 2012). This study outlines a broad approach which I can adapt to have a more comparative framework between developing and developed countries as well as active and passive mutual funds.

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[8] Small minus big - average return on small capitalization portfolios minus average return on large capitalization portfolios

[9] Difference in return between portfolios with high book to market stocks and the portfolio with low book to market stocks

[10] Difference in returns between the portfolio with the past 12 month winners and past 12 month losers

[11] Total annual expenses as a fraction of Net Assets

[12] Sum of front-end and back-end loads

[13] Percentage growth in total assets under management between the beginning and the end of desired time period

[14] The paper measures economic development via GDP per capita in US dollars and the ratio of internet users to the population of the country

Another salient paper in my research was a World Bank Report that compared growth drivers in developing and developed countries for the increase in Assets Under Management (AUM) of mutual funds for various countries. In contrast with the Ferreira et al. (2012) study, this one clearly sought to look at the differences between developed and developing countries. It raised a number of concerns when comparing mutual fund performance and growth in different economies including regulation, stock market development, legal framework for accounting and tax incentives for mutual funds. The paper also gave a list of explanatory macroeconomic variables used that could potentially impact mutual fund performance. These could be classified in the following broader categories: Level of Economic Development, Capital Market Development, Market Efficiency, Development of Banking Sector, Openness to international Trade and foreign investment and Legal and Governance Variables. These are useful broader categories from which to create a vector of explanatory variables. The study concluded that level of economic growth and financial development as well as the legal system of choice in the country were statistically significant factors in determining the increase of AUM in various countries, suggesting that these may be variables of importance.

Another paper by Otten and Schweitzer (1998) conducted a comparative study between the mutual fund industry in Europe and the United States. The paper described a similar possible universe of mutual funds to pick from as the Ferreira et al. (2012) paper. Both papers chose a fund universe of active open end mutual funds and included funds that closed and the ones that remained open during the period chosen. Choosing open end mutual funds[15] with a primary fund

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[15] Open End Funds don't have a limit as to how many shares they can issue. When an investor purchases shares in a mutual fund, more shares are created, and when somebody sells his or her shares the shares are taken out of circulation. Their price is based on the total value of the fund or the net asset value (NAV) instead of supply and demand (equity like model)

allocation in equities would be good for comparison because equities would depend on market

performance more than just government regulation as compared to bond funds, which will need

many controls for country specific controls and policies.

These studies form the basis for the essential framework I will build for this study. The

following section discusses the key questions that need to be answered in order to conduct the

analysis.

III. Empirical Framework

There are three key questions that will be addressed in this section in order to test the

hypothesis that developing countries or informationally inefficient countries should see higher

returns for active mutual funds on average than passive funds, and the trend would be reversed in

developed nations or informationally efficient economies.[16] This section creates a set of

regression equations to answer these. In subsection (i) we lay out the intuition behind the cross

section of countries picked, the theoretical controls we need in order to conduct the analysis and

follow it up by creating a rigorous framework of regression equations. Subsection (ii) discusses

the actual choice of variables used in the empirical analysis.

(i) Framework

<u>*(a) Theoretical Considerations*</u>

In order to achieve a representative sample, we will use four developing and four

developed countries. It should be noted that the primary mode of classification of countries is the

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[16] Please note that the hypothesis does not necessarily conflate the development level of the country with informational efficiency. The study is designed to consider both aspects separately because the correlation between the development level and informational efficiency in financial markets is not extremely strong.

classification ascribed to countries by the World Trade Organization (WTO). However, measures such as the Human Development Index (HDI) and Gross Domestic Product (GDP) per capita should also support to this classification.[17]

The fund universe will consist of both active and passive funds in each country. These will be equity focused, open ended mutual funds. This leads to a selection of funds that are directly impacted by the characteristics of the stock market and will hence give us a better understanding of how systematic differences stemming from country specific factors impact returns in case there is an effect at all. The return series considered was over a time frame from 2012 to 2017. These years give us a relatively stable growth environment in the United States and most of the world. The vectors of controls include both country and fund specific controls. Country specific controls include metrics for social development, financial development, degree of openness to foreign investments, market return and a measure of the business cycle. Intuitively, these measures provide a relatively complete picture of the economy and the country, hence accounting for macroeconomic factors that might play a role in returns. Social indicators such as the HDI provide a proxy for the economic well-being of an average investor. The most important metric in this case will be a measure of financial development for both financial institutions and the market. It is important to note that financial and social development measure the development of the two sides of the mutual fund industries, namely, the institutions and the markets that handle the money on one side and the investors pouring in the money on the other. A metric for involvement of foreign capital accounts for synergies from global trade, including increased demand and better technologies of production, which could lead to increased returns

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[17] Throughout this paper there will be no distinction made between an "emerging market" and "developing country" because the countries will be picked such that they fall under both categories.

(Ferreira et.al., 2012 & Fernando et al, 2003). Market return is a natural control because often the benchmark of interest is the broader market and the performance of the market can significantly determine performance of individual mutual funds. We use the yield curve as a proxy of business cycles that may have occurred during this time. The credit spread also approximates credit cycles in the economy (Bernanke,1990). Given that this was a period of relatively stable growth, the business cycle effects should vary little over time.

Fund specific controls such as Net Asset Value (NAV), Volatility (Vol) and management fees can account for the share of returns that come from systematic differences between the funds themselves instead of country specific differences. These are important explanatory variables, due to their immediate impact on returns. Accounting for volatility not only accounts for the associated risk but also accounts for consistent performance of the returns or the lack thereof. We need to control for the size of the fund in case the assets under management impact the returns. Given that we will use total gross returns as the measure of the return series, we need to control for some of the fees involved including management fees. It has been shown that value funds perform better than growth for certain types of firms and this effect has been captured in the Fama French Three factor model. Both size and value factors impact returns (Fama and French, 1992).

After considering all the above controls, we set up the system of regression equations we need in order to test whether there is a systematic difference between active and passive returns in developing and developed countries. The primary variables of interest would be the proxy variable for information efficiency and the development dummy that explains what proportion of returns can be explained by the difference between active and passive strategies for different

levels of development and informational efficiency. Since it is hard to directly measure informational efficiency, we use proxy variables. In many instances informational efficiency is approximated by bid - ask spreads. Armstrong et al. (2010) propose two standard proxy variables for measure of informational asymmetry, namely, "Adverse Selection component of bid ask spread" or the "average bid ask spread" itself. (Amrstrong et al. 2010). They justified the choice assuming that when there is more informational asymmetry, a mutual fund house/ brokerage needs to make more effort or, in effect, "pay more" in order to get information, which implies that information in and of itself gains value. This is reflected in the bid ask spread. The wider the spread, the greater the informational asymmetry. The paper views the bid ask spread as an information premium. A key variable of control, used in both papers when using bid-ask spreads was the degree of market competition. This was approximated by number of shareholders (Armstrong et al., 2010). This paper was written from the point of view of understanding whether bid ask spreads have any effect on cost of capital. In order to understand whether this extends to a country level, I read a report from Price Waterhouse Coopers (PwC) titled "Global Financial Markets Liquidity Study" which seeks to evaluate the liquidity of various capital markets including equities across developing and developed countries. The report also used bid-ask spreads as a measure of "tightness", which is a component of liquidity. The premise of the report suggests that the more liquid the market, the more efficient it is.

It is widely accepted that greater market liquidity generally implies tighter spreads. Kim and Verrecchia (1992), Greene and Scott (1999) and Chordia et.al. (2000) all recognize that market liquidity is inherently linked to bid-ask spreads. There is an acknowledged inverse relationship between the two. Hence, using either would inherently act as a proxy for the other.

The only issue might arise when we are trying to approximate informational efficiency with either of the measures is that extraneous factors such as noise trading might impact liquidity and bid ask spreads, artificially increasing liquidity and tightening spreads (Greene and Scott, 1999), giving a semblance of increased informational efficiency where there is actually negligible or an adverse impact on informational efficiency. Due to the lack of data regarding national average bid ask spreads, we will use liquidity as our measure for informational efficiency. A key measure for liquidity is the turnover ratio defined as the ratio of the value of total shares traded to average real market capitalization.[18] An increase in the turnover ratio generally is driven by an increasing in the volume of trading which is one of the measures of liquidity in a national financial market. Throughout the paper, info proxy will refer to turnover ratio as a measure of liquidity. Ideally, an increase in liquidity will represent an increase in informational efficiency and a commensurate increase in returns. However, should confounding factors such as noise trading exist in a market, we might see liquidity acting differently and possibly impacting returns negatively. Based on these theoretical discussions, I now discuss a framework that takes all of these considerations into account to test the hypothesis that developing countries or informationally inefficient countries should see higher returns for active mutual funds on average than for passive funds, and the trend should be reversed in developed nations or informationally efficient economies.

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[18] the denominator is deflated using the following method: $Tt/P\_at/\{(0.5)*[Mt/P\_et + Mt\text{-}1/P\_et\text{-}1]$ where T is total value traded, M is stock market capitalization, P_e is end-of period CPI.
Source: World Bank

There are three essential parts to the set of regression equations in the framework. Set 1 of the regression equations tests whether there is a systematic difference between active and passive investing strategies in the cross section of developing and developed countries. This will help us test the preliminary hypothesis that there is no clear dominant strategy between active and passive investment across a cross section of developed and developing countries. Set 2 of the equations then tests for how active and passive investing perform on a country by country basis. It also looks at how the effects of informational inefficiency differ across nations, taking a look at the specific nations. This helps us further explore the hypothesis that increases in informational efficiency would lead to higher passive returns. The final step then explores whether a measure of informational efficiency has a different effect on the returns for active investment instruments and passive investment instruments regardless of countries, to understand whether an increase in informational efficiency leads to higher returns for active or passive investment strategies. We discuss the three sets of equations below.

Step 1: Cross Section (Multi Country) Regressions

The following outlines a set of exploratory regression equations involving all the funds chosen across the various countries and times. This includes five main regressions that each test the basic components of my main hypothesis. The hypothesis posits that there is a country specific difference between active and passive investing strategies but theorizes that there is no dominant one universally. Equation1 tests this claim. Another big component of the hypothesis rests on the impact that the WTO classification of countries into developing and developed has on the fund returns. If there is a systematic difference in returns between developing and

developed countries, Equation 2 should reflect it. This naturally leads to an analysis of whether

active and passive investing strategies have differential impacts on returns when considered in

conjunction with the development level of the country. To test this component of the hypothesis,

I use the model in Equation 3. The hypothesis further rests on the fact that information efficiency

should impact returns. In particular, it should impact active and passive returns differentially.

These claims are explored in equations 4 and 5. The specifics of the regression equations and the

expected sign of the coefficients are explained below.

$$returns_{cft} = \alpha(active_f) + \beta(vectors\ of\ control) + \varepsilon$$
$$returns_{cft} = \alpha(dev.dummy) + \beta(vectors\ of\ control) + \varepsilon$$
$$returns_{cft} = \alpha(active_f * dev.dummy) + \beta(vectors\ of\ control) + \varepsilon$$
$$returns_{cft} = \alpha(info\ proxy_{ct}) + \beta(vector\ of\ controls) + \varepsilon$$
$$returns_{cft} = \alpha(info\ proxy_{ct}) + \gamma(active_f * info\ proxy_{ct}) + \beta(vectors\ of\ control) + \varepsilon$$

$returns_{cft}$ is the main variable that shows total gross returns, inclusive of dividends, per

country per fund per year measured as percentages. The $active_f$ is a fund specific dummy

variable set to 1 when the fund under consideration is managed actively. Each country has its

own dummy variable. The "dev dummy" refers to the WTO classification of the country into

developing and developed. Developed countries are represented by a value of 0 and developing

countries by a 1. The vectors of control consist of the fund and country specific controls

discussed above. The $infoproxy_{ct}$ is the primary variable of interest. As discussed in the section

above, this refers to the turnover ratio, a measure of liquidity which is acts as a proxy variable for

informational efficiency. The coefficient for the above will allow us to test whether liquidity

positively or negatively impacts overall returns. Should the turnover ratio, represented as

$infoproxy_{ct}$, not be affected by extraneous effects such as noise trading, then the coefficient

should be positive. Otherwise it would be negative, showing the negative impact of noise trading on returns. The interaction terms including $devdummy * active_f$ and $acitve_f * infoproxy$ will allow us to approximate whether there is a systematic difference between active and passive returns for different development levels and how the informational efficiency proxy variable impacts returns. I do not expect $active_f$ to be significant in Equation 1. Given the perception that developing economies generally have weaker financial performance, I would expect that coefficients for $dev.dummy$ to be significant. To explore the effects of active and passive strategies at a more granular level, we then look at each country separately.

Step 2: Single Country Regressions

The second step of the regression analysis would be to see if there are any differences between how the information proxy impacts the active and passive returns per country. These will be basic, single grouping variable panel regressions that allow us to see whether there are systematic differences between active and passive returns in the eight countries of choice. This allows us to see whether there are any patterns that arise with the labels of "developing" and "developed" countries. The regressions run per country will be as follows:

$$returns_{ft} = \alpha(info\ proxy_t) + \gamma(active_f * info\ proxy_t) + \beta(vectors\ of\ control) + \varepsilon$$
$$returns_{ft} = \alpha(active_f) + \gamma(active_f * info\ proxy_t) + \beta(vectors\ of\ control) + \varepsilon$$

These will track how the coefficients change when we are not taking a cross section of countries into account. A positive info proxy coefficient would suggest that returns are positively impacted by increased liquidity confirming that liquidity and informational efficiency go hand in hand. This regression demonstrates which countries exhibit systematic differences between active and passive strategies. It also helps in identifying places where liquidity proxies for informational

efficiency as expected (ie positive coefficients for alpha) and where it is impacted by noise trading (ie a negative coefficient for alpha).

Step 3: Active and Passive Regressions

In the final step of the regression analysis we run separate estimations using active and passive returns as dependent variables to understand whether informational efficiency impacts the returns for one more than the other. These are basic regressions and are stated as under:

$$returns_{cft} = \alpha(info\ proxy_{ct}) + \beta(vectors\ of\ control) + \varepsilon$$

The alpha coefficient for the above helps us understand whether an increase in liquidity leads to an increase in the returns for active or passive strategies regardless of country, giving us an idea of whether informational efficiency helps one investment strategy over another. If confounding factors such as noise trading do not exist, we would alpha to be positive for both but differ in magnitude.

A combination of the three steps above will help us answer where there is a systematic advantage of active or passive across countries, how countries react to liquidity and how active and passive investment strategies react to changes in liquidity as it proxies for informational efficiency. To estimate the above theoretical framework, we need to make certain choices for regarding the vectors of controls and the various proxy variables we need to use. The subsection below explains the choices of proxy and control variables made.

(ii) Choices of variables and funds

There are a few salient variable choices we need to make. The primary among them is the choice of countries for the cross sectional analysis. The second step is the selection of the fund

universe to get a representative return series. We then continue the discussion to include the explanatory variables and the choice of proxy for informational efficiency.

(a) Determine a feasible universe of mutual funds

As discussed by Otten and Schweitzer (1998), I first used open ended mutual funds with asset class focus in equities. Given the vast number of funds that will accumulate over a cross sectional sample, I sorted the funds in a descending order by their NAV and then picked the top 20 funds that started before 2012. These choices were made to accommodate data collection restrictions well as create a balanced fund universe per country because countries like the United States have significantly more funds than, say, India. Without using a cap on the number of funds, we would over-represent the US in the sample. While these criteria certainly are associated with the danger of only representing the larger mutual funds, it should also be noted that in many developing countries, the mutual fund industry is in its nascent stages. A larger, more popular mutual fund is often the most liquid. Given that liquidity is essential to the analysis, picking the funds with the highest NAV, provided that they started before 2012, is a good way to ensure that they are traded frequently. While this may lead to bias in the selection based on size, there isn't a good alternative in many of the developing countries where the trading in the lower NAV funds is minimal. There are relatively few funds to begin with, and the majority of them are focused on large cap growth stocks. A fund with lower NAV is generally lacking in popularity and will not be traded as frequently, making it a poor addition to the sample.

Another factor which ensures that the sample is mostly representative is the fact that the funds picked must have started before 2012. This is necessary to make a returns series long

enough to have a valid analysis.[19] The choice of the year 2012 is not arbitrary. Many developing

countries started venturing into passive investing after the 2008 recession, possibly to mimic the

success of passive investing strategies in countries like the United States. The assortment of

funds that started prior to 2012 is a relatively representative sample from the range of the values

of NAV. In most developing countries, the majority of the passive investing instruments started

in 2012 or later. The most commonly traded funds are often the ones that are newest or have been

achieving high returns over a long time frame. Given that we are looking at funds that started

before 2012, we are looking at funds with slightly lower NAVs as well. In other words, adding

the 2012 filter ensures that funds from the top, middle and bottom thirds of the NAV distribution

are represented in the sample.

Another problem that arises with the addition of the 2012 filter is the idea that we are

picking funds that are active still and started before 2012, which brings about the issue of

survivorship bias or the notion that funds perform better over time as returns accumulate. This is

a notable problem. However, given that the analysis is primarily cross sectional between

countries and the criterion is applied for funds in every country, the bias will not affect my ability

to detect differences between active and passive returns across the cross section as well as the

impact of the information proxy. Furthermore, as will be evident in Section IV, the analysis will

account for this survivorship bias in some capacity. The same considerations were kept in mind

when picking the ETFs and Index Funds (passive investing instruments) per country as well.

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[19] Due to data restrictions induced by indicators such as HDI, Chinn - Ito Index etc., the returns series can only
extend till 2017. Hence, 2012 gives us at least 5 years of data to work with

(b) Determining developing and developed countries of interest

In order for the study to have a representative sample of geographically and industrially diverse economies while ensuring that they have similarly structured mutual fund options, I looked at a variety of countries. It was recommended that I use OECD countries, but they are primarily high income countries and not many developing countries qualify. Using a list of the countries in the World Bank Report as well WTO classifications, I have determined that the following countries would be a representative sample:

Developed: United States, Australia, Germany, Japan

Developing: China, India, South Africa, South Korea

There are a number of considerations that come up with the selection of the following countries. The developed countries represent a fairly geographically diverse sample and all are acknowledged as developed countries not just based on World Bank and WTO classifications but also have high values on average for developmental indicators such as GDP and HDI. (See Table 8, Pg 35)

However, the section of countries classified as "developing" leads to a many concerns. While China and South Korea (referred to as Korea for the purposes of this paper) are classified as "developing" by WTO, there is a general perception that these economies are in fact at par with many developed countries. This is in fact reflected in the economic indicators such as openness to foreign investment and institutional efficiency (See Table 8, Pg 35). However, on the basis of HDI, GDP per capita and overall financial development, these countries can still be classified as "developing". The concern, however, is still valid. China and Korea have both shown outstanding economic performances in recent years. The selection of these countries was

primarily due to the fact that there are almost no other countries in the world traditionally classified as "developing" that have a mutual fund industry developed enough to have 20 ETFs that started before 2012. Countries like Brazil and Indonesia would be the next options considered, but the number of ETFs offered is either lower than 20 or the funds started as recently as 2016. As explained in footnote 10, the limitations of the data produced by the World Bank and the UNDP lead to insufficient data to conduct a meaningful analysis with these countries. The consideration still remains that the outcomes of the study can be impacted by the relative economic and financial development of the these countries.

(c) Selection of explanatory and control proxy variables

This section discusses the choice of the proxy variables for main explanatory and control variables determined in Section III (i). These have been divided into five broad categories: economic development indicators, financial market development, degree of openness of the market, macroeconomic financial factors and informational efficiency.

1. Informational Efficiency

This paper will use turnover ratio of the major index per country to approximate informational efficiency. As explained in Section III (i), there is an inherent correlation between bid ask spread and liquidity and one does not offer an advantage over the other due to their inherent correlation. The higher the liquidity, the lower the bid ask spread and vice versa. Due to lack of data on national bid-ask spreads at available data sources, we will utilize the turnover ratio.

2. <u>Economic Development Indicators</u>

The choices for these included GDP per capita quoted in USD, HDI and number of internet users as a percentage of the total population of the country (Ferreira et al, 2012). HDI is also considered a comprehensive indicator of economic development of the investors. (Nielson, 2011). HDI is a composite index of three indices measuring countries' achievement in longevity, education and income. UNDP defines the HDI as "Gross National Income per capita (GNI/n) with local currency estimates converted into equivalent US dollars using PPP. Longevity is measured by life expectancy at birth. For education, a proxy is constructed by combining measures of actual and expected years of schooling." (Neilson, 2011). HDI is included as a measure of economic development as it is a more comprehensive metric and encompasses greater aspects of economic development of the retail investors.

3. <u>Financial Market Development</u>

Financial market development can be measured by nine indices published by the International Monetary Fund (IMF). The IMF created a number of indices that summarize how developed financial institutions and financial markets are in terms of their depth, access, and efficiency, culminating in the final index of financial development. These important indices can be useful explanatory variables when accounting for development of the financial and capital markets. The indicators use World Bank FinStats, a more updated version of the Global Financial Development Database (GFDD) introduced by Čihák and co-authors, with additional data from the Bank of International Settlements (BIS) debt securities database, Dealogic corporate debt database, and IMF Financial Access Survey. They are a summary of this diverse information in several easy to use indices. This means that they capture development in the banking sector,

Figure 1. Financial Development Index Pyramid
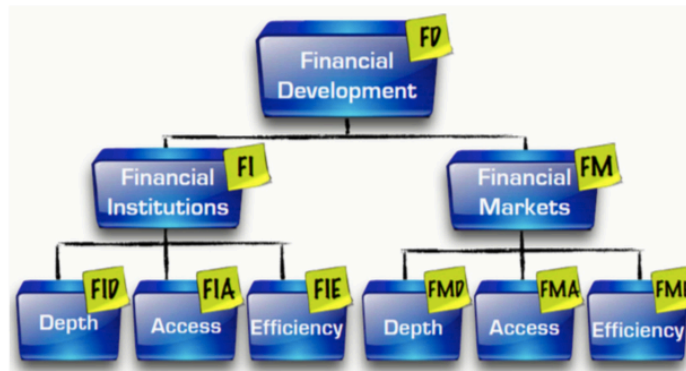
market and informational efficiency, and capital market reach and development. There are 9

indices summarized in the following graphic. Data is available for all nine indicators and

depending on the focus, I can pick a subset of the indicators to use.

4. Degree of Market Integration into the Global Economy

These indicators can be used as proxies for the determining the level of integration the

country has in a global financial framework. Indicators like Foreign Direct Investment are useful

to see how much of the growth is coming from foreign funds instead of domestic growth. The

Chinn-Ito index (KAOPEN) is an index measuring a country's degree of capital account

openness. As stated on their website, the Chinn - Ito index is "based on the binary dummy

variables that codify the tabulation of restrictions on cross-border financial transactions reported

in the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions

(AREAER)" (Chinn et al, 2019). It will measure how open to flows of foreign capital a particular

country is. This is relevant to understanding the degree of market openness, which impacts

equity performance and hence that of mutual funds.

5. <u>Macroeconomic Financial Controls</u>

In order to control for business cycles as well as how well the companies are doing, we use proxies such as the US yield curve, assuming that its slope will act as a proxy for whether the economy is in a boom or a slump. The US yield curve should suffice as a metric for all countries because the business cycles across countries are very highly correlated and a business cycle change is often reflected in the business cycles of other nations. We also intend to control for the credit spread ,which can be defined as the difference between corporate and government yields of similar maturity. (Neal and Rolph, 1998). This will indicate how many companies have a perceived default likelihood showing a clearer picture of the credit landscape.

The other macroeconomic variable we use will be the value of market return for each country per year. This is the value of the r_m used in the Carhart model for explaining returns. This is the average annual return of the major index (used as a proxy for the market eg: the S&P 500) calculated per country.[20]

<u>*(d) Determining Mutual Fund specific Variables*</u>

Following the papers outlined above, we will use volatility to adjust risk. We do not control for the size and the value effect using the methods outlined by Cahart (1997). This is due to the fact that in many developing countries there is no trading for small cap firms or value firms. Most of the trading is concentrated in the Large Cap category and blend is the most common strategy. Hence, constructing the "small minus big" and "high minus low" portfolios

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[20] It should be noted that we do not control for tax because the returns are taxed based on the investors' income, capital gains and the tax codes across countries are not clear on the treatment of ETFs and active funds separately. Instead, we look at the return the investor takes home, which is total gross return adjusted for fees paid, captured in management fees or expense ratios.

Table [1]
Controls Summarized

Measure	Definition	Interpretation
Country Specifc		
Yield Curve (US)	US Treasury Yield Curve Rate T Note Constant Maturity 10 Year	Steeper the slope of the yield curve, the better the business cycle
Credit Spread (US)	US Corporate BBB - 10-Yr Treasury Spread. Calculated by taking the BVAL USD Composite (BBB) 10 Year yield minus the BVAL US Treasury 10 Year Yield.	Larger the credit spread, the worse the economy
IMF Financial Development Indicators		
[1] Financial Institutional Depth	compiles data on bank credit to private sector in percent of GDP, pension fund assets to GDP, mutual fund assets to GDP and Insurance premiums, life and non life to GDP.	
[2] Financial Institutional Efficiency	compiles data on banking sector net interest margin, lending-deposit spread, non-interest margin, lending-deposit spread, non-interest income to total income, overhead costs to total assets, return on assets and return on equity.	Closer the value to 1, better the country is performing per that metric. Higher values are associated with better financial development of a country
[3] Financial Market Depth	data on stock market capitalization to GDP, stocks traded to GDP, internatinoal debt securities of government to GDP, and total debt securities of financial and nonfinancial corporations to GDP	
[4] Financial Market Access	data on percent of market capitalization outside of the top 10 largest companies and total number of issuers of debt per 100,000 adults	
Human Development Index	is a summary measure of average achievement in key dimensions of human development: a long and healthy life, being knowledgeable and have a decent standard of living.	Higher the value, the better the development
Chinn - Ito Index	an index measuring a country's degree of capital account openness based on the binary dummy variables that codify the tabulation of restrictions on cross-border financial transactions reported in the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER)	Closer the value to 1, the more open the economy
Market Return	average annual return of the major country specific index	Higher values means that the index is performing well and the financial health is good
Fund Specific		
Volatility	the extent to which a fund's net asset value typically fluctuates	Greater the more risky the investment
Net Asset Value	measure of the size of the mutual funds' assets	Greater the NAV, greater the trading price and generally more popular the mutual fund
Management Fees	is a charge levied by an investment manager for managing an investment fund.	Higher management fees are detrimental to the returns available to the investor
Length of Existence	differnce between the inception year of the mutual fund and 2012, the start year of the analysis. Acts as a measure to correct survivorship bias	Higher the number, the longer the fund has been around and the more chance the returns have for compounding

Sources:
IMF, Bloomberg, UNDP, Investopedia

will not be possible. Instead, we use two dummies for the management style used. The size is

proxied by NAV scaled by the market cap as explained in the section on Fund Universe selection.

Management fees will also be important in explaining returns. We correct for survivorship bias

discussed above by subtracting the inception year of the mutual fund from 2012. This will give

us a sense of how long the fund has been around and whether the returns are explained by that.

All the above variables are summarized in the Table 1. Table 2 below describes the prediction for

whether the coefficients of the controls would be negative or positive after the regressions are

run as described in Section III (i).

Table [2]
Predicted Co-efficients of the Regression

Factor	Predicted Coefficient	Explanation
Country Specific		
Yield Curve (US)	Positive	The more positive the value of the yield curve the better the economy, which will translate into higher returns
Credit Spread (US)	Negative	Greater the spread, worse the economy hence worse the return
IMF Financial Development Indicators	Positive	Higher degree of financial development in the market and institutions will lead to better returns
Human Development Index	Positive	Greater overall development should translate to higher returns
Chinn - Ito Index	Positive	A greater openess to foreign capital and investors will lead to better trade relations which, in turn leads to better returns
Market Return	Positive	Mutual funds are inherently equity based. This indicator measures the performance of the major index that proxies for the market in an economy. Stronger the market, the better the returns
Fund Specific		
Volatility	Positive	Increased risk profiles are associated with higher returns
Net Asset Value	Uncertain	Whether a larger fund necessarily leads to higher returns is not clear
Management Fees	Negative	Management fees eat into the take home returns of the investor
Length of Existence	Uncertain	The effects of length of existence on returns are not clear

IV. Data

This section delineates the data collection and details the results achieved so far.

Subsection (i) describes the data collection methodology as well as sources. It also discusses

which subset of variables would be used in the regression, the results of which are discussed in

Section VI. This is followed by a discussion of summary statistics describing the data in subsection (ii).

(i) Collection and cleaning

The final data consists of 40 funds per country, 20 open ended actively managed and 20 passive ones. The data for the funds was collected using Bloomberg. The funds were arranged in descending order of size (net asset value) and then were individually examined to ensure that only funds that started before 2012 were included. There was no "loss" of funds per se. This is due to the 20 - fund cap discussed above, which helps us balance the data. Instead of just picking the top 20 funds or the total funds available, I looked through funds in order of decreasing NAV picking only those that started before 2012.[21] The explanatory variables were collected using datasets such as World Bank's Global Financial Development Dataset (GFDD), IMF's Financial Development Index Database, China - Ito index, UNDP's Human Development Index (HDI) amongst others. Table 3 lists the sources for each of the variables used.

Table [3]
Datasources for Explanatory Variables and Controls

Variable	Datasource
Yiled Curve	Bloomberg
Credit Spread	Bloomberg
HDI	UNDP
Chinn - Ito Index	KAOPEN website, open sourced by the original author
Financial Development Indicators	IMF
Market Return	The World Bank
Turnover Ratio	The World Bank
Fund Specific Variables	Bloomberg

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[21] The rationale for this is explained in Section III (ii) 1.

Due to difficulties in finding data for average bid-ask spreads per country, turnover ratio[22] per country per year is used as the proxy for a measure of informational efficiency because turnover ratio acts as a measure of liquidity.

Following the data collection, we ran a correlation matrix in order to ensure that we only used combination of variables that wouldn't introduce the possibility of multicollinearity. The correlation matrix showed that certain financial development indices were extremely correlated. For example, overall financial development was extremely correlated to Financial Market and Financial Institutional Development. However, the two were not correlated to each other. Hence, Financial Market access and financial institutional development were considered. This was then followed by an analysis of the correlation of their individual components. The set of components that were the least correlated were financial market depth and efficiency as well as financial institutional efficiency and depth. Table 4 below is the matrix correlation supporting the above claim. After determining the set of financial development indicators, similar correlations were run for HDI and Chinn Ito Index. The magnitude of correlation in all the cases was less than 0.5.

Table [4]
Correlation Coefficients for IMF Indicators
(2012 - 2017)

	Market Effciciency	Market Depth	Institutional Efficiency	Institutional Depth
Market Effciciency	1.00			
Market Depth	0.31	1.00		
Institutional Efficiency	0.24	0.17	1.00	
Institutional Depth	-0.06	0.83	0.39	1.00

---

[22] Turnover Ratio is defined by the World Bank as follows: "Turnover ratio is the value of domestic shares traded divided by their market capitalization. The value is annualized by multiplying the monthly average by 12".

After collecting data, it was reshaped and merged to form a three dimensional panel structure. The panel variable is a combination of fund and country and the years are used as the time dimension. The data contains variables that constitute country, time and fund fixed effects as well as those that vary in two or more of those dimensions. The majority of the explanatory variables vary with time and country or time, country and fund. We used panel regressions, some using the fixed effects model and others using the random effect model based on whether the variable of interest is time variant. The Hausman test was conducted to determine which is the better model to use in the case when the main explanatory variable of interest did vary with time and it was determined that the fixed effect model was the better fit for the data. Ultimately however, it was determined that a random effect model would be a better one because majority of the explanatory variables are time invariant and will be omitted in a fixed effect model. Hence, all the five regressions in step 1 were run using a random effects model. The final set of variables chosen after the correlation analysis was HDI, Chinn - Ito Index, Financial Market Depth and Efficiency as well as Financial Institution Depth and efficiency and the market returns per country. These will constitute the vector of explanatory variables seen the regression equations in section III (i).

Another key consideration for such a vast data set were inherent characteristics present in the data such as heteroscedasticity and autocorrelation. Heteroscedasticity occurs when a collection of random variables has sub-populations that have different variabilities from others.[23] This variability is generally manifested in the variance of the error terms across different populations. The presence of this leads to erroneous standard error predictions which lead to

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[23] Source: Wikipedia definition of heteroscedasticity

misinterpretations. In order to avoid this preemptively, we had a few options including the use of least square estimators, such as pooled OLS estimators, and using robust standard errors. This paper uses robust standard errors to correct for the error because running a pooled OLS regression does not take into account the panel characteristics of the data which are key to the analysis. This is achieved by using the "robust" command in Stata.

The other expected issue was autocorrelation. This occurs in the time series component of the analysis when returns, volatility or NAV for example, are "sticky". This means that a time dependent variable at time t is correlated to its own values at time t-1 and so on. In such a short time series (2012- 2017), I do not expect the time varying variables to be particularly "sticky". However, in order to confirm this intuition, I tested for this error using the Woolridge test (Drukker, 2003 & Woolridge, 2002). Using this test, it is determined that the test statistic can have as extreme a value under the null hypothesis which assumes no autocorrelation. Hence, no correction was applied for autocorrelation.

With these considerations accounted for, I now discuss a few of the characteristics and summary statistics of the data in the following section.

(ii)   Summary Statistics

<u>*(a) Fund data*</u>

From Table 5 we can see that there is no trend apparent in the raw data that would suggest a systematic difference between active and passive returns in developing countries as compared to developed countries. We see that in Australia, Japan and the United States actively managed open ended mutual funds exhibit marginally higher gross returns on average than the

Table [5]
Summary Statistics for Returns of Funds
(2012 - 2017)

	Developed				Developing			
	Australia	Germany	Japan	United States	China	India	Korea	South Africa
Active	15.69	14.05	20.84	15.36	14.43	20.57	12.17	14.77
	(11.31)	(9.28)	(19.94)	(12.00)	(21.90)	(18.92)	(12.48)	(13.31)
Passive	13.90	55.86	19.19	14.59	14.46	17.69	9.21	16.80
	(11.52)	(55.81)	(22.23)	(11.93)	(25.11)	(20.58)	(18.26)	(25.63)

Note:
The numbers in the parantheses represent the standard deviation for the returns reported above

passive instruments. In developing countries however, India and Korea are the only ones where

gross returns for active instruments exceed those of passive instruments. The standard deviations

for all returns are also high, suggesting that it would not be possible to draw very strong

conclusions based off of these averages. It should be emphasized again that the returns under

consideration are gross returns and the effects of taxes and fees have not been taken into account.

This raw data does not immediately suggest that there is a systematic difference between active

and passive returns in developing and developed countries. There is evidence to suggest that in

five of the eight countries (close to half of the countries) active returns outperform passive

returns. These averages, however, have a very high standard deviation, suggesting that a

regression would be a more appropriate way to draw conclusions.[24]

Table 6 shows the correlation between the returns of active funds in the data. All

correlation coefficients represent the correlation of the funds in a given country in 2012 or 2017

with the returns of the active funds chosen in the data from the United States. As we can see,

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[24] The magnitude for passive returns for Germany is significantly higher than any other due to the inclusion of Exchange Traded Notes (ETNs)in the fund universe. ETNs are bond like instruments that are based off the principle of passive investing. They pay the returns of the index they are benchmarked to at the end of their life span, but do not hold the stocks of the index in question. This leads to a different calculation of returns than the one for ETFs. This data could not be replaced due to lack of access to a Bloomberg terminal under the unprecedented COVID-19 crisis. Germany will hence be given limited attention in the analysis

there is no significant or systematic correlation between these returns hence decreasing the risk

of collinearity in the regressions .

Table [6]
Correlation Coefficients of Returns with the Returns for the United States
Fund Level Data (Active)

	Developed				Developing			
	Australia	Germany	Japan	United States	China	India	Korea	South Africa
2012	-0.45	0.02	-0.34	1.00	-0.16	0.45	0.15	-0.08
2017	0.06	0.33	0.05	1.00	0.07	0.05	-0.03	-0.32

A similar trend exists for passive funds as well as seen in Table 7. We see no direct

correlation between the returns of US passive funds and the passive funds chosen across other

countries. Notable exceptions are that of Korea and South Africa in 2012. However, these

correlations switch drastically in 2017. None of the correlations in 2017 exceed 0.5 in magnitude

and this helps reinforce the idea that there are no correlations between the returns series we use.

Table [7]
Correlation Coefficients of Returns with the Returns for the United States
Fund Level Data (Passive)

	Developed				Developing			
	Australia	Germany	Japan	United States	China	India	Korea	South Africa
2012	-0.30	0.49	0.26	1.00	0.05	-0.03	-0.72	-0.80
2017	0.03	0.03	0.11	1.00	-0.09	0.33	-0.33	0.07

It should be noted that these two years have been chosen because they are the beginning and the

end years of the time frame under consideration. The next subsection explores the summary

statistics associated with the explanatory variables before moving on to the results of the

regressions.

(b) Explanatory Variables

We observe a few expected and unexpected trends in Table 8, which summarizes the statistics for explanatory variable used. The overall measure of financial development does show that, on average, developed economies are also more financially developed (as a combination of market and institutional development) than the emerging economies. Financial Institutional

Table [8]
Summary Statistics for Explanatory Variables
(2012 - 2017)

	Financial Development	Financial Institutions	Institutional Efficiency	Market Depth	Market Efficiency	Human Development Index	Turnover Ratio of Domestic Shares (%)	Chinn - Ito Index	Stock Market Return (%)
Developed:									
Australia	0.88	0.94	0.85	0.92	0.62	0.93	59.04	1.00	4.52
	(0.01)	(0.01)	(0.01)	(0.05)	(0.04)	(0.00)	(4.25)	(0.00)	(7.25)
Germany	0.71	0.72	0.72	0.68	0.79	0.93	74.60	1.00	12.66
	(0.02)	(0.01)	(0.01)	(0.03)	(0.08)	(0.00)	(7.68)	(0.00)	(10.24)
Japan	0.85	0.92	0.88	0.82	1.00	0.90	108.81	1.00	13.71
	(0.02)	(0.02)	(0.01)	(0.08)	(0.01)	(0.00)	(13.47)	(0.00)	(19.63)
United States	0.88	0.84	0.62	0.99	1.00	0.69	139.26	0.00	9.82
	(0.01)	(0.01)	(0.05)	(0.00)	(0.00)	(0.01)	(27.22)	(0.00)	(6.99)
Emerging:									
China	0.61	0.57	0.85	0.63	1.00	0.74	242.76	0.00	6.53
	(0.04)	(0.05)	(0.00)	(0.06)	(0.00)	(0.01)	(111.39)	(0.00)	(28.53)
India	0.41	0.38	0.61	0.52	0.52	0.62	49.31	0.00	10.09
	(0.01)	(0.01)	(0.02)	(0.04)	(0.02)	(0.01)	(1.78)	(0.00)	(9.83)
Korea	0.86	0.82	0.83	0.85	1.00	0.90	122.69	1.00	6.24
	(0.01)	(0.01)	(0.02)	(0.02)	(0.00)	(0.00)	(15.82)	(0.00)	(-2.67)
South Africa	0.60	0.73	0.76	0.75	0.30	0.92	28.64	1.00	11.77
	(0.02)	(0.01)	(0.01)	(0.05)	(0.05)	(0.00)	(4.97)	(0.00)	(6.44)

Note:
The numbers in the paratheses represent the standard deviations of the mean values.

development shows similar trends with the noticeable exception of South Korea. It should be noted that many of South Korea's indicators would evince that it is in fact a developed country, but they maintain their "developing country" status with the WTO. Noticeable deviation in trends is seen in Market Efficiency, where China and Korea both show extreme market efficiency and are comparable to Japan and the United States. The Human Development Index manifests the

expected trend wherein developed countries have a higher average value over 2012 to 2017 than

developing countries. The Chinn-Ito index is mostly invariant in time and depicts the focus of the

economy in terms of its acceptance of foreign capital. The turnover ratio most remarkably does

not exhibit a clear trend for developing or developed countries. This could be a function of the

fact that in economies like Germany and Australia, banking is the primary way of raising capital

instead of financial markets. This may suggest that the turnover ratio impacts returns in active

and passive funds but may not be related to the developing or developed status of the country.

Table [9]
Correlation Coefficients for Stock Market Return
(2012 - 2017)

	Australia	China	Germany	India	Japan	South Africa	South Korea	United States
Australia	1.00							
China	0.14	1.00						
Germany	0.83	0.50	1.00					
India	0.71	0.38	0.77	1.00				
Japan	0.91	0.46	0.89	0.65	1.00			
South Africa	0.21	0.07	0.41	0.16	0.08	1.00		
South Korea	0.57	-0.12	0.55	0.50	0.53	-0.08	1.00	
United States	0.81	-0.04	0.82	0.72	0.68	0.38	0.82	1.00

Note:
Stock market return is the growth rate of annual average stock market index. Annual average stock market
index is constructed by taking the average of the daily stock market indexes available at Bloomberg
Source:
The World Bank Data Catalog

Table 9 above highlights that the general stock market return for all the economies, with

the exception of China, are extremely correlated to the United States.[25] We hence conclude that

using the United States yield curve and corporate spreads as measures of the business cycle

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[25] This should not be confused with Table 6 which shows the correlation of the returns of active funds of
a given country with the returns of active funds in the United States.

across the world sufficient to capture business cycles and financial cycle effects. This may also

hint towards a general re-coupling of various markets across the globe since the financial crisis.

Given the lack of strong trends, it is more suitable to rely on the regression evidence than the

summary statistics. The results of the regressions are discussed below.

V. Empirical Results

Section III (i) laid out a three step empirical framework that was used to test the

hypothesis that developing countries or informationally inefficient countries should see higher

returns for active mutual funds on average than passive funds and the trend would be reversed in

developed nations or informationally efficient economies.[26] We discuss the results of these steps

next.

Step 1: Cross Section (Multi Country) Regressions

As a quick recap, Step 1 consists of the preliminary exploratory analysis that helps us get

an intuition about the many components of the hypothesis. There are five regression equations,

each of which explores a different aspect. The results for Step 1, shown in Table 10 below, paint

an interesting picture. From the very beginning we see that the coefficient for $active_f$ in Model

(1) is statistically insignificant, confirming the intuition that there is no clear dominant strategy

between active and passive across the cross section of eight countries chosen. This would suggest

that a country specific analysis is necessary to understand the systematic difference between the

two strategies. Model (2), then, looks at the effect that the classification of the country based on

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[26] Please note that the hypothesis does not necessarily conflate the development level of the country with informational efficiency. The study is designed to consider both aspects separately because the correlation between the development level and informational efficiency in financial markets is not extremely strong.

Table [10]
Step 1: Cross Section (Multi-Country) Regression
(Dependent Variable: Fund Returns)

	Active	Development Level	Development Level x Active	Turnover Ratio	Turnover Ratio x Active
	(1)	(2)	(3)	(4)	(5)
Active	-0.85				
	(1.19)				
Devloping		-6.59**			
		(1.28)			
Developed x Active			-10.93**		
			(1.94)		
Developing x Passive			-6.71**		
			(1.75)		
Developing x Active			-7.93**		
			(1.69)		
Turnover Ratio				-0.06**	-0.06**
				(0.01)	(0.02)
Active x Turnover Ratio					-0.01
					(0.01)
Fund Specific Controls					
Net Asset Value	0.00	0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Volatility	0.31**	0.27**	0.27**	0.48**	0.47**
	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)
Management Fees	1.15			1.20*	1.37
	(0.84)			(0.69)	(0.73)
Length of Existence	-0.01	-0.11**	-0.11**	-0.01	-0.02
	(0.02)	(0.05)	(0.05)	(0.02)	(0.02)
Country Specifc Controls					
Financial Market Access	6.54*	3.32	3.32	9.83**	10.18**
	(3.58)	(3.44)	(3.44)	(3.17)	(3.22)
Financial Market Depth	-16.21	-5.89	-5.89	30.49**	-4.68
	(11.28)	(11.75)	(11.75)	(6.78)	(12.54)
Financial Institutional Effciency	10.72*	-39.69**	-39.69**	-4.20	29.49**
	(6.17)	(11.78)	(11.79)	(12.44)	(7.32)
Financial Institutional Depth	12.81	-18.05*	-18.06*	1.35	1.78
	(8.61)	(10.18)	(10.19)	(9.42)	(9.54)
HDI	-84.43**	85.55**	85.55**	-45.95**	-45.46**
	(16.31)	(29.56)	(29.56)	(17.65)	(17.78)
Chinn - Ito Index	13.70**	-9.06*	-9.06*	0.07	-0.22
	(4.07)	(5.42)	(5.42)	(4.27)	(4.31)
Market Return	0.52**	0.48**	0.48**	0.67**	0.67**
	(0.06)	(0.05)	(0.05)	(0.07)	(0.07)
Yield	34.39**	50.69**	50.69**	29.96**	29.88**
	(4.98)	(5.77)	(5.77)	(4.70)	(4.71)
Credit Spread	39.09**	52.42**	52.42**	41.11**	40.99**
	(3.85)	(4.95)	(4.95)	(3.63)	(3.65)
Time Fixed Control					
2013	-11.98**	-15.94**	-15.94**	-11.64**	-11.62**
	(2.23)	(2.15)	(2.15)	(2.11)	(2.11)
2014	-25.14**	-35.21**	-35.21**	-23.74**	-23.69**
	(2.74)	(3.44)	(3.44)	(2.67)	(2.68)
2015	-33.00**	-43.88**	-43.88**	-33.18**	-33.08**
	(2.61)	(3.09)	(3.09)	(2.47)	(2.50)
2016 and 2017		|---- Omitted due to collinearity -----|		
R- squared (overall)	**0.40**	**0.37**	**0.30**	**0.41**	**0.41**

Notes:
** - Significant at 5% level
* - Significant at 10% level
The numbers in the parantheses represent the standard errors

development status has on returns. We see an economically and statistically significant difference of 6.59% between developing and developed countries. There is a significant negative impact on returns when the country is classified as developing which suggests that the commonly held notion of development level impacting returns may have some credibility to it. Further analysis, done in country specific regressions, is required to see whether all the countries classified as "developing" follow this trend. Model (2) also motivates the next key assumption of the hypothesis - a difference between active and passive returns in developed versus developing countries. Model (3) tested this theory and we see that the coefficients for the interaction between the active dummy and the development level dummy are all significant. These results can be interpreted by comparing all the coefficients to the returns of passive funds in developed countries (code by 0x0). We see that in developed countries, active seems to perform 10.93% worse than passive investing strategies. For developing countries, we see that the returns for passive funds are 6.71% lower when compared to the passive funds in developed countries. In a similar comparison between active funds in developing countries and passive in developed, we find a -7.93% difference. While these results do not test whether the coefficient for active fund in developing and passive funds in developing countries are different than one another, they do suggest that a difference might exist, which can be more directly tested in the country specific regressions. So far the results have supported the hypothesis that there is no dominant strategy between active and passive universally and the development level of the country impact the returns achieved. Models (4) and (5) proceed to test the impact of the informational efficiency proxy variable, the turnover ratio, on returns.

Model (4) suggests that there is a statistically significant but economically insignificant negative impact of the turnover ratio on returns. This is contrary to how I expected liquidity to act if there were no confounding factors. As discussed in Section III (i), we would expect an increase in turnover ratio or liquidity to be associated with a decrease in spreads due to increased informational efficiency and overall higher returns. A negative coefficient, on the other hand, suggests that there are some confounding factors such as noise trading that are impeding the ability for liquidity to bring efficiency to the market. Given that this regression is a multi country regression, a negative coefficient could suggest multiple things. It can be immediately discerned that there are one or more countries where confounding factors such as noise trading are impacting the effectiveness of turnover ratio as an informational efficiency proxy. Another possible confounding factor is that countries with high level of foreign investment through Foreign Portfolio Investment experience increase in trading volume due to churn effect created by the rapid movement of money between economies in order to maximize capital gains (also referred to as hot money).[27] There is a theory that due to herd behavior of foreign investors and informational frictions, money moves in an out of different economies, especially in emerging markets, regardless of fundamentals of the economy. This effect is generally associated with the debt market but could also impact stock market returns and trading volume (Chari and Kehoe, 2003). This high rate of churn, or changing assets held quickly, along with informational frictions could be causing negative returns in some of the countries. It should be noted that the magnitude of this negative effect is extremely small (-0.06%). It is possible that the negative impact in a few of the countries is counterbalanced by the places where liquidity is having a positive impact on

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[27] signifies currency that quickly and regularly moves between financial markets

returns due to an associated increase in informational efficiency. The country specific regressions can provide a better insight into the workings of this variable.

Model (5) similarly suggests a slightly negative impact of the turnover ratio across a cross section of eight countries considered together. It also shows that turnover ratio has a slightly negative impact when considered in conjunction with the active management strategies as compared to the impact of the turnover ratio on passive funds. The coefficient is statistically significant but economically not. This further indicates that a country by country analysis will be able to better discern how active and passive strategies respond to a 1% change in liquidity in context of the country specific considerations.

A few of the salient controls and their coefficients include volatility, which, as expected, has a positive coefficient across all the models. A unit increase in volatility seems to be causing a small but significant increase in the returns (anywhere between 0.27% to 0.40%). We also note, that for the majority of the models, survivorship bias is not a major concern. It is also apparent that financial market access has a positive impact on returns across the five models. Financial Market Access is a measure for how much of the market capitalization comes from companies other than top 10 largest firms as well as how accessible debt is. A unit increase in this metric should intuitively increase returns as is shown in the models. Market return, yield and credit spread all have strong positive impacts on returns, suggesting an influence of the home market and the global business cycle on the returns. It should be noted that the explanatory power of all of these models are in line with what is expected for running regressions with returns.

After taking a preliminary exploratory look at the data through regressions, it is apparent that country specific regressions will not only be able to reveal the impact of active and passive

strategies on returns but also show how the turnover ratio is affecting returns and whether

confounding factors such as noise trading are impeding the efficiency of the financial markets.

Step 2: Single Country Regressions

These are the main regressions that will help us understand many of the interesting results

we see in the previous subsection. Model (1) run for each of the eight countries is trying to test

the impact of active versus passive strategies on returns in each country. Model (2) helps us

understand how liquidity is behaving with respect to returns in order to give us some insight into

the potential presence of the "hot money" like effect or noise trading issues, both of which lead

to increased liquidity but lower informational efficiency.

We first take a look at Table 11, which summarizes the results for Model (1) across all

eight countries under considerations. Notably, Australia, Japan, India and South Korea all exhibit

positive coefficients for active but the only one of statistical significance is Japan. In Japan,

active seems to perform better than passive by 33%. This analysis will not be actively discussing

Germany due to the confounding factor of the ETNs, which have a much different returns

structure than ETFs and open-ended mutual funds. It is notable that China and the United States

both exhibit significantly negative returns for active strategies. These results are also not

surprising because both these markets have exhibited strong growth, especially in the

technology sector, which leads investors to purchase the market and get profits instead of taking

additional risks and costs associated with active mutual funds. The key result through these

country specific regressions is that the classification of countries into developing and developed

does not give the investor a great insight into whether passive or active would be a better

strategy. We see evidence that in some countries, active might be better than passive while in

Table [11]
Single Country Regressions: Equation 1
Impact of Active vs Passive Strategies
(Dependent Variable: Fund Returns)

Variables	Devloped Countries				Developing Countries			
	Australia	**Germany**	**Japan**	**United States**	**China**	**India**	**South Korea**	**South Africa**
Active	6.45	-269.82**	32.81**	-10.27**	-18.80**	13.12	22.05	-14.21
	(11.56)	(48.66)	(16.36)	(0.35)	(6.25)	(34.84)	(13.77)	(15.19)
Passive x Turnover	0.58**	-4.65**	2.81**	-0.24**	-0.32**	-16.71**	0.13	1.48
	(0.22)	(0.67)	(0.31)	(0.03)	(0.04)	(2.19)	(0.13)	(0.92)
Active x Turnover	0.50*	-1.39**	2.54**	-0.17**	-0.24**	-16.93**	-0.01	1.89**
	(0.26)	(0.32)	(0.32)	(0.03)	(0.04)	(2.13)	(0.06)	(0.81)
Controls								
Volatility	0.38**	0.45	0.61**	0.64**	0.45**	0.00	0.48**	-0.02
	(0.13)	(0.28)	(0.2135)	(0.27)	(0.16)	(0.07)	(0.17)	(0.06)
Survivor	0.03	0.00	0.20	0.04	-0.39	-0.02	-0.56**	0.05
	(0.08)	(0.03)	(0.2706)	(0.03)	(0.42)	(0.19)	(0.22)	(0.11)
Institutional Depth	-303.88**	3003.75**	1738.82**	-358.52**	-235.42**	102.52	-70.08	-999.32
	(25.30)	(593.45)	(171.49)	(143.53)	(51.51)	(133.05)	(91.53)	(993.72)
Market Depth	-121.16**	734.62**	-982.53**	Collinearity	220.44**	744.66**	122.76	-138.21
	(13.94)	(185.95)	(83.11)		(59.97)	(120.42)	(80.93)	(129.92)
Market Return	0.64**	-0.29**	0.00**	1.13**	1.11**	-1.98**	1.44**	1.53
	(0.22)	(0.33)	(0.08)	(0.11)	(0.09)	(0.37)	(0.56)	(1.04)
Constant	365.76	-2040.31**	-878.85**	317.01**	36.66**	443.35**	-65.88	938.88
	(39.67)	(475.96)	(98.55)	(111.19)	(12.90)	(84.91)	(125.14)	(765.17)
R - Sqaured	**0.46**	**0.53**	**0.57**	**0.33**	**0.37**	**0.64**	**0.33**	**0.19**

Notes:
** - Significant at 5% level
* - Significant at 10% level
The numbers in the parantheses represent the standard errors

others passive might dominate active. A majority of the countries show no significant difference

between the two. We now turn to see how informational efficiency impacts the returns for active

and passive strategies.

Table 12, below, delineates the results for the impacts of the turnover ratio on returns and

how that affects the active and passive returns per economy. In four of the eight economies we

see that the turnover ratio has a positive impact on returns suggesting that a unit increase in the

turnover ratio leads to a positive change in returns. In Germany, United States, China and India

we see the reverse effect. Germany is not being given particular importance in the analysis due to

Table [12]
Single Country Regressions: Equation 2
Impact of Liquidity on Returns
(Dependent Variable: Fund Returns)

Variables	Devloped Countries				Developing Countries			
	Australia	**Germany**	**Japan**	**United States**	**China**	**India**	**South Korea**	**South Africa**
Turnover Ratio	0.52**	-2.62**	2.67**	-0.21**	-0.29 **	-16.85**	0.04	1.71**
	(0.22)	(0.58)	(0.31)	(0.03)	(0.04)	(2.13)	(0.08)	(0.84)
Active x Turnover	0.02	-0.31**	0.03	0.00	0.02**	0.05	0.03**	-0.07
	(0.02)	(0.11)	(0.28)	(0.01)	(0.00)	(0.04)	(0.01)	(0.08)
				Controls				
Volatility	0.38**	0.28	0.62**	0.61**	0.42**	0.00	0.48**	-0.01
	(0.13)	(0.29)	(0.21)	(0.26)	(0.16)	(0.07)	(0.17)	(0.06)
Survivor	0.03	-0.29**	0.19	0.03	-0.72*	-0.02	-0.53**	0.04
	(0.08)	(0.13)	(0.28)	(0.03)	(0.42)	(0.19)	(0.22)	(0.10)
Institutional Depth	-303.86**	3216.12**	1743.24**	-342.75**	-210.13**	102.01	-69.52	-997.86
	(25.30)	(611.07)	(169.90)	(140.52)	(51.38)	(132.49)	(91.17)	(989.84)
Market Depth	-121.11**	758.61**	-983.12**	Collinearity	206.84**	744.56**	121.81	-139.02
	(13.90)	(187.31)	(82.84)		(59.04)	(120.19)	(80.94)	(129.54)
Market Return	0.64**	-0.48	0.00**	1.12**	1.11**	-1.98**	1.44	1.54
	(0.21)	(0.35)	(0.09)	(0.11)	(0.09)	(0.37)	(0.56)	(1.03)
Constant	369.03**	-2333.44**	-866.37**	299.94**	25.71**	450.21**	-54.21	931.34
	(39.75)	(474.59)	(97.53)	(108.65)	(12.27)	(80.52)	(129.12)	(761.28)
R - Sqaured	**0.46**	**0.43**	**0.57**	**0.32**	**0.34**	**0.64**	**0.32**	**0.19**

Notes:

** - Significant at 5% level

* - Significant at 10% level

The numbers in the parantheses represent the standard errors

the presence of ETNs. Effectively, the interesting economies with a negative impact of liquidity

on returns are India, China and the United States. These three economies (and Germany) are

among the top destinations for foreign investors.[28] This correlation could possibly point to the

confounding effect of hot money moving in and out of the economy. Further, in the United

States, it is possible that noise trading might also be an issue due to the large number of retail

investors. We also see that a unit increase in the turnover ratio leads to a marginal to no

significant change for the returns for the active funds per country. South Korea and China are the

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[28] Source: World Bank

only countries that shows effective 0.03% and 0.02% increases respectively in active returns when the turnover ratio increases. These results are not economically significant. This would suggest that a marginal increase in liquidity (acting as a proxy for informational efficiency) does not benefit active returns any more than passive returns. From Table 11, we also see that the coefficients for passive x turnover are positive for Australia, Japan, South Korea and South Africa suggesting that increased informational efficiency may lead to increased passive returns. In these countries, with the exception of South Korea, active funds also perform better with increased liquidity. The trend is reversed for India, China and the United States where the increase in liquidity leads to lower returns for both active and passive strategies.

It should be noted that the vector of controls used in these regressions was slightly truncated in comparison to the ones in the multi country regression due to the limited number of degrees of freedom available. Hence, we added as many regressors as possible without getting collinearity omissions and picked the specifications with the highest overall R-squared values. A salient feature of both sets of regressions is that volatility is positively correlated to returns and so is market return. These results performed as per expectation.

From the above discussion, we see that there is no evidence to suggest a systematic difference between active and passive strategies in developing and developed countries. This is consistent with the idea that the labels of developed and developing do not perfectly take the financial markets of a nation into account. Furthermore, we see that outside of India, China and the United States, all of which could be facing unique economic situations due to high volume of foreign investing, an increase in the turnover ratio proxies for increased informational efficiency and leads to higher returns. We see that a unit increase in the turnover ratio is associated with

positive coefficient for passive returns in four of the seven countries (excluding Germany from

the analysis) suggesting that increased informational efficiency does indeed improve passive

returns. A surprising finding was that active also performed better with increased liquidity,

Table [14]
Active and Passive Regressions
Dependent Variable: Fund Returns

	Active	Passive
	(1)	(2)
Turnover Ratio	-0.06**	-0.18**
	(0.02)	(0.03)
Fund Specific Controls		
Net Asset Value	0.00	0.00**
	(0.00)	(0.00)
Volatility	0.46**	0.15
	(0.09)	(0.08)
Management Fees	1.41*	
	(0.74)	
Length of Existence	-0.02	0.40
	(0.02)	(0.17)
Country Specific Controls		
Financial Market Access	9.01**	25.73**
	(3.26)	(5.83)
Financial Market Depth	-0.69	31.56
	(12.96)	(22.43)
Financial Institutional Effciency	28.69**	-66.01**
	(7.56)	(19.39)
Financial Institutional Depth	-0.53	-95.88**
	(9.82)	(20.99)
HDI	-44.34**	533.86**
	(17.92)	(72.53)
Chinn - Ito Index	0.19	-103.70**
	(4.37)	(14.58)
Market Return	0.65**	1.02**
	(0.07)	(0.10)
Yield	30.85**	33.09**
	(4.83)	(6.90)
Credt Spread	41.16**	70.48**
	(3.68)	(9.93)
Time Fixed Control		
2013	-12.09**	-12.13**
	(2.19)	(3.30)
2014	-23.62**	-33.22**
	(2.74)	(5.11)
2015	-32.74**	-51.88**
	(2.51)	(5.68)
2016 and 2017 collinearity		
R- squared (overall)	**0.39**	**0.37**

Notes:
** - Significant at 5% level
* - Significant at 10% level
The numbers in the parantheses represent the standard errors

suggesting that increased informational efficiency impacts both strategies in the same way. This suggests that a unit increase in the efficiency, proxied by liquidity in the market results in a co-movement in returns for both active and passive strategies. The direction of this co-movement, whether positive or negative, is dependent upon the presence or absence of confounding factors such as noise trading or hot money in the economy. We now describe the effects of increased liquidity on active and passive returns when studied across the entire cross section of countries to check whether their co-movement is confirmed.

Step 3: Active and Passive Regressions

Table 14, above, shows the results of the analysis. Using the vector of controls used in the multi country regression, we see that active and passive do move in the same direction with increased liquidity. Both the coefficients are negative suggesting the the impact of the economies like the US, China and India may be stronger in this cross section. We do see that active is impacted by a smaller percentage than passive is. However, due to their small magnitude, these differences could indeed be negligible and biased due to Germany's passive returns. Performing an F-test to understand whether these two results are significantly different in magnitude does not add to out understanding due to the country specific nature of the active and passive returns. This regression confirms the results obtained in Step 2 that for majority of the countries, the impact of increased liquidity is felt in the same way for active and passive returns, suggesting that increase in informational efficiency results in a co-movement of returns for both active and passive strategies.

VI. Conclusion

The recent rise in popularity of emerging markets among both retail and institutional investors is indicative of an investor mentality that classifies markets on the basis of developmental level of the economy as well as social development indicators. In accordance with these generalizations, the hypothesis under investigation sought to test whether developing countries or informationally inefficient countries on average see higher returns for active mutual funds than passive funds and whether this trend is reversed in developed nations or informationally efficient economies. The results clearly showed that no systematic difference exists between active and passive investing in developing and developed countries, bringing the efficacy of these categories into question. We saw that, in the cross sectional analysis of all eight countries, four developing and four developed, there is no clear dominant strategy between active and passive investing. It was also made clear that while development level contributed to the returns in an economically and statistically significant way, a country specific analysis revealed no systematic difference between active and passive investment strategies across the majority of the countries.

These results could point to the fact that categorizations such as "developing" and "developed" are anachronistic and fail to take the idiosyncrasies of each individual market into account. They also disregard the development of modern financial markets separate from the development of traditional growth drivers such as manufacturing and industrial setups. There is a need to dissociate the development of the country and its populace from that of financial markets which are increasingly globally connected. We see the evidence for this with the regressions testing the impact of informational efficiency on returns. It was revealed that informational

efficiency, when measured through liquidity, results in a co-movement of returns of active and passive investment strategies. The direction of this movement, whether positive or negative, depends on the absence or presence of confounding factors such as movement of hot money and noise trading, both potentially stemming from the flows of foreign capital. These are areas for further research. The presence of these confounding factors in markets like India, China and the United States suggest that new categorizations may be necessary for us to understand whether there are systematic differences and ensuing arbitrage opportunities between different global financial markets. Similar studies dividing financial markets on the basis of level of foreign investment or development of tertiary and service sector for example could test this possibility. Furthermore, research into the presence of such components that lead to potentially lowered efficiency of domestic markets could help shape policies that would help protect domestic investors from their deleterious effects.

The analysis is, of course, not without shortcomings. Due to the restrictions on data access associated with the COVID - 19 crisis, certain variables of interest such as expense ratios and back and front load could not be added. Estimating business cycles with the spread between 2 year and 10 year treasury bonds could lead to a better estimation of the business cycle. Addition of country specific regulatory environments, legal systems and tax codes, as well as a deeper dive into the idiosyncrasies of each economy under consideration, could further enhance the accuracy of the models. As time progresses and more and more data is available on passive investing for other developing countries, these results could be updated and include substantial series of data.

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International Monetary Fund: Financial Soundness Indicators (FSI)

Portland University: Chinn - Ito Index (KAOPEN)

US Treasury: Yield Curve

VIII. Appendix

1. IMF Financial Development Indices

Table 1. Data Sources

CATEGORY	INDICATOR	DATA SOURCE
Financial Institutions		
Depth	Private-sector credit to GDP	FinStats 2015
	Pension fund assets to GDP	FinStats 2015
	Mutual fund assets to GDP	FinStats 2015
	Insurance premiums, life and non-life to GDP	FinStats 2015
Access	Bank branches per 100,000 adults	FinStats 2015
	ATMs per 100,000 adults	IMF Financial Access Survey
Efficiency	Net interest margin	FinStats 2015
	Lending-deposits spread	FinStats 2015
	Non-interest income to total income	FinStats 2015
	Overhead costs to total assets	FinStats 2015
	Return on assets	FinStats 2015
	Return on equity	FinStats 2015
Financial Markets		
Depth	Stock market capitalization to GDP	FinStats 2015
	Stocks traded to GDP	FinStats 2015
	International debt securities of government to GDP	BIS debt securities database
	Total debt securities of financial corporations to GDP	Dealogic corporate debt database
	Total debt securities of nonfinancial corporations to GDP	Dealogic corporate debt database
Access	Percent of market capitalization outside of top 10 largest companies	FinStats 2015
	Total number of issuers of debt (domestic and external, nonfinancial and financial corporations)	FinStats 2015
Efficiency	Stock market turnover ratio (stocks traded to capitalization)	FinStats 2015

Source: IMF staff estimates.

2) Human Development Index Components