

# Manager Mobility and Private Equity Syndications from the Perspective of Coupling Networks: Evidence from China's Private Equity Industry

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**Abstract:** This study explores whether manager mobility can influence syndications between private equity (PE) firms by constructing coupling network models. Using data from China's private equity market from 1993 to 2017, we found that driving forces, resistant forces, and network structure play significant roles in determining resource flows between PE firms. Specifically, driving forces indicate that managers moving from domestic and foreign PE firms to state-owned PE firms are more likely to induce syndications. Furthermore, if the manager is promoted when changing jobs, mobility is likely to enhance the flow of resources. Resistant forces indicate that increased geographical distance reduces syndications. As for the influence of structure, if managers leave PE firms with higher status, they are more likely to induce syndications. This study contributes to the coupling network literature by providing a clarified three-factor framework. By exploring the characteristic of managers in state-owned private equity firms, we specified the syndication theory in China. This study can help private equity firms hire valuable managers and expand syndication networks in practice.

**Key words:** manager mobility; syndication; coupling networks; driving force; resistance force; network structure

## 1 Introduction

Private equity (PE) firms raise money from limited partners and invest the funds in promising startups<sup>[1, 2]</sup>. When PE firms search for innovative companies, they have to deal with high levels of uncertainty. One of the important mechanisms enabling PE firms to find innovative companies under uncertain conditions is the establishment of syndication networks<sup>[3, 4]</sup>. A

syndication means that several PE firms invest in the same enterprise in the same round. Syndications can help PE firms share risks while exchanging information and complementary resources<sup>[5]</sup>. A valuable syndication partner can provide increased market opportunities and greater prestige for PE firms, offer value-added services to the companies in which they invest, and improve the financial returns<sup>[6]</sup>. Because of the far-reaching influence of syndication networks, many PE firms consciously construct cooperative networks.

Previous studies have also analyzed the impact of various characteristics of managers on the formation of syndication networks<sup>[7]</sup>. The main characteristics of managers that influence syndications include the knowledge and abilities that they have accumulated through their education and the professional experience that they have accumulated through their work. Experienced and talented managers can identify

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suitable co-investment opportunities using their professional judgment. Managers' social capital can also facilitate co-investments<sup>[8]</sup>. Managers who have access to entrepreneurs and analysts are more likely to identify potential syndication partners. In addition, managers' prior entrepreneurial experiences can affect the formation of syndication networks<sup>[9]</sup>. Many successful managers are former entrepreneurs with considerable experience and can use their social networks to identify co-investment opportunities. Finally, the manager's investment strategy is an important factor in the formation of syndication networks. Junior managers entering the PE market collaborate with managers with a high degree centrality in an effort to invest in high-quality projects<sup>[10]</sup>.

Previous studies have not focused on the impact of manager mobility on the formation of syndication networks. Hiring managers who can bring valuable resources and information to an organization has a significant impact on the performance of PE co-investments. PE firms often choose to recruit managers who have working experience in other PE firms in an effort to learn from the experiences of other institutions and gain access to more co-investment opportunities<sup>[11]</sup>. However, previous studies have failed to identify the types of manager mobility that are more likely to enhance co-investment opportunities. Thus, this study focuses on whether manager mobility leads to PE syndications using the coupling network models.

The structure of this study is as follows. Firstly, we review the factors affecting PE firm syndications, including the node attributes, the attributes of ties, third parties, and the whole network structures. Then we focus on the impact of manager mobility on syndication and construct a coupling network framework by analogizing with the percolation models in environmental science. This framework contains three important factors, driving forces, resistant forces, and network structures. We put forward the hypotheses of this study in the theory part. In the method part, we use the data from China's PE market from 1993 to 2017 to analyze the impact of manager mobility on syndication through logit models and linear models. Finally, we analyze the results of the empirical study and point out the implications and weaknesses of the study.

This study is innovative in the following perspectives.

(1) This study innovatively constructs the theoretical framework by analogizing with the percolation models in environmental science. We found the driving forces, resistance forces, and network structures can affect syndications. (2) This paper expands the theory of resource flows in the coupling network. The study of the basic forces that cause the interaction of two-layer network resource flow is at the frontier of social network research. (3) This paper innovatively studies the impact of manager mobility in the Chinese context, identifies the role of managers in state-owned PE firms, and deepens the understanding of China's private equity market.

The theoretical contributions of this paper are as follows. This study extends the coupling network theory by putting forward the three-factor framework. This study also shows that the flow of the manager is the antecedent of PE syndication and deepens the syndication theory. This study proposes that the managers moving from private-owned PE firms to state-owned private equity firms will affect the syndication networks and puts forward antecedents of PE syndication in the Chinese context.

The practical implications of this paper can help PE firms and managers. We provide references for PE firms to hire appropriate managers from the market to expand the syndication networks. In addition to considering the human capital factors of managers, the social capital owned by managers can also help PE firms expand cooperation. This study also provides references for investment managers to make career choices.

## 2 Theory

### 2.1 Antecedents of syndications

Previous literature has researched the different mechanisms of the formation of syndication networks. Firstly, researchers analyzed the importance of node attributes for the formation of syndication. Wu et al.<sup>[8]</sup> explained the knowledge and capabilities that managers have accumulated through their education and professional experience could help build up cooperation. Experienced managers can identify feasible co-investment opportunities using their professional judgment. Hallen<sup>[12]</sup> pointed out that a new organization can build social networks through the

social capital and human capital of the founders at the beginning stage of its life cycle, but after a period of time, the organization prefers to build social networks through organizational achievements.

Secondly, researchers found that the dyad level attributes could affect the formation of syndication networks. Sorenson and Stuart<sup>[13]</sup> found it easy to form a long-distance relationship in the following situations: the scale of the syndication is large, and the network density between other members of the syndication is small. Zheng et al.<sup>[14]</sup> showed that there were two goals for syndication partner selection at the same time: selecting homogeneous partners to improve trust and security or selecting heterogeneous partners to improve efficiency and profits. The two objectives are opposite. The article found two boundary conditions to help PE firms choose syndication partners. One is the uncertainty of the institutional environment, and the other is whether PE firms tend to invest in many innovative companies.

Thirdly, third-party organizations (triad level) can influence the formation of networks. Zhang and Guler<sup>[10]</sup> studied how newcomers enter syndications through network embeddedness. Based on the data on American venture capital from 1985 to 2008, this paper found that the depth and breadth of embeddedness could affect the possibility of newcomers entering the syndications. Polidoro et al.<sup>[15]</sup> found that structural embeddedness affects the formation of ties. Having common neighbors can prevent the opportunism of actors. Common neighbors can supervise actors and punish their bad performance. The cumulative advantage effect can also affect the formation of syndications. The cumulative advantage effect means that more connected actors will attract more actors<sup>[16]</sup>. With the increase of newcomers, the centrality of the actor with a high degree centrality increases more rapidly than the centrality of the actor with a low degree centrality.

Lastly, some researchers explored the impact of the overall nature of the networks. Hochberg et al.<sup>[6]</sup> proposed that for new entrants, markets with higher network density have fewer opportunities to enter. By studying PEs from six industries in 129 countries, this study explored the impact of network density on the number of new entrants through linear regression models. Powell et al.<sup>[17]</sup> found that PEs in

biotechnology industries chased popular investment trends when making investment decisions.

This study explores the impact of investor mobility on the investment network at the dyad level. In the existing literature, when researchers studied the influence of investors, they often studied the influence of the attributes of the managers. This study hopes to focus on whether the movement of investors can bring the flow of resources between organizations at the dyad level. Many newly established PE firms rely on competent managers to expand their investment network. Mature PE firms also need to employ investors familiar with specific industries and regions to enhance the competitiveness of the PE firm in specific market segments. In this study, when studying the influence of manager mobility, we control the PE firm-level factors mentioned above to exclude firm-level possible explanations.

## 2.2 Coupling networks and syndications

When we study how the manager mobility network can influence the syndication network, we use the coupling network models. Coupling networks are composed of two networks, and the meanings of the nodes and edges of these two networks can differ, but there should be a logical relationship between the two networks<sup>[18]</sup>. Examining the interactions between the networks is important<sup>[19, 20]</sup>. By exploring the mechanisms underlying coupling network resource flows, this study enriches the coupling network theory<sup>[21]</sup>.

The coupling networks in this paper are shown in Fig. 1. The nodes in the upper and lower networks are PE firms, but the connections in the upper and lower networks have different meanings. The connection in the upper layer of the network means that a manager has moved from one PE to another. The connection in the lower network means that two private equities have co-invested in the same enterprise. The research question is under what circumstances the establishment of the connection in the upper network is more likely to lead

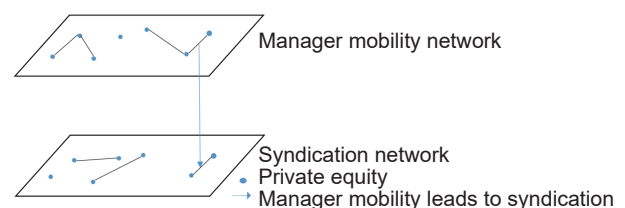


Fig. 1 Coupling networks of private equity firms.

to the establishment of the connection in the lower network, that is to say, under what circumstances the change of manager's job is more likely to bring syndications to two private equities.

When analyzing the influence of one network on another network, we refer to the percolation model in environmental science<sup>[22]</sup>. Percolation is defined as the flow of fluids through a porous medium, which refers to materials composed of connected pores and frameworks. The time required for fluid to flow from one surface to another is negatively correlated with the water head pressure, positively correlated with the distance between the two surfaces, and negatively correlated with the porosity of the medium. Water head pressure refers to the pressure at which a fluid enters a porous medium divided by the cross-sectional area. As the water head pressure increases, the fluid flow becomes more powerful. As the distance between the two surfaces increases, the fluid takes longer to flow from one surface to the other. Porosity refers to the average area occupied by pores in the cross-sectional area and reflects the internal structure of a porous medium. For example, the time taken by rainwater to flow from the surface of the soil to a specific underground surface is determined by the intensity of the rainfall, the distance between the two surfaces, and the porosity of the soil.

The resource flow in the coupling networks has been studied by many scholars. For instance, the movement of engineers in the microprocessor industry leads to knowledge transfer and patent cooperation between companies<sup>[23]</sup>. However, there is no theoretical framework for explaining the primary factors that influence resource flows in the coupling networks. If we analogize this percolation model from environmental science to the two-layer coupling networks in the field of social computing, we are able to get a complete framework that can include the most important ways of interactions between coupling networks. In this study, we hypothesize that the likelihood of PE co-investment as a result of managers moving from one PE firm to another is influenced by driving forces, resistant forces, and structural factors.

Driving forces mean that connections with specific characteristics can drive the flow of resources and information. This study examines two driving forces. The first is caused by the differences among nodes in

terms of resources and information. The second is caused by the different incentive levels. Resistance forces mean that connections with specific characteristics can hinder the flow of resources. Network structure means that specific network structure around the nodes can assist the flow of resources and information. The following parts explain the hypotheses.

### 2.3 Driving forces

This study examines the influence of two driving forces. The first is caused by the differences among various types of PE firms in terms of information and resources<sup>[24]</sup>. There are various types of PE firms in China's PE market. The controlling shareholders of state-owned PE firms (SPEs) are either the Chinese government or state-owned enterprises, the controlling shareholders of foreign PE firms (FPEs) are foreign institutions, and the controlling shareholders of domestic private-owned PE firms (DPEs) are privately owned Chinese institutions<sup>[11]</sup>.

Compared with other private equities, the information and resource disadvantages of state-owned private equity firms (SPEs) are mainly reflected in the following two aspects. Firstly, the information and resources of SPEs are mainly concentrated in traditional industries, while their information and resources in emerging industries are relatively scarce<sup>[14]</sup>. Those emerging industries, such as information and communications technology, life sciences, and medical health, are the sectors to which private-owned PE firms pay the most attention because they generally offer faster growth and higher expected returns. Thus, state-owned enterprises in these industries need managers from private-owned PE firms to enrich their information and resources. Secondly, the information and resources of SPEs are generally concentrated in more mature enterprises, and they are less involved in early-stage enterprises<sup>[25]</sup>. Early-stage enterprises face greater environmental uncertainty, more important decisions, and relatively immature markets compared with mature enterprises. Thus, the investment team must be able to evaluate the competitive advantages of startups. The valuation models used for established firms and startups also differ. Revenue and the number of users are important indicators of the performance of startups. If SPEs want to become involved in

enterprises in the growth stage, they need to rely on the social networks of managers who have joined them from other types of PE firms.

Private-owned PE firms can be divided into two types: domestic and foreign. Managers who move from either of these two types of private-owned PE firms bring some similar information and resources to SPEs, but there are also differences in what they bring. Managers from both DPEs and FPEs know more about non-state-owned economic entities and have more contacts with enterprises in the startup stage and in high-tech industries, providing valuable supplementary information and resources for SPEs<sup>[26]</sup>. However, if managers from FPEs want to bring resources directly to SPEs, differences in institutional logic between SPEs and FPEs will bring difficulties to the flow of resources<sup>[27]</sup>. If enterprises in which DPEs have invested are the subject of investment by SPEs in the next round, they are more easily accepted by SPEs because of the relatively small differences in institutional logic. However, if enterprises in which FPEs have invested are the subject of investment by SPEs in the next round, the SPEs will need to do more work on due diligence and might even require the enterprises in which they are planning to invest to rearrange various aspects of their operations. Differences in institutional logic include such things as organizational structure, non-market strategies, and where to go public<sup>[28]</sup>. For example, when PE firms exit their investment in an enterprise, FPEs want the enterprise to be listed in foreign capital markets, SPEs want the enterprise to be listed in China's capital market, while DPEs are flexible regarding their listing preferences. That is, the barriers to resource flows between DPEs and SPEs are lower than those between FPEs and SPEs, and thus managers from DPEs are more likely to enable SPEs to achieve syndication. Thus, the following hypothesis is proposed:

**Hypothesis 1a:** When managers move from domestic private-owned PE firms to state-owned PE firms, manager mobility is more likely to lead to syndication between the PE firms, compared with manager mobility from foreign private-owned PE firms to state-owned PE firms.

The resources that FPE managers bring to SPEs include investment experience, professional knowledge of high-tech industries, and decision-making skills.

However, there are differences between SPEs and FPEs in terms of their operation. Although cooperation is difficult, managers from FPEs can bring different knowledge and information to SPEs. If SPEs want to invest in more startups and high-tech enterprises, the experience and knowledge of managers from FPEs will be valuable. Furthermore, FPEs have more experience than SPEs in investing in high-tech enterprises in other markets<sup>[29]</sup>, which can assist SPEs. Thus, although there are differences between FPEs and SPEs, improvements in multilevel capital markets mean that enterprises now have more options in terms of listing in domestic and foreign markets. In addition, even if there are differences in terms of institutional logic, SPEs can become financial investors and join the syndication. Thus, the following hypothesis is proposed:

**Hypothesis 1b:** When managers move from foreign PE firms to state-owned PE firms, manager mobility is more likely to lead to syndication between the PE firms, compared with manager mobility from foreign PE firms to domestic private-owned PE firms.

The second driving factor is the promotion of the manager. In addition to differences in information and resources at the institutional level, motivation at the individual level influences the connections between the two coupling networks<sup>[30]</sup>. Managers leave one PE firm to join another PE firm for two main reasons. The first is the personal consideration, with managers simply wanting to work in a different environment, while the second is a promotion in the PE firm that the manager joins, offering either better remuneration or a better working environment. Somaya et al.<sup>[31]</sup> found when managers moved to cooperative organizations and got promoted, they were more likely to positively influence the performance of organizations. Dokko and Rosenkop<sup>[32]</sup> found that when managers have higher social capital when they get promoted, they are more likely to increase the social capital of the firms they joined.

When a manager is promoted, he or she is more motivated to perform better in the PE firm that he or she has joined in an effort to establish a good reputation among his or her new colleagues<sup>[33]</sup>. The manager is also more likely to promise to achieve higher goals in the PE firm that he or she has joined<sup>[34]</sup>. Sorenson and Rogan<sup>[35]</sup> found that when there are emotional attachments and when managers feel greater

indebtedness to the organization, the managers are more likely to change personal social capital to organizational social capital. Rogan and Mors<sup>[36]</sup> found that when moving managers were promoted, they were more likely to explore new cooperation opportunities than exploit ties that already existed. Therefore, promoted managers are more likely to persuade enterprises in which their former PE firm invested to accept investment from the PE firm that he or she has joined. Thus, the following hypothesis is proposed:

**Hypothesis 1c:** When managers are promoted when joining a new PE firm, manager mobility is more likely to lead to syndication between the PE firms.

#### 2.4 Resistant forces

In contrast to these driving forces, there are some factors that hinder the flow of resources and information. Distance is one of the most common resistant forces because it usually involves the segmentation of markets and increased communication and supervision costs<sup>[37]</sup>. This study analyzes how geographical and industry distance hinder the flow of information and resources when managers move between PE firms.

Firstly, geographical distance hinders the flow of resources brought by managers who move from one PE firm to another. Because of the information asymmetry, cross-regional investment involves a relatively high level of risk. Prior to investing, there are adverse selection risks. Local PE firms tend to invest in high-quality enterprises in close proximity about which they have sufficient knowledge, whereas distant PE firms find it more difficult to confirm the quality of enterprises in which they are considering an investment. Post-investment management also involves moral hazards. The interests of the distant PE firms might be harmed during the decision-making process by the enterprises in which they invest<sup>[38]</sup>. In addition, the lack of third-party supervision as a result of the distance increases the risk of moral hazard. If the PE firms and the enterprise in which they invest are in the same city or province, they are more likely to have contacts in common who can play supervisory roles, thereby reducing the likelihood of moral hazards, and if moral hazards still occur, these third-party contacts will punish the group that has violated the moral standards<sup>[10, 39]</sup>. When the distance between the PE firms and the enterprise in which they invest is excessive, they have

fewer contacts in common, and thus it is difficult to obtain effective third-party supervision. Considering the information asymmetry and third-party supervision mechanism mentioned above, when a manager has left one PE firm in a distant place and moves to another PE firm, the distance between the invested companies and the PE firm that the manager has joined is relatively far. The PE firm that the manager has joined needs to consider the difficulties of investing in distant enterprises<sup>[40]</sup>. Thus, the following hypothesis is proposed:

**Hypothesis 2a:** When the geographical distance between the two PE firms involved in the manager's movement is relatively short, manager mobility is more likely to lead to syndication between the PE firms.

In addition to geographical distance, industry distance affects the information and resources that are brought to the new PE firms by managers who move. While geographical distance can result in market segmentation, industry distance involves barriers in terms of tacit knowledge and industry-specific resources<sup>[41]</sup>. If both PE firms are focused on the same industry, for example, the bio-pharmaceutical industry, the two PE firms are more likely to have the same tacit knowledge and understanding regarding the future development of bio-pharmaceutical firms. However, if the manager moves from a PE firm focusing on the bio-pharmaceutical industry to a PE firm focusing on the clean energy industry, it is difficult for the PE firm that the manager has joined to assess the value of enterprises in the bio-pharmaceutical industry, and thus it is difficult to co-invest with the PE firm that the manager has left<sup>[42]</sup>. The tacit industry knowledge barrier will make it difficult for the new employer to supervise the invested enterprise in the follow-up round of investment. Thus, the following hypothesis is proposed:

**Hypothesis 2b:** When the portfolios of the two PE firms involved in the manager's movement are relatively similar in terms of industry focus, manager mobility is more likely to lead to syndication between the PE firms.

#### 2.5 Network structure

The driving forces and resistant forces are direct characteristics of the connections, while the network

structure in which the connections are located also affects the coupling networks. The status of the PE firms that managers leave and join can influence syndication formation.

Firstly, the status of the PE firm that the manager has left affects the resources and information that the manager can access<sup>[43]</sup>. PE firms obtain information and resources through syndication networks, which enable managers to develop cooperative relationships with other managers, form social connections, identify worthwhile projects, and obtain opportunities to invest in high-quality enterprises<sup>[44]</sup>.

Secondly, if the PE firm that the manager has left has high status, the PE firm did not mind that the manager took some related resources because the PE firm in the center of the network has a higher ability to mobilize resources, handle the changes, and make up for possible losses by establishing new connections<sup>[45]</sup>. If the PE firm that the manager has left has less cooperation with other PE firms, the loss of the high-quality project may have a severe impact. The departing manager is unlikely to take away lots of resources. Thus, the following hypothesis is proposed:

**Hypothesis 3a:** The status of the PE firm that a manager has left is positively correlated with the likelihood of syndication between that PE firm and the manager's new PE firm.

The status of the PE firm that a manager has joined also affects whether the resources that the manager brings to the PE firm can be used effectively. Firstly, if the manager has joined a PE firm with high status, the PE firm has more partners and thus can make a more detailed assessment of the new information brought by the manager through various channels in an effort to accurately evaluate the worth of projects recommended by the new manager<sup>[46]</sup>. Even if the project recommended by the new manager differs from other investments in terms of industry or development stage, the PE firm that the manager has joined can make an accurate assessment using information obtained from its network. A PE firm with high status can also mobilize resources from its syndication network to assist the development of the new enterprise in which it has invested. If the status of the PE firm that the manager has joined is low, it might not be able to accurately evaluate the worth of potential investments recommended by the new manager as a result of

lacking information and resources. Moreover, if the PE firm has high status, it is more likely to have a diverse investment portfolio across different industries and regions and different stages of development<sup>[47]</sup>, and thus has more experience in managing different types of projects. Therefore, the following hypothesis is proposed:

**Hypothesis 3b:** The status of the PE firm that a manager has joined is positively correlated with the likelihood of syndication between that PE firm and the PE firm that the manager has left.

### 3 Method

#### 3.1 Sample

The sample used in this study was mainly obtained from the Zero2IPO database, which is the first and largest database focusing on Chinese PE firms and startups. The data contained in the Zero2IPO database are obtained from surveys and online sources, and the quality is evaluated and tested by Zero2IPO's professional team<sup>[11, 25, 48]</sup>. To improve the accuracy of the investor-related data, we also used the big data method to download the curricula vitae (CV) of investors from the website of the Asset Management Association of China. Every investor with the private equity qualification certificate is required to disclose their entire career experiences. We wrote web crawlers using Python to download the public data and used rough match technics to match this dataset with the Zero2IPO database.

The database we got includes five basic data tables: PE firms, investee enterprises, investment events, managers, and managers' positions. The fields in the PE firms table include the name of the PE firm, date of establishment, headquarters, capital type (domestic, foreign, or state-owned), and type of PE firm. The fields in the investee enterprises table include the name of the enterprise, date of establishment, stage of development, headquarters, industry classification, and whether the enterprise is listed. The fields in the investment events table include the name of the PE firm, investee enterprise, date of investment, the round of investment, amount of investment, investment valuation, and the name of the manager responsible for the investment. The fields in the manager table include the manager's name, gender, date of birth, working

experience, and government working experience. The fields in the managers' positions table include the name of the manager, the company where the manager works, and the position he or she held.

In addition to the five basic tables, a syndication network is constructed. We used the package "igraph" in the R programming language to get the syndication networks from 50 393 investments. A syndication occurs when several PE firms invest in the same enterprise in the same round, thereby sharing the associated risks and benefits<sup>[49]</sup>. The fields in this table include the names of the PE firms participating in the investment, the investee enterprise, and the date of investment. Investment records that included unknown PE names were excluded.

The time frame for this study was from 1993 to 2017. Networks are aggregated every five years because that is the average duration of PE funding<sup>[48]</sup>. The five-year aggregation can stabilize the syndication network, and this is standard practice in PE research<sup>[25]</sup>. If any key fields in the tables were empty, the records were excluded. This study focused on the syndication behavior of PE firms, and thus it was necessary to consider whether the risks and benefits of syndication were comparable when investing in enterprises at different stages of development. Angel investors were excluded because early investments carry extremely high risks. Investments in mature enterprises were also excluded because most mature enterprises seek investment for IPO or diversification, which are quite different from the reasons why enterprises in the startup stage and growth stage seek investment.

A total of 10 631 PE firms were identified, including 2441 SPEs, 1157 FPEs, and 7033 DPEs. There were 50 393 investments, 31 516 syndications, and 4645 PE firms participating in syndications, while 12 115 managers and 23 902 managers' employment records were identified. PE firms with manager mobility were selected for analyses. If a manager moved from one PE firm to another PE firm, those two PE firms were included in the analyses. A total of 783 managers moved from one PE firm to another. The database included members of the senior management team and the investment committee but excluded junior analysts who have limited influence on PE firm's decision-making<sup>[8]</sup>.

The R3.6.1 and STATA16.0 packages were used for

data analyses and calculations, while the igraph package<sup>[50]</sup> and the ERGM package<sup>[51]</sup> in R were used for network calculations.

### 3.2 Measurement

The dependent variable is whether the manager brings an investee enterprise from the PE firm that he or she has left to the PE firm that he or she has joined. If the manager invested in company X in PE firm A and moved to PE firm B, and following the move, PE firm B and PE firm A co-invested in company X in the next round, the dependent variable was assigned a value of 1. If, after the manager moved to PE firm B, there was no co-investment between PE firm A and PE firm B in company X, the dependent variable was assigned a value of 0. When we use this measurement, some resources brought by the manager mobility can be ignored because only one manager is recorded for one investment, while the rest of the team is ignored. Therefore, in the robustness test, the dependent variable is the number of syndications between the PE firm that the manager has left and the PE firm that the manager has joined in the next round. If the number of syndications increases, this suggests that manager mobility has brought additional resources to the manager's new PE firm. In another robustness check, all of the newly established PE firms were analyzed. Newly established PE firms depend on the social capital of the team members and better reflect the resources brought by the managers regardless of the history of the PE firms. In the robustness test, the dependent variable was the status of newly established PE firms five years after their establishment. The eigenvector centrality of the syndication network was used to measure status.

The independent variables include driving forces, resistant forces, and network structure. The first driving force is the mobility of managers among different types of PE firms. The definition of a manager's movement from a DPE to an SPE is that during the observation period, the manager left the DPE to work for the SPE. The reference group is a manager's movement from an FPE to another SPE. Similarly, the definition of a manager's movement from an FPE to an SPE is that during the observation period, the manager left the FPE to work for the SPE. The reference group is a manager's movement from an FPE to a DPE. The second driving



force is promotion. The promotion was judged according to the rank of management teams and the board of directors. Junior managers, senior managers, partners and director members, CEOs, and presidents were assigned values of 1, 2, 3, 4, and 5, respectively. Other positions were assigned to the closest positions. If the rank became higher for the manager, the promotion was assigned a value of 1; otherwise, the value of the promotion was assigned a value of 0.

The resistant forces include geographical distance and industry distance between the two PE firms. The geographical distance was calculated based on the distance between the city in which the manager's original PE firm was located and the city in which the manager's new PE firm was located, with the latitude and longitude of the cities obtained from Baidu maps. If both PE firms were located in the same city, the distance was recorded as 0. We take the logarithm of geographic distance in the regression.

Industry distance was calculated as follows. First, we found out the industries in which two PE firms invested during the window period and expressed those combinations as two vectors. Then we divide the intersection of industries invested by both two PE firms by the union set of industries invested by two PE firms. This is the Jaccard coefficient of the industry vector<sup>[52]</sup>. Then we subtract the Jaccard coefficient from one to get the industry distance. The longer the industry distance between the two PE firms, the larger the gap between the two PE firms.

The network structure includes the status of the PE firm that a manager has left and the status of the PE firm that the manager has joined. The status of the PE firm that the manager has left is measured by the eigenvector centrality of the syndication network from five years before the manager left the PE firm to the year in which the manager left the PE firm<sup>[53]</sup>. The status of the PE firm that the manager has joined is measured by the eigenvector centrality of the syndication network from the year in which the manager joined the PE firm to five years after the manager joined the PE firm.

This study controls the existing links between PE firms, that is, the number of syndications between two PE firms before the manager moved from one to the other. We also controlled the number of investments of the

PE firm that the manager left, the number of investments of the PE firm that the manager joined, the investment round, and the number of common neighbors. The number of investments of the PE firm that the manager left is measured by the number of investments that the PE firm made in the year before the manager left. The number of investments of the PE firm that the manager joined is defined by the number of investments that the PE firm made in the year before the manager joined. The investment round is an ordered variable, from round A to round F. We treat pre-A or pre-IPO as one round. The number of common neighbors is the measurement of structural embeddedness.

The control variables also include the managers' gender, age (at the time of changing jobs), years of education, whether the manager is a member of the investment committee, and whether the manager has experience working in other enterprises<sup>[54]</sup>. Years of education were measured based on the time spent in formal education; that is, managers with a college, bachelor, master, or doctor degree were assigned values of 14, 16, 19, and 22 years, respectively.

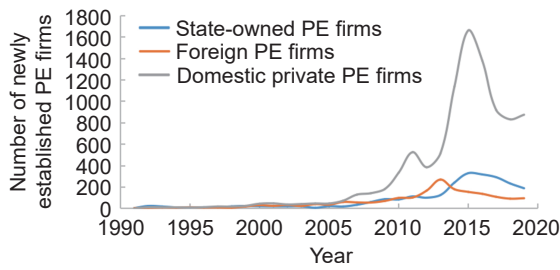
### 3.3 Analytical method

In this study, the logit models were used to analyze the influence of different factors on inter-organizational cooperation when managers changed jobs. If the manager brought an investment project from the original PE firm to the new PE firm and the two PE firms co-invested, the dependent variable was assigned a value of 1; otherwise, it was assigned a value of 0.

In the robustness test, the dependent variable was the number of co-investments between the PE firms. The variance of the dependent variable was greater than the mean, and thus negative binomial regressions were used for the analyses. In this robustness check, we controlled the PE firm-level variables and the characteristics of managers. In another robustness test, the status of the newly established PE firm was the dependent variable, with ordinary linear regressions used for the analyses.

## 4 Result

Figure 2 shows the number of newly established private equity firms in different years. The number of newly established foreign private equity firms

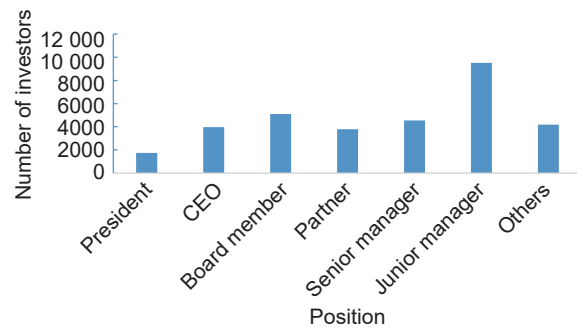


**Fig. 2** Number of newly established PE firms over year.

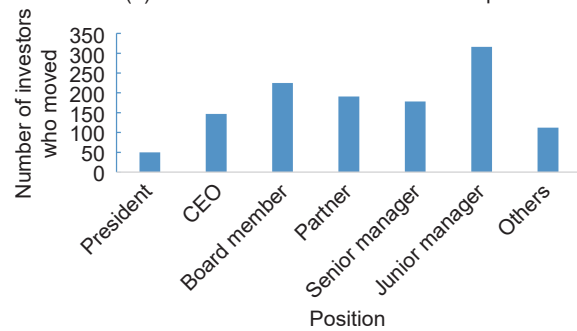
increased quickly since 2000, reached its peak in 2013, and then decreased. The number of domestic private equities increased rapidly, exceeded the number of foreign private equities since 2000, and reached its peak in 2015. The number of newly-established state-owned private equities also reached its peak in 2015. After 2015 the number of newly established state-owned private equities exceeded the number of newly established FPEs but was lower than the number of newly established domestic private equities. Figure 2 shows that monetary policy and economic trends have significant impacts on the establishment of investment institutions. We can also see that foreign private equities entered the Chinese market earlier, domestic private equities were the most active PE firms, and most state-owned private equities were established in recent years.

Figure 3 shows the number of investors in different positions. There are 12 115 investors in total. Seven hundred and eighty-three investors move from one PE firm to another. One person can take several positions at once. We rank the positions as precisely as we can. Figure 3 shows the number of junior managers, senior managers, partners, board members, CEOs, and presidents of all investors and of investors who move from one PE firm to another. There are also lots of positions labeled as others, such as consultants and regional managers.

Figure 4 shows the evolution of the private equity syndication networks over time. We draw four private equity networks at different time to show the trends in the syndication networks. Figure 4a shows the syndication network from 1996 to 2000. Figures 4b–4d are syndication networks from 2001 to 2005, from 2006 to 2010, and from 2011 to 2015, respectively. From Fig. 4, we can see that the syndication networks are becoming denser. The red nodes are domestic private PE firms, the yellow nodes are SPEs, and the



(a) Number of all investors in different positions



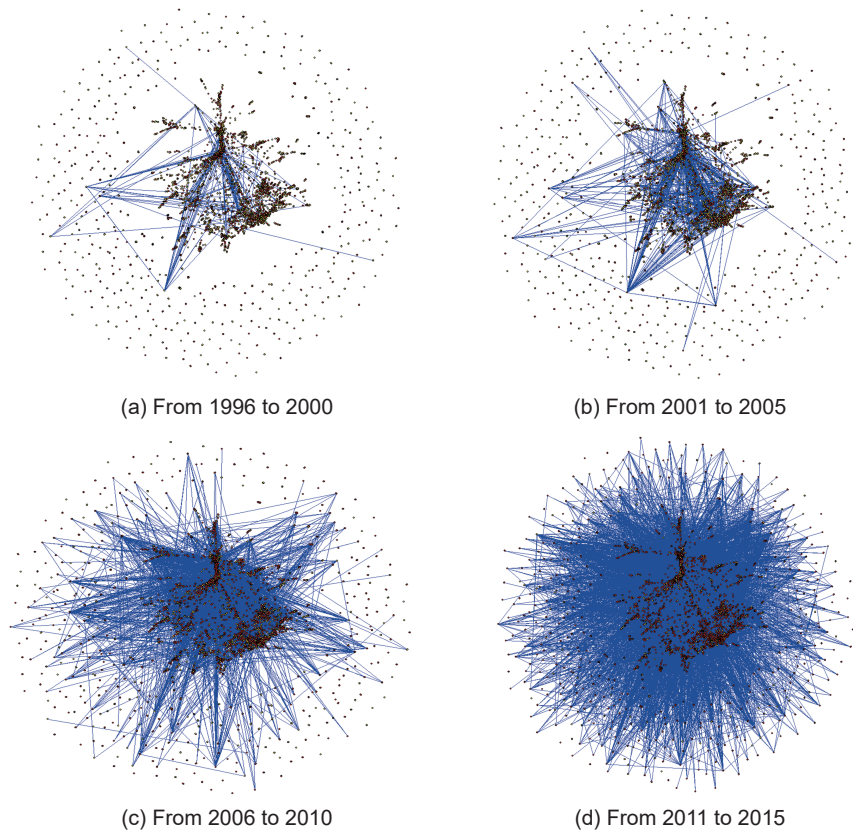
(b) Number of investors who moved in different positions

**Fig. 3** Number of investors in different positions.

green nodes are FPEs. In the earlier stage, there were many FPEs, while in the later stages, the number of state-owned and private PE firms increased very quickly. There are three closely connected groups in the network. When we studied their attributes, we found that the three groups were clusters of PE firms located in the Bohai Rim regions, Yangtze River Delta regions, and Pearl River Delta regions. The importance of geographic distance on network formation is justified.

Table 1 presents the definitions and descriptive statistics of the main variables, while Table 2 presents the correlations between the main variables. It can be seen that there were no severe correlations between variables. The managers' CVs had the following characteristics. Many held the bachelor degrees in engineering, management, or law and had also completed MBAs. Most of the managers had graduated from well-known universities either in China or overseas, and managers who had majored in finance and accounting usually had experience in security-trading companies or auditing firms. Some managers had experience working in state-owned enterprises or government departments.

Table 3 presents the factors affecting the influence of manager mobility on syndication. Control variables are included in Model 1, driving forces are added in Model



**Fig. 4 Evolution of the private equity syndication networks over time.**

2, resistant forces are added in Model 3, and network structure is added in Model 4. Model 4 shows that when a manager moves from a DPE to an SPE firm, manager mobility is more likely to lead to syndication than when the manager moves from an FPE to an SPE. Hypothesis 1a is supported ( $\beta=0.85$  and  $p<0.05$ ). When a manager moves from an FPE to an SPE, manager mobility is more likely to lead to syndication, compared with a manager moving from an FPE to a DPE. Hypothesis 1b is supported ( $\beta=0.43$  and  $p<0.01$ ). When a manager is promoted as a result of the move, manager mobility is more likely to lead to syndication. Hypothesis 1c is supported ( $\beta=0.73$  and  $p<0.01$ ). When the geographical distance between the two PE firms involved in manager mobility is relatively short, manager mobility is more likely to lead to syndication. Hypothesis 2a is supported ( $\beta=-0.35$  and  $p<0.05$ ). When the industry distance between the two PE firms involved in manager mobility is relatively short, there is no significant correlation between manager mobility and the syndication. Hypothesis 2b is not supported. There is a positive correlation between the status of the PE firm that the manager left and the syndication.

Hypothesis 3a is supported ( $\beta=1.02$  and  $p<0.01$ ). Finally, there is no significant correlation between the status of the PE firm that the manager joined and the syndication. Hypothesis 3b is not supported. As for control variables, the prior syndications, the years of education managers received, the number of investments of PE firms, and the investment rounds significantly influence the syndications.

In the robustness test, the dependent variable is the number of syndications between the two PE firms, and negative binomial regressions are used for analyses. The number of prior syndications between PE firms is controlled. This variable is measured by the number of syndications before the managers change jobs. The controlling variables also include the characteristic of managers, the number of investments, the investment round, and the number of common neighbors. The results presented in Table 4 show that Hypotheses 1a, 1b, 1c, 2a, and 3a are supported. Hypotheses 2b and 3b are not supported. Thus, the robustness check provides further support for the main results. Geographical distance is clearly more important than industry distance, and the status of the PE firm that a manager has left is

**Table 1** Variable definitions and descriptive statistics.

|                            | Variable   | Description   | Mean  | Standard deviation |
|----------------------------|--|---|-------|--------------------|
| Control variable           | Prior syndication between PE firms                           | Number of syndications between two PE firms before the managers change jobs.  | 0.17  | 0.19               |
|                            | Gender   | If the manager is male, the variable is defined as equal to 0, otherwise 1.   | 0.09  | 0.19               |
|                            | Age  | Age of the manager when he or she joined the PE firm.   | 37.15 | 17.64              |
|                            | Years of education   | Length of academic education (estimated).   | 16.9  | 3.2                |
|                            | Member of the investment committee                           | Whether the manager is a member of the investment committee.  | 0.42  | 0.16               |
|                            | Working experience in enterprises                            | Whether the manager has any work experience in other enterprises.   | 0.32  | 0.27               |
|                            | Number of investments of the PE firm that the manager left   | Number of investments that the PE firm made in the year before the manager left.  | 83.29 | 65.74              |
|                            | Number of investments of the PE firm that the manager joined | Number of investments that the PE firm made in the year before the manager joined.  | 69.33 | 58.45              |
|                            | Investment round   | Ordered variable, from round A to round F.  | 2.14  | 1.75               |
| Number of common neighbors | Number of common syndication partners.                       | 2.39  | 2.44  |                    |
| Driving force              | Movement from a DPE to an SPE                                | Employees left DPE and work in SPE  | 0.23  | 0.14               |
|                            | Movement from an FPE to an SPE                               | Employees left FPEs and work in SPE   | 0.16  | 0.12               |
|                            | Manager promotion  | The manager is promoted while changing his or her job. The promotion is determined according to the order of junior managers, senior managers, partners and director members, CEOs, and presidents. | 0.68  | 0.13               |
| Resistance force           | Geographical distance (km)                                   | Geographic distance of cities between two PE firms.   | 523   | 695                |
|                            | Industry distance  | One minus the Jaccard index.  | 0.77  | 0.43               |
| Network structure          | Status of PE firm that the manager left                      | Eigenvector centrality of the PE firm in the syndication network from five years before the manager left the PE firm to the time the manager left the PE firm.                                      | 0.07  | 0.03               |
|                            | Status of PE firm that the manager joined                    | Eigenvector centrality of the PE firm in the syndication network from five years before the manager joined the PE firm to the time the manager joined the PE firm.                                  | 0.03  | 0.06               |

more important than that of the PE firm that the manager has joined. The coefficient of prior syndication between PE firms is 0.21 and significant in Model 7. When controlling the prior syndications, the main effects are still significant. The number of investments, the investment round, and the managers' age also positively influence the dependent variables.

Another robustness check was performed in an effort to eliminate the influence of PE firms' history. In newly established PE firms, the social capital of team members is extremely important for building

syndication networks, and the influence of PE firms' history can be eliminated. This is an ideal scenario for testing the hypotheses. The status of the PE firm after it had been established for five years was used as the dependent variable for analyses. The unit of analysis was the PE firm, and thus we controlled the number of investments in five years, the proportion of investments in high-tech enterprises, PE firm's type, PE firm's ownership, and location. The results presented in Table 5 show that the numbers of managers moving from DPEs and FPEs to SPEs are positively correlated with the

**Table 2 Correlation matrix.**

| Variable   | Pearson correlation coefficient |         |  |  |                            |                       |                   |   |   |
|--|---------------------------------|---------|--|--|----------------------------|-----------------------|-------------------|---|---|
|  | Prior syndication               | Age     | Number of investments of the PE firm that the manager left | Number of investments of the PE firm that the manager joined | Number of common neighbors | Geographical distance | Industry distance | Status of PE firm that the manager left | Status of PE firm that the manager joined |
| Prior syndication  | 1.00                            |         |  |  |                            |                       |                   |   |   |
| Age  | 0.13                            | 1.00    |  |  |                            |                       |                   |   |   |
| Number of investments of the PE firm that the manager left   | 0.32***                         | 0.21*** | 1.00   |  |                            |                       |                   |   |   |
| Number of investments of the PE firm that the manager joined | 0.37***                         | 0.29*** | 0.25   | 1.00   |                            |                       |                   |   |   |
| Number of common neighbors                                   | 0.31                            | 0.14    | 0.27   | 0.20   | 1.00                       |                       |                   |   |   |
| Geographical distance  | -0.33***                        | 0.21    | 0.17   | 0.10   | 0.43                       | 1.00                  |                   |   |   |
| Industry distance  | -0.28                           | 0.17    | 0.05   | 0.12   | 0.15                       | 0.46***               | 1.00              |   |   |
| Status of PE firm that the manager left                      | 0.39                            | 0.19    | 0.48***  | 0.34   | 0.17                       | 0.39                  | 0.12              | 1.00                                    |   |
| Status of PE firm that the manager joined                    | 0.49*                           | 0.07    | 0.32   | 0.53***  | 0.11                       | 0.17                  | 0.21              | 0.43***                                 | 1.00                                      |

Note: \* $p < 0.1$  and \*\*\* $p < 0.01$ .

status of the PE firms. These results provide further support for Hypotheses 1a and 1b. As for control variables, PE firms located in east China are more likely to gain higher status compared with PE firms in other parts of China.

## 5 Conclusion

This study investigated whether manager mobility leads to PE syndication. Three factors were found to determine whether manager mobility facilitates the flow of resources between organizations: driving forces, resistant forces, and network structure. Regarding driving forces, when a manager moves from a domestic or foreign PE firm to a state-owned PE firm, he or she is more likely to facilitate syndications. When a manager is promoted as a result of the move, manager mobility is more likely to facilitate syndications. Regarding resistant forces, increased geographical distance reduces the likelihood of resource flows. As

for network structure, managers who leave PE firms with high status are more likely to facilitate syndications because they have more social capital.

The theoretical contribution of this study is putting forward the framework of driving forces, resistant forces, and network structure, which can be applied to other coupling networks. This study enriches the social computing theory of coupling networks<sup>[55]</sup>. This study also empirically tests the influence of one network on the other network. In addition, this study demonstrates that manager mobility is an antecedent of private equity syndications, deepening the theory of private equity syndications. Finally, this study proposes that managers coming from private-owned PE firms can influence the syndication network of state-owned PE firms, providing clues for constructing a unique syndication theory in China.

The practical implications of this study are mainly reflected in the following aspects. Firstly, this study provides references for PE firms to hire suitable

**Table 3** Logit models of the influence of manager mobility on syndications.

| Variable   | Manager mobility bringing syndication |                   |                    |                   |
|--|---------------------------------------|-------------------|--------------------|-------------------|
|  | Model 1                               | Model 2           | Model 3            | Model 4           |
| Prior syndications between PE firms                          | 0.18***<br>(0.06)                     | 0.19***<br>(0.05) | 0.20***<br>(0.05)  | 0.21***<br>(0.05) |
| Gender   | -0.31<br>(0.89)                       | -0.27<br>(0.88)   | -0.29<br>(0.91)    | -0.33<br>(0.84)   |
| Age  | 0.07<br>(0.48)                        | 0.19<br>(0.43)    | 0.17<br>(0.46)     | 0.28<br>(0.42)    |
| Years of education   | 1.10**<br>(0.51)                      | 1.09**<br>(0.51)  | 1.06**<br>(0.52)   | 1.14**<br>(0.56)  |
| Control variable   |                                       |                   |                    |                   |
| Member of the investment committee                           | 0.19<br>(1.36)                        | -0.22<br>(1.22)   | -0.20<br>(1.10)    | 0.03<br>(1.08)    |
| Working experience in enterprises                            | 0.49<br>(0.55)                        | 0.46<br>(0.47)    | 0.27<br>(0.49)     | 0.95<br>(0.54)    |
| Number of investments of the PE firm that the manager left   | 0.18***<br>(0.04)                     | 0.17***<br>(0.04) | 0.16***<br>(0.03)  | 0.11***<br>(0.03) |
| Number of investments of the PE firm that the manager joined | 0.22***<br>(0.06)                     | 0.20***<br>(0.06) | 0.27***<br>(0.06)  | 0.14***<br>(0.04) |
| Investment round   | 0.37***<br>(0.11)                     | 0.33***<br>(0.10) | 0.35***<br>(0.11)  | 0.35***<br>(0.09) |
| Number of common neighbors                                   | 0.09<br>(0.26)                        | 0.08<br>(0.32)    | 0.10<br>(0.21)     | 0.13<br>(0.17)    |
| Driving force  |                                       |                   |                    |                   |
| Movement from a DPE to an SPE                                | —                                     | 0.72***<br>(0.18) | 0.71***<br>(0.18)  | 0.85***<br>(0.20) |
| Movement from an FPE to an SPE                               | —                                     | 0.41***<br>(0.12) | 0.40***<br>(0.11)  | 0.43***<br>(0.13) |
| Manager promotion  | —                                     | 0.70***<br>(0.21) | 0.71***<br>(0.22)  | 0.73***<br>(0.23) |
| Resistance force   |                                       |                   |                    |                   |
| Geographical distance  | —                                     | —                 | -0.31***<br>(0.08) | -0.35**<br>(0.07) |
| Industry distance  | —                                     | —                 | 0.26<br>(0.24)     | 0.28<br>(0.39)    |
| Network structure  |                                       |                   |                    |                   |
| Status of PE firm that the manager left                      | —                                     | —                 | —                  | 1.02***<br>(0.20) |
| Status of PE firm that the manager joined                    | —                                     | —                 | —                  | 0.84<br>(0.95)    |
| Constant   | -0.44<br>(0.91)                       | -0.75<br>(0.76)   | -1.22<br>(1.22)    | -1.39<br>(1.03)   |
| Observation  | 783                                   | 783               | 783                | 783               |
| Chi square   | 44.29***                              | 48.16***          | 49.74***           | 51.23***          |

Note: Standard errors are in parentheses. \*\* $p < 0.05$  and \*\*\* $p < 0.01$ .

managers from the market. This article analyzes what kinds of managers can bring more resources to PE firms, which can help PE firms quickly build efficient investment teams. Secondly, this study can help PE firms expand their syndication network. Besides considering the human capital of the manager, the

social capital of the manager also helps private equity firms cooperate. Thirdly, this study provides references for managers to make career choices. Managers can consider the influence of mobility to plan their career paths reasonably.

While manager mobility can result in syndications,

**Table 4** Negative binomial models of the influence of manager mobility on syndications.

| Variable          |  | Number of syndications |                    |                    |
|-------------------|--|------------------------|--------------------|--------------------|
|                   |  | Model 5                | Model 6            | Model 7            |
| Control variable  | Prior syndications between PE firms                          | 0.22***<br>(0.06)      | 0.24***<br>(0.06)  | 0.21***<br>(0.06)  |
|                   | Gender   | -0.58<br>(0.69)        | -0.52<br>(0.65)    | -0.46<br>(0.71)    |
|                   | Manager's age  | 0.09***<br>(0.02)      | 0.11***<br>(0.01)  | 0.13***<br>(0.01)  |
|                   | Years of education   | 0.67<br>(0.66)         | 0.63<br>(0.43)     | -0.50<br>(0.59)    |
|                   | Member of the investment committee                           | 0.17<br>(0.33)         | 0.14<br>(0.38)     | 0.19<br>(0.31)     |
|                   | Working experience in enterprises                            | 0.21<br>(0.47)         | 0.53<br>(0.41)     | 0.33<br>(0.61)     |
|                   | Number of investments of the PE firm that the manager left   | 0.43***<br>(0.13)      | 0.41***<br>(0.11)  | 0.35***<br>(0.10)  |
|                   | Number of investments of the PE firm that the manager joined | 0.51***<br>(0.09)      | 0.52***<br>(0.10)  | 0.45***<br>(0.14)  |
|                   | Investment round   | 0.31***<br>(0.07)      | 0.33***<br>(0.05)  | 0.42***<br>(0.12)  |
|                   | Number of common neighbors                                   | 0.18<br>(0.23)         | 0.22<br>(0.26)     | 0.15<br>(0.25)     |
| Driving force     | Movement from a DPE to an SPE                                | 0.89***<br>(0.15)      | 0.84***<br>(0.17)  | 0.72***<br>(0.19)  |
|                   | Movement from an FPE to an SPE                               | 0.47***<br>(0.15)      | 0.63***<br>(0.13)  | 0.49***<br>(0.11)  |
|                   | Manager promotion  | 0.92***<br>(0.31)      | 0.95***<br>(0.27)  | 1.03***<br>(0.30)  |
| Resistance force  | Geographical distance  | —                      | -0.94***<br>(0.31) | -1.03***<br>(0.33) |
|                   | Industry distance  | —                      | -0.37<br>(0.27)    | 0.31<br>(0.45)     |
| Network structure | Status of PE firm that the manager left                      | —                      | —                  | 1.35***<br>(0.27)  |
|                   | Status of PE firm that the manager joined                    | —                      | —                  | 0.35<br>(0.41)     |
|                   | Constant   | 2.35***<br>(0.62)      | 2.33***<br>(0.58)  | 2.24***<br>(0.64)  |
|                   | Chi square   | 68.21***               | 74.84***           | 78.02***           |

Note: Standard errors are in parentheses. \*\*\* $p < 0.01$ .

cooperation between PE firms can also result in manager mobility. This study focuses on resource flows as a result of manager mobility and controls for the reverse effect by controlling the time window<sup>[56]</sup>. Future studies could apply exponential random graph models of coupling networks in an effort to take more network configurations into consideration<sup>[57]</sup>. Future

studies could also collect more detailed recruitment data through public websites and undertake more detailed analyses to verify the influence of human capital on the three forces<sup>[58]</sup>.

There are also limitations in this study. First, this study only considers the co-investments brought by managers, other kinds of resources brought by the

**Table 5** OLS models of the influence of manager mobility on the status of newly established PE firms.

| Variable  |                    | Status of newly established PE firm |                   |                   |
|---|--------------------|-------------------------------------|-------------------|-------------------|
|   |                    | Model 8                             | Model 9           | Model 10          |
| Number of investment                              |                    | 3.45***<br>(0.38)                   | 3.23***<br>(0.36) | 3.21***<br>(0.41) |
| Proportion of investments in high-tech industries |                    | -0.78<br>(0.47)                     | -0.70<br>(0.49)   | -0.73<br>(0.43)   |
| Location  | East               | 2.32***<br>(0.53)                   | 2.19***<br>(0.50) | 2.25***<br>(0.48) |
|   | Central            | 0.94<br>(1.03)                      | 0.77<br>(1.32)    | 0.77<br>(1.07)    |
| PE type   | Venture capital    | -0.14<br>(0.06)                     | -0.08<br>(0.07)   | -0.10<br>(0.07)   |
|   | Strategic investor | -1.26<br>(0.83)                     | -1.42<br>(0.95)   | -1.31<br>(0.99)   |
| PE ownership                                      | SPE                | 0.66<br>(0.43)                      | 0.69<br>(0.37)    | 0.73<br>(0.49)    |
|   | FPE                | 0.83***<br>(0.27)                   | 0.86***<br>(0.25) | 0.81***<br>(0.22) |
| Number of managers from DPEs to SPEs              |                    | —                                   | 0.14***<br>(0.05) | 0.12***<br>(0.04) |
| Number of managers from FPEs to SPEs              |                    | —                                   | —                 | 0.07***<br>(0.01) |
| Year of establishment                             |                    | Controlled                          | Controlled        | Controlled        |
| Constant term                                     |                    | 2.82***<br>(0.93)                   | 2.75***<br>(0.70) | 3.07***<br>(0.98) |
| Observation value                                 |                    | 1319                                | 1319              | 1319              |
| $R^2$   |                    | 0.05                                | 0.05              | 0.05              |
| Adjusted $R^2$                                    |                    | 0.06                                | 0.06              | 0.07              |
| $F$ value   |                    | 17.02***                            | 17.94***          | 18.19***          |

Note: Standard errors are in parentheses. \*\*\* $p < 0.01$ .

managers are not included in the analyses. Secondly, while the driving forces and resistant forces identified in the paper are important factors to consider, there are also other potential variables that may also impact resource flows between PE firms. Although we controlled the number of investments, the investment round, and embeddedness, there might be other mechanisms that can influence the resource flows. Finally, it is worth noting that the results of this study may not be generalizable to all private equity firms or managers. There are lots of state-owned PE firms in China, but in other countries, the influence of SPE may be unimportant. The conclusions may also be different in different firm cultures and in different industry trends.

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