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Three Essays on Hybrid Organisations: Microfinance Institutions and Social Enterprises

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Can Microfinance Institutions Aid in the Development of Formal Credit Institutions?

Abstract

We analyze whether Microfinance Institutions (MFIs) can aid in the development of formal financial institutions by functioning as intermediaries within the financial superstructure. By providing credit to the population of the core poor, MFIs help them accumulate credit histories and collateral. This will reduce the information asymmetry in the credit market. We conduct a panel analysis of 78 countries from 2004 to 2018 using the Generalized Method of Moments (GMM) estimation method. The results indicate that while MFI activity alleviates information friction, MFI risk has a non-linear effect. Initially, even an increase in MFI risk positively impacts the supply of formal credit as it supplies previously absent data. But, as the risk gets too high, formal credit institutions will move back to rationing.

Can Microfinance Institutions Aid in the Development of Formal Credit Institutions?

I. Introduction

Microfinance Institutions (MFIs) operate in the historically poorer sections of the economy. They focus on providing credit to poor families so that they can sustain themselves by initiating income generating activities or increasing their expenditure on basic necessities. One of the things that make MFIs very important is the presence of credit constraints in the financial market. Due to credit constraints, credit supply is restricted to specific relatively well off areas of the economy. In the absence of perfect information, it is difficult to incentivize the borrowers to refrain from inferior projects. As a result, the formal credit institutions find it too risky to serve the poorer sections of the market (Galor and Zeira, 1993; Galor and Moav, 2004). Several studies have analyzed the connection between credit constraints and financial development (King and Levine, 1993; Demetriades and Hussein, 1996; Luintel and Khan, 1999; Kirkpatrick, 2000; Bhattacharya and Sivasubramanian, 2003; Apergis et al., 2007). Better capital allocation increases the productive assets and results in better performance on a number of development indicators including poverty and income inequality (World Bank, 2000; Jalilian and Kirkpatrick, 2002).

Over the years, MFIs have made an attempt to reduce the credit constraints that hamper the development of the core poor. In contrast to other forms of financial assistance such as donations and charity, MFIs can instill long-term change as they put in place a rudimentary financial structure that can be leveraged later (Becchetti and Castriota, 2011). Moreover, unlike commercial banks, MFIs can operate even in the remotest of locations as they are not constrained by their need for collateral. This also helps them in mobilizing savings even if it is in extremely small amounts. In place of collateral they rely on strategies such as lending to groups and accessing the social networks to resolve agency concerns (Khandekar, 2005; Tressel, 2003). Indeed, these strategies are very helpful in dealing with the problem of imperfect information.

Our study aims to contribute to the literature by analyzing one of the most understudied roles of MFIs. To be specific, in this paper, we analyze whether MFIs can aid in the development of the formal financial institutions by functioning as intermediaries within the financial superstructure. Intermediaries are important because they promote safety and liquidity in the financial system. Moreover, because of economies of scale, an intermediary's services can be utilized by several institutions at once. They have a fundamental role in alleviating the credit constraints that inhibit the supply of credit. As

intermediaries in the financial system, MFIs can not only provide much needed credit but also minimize the information gap. They can help people with the primary financial requirements of credit history and collateral. Indeed, this will lead to a much better assessment of the risk profiles of the underserved markets. Overall, the MFIs should have a positive effect on the expansion of formal credit institutions in the economy and ultimately lead to better capital allocation.

In this study, we perform a panel analysis of 78 countries over the period from 2004 to 2018 using the Generalized Method of Moments (*GMM*) estimation method. We find evidence for the argument that microfinance institutions can have a positive impact on the spread of the formal credit sector. The results suggest that higher levels of microfinance activity can aid in alleviating the information frictions with the financial superstructure. Moreover, the results also indicate that the effect of microfinance risk on the formal credit sector is non-linear. In the early stages, even an increase in the MFI risk has a positive impact on the supply of formal credit. Indeed, this reduces the information frictions in the market as the formal credit institutions can use this information to decide what part of the previously rationed credit they can now supply to the market. Beyond a point, however, we see that the MFI risk has the opposite effect as the formal credit institutions once again begin to ration their credit because the risk is considered too high.

The remainder of the article is organised as follows. In Section II, we review the existing literature on microfinance and financial intermediaries. In Sections III and IV, we discuss our empirical model and the data that are used in our study respectively. In Section V, we discuss our empirical results. Finally, in Section VI, we summarize our findings and put forward our conclusions.

II. Literature Overview

The Impact of Microfinance

Over the years, various researchers have analyzed the impact of MFIs. The advocates believe that microfinance can help in alleviating extreme levels of poverty (Dunford, 2006; Littlefield, Morduch, & Hashemi, 2003; Inoue and Hamori, 2013; Pitt and Khandker, 1998; Mosley, 2001). It can reduce the level of income inequality and provide long-term benefits such as helping the borrowers in setting up their own ventures (Kai and Hamori, 2009; Ahlin and Jiang, 2008). Microfinance, in some cases, has had a greater impact when the focus is on women. Provision of credit to women has seen greater expenditure on activities such as personal consumption and children's education (Pitt and Khandkar, 1998). At other times, MFIs have been extremely useful after unfortunate events such as sickness, drought, floods, and earthquakes (Hoque,

2008). Indeed, the loans are significantly more important for people recently hit by a natural catastrophe (Becchetti and Castriota, 2011). Last but not least, microfinance loans provide people access to better housing and healthcare (Hermes and Lensink, 2011).

Yet, researchers have also criticised microfinance. These criticisms cast doubts on microfinance's promise to lift people and societies from poverty. This can happen, at times, due to the founding goals such as profitability and sustainability (Wright 2000). Because of this, the outreach of microfinance may be limited (Simanowitz and Walter, 2002). There has been an ongoing debate between sustainability and outreach of MFIs. Cull et al. (2007) argue that while the two goals can coexist, there is a possibility that profitability can come at the cost of engagement with the core group of poor people. Hermes et al. (2011) argue that there is a tradeoff between being financially efficient and outreach. Outreach comes at a cost of financial efficiency. This is also true when outreach is targeted towards women to a higher extent.

The core poor may exclude themselves for various reasons. As a result, the participants can be relatively wealthier to begin with. Coleman (2006) argues that the richer members were more likely to join the program. Moreover, their high influence within the community meant that they were able to borrow more than the maximum amount allowed using multiple names. Some members even borrow money to exploit arbitrage opportunities and lend the borrowed amount at a higher rate of interest (Coleman 1999). Even in group based MFIs, the relationship between borrowers may decide the eventual distribution of credit (Woolcock 1999). Richer borrowers can discourage the poorer members of the community from joining the group if they perceive that they will make the group riskier and cause delays in repayment (Marr 2004). Some researchers have argued that the availability of loans should be based on the borrower's ability to repay, which could be determined by their levels of savings or profitability (Simanowitz and Walter, 2002, Mosley 2001). In some MFIs, there is also a minimum level set for loans (Mosley 2001). Naturally, these measures can lead to the exclusion of the core poor.

Some of the widely discussed positives of microfinance have also come under scrutiny. Pitt and Khandkar (1998), in their paper, emphasized that only those with less than half an acre of land were given the loans. Morduch (1998) argues that this identification strategy was not always followed and the results presented by Pitt and Khandkar may not be accurate as such. Advocates often point towards high repayment rates to argue for MFIs (Coleman 1999). Critics have argued that these figures are possibly overestimated. For instance, Chemin (2008), in his study, cross checks claims that repayment rates were as high as 98 percent. His study shows that even after providing a grace period, the repayment rates were around 70 percent. Moreover, borrowers can also take out additional loans, sometimes at a higher rate of interest, to payback the

original loan on time (Coleman 1999). Some of the rudimentary personal benefits of microfinance such as better health have also been contested (Coleman 1999).

Microfinance Institutions as Intermediaries

In the initial years of financial development, formal and informal financial institutions should co-exist (Tressel 2003). Even though formal financial institutions such as commercial banks can mobilize savings and provide credit at a large scale, their ability to collect credible information in under-served areas through official channels is limited. Because of the lack of information, agency costs remain high (Chan 1983; Acemoglu and Zilibotti, 1999). Indeed, the problem of imperfect information raises the risk that the borrowers may undertake inferior projects. As a result, the formal institutions will most likely ration their credit (Stiglitz and Weiss 1981). Imperfect information can be especially problematic for the core poor as they often lack credit history and possess no collateral. As Acemoglu and Zilibotti (1999) argue, financial information is accumulated overtime by repeating certain tasks and the lack of capital prevents this from happening. This creates a loop where both information and capital need each other to be accumulated overtime. Informal financial institutions such as MFIs can overcome this barrier. They remain in close proximity with the borrowers and can gain access to informal information. Moreover, because they can diversify their portfolio, they are able to provide loans at affordable rates (Diamond 1984). Tressel (2003) argues that to reduce agency costs and ensure repayment, MFIs can use social networks and sanctions. They can also help in accumulating the initial levels of collateral that is a prerequisite for the development of the formal banking sector.

From a policy perspective, along with wealth redistribution policies, regulators should also focus on smoothening the flow of information (Beck et al. 2007). This will aid in the decentralization of information from specific sectors and increase the pace of financial development (Acemoglu and Zilibotti, 1999). Intermediaries are an important part of this process as through their closer proximity to the agents, they can develop relationships that can reduce the information frictions (Boyd and Prescott, 1986). Indeed, in the presence of imperfect information, relationships can determine the flow of credit and the rate at which it is made available (Petersen and Rajan, 1994). Moreover, intermediaries reduce the cost of collecting information as they can serve multiple institutions at once. Even if each institution is able to reduce the information friction itself, it will still prove to be very expensive due to dissipation of efforts and resources (Greenwood and Jovanovic, 1990). In this sense, intermediaries work for investor welfare (Chan 1983).

III. Empirical Model

We perform a panel analysis of 78 countries over the period from 2004 to 2018, with an annual frequency. We estimate our models using the Generalized Method of Moments

(GMM) estimator. This suits the “*small T, large N*” framework of our dataset. Moreover, the GMM estimation also takes into account the endogeneity of the microfinance variables in our specifications. In particular, the endogeneity is concerned with the bi-causal relationship between the level of microfinance activity and formal banking activity in a country. For instance, the level of formal banking may affect the level of microfinance activity if the authorities decide to promote MFIs in areas where banks have little to no reach.

In all of our our specifications, we employ two sets of instruments. As *GMM* style instruments, we use one and deeper lags of all microfinance activity and risk variables. As *IV* style instruments, we use one year lag of all control variables. Researchers in the field have used lagged values as instruments to deal with the problem of endogeneity. We use the collapse option to minimize the number of instruments.

We use the following model in our analysis:

$$\mathbf{Model:} \quad Y_{it} = \beta_0 + \beta_1 L.Y_{it} + \beta_2 MA_{it} + \beta_3 MR_{it} + \gamma X_{it} + \mu_{it}, \quad i = 1, 2, \dots, N \quad (1)$$

where Y_{it} is a vector of the spread of formal credit in country i at time t , $L.Y_{it}$ is the one year lag of the vector of the spread of formal credit in country i at time t , MA_{it} is a vector of microfinance activity in country i at time t , MR_{it} is a vector of microfinance risk in country i at time t , X_{it} is a vector of control variables, and μ_{it} is the error term. In line with Roodman (2009), we employ two sets of instruments in our analysis - *GMM* style and *IV* style. For the former, we use one and deeper lags of our major explanatory variables and for the latter, we use one year lag of all control variables. Similar instruments have been used in past literature (Inoue and Hamori 2013; Inoue and Hamori 2016) .

IV. Data

The data for this analysis are taken from the Microfinance Information Exchange (MIX) and the World Development Indicators (WDIs) section of the World Bank database. We have an unbalanced panel of 78 countries and time period stretches from 2004 to 2018. The total number of observations is 576. The minimum number of times a country is observed is one whereas the most number of times a country is represented is fourteen. In the following paragraphs, we will discuss each variable that we employ in our analysis. The data for our dependent variables were obtained from the International Monetary Fund section of the World Bank website. All data related to MFIs were obtained from the Microfinance Information Exchange (MIX) website. All other data were obtained from the World Development Indicators (WDIs) section of the World Bank website.

Our dependent variable is the spread of formal credit in a country. Following Beck et al. (2005), we measure it using indicators - Number of Commercial Bank Branches per 1,000 km² and Number of Commercial Bank Branches per 100,000 Adults. The former measures the geographic penetration whereas the latter measures the demographic penetration of the formal credit sector. Over the years, various studies have utilized these indicators (Demirgüç-Kunt, Córdoba, Pería, and Woodruff 2011; Ghosh 2011; Kendall, Mylenko, and Ponce 2010; Inoue and Hamori 2016a; Inoue and Hamori 2016b).

The level of microfinance activity is the first of the two most important independent variables in our analysis. It measures the extent to which the microfinance operations are spread across the population. We have measured it using three different indicators. The first indicator is obtained by dividing the number of MFIs by the population in a country (*MFIRATIO*). The second indicator is obtained by dividing the number of active borrowers by the population in a country (*ABRATIO*). Finally, the third indicator is obtained by dividing the gross loan portfolio by the population in a country (*GLRATIO*). We follow the line of literature in which the researchers have employed these indicators (Hermes 2014; Kai and Hamori 2009; Imai et al. 2012; Inoue and Hamori 2013). Based on the theory that we have discussed in the previous section, we expect this variable to have a positive impact on our dependent variables.

The level of microfinance risk is the second of the two most important variables in our analysis. We have measured it using one indicator that is the Portfolio overdue after 30 days plus the Renegotiated Portfolio divided by the Gross Loan Portfolio (*PortfolioAtRisk30*). This indicator has been widely employed in microfinance literature (Chakravarty and Pylypiv 2015; Schulte and Winkler 2019; Gonzalez 2007). Initially, it seems rational to expect this indicator to have a negative coefficient. However, given the context we are analyzing, the microfinance risk information can reduce the information frictions within the financial superstructure. Because of this, even an increase in the portfolio risk of the MFIs can initially have a positive impact on the expansion of the formal credit sector. Indeed, in the initial stages of economic development, the majority of formal credit institutions may ration their credit due to high agency costs (Chan 1983; Acemoglu and Zilibotti 1999; Stiglitz and Weiss 1981). This is where the MFIs' risk profiles reduce the level of residual imperfect information in the credit market. We expect this positive impact to exist only in the early stages of economic development because as the risk crosses a certain threshold, the formal credit institutions will once again begin to ration their credit. They can not continue to charge higher interest rates on riskier loans as extremely high interest rates may persuade borrowers to undertake extremely risky ventures (Stiglitz and Weiss 1981). To account for this, we have included the square of our risk variable i.e. *PortfolioAtRisk30*.

We use economic openness as one of our control variables. We measure it using two indicators - Ratio of Import and Export over GDP per Capita (*OPEN1*) and Foreign Direct Investment (FDI) over GDP per Capita (*OPEN2*). Liberal Economic policies that promote international trade are believed to have a positive impact on growth rates (Srinivasan and Bhagwati, 1999; Dollar and Kraay, 2004). Foreign Direct Investment can also lead to the expansion of the financial sector (Adeniyi, Omisakin, Olusegun, Egwaikhede, and Oyinlola, 2012) and economic growth (Borensztein et al. 1998). However, various studies also question the potential of FDI to provide positive spillovers (Blomström and Kokko 2003; Görg and Greenaway, 2004; Alfaro et al. 2009).

To control for country level inflation, we use the Consumer Price Index data. For levels of literacy, we use Primary School Enrolment data. High levels of inflation can have a detrimental effect on financial development (Huybens and Smith 1999; Bittencourt 2011). Higher levels of literacy should have a positive impact on the human resource development and distribution of financial know-how. It also develops absorptive capacity to extract benefits from liberalization policies (Borensztein et al. 1998). Overall, we expect higher levels of education to have a similar impact on our dependent variable. As our last control variable, we use a dummy variable to split our sample based on the median value of the GDP per capita.

V. Empirical Results

Equation 1 has been estimated using the generalised method of moments (GMM) estimator. The results are presented in Tables 3 and 4. GMM helps us in dealing with the endogeneity issue. Table 3 presents the results using *Number of Commercial Bank Branches per 1,000 km²*, which measures the geographical penetration of the formal credit sector. Table 4 presents the results using *Number of Commercial Bank Branches per 100,000 Adults*, which measures the demographic penetration of the formal credit sector.

The empirical results in Tables 3 and 4 are in line with the arguments that we presented in our theoretical discussion¹². For both geographic and demographic measures of the spread of formal credit, the coefficients of different measures of microfinance activity are positive and statistically significant in all the specifications. For instance, in Table 3, the coefficients for MFIRATIO are *0.0484* and *0.0141* for the geographic and demographic measures respectively. Microfinance Institutions aid in the growth of the formal credit sector. They act as intermediaries and alleviate information frictions within the financial

¹ Our final number of instruments is less than the number of groups in our panel.

² The Arellano-Bond second order test statistic is insignificant in all our models. Thus, our models do not suffer from second order serial correlation. Moreover, the Hansen test statistic is insignificant in all our models, indicating that we use an appropriate set of instruments and the overidentifying restrictions are valid.

superstructure. Indeed, as we have discussed, access to MFI loans can help in accumulating initial amounts of collateral. They also fill the gap of credit histories of potential borrowers. Formal credit institutions such as banks can access this information to decide the optimum level of credit that they can supply. Yet, the magnitude of this impact seems to be relatively small. For instance, in Model 1 in Table 3, 10% increase in the MFIRATIO leads to an increase of only 0.46% in the spread of formal credit. We get coefficients of similar magnitude, as can be seen across our results, even as we employ different specifications. One major reason for this small effect size could be that, in our sample, MFIs are not that widespread across the population. Whether the impact can be increased by expanding the presence of MFIs across the population is for future research to analyze. Another important aspect in this regard may be the cost of establishing and operating MFIs. Another reason could be time related. The indicators for the spread of formal credit and the level of MFI activity in all our specifications are measured in the same year. The hypothesized effect may be low in the short-term. However, it is possible that MFI activity may begin to have an increased effect with time as informational constraints are lifted over time.

We find evidence that microfinance risk can have a positive impact on the spread of the formal credit sector. The risk information reduces the information frictions and even an increase in risk reveals information about the current state of the market in question. Except for one model, the coefficients of PortfolioAtRisk30 are positive and significant at least at the 10 percent level. However, this impact of microfinance risk on the formal credit sector is not linear. We find that the coefficients of the squared risk indicator i.e. PortfolioAtRisk30² are negative and significant at the 5 percent level. This confirms our expectations that in the initial stages of financial development, even an increase in the risk associated with MFIs can have a positive impact on the formal credit sector as it alleviates information frictions, reduces agency concerns, and helps formal credit institutions make informed decisions regarding the amount of credit that they can supply. This positive impact though, as the results indicate, only exists in the initial stages. Beyond a point, as the risk crosses a certain threshold, the banks will once again begin to ration their credit due to rising agency costs. This shows that the ability of microfinance risk information to alleviate information frictions is limited. As has been discussed, banks can not continue to compensate for high risk through higher rates of interest as after a point, the price of loans itself will start influencing the borrowers' actions. They will feel pressured to undertake even riskier projects to pay back their expensive loans. This explains the non-linear impact of microfinance risk that we see in our results. Having said that, just as is the case with MFI activity, the magnitude of the impact that MFI risk has on the spread of formal credit remains relatively small. As we can see in Tables 3 and 4, 10% increase in our risk measure leads to an increase in the spread of formal credit that ranges between 0.09% and 0.37%.

Some of our control variables also have a significant impact on the spread of formal credit. We have used two indicators to measure the degree of openness of an economy - *OPEN1* and *OPEN2*. *OPEN1* is measured as trade (Import over Export) to GDP per Capita ratio and *OPEN2* is measured as the FDI to GDP per Capita ratio. For the first indicator, the findings appear mixed as the coefficients are significantly positive only in case of the first dependent variable. Based on our analysis, we can only provide partial support for the argument that trade can have a positive impact on the growth of the formal credit sector as it does not have a positive impact on the demographic penetration in our sample. For the second indicator, most coefficients are significantly negative. It is likely that higher levels of FDI may have an adverse impact on the formal credit sector. Our results add to the set of articles that question the potential spillover effects of FDI (Blomström and Kokko 2003; Görg and Greenaway, 2004; Alfaro et al. 2009).

For the second indicator of the degree of openness, the coefficients are significantly negative. It appears that FDI can have a negative impact on the spread of the formal financial sector. This particular finding is in line with the articles that raise question on the potential spillover effects of FDI (Blomström and Kokko 2003; Görg and Greenaway, 2004; Alfaro et al. 2009).

Next, we analyze the effect of inflation, which we have measured using the Consumer Price Index. The coefficient for consumer price index is significantly negative in all the specifications across Tables 3 and 4. The coefficients range from -0.0233 to -0.01223 in case of the first dependent variable and -0.0236 to -0.0169 in case of the second dependent variable. Thus, inflation is likely to have a negative impact on the spread of the formal credit sector. Past literature has discussed how high inflation can reduce the real level of economic activities in a particular country.

With regard to the last two of our control variables, Tables 3 and 4 show us the effects of education and GDP median dummy. For levels of education, at the 5 percent level, only Model 2 is significant and positive in case of the first dependent variable where as Models 1,2,4, and 6 are significant and positive in case of the second dependent variable. Although not entirely conclusive, it is likely that an increase in levels of education, because it leads to human capital development, can potentially aid in the expansion of the formal credit sector. Finally, a growing economy will most likely have a positive effect on the supply of credit. In our results, we see that GDP per capita above the median figure has a positive impact on our dependent variables compared to GDP per capita below the median figure. The coefficients are positive and significant for most of our models.

To test the robustness of our main results, we employ a third indicator of MFI activity, GLRatio. These results are presented in Table 5. As we can see, for both the dependent

variables, MFI activity has a positive impact on the spread of the formal credit sector. The positive and non-linear effect of MFI risk is only significant in the case of second dependent variable.

Before discussing the concluding comments, we will summarize the main findings. Our results indicate that the MFIs have a positive impact on the spread of the formal financial sector. Interestingly, MFI risk information has a non-linear impact on the spread of the formal financial sector. Risk information alleviates informational constraints only in the initial levels of increasing risk. As a result, for the squared term, we see a negative coefficient. Although these results are in line with our expectations in terms of the signs of the coefficients, we acknowledge that the magnitude of the impact remains low. This raises some questions regarding the viability of MFIs as a long-term financial intermediary. This also means that policy related decisions in relation to promoting MFIs should be taken with caution.

VI. Conclusions

Microfinance has been, in the past few decades, promoted as an effective way of alleviating the hurdles that come in the way of financial development in the economically disadvantaged areas. One of these hurdles is the lack of financial intermediaries in the poorest sections of the economy. This article empirically examines whether Microfinance Institutions (MFIs) can function as intermediaries within the financial superstructure and as a result, aid in the expansion of the formal financial sector. We measure the level of microfinance activity using three different indicators and conduct a panel analysis of 78 countries over the period of 2004 to 2018 using the Generalized Method of Moments (*GMM*) estimation method. The results indicate that, as we argued, the MFIs can have a positive impact on the spread of the formal financial sector. Moreover, we also find evidence that points towards the non-linear effect of microfinance risk on the expansion of the formal credit sector. The risk information can alleviate informational frictions only at the initial stages after which the credit institutions will most likely begin to ration their credit yet again. The results remain robust even as we employ different indicators for our explained and explanatory variables, a set of control variables, and control for endogeneity issues. However, we acknowledge that the magnitude of the effect that MFIs have on the spread of the formal financial sector, although significant, remains low. A potential reason for this is the relatively small presence of MFIs across the countries in our sample.

Our analysis lends some support to the argument that the MFIs can aid in the expansion of the formal financial sector by alleviating informational constraints in the credit market. MFIs do not just help the core poor directly by providing them much needed credit but, they also help them indirectly by reducing the information gap in the credit market. Because they help the poor in accumulating credit history and collateral,

they can lead to a much better risk profiling of the underserved markets and an improved capital allocation. However, since the magnitude of the discussed positive impact is low, MFIs can not be solely relied upon to accomplish the enormous task of eliminating credit constraints. From a public policy point of view, the authorities should aim to promote other intermediaries that can have a wider reach across the population of the country.

With this article we start a new discussion on the potential benefits of MFIs. Most cross country studies analyze the impact of microfinance on variables such as poverty and income inequality. These studies put forward mixed findings using different methodologies making it difficult to make generalizable conclusions. We make an attempt to analyze one of the potential spillover effects of MFIs i.e. their role in alleviating informational constraints in the credit market. Our findings indicate that although MFIs may have an impact in this role, this impact is likely to be low. At this point, we can not say whether their impact can be increased by simply expanding their presence across the population. Moreover, from a policy point of view, this does not tell us whether MFIs can be effectively relied upon to provide intermediary services in the economically under-served areas of the market or whether other institutions can perform this role more efficiently. We sincerely hope that future research will shed more light on this discussion.

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Table I. Descriptive Statistics

Variable	Observations	Mean	Std. Dev.	Min	Max
Bran1000km2	576	10.116	12.055	0.03	59.061
Bran100000adults	576	14.235	14.048	0.473	92.173
MFIRATIO	576	0	0	0	0.001
ABRATIO	576	0.028	0.035	0	0.165
GLRATIO	576	61.585	116.779	0.042	950.289
PortfolioAtRisk30	576	98.038	149.697	0.23	2086.08
OPEN1	576	0.001	0.002	0	0.021
OPEN2	576	1679714.2	4365158.1	1452.918	43470512
CPI	576	6.236	4.707	0.054	29.507
PrimarySchoolEnrolment	576	105.754	13.969	69.149	149.957

Table III. Baseline GMM Results for Dependent Variable 1

DV - logBran1000km2	Model 1		Model 2		Model 3		Model 4	
Variables	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE
L.logBran1000km2	0.9310***	0.0085	0.9567***	0.0085	0.9196***	0.0096	0.9144***	0.0122
logMFIRATIO	0.0484***	0.0055	0.0141***	0.0052				
logABRATIO					0.0310***	0.0057	0.0284***	0.0048
logPortfolioAtRisk30	0.0102**	0.0050	0.0303***	0.0052	0.0029	0.0063	0.0108*	0.0062
logPortfolioAtRisk30^2	-0.0033***	0.0008	-0.0041***	0.0007	-0.0015**	0.0008	-0.0027***	0.0008
logOPEN1	0.0133***	0.0047			0.0232***	0.0051		
logOPEN2			-0.0069**	0.0034			-0.0078**	0.0034
logCPI	-0.0145***	0.0036	-0.0123***	0.0040	-0.0233***	0.0035	-0.0188***	0.0036
logPrimarySchoolEnrolment	0.0376	0.0409	0.1010***	0.0322	-0.0006	0.0441	0.0278	0.0437
GDP_median	0.0387***	0.0098	0.0023	0.0086	0.0676***	0.0164	0.0307**	0.0117
<i>Year Dummies</i>	Yes		Yes		Yes		Yes	
<i>Observations</i>	576		576		576		576	
<i>F Statistic</i>	606902.03		3.61E+06		559327.03		2.01E+07	
<i>Groups/Instruments</i>	78/77		78/77		78/77		78/77	
<i>Arellano-Bond - AR (2)</i>	0.616		0.666		0.519		0.715	
<i>Hansen Statistic</i>	0.444		0.492		0.589		0.698	
	SE = Standard Errors							
	*** p<0.01, ** p<0.05, * p<0.1							

Table IV. Baseline GMM Results for Dependent Variable 2

DV - logBran10000adults		Model 1		Model 2		Model 3		Model 4	
Variables	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE	
L.logBran10000adults	0.9208***	0.0106	0.9141***	0.0083	0.9440***	0.0088	0.9360***	0.0073	
logMFIRATIO	0.0326***	0.0047	0.0219***	0.0060					
logABRATIO					0.0339***	0.0051	0.0313***	0.0047	
logPortfolioARisk30	0.0385***	0.0044	0.0395***	0.0053	0.0248***	0.0069	0.0280***	0.0066	
logPortfolioARisk30^2	-0.0057***	0.0006	-0.0052***	0.0007	-0.0034***	0.0009	-0.0036***	0.0008	
logOPEN1	-0.0077	0.0061			0.0019	0.0041			
logOPEN2			-0.0009	0.0030			-0.0085***	0.0019	
logCPI	-0.0177***	0.0040	-0.0169***	0.0041	-0.0236***	0.0043	-0.0173***	0.0042	
logPrimarySchoolEnrolment	0.0596**	0.0254	0.0721***	0.0212	0.0321	0.0240	0.0500**	0.0237	
GDP_median	0.0301***	0.0095	0.0518***	0.0091	0.0191*	0.0098	0.0227**	0.0101	
<i>Year Dummies</i>	Yes		Yes		Yes		Yes		
<i>Observations</i>	576		576		576		576		
<i>F Statistic</i>	2.78E+06		648304.56		6.07E+07		706557.32		
<i>Groups/Instruments</i>	78/77		78/77		78/77		78/77		
<i>Arellano-Bond - AR (2)</i>	0.686		0.622		0.682		0.807		
<i>Hansen Statistic</i>	0.349		0.333		0.279		0.222		
			SE = Standard Errors						
			*** p<0.01, ** p<0.05, * p<0.1						

Table V. Robustness Check - GMM Results

	Model 1		Model 2		Model 3		Model 4	
Variables	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE
DV - logBran1000km2 in Models 1 and 2								
DV - logBran10000adults in Models 3 and 4								
L.logBran1000km2	0.8556***	0.0106	0.8463***	0.0135				
L.logBran10000adults					0.9001***	0.0108	0.8928***	0.0089
logGLRATIO	0.0353***	0.0039	0.0343***	0.0039	0.0245***	0.0028	0.0219***	0.0025
logPortfolioAtRisk30	-0.0025	0.0064	0.0036	0.0080	0.0309***	0.0062	0.0306***	0.0066
logPortfolioAtRisk30^2	-0.0010	0.0009	-0.0020*	0.0010	-0.0040***	0.0008	-0.0038***	0.0008
logOPEN1	0.0422***	0.0064			0.0052	0.0049		
logOPEN2			-0.0083**	0.0041			-0.0096***	0.0031
logCPI	-0.0065*	0.0037	-0.0025	0.0038	-0.0052	0.0034	-0.0039	0.0031
logPrimarySchoolEnrolment	0.0196	0.0447	0.0490	0.0528	0.0417*	0.0212	0.0401**	0.0197
GDP_median	0.1512***	0.0114	0.0954***	0.0107	0.0702***	0.0111	0.0732***	0.0104
<i>Year Dummies</i>	Yes		Yes		Yes		Yes	
<i>Observations</i>	576		576		576		576	
<i>F Statistic</i>	38887.03		347215.33		374518.75		578600.92	
<i>Groups/Instruments</i>	78/77		78/77		78/77		78/77	
<i>Arellano-Bond - AR (2)</i>	0.844		0.849		0.932		0.978	
<i>Hansen Statistic</i>	0.733		0.771		0.634		0.605	
		SE = Standard Errors						
		*** p<0.01, ** p<0.05, * p<0.1						

Microfinance and Poverty: Role of Institutional Quality

Abstract

Institutional quality matters with regard to how Microfinance Institutions (MFIs) influence various economic outcomes. In this article, we analyze the importance of institutional quality in the association between microfinance and poverty. We perform a panel analysis of 39 countries over the period from 2004 to 2017 using the Generalized Methods of Moments (*GMM*) estimation method. We employ six different indicators of institutional quality. Moreover, to represent overall institutional quality, we also employ the composite index of institutional quality, which is calculated as the sum of six individual indicators. Overall institutional quality strengthens the connection between microfinance activity and poverty. However, when we analyze the impact of six indicators separately, only Control of Corruption, Regulatory Quality, and Voice & Accountability showcase the same strengthening effect. Interestingly, in the case of Control of Corruption, Political Stability & Absence of Violence/Terrorism, and Voice & Accountability, an increase in institutional quality causes an increase in poverty. This implies that aiming for zero corruption may not be ideal as some level of corruption may be required to circumvent inefficient institutions. Moreover, early stages of institutional improvement may disrupt the existing order and intensify inefficiencies in the short term.

I. Introduction

The importance of institutions has long been studied and defended by researchers in various academic areas such as economic growth, income inequality, and poverty alleviation (North 1990; Nelson and Sampat 2001; Acemoglu et al. 2001; Bastiaensen et al. 2005). Institutions are widely employed “rules of the game” (North 1990) or social technologies (Nelson and Sampat 2001) that affect the way different actors in a society interact with each other. Differences in institutional quality can also account for the differences in development across different societies (Acemoglu et al. 2001; Lopez 2004). Countries with high-quality institutional development value local knowledge and encourage participation from and provide representation to all sections of society (Rodrik 2000; Bastiaensen et al. 2005). Indeed, institutions can directly or indirectly influence the inclusion or exclusion of different interest groups from the various schemes of economic and social development. Countries with a highly disproportionate distribution of resources exhibit institutions that are extractive in nature (Acemoglu et al. 2001) and small but powerful interest group that lobbies against financial development to preserve the status quo

(Rajan and Zingales 2003). Moreover, a lack of sufficient institutional development will lower incentives to invest and lead to constrained liquidity (Sala-i-Martin 2002; Madestam 2014). Naturally, all these factors eventually either contribute to the rate of poverty in a country or act as impediments in the way of poverty alleviation measures.

This article focuses on the drivers of poverty alleviation. We follow the line of literature that focuses on microfinance as a means of poverty alleviation (Pitt and Khandker 1998; Mosley 2001; Imai et al. 2012; Inoue and Hamori 2013). We add to the literature by analyzing the importance of institutional quality in the connection between microfinance and poverty. So far, the research presents mixed evidence on microfinance's potential to be a meaningful tool that can aid in poverty alleviation. There's a group of researchers that defends microfinance as an effective tool that not only reduces the rate of poverty in the focal population but, also improves their rate of consumption (Pitt and Khandker, 1998; Mosley, 2001; and Khandker, 2005; Imai and Azam 2012). Microfinance has also been especially beneficial for women, leading to a positive effect on household expenditure and assets (Khandker 2005) and children's education (Pitt and Khandkar, 1998). Other benefits of microfinance include the possibility of achieving better housing and healthcare (Hermes and Lensink 2011). Several studies also offer a macro perspective. They utilize cross-country data and defend microfinance's potential as a poverty reduction tool (Kai and Hamori, 2009; Imai et al., 2010; Inoue and Hamori, 2013). Yet, another group of researchers has also criticised microfinance. Their studies question whether MFIs have the ability to alleviate poverty at a level that is significant enough that they can be thought of as an effective policy tool (Coleman 1999; Morduch 1999). The doubts also rise from the balance that needs to be attained between the two contrasting objectives of MFIs - sustainability and outreach (Cull et al. 2007; Hermes et al. 2011). Another criticism stems from local factors that

decide the eventual distribution of credit within the focal societies (Woolcock 1999; Marr 2004). So far, in microfinance literature, we have not seen any major study that focuses on the role of institutions. We believe that institutions are an important factor in this regard because there is evidence that the effect of financial development on income levels may be influenced by the country's institutions (Delis et al. 2014; Law et al. 2014). Poverty manifests itself in various dimensions (Lipton and Ravallion 1995) that are dynamically connected to various institutions (Green and Hulme 2005; Hickey and Du Toit 2013). This is why it is necessary, even in our specific case of microfinance, to analyze the moderating role of institutions.

In this study, we perform a panel analysis of 39 countries over the period from 2004 to 2017 using the Generalized Methods of Moments (*GMM*) estimation method. We begin the analysis by employing the composite index of institutional quality, which is calculated as the sum of six individual indicators. Along with this, we employ each indicator individually as part of separate models. The composite indicator of institutional quality strengthens the connection between microfinance activity and poverty. However, when indicators are employed individually, only Control of Corruption, Regulatory Quality, and Voice and Accountability have the same impact. Interestingly, and perhaps slightly paradoxical, institutional quality leads to an increase in poverty in some of our models. Specifically, this is true in models where we employ the following indicators - Control of Corruption, Political Stability and Absence of Violence/Terrorism, and Voice and Accountability. This implies that the desired level of corruption in a country may not be zero. Moreover, it is possible that the benefits of improved institutional quality may be realised at a later stage. This is because, at the initial stages, improved institutional quality may cause a disruption in the existing way of doing things and as a result, intensify inefficiencies.

Further sections of this article are organized as follows. In Section II, we review the literature on the association between Microfinance Institutions and Poverty, and the importance of Institutions. In Sections III and IV, we discuss the empirical model and the data set employed in this study. In Section V, we discuss our results and finally, in Section VI, we put forward our concluding remarks.

II. Review of Literature

Microfinance Institutions (MFIs) and Poverty

Ever since the introduction of the most recent forms of Microfinancing in the 1970s, the body of literature that focuses on Microfinance Institutions (MFIs) has grown at a steady rate. These studies have contributed immensely to the debate on the benefits of MFIs. Over the years, several researchers have argued that microfinance can help in resolving the problem of extreme poverty in different areas of the world (Pitt and Khandker 1998; Mosley 2001; Littlefield, Morduch, & Hashemi 2003; Dunford 2006; Chemin 2008; Nawaz 2010; Inoue and Hamori 2013). Indeed, MFIs help the vulnerable populations across the world in different ways such as by providing credit, especially to women, lending funds for better education and healthcare, resolving credit constraints in extreme circumstances such as natural disasters (Pitt and Khandkar 1998; Hoque 2008; Becchetti and Castriota 2011; Hermes and Lensink 2011).

Yet, another group of researchers has been sceptical of the widely discussed benefits of microfinance. This group of studies raises doubts about microfinance's viability as a poverty alleviation tool. The primary points of concern in this regard are the sustainability and outreach aspects of MFIs. Ideally, MFIs would like to reach the maximum number of people and remain

profitable in that process. However, one goal might be achieved at the cost of the other (Cull et al. 2007; Hermes et al. 2011). If MFIs choose long-term sustainability as one of their primary goals, they may have to sacrifice some of their outreach. As long as financial sustainability and efficiency come at the cost of outreach, the core poor population will find it difficult to access the MFIs' services. In this regard, some researchers have also argued that the availability of loans should be based on the borrowers' ability to repay them (Mosley 2001; Simanowitz and Walter 2002). Moreover, some MFIs have a lower limit on the amount of funds they are willing to lend (Mosley 2001). Naturally, these policies may work as exclusion measures. Additionally, the intragroup dynamics may also affect the eventual distribution of credit (Woolcock 1999). While the core poor may exclude themselves to begin with, the, relatively, richer members of the community may also discourage them from participating. In cases of group lending, the core poor may be excluded by the community if it is believed that their inclusion may make the group riskier and cause delays in repayment (Marr 2004). Moreover, the richer members of the community may use their influence to borrow more than the maximum amount allowed by using multiple names and some may even borrow to exploit arbitrage opportunities (Coleman 2006).

Importance of Institutional Quality

In recent years, the impact of institutional quality has increasingly been the focus of researchers in economic growth, income inequality, and poverty-related literature (Knack and Keefer 1995; Chong and Calderon 2000; Rodrik 2000; Beck et al. 2001; Acemoglu et al. 2001; Dollar and Kraay 2002; Ravallion and Chen 2003; Bastiaensen et al. 2005; Chong and Gradstein 2007; Tebaldi and Mohan 2010). Institutions are a set of rules that guides human interactions within societies (North 1990). North argues that institutions influence various spheres of human life

whether political, social, or economic and shape how societies evolve over time. Nelson and Sampat (2001) define institutions as the widely employed social technologies. They argue that economic growth is the result of the coevolution of physical and social technologies. The existing or upcoming set of economic activities influence institutional change but, the current set of institutions also influences the economic path that is pursued. Institutions also dictate how benefits of economic growth are distributed among different interest groups. This is why many nations, despite achieving substantial economic growth, do not succeed in alleviating poverty at a similar scale (Lopez 2004). In this sense, high-quality institutions will ensure that the economic growth is not directed toward only a small group of people (Rodrik 2000).

Differences in institutional quality can account for the differences in income levels across countries (Acemoglu et al. 2001). The institutional quality is often the result of a country's legal origin (La Porta, Lopez-de-Silanes, Shleifer, and Vishny 1998). Legal origin influences the various rules and regulations that are made over time and as a result has an impact on various social and economic outcomes (La Porta, Lopez-de-Silanes, and Shleifer 2008). Additionally, a relatively variable factor, political forces also shape the institutions (Rajan and Zingales 2003). Rajan and Zingales (2003) argue that in certain societies, powerful interest groups may oppose financial development as it may create more competition for them. In such cases, they continue to enjoy their privileged position as there is little international trade and capital flow. As long as the poor lack representation, the rich will continue to influence the distribution of financial resources. This could also lead to high corruption as the government will only be accountable to a small set of people. In addition to legal origin and political forces, even geography can have an impact on the quality of institutions (Rodrik et al. 2004). Rodrik (2000) argues that local

knowledge is crucial to building high-quality institutions. In that process, a democracy that encourages decentralization and participation at the local level is an essential tool.

With regard to economic growth and investment, institutions that ensure the protection of property rights are crucial (Knack and Keefer, 1995). In the absence of such institutions, the incentives to take the risk of investing will be low (Sala-i-Martin 2002). Similarly, to ensure steady credit supply and liquidity in the form of formal finance, effective legal institutions that reduce the possibility of moral hazard, need to be established (Madestam 2014). Increased liquidity has been argued as one of the effective tools that can help in reducing income inequality and poverty (Blau 2018). Institutional quality can have a positive moderating effect in this regard (Aracil et al. 2021). Additionally, from the point of view of alleviating poverty, it is important to protect institutions that not only promote growth but, also ensure that the benefits of economic growth reach the core poor (Enders and Hoover 2003; Ravallion and Chen 2003). In fact, as Tebaldi and Mohan (2008) argue, bad institutions can establish poverty traps and if in poor countries, the quality of institutions does not improve relative to the richer countries, the income gap between these countries will continue to rise. Moreover, institutions that discourage corruption, promote government effectiveness and stability are essential to have equitable distribution of income and reduce poverty (Mauro 1995; Tebaldi and Mohan 2010). Government effectiveness and rule of law are some of the most important determinants of low corruption (Jetter and Parmeter 2018).

III. Empirical Model

In this study, we perform a panel analysis of 39 countries over the period from 2004 to 2017, with an annual frequency. The dependent variable is a proxy for the poverty level in a country.

The independent variables include a proxy for microfinance activity, different indicators of institutional quality, the interaction between microfinance activity and institutional quality, a proxy for the spread of the formal banking sector, and other control variables such as openness of a country's economy, inflation, and education¹. All models are estimated using the Generalized Methods of Moments (GMM) estimator, which is suitable for datasets that fall under the “*small T, large N*” framework. The GMM estimator also helps us in dealing with the endogeneity issues that arise, for instance, from the potential reverse causality between microfinance activity and poverty level in a country. While the MFIs can affect the poverty rates in a country, the level of poverty can also affect the level of microfinance activity if government policy dictates that the MFIs are to be specially promoted in areas with chronic poverty.

We use the following model in our analysis:

$$\mathbf{Model: } Y_{it} = \beta_0 + \beta_1 Y_{it-1} + \beta_2 MA_{it} + \beta_3 IQ_{it} + \beta_4 MA_{it} * IQ_{it} + \gamma X_{it} + \mu_{it}, \quad i = 1, 2, \dots, N \quad (1)$$

where Y_{it} is a vector of the poverty level in country i at time t , Y_{it-1} is a vector of the poverty level in country i at time $t-1$, MA_{it} is a vector of microfinance activity in country i at time t , IQ_{it} is a vector of institutional quality in country i at time t , $MA_{it} * IQ_{it}$ is a vector of the interaction between microfinance activity and institutional quality in country i at time t , X_{it} is a vector of control variables, and μ_{it} is the error term. We employ GMM and IV style instruments in our analysis (Roodman 2009). As has been employed in past literature, as instruments, we use lag of our explanatory and control variables (Inoue and Hamori 2013; Inoue and Hamori 2016).

¹ We provide a detailed discussion on all the variables employed in this article in Section IV.

IV. Data

The data for this study are taken from multiple sources. The data on microfinance activity has been taken from the Microfinance Information Exchange (*MIX*) database. The data on institutional quality has been taken from the Worldwide Governance Indicators (*WGI*) section of the World Bank database (Kaufmann et al. 2009). The data on the spread of the formal banking sector were obtained from the International Monetary Fund section of the World Bank website. Finally, the data on the dependent variable as well as all other control variables were collected from the World Development Indicators (*WDI*) section of the World Bank database. We have an unbalanced panel of 39 countries over the period from 2004 to 2017 and the total number of observations is 354. The average number of times a country is observed in our sample is approximately nine.

As our dependent variable, we use the poverty headcount ratio (Imai et al. 2010; Donou-Adonsou and Sylwester 2016; Rewilak 2017). Specifically, we employ the poverty headcount ratio at \$5.50 a day (calculated as a percentage of the population). In all our specifications, we use the annual observations rather than X-year average or X-year moving averages. While several other indicators of poverty are available and have been employed in the literature, we use this indicator because of the greater availability of data in terms of the number of observations available per country and relatively easier interpretability (Imai et al. 2010). Another reason for preferring this variable to the \$1.90 and \$3.20 poverty ratios is that in these two variables, many more observations are closer to zero and that results in higher skewness.

The level of microfinance activity is one of our explanatory variables. It accounts for the spread of MFIs' portfolios across the population. We measure it using the Gross Loan Ratio

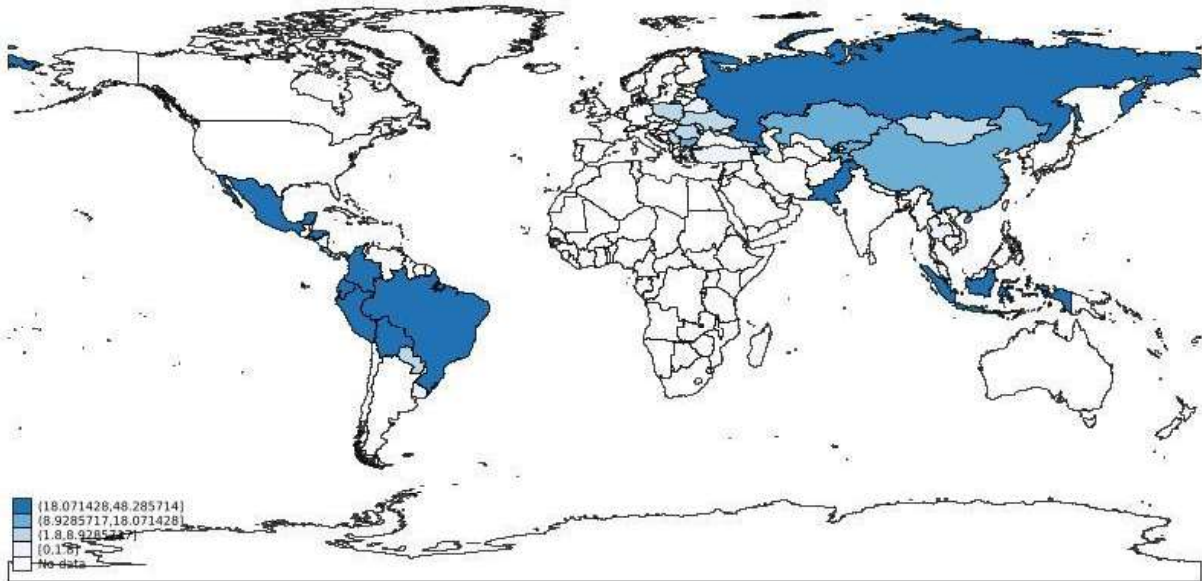
(*GLRATIO*). This is obtained by dividing the gross loan portfolio of MFIs by the population in a country. The standardization through the population of respective countries facilitates meaningful comparison. This is why this indicator has been widely employed in microfinance research (Kai and Hamori 2009; Imai et al. 2012; Inoue and Hamori 2013; Hermes 2014). Based on the discussion in the literature review, we expect the coefficient of microfinance activity to have a negative coefficient.

Institutional quality can play an influential role in MFIs' range of operations (Barry and Tacneng 2014). As a proxy for data on institutional quality, we use the Worldwide Governance Indicators (*WGI*) (Kauffman et al. 2009). This database provides us with data on the following six dimensions of governance: (i) Control of Corruption, (ii) Government Effectiveness, (iii) Political Stability and Absence of Violence/Terrorism, (iv) Regulatory Quality, (v) Rule of Law, and (vi) Voice and Accountability. The values for each of these dimensions range from -2.5 (very weak) to +2.5 (very strong). To analyze the moderating effect of institutional quality on the relationship between microfinance activity and poverty, we interact institutional quality with microfinance activity ($MA_{it} * IQ_{it}$). Based on the theoretical discussion in Section II, we expect the coefficient of the interaction term to be negative. Indeed, a negative (positive) coefficient of the interaction term suggests that institutional quality further strengthens (weakens) the beneficial impact of microfinance activity on poverty.

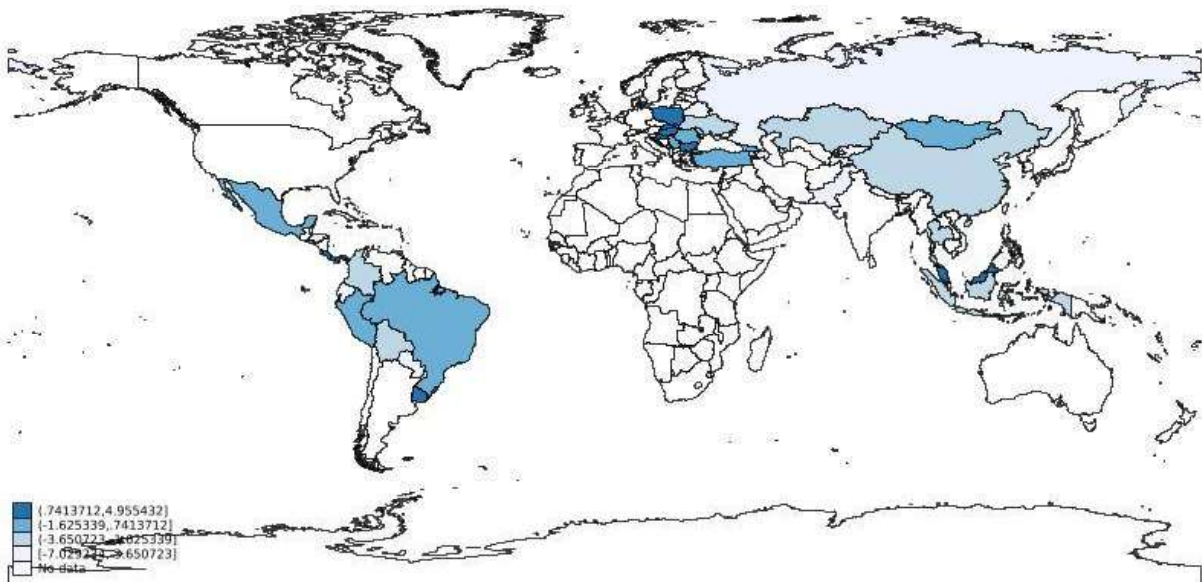
Over the years, financial development has been discussed as an important component of poverty alleviation programs and related policy decisions (Jalilian and Kirkpatrick 2002; Jalilian and Kirkpatrick 2005; Rewilak 2017). To control for this, in our study, we include an indicator that measures the spread of formal credit in a country. Specifically, we use the Number of Commercial Bank Branches per 100,000 Adults (Beck et al. 2005). It measures the demographic

presence of the formal banking sector in a country and provides an idea of the level of financial development in various countries. This indicator has been employed by researchers in fields such as economics, finance, and microfinance (Kendall, Mylenko, and Ponce 2010; Demirgüç-Kunt, Córdova, Pería, and Woodruff 2011; Ghosh 2011; Inoue and Hamori 2016a; Inoue and Hamori 2016b).

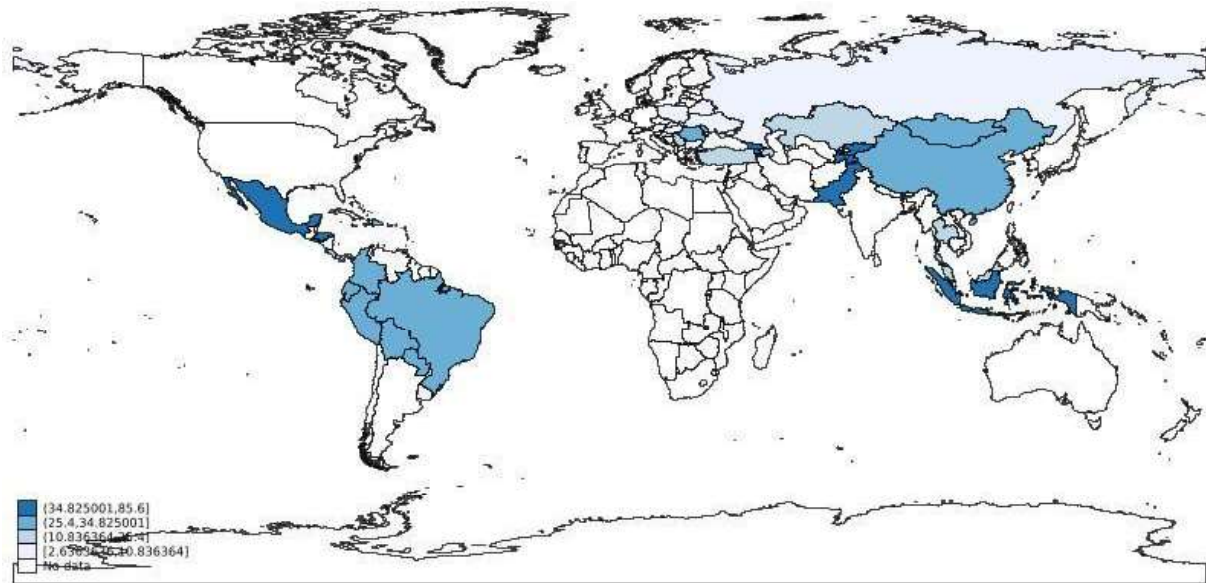
Last but not least, we use Economic Openness, Inflation, and Literacy Level as other control variables. We calculate Economic Openness as the ratio of imports and exports over GDP per Capita (*OPEN*). Liberal economic policies can aid in poverty alleviation in several manners. One of the primary means is through a positive impact on economic growth (Srinivasan and Bhagwati, 1999; Dollar and Kraay, 2004; Baldwin 2004). Others have also analyzed the potential benefits of a relatively open economy directly in terms of poverty alleviation (Dollar 2001; Bhagwati and Srinivasan 2002; Tsai and Huang 2007). To control for inflation, we use the Consumer Price Index data. Inflation can be detrimental to financial development (Barro 1995; Sarel 1996; Huybens and Smith 1999; Bittencourt 2011). Moreover, inflation also has a direct impact on a country's poor population (Cardoso 1992; Easterly and Fischer 2001). Finally, an increase in literacy levels should promote human capital development and have direct and indirect benefits at both micro and macro levels (Tilak 2002; Awan et al. 2011). For instance, a minimum threshold of education may be required to reap maximum benefits from various economic policies as it develops absorptive capacity for advanced knowledge (Borensztein et al. 1998).



Graph I: Average Number of MFIs operating in the 39 countries in our sample from 2004 to 2017



Graph II: Average Value of Overall Institutional Quality in the 39 countries in our sample from 2004 to 2017



Graph III: Average Poverty Headcount Ratio in the 39 countries in our sample from 2004 to 2017

V. Results

Table III lists the results from the GMM estimation of the models summarized in equation 1. In Model 1, we employ a composite indicator for institutional quality, which is calculated as the sum of all six individual institutional quality indicators. In this model, we can see that MFI activity has a negative impact on the poverty measure. This, based on our theoretical discussion, is on expected lines. An increase in microfinance activity has a beneficial effect in terms of poverty alleviation. This is mainly because, in areas with little to no availability of formal finance, MFIs, using their proximity to the focal population and reliance on social networks, can lend poor people money even if it is in small amounts. Next, we move on to the effect of institutional quality on poverty. When considered alone, the composite indicator for institutional quality does not appear to have a significant effect on the poverty measure. However, we find evidence for the main hypothesis of this article. The model I shows a negative and significant association between the interaction variable ($MA_{it} * IQ_{it}$) and poverty. This implies that

institutional quality strengthens the connection between microfinance activity and the poverty ratio. MFIs operate within the existing social order and naturally, are impacted by the quality of institutions of the societies they operate in. Quality institutions ensure that institutions such as MFIs can maximise their contributions to the communities they serve.

In Models 2 through 7, we employ each of the institutional quality indicators separately to analyze their association with the poverty ratio. In all these models, the coefficients of MFI activity are negative. However, they are significant only in Models 2, 5, and 6. The results provide evidence that financial access gained through MFIs can help in reducing poverty. When considered alone, the coefficients of Control of Corruption, Political Stability and Absence of Violence/Terrorism, and Voice and Accountability are positive and significant, implying that these indicators have a positive association with the poverty ratio. While this appears confounding, similar results have been discussed in past literature (Mendez and Sepúlveda 2006; Heckelman and Powell 2010; Xu et al. 2017). These results provide some support to the “grease the wheels” hypothesis, initially advanced by scholars such as Leff (1964), Leys (1965), and Huntington (1968). The core argument here is that some level of corruption may be essential in economies where inefficient bureaucracies create impediments to economic activities. Corruption, in such cases, can help agents circumvent ill-functioning institutions. Even when we consider the effect of other institutions, in our case Political Stability and Absence of Violence/Terrorism, and Voice and Accountability, there is a possibility of observing a Kuznets curve (Bourguignon and Verdier 2000; Acemoglu and Robinson 2000). Improvement in institutional quality may cause an increase in poverty as it may disrupt the existing system of undertaking social and economic transactions. However, at a later stage, beneficial effects may be observed as new systems are put in place and become fully operational. Even though it is

beyond the scope of this article, as Chong and Calderón (2000) argue with regard to the association between institutional quality and income inequality, it is possible that the Kuznets curve will only be observed in countries that have only moderate levels of poverty. Next, in line with our discussion regarding the interaction term, the coefficients are negative for each of the six cases but, they are significant only where we interact MFI activity with Control of Corruption, Regulatory Quality, and Voice and Accountability. These results imply that similar to the composite indicator, these individual indicators of institutional quality also strengthen the connection between microfinance activity and the poverty ratio. Based on our results, we can not make a similar conclusion regarding MFI activity's association with the remaining three indicators - Government Effectiveness, Political Stability and Absence of Violence/Terrorism, and Rule of Law.

We include financial development as one of the control variables. Initially, researchers were primarily concerned about the association between financial development and economic growth (Demetriades and Hussein 1996; Arestis and Demetriades 1997; Luintel and Khan 1999). Others, with time, analyzed the benefits of financial development in achieving other goals such as poverty reduction (Jalilian and Kirkpatrick 2002; Jalilian and Kirkpatrick 2005; Rewilak 2017). In all but two of our models, financial development in terms of the spread of banks across the population has a negative and significant coefficient implying that it can help in poverty reduction. These results are expected as improved access to finance and other related services, as a result of reduced credit rationing by banks (Stiglitz and Weiss 1981), is bound to increase the levels of productive capacity and accumulated assets in the population of core-poor that was relatively closed-off from the financial system initially (World Bank 2001).

With regard to the remaining control variables, we find mixed results on the impact of economic openness on the poverty ratio. We measure openness as the ratio of imports over exports, standardized by GDP per capita. As discussed above, researchers have found evidence that economic openness can help in poverty reduction (Dollar 2001; Bhagwati and Srinivasan 2002; Tsai and Huang 2007). However, in contrast to these findings, the results in four of our models indicate that economic openness can be detrimental to the poverty reduction effort. The coefficients in the remaining models are not significant. As Rodriguez and Rodrik (2000) argue in relation to the linkage between trade policy and economic growth, we suspect that the impact of a relatively open trade policy on poverty is also contingent on various country-level factors. This discussion, however, is beyond the scope of this article. Finally, the results regarding the impact of inflation and education are not significant. Thus, based on our analysis, we can not make any conclusive statements on their association with poverty.

Before proceeding to our concluding remarks, we will summarize the most important findings discussed in this section. First and foremost, microfinance activity can help in reducing poverty. When we employ the composite indicator, institutional quality, when considered alone, does not have a significant impact on poverty. However, when we consider the interaction term, institutional quality strengthens the connection between microfinance activity and poverty. This provides support to our main hypothesis. We also employ the six institutional quality indicators individually. When considered alone, few of the indicators including Control of Corruption have a positive association with the poverty ratio implying that even an improvement in institutional quality may cause an increase in poverty. On one hand, these results provide some support to the “grease the wheels” hypothesis. On the other hand, they hint toward the possibility of observing a Kuznets curve. Poverty may initially increase as improvement in institutional quality disrupts

the existing way of accomplishing things. With time, as new systems replace the older ones, positive effects may be observed. Coming back to the hypothesis concerning the interaction term, similar to the composite indicator, Control of Corruption, Regulatory Quality, and Voice and Accountability strengthen the connection between microfinance activity and poverty.

VI. Discussion and Conclusion

Our article aims to explicate the association between two prominent fields of literature - Microfinance Institutions and Institutional Quality. Over the years, a group of researchers has hailed microfinance as a promising way of tackling the major problem of poverty in various areas of the world. However, others have questioned the viability of microfinance. Doubts arise with regard to the magnitude of the benefits that MFIs generate. For instance, is the decrease in poverty or increase in income of participants significant enough? Another critique of microfinance stems from various local-level factors. Powerful participants may use their influence to secure disproportionate benefits for themselves. We argue that the performance of MFIs is influenced by the institutions of the country they operate in. Specifically, we contribute to the literature by analyzing the role of institutional quality in the association between microfinance activity and poverty in a country. Institutions are defined as the “rules of the game” that are employed at the societal level (North 1990; Nelson and Sampat 2001). Because they define how different actors in a society interact with each other, our article rests on the idea that institutions matter. In this study, we perform a panel analysis of 39 countries over the period from 2004 to 2017 using the Generalized Methods of Moments (*GMM*) estimation method. In the first model, we employ the composite index of institutional quality, which is obtained by aggregating the six individual indicators. Furthermore, we also employ the six indicators

separately in Models 2 through 7. In the case of the composite indicator, institutional quality strengthens the connection between microfinance activity and poverty. Whereas, in the case of individual indicators, we see the same effect only with three indicators - Control of Corruption, Regulatory Quality, and Voice and Accountability. Interestingly, as far as the direct association between institutional quality and poverty is concerned, we find that higher levels of institutional quality may not always be beneficial. For instance, in certain countries, some level of corruption may be essential to circumvent the inefficient institutions. It is also possible that the benefits of improved institutional quality may be realised at a later stage and initially, because this improvement may disrupt the existing way of doing things, it may even be harmful.

The results bring forward two important implications. First, Microfinance Institutions do not operate in isolation, unaffected by other societal factors. They can not fulfil their potential if the institutional framework surrounding them is not efficient enough. Second, improvement in institutional quality may improve the performance of MFIs with regard to poverty alleviation. Yet, the direct association between institutional quality and poverty may not be similar and can be contingent on other factors. From a policy perspective, this means that the authorities, before taking a decision on microfinance as a poverty alleviation tool, should analyze the wider institutional framework. Moreover, institutional improvement should be done keeping in mind the wider picture. Let us consider the case of corruption. As a general rule, controlling corruption may be a good step. But, if along with curtailing corruption, other inefficient institutions that gave rise to corruption are not replaced, the country might face other unforeseen consequences. Similarly, seeking improvement in other institutions is a reasonable objective but, the authorities need to be mindful of the fact that this may lead to the loss of older social technologies. So,

institutional improvement needs to be accompanied by efforts that minimize the disruption and time required to install new “rules of the game.”

This article re-emphasizes the dynamic nature and interdependence of various social and economic challenges. Our findings justify a greater focus on the ground realities that perpetuate poverty and not just the end symptoms. Moreover, we argue that institutional improvements should be a part of the wider social change. This includes focusing on issues such as the development and dissemination of new social and scientific technologies through education and training. Specifically in the case of financial inclusion, not only will this lead to a more equitable distribution of financial services but, also ensure that the recipients use these services to their best advantage. Future research in microfinance should study the role of institutions with regard to other issues such as outreach and sustainability. Moreover, researchers should also analyze how institutions influence other small and large scale projects that, like microfinance, target grand developmental challenges such as chronic poverty by promoting financial inclusion in some of the poorest areas of the world. One major example of a project of this kind is Fintech (Ozili 2018).

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Table I - Descriptive Statistics

Variables	Observations	Mean	Std. Dev.	Min.	Max.
GL Ratio	354	65.40793	121.5526	0	950.2894
Control of Corruption	354	-0.3765267	0.5528177	-1.373365	1.378793
Government Effectiveness	354	-0.1728804	0.5162974	-1.129521	1.108519
Political Stability and Absence of Violence/Terrorism	354	-0.2417541	0.7114521	-2.810035	1.119518
Regulatory Quality	354	-0.0054155	0.5952095	-1.622619	1.21221
Rule of Law	354	-0.365724	0.5553137	-1.371563	0.9977335
Voice and Accountability	354	-0.0775996	0.6903038	-1.766817	1.175189
Branch100000adults	354	18.4805	14.37276	0.767367	92.17314
OPEN1	354	0.0004219	0.0005826	0.0000487	0.0038015
CPI	354	6.059946	6.068026	-1.418184	59.21974
PrimarySchoolEnrolment	354	18.4805	14.37276	0.767367	92.17314

Table II – Correlation Matrix

Variable Name	GI Ratio	Control of Corruption	Government Effectiveness	Political Stability and Absence of Violence/Terrorism	Regulatory Quality	Rule of Law	Voice and Accountability	Branch100000adults	OPENI	CPI	PrimarySchoolEnrolment
GI Ratio	1.000										
Control of Corruption	-0.1196**	1.000									
Government Effectiveness	-0.1194**	0.7956***	1.000								
Political Stability and Absence of Violence/Terrorism	-0.0263	0.5085***	0.4540***	1.000							
Regulatory Quality	-0.1286**	0.6905***	0.8452***	0.4138***	1.000						
Rule of Law	-0.2186***	0.8676***	0.8775***	0.5509***	0.8396***	1.000					
Voice and Accountability	0.0053	0.6990***	0.6093***	0.5068***	0.7259***	0.3701***	1.000				
Branch100000adults	0.2011***	0.2569***	0.3165***	0.3250***	0.3653***	-0.3749***	-0.1343**	1.000			
OPENI	-0.0358	-0.3950***	-0.4754***	-0.4014***	-0.3526***	-0.2429***	-0.3213***	-0.1565***	1.000		
CPI	-0.1180**	-0.1755***	-0.3301***	-0.0379	-0.3330***	-0.2935***	-0.2935***	-0.1665***	0.0709	1.000	
PrimarySchoolEnrolment	0.0987*	0.1694***	0.0473	0.0964*	0.0313	0.0452	0.2388	-0.0978*	-0.2881***	-0.0051	1.000

Scaling the Social Impact of Social Enterprises: Ecosystem Growth through Replication

Abstract

We apply Topic Modelling and Multinomial Regression Analysis to analyse whether social enterprises choose to scale their social impact indirectly by acting as templates that other social entrepreneurs can replicate. The next step is to analyse the kind of social enterprises that are more likely to engage in this form of scaling. Our dataset of social enterprises comes from the venture philanthropy organisation, Ashoka. We scrap data on individual project profiles from Ashoka's website and get access to their internal fellow survey. Indeed, as our results indicate, we find evidence in favour of an increase in social impact through replication, which is our proxy for Ecosystem Growth. Moreover, we find that social enterprises operating in the following domains are more likely to promote Ecosystem Growth: Global Tech Solutions, Poorer Neighborhoods, Agriculture, Children's Disability, and Sustainability.

Introduction

Social Enterprises, as a form of hybrid organisation, adopt multiple institutional logics as a core feature of their business model. The reason behind this is that while they are driven by their mission to fulfil a social need, they also have to follow the financial logic to sustain their activities and satisfy their financial obligations (Battilana and Dorado 2010; Battilana and Lee 2014). Social enterprises thus face the challenge of surviving in a competitive environment as an upcoming venture and striking an optimum balance between the social and financial aspects so as to avoid the risk of mission drift.

Given the core nature of social enterprises, initial research in this field focused primarily on the conflict between different institutional logics at play (Battilana and Dorado 2010; Battilana, Sengul, Pache, and Model 2015; Mair et al. 2015). These conflicts often come to the forefront when one logic begins to dominate the other (Selznick 1949). While studies on mature social enterprises can act as a guide on handling the conflict between organisational logics, Battilana and Dorado (2010) argue that newer forms of hybrid organisations cannot rely solely on existing models. Given the heterogeneity, they cannot be structured in a uniform fashion (Mair, Battilana, and Cardenas 2012). In fact, in practice, social enterprises often prioritise one logic over another, adopt a customised combination of social and commercial logics, or at times innovate by adopting completely novel practices (Mair et al. 2015). Another helpful practice with regard to minimising conflict is creating a space for negotiation between different groups that represent each logic (Battilana, Sengul, Pache, and Model 2015). To add to this, as Ometto et al. (2018) argue, organisations should have regular 'herding spaces' that

connect members to the changing institutional context. This will aid in achieving a collective organisational identity (Battilana and Dorado 2010).

As discussed above, there has been extensive research in the field of social enterprises. However, the rationale, strategies, and processes behind the scaling of social enterprises have been relatively less explored (Ometto et al. 2018; Bauwens et al. 2020). Most existing studies have analysed scaling through the lens of case study research and the categorisation of social enterprises (Bauwens et al. 2020). Social Enterprises can either opt for Organisation Growth or Ecosystem Growth to scale their operations. We, in this paper, focus on ecosystem growth which is where social enterprises aim to widen the ecosystem in which operate so that upcoming organisations can also flourish (Bloom and Dees 2008; Lyon and Fernandez 2012). Under this strategy, established social enterprises can share their knowledge and technical skills with other organisations and thus expand their social impact indirectly. By aiming for ecosystem growth, social enterprises can act as a template that new organisations can utilise to replicate the business model. Indeed, a template can lay out the order in which activities are to be carried out and the connection between different steps and thus can be really helpful for the growth of new enterprises (Winter and Nelson 1982; Jensen and Szulanski 2007; Ringov, Liu, Jensen, and Szulanski 2016). So far, much of the research on templates has focused on established, relatively larger, firms (Chliova and Ringov 2017). Our research presents an interesting opportunity to study replication in the context of social enterprises that face different environmental pressures and have hybrid motivations with regard to growth.

In this study, we conduct Topic Modeling and Multinomial Logit Regression Analysis on data taken from social enterprises across the world. The founders of these social enterprises are fellows at Ashoka, a Venture Philanthropy organisation founded in the United States in 1980. Ashoka accounts for over 60 per cent of the investments made in this sector. We have textual data that provides descriptions of over 2500 projects run by as many Ashoka fellows. This data is publicly available and was scraped from Ashoka's website. In addition to this, we have access to Ashoka's 2018 Global Fellows Study, which was an internal survey completed by the Ashoka fellows. Among other details, this report includes information such as the level of change achieved, the current status of the original idea, and the replication status of the project. The aim of our study is to find out the kind of projects that are likely to be replicated by other social entrepreneurs either locally or in different settings. We employ topic modelling on our scraped data to identify the latent structure of our data and go deeper into issues that each project aims to resolve. Based on the results, we identify that 20 topics best describe our data. Post this, we qualitatively analysed each topic and merged the results with Ashoka's internal survey. Finally, the results of the regression analysis provide evidence that social enterprises opt for ecosystem growth to increase their social impact. They do so by acting as a template that the newer enterprises can replicate. Our results also go deeper into the kind of social enterprises that are more likely to engage in ecosystem growth.

Further sections of this article are organized as follows. In Section II, we review the literature on Social Enterprise and Scaling & Ecosystem Growth. In Sections III, we

discuss the sample and methodology employed in this study. In Section IV, we discuss our results and finally, in Section V, we put forward our concluding remarks.

Literature Review

Social Enterprises

In the past few decades, there has been a steady rise in organisations that do not solely fall under the umbrella of a single organisational logic. Organisational logics are socially accepted and taken for granted prescriptions in a particular field of work (Friedland and Alford, 1991; Thornton and Ocasio 1999; Suddaby and Greenwood 2005). Social organizations are an archetype of such organisations (Battilana and Lee 2014). Their fundamental characteristic is that they combine the social and commercial organizational logics. As a result, they are driven by their goal of helping the poor as well as maintaining a sufficient level of profit to sustain their operations (Battilana and Dorado 2010). To elaborate, social enterprises are driven by social needs and seek to put out innovative solutions for widespread social issues in the context in which they operate (Alvord, Brown, and Letts 2004; Austin, Stevenson, and Wei-Skillern 2006; Dees 2001). Moreover, even though institutional requirements constrain them, the context in which they operate is such that they have to put the common good over and above their private organisational needs (Dorado and Ventresca 2013; Santos 2012). This is essential, as VanSandt et al. (2009) argue, to promote the equitable distribution of resources and capture the true aim of capitalism.

Being a type of Hybrid Organisation, social enterprises aim to maintain a balance between commercial and social organizational logics. This is an ongoing process, involves different agents, and can be inherently political in nature (Mair and Marti 2009). Ideally, an organisation in this sector will want to generate enough funds to support its social mission. However, at the same time, it would not want to drift away from its mission and focus primarily on the financial aspect (Battilana and Lee 2014). A prominent line of research on social enterprises focuses on the conflict between different organizational logics. Social enterprises have to respond to challenges from a variety of stakeholders to maintain their legitimate status (Battilana and Dorado 2010; Battilana, Sengul, Pache, and Model 2015; Mair et al. 2015). As discussed above, these organizations bring together seemingly opposing logics and the result of this could be ongoing tension among different organizational members who may champion one logic over another (Zilber 2002; Heimer 1999; Glynn 2000; Battilana and Dorado 2010). At the same time, they remain heterogeneous in terms of how much they choose to focus on any one of the multiple organisational logics (**Dees 1998; Stevens et al. 2015**). This ongoing tussle within the organisation may cause an undesirable image for outsiders, especially investors who may prefer private gains over the common good. Thus, procuring financial resources can become an enormous task for a social enterprise (Austin et al. 2006). In contrast to this, another problem that may arise is mission drift, which results from an excessive focus on the commercial aspect. Critics argue that while focusing on the commercial aspect may help in sustaining the operations, it will come at the cost of the social goal of helping more and more people (Ebrahim,

Battilana, and Mair 2014; Mersland and Strom 2010; Hermes et al. 2011; Simanowitz and Walter 2002, Mosley 2001).

Scaling and Ecosystem Growth

Researchers analysed the scaling strategies in Social Enterprises primarily either through case studies that explicate the entire process or through typologies (Lyon & Fernandez 2012; Battilana & Lee 2014; Vickers & Lyon 2014; Kannothra, Manning, & Haigh 2018). With time, researchers underlined the importance of the rationale behind the growth strategies pursued by social enterprises. For instance, the organisation's founding mission or relative position in the industry, among other things, may significantly impact the scaling strategy (Bauwens et al. 2020). The founding environment can be influential not only in the early setup phase of the organisation but, also in the later phases (Stinchcombe 1965; Vickers and Lyon 2014). In academic literature, this process has been established as Imprinting. In one of the seminal papers on imprinting, Marquis and Tilcsik (2013) define imprinting as a process whereby the early-stage characteristics that reflect their corresponding environment may persist over time even as the environment changes at a later stage. However, the imprinting process can change over time as the past and present of the organisation interact.

Researchers have also distinguished between the kinds of scaling strategies based on how the organisations aim to expand their social impact. Specifically, most social enterprises, to scale their operations, pursue one or a combination of the following two overarching strategies: Organisation Growth and Ecosystem Growth. As the name implies, under the first strategy, the organizations aim to solve societal problems at a

greater scale by manipulating the depth and breadth of their operations (Dees et al. 2004; Lyon and Fernandez 2012; Vickers and Lyon 2014). For instance, they can expand to newer geographical locations or introduce new products and services. Under the second strategy, the approach towards greater social impact is indirect. The organisations wish to widen the ecosystem in which they operate so that newer organisations can also flourish (Bloom and Dees 2008; Lyon and Fernandez 2012). This can be achieved through efforts such as the dissemination of knowledge and the organisation of training and advocacy campaigns (Bauwens et al. 2020; Bloom and Chatterji 2009).

With the success of an increasing number of social enterprises, there is a significant demand for readily available business model templates that can be taken advantage of by upcoming social entrepreneurs and thus, lead to ecosystem growth (Bloom and Smith 2010). A template is a set of organizational routines that acts as a working manual for carrying out day-to-day business operations. It lays down the order in which different activities need to be executed and the connection between each of them (Nelson and Winter, 1982). The benefits of replication with regard to the growth of new enterprises are fairly straightforward and widely argued in academic literature (Jensen and Szulanski 2007; Ringov, Liu, Jensen, and Szulanski 2016). However, a great deal of this research focuses on relatively larger firms (Chliova and Ringov 2017). Social enterprises, on the other hand, present different challenges, especially in terms of the context in which they operate and the hybrid motivations that drive them.

Sample and Methodology

We conduct Topic Modeling and Multinomial Logit Regression Analysis on data from the Venture Philanthropy organisation, Ashoka. Ashoka funds social enterprises across the world and it accounts for over 60 per cent of the investments made in this sector. We scrape publicly available project descriptions on over 2500 projects from Ashoka's website. We use this data to run our topic modelling exercise. Moreover, Ashoka has provided us access to their 2018 Global Fellows Study Report and the internal survey completed by their fellows, based on which the report was prepared. Post the topic modelling exercise, we merge our topic loadings with the internal survey data. Our final sample includes 363 social enterprises that have representation on both the scraped dataset and the internal survey.

Topic Modeling

We apply Latent Dirichlet Allocation (LDA), which is a generative probabilistic model for a collection of textual documents (Blei, Ng, and Jordan 2003). This enables us to discover the latent themes in our large dataset. LDA works by using documents and the collection of words in each of those documents as input and provides us with an aforementioned number of topics, the distribution of these topics per document and the distribution of words over topics. LDA does not require prior human classification and hence, the structure emerges from the data. But, we do have to input the number of topics that we want to emerge from our dataset. There are topic coherence measures that can give us the ideal number of topics (Aletas and Stevenson 2013; Syed and Spruit 2017). But, in practice, it is best to conduct some qualitative analysis to ensure

the topics are interpretable. We decided that 20 topics best capture the themes in our dataset. Another tool that we used to ensure better interpretability of our topics is LDAvis (Sievert and Shirley 2014). LDAvis provides us with a graphical view of all the topics and the semantic distance between them. Moreover, we also have the option of adjusting the λ parameter that enables the ordering of words according to their relevance to each topic. In our qualitative analysis, we assigned codes to our topics using 0, 0.5, and 1 as values for λ . Moreover, as a robustness check, we also used $\lambda = 0.6$ (Sievert and Shirley 2014). In the first step, we chose to discard two topics for lack of interpretability and in the second step, given our sample comes from all over the world, we chose to discard two topics because they focused specifically on a geographical region. In the end, we had 16 topics. Appendix 1 gives us the LDAvis output. Table 1 lists the names that we assigned to each of the 16 topics.

A.K.M. Maksud

Ashoka Fellow



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This description of A.K.M. Maksud's work was prepared when A.K.M. Maksud was elected to the Ashoka Fellowship in 2006.

- Introduction
- The New Idea
- The Problem
- The Strategy
- The Person

Example of an Ashoka Fellow's Profile that we scrape from the web

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
0.000468384	0.124590164	0.000468384	0.023887588	0.000468384	0.35175644	0.087119438	0.145667447	0.002810304	0.03559719	0.007494145	0.000468384	0.000468384	0.000468384	0.187822014	0.000468384	0.026229508	0.000468384	0.002810304	0.000468384
0.252008457	0.040591966	0.114587738	0.000422833	0.000422833	0.125158562	0.000422833	0.171670119	0.000422833	0.156871036	0.000422833	0.000422833	0.000422833	0.000422833	0.000422833	0.000422833	0.129386892	0.002536998	0.000422833	0.002536998
0.073684211	0.000809717	0.000809717	0.000809717	0.000809717	0.000809717	0.000809717	0.000809717	0.097975709	0.000809717	0.041295547	0.000809717	0.0048583	0.089878543	0.025101215	0.000809717	0.300404858	0.053441296	0.300453441	0.000809717
0.025625	0.035	0.000625	0.013125	0.075625	0.000625	0.24125	0.000625	0.14125	0.00375	0.000625	0.000625	0.000625	0.000625	0.038125	0.000625	0.056875	0.275625	0.000625	0.088125
0.014012739	0.001273885	0.0045859673	0.001273885	0.173248408	0.001273885	0.185987261	0.033121019	0.039490446	0.001273885	0.001273885	0.001273885	0.001273885	0.007643312	0.007643312	0.230573248	0.001273885	0.249681529	0.001273885	0.001273885
0.007142857	0.007142857	0.001190476	0.042857143	0.170238095	0.019047619	0.275	0.001190476	0.001190476	0.030952381	0.007142857	0.042857143	0.257142857	0.007142857	0.001190476	0.001190476	0.102380952	0.019047619	0.054761905	0.001190476
0.000539084	0.129919137	0.000539084	0.000539084	0.000539084	0.081401617	0.086792453	0.054447439	0.000539084	0.468846361	0.132614555	0.000539084	0.000539084	0.000539084	0.014016173	0.000539084	0.01671159	0.000539084	0.000539084	0.111320755
0.000970874	0.267961165	0.000970874	0.000970874	0.000970874	0.05825243	0.044660194	0.015533981	0.005825243	0.35333806	0.185436893	0.015533981	0.000970874	0.005825243	0.000970874	0.005825243	0.083495146	0.000970874	0.000970874	0.000970874
0.000673401	0.000673401	0.041077441	0.000673401	0.034343434	0.000673401	0.111784512	0.004040404	0.000673401	0.000673401	0.014141414	0.020875421	0.000673401	0.334006734	0.004040404	0.000673401	0.424915825	0.000673401	0.000673401	0.000673401
0.000492611	0.000492611	0.000492611	0.000492611	0.022860099	0.217241379	0.034975369	0.030049261	0.015270936	0.000492611	0.000492611	0.108866995	0.416748768	0.000492611	0.005418719	0.000492611	0.069458128	0.06453202	0.010344828	0.000492611
0.000352113	0.00915493	0.000352113	0.000352113	0.016197183	0.051408451	0.007394366	0.016197183	0.002112676	0.341901408	0.38943662	0.000352113	0.000352113	0.000352113	0.000352113	0.000352113	0.000352113	0.158802817	0.002112676	0.002112676
0.000677966	0.000677966	0.190580475	0.000677966	0.02440678	0.078644068	0.000677966	0.004067797	0.017627119	0.078644068	0.115932203	0.000677966	0.007457627	0.126101695	0.021016949	0.000677966	0.000677966	0.329491525	0.000677966	0.000677966
0.001069519	0.097326203	0.001069519	0.001069519	0.001069519	0.145454545	0.049197861	0.102673797	0.001069519	0.001069519	0.567219251	0.006417112	0.001069519	0.022459893	0.006417112	0.001069519	0.001069519	0.001069519	0.001069519	0.001069519
0.000732601	0.022710623	0.000732601	0.008058608	0.396336996	0.015384615	0.000732601	0.000732601	0.000732601	0.000732601	0.000732601	0.000732601	0.000732601	0.000732601	0.015384615	0.000732601	0.033699634	0.004395604	0.015384615	0.015384615
0.011678832	0.208759124	0.000729927	0.000729927	0.000729927	0.212408759	0.208759124	0.000729927	0.000729927	0.095620438	0.179562044	0.004379562	0.000729927	0.000729927	0.000729927	0.000729927	0.062773723	0.004379562	0.000729927	0.004379562
0.000641026	0.007051282	0.007051282	0.003846154	0.087179487	0.000641026	0.000641026	0.000641026	0.000641026	0.000641026	0.112820513	0.000641026	0.032692308	0.003846154	0.31474359	0.000641026	0.007051282	0.122435897	0.295152821	0.000641026
0.000865801	0.148051948	0.000865801	0.000865801	0.000865801	0.005194805	0.000865801	0.005194805	0.005194805	0.005194805	0.161038961	0.000865801	0.000865801	0.161038961	0.018181818	0.000865801	0.091774892	0.091774892	0.000865801	0.000865801
0.000816327	0.029387755	0.004897959	0.000816327	0.106938776	0.000816327	0.000816327	0.004897959	0.000816327	0.004897959	0.000816327	0.000816327	0.000816327	0.486530612	0.192653061	0.008979592	0.02122449	0.131428571	0.000816327	0.000816327
0.023943662	0.000469484	0.000469484	0.000469484	0.000469484	0.218779343	0.000469484	0.378403756	0.007511737	0.02629108	0.000469484	0.000469484	0.000469484	0.002816901	0.000469484	0.002816901	0.270422353	0.061502347	0.002816901	0.000469484
0.040243902	0.000609756	0.143902439	0.009756098	0.000609756	0.000609756	0.329870049	0.02195122	0.293292023	0.000609756	0.000609756	0.000609756	0.000609756	0.009756098	0.000609756	0.031097561	0.113414634	0.000609756	0.000609756	0.000609756
0.000966184	0.05410628	0.000966184	0.107246377	0.010628019	0.000966184	0.170048309	0.000966184	0.266666667	0.049275362	0.000966184	0.015458937	0.000966184	0.000966184	0.005797101	0.000966184	0.000966184	0.310144928	0.000966184	0.000966184
0.000623053	0.000623053	0.000623053	0.000623053	0.078504673	0.000623053	0.000623053	0.025645171	0.408722741	0.075389408	0.000623053	0.000623053	0.000623053	0.000623053	0.013084112	0.020315265	0.11588785	0.034890966	0.038006231	0.000623053
0.000621118	0.003726708	0.053416149	0.000621118	0.000621118	0.08757764	0.183950932	0.000621118	0.382608696	0.06894099	0.155900621	0.009937888	0.000621118	0.000621118	0.047204969	0.000621118	0.000621118	0.000621118	0.000621118	0.000621118
0.005714286	0.005714286	0.000952381	0.072380952	0.043809524	0.091428571	0.086666667	0.000952381	0.153333333	0.072380952	0.000952381	0.01047619	0.000952381	0.000952381	0.01047619	0.000952381	0.005714286	0.000952381	0.424761905	0.01047619
0.005020921	0.00083682	0.00083682	0.00083682	0.067782427	0.406894561	0.00083682	0.034309623	0.088702929	0.017573222	0.247698745	0.00083682	0.009205021	0.017573222	0.00083682	0.005020921	0.076150628	0.017573222	0.00083682	0.00083682
0.053744493	0.049339207	0.06255066	0.031718062	0.09339207	0.000881057	0.040528634	0.005286344	0.000881057	0.124229075	0.06690352	0.000881057	0.000881057	0.128634361	0.000881057	0.000881057	0.022907489	0.005286344	0.300440529	0.000881057
0.000472813	0.017021277	0.000472813	0.095035461	0.012293144	0.000472813	0.236879433	0.033669974	0.002836679	0.002836679	0.019385343	0.000472813	0.012293144	0.10212766	0.000472813	0.005200946	0.002836679	0.442455191	0.000472813	0.012293144
0.001449275	0.001449275	0.001449275	0.131884058	0.001449275	0.001449275	0.001449275	0.001449275	0.146376812	0.001449275	0.233333333	0.001449275	0.001449275	0.001449275	0.001449275	0.001449275	0.05942029	0.015942029	0.015942029	0.37826087
0.0000724638	0.058895652	0.000724638	0.04057971	0.000724638	0.000724638	0.301449275	0.000724638	0.065942029	0.004347826	0.000724638	0.000724638	0.004202899	0.000724638	0.015217391	0.000724638	0.13115942	0.000724638	0.276866957	0.055072464
0.021311475	0.013114754	0.000819672	0.013114754	0.004918033	0.000819672	0.209836066	0.004918033	0.197540984	0.000819672	0.029580197	0.062295082	0.000819672	0.000819672	0.000819672	0.000819672	0.000819672	0.435245902	0.000819672	0.000819672
0.1872	0.037866667	0.000533333	0.000533333	0.005866667	0.000533333	0.000533333	0.0192	0.216533333	0.000533333	0.149866667	0.069866667	0.144533333	0.0192	0.000533333	0.000533333	0.058666667	0.064533333	0.0192	0.000533333
0.004651163	0.006765328	0.000422833	0.019450317	0.188469345	0.000422833	0.118816098	0.000422833	0.000422833	0.030021142	0.002536998	0.046934461	0.000422833	0.000422833	0.000422833	0.000422833	0.023678647	0.457082452	0.013107822	0.087103894
0.000362976	0.000362976	0.00362976	0.005807623	0.276225045	0.022141561	0.094736842	0.020326679	0.000362976	0.000362976	0.085662432	0.000362976	0.000362976	0.00399274	0.091107078	0.000362976	0.000362976	0.056624319	0.339745917	0.000362976
0.000840336	0.000840336	0.005042017	0.000840336	0.000840336	0.000840336	0.000840336	0.227731092	0.000840336	0.011674059	0.011674059	0.012605044	0.122889076	0.000840336	0.000840336	0.000840336	0.429411765	0.000840336	0.013445378	0.105882353

Screenshot of the Topic Modelling Output: 20 Topics

Regression Analysis

After Topic Modelling, we conduct a multinomial regression analysis to analyze the kind of social enterprises that are likely to be replicated at different levels. Our final sample has 363 social enterprises and the year of the survey is 2018. Our dependent variable is a proxy for replication and is categorical in nature. Our primary independent variables are the topic loadings obtained from the topic modelling exercise. Our control variables include a range of variables from the internal survey such as Idea Status, Fellow Gender, Fellow Education, Number of People Helped, Number of Employees, Number of Countries, Encourage Others, and Realised the Importance of Other Institutions. Appendix 2 gives us the definitions of all variables.

We use the following model in our analysis:

$$\text{Model: } Y = \beta_0 + \beta_1\text{TM} + \beta_2\text{IS} + \beta_3\text{EO} + \beta_4\text{IO} + \gamma X + \mu \quad (1)$$

where TM is a vector of topic loadings from 16 topics, IS is a vector of the current status of the original idea, EO is a vector that measures how much the fellow has encouraged others about pursuing their idea, IO is a vector that measures how much the fellow has realised the importance of other institutions, X is a vector of control variables, and μ , is the error term.

Results

Table 3 lists the results of our multinomial regression analysis. As mentioned in Appendix 2, our dependent variable is categorical in nature and it captures the replication status in the following ways: Not replicated (0), Replicated in the country of residence (1), Replicated in other countries (2), and Replicated both in the country of residence and in other countries (3). In our regression model, we keep no replication (0) as our base. Results present some evidence in favour of the argument that social enterprises choose ecosystem growth as a means of expanding their social impact. We observe that social enterprises that work heavily in areas such as Global Tech Solutions, Poorer Neighborhoods, Agriculture, Children's Disability, and Sustainability have the greatest positive impact on replication when it happens in the country of residence. As we move from local replication to replication in other countries, we see the same significant impact on replication in relatively fewer sectors. In case of replication both in the country of residence and in other countries, apart from the significant impact of other sectors discussed previously, the community sector has a

significantly positive impact. Interestingly, the community sector did not have this impact in the previous two cases of replication.

As far as the current status of the idea is concerned, in the case of local replication, social enterprises that continue to work in the social sector have a significantly positive impact on replication. This is in comparison with social enterprises that no longer operate in the social sector. For the other two categories of replication, the effect of the current status of the idea is not significant. Moreover, along expected lines, we can also see that fellows who encouraged other upcoming entrepreneurs to replicate their idea had a positive impact on replication.

Discussion and Conclusion

This paper analyses whether social enterprises choose Ecosystem Growth as a means of expanding their social impact. We use replication of the original idea by other social entrepreneurs as a proxy for ecosystem growth. We utilise a dataset of social entrepreneurs funded by Ashoka, an American Venture Philanthropy organisation founded in 1980. This dataset includes individual project descriptions available on Ashoka's website and the internal survey completed by their fellows. We first conduct Topic Modelling on the data scraped from Ashoka's website to identify the latent structure in the textual dataset and group projects based on the kind of problems they majorly focus on. We then merge the topic modelling results with Ashoka's survey dataset to conduct our Multinomial Logit Regression Analysis. The results indicate that indeed, social enterprises increase their social impact by acting as templates that other

social entrepreneurs can replicate. Moreover, our analysis also indicates the broad areas in which this kind of social impact is more likely to take place.

Our study contributes to the literature on social enterprises. While a large proportion of existing literature studies the conflict between multiple logics employed in such organisations, we focus on the scaling issues in social enterprises. Specifically, we analyse whether certain specific kinds of social enterprises are more to be replicated and increase their social impact indirectly by guiding upcoming social enterprises. So far, very few papers on replication focus on smaller firms (Chliova and Ringov 2017). We add to this by bringing together social impact and replication within the context of social enterprises. Moreover, from an investment and policy perspective, we also identify certain areas where ecosystem growth can be an effective way to increase social impact. In other words, rather than focusing on organisational expansion, increasing the number of organisations in a domain can be an alternative way of reaching more and more people.

Future research can focus on how policymakers, venture philanthropists, and other concerned parties can enable the easy transfer of skills and knowledge that can enable this kind of social impact in the future. We need to find more ways to bridge the gap between social enterprises that can gain from each other but, are geographically far away from each other. Whether this can be done effectively through agreements between different countries or through private means is another interesting avenue for future research.

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TABLE 1: Topic Names	
Topic Number	Topic Name
1	v_GlobalTechSolutions
2	v_LegalSystem
3	v_EntreSmallBusiEcosystem
4	v_YoungChildren
5	v_PoorerAreasCity
6	v_Community
7	v_AgricultureBusiness
8	v_YouthIssues
9	v_GroupsAndOrganizations
10	v_media
11	v_DisabilityChildren
12	v_Workers
13	v_NatureAndEnvironment
14	v_health
15	v_SocietalIssuesWomen
16	v_Sustainability

TABLE 2: Summary Statistics						
Variables - Topics	Observations	Mean	Std. Dev.	Min	Max	
v_st_GlobalTechSolutions	363	0.0721095	0.1235317	0.0002463	0.653202	
v_st_LegalSystem	363	0.0348682	0.0859905	0.0002463	0.7107692	
v_st_EntreSmallBusiEcosystem	363	0.0337444	0.071472	0.0002128	0.4403846	
v_st_YoungChildren	363	0.0476626	0.0922736	0.0002865	0.6444445	
v_st_PoorerAreasCity	363	0.125635	0.1388523	0.0002513	0.7844961	
v_st_Community	363	0.0225697	0.0544703	0.0002513	0.375641	
v_st_AgricultureBusiness	363	0.0456707	0.0781392	0.0002128	0.4668463	
v_st_YouthIssues	363	0.0888846	0.109468	0.0002743	0.6933333	
v_st_GroupsAndOrganizations	363	0.0438346	0.0836941	0.0002128	0.4565333	
v_st_media	363	0.0356391	0.087353	0.0002128	0.6596882	
v_st_DisabilityChildren	363	0.0688558	0.1130437	0.0002743	0.4947369	
v_st_Workers	363	0.0277829	0.0647949	0.0002128	0.4602787	
v_st_NatureAndEnvironment	363	0.0697451	0.1174702	0.0002128	0.622335	
v_st_health	363	0.0581469	0.1075454	0.0002865	0.68375	
v_st_SocietallssuesWomen	363	0.0438888	0.1026204	0.0002463	0.545679	
v_st_Sustainability	363	0.029249	0.0732368	0.0002463	0.4660333	
People Helped	363	224140.6	1511580	0	2.50E+07	
Number of Employees	363	65.75758	216.4725	0	3000	
Number of Countries	363	6.253444	18.6265	0	197	
Categorical Variables						
Replication						
Replication Status	Freq.	Percent	Cum.			
No	57	15.7	15.7			
Yes - within my country of residence	145	39.94	55.65			
Yes - in other countries	68	18.73	74.38			
Yes - within my country of residence and in other countries	93	25.62	100			
Idea Status						
Idea Status	Freq.	Percent	Cum.			
No, I am no longer in the social sector	2	0.55	0.55			
No, I have moved on to another idea in the social sector	31	8.54	9.09			
Yes, I am working on the same idea in a very similar way and scope to when I was elected.	135	37.19	46.28			
Yes, I am working on the same idea, but my strategy has changed significantly	195	53.72	100			
Gender						
Gender	Freq.	Percent	Cum.			
Female	153	42.15	42.15			
Male	210	57.85	100			
Encouraged Others						
Encouraged Others	Freq.	Percent	Cum.			
No	106	29.2	29.2			
Yes- I actively encouraged others to replicate my idea - A	174	47.93	77.13			
Yes - I open-sourced my idea so others could replicate it - B	55	15.15	92.29			
Both A and B	28	7.71	100			
Realised the Importance of Other Institutions						
Realised the Importance of Other Institutions	Freq.	Percent	Cum.			
No	85	23.42	23.42			
To some extent	117	32.23	55.65			
Yes	161	44.35	100			

TABLE 3: Multinomial Regression Results

		Robust					
replication		RRR	Std. Err.	z	P> z	[95% Conf. Interval]	
0		(base outcome)					
Multinomial logistic regression Number of obs = 363 Wald chi2(78) = 485.85 Prob > chi2 = 0.0000 Log pseudolikelihood = -386.18489 Pseudo R2 = 0.1940							

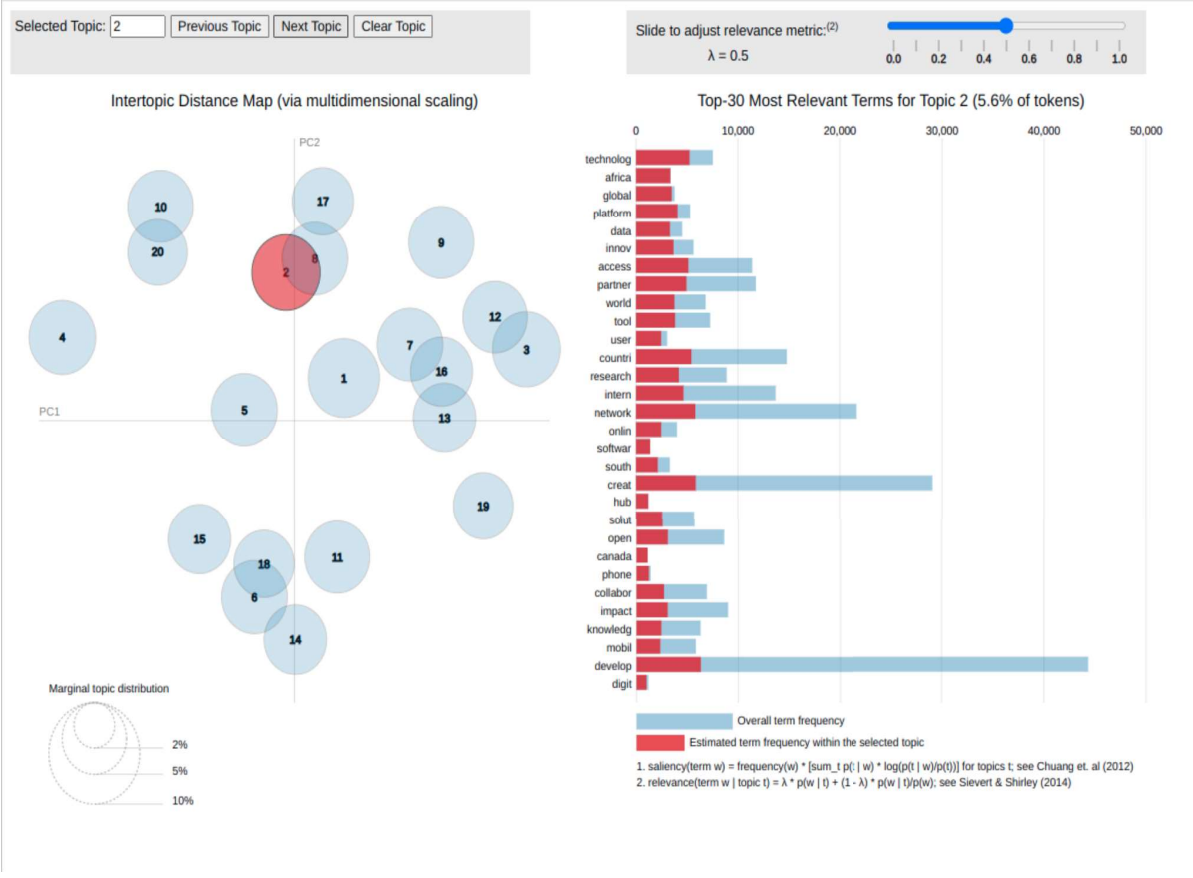
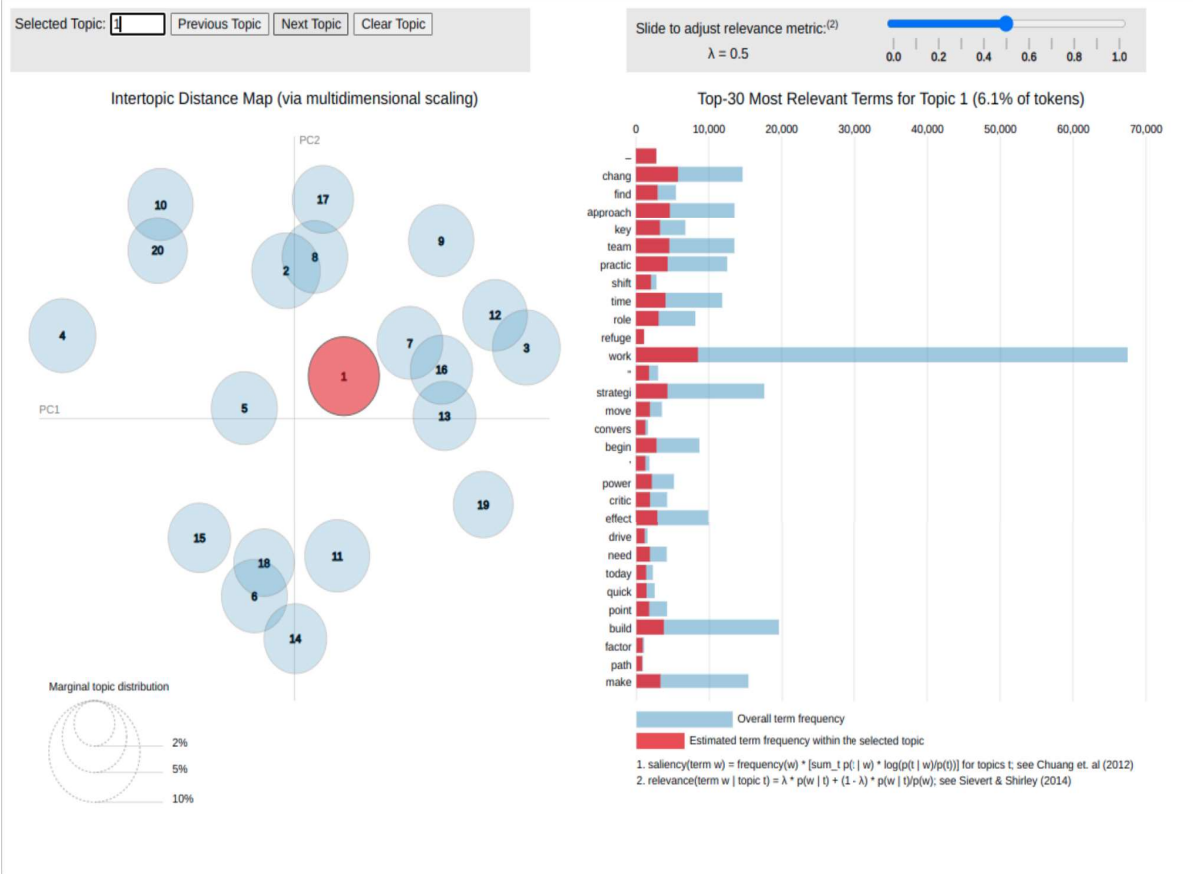
1							
	v_st_GlobalTechSolutions	.0268608	.0491624	-1.98	0.048	.0007434	.9706069
	v_st_LegalSystem	.1469831	.4452576	-0.63	0.527	.0063879	55.6957
	v_st_EntreSmallBusiEcosystem	.6736291	2.1837	-0.13	0.899	.0014797	306.6674
	v_st_YoungChildren	.5600236	1.661636	-0.20	0.845	.0016696	187.8412
	v_st_PoorerAreasCity	.0158297	.0265938	-2.37	0.018	.0004686	.4820391
	v_st_Community	.0047873	.0153471	-1.67	0.096	8.94e-06	2.563734
	v_st_AgricultureBusiness	.0000799	.0002357	-3.20	0.001	2.45e-07	.026002
	v_st_YouthIssues	.1956444	.4560416	-0.70	0.484	.0020293	18.86228
	v_st_GroupsAndOrganizations	.0055424	.0114596	-2.51	0.012	.0000963	.3189022
	v_st_media	158.3774	675.1773	1.19	0.235	.0372344	673661.6
	v_st_DisabilityChildren	.0000671	.0001521	-4.24	0.000	7.92e-07	.0056923
	v_st_Workers	.0375506	.1480611	-0.83	0.408	.0000159	88.92429
	v_st_NatureAndEnvironment	.0251793	.0582007	-1.59	0.111	.0002714	2.336433
	v_st_health	.7844132	2.127721	-0.09	0.929	.0038518	159.746
	v_st_SocietalIssuesWomen	.019733	.0432669	-1.79	0.073	.0002684	1.45061
	v_st_Sustainability	.0005063	.0013133	-2.93	0.003	3.14e-06	.0017371
	v_idea_status						
	No, I have moved on to another idea in the social ..	321031.1	361673	11.25	0.000	35284.61	2920849
	Yes, I am working on the same idea in a very simil..	.631026	646919.2	13.03	0.000	84596.63	4706969
	Yes, I am working on the same idea, but my strateg..	1134197	1208608	13.08	0.000	140488.7	9156618
	1.f_gender	1.643045	.6487419	1.26	0.209	.7578092	3.562369
	f_education	.6374569	.7557064	-0.38	0.704	.0624237	6.509565
	v_peoplehelped	.9999993	5.57e-07	-1.29	0.197	.9999982	1
	v_employees	.9999664	.0008196	-0.04	0.967	.9983613	1.001574
	v_countries_n	.8132995	.1187605	-1.42	0.157	.6108794	1.082793
	EncourageOthers	2.507125	.887518	2.60	0.009	1.252715	5.017645
	RealizeImportanceInstitutions	1.002825	.2791134	0.01	0.992	.5811825	1.730365
	_cons	.0001143	.0002197	-4.72	0.000	2.64e-06	.0049443

2							
	v_st_GlobalTechSolutions	.0279684	.0582466	-1.72	0.086	.000472	1.657165
	v_st_LegalSystem	53.2396	159.3496	1.33	0.184	.1508459	18790.4
	v_st_EntreSmallBusiEcosystem	2.246504	7.74251	0.23	0.814	.0026174	1928.182
	v_st_YoungChildren	5.742119	17.61674	0.57	0.569	.0140475	2347.177
	v_st_PoorerAreasCity	.0128529	.0242767	-2.19	0.028	.0002326	.6245429
	v_st_Community	.0240213	.0856338	-1.05	0.296	.0000222	26.08524
	v_st_AgricultureBusiness	.0000171	.0029192	-2.20	0.028	1.79e-06	.469896
	v_st_YouthIssues	.350945	.8485868	-0.43	0.665	.0030692	40.12811
	v_st_GroupsAndOrganizations	.0038608	.2020704	-1.02	0.306	.0007318	9.610098
	v_st_media	387.5781	1680.085	1.37	0.169	.0791674	1897459
	v_st_DisabilityChildren	.000106	.0002805	-3.46	0.001	5.93e-07	.0189507
	v_st_Workers	.0491041	.201098	-0.74	0.462	.0000016	150.3409
	v_st_NatureAndEnvironment	.1219953	.3126446	-0.82	0.412	.0000034	18.52544
	v_st_health	30.92943	84.82774	1.25	0.211	.1431685	6681.844
	v_st_SocietalIssuesWomen	.221593	.5571226	-0.60	0.549	.0016051	30.59299
	v_st_Sustainability	.0013893	.0042159	-2.17	0.030	3.63e-06	.5318218
	v_idea_status						
	No, I have moved on to another idea in the social ..	596235.7	767506.6	10.33	0.000	47830.57	7432422
	Yes, I am working on the same idea in a very simil..	988141.7	1166323	11.69	0.000	97752.81	9988706
	Yes, I am working on the same idea, but my strateg..	1278164	1536135	11.70	0.000	121223.7	1.35e+07
	1.f_gender	1.188146	.5079271	0.40	0.687	.514026	2.746342
	f_education	.2566089	.3229841	-1.06	0.280	.0217719	3.024458
	v_peoplehelped	1	2.52e-07	1.38	0.168	.9999999	1.0000001
	v_employees	.9991962	.0005504	-1.46	0.144	.9981118	1.000276
	v_countries_n	1.049533	.0466915	1.09	0.277	.9618952	1.145155
	EncourageOthers	2.194123	.8648549	1.99	0.046	1.013314	4.750924
	RealizeImportanceInstitutions	.8699043	.2708993	-0.45	0.654	.4724942	1.601572
	_cons	.0000181	.0000382	-5.17	0.000	2.89e-07	.0011354

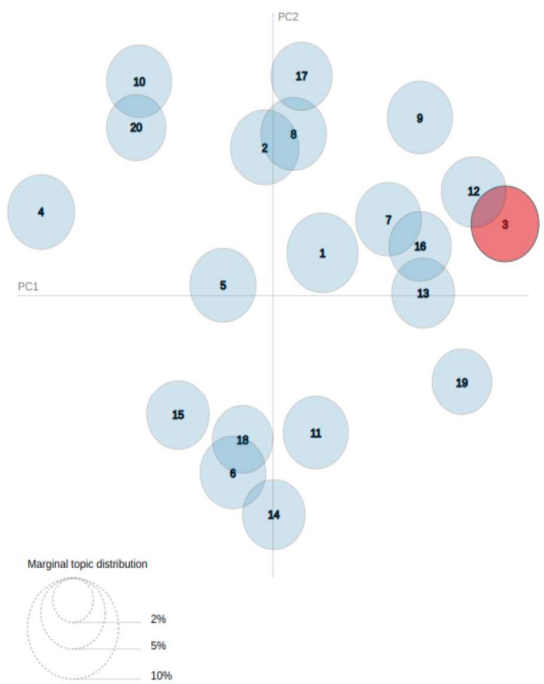
3							
	v_st_GlobalTechSolutions	.0595943	.1148495	-1.46	0.143	.0013639	2.603944
	v_st_LegalSystem	6.303394	19.35799	0.60	0.549	.0153285	2592.089
	v_st_EntreSmallBusiEcosystem	.0246356	.0875508	-1.04	0.297	.0000233	26.09688
	v_st_YoungChildren	2.705337	8.636156	0.31	0.755	.0051875	1410.857
	v_st_PoorerAreasCity	.0401562	.0697541	-1.85	0.064	.001334	1.208788
	v_st_Community	.0004701	.0017337	-2.08	0.038	3.41e-07	.6476742
	v_st_AgricultureBusiness	.0002581	.0007912	-2.70	0.007	6.35e-07	.1049132
	v_st_YouthIssues	.0665464	.1611779	-1.12	0.263	.0005774	7.669506
	v_st_GroupsAndOrganizations	.030274	.0749444	-1.41	0.158	.0002365	3.874801
	v_st_media	120.3518	526.9494	1.10	0.273	.0229323	633723.4
	v_st_DisabilityChildren	.0007145	.0015579	-3.32	0.001	9.96e-06	.0512754
	v_st_Workers	.0136218	.0545414	-1.07	0.283	5.32e-06	34.86829
	v_st_NatureAndEnvironment	.1301581	.3167477	-0.84	0.402	.0011041	15.34344
	v_st_health	20.20828	54.12659	1.12	0.262	.1060815	3849.628
	v_st_SocietalIssuesWomen	.2643483	.5699753	-0.62	0.537	.0038624	18.09244
	v_st_Sustainability	.0007643	.0021606	-2.54	0.011	3.00e-06	.1947986
	v_idea_status						
	No, I have moved on to another idea in the social ..	1.82508	2.137674	0.51	0.607	.1837763	18.12485
	Yes, I am working on the same idea in a very simil..	3.215387	3.417908	1.10	0.272	.4003305	25.82544
	Yes, I am working on the same idea, but my strateg..	5.320115	5.809547	1.53	0.126	.6257662	45.23036
	1.f_gender	1.589171	.6571047	1.12	0.263	.7066563	3.573823
	f_education	.5120093	.6115942	-0.56	0.575	.0492628	5.321532
	v_peoplehelped	1	2.51e-07	0.99	0.320	.9999998	1.0000001
	v_employees	.9991326	.0005215	-1.66	0.096	.9981111	1.000155
	v_countries_n	1.048654	.0466842	1.07	0.286	.9610334	1.144264
	EncourageOthers	2.714404	1.012752	2.68	0.007	1.306438	5.639755
	RealizeImportanceInstitutions	.821771	.2471648	0.65	0.514	.4557578	1.481725
	_cons	4.318605	8.243415	0.77	0.443	.1024608	182.0242

Note: _cons estimates baseline relative risk for each outcome.							

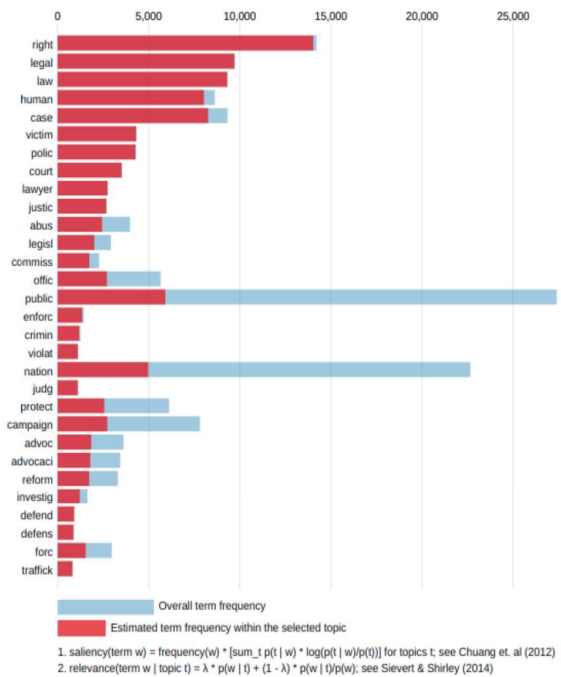
Appendix 1: Topic Modelling - LDAvis Output ($\lambda = 0.5$)



Intertopic Distance Map (via multidimensional scaling)



Top-30 Most Relevant Terms for Topic 3 (5.5% of tokens)



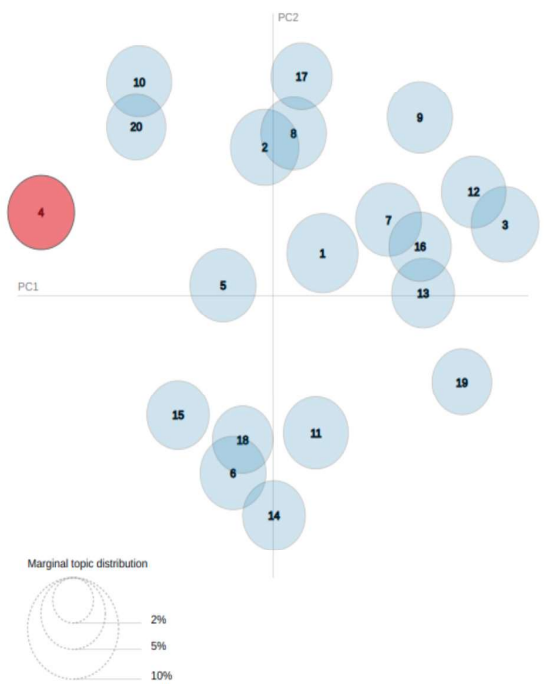
Selected Topic: Previous Topic Next Topic Clear Topic

Slide to adjust relevance metric:⁽²⁾

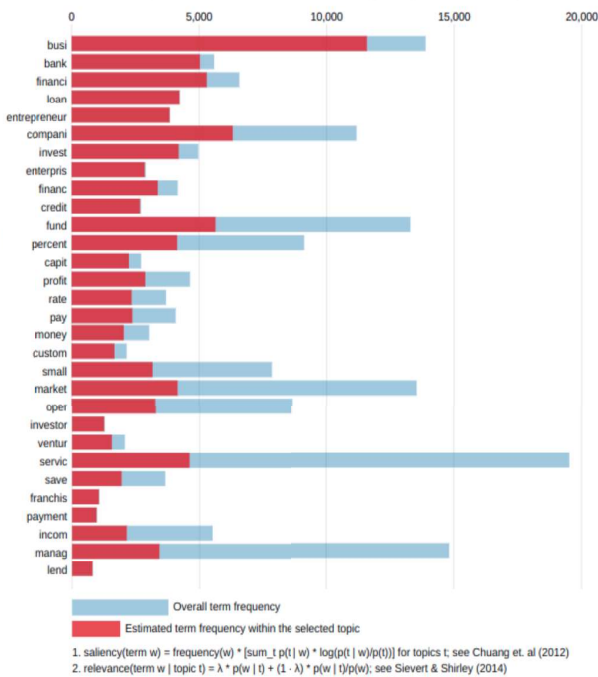
$\lambda = 0.5$



Intertopic Distance Map (via multidimensional scaling)



Top-30 Most Relevant Terms for Topic 4 (5.4% of tokens)



Selected Topic: Previous Topic Next Topic Clear Topic

Slide to adjust relevance metric:⁽²⁾

$\lambda = 0.5$

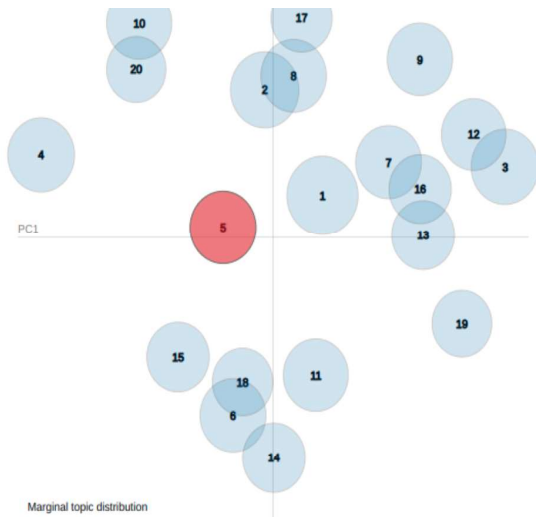


Intertopic Distance Map (via multidimensional scaling)

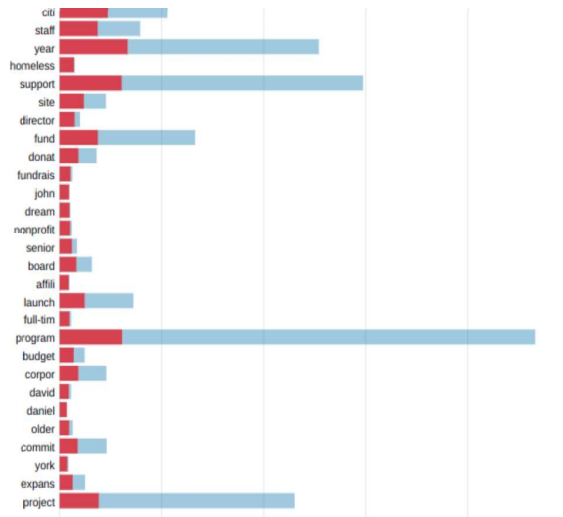


Top-30 Most Relevant Terms for Topic 5 (5.3% of tokens)





Marginal topic distribution



Overall term frequency

Estimated term frequency within the selected topic

1. saliency(term w) = frequency(w) * [sum_t p(t | w) * log(p(t | w)/p(t))] for topics t; see Chuang et. al (2012)
2. relevance(term w | topic t) = $\lambda * p(w | t) + (1 - \lambda) * p(w | t)/p(w)$; see Sievert & Shirley (2014)

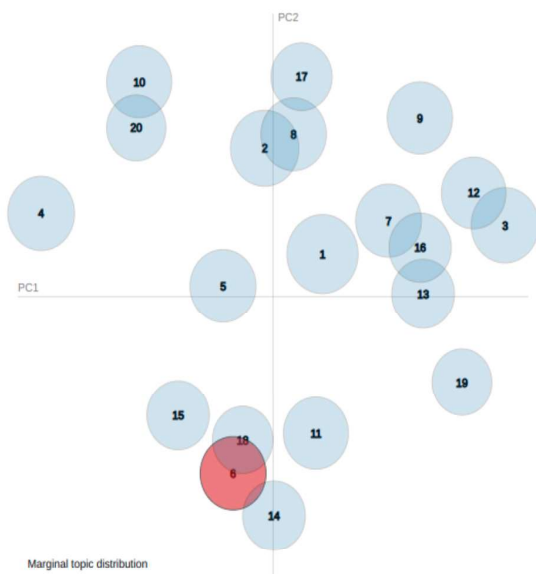
Selected Topic: Previous Topic Next Topic Clear Topic

Slide to adjust relevance metric:⁽²⁾

$\lambda = 0.5$



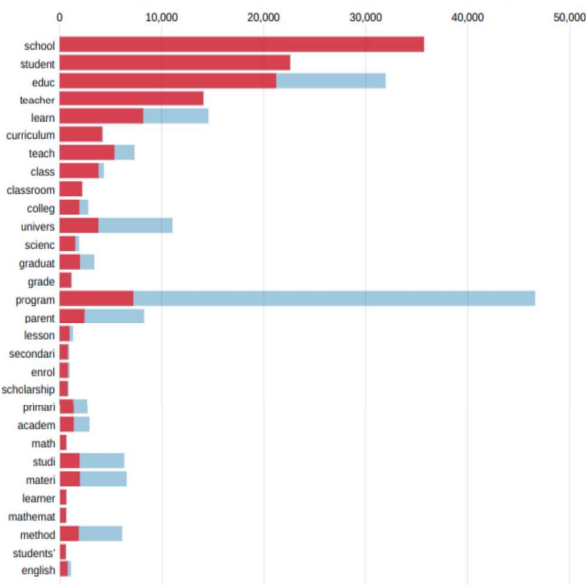
Intertopic Distance Map (via multidimensional scaling)



Marginal topic distribution



Top-30 Most Relevant Terms for Topic 6 (5.2% of tokens)



Overall term frequency

Estimated term frequency within the selected topic

1. saliency(term w) = frequency(w) * [sum_t p(t | w) * log(p(t | w)/p(t))] for topics t; see Chuang et. al (2012)
2. relevance(term w | topic t) = $\lambda * p(w | t) + (1 - \lambda) * p(w | t)/p(w)$; see Sievert & Shirley (2014)

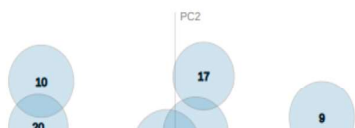
Selected Topic: Previous Topic Next Topic Clear Topic

Slide to adjust relevance metric:⁽²⁾

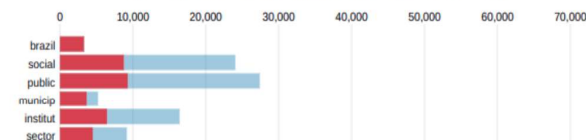
$\lambda = 0.5$

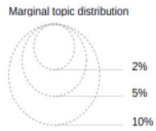
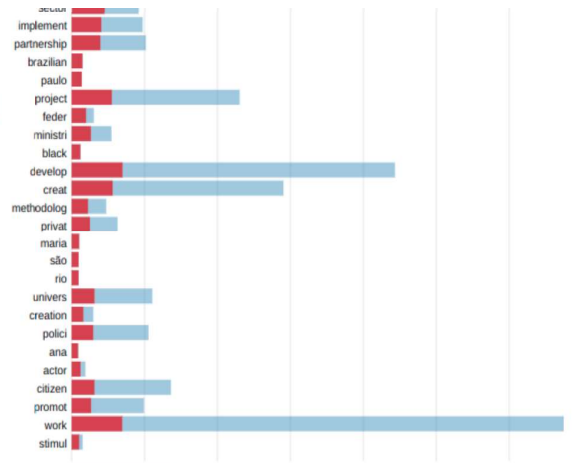
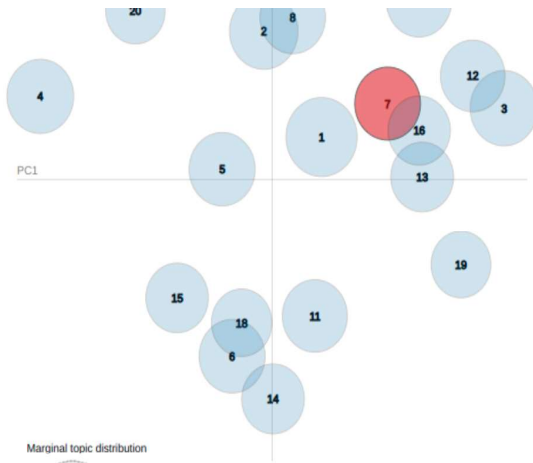


Intertopic Distance Map (via multidimensional scaling)



Top-30 Most Relevant Terms for Topic 7 (5.2% of tokens)



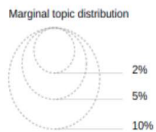
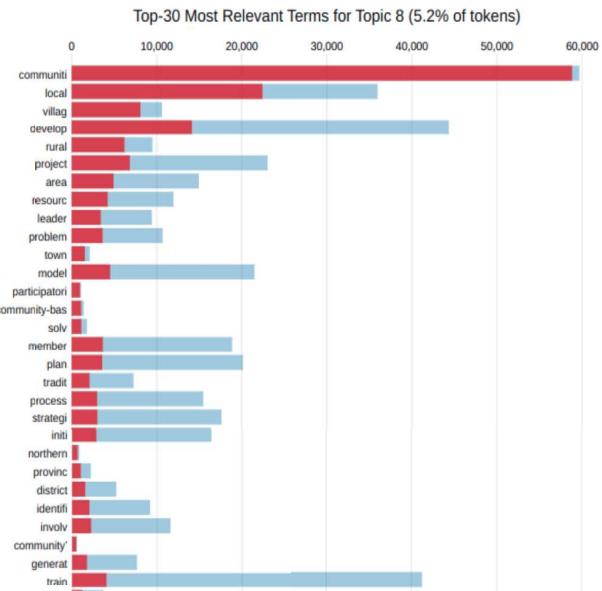
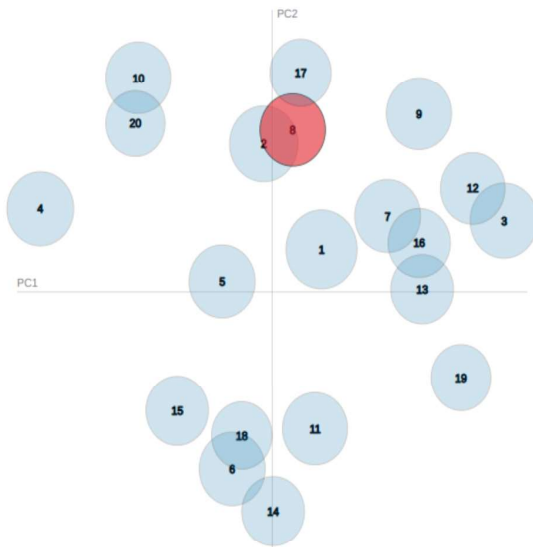


1. saliency(term w) = frequency(w) * [sum_1 p(t | w) * log(p(t | w)/p(t))] for topics t; see Chuang et. al (2012)
 2. relevance(term w | topic t) = λ * p(w | t) + (1 - λ) * p(w | t)/p(w); see Sievert & Shirley (2014)

Selected Topic:

Slide to adjust relevance metric:⁽²⁾ λ = 0.5

Intertopic Distance Map (via multidimensional scaling)

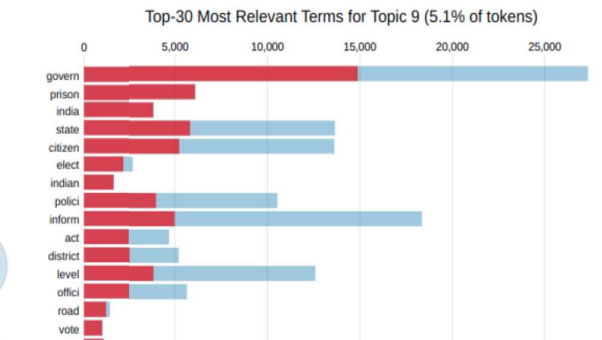


1. saliency(term w) = frequency(w) * [sum_1 p(t | w) * log(p(t | w)/p(t))] for topics t; see Chuang et. al (2012)
 2. relevance(term w | topic t) = λ * p(w | t) + (1 - λ) * p(w | t)/p(w); see Sievert & Shirley (2014)

Selected Topic:

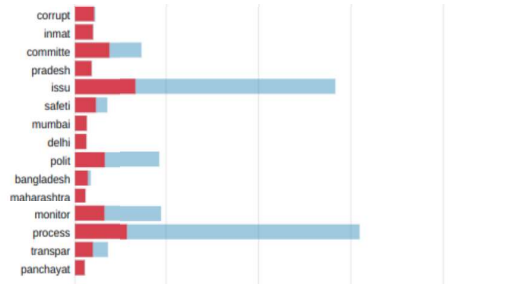
Slide to adjust relevance metric:⁽²⁾ λ = 0.5

Intertopic Distance Map (via multidimensional scaling)



1. saliency(term w) = frequency(w) * [sum_1 p(t | w) * log(p(t | w)/p(t))] for topics t; see Chuang et. al (2012)
 2. relevance(term w | topic t) = λ * p(w | t) + (1 - λ) * p(w | t)/p(w); see Sievert & Shirley (2014)

Marginal topic distribution



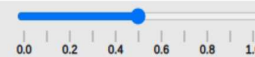
Overall term frequency
Estimated term frequency within the selected topic

1. saliency(term w) = frequency(w) * [sum_t p(t | w) * log(p(t | w)/p(t))]
2. relevance(term w | topic t) = $\lambda * p(w | t) + (1 - \lambda) * p(w | t)/p(w)$

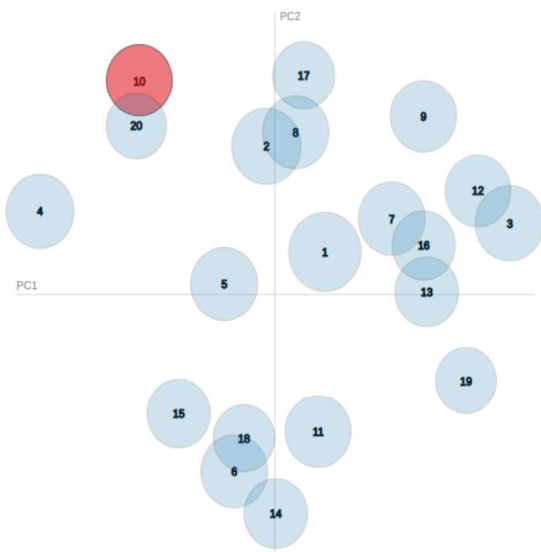
Selected Topic: 10

Slide to adjust relevance metric:⁽²⁾

$\lambda = 0.5$



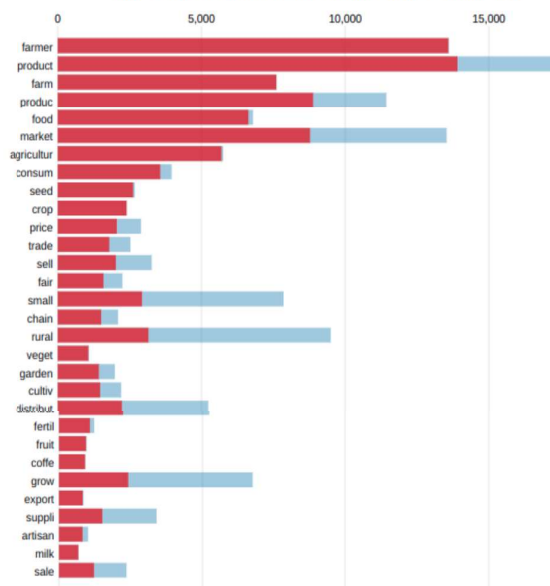
Intertopic Distance Map (via multidimensional scaling)



Marginal topic distribution



Top-30 Most Relevant Terms for Topic 10 (5.1% of tokens)



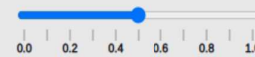
Overall term frequency
Estimated term frequency within the selected topic

1. saliency(term w) = frequency(w) * [sum_t p(t | w) * log(p(t | w)/p(t))]
2. relevance(term w | topic t) = $\lambda * p(w | t) + (1 - \lambda) * p(w | t)/p(w)$

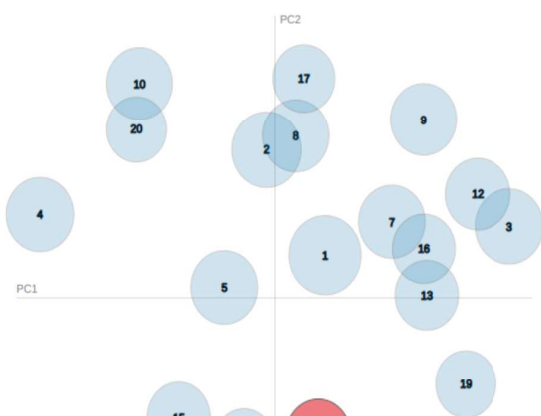
Selected Topic: 11

Slide to adjust relevance metric:⁽²⁾

$\lambda = 0.5$



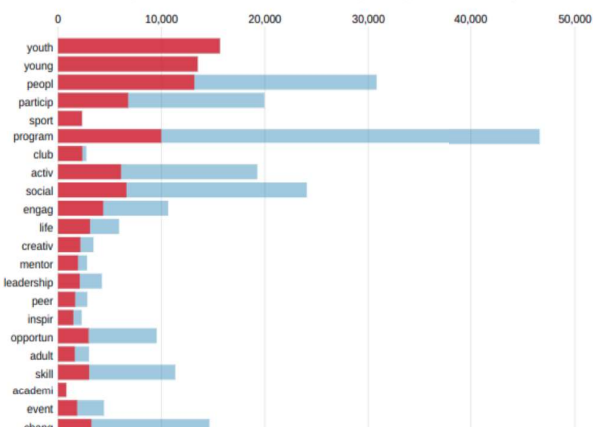
Intertopic Distance Map (via multidimensional scaling)

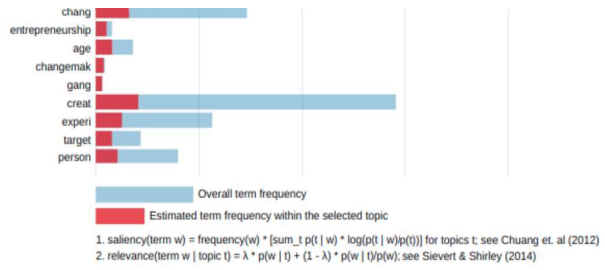


Marginal topic distribution



Top-30 Most Relevant Terms for Topic 11 (5.1% of tokens)





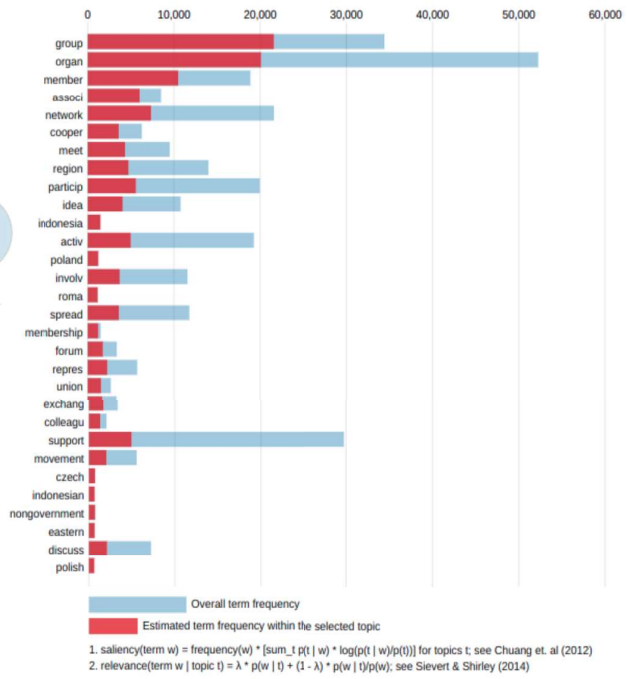
Selected Topic:



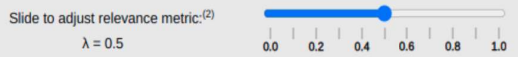
Intertopic Distance Map (via multidimensional scaling)



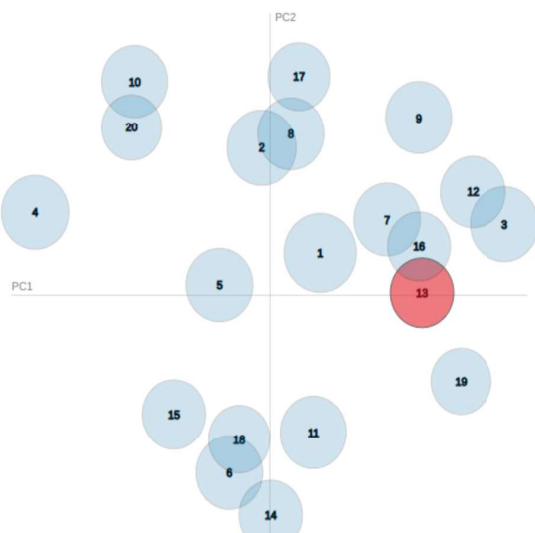
Top-30 Most Relevant Terms for Topic 12 (5% of tokens)



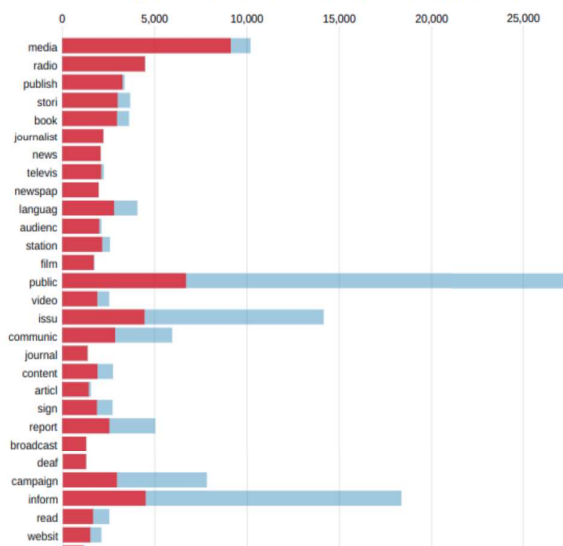
Selected Topic:

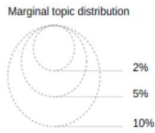


Intertopic Distance Map (via multidimensional scaling)



Top-30 Most Relevant Terms for Topic 13 (4.7% of tokens)



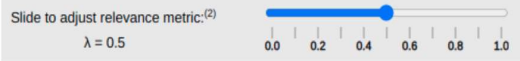


print
advertis

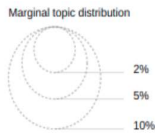
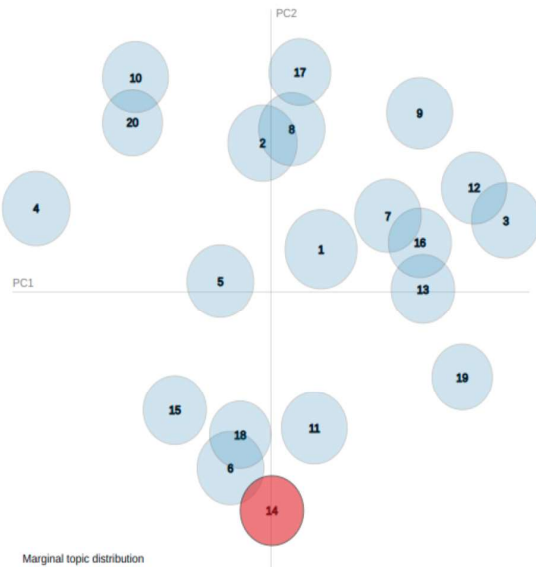
Overall term frequency
Estimated term frequency within the selected topic

1. saliency(term w) = frequency(w) * [sum_t p(t | w) * log(p(t | w)/p(t))] for topics t; see Chuang et. al (2012)
2. relevance(term w | topic t) = $\lambda * p(w | t) + (1 - \lambda) * p(w | t)/p(w)$; see Sievert & Shirley (2014)

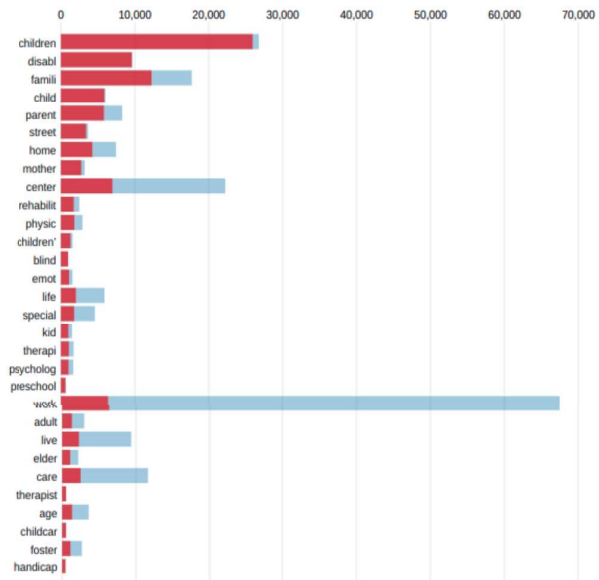
Selected Topic: 14 Previous Topic Next Topic Clear Topic



Intertopic Distance Map (via multidimensional scaling)



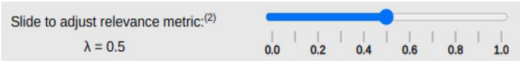
Top-30 Most Relevant Terms for Topic 14 (4.7% of tokens)



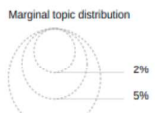
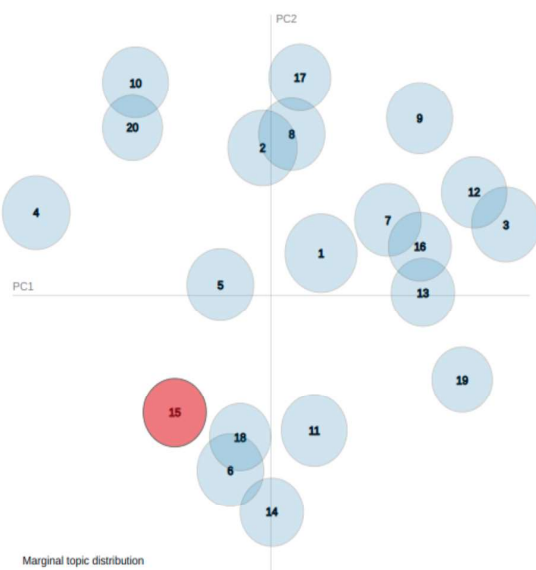
Overall term frequency
Estimated term frequency within the selected topic

1. saliency(term w) = frequency(w) * [sum_t p(t | w) * log(p(t | w)/p(t))] for topics t; see Chuang et. al (2012)
2. relevance(term w | topic t) = $\lambda * p(w | t) + (1 - \lambda) * p(w | t)/p(w)$; see Sievert & Shirley (2014)

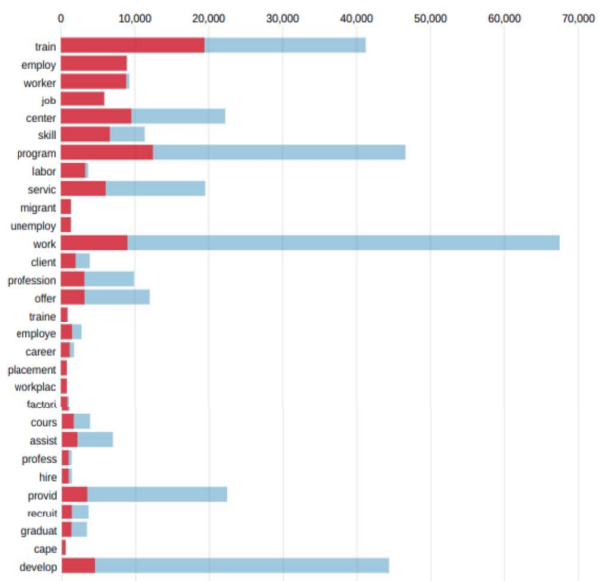
Selected Topic: 15 Previous Topic Next Topic Clear Topic



Intertopic Distance Map (via multidimensional scaling)



Top-30 Most Relevant Terms for Topic 15 (4.7% of tokens)



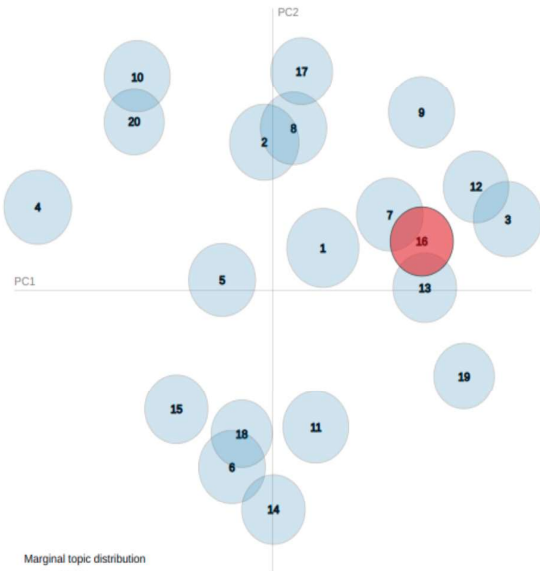
Overall term frequency
Estimated term frequency within the selected topic

1. saliency(term w) = frequency(w) * [sum_t p(t | w) * log(p(t | w)/p(t))] for topics t; see Chuang et. al (2012)
2. relevance(term w | topic t) = $\lambda * p(w | t) + (1 - \lambda) * p(w | t)/p(w)$; see Sievert & Shirley (2014)

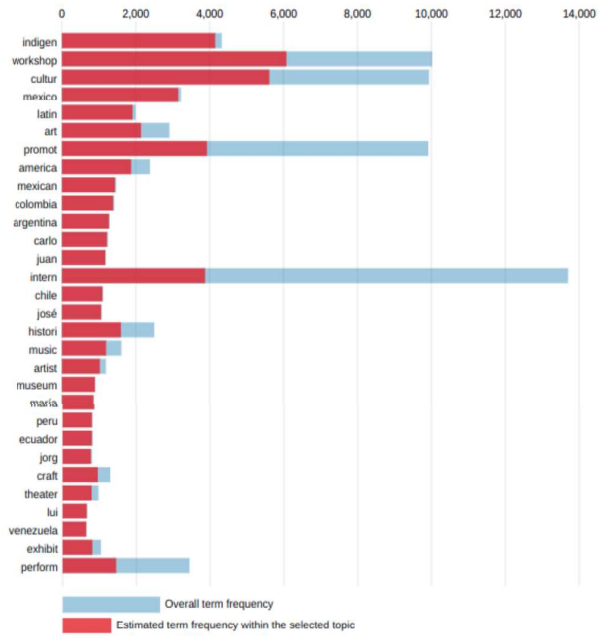
Selected Topic:

Slide to adjust relevance metric:⁽²⁾ $\lambda = 0.5$

Intertopic Distance Map (via multidimensional scaling)



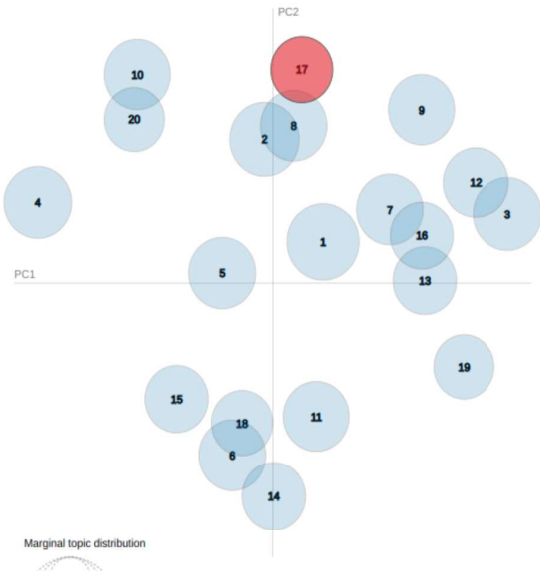
Top-30 Most Relevant Terms for Topic 16 (4.7% of tokens)



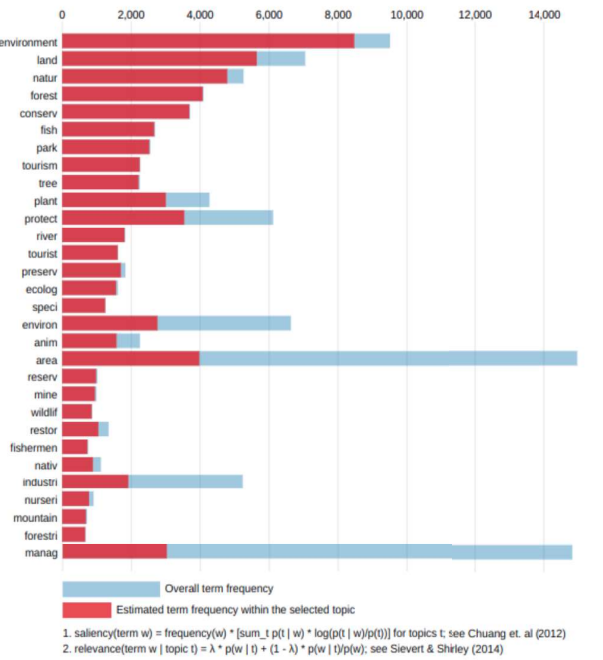
Selected Topic:

Slide to adjust relevance metric:⁽²⁾ $\lambda = 0.5$

Intertopic Distance Map (via multidimensional scaling)



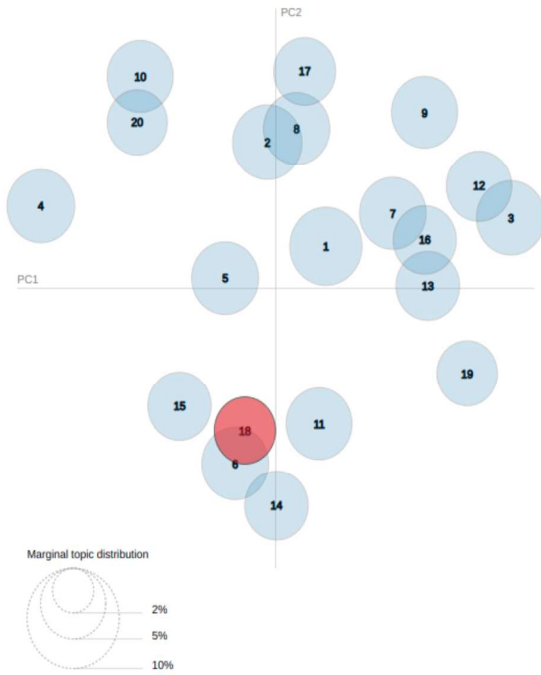
Top-30 Most Relevant Terms for Topic 17 (4.5% of tokens)



Selected Topic:

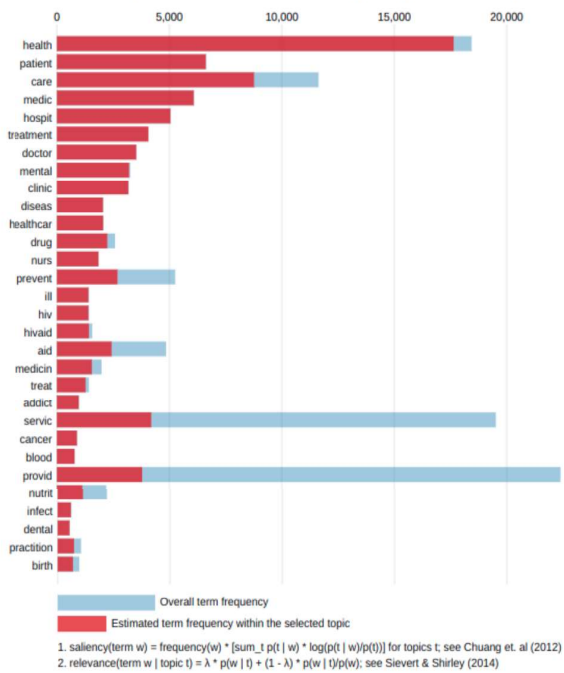
Slide to adjust relevance metric:⁽²⁾ $\lambda = 0.5$

Intertopic Distance Map (via multidimensional scaling)



Selected Topic:

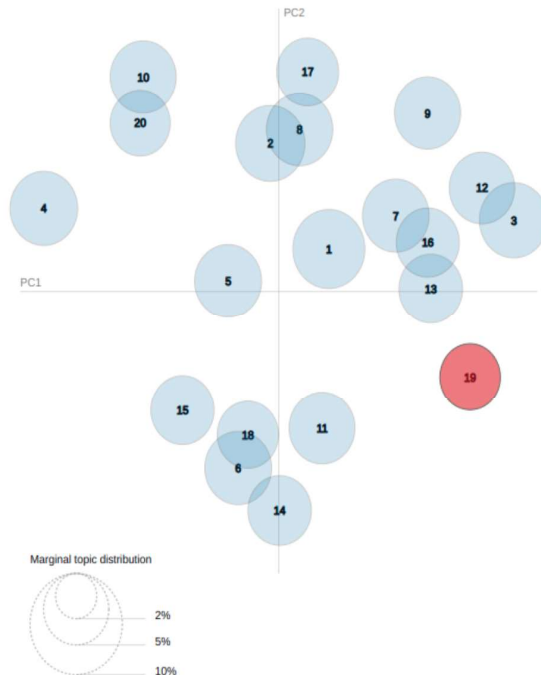
Top-30 Most Relevant Terms for Topic 18 (4.4% of tokens)



1. saliency(term w) = frequency(w) * [sum_t p(t | w) * log(p(t | w)/p(t))] for topics t; see Chuang et. al (2012)
 2. relevance(term w | topic t) = λ * p(w | t) + (1 - λ) * p(w | t)/p(w); see Sievert & Shirley (2014)

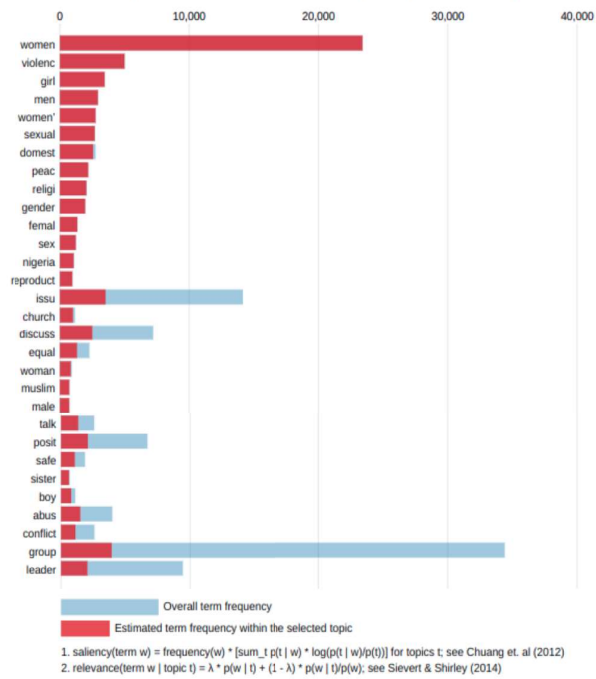
Slide to adjust relevance metric:⁽²⁾ λ = 0.5

Intertopic Distance Map (via multidimensional scaling)



Selected Topic:

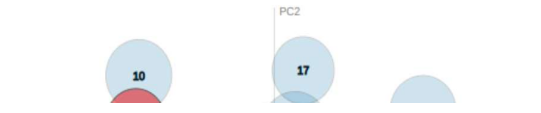
Top-30 Most Relevant Terms for Topic 19 (4.3% of tokens)



1. saliency(term w) = frequency(w) * [sum_t p(t | w) * log(p(t | w)/p(t))] for topics t; see Chuang et. al (2012)
 2. relevance(term w | topic t) = λ * p(w | t) + (1 - λ) * p(w | t)/p(w); see Sievert & Shirley (2014)

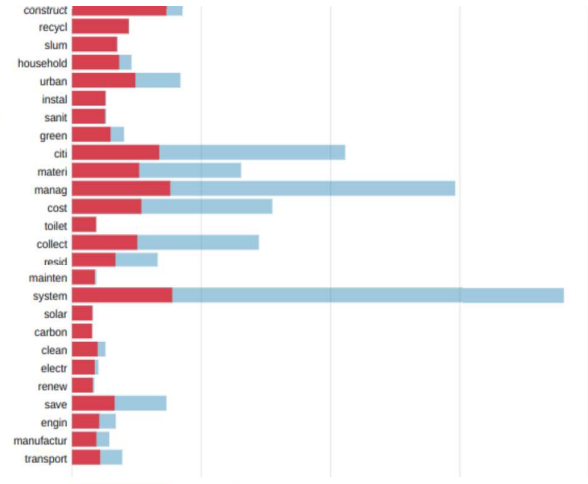
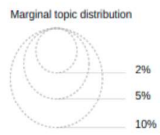
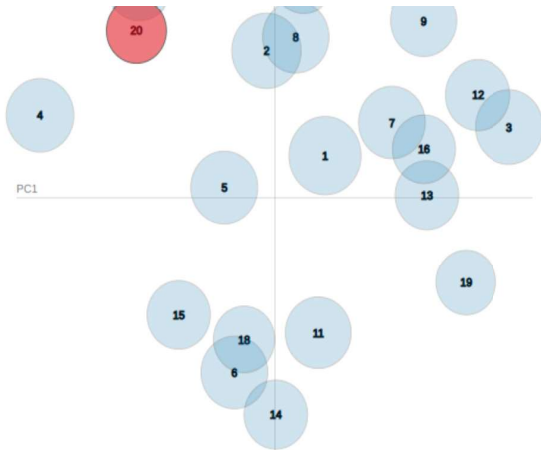
Slide to adjust relevance metric:⁽²⁾ λ = 0.5

Intertopic Distance Map (via multidimensional scaling)



Top-30 Most Relevant Terms for Topic 20 (4.2% of tokens)





Overall term frequency
 Estimated term frequency within the selected topic

1. saliency(term w) = frequency(w) * [sum_t p(t | w) * log(p(t | w)/p(t))] for topics t; see Chuang et. al (2012)
 2. relevance(term w | topic t) = lambda * p(w | t) + (1 - lambda) * p(w | t)/p(w); see Sievert & Shirley (2014)

Appendix 2: Variable Definition

Name	Variable Definition	Source	Type of Variable	Possible Answers
IM	Following provided follow, has your idea been replicated by other groups or institutions? (Select all that apply)	Internal Survey	Categorical	Yes - within my country of residence; Yes - in other countries; No; Not sure
IS - Jobs Status	Are you still pursuing the idea for which you were elected a Fellow?	Internal Survey	Categorical	Yes, I am working on the same idea in a very similar way and scope to when I was elected; Yes, I am working on the same idea, but my strategy has changed significantly; No, I am no longer in the social sector or have retired
EO - Encouraged Others	As a result, have you encouraged other organizations/institutions to replicate your idea?	Internal Survey	Categorical	Yes - I actively encouraged others to replicate my idea; Yes - I open-sourced my idea so others could replicate it; No
ID - Realized Importance of Institutions	Has Atlanta helped you see the importance of other organizations/institutions independently replicating your idea?	Internal Survey	Categorical	Yes - To some extent; No
ED - Gender of the Population	Gender of the population that your idea is intended to help	Internal Survey	Categorical	Male; Female
ED - Education	What level of education do you have achieved?	Internal Survey	Categorical	No formal schooling; Less than a high school diploma; High school diploma; Higher education (college or university degree)
PE - People helped	How many people have directly received your service/program in the last year?	Internal Survey	Continuous	
EE - Employees	How many people are employed at your organization directly, including you (not volunteers)?	Internal Survey	Continuous	
CO - Countries	How many countries are you active in (including your own)?	Internal Survey	Continuous	