Why do German firms invest in Israel, and why do Israeli firms invest in Germany?

The rise of innovation complementarities in German-Israeli economic relations

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Executive summary

Why do German firms invest in Israel? And why do Israeli firms invest in Germany? Based on personal interviews and the analysis of a sample of 87 cases of Israeli and German FDI-receiving entities in Germany and Israel, this study finds that Israeli firms invest in Germany to gain access to German and European consumer and public procurement markets. We estimate that about 90% of all instances of Israeli FDI exclusively or mainly seek such consumer and/or public procurement market access. German firms also invest in Israel to gain consumer and public procurement market access. But with the rise of Israel as a world market leader in IT-related innovation, increasingly a newly emerging motivation gains relevance: German firms investing in Israel to access the country’s innovation market and acquire Israeli technologies – in particular in the areas of optometric technology, image recognition, cyber security, virtual (VR) and augmented reality (AR), and social network applications. Today, already about 50% of all cases of German FDI in Israel are instances of innovation-seeking FDI. In the context of this development, more than half of the large German corporations making up the DAX 30 Stock Market Index, such as VW, Siemens, Deutsche Bank, Deutsche Telekom, innogy (formerly RWE), Bosch, Munich Re, Daimler or BMW, has in the recent years invested in Israel (or are currently in the process of investing) mainly or exclusively to participate in the Israeli innovation market. Many of these firms, in particular in the non-IT sectors, such as in the car industry, feel that their business model – supplying world markets with optimized, but technologically conventional products – is threatened by ongoing technological revolutions in the IT sector. They demand access to disruptive IT-based innovations to prepare for, and gain the ability to shape this revolution and therewith the future of their industries. Israel’s disruptive innovation-oriented startup market supplies this demand.

What policy recommendations follow thereof? The study suggests interpreting these findings through the lens of innovation complementarities: the Israeli market gives rise to entrepreneurship which takes risks and disruptively innovates, but which is rarely capable to turn new technologies into mass products. Germany, as an institutional system, inspires in firms the ability to optimize existing technologies and sell perfect products on world markets. But it discourages risk-taking entrepreneurial strategies that
aim at disruptive innovation. FDI connecting both innovation systems allows firms to overcome their ‘home’ country-induced weaknesses without losing their country-specific strengths. Policy should aim at maximizing these *innovation complementarities* in German-Israeli business relations. The study proposes two types of policy programs for this end, each aiming at correcting market failure. We firstly suggest creating a *Mittelstandsinitiative Israel* – a program that seeks to facilitate *innovation complementarities* between medium-sized German technological market leaders and Israeli startups. And secondly, we propose the establishment of a public-private partnership-based R&D framework between Israel and Germany, under which early-stage Israeli technologies are scaled up to facilitate a more efficient transfer of technology between Israeli startups and German corporations.
Introduction

Israeli firms invest in Germany to sell to German/European markets

German firms’ investments in Israel increasingly seek innovations

“Cyber security systems, computer vision, analytics, deep learning, sensors. When you need to get there you can’t dismiss Israel” -Representative of a large German car firm on why it has invested in Israel.

“Germany is an industrial power. They are very good at manufacturing and engineering. But there is a threat: the threat comes from Apple, it comes from Google. When it comes to communicating cars or the ‘internet of things’, German firms – and not only car firms, but also the Mittelstand – realize that they are less developed. They recognize the revolution the world is going through, the disruption. And they say that in Israel, the startup nation, there are solutions that can keep them at the frontline of technology, so that they can maintain their position as world market leaders.” -A long-time facilitator of Israeli-German economic relations, who is currently an official working at Israel’s Ministry of the Economy in charge of the promotion of cross-national business cooperation.

Why do German firms invest in Israel? And why do Israeli firms invest in Germany? This study is based on in-depth conversations with Israeli firms in Germany, and German firms in Israel, about their motivations for investing in the ‘other’ country. There are about 50 German firms with foreign direct investment (FDI) in Israel, and roughly the same number of Israeli firms with FDI in Germany. Some of these firms have however more than one investment in the ‘other’ country. Our study considers each investment of a German firm in Israel, and of an Israeli firm in Germany, as an instance of FDI. It draws on the detailed analysis of 87 such cases of FDI, which we specifically inquired for this study by collecting data in the context of personal interviews with managers in firms, with policy-makers, academic observers and facilitators in Israel and Germany. We estimate that these 87 cases make up for about 35% to 40% of all possible cases of German/Israeli FDI in the ‘other’ country. They were carefully chosen to guarantee that the analysis in this study incorporates all existing variants and forms of, important dynamics and developments in, and motivations for FDI between the two countries. This makes us confident that our case selection is relatively representative, allowing for valid inferences and the drawing of conclusions about FDI between both countries beyond the analyzed cases.
The recent years, including 2017, mark a number of important anniversaries in Israeli-German relations. In 2015, Germany and Israel celebrated the 50th anniversary of the beginning of their diplomatic relations. On this occasion, German Chancellor Angela Merkel adequately called today’s close political, academic, social, and economic relations between Israel and Germany a “miracle” in view of the dark history the two countries share. Two years later, in 2017, the German-Israeli Chamber of Commerce is celebrating its establishment half a century ago. We take this occasion for a closer look at the economic side of the German-Israeli “miracle”. Israeli-German economic relations trace back to as early as 1952, the Luxembourg agreement – also called reparation agreement – which paved the way for the beginning of diplomatic relations between Israel and Germany later on in 1965, and the facilitation of close business relations through the founding of the German-Israeli Chamber of Commerce in 1967.

What motivates and drives the firms that have, by investing in the ‘other’ country, helped to create the Israeli-German “miracle” on the micro- (i.e. firm-) level? This study’s first aim is to shed light on this question.

The second aim of the study is to trace ongoing dynamics and developments in Israeli-German business relations. According to an outdated, yet still prevalent view, Israeli-German economic relations can be reduced to two structuring principles. The first one is that the two countries’ economic relations follow political imperatives. For example, an important factor in the economic relations between the two countries is politically brokered arms deals (which usually do not show up in the official trade statistics). They are a direct result of the two countries’ close security and military cooperation. The second structuring principle is that trade relations between Germany and Israel are imbalanced. In 2016, for example, Germany exported goods worth about 4 billion Euros

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to Israel, and imported Israeli goods worth roughly 1.7 billion Euros. The Israeli trade deficit amounted to about 2.2 billion Euros. These numbers are not exceptional, but illustrate the general state of affairs as concerns trade between the two countries in the past years and decades (see Appendix 1). They corroborate the cliché of Israeli-German trade relations consisting essentially of an exchange of ‘oranges for cars’ — or more generally, of the rather simple goods of a still agrarian, developing economy (Israel) for the high-end products of a highly industrialized one (Germany).

Yet, while there is truth to this conventional view, it no longer gives us the full picture. Israel re-invented itself during the 1990s economically as the “start up nation” and as a world market leader for innovations in the IT sector. This development is not reflected in ‘normal’ trade statistics, as these only document trade with physical goods. It does however show up in the non-physical business services-trade (which includes IT-related services and IP). These statistics establish that in 2016, Israel imported business services worth about 350 million USD from Germany, and exported services worth about 1.5 billion USD to Germany. The services trade deficit of Germany thus amounts to roughly 1.2 billion USD. Also these services-trade related numbers are not outliers, but in line with the general trend (see Appendix 2). Israeli-German economic relations today thus feature a double-imbalance: A stark Israeli physical goods trade deficit and a significant German deficit in services trade. The Israeli deficit vis-à-vis Germany is consequently much smaller than usually assumed in view of official statistics, which only include the trade of physical entities, and not services (see Appendix 3). It is in this context of services trade-dynamics in German-Israeli economic relations, and the rise of Israel as an innovation market, that the study asks whether, in how far, and in what ways investment decisions by German companies in Israel and by Israeli firms in Germany have changed.

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6 Business services include telecommunication, electronic and optical products, computer programming, consultancy and related activities, scientific R&D, and IP.

What are the findings of this study with respect to these questions? The main findings of our study are that Israeli firms invest in Germany mainly to access German and European consumer and public procurement markets. German firms also invest in Israel to gain consumer and public procurement market access. But increasingly, a new motivation predominates: German firms invest in Israel in order to access the country’s innovation market and to acquire Israeli innovations and technologies. Our analysis of the motivations for FDI between Israel and Germany – what motivates Israeli and German firms to invest in each other’s countries – establish these findings in detail.

Four specific motivations stand out (for a summary, see Appendix 4a-c):

The first motivation for German and Israeli firms to invest in the ‘other’ country is to improve their access and penetration of the ‘other’ country’s consumer market. We estimate that about 40% of all cases of FDI between Israel and Germany fall into this category of consumer market access and penetration-seeking FDI (driver/motivation 1). This type of FDI is however unevenly distributed between Israel and Germany: consumer market access and penetration-seeking FDI is a much more important motivation for Israeli FDI into Germany than for German FDI into Israel. About 80-90% of all Israeli FDI into Germany are exclusively or significantly motivated by market access concerns. Different to that, only about 30% of all cases of German FDI into Israel are predominantly or significantly motivated by market access and penetration considerations. The lower proportional importance of this motivation/driver for German-originating FDI into Israel results from the rise of innovation and technology-seeking FDI among German firms. In recent years, German FDI in Israel follows increasingly motivation/driver 3 and 4 and is thus seeking firm- or technological advantages or access to the Israeli innovation market. Consumer market access-seeking FDI continues to matter, though, in absolute numbers, which do not seem to have declined – but its relative importance decreases due to an increase of cases of innovation-seeking FDI among German firms with investments in Israel.

Secondly, Israeli and German-originating FDI serve to improve the respective firms’ chances in public tenders and procurement procedures in the ‘other’ country. The study finds that about 20% of instances of FDI between the two countries is public procurement-seeking FDI (driver/motivation 2).
Thirdly, firms from Germany and Israel, respectively, invest in the ‘other’ country in order to acquire a unique technology and therewith a market advantage. We estimate that about 20-30% of cases of German firms’ FDI in Israel and Israeli FDI in Germany is firm- and technological advantage-seeking FDI (driver/motivation 3). As in the case of consumer market access and penetration-seeking FDI (driver/motivation 1), driver/motivation 3-type FDI is unequally distributed in German-Israeli FDI-relations. It is a much more important motivation for German firms investing in Israel than for Israeli firms in Germany. Of all German firms investing in Israel, about 35-40% are exclusively or significantly motivated by the investing firm seeking a firm- or technology-specific advantage. Israeli firms, by contrast, invest in Germany more rarely in order to obtain a unique technology. Only about 5-10% of Israeli FDI into Germany is predominantly or significantly motivated by firm- or technology-specific advantages. The higher importance of this motivation/driver for German-originating FDI into Israel results from the rise of Israel as a world market leader in IT-related technology.

Fourthly, large German corporations of different sorts have in recent years invested in Israel in order to access the country’s innovation market. The study finds that today already about 15-20% of all cases of FDI between Germany and Israel fall into this category of innovation market access-seeking FDI (driver/motivation 4). Almost 100% of the cases we identified as innovation market access-seeking FDI feature large German corporations as FDI-sender firms, and Israel as receiver. More than half of all large German corporations making up the DAX 30 index\(^8\) have by now decided to come to Israel – or are in the process of doing so – in order to participate in and profit from the country’s innovation market. Interestingly, the majority of these German firms investing in Israel to access the country’s innovation market are not comprised of IT-based firms, such as SAP or Deutsche Telekom, which did already come to Israel years ago to participate in the country’s innovation dynamics. But in fact, the bulk of them make up non-IT firms who have come more recently to Israel, driven by the belief that the future of their industries is affected by Israeli IT innovations, such as in the automotive industry VW, Daimler, BMW, Siemens or Bosch – or the electricity provider innogy (formerly RWE). Apart from them, also financial

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services firms such as Deutsche Bank or Munich Re have entered the Israeli innovation market. They look for Fintech innovations in Israel. And they see in Israel’s innovation market a promising investment opportunity, which allows them to accumulate knowledge about possible futures of other key industry sectors in which they normally invest, such as the car industry.

The first two drivers/motivations, consumer market access and penetration (driver/motivation 1), and improved public purchasing opportunities (driver/motivation 2), fall into the broad category of horizontal FDI. Horizontal FDI refers to firms duplicating organizational functions in another country. It serves the general function of supporting sales abroad, of the provision of an organizational infrastructure for trade between Israel and Germany. Driver/motivation 1 and 2 are not affected by or linked to Israel’s rise as an IT innovation hub since the 1990s. They are an important but yet non-dynamic factor in Israeli-German investment relations (in terms of the absolute quantity of cases). Horizontal FDI predominates in Israeli FDI-flows into Germany. All in all, about 90% of Israeli FDI into Germany is FDI in support of sales and trade. Horizontal FDI is also characterizing traditional FDI flows originating from Germany into Israel. But with the rise of Israel as a world market leader for IT-related innovations, and the related rise of innovation-seeking FDI, horizontal FDI lost some of its relative importance. Today, just about 50% of all cases of German firms investing in Israel fall under the category of horizontal, trade-supporting FDI.

The latter two motivations/drivers, firm- and technology specific advantage-seeking FDI (driver/motivation 3), and innovation market access-seeking FDI (driver/motivation 4), fall into the broad category of vertical FDI. By vertical FDI this study understands firms organizing different production processes in different countries. Vertical FDI serves the general purpose of supporting and assuring firms’ competitiveness on their main markets ‘at home’. It is also known as efficiency-seeking FDI. In particular, driver/motivation 4, innovation market access-seeking FDI, is directly causally related to Israel having re-invented itself as a world market leader in

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innovations – most importantly, in the areas of optometric technology, image recognition, cyber security, virtual (VR) and augmented reality (AR), and social network applications. In difference to that, driver/motivation 3, firm- and technology specific advantage-seeking FDI, would also be present in Israeli-German investment relations had Israel not emerged as an IT innovation hub, though to a much lesser extent. It drives FDI in the IT and non-IT related sectors. However, the emergence of a highly innovative IT sector has resulted in a dynamic development of this type of FDI: increasingly, German firms with innovation market access-seeking FDI are finding opportunities to realize firm- and technology specific advantages by investing in Israeli IT companies. Overall, therefore, vertical FDI is a phenomenon that newly characterizes Israeli-German FDI-relations, and which is overwhelmingly ‘German’ in the FDI-sender side. While some cases of firm- and technological advantage-seeking FDI can be found among Israeli firms investing in Germany (in about 10-20% of cases), by now about 50% of all German FDI flows into Israel are predominantly motivated by drivers/motivations 3 and/or 4. The study thus shows that German-Israeli FDI-relations are transforming as a result of Israel’s rise as IT innovation market; vertical, efficiency-seeking FDI is dynamically increasing.

We suggest analyzing the findings in this study through the lens of innovation complementarities: the German institutional system inspires in firms the ability to supply world markets with optimized products. German firms are typically incremental innovators. Yet this strength also comes with a weakness. The German institutional environment is not known to produce firms that are good at generating disruptive innovations. The Israeli context, by contrast, has given rise to firms that are good at what German firms cannot do: disruptive, radical innovations. ‘Being Israeli’ is thus a major competitive advantage. But it also comes with a disadvantage. Typically, Israeli innovators do not have what it takes to turn their path-breaking innovations into mass products. By investing in the ‘other’ country to participate in the innovation system and dynamics there, firms can overcome their weaknesses without losing their ‘home’ country-induced strengths. This is the idea of innovation complementarities. It is in this context that we suggest considering drivers/motivations 3 and 4. Innovation and

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technology-seeking FDI allows both sides, Israel and Germany, to maximize the benefits of their respective economic models while avoiding associated costs and risks. FDI of the drivers/motivations 3 and 4-type should thus be endorsed and supported on all levels.

What policy measures do we suggest? Policy should aim at correcting market failure. The study finds in particular two types of market failure that should be addressed. The first one relates to the fact that so far only large (German) corporations invest in order to profit from innovation complementarities with Israeli firms. Small- to medium sized firms – most importantly, the German Mittelstand – do not participate in this dynamic yet. Mittelstand-firms typically lack the resources and capacities for vertical, innovation complementarity-seeking FDI (motivations/drivers 3 and 4). We therefore propose a Mittelstandsinitiative Israel. The proposal suggests to pool resources of Mittelstand-firms according to functional industry needs in the areas of optometric technology, image recognition, cyber security, virtual (VR) and augmented reality (AR), and social network applications, supported by joint German-Israeli research and public policy programs. A coordinating body organized, for example, under the roof of the German-Israeli Chamber of Commerce, should govern these collective direct investment funds aimed at allowing Mittelstand firms to access Israel’s innovation market.

The second market failure concerns the transfer of technology between Israeli startups and their German investors, which, we found, often fails due to uncertain scalability of Israeli innovations. Scalability refers to two aspects of a business model: its (mass-)market potential – whether its processes or outputs meet a significant market demand; and its ability as a processing system to handle large and growing amounts of work without diminishing the quality of the output or process. For German investor firms, scalability is often a precondition for the transfer of technology. Israeli startups, however, typically focus on the early stages in the life cycle of innovations, in which the scalability of technologies is yet unknown. A transfer of technology thus often requires from German firms who own or co-own an Israeli technology to continue investing in the technology after the initial acquisition in order to develop its scalability. But they often shy away form the significant costs and risks associated with such further investments – and so decide to rather re-sell the technology after some time. High development costs and risks thus often undermine firms’ investment strategies between
the two countries, and efforts to shape Israeli-German innovation complementarities. To allow innovation complementarity-seeking investment strategies to succeed at a higher rate though a lowering of the costs and risks associated with the transfer of technology, we propose the creation of a new R&D framework between Germany and Israel, under which Israeli innovations are scaled up with the help of public research institutions. At the center of this framework should be a research institute modeled after the Fraunhofer Institute-principle of public-private innovation research, involving – apart from public research organizations (universities and applied research institutes) – large German corporations with innovation-seeking investments in Israel and innovators and entrepreneurs from the Israeli startup market. The institute should be located in Israel, where firms seek innovation complementarities. The suggested measure would allow German policy makers to re-orient German-Israeli research cooperation strategically towards the goal of keeping German industry at the forefront of technology in times of technological uncertainty and disruption. And it would have the positive effect for Israel of the development of a scaleup\textsuperscript{11} sector with significant employment and income effects.\textsuperscript{12}

\textsuperscript{11} A scaleup or high-growth company is a company with an “average annual growth greater than 20% per annum, over a three year period” in terms of employment or by turnover. OECD. 2010. “High-Growth Enterprises: What Governments Can Do to Make a Difference?” Paris, p. 16.

Method, Case Selection, and Conceptual Clarifications

What is FDI, and how does the study analyze what drives it?

The phenomenon of FDI between Germany and Israel is best understood as a specific instance or subcategory of the broader phenomenon of firms originating in Germany or Israel, respectively, with identifiable commercial activities in the ‘other’ country. There are about 120+ firms on each side, Germany and Israel (i.e. a total of 240+ businesses), which fall in this broad category. Of these 240+ firms, about 50 on each side (i.e. a total of about 100) are German or Israeli firms with FDI in the ‘other’ country. Most Israeli or German firms’ identifiable commercial activities in the ‘other’ country are thus not instances of FDI.

FDI refers to the specific situation of a firm holding a controlling (minority or majority) interest in commercial operations in a foreign country. This is usually considered to require a minimum of 10% ownership in operations abroad.\(^ {13} \) Not instances of FDI are thus, for example, identifiable commercial activities in a foreign country that are purely based on trade (exporting or importing). Neither are portfolio investments or foreign indirect investments instances of FDI, as they do not involve a foreign investor controlling activities abroad.

Most of the roughly 140 firms out of the 240+ firms with identifiable commercial activities in the ‘other’ country we determined as ‘not-FDI’ were cases in which firms from both countries are linked through close trade relations. Typically, they comprise of accredited exclusive or non-exclusive importers who sell and market the products of a firm from the ‘other’ country. In these cases the importing entity often ‘looks’ like it was part of the corporation from the ‘other’ country whose products it markets, distributes and sells: the importer may use the logo and advertising of this firm, for example, and be granted special prices and services by the exporting firm. But in these cases, the importer is not a recipient of FDI and thus remains legally independent from the exporting firm(s) whose products it markets. Such trade relations are, of course, a very important part of Israeli-German economic relations. But in this study, we are

\(^ {13} \) The study thus applies the basic definition by UNCTAD, which is also the one commonly referred to in the academic literature – see [http://unctad.org/en/Pages/DIAE/Foreign-Direct-Investment-(FDI).aspx](http://unctad.org/en/Pages/DIAE/Foreign-Direct-Investment-(FDI).aspx) (retrieved 10 August 2017).
focusing exclusively on the analysis of the motivations that drive FDI – for three main reasons:

Firstly, FDI is generally considered to be the most important type of commercial activity firms may have in other countries.\textsuperscript{14} FDI commits a firm to a foreign country; is an invaluable source of capital and thus a key factor for economic growth and development; is widely associated with the creation of well paid jobs and the creation of skills; provides for the infrastructure of frictionless trade (as multinational corporations have the ability to internalize international trade), which is important for lowering consumer prices and the supply of consumer demands; and is commonly associated with manifold positive spill-overs (technology, know-how) that upgrade and develop the dynamic capabilities in an economy. The investigation of FDI flows between Germany and Israel is thus about one of the – if not the – most important aspect in Israeli-German economic relations.

Secondly, in recent years, many large German corporations – Siemens, Deutsche Telekom, VW, Munich Re, BMW, Bosch, Daimler AG, to name a few – have decided to come to Israel with FDI. This important dynamic had until now not been inquired in detail. The study fills this gap.

Thirdly, FDI between Israel and Germany is politically, culturally and socially particularly interesting. FDI implies more than Germans and Israelis working together in distance for mutual benefit, such as when they trade with each other. FDI means that relations are closer and go deeper: that Israelis and Germans share risks, assets and a common corporate culture, deal with inevitably resulting conflicts jointly, become in this context mutually dependent on each other, visit and in many cases live for some time in the ‘other’ country, and complement each other personally, with their skills and different cultural backgrounds. It is thus a particularly relevant part of the “miracle” of Israeli-German relations.

The study is based on the in-depth analysis of 87 specific instances – cases – of German or Israeli FDI in the ‘other’ country. We define a case as “direct investment enterprise”\(^{15}\) – thus on the FDI-receiver side. The total universe of cases is thus larger than 100, the number of firms from Germany and Israel, respectively, with FDI in the ‘other’ country. The reason is that some firms invest in several different entities in the ‘other’ country. FDI-receiving instances of FDI are also unevenly distributed between Israel and Germany.\(^{16}\) The precise number of all FDI-receiving entities in both countries is difficult to assert. We could confirm 184 of such cases – 132 German investments in Israel and 52 Israeli investments in Germany – but estimate that there may be up to 270 (about one third in Germany, and two thirds in Israel) German and Israeli “direct investment enterprises” in the ‘other’ country. The sample of cases on which this study is built thus consists of about 35-40% of all possible cases. They were selected based on a careful analysis of all publically available information about potentially relevant firms, their investments, and German-Israeli economic relations in general. On the basis of this analysis and the relevant theoretical literature on FDI in Economics, Management Studies and Political Economy we identified criteria for case selection, such as relevant industry sectors and FDI features. Relevant industry sectors between the two countries are: automotive, chemical and pharmaceuticals, electronics, arms and defense systems, medical devices, banking and financial services, IT services, energy, environmental technology and services, industrial complexes, agriculture, water technology, manufacturing, and mechanical engineering. We chose the cases so that all the mentioned industry sectors – with few exceptions, such as agriculture – are represented in the sample.

As concerns FDI features, we sampled on characteristics such as firm size (i.e. made sure to include firms of different size) and different legal and organizational form of the investment (majority or minority ownership, partnership models, silent investor models, VC models etc). The relatively high percentage of total cases covered by our empirical investigation, and these criteria make us confident that our case selection is relatively representative, allowing for valid inferences about FDI between both

\(^{15}\) Again following UNCTAD, see Fn 7 above.

\(^{16}\) The main reason for this imbalance is that German innovation-seeking FDI has in recent years given rise to an increase in FDI-receiving entities in Israel, linked to (very few) individual German FDI-sender firms.
countries beyond the analyzed cases. That is to say, we believe that the trends and insights we report on in this study describe the trends and patterns of FDI between Israel and Germany in general.

The data for this study was collected between March and mid-June 2017. Data collection comprised of personal, semi-structured interviews. The structured part of the interviews followed a questionnaire, which was developed on the basis of a multi-variable causal model explaining German-Israeli FDI. The underlying model reflects the state of the art in Management, Business, and Political Science literature on FDI, and empirical information about German-Israeli economic relations. The open part of the interviews served to obtain information and opinions from our interview partners they considered important – which allowed us to assure that the study also covers problems, trends and patterns that we did not or could not think of when we constructed the questionnaire. The interviews lasted between 30 and 135 minutes; interviews were recorded, transcribed and analyzed in view of our research question, the underlying causal model, and the information we received in the open part of the interviews. We guaranteed anonymity to all our interview partners.

Finally, a financial interest disclosure-statement: The study was initially planned as a commercial study commissioned by the German-Israeli Chamber of Commerce. Upon suggestion of the Principle Investigator (PI), the Chamber of Commerce and the Hebrew University of Jerusalem agreed that the study would be conducted as a non-profit, fully academic, independent study. For this purpose, 100% of budget for this study was transferred to the Hebrew University and thereby transformed into a research grant. The budget became therewith subject to the rules and regulations of the Hebrew University (which, for example, prohibit PIs from profiting financially and in other ways personally from research grants). The Hebrew University also agreed to significantly contribute to this study through project management and monitoring functions, which it supplied, and by covering the salary of the PI. This arrangement guaranteed the total independence of the research team and of the research process from any direct commercial interests.

The research team was led by the PI Dr. Christian R. Thauer, Senior Lecturer, Department of International Relations, DAAD Center for German Studies, The Hebrew
University of Jerusalem. Noa Swisa, PhD candidate, and Griffin Elbron, MA student – both at the DAAD Center for German Studies at The Hebrew University of Jerusalem – were employed by the PI through the grant as Research Assistants.
Analysis and Findings

Why do German firms invest in Israel?
And why do Israeli firms invest in Germany?

The study finds four relevant types of (motivations for) FDI in German-Israeli business relations:

1. Consumer market access and penetration-seeking FDI (*driver/motivation 1*);
2. Public procurement opportunities-seeking FDI (*driver/motivation 2*);
3. Firm- and technological advantage-seeking FDI (*driver/motivation 3*);
4. Innovation market access-seeking FDI (*driver/motivation 4*).

The first two types, consumer market access and penetration-seeking FDI (*driver/motivation 1*), and improved public purchasing opportunities-seeking FDI (*driver/motivation 2*), fall into the broad category of horizontal FDI. Horizontal FDI refers to firms duplicating organizational functions in another country. Horizontal FDI serves the principal function of supporting sales abroad. Horizontal types of FDI thus provide for the organizational infrastructure of German-Israeli trade relations. *Driver/motivation* 1 and 2 are not affected by or linked to Israel’s rise as an IT innovation hub. They are an important (in terms of quantity of cases) but yet non-dynamic factor in Israeli-German investment relations.

Firm- and technological advantage-seeking FDI (*driver/motivation 3*), and innovation market access-seeking FDI (*driver/motivation 4*), fall into the broad category of vertical FDI. Vertical FDI refers to firms organizing different production processes in different countries. It serves the general purpose of supporting and assuring firms’ competitiveness on their main markets ‘at home’, and is also known as efficiency-seeking FDI. Vertical FDI accounts for major dynamics in German-Israeli FDI-relations. These dynamics are the result of the rise of Israel as an important innovation market – in particular in the areas of optometric technology, image recognition, cyber security, virtual (VR) and augmented reality (AR), and social network applications. Innovation market access-seeking FDI (*driver/motivation 4*) evolved as a direct consequence of Israel having emerged as world market leader in IT innovations. The
driver/motivation is highly relevant: though it has only emerged in recent years in Israeli-German FDI-relations, innovation market access-seeking FDI has brought up until today already more than half of the firms that make up the DAX 30 Stock Market Index to Israel. Firms such as Siemens, SAP, Axel Springer, VW, Bosch, BMW, Daimler AG, Deutsche Bank, Deutsche Telekom, innogy, Siemens, and many more are invested in Israel to participate in and profit from the country’s innovation dynamics. They often come with significant investment volumes, ready to spend tens of millions and in some cases even hundreds of millions of Euros on innovations in the country. *Driver/motivation 3*, firm- and technology specific advantage-seeking FDI, would – unlike innovation market access seeking FDI (*driver/motivation 4*) – also be present in Israeli-German investment relations had Israel not emerged as IT innovation hub, though to a much lesser extent. It drives FDI in the IT and non-IT related sectors. However, the emergence of a highly innovative IT sector has resulted in a dynamic development of this type of FDI: more and more, German firms with innovation market access-seeking FDI are finding opportunities to acquire firm- and technology specific advantages by investing in Israeli IT companies.

The main findings of our study are that horizontal FDI dominates in FDI flows into Germany originating in Israel. In about 90% of all cases, Israeli firms invest in Germany to access German and European consumer and public procurement markets. German firms also invest in Israel to access the consumer and public procurement market. But more and more, German-originating FDI flows into Israel are characterized by vertical FDI. Today, just about 50% of German FDI in Israel falls under the broad category of horizontal FDI – and about 50% under vertical FDI. More and more, German firms invest in Israel in order to access the country’s innovation market and acquire Israeli innovations and technologies.

A research note to assure that the following analysis is properly understood: the four driver/motivation that structure the inquiry in this section are not mutually exclusive categories – quite the contrary. In fact, many large firms make different FDIs for different reasons: some investments to improve consumer market access, others to improve their chances in public tenders, still others to profit from firm- or technology-specific advantages or to access Israel’s innovation market. Also individual investment decisions may be made for several reasons. A German or Israeli firm may, for example,
invest in the ‘other’ country to improve its chances in public tenders in a way that also generates a firm- or technology-specific advantage. Analytically, this is unproblematic: we simply documented when a “direct investment enterprise” was founded for several reasons, which was often the case. In these instances, we counted the “direct investment enterprise” as one case for each of the involved motivations/drivers – without however counting the respective cases several times in our overall case count of 87. In the following sub-sections, we will describe each of the four motivations/drivers and illustrate them with examples.

(1) Consumer market access and penetration-seeking FDI (driver/motivation 1)

"Why did we come to Israel? The decision was driven by market access (...) we recognized the potential, heard the country is growing. Not everywhere in the world one may find a country with an annual growth rate of 3.5%." -Manager of a large German electronics company with FDI in Israel.

"The firm we purchased was the number one player in our industry in Germany and in some other European markets. To enter these markets, we have always looked at it as an acquisition target, and when the opportunity opened up it was almost a natural thing to buy them" -Manager of large Israeli corporation on the acquisition of a large German market leader firm.

We estimate that among all cases of FDI between Germany and Israel about 40% are motivated by the desire to access or penetrate the market in the ‘other’ country. Consumer market access and penetration-seeking FDI is, however, a much more important motivation for Israeli FDI into Germany than for German FDI into Israel. About 80-90% of all Israeli FDI into Germany are exclusively or significantly motivated by market access concerns. Of German FDI into Israel, only about 30% are predominantly or significantly motivated by market access and penetration considerations. The lower proportional importance of this motivation/driver for German-originating FDI into Israel results from the rise of innovation and technology seeking FDI among German firms in Israel. In recent years, German FDI in Israel follows increasingly drivers/motivations 3 and 4, thus seeking firm- or technological advantages or access to the Israeli innovation market. Consumer market access-seeking FDI continues to matter, though, in absolute numbers – but its relative importance decreases due to the relative increase of cases of vertical FDI from Germany into Israel. Nevertheless, an important part of Israeli-German FDI on both sides remains motivated by the desire to penetrate further or improve access to the ‘other’ country’s consumer
market. In case of Israeli FDI in Germany, the desire is thereby often to not only access and penetrate the German market, but with it, also gain access to the EU’s internal market, and in certain instances also access to Arab markets. Israeli FDI in Germany is thus often “export-platform FDI”.17

At first sight, this finding of a strong relevance of market access and penetration-seeking FDI may seem surprising. Germany and Israel’s trade relations are governed by the European Communities-Israel Association Agreement, which entered into force in June 2000 (amended and extended for agricultural products in 2010).18 In this agreement, the European Communities and their member states on the one hand and the State of Israel on the other, grant each other’s imports preferential treatment.19 Under this treaty framework, firms’ sales in the ‘other’ country can thus in principle be organized in the form of trade (i.e. exporting) without confronting major discrimination.20 That is to say, under such a framework firms do not have to relocate, for instance, manufacturing capacities in order to become competitive in a foreign market. Levels of so-called horizontal FDI – investments abroad that reproduce organizational functions that already exist at home – are consequently low and can be expected to be low. And as highlighted in this study’s section on methods, case selection and conceptual clarifications above, many Israeli and German firms with close ties to the ‘other’ country make indeed use of the opportunity to simply import/export in a way that does not involve FDI.

Yet even under these highly favorable trade conditions, many German and Israeli firms find it worthwhile to access and penetrate the ‘other’ market with FDI. Why so? Oligopolistically-organized markets with high (non-tariff) entry barriers, for example, may factually require it from foreign firms to enter a market or increase their market

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17 Ekholm, Karolina, Rikard Forslid, and James R. Markusen. 2007. "Export-platform Foreign Direct Investment." Journal of the European Economic Association 5, no. 4: 776-795. German FDI in Israel does not follow the export-platform logic: Israel is politically isolated in its region and thus does not serve as a regional export platform.
19 Which excludes the territories occupied by Israel in the West Bank. Palestine has, however, its own separate preferential trade agreement with the EU.
share on that market through an M&A. In other instances, the expertise in the foreign country may be lacking for a successful market entry or further penetration of the products or services a firm sells, and so the firm will have to build up and invest in structures that supply this expertise. Globally operating brands may in addition want to make sure that their pricing and marketing strategies in different countries are closely aligned and coordinated and to this end decide to integrate the local importer, marketing and sales units/persons into their corporate organization through FDI. The study finds all of these specific motivations driving consumer market access and penetration-seeking FDI between Israel and Germany. Many interview partners highlighted in particular that they “wanted control over how the brand is handled and represented” – indicating that the last motivation of having a coordinated global marketing strategy triggers off the majority of firms consumer market access-seeking FDI.

Examples include the Israeli pharmaceutical company TEVA buying the German pharmaceutical firm Ratiopharm in 2010. At the time of the acquisition, Ratiopharm was the sixth biggest generics producer in the world, and a market leader in Germany and several European markets. The M&A thus granted TEVA access to and deep penetration of the German and European pharmaceutical markets, which are difficult to penetrate from outside. Henkel, a chemical firm from Germany producing shampoos and toiletries, is another example of consumer market access-seeking FDI. Henkel produces glues, laundry products, hair products and toiletries – of which some cannot be easily exported to Israel, as restrictions apply. Its activity in Israel started with the acquisition of an Israeli firm called Sod in 1996 and includes the marketing and sales of Henkel’s global products like Persil and Indola as well as local brands such as Hawaii. Furthermore illustrating consumer market access-seeking FDI originating in Germany is the example of the Würth Group. Würth supplies the Israeli market with a large variety of fasteners, chemicals, tools, and safety products. The firm owns three subsidiaries in Israel: Würth Israel, Würth Industries and the more recently founded Würth Electronics. The firm invested to access and penetrate the Israeli market already in the 1990s. Würth Israel was founded in 1996. Today it has more than 5000 long-term clients, including car importers, leading industrial factories and security plants.

21 Quote from interview with large German chemical firm in Israel.
What is the policy-maker’s perspective on consumer market access-seeking FDI? Should it be supported or discouraged? From the FDI-sender country’s perspective, market access and penetration seeking FDI is beneficial as it comes with potential increases in sales without relocation of production. This type of FDI is thus usually not associated with employment losses on the FDI-sender side. Quite to the contrary, better market access and penetration abroad may result in net job increases ‘at home’ due to overall higher sales volumes and a corresponding increase in production capacities.

From the FDI-receiver country’s perspective, market penetration and access-seeking FDI does not necessarily yield positive employment effects. By contrast, improved market access and penetration may increase the level of competition for domestic industries, and enhance the overall level of efficiency – with the potential consequence of net job losses. Market access seeking FDI is, from the FDI-receiver country perspective, also not yielding many positive effects as concerns the second advantage often associated with FDI intakes, which consist of positive spill-over effects of technologies and know-how from the investing firm onto supply chains and from there, the whole economy. In the context of market access-seeking FDI between Germany and Israel, the main R&D, engineering and manufacturing functions of the firm that accesses the market remain in the firm’s ‘home’ country. Usually, this type of FDI is as a consequence not transferring technology or expertise, and is therefore not a driver of any significant technological upgrading effects.

However, market access and penetration-seeking FDI does have other important positive effects in the FDI-receiving country: It improves the supply of consumer and industry demands for products and intermediary products. This type of FDI enters a country to smash inefficient structures, thereby driving consumer prices down and providing for a wider range of consumer choices and higher product quality. Overall, it makes a country more competitive. In particular in Israel – a small market with high consumer prices – this type of FDI should be encouraged.
“Our company has operations in about 20 countries. The main reason for these operations abroad is that governments like to buy local products, because this creates jobs in the country. If the German military, for example, buys a product of our company in Israel, it creates jobs for Israelis. But if it buys the product from the factory in Germany, it is a German product and creates jobs in Germany. All governments look more favorably at domestic producers when it comes to government contracts.” - Director of large Israeli defense corporation on the firm’s investments in Germany.

"Israel Aerospace Industries (IAI) explained in the past few days that the decision to open a branch in Berlin had been taken, among other things, following the German Ministry of Defense's decision to lease IAI-made unmanned aerial vehicles (UAVs) for more than €600 million. The company is preparing for more tenders scheduled for publication in Germany in the coming years, and the new Berlin branch will be an ‘advanced outpost’, as a senior company executive called it, for promoting the company's business in the German market, and in the European market in general.” -Globes Online. Israel Business News. “Israel Aerospace Industries will open a new branch in Berlin. Published June 21 2017.  http://www.globes.co.il/en/article-elbit-iai-target-german-market-1001193509 (retrieved 01 August 2017)

Of all cases of German-Israeli and Israeli-German FDI, we estimate that about 20% are directly or indirectly motivated by improving firms’ chances in public purchasing procedures in the ‘other’ country. This type of FDI between the two countries concerns mainly the defense industry – heavy armament and weapons systems, intelligence and military supply. Israel and Germany are strategic allies. The security cooperation between both states is extremely close22. Chancellor Angela Merkel has called Israel’s security a “reason of state”23 for Germany. There is a thriving military and security-related trade between the two countries (which however does not show in the official trade statistics). For example, Israel was the largest non-NATO non-EU country recipient of German arms exports in the first half of 2014 according to a German government's armament export interim report.24 This trade is usually organized on the basis of public tenders resulting in public purchasing contracts. Both, the tenders and the contracts themselves may ‘pull’ FDI: firstly, indirectly through contractually

determined local content or buy-back obligations; secondly, directly through the explicit or implicit threat to discriminate in the tenders against foreign operators.

As concerns the first ‘pull’ factor, government purchasing deals usually include the contractually stipulated expectation that the purchased items, technology, or services contain some proportion of local content or other forms of support for the creation of local jobs in the form of buy-back obligations. For example, according to Reuters, the 2015 Thyssen-Krupp deal with the Israeli government over four corvette warships worth about 430 million Euros committed the German shipbuilder to “buy back” Israeli goods worth about 180 million US Dollar. Often, such buy-back obligations are difficult to honor for firms, as they may not find suitable business partners and suppliers in the ‘other’ country. But they are also problematic from the government’s point of view, as they often turn out to be difficult to enforce. At the same time neither governments nor firms can entirely ignore them once they have been put in a contract. Firms are therefore often given the option to set these obligations off through FDI. FDI has the additional advantage that it allows firms to set up an organizational infrastructure (i.e. a firm that produces local content) that allows them to meet buy-back obligations more easily in the future. Yet buy-back obligations are only an indirect ‘pull’ factor, as they can in principle also be met through trade. In combination with the second mechanism, however, FDI often appears as the more attractive alternative.

As concerns this second ‘pull’ factor, bidding firms usually know that it is politically easier for policy-makers to justify and push through a deal with a ‘domestic’ company that creates and sustains jobs ‘at home’ – rather than with a foreign firm that creates jobs abroad. Through FDI foreign firms can turn themselves into domestic producers. FDI is thus a market strategy that helps foreign firms seeking public purchasing contracts to avoid formal and informal discrimination vis-à-vis domestic competitors (and to gain a competitive advantage vis-à-vis foreign competitors).

However, not all government contracts trigger off FDI. If a firm has for political or technological reasons no competitor in a bid, for example, it may not fear being

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discriminated against. We have been told that in such cases, the firm may also speculate that it can find a way around or re-negotiate its buy-back obligations once the contract is signed. These exceptions notwithstanding, better access and handling of public purchasing contracts has motivated many firms in the defense industry to come with FDI to the ‘other’ country. Examples include almost all Israeli arms systems developers and many German ones.

As concerns its desirability, this type of FDI is probably best described as a mixed blessing. On the one hand, these direct and indirect ‘pull’ mechanisms are applied for job creation at home, which is from a public policy standpoint desirable. And indeed, as concerns this type of FDI between Germany and Israel, some positive employment effects in the receiver country can be observed – though on a low level (amounting to a few thousand jobs on both sides combined). On the other hand, the danger is that through these ‘pull’ mechanisms firms are being created or sustained through FDI solely for the fulfillment of the investing firm’s contractual buy-back obligations, and to appear as a domestic firm more favorable in biddings. In the extreme case, this may mean that inefficient, non-competitive firm structures are being sustained. Such inefficiencies will inevitably be born by the purchaser, increase the costs of public procurement, and so in the end turn into an extra burden for the taxpayer.
"Getting access to Israel’s consumer market is definitely not a reason for us to invest in the country (...) it is the technology that drives our investments and when we consider to partner with Israeli firms" - Manager of a large German car company about the firm’s investment partnership with an Israeli social network application start-up.

"We were on our way to upgrade an existing product, but we could not start development because we were lacking some technology. When we were informed that this company in Germany had developed this technology, contact was initiated and we quickly came to an agreement with the owner.” - Manager of an Israeli electronics firm.

Firm- and technological advantages-seeking FDI typically takes on the form of a transnational M&A or partnership: a firm abroad is in possession of a unique technology, IP, patents, know-how and/or expertise. Purchasing or partnering with this firm allows the buyer (FDI-sender firm) to exclude competitors from this technology, IP, patents and expertise – thus to exploit a monopoly position for the time span it will take competitors to replicate this technology or knowledge, advance it or substitute it.

We estimate that of all cases of FDI between Germany and Israel about 20-30% are instances of such firm- or technology-specific advantages-seeking FDI. As in the case of consumer market access and penetration-seeking FDI (driver/motivation 1), driver/motivation 3-type FDI is unequally distributed in German-Israeli FDI-relations. It is a much more important motivation for German FDI into Israel than for Israeli FDI into Germany. 35-40% of all cases of German FDI into Israel are exclusively or significantly motivated by the investor seeking a firm- and technological advantage. As concerns Israeli FDI-flows into Germany, only about 5-10% are predominantly or significantly motivated by the investor seeking a firm- and technological advantage. The higher importance of this motivation-driver for German-originating FDI-flows into Israel results from the rise of Israel as an IT innovation hub. Many German firms look to Israel specifically for the acquisition of IT-related technologies – much more so than Israeli firms looking to Germany. In particular the rise of innovation market access-seeking FDI (driver/motivation 4, see below) from Germany increases firm- and technological advantages-seeking FDI (driver/motivation 3), as it is often made to support the firm’s search for firm- and technological advantage-seeking investments in the Israeli start-up market. The emergence of driver/motivation 4 in Israeli-German
FDI-relations, which in turn is the result of the rise of Israel as a world market leader for disruptive innovations in the IT sector, is thus partly responsible for the increase of *driver/motivation 3*-type of FDI.

Firm- and technology-specific advantage-seeking FDI, would, however – unlike innovation market access-seeking FDI (*driver/motivation 4*) – also be present in Israeli-German investment relations had Israel not emerged as IT innovation hub, but to a much lesser extent, and not dynamically growing. It drives FDI in the IT and non-IT related sectors and has always been around in German-Israeli FDI-relations. Israel has always had excellent universities and research centers, and thus a long history of producing patents and unique technologies – which at times attracted German investors. The same is of course true for the reverse case. There are a number of Israeli firm- and technological advantage-seeking “direct investment enterprises” in Germany.

Examples include Orbotech, an Israeli company that develops groundbreaking solutions for the production of printed circles. From the mid 1990's on to 2000, Orbotech had a joint venture with the East German firm Jenoptik. BMW’s cooperation with the Israeli firm Mobileye from 2011 until 2017 further illustrates firm- and technological advantage-seeking FDI. It allowed BMW to transfer key optometric technology and embed it in the regular technology of new BMW cars sold on markets worldwide. Another example is Moia, the company in the VW group that looks for new technology partners, launched in 2016, and its strategic acquisition in GETT – an Israeli mobile application developer also known as the Israeli version of Uber. GETT provides Moia with unique technology for its development of network mobility solutions in metropolitan areas. A further example illustrating Israeli firm- and technological advantage-seeking investments in Germany is the Israeli Federmann Enterprises’ acquisition of a Wafer-technology specialized firm in Saxonia in 1994, re-named thereafter Freiberger Compound Materials GmbH. This purchase is often cited as one of the rare examples of a success case of the privatization attempts of the former Treuhand Gesellschaft, which was founded to spin off the former state enterprises of the GDR during the 1990s. The technology of this East German firm is up until today unique and to be found in most modern mobile phones sold around the world.
"Here we were all aware that Israel is a very important innovation hub (...) So I came to Israel to see what is going on here on behalf of the corporation: how is the innovation ecosystem working, what are the relevant topics? I was also sent to make suggestions whether we should enter the country (...) and so the decision was made on the board level that we should be in Israel” -Manager of a large German engineering corporation.

"It's important to really get access to the ecosystem. Not only to more companies. The companies and entrepreneurs in Israel are linked, somehow connected, they are talking to each other, and they love to do business together. That is why we had to come here. To access the market and become part of it, of this ecosystem.” -Manager of a large German car firm.

Of all cases that make up German-Israeli and Israeli-German FDI-relations, we estimate that by now about 15%-20% fall into the category of innovation market access-seeking FDI. Almost 100% of the cases we identified as innovation market access-seeking FDI comprise of large German corporations as FDI-sender firms, and Israel as receiver. Also this type of FDI is thus unevenly distributed across German- and Israeli-originating FDI. We estimate that about 20-30% of all German-originating FDI into Israel is motivated by the desire of firms to access Israel’s innovation market. On the side of Israeli-originating FDI, we only found one case of innovation market access-seeking FDI.

Typically, innovation market access-seeking FDI involves green-field investments and in many cases also a partnership (facilitated through FDI) with a domestic innovation market expert organization in possession of strategic information as concerns the innovation market. The key characteristic of this type of vertical FDI is that it seeks ‘access’, which is a public good – the investing firm can thus not exploit a monopoly over it by excluding its competitors: VW’s market access, for instance, does not exclude General Motors or BMW from also accessing Israel’s innovation market. This makes innovation market access-seeking FDI a classical case of country-specific advantage-seeking FDI.

All of the firms coming with innovation market access-seeking FDI to Israel do so to be able to invest or improve their investment decisions on this market in the future. Israel’s innovation market is highly competitive on the demand and supply side, and
there are significant information advantages that can be exploited by the investment-receiver vis-à-vis the investor. Innovation market access-seeking FDI thus serves the principal purpose of collecting and accumulating information about the Israeli innovation market – to improve the situation of the prospective investor. Accordingly, innovation market access-seeking FDI is used to establish entities in the ‘other’ country (i.e. Israel) that collect information on this market, on basic (including non-market, university-based) research that will eventually spill over into this market, and that enables the investor to partner with, acquire or sponsor innovative projects and enterprises. Typically, German innovation market access-seeking firms in Israel thus set up offices with staff for these purposes, enter a sponsoring-partnership with basic research-oriented institutions (a university, institute or research lab), establish a partnership program for start ups and other firms on this market, and incorporate a venture capital-arm (VC) of the firm. All of these organizational functions are routinely kept strictly separate from the ‘normal’ organizational set-up in the firm’s ‘home’ country in Germany. While these investments are made to thereafter increase the efficiency of the firm’s specific-purpose investment decisions, not investing bears the risk that competitors who are investing may gain a strategic advantage and make the firm fall behind.

Of course, this *rationale* behind innovation market access-seeking FDI hinges upon a highly psychological factor: the belief that Israel’s innovation market is indeed producing the disruptive technologies that will shape the future of relevant industries and can therefore not be ignored. This type of FDI would not exist in German-Israeli economic relations in the absence of Israel’s rise as an IT world market leader in crucial areas (optometric technology, image recognition, cyber security, virtual (VR) and augmented reality (AR), and social network applications). The country’s transformation into the “start up nation” thus has changed German-Israeli FDI-relations quite dramatically. Who are the firms seeking innovation market access through FDI – and who does not pursue innovation market access-seeking FDI strategies? The following characteristics illuminate this question more systematically, thereby however repeating some information that has been mentioned before. Three types of FDI stand out:
Firstly, innovation market access-seeking FDI is (almost), as mentioned, exclusively German on the FDI-sender side, and Israeli on the FDI-receiver side. Israeli firms do not pursue innovation market access-seeking strategies in Germany. The conclusion thereof is however not that Germany does not have an innovation market from which Israeli firms could not benefit. Germany, with its many applied research and innovation institutions such as the Fraunhofer Institutes, is a world market leader when it comes to product optimization. The Israeli innovation market has, however, so far mainly produced firms that seek an early exit after the development of early stage innovations. And these firms are usually small in size. They thus lack the incentives and organizational capacities to pursue strategies to embed their innovations in a German mass product – and therefore do not (yet) seek innovation market access in Germany.

Secondly, so far the German firms that seek innovation market access in Israel with significant investment volumes are exclusively large corporations, such as the DAX 30 Index-companies: Siemens, Deutsche Telekom, Axel Springer, VW, Bosch, BMW, Daimler, SAP, Deutsche Bank, Munich Re, innogy, Siemens. German Mittelstand-firms – small- to medium sized, usually family-owned companies, which are the backbone of the German economy – have not done the same. Yet the conclusion that they simply do not need access to innovations would be misleading. As the mentioned large German corporations, German Mittelstand-firms are often technological world market leaders. As the large corporations, they are typically engineering-based companies, and as in case of the large corporations, so are their industry sectors rapidly changing. Also these firms future will be heavily influenced by the ‘internet of things’, self-communicating machines, cyber security concerns, and social network solutions. Thus, the same rationale for innovation market access-seeking FDI applies in their situation. Mittelstand-firms, however, lack the organizational capacities and international experience for innovation market access-seeking FDI.

Thirdly, while neither Israeli firms nor German Mittelstand-firms pursue innovation market access-seeking FDI strategies, the diversity among the large German corporations that do pursue this strategy is worth pointing out. Firms of different types and trades seek innovation market access in Israel. We suggest differentiating between three types of innovation market access-seeking firms: The first type collects firms in the IT sector. Some of these firms, such as SAP, have already years ago begun to invest
in capacities in Israel to closely scrutinize the country’s innovation market. SAP, for example, begun its presence in the country in 1998. For these firms, internationalizing their R&D and incorporating disruptive innovations comes naturally. It is their core business. These firms have learned to deal with the organizational incompatibilities that arise when a large product-optimizing firm meets a small and flexible technological risk-taker – the typical situation German firms encounter in Israel. Some of these firms’ operations in Israel are of significant size, and they told us that these operations pay off. These firms are by now often in possession of the necessary information about the market and know-how as concerns how to deal with its innovations organizationally that allows them to pursue effective firm- and technological advantage-seeking investment strategies.

The second type consists of firms from mechanical engineering sectors such as the car industry – VW, Siemens, Bosch, Siemens, Daimler, BMW. These firms are typically German in that they are product optimizers, oriented towards supplying world markets with technologically perfect products. They invest in Israel because they believe that “there is a threat: the threat comes from Apple, it comes from Google. When it comes to communicating cars or the ‘internet of things’, German firms – and not only car firms … – realize that they are less developed. They recognize the revolution the world is going through, the disruption. And they say that in Israel, the startup nation, there are solutions that can keep them at the frontline of technology, so that they can maintain their position as world market leaders.”26 For these firms, Israeli innovations are more a future than a present input factor. They have typically not (yet) transnationalized their R&D functions, and struggle to pursue effective firm- and technological advantage seeking strategies in Israel. They are often frustrated by the organizational incompatibilities that exist between small and flexible Israeli startups and large German corporations, and the start-ups’ different approach to taking risks and dealing with uncertainty. These firms usually came only more recently to Israel to access the countries innovation market, and they are in the process of learning how to make their investment worthwhile.

26 A long-time facilitator of Israeli-German economic relations, who is currently an official working at Israel's Ministry of the Economy in charge of the promotion of cross-national business cooperation.
The third type consists of financial services providers such as Deutsche Bank, Munich Re, Commerzbank or Allianz. These firms look for Fintech innovations in Israel. And they see in Israel’s innovation market a promising investment opportunity, which allows them to accumulate knowledge about possible futures of other key industry sectors in which they normally invest, such as the car industry.
Policy Advise
Correct market failure and maximize innovation complementarities

The most important finding in this study concerns the rise of innovation-seeking investments (motivation/driver 3 and 4) in Israeli-German FDI relations. Innovation-seeking FDI between Israel and Germany is driven by firms that are on the FDI-sender side predominantly German and on the FDI-receiver side Israeli; very large in size; and diverse in type, featuring IT firms such as Deutsche Telekom and SAP, car manufacturers such as VW, Daimler AG, BMW, Siemens or Bosch, electricity providers such as innogy and financial firms as, for example, Deutsche Bank or Munich Re. Today, about 50% of all German-originating direct investments in Israel fall into this category of innovation-seeking FDI. We suggest analyzing this finding with respect to its policy implications through the conceptual lens of innovation complementarities. By innovation complementarities, this study understands different capabilities as concerns the development of innovations (of technologies or products, physical and non-physical) vested in institutional ecosystems of countries (Israel and Germany, respectively) that, in the context of each other (i.e. when made interdependent), increase their value creating function (i.e. generate increasing returns).

Germany, as an asset specificity-based, coordinated (“neo-corporatist”27) market economy inspires in firms the ability to supply markets with optimized products on the basis of established technologies.28 This ability is an advantage. Many German firms are world market leaders in their industrial branch. But it is also a disadvantage, in particular in times of technological revolutions and disruption. Germany, as an institutional context, frustrates the development of ideas that are technologically path breaking and out-of-the-box. German firms are incremental innovators.29 They innovate on the basis of existing technologies. They are not disruptive innovators, and

29 Hall and Soskice 2001, see FN 10.
so have limited capacities to shape the technological changes that threaten their world market leadership.

As concerns Israel, the country’s elite military units pushing technological boundaries, high-skilled mass immigration, and a shortage of large corporations offering secure employment with social benefits and long-term career prospects to talent – all in the context of a lax regulatory regime – helped to create the “start up nation” during the 1990s. The conditions brought to life firms with the capacity to do what German firms are often not capable of: disruptive innovation.

The two countries thus expose of complementary innovation systems. Each is weak were the other one is strong. And they provide for mutually exclusive incentives on the micro-level: in Germany, incremental innovation-oriented business strategies offer top talents secure jobs with social benefits and long-term career prospects in large and medium sized corporations – at the price of disincentivizing them to take risks, think out of the box, and disrupt organizational and technological routines and paths. Disruptive innovation systems as the Israeli one provide top talents with more attractive career paths outside corporations – thereby discouraging them to scale up and optimize the technologies they have developed. The two innovation systems – disruptive (Israeli) and incremental (Germany) – are thus complementary in that one cannot have one and the other, but only one or the other. Incremental innovation requires firms of substantial size and long-term vision, and sufficient incentives for top talent to seek long-term employment with these firms. Disruptive innovation flourishes only when top talent lacks these incentives. A perspective emphasizing innovation complementarities is thus a perspective that is skeptical towards the idea that countries should learn from others’ ‘best practices’ in order to converge on an optimized global model. Instead, it emphasizes necessary trade-offs that come with any promising market strategy, differences between countries’ economic models, and the comparative advantages they give rise to.

Senor and Singer 2009, see FN 5.
From this perspective, the findings in this study are fascinating. Institutional complementarities have been extensively discussed in the domestic context.\textsuperscript{31} We find, however, that by investing in Israel to participate in the country’s innovation market, German firms create such complementarities also across countries’ economic models and innovation systems. German firms invest in the Israeli innovation market to overcome their ‘home’-made weakness, their lack of access to disruptive innovation. Thereby they do not risk or threaten their core competence and market advantage, their world market leadership as concerns product optimization developed in the context of the institutional ecosystem in their ‘home’ market in Germany. The identified types of vertical FDI associated with driver/motivation 3 and 4, firm- and technological advantage-seeking FDI and innovation market access-seeking FDI, are however not only fascinating academically, but also highly desirable from a policy perspective – for all sides involved:

On the FDI-sender side, Germany, large German corporations’ innovation-seeking FDI boosts the ability of the German economy to remain competitive in a rapidly changing technological environment. Germany is one of the few developed countries left with an industrial-workplace based employment model offering relatively well-paying, long-term jobs. This model can only be sustained if German firms remain competitive. Innovation seeking FDI serves from an innovation complementarities-perspective as an insurance against the risk of this model becoming non-competitive.

On the FDI-receiver, Israeli side, Israeli firms gain from innovation-seeking FDI by German firms access to new and additional sources of capital. Resulting is a growing Israeli innovation market offering more high-paying jobs and generating economic growth. It follows that both countries should endorse and support firm- and technological advantage- (motivation/driver 3) and innovation market access-seeking FDI (motivation/driver 4) by large German firms in Israel.

In addition to refraining from measures that could burden innovation-seeking FDI, policy should concentrate on correcting market failure. Based on the findings in our

study, we identify two such market failures as concerns innovation complementarities that should be addressed by policy. The first one relates to the fact that so far only large (German) corporations invest in an innovation complementarities-generating manner. Small- to medium sized firms – most importantly, the German *Mittelstand* – do not participate in this dynamic. *Mittelstand*-firms typically lack the resources and capacities for vertical, innovation complementarity-seeking FDI (motivations/drivers 3 and 4). Yet the conclusion that they simply do not need access to disruptive innovations would be misleading. As the mentioned large German corporations, German *Mittelstand*-firms are often technological world market leaders. As the large corporations, they are typically engineering-based companies, and as in case of the large corporations, so are their industry sectors rapidly changing. Also these firms future will be heavily influenced by the ‘internet of things’, self-communicating machines, cyber security concerns, and social network solutions. Thus, the same rationale for innovation market access-seeking FDI applies in their situation as it does for large German corporations. *Mittelstand*-firms, however, lack the organizational capacities for innovation market access-seeking FDI (motivation/driver 3) or for firm- and technological advantage-seeking FDI (motivation/driver 4). This exposes these otherwise highly competitive firms to significant market risks that should be mitigated with the support of policy programs. We therefore propose a *Mittelstandsinitiative Israel*. The proposal suggests to pool resources of *Mittelstand*-firms according to functional industry needs in the areas of optometric technology, image recognition, cyber security, virtual (VR) and augmented reality (AR), and social network applications, supported by joint German-Israeli research and public policy programs. A collective body organized, for example, under the roof of the German-Israeli Chamber of Commerce, should govern these collective direct investment funds aimed at allowing *Mittelstand* firms to access Israel’s innovation market.

The second market failure concerns the transfer of technology between Israeli startups and their German investors, which often fails due to uncertain scalability of Israeli innovations. Scalability refers to two aspects of a business model: its (mass-) market potential – whether its processes or outputs meet a significant market demand; and its ability as a processing system to handle large and growing amounts of work without diminishing the quality of the output or process. For German investor firms, scalability is often a precondition for the transfer of technology. German firms sell optimized yet
complex products on world markets. Before they adopt a new technology they want to make sure that it adds market value; does not pose any technological risks to the functioning of other product features when embedded in a complex system of interacting technologies; is stress-tested, fully debugged and reliable; and has the potential to yield scale effects (decreasing unit-fixed costs with increasing unit numbers). In other words: they need certainty that the new technology has scalability and thus contributes to the optimization of the product as concerns its quality-price-profit ratio. The Israeli startup market, however, does not usually develop technologies to this level of certainty. Israeli startups typically specialize on the early, ‘birth’ stage in the life cycle of technologies. They transform daring ideas into repeatable business models, with yet unknown markets and product features, and typically seek an ‘early’ exit soon after the prototype-stage – notable exception such as the optometric car technology firm Mobile Eye, which took a ‘late’ exit (and did scale up its business model before) notwithstanding. German investor firms that want to transfer an Israeli technology thus have to fill the gap between their needs as concerns the state of development of new technologies, and the state they find them in on the Israeli innovation market, and develop the scalability of Israeli innovations. This however requires them to continue to invest significantly in Israeli technology after its acquisition, thereby taking high risks, as most innovations are likely to fail the test and turn out not to be transferable.

Our findings show that there are some German investor firms who are willing to bear these costs of a further development of Israeli early-stage innovations. These are firms that have built up extensive organizational capacities to scale up technologies – though typically not in Israel or Germany, but in Asian countries. These capacities allow them to pick up promising early stage innovations in Israel and elsewhere (such as the US), then pass them on to operations in an Asian third country in order to scale them up, before they transfer them to central R&D in Germany for further testing. This process yields the desired effect: these firms frequently adopt fresh technologies from their Israeli startups (and startups worldwide) to improve their products.

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In many other cases, however, we found that the costs of a further development of early Israeli innovations are considered too high by the German investor firms. These German firms nevertheless continue to invest in Israeli startups to accumulate knowledge about the country’s innovation market, and to re-sell their ownership-shares after some time at a profit. But they shy away from the costs of scaling up of Israeli technologies – and so fail to transfer technology. The implication thereof is that many German firms, despite their innovation-seeking investments in Israel, do not manage to profit from the two countries’ complementary innovation systems. The risk is that these firms remain therewith ill prepared for the IT revolution that is unfolding and that they themselves anticipate to bring at one point in the future dramatic changes to their industries. We therefore propose the creation of a new R&D framework between Israel and Germany in support of innovation complementarity-seeking business strategies, under which early stage Israeli innovations are scaled up with the help of public research institutions. At the center of this framework should be a research institute modeled after the Fraunhofer Institute-principle of public-private innovation research, involving – apart from public research institutions (universities and applied research institutes) – large German corporations with innovation-seeking investments in Israel and innovators and entrepreneurs from the Israeli startup scene. The institute should be located in Israel, where firms seek innovation complementarities. It would allow German policy makers to re-orient German-Israeli research cooperation strategically towards the goal of keeping German industry at the forefront of technology in times of technological uncertainty and disruption. And it would have the positive effect for Israel of the development of a scaleup company sector, which is in other countries a main driver of job growth in the upper income segment.  

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33 Coad et al. 2014, FN 12.
Literature


Shpiro, Shlomo. 2002. “Intelligence Services and Foreign Policy: German-Israeli intelligence and military Co-operation.” *German Politics* 11, no. 1: 23-42


Appendix 1

Israeli-German trade of goods (physical entities): Israeli trade deficit since 1980

Appendix 2

Israeli-German trade of services (non-physical entities, including IT and IP): German services trade deficit (data available since 2012)

Appendix 3

Double imbalance in German-Israeli trade relations and consolidated Israeli trade deficit, 2012-2016

Source: Graph combines data from Appendix 1 and 2.
Appendix 4

Summary of the findings:
What motivates FDI between Israel and Germany?

a.) Why do Israeli firms invest in Germany?

Israeli firms invest in Germany mainly to gain access to Germany’s consumer and public procurement markets.

Drivers/Motivations: Israeli FDI in Germany

- Consumer market access and penetration-seeking FDI (driver/motivation 1)
- Public procurement opportunities-seeking FDI (driver/motivation 2)
- Firm- and technological advantage-seeking FDI (driver/motivation 3)
- Innovation market access seeking FDI (driver/motivation 4)

34 Please note with respect to graphs 4a b and c that in some cases FDI is driven by more than one motivation (see pp. 18/19 of this study for a detailed explanation). The numerical indications (e.g. 80%-90% consumer market access-seeking FDI in graph 4a above) in the graphs reflect this fact and may therefore exceed 100 in total (such as in graph 4a above), and for the same reason slightly deviate from the respective motivations’ graphically represented relative importance.
b.) Why do German firms invest in Israel?

German firms’ investments in Israel increasingly seek innovations

Drivers/Motivations: German FDI in Israel

- Consumer market access and penetration-seeking FDI (driver/motivation 1)
- Public procurement opportunities-seeking FDI (driver/motivation 2)
- Firm- and technological advantage-seeking FDI (driver/motivation 3)
- Innovation market access seeking FDI (driver/motivation 4)
c.) Aggregate Findings

*FDI between Israel and Germany seeks consumer market access, specific technologies, access to public procurement, and access to innovation markets*

Drivers/Motivations: FDI between Germany and Israel

- Consumer market access and penetration-seeking FDI (driver/motivation 1) - 15%-20%
- Public procurement opportunities-seeking FDI (driver/motivation 2) - 40%
- Firm- and technological advantage-seeking FDI (driver/motivation 3) - 20%-30%
- Innovation market access seeking FDI (driver/motivation 4) - 20%